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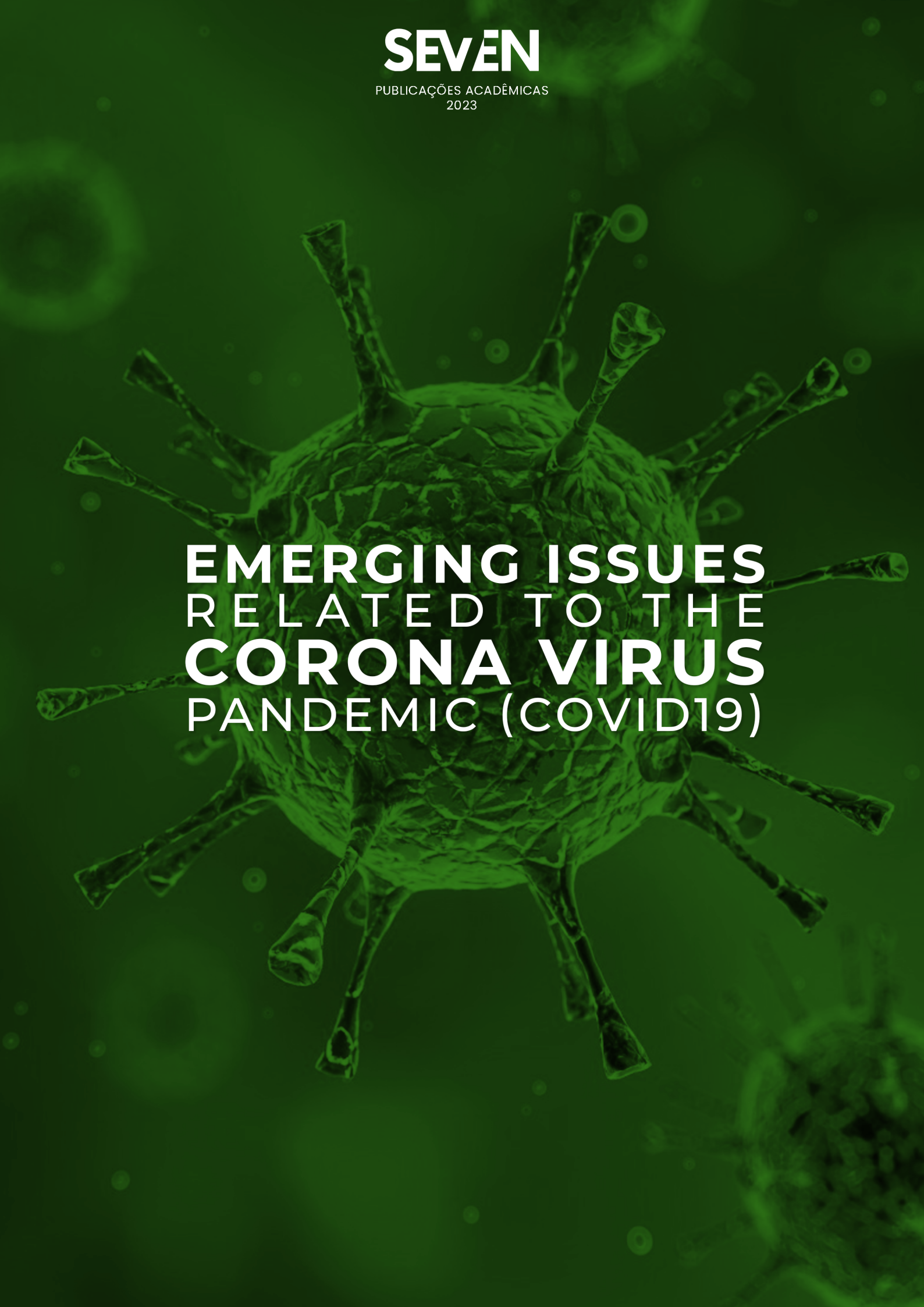

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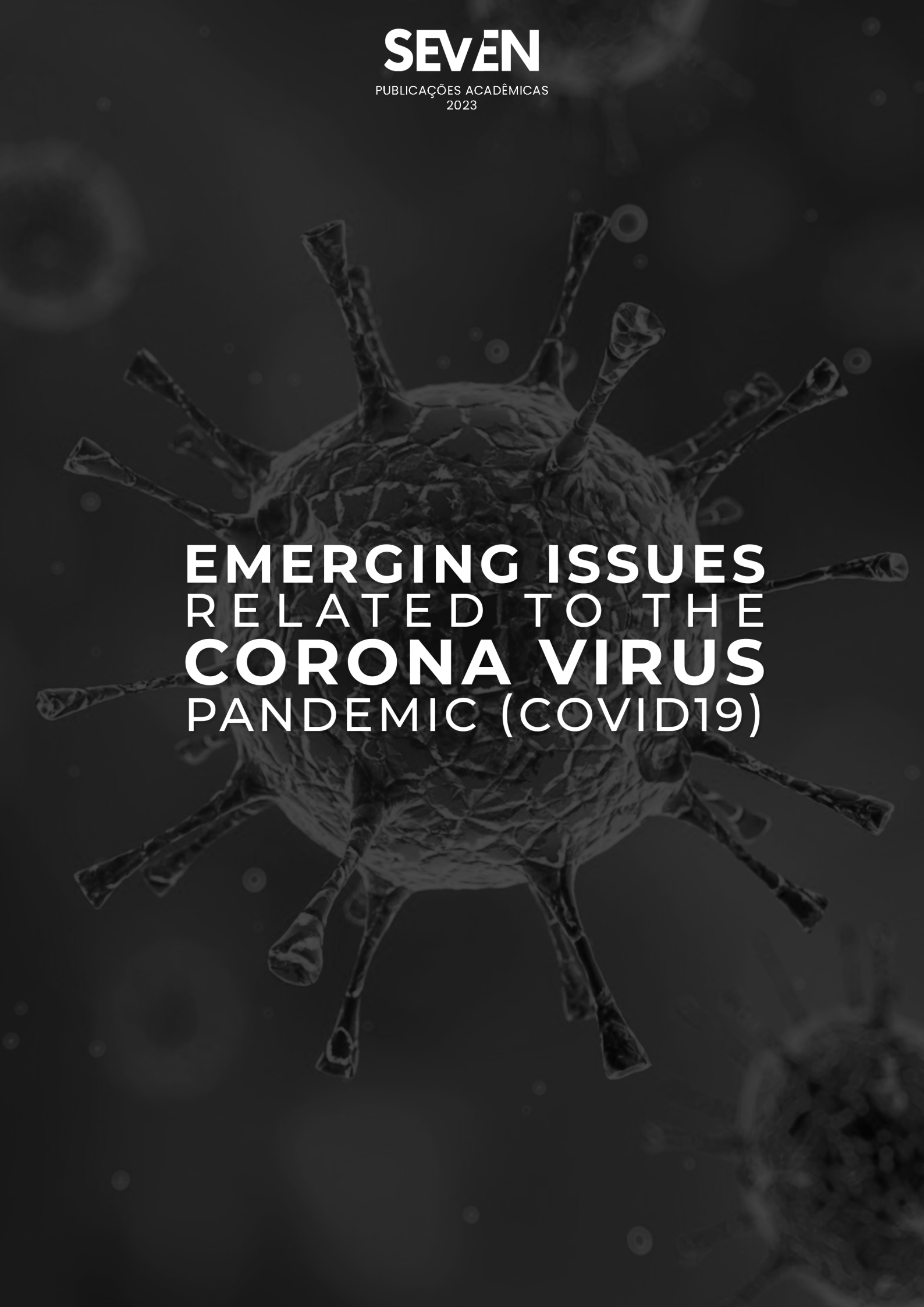

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Presentation

Dear readers,

It is with great enthusiasm that we present to you the book "Emerging Issues Related to the Corona Virus Pandemic (COVID-19)". Comprised of 71 fascinating chapters, this comprehensive work explores the challenges and emerging issues related to the coronavirus pandemic.

COVID-19, a highly contagious disease caused by the SARS-CoV-2 coronavirus, has affected the world in unprecedented ways. Since its emergence, the pandemic has brought about significant changes in our lives, public health, economy, and society as a whole. In this book, we have gathered a diverse selection of renowned experts and professionals, whose contributions provide an in-depth understanding of the multiple facets of this global crisis.

With chapters divided into comprehensive topics, each section addresses a specific area of interest and concern in the context of the COVID-19 pandemic. We explore everything from the origins of the virus, its global spread, and implications for public health, to the scientific and technological advancements that have emerged to combat the disease. Additionally, we delve into the social, economic, and ethical issues intertwined in this crisis and discuss the long-term implications across various sectors.

Public health experts provide detailed analyses of the challenges faced by healthcare systems, highlighting strategies to mitigate the spread of the virus, prepare hospitals and healthcare professionals, as well as the importance of effective communication with the public. Furthermore, researchers share the latest scientific advancements in terms of diagnosis, treatment, and vaccines, providing an updated perspective on the medical innovations being developed.

Our approach goes beyond the medical aspect and also considers the social and economic consequences of COVID-19. We discuss the impact on communities, families, and individuals, as well as the challenges faced by sectors such as tourism, commerce, education, and the job market. Ethical issues related to resource distribution and complex decision-making are also carefully explored.

"Emerging Issues Related to the Corona Virus Pandemic (COVID-19)" is essential reading for anyone seeking a comprehensive and up-to-date understanding of this global crisis. With a multidisciplinary approach, this book offers valuable insights for researchers, healthcare professionals, policymakers, students, and all those interested in understanding the challenges faced and the emerging solutions in the face of the COVID-19 pandemic.

We are confident that reading this book will provide a deeper understanding of the critical aspects related to the pandemic and inspire new approaches to addressing the challenges and emerging issues posed by COVID-19.

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CHAPTER
1

Emergency remote learning and TDIC's during the COVID-19 pandemic: Impulses and obstacles

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ABSTRACT
This article aims to report the experience of the researcher in a working group constituted to assist in the uninterrupted maintenance of the academic activities of a public educational institution during the COVID-19 pandemic. The group was constituted in a collaborative institutional effort of technicians and teachers. The researcher works in the technical staff of the institution, as a professional of Information and Communication Technology (ICT), however, also acts as a professor and researcher in the field of technologies in education. This work is intended to history the practices and activities of the group, designed and built collaboratively, focusing on the students and teachers of the institution, seeking to contribute to the existing projects of remote activities. This work portrays the effort to build and apply a set of actions that sought to reproduce, in a virtual teaching environment, the production and dissemination of content and teaching activities to integrate and link to teaching and learning actions in all units of the institution. Through free technological tools, solutions were proposed to incorporate and enrich teaching practices, as well as to promote the creation of educational policies and teacher training. The methodological basis used was that of participant research, which according to Brandão (1990) allows an active and critical positioning as being a possible intervention and search for transformation through the construction of new concepts and values from the collective dialogical-dialectical participation. It is expected that this report will have a significant impact not only on emergency remote teaching but as studies for water education grow. In the State of Minas Gerais, the "Conexão Se Liga" project has so far trained approximately 15,000 teachers, but the project is still ongoing and can serve 60,000 teachers from the state network of Minas Gerais.

Keywords: Emergency Remote Teaching, Virtual Environments, Educational Practices Interaction, Participant Research.

1 INTRODUCTION

Research in education in contemporary times is a vast and interdisciplinary space and the theories and practices that compose it are conducted by empirical reflections coming from different fields of knowledge. Of the ideas and critical research that feed the educational nature, some can be converted into educational policies, teaching practices, or teaching contents and materials and predictions. Educational research and its dynamics, when combined with technical knowledge, can provide educators with proposals for innovations and/or interventions that can contribute directly or indirectly to national education, whether as new forms of management, procedures, educational practices, materials, and means to achieve the quality of teaching.

Through the report of the experiences made of this work, the researcher is based on his studies, research, and previous practices within this theme. He speaks not only as a professional in the area of Technology but also as a teacher and researcher in the area of Distance Education and Digital Technologies in Education.

The impacts felt in the current context of the Covid19 pandemic [1]on society are enormous, in all segments, however, also in the educational context. And this unfortunate conjuncture, not only plagues national education but also afflicts the whole world, a situation and moment that become of extreme relevance and should be the object of contemporary research and discussions. It becomes impossible not to talk about this theme, due to the size and speed that this pandemic advances and about everything that has been affecting and that potentially and consequently will affect. There remain the salient questions of students, teachers, managers, politicians, and citizens: What will education look like after the pandemic?

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), the crisis caused by Covid-19 has resulted in the closure of classes in schools and universities, affecting more than 90% of the world's students (UNESCO, 2020). For UNESCO, it is the worst health crisis of the century. At this moment, it is essential to rethink social and educational policies, returning to ancestral issues related to structural inequalities, misery, unemployment, and exclusion. It is possible that a global recession could bring violent consequences in the financing of education and other public services, as well as in the forms of survival of people. The current chaotic situation is also a season of (re)learning. Socially isolated, students and teachers are physically distant, but with a great challenge and potential in the perspective of working differently and rethinking educational practices.

In Brazil, the influence of the pandemic in the 2020 educational year can be fragmented into four distinct scenarios:

The first scenario is that there was already a moment of educational crisis, in addition to the political, social and economic crisis. These are difficult especially for the most disadvantaged in a context of intense social inequalities.

A second scenario was constituted with the pandemic, which only exponentiated the situation, bringing moments of tension, uncertainty and insecurity. With the advent tof face-to-face classes, education professionals were forced to readjust their lives and practices. The migration to a phase of remote education brought to the fore controversial educational issues about conceptions of space and time, about the use of educational technologies, and about concepts of mediation, distance and face-to-face. Obscurities and uncertainties marked this phase for students, parents and educators, who

1 COVID-19 is a disease caused by the coronavirus, called SARS-CoV-2, which has a clinical spectrum ranging from asymptomatic to severe infections. According to the World Health Organization, the largest (about 80%) of COVID-19 patients may be asymptomatic or oligosymptomatic (few symptoms), and approximately 20% of detected cases require hospital care because they have difficulty breathing, of which approximately 5% may require ventilatory support. Source: https://coronavirus.saude.gov.br/sobre-a-doenca#o-que-e-covid

largely without preparation or experience in remote education were forced to learn suddenly. Inequalities and derangements emerged not only technologically, but also related to the methodologies and educational practices practiced.

Notwithstanding all the problems of a technical and/or technological nature, a new phase of challenges arose: physically and mentally overloaded teachers, demotivation and evasion of students and other factors negatively impacting the life and profession of the teacher. Among the students, gaping, socio-economic, structural, historical and cultural inequalities, limiting situations of digital exclusion or problems with access to technologies, and the need to reconcile time with work, family, and leisure. Teachers use all possible means and artifices seeking to stimulate/encourage and make the student stay in this process.

For Maia and Dias 2020, social isolation, the absence of personal contact, the fear of being infected, the lack of space at home, and the lack of snacks for the less advantaged students, were some of the stressors that initially affected the mental health of the students, as well as their families. The authors confirm that there was a significant increase in psychological disturbance (anxiety, depression and stress) among college students in the pandemic period compared to normal periods. For the authors, encouraging solidarity, resilience and close relationships and interactions with teachers and students is an extremely important approach, and can contribute to reducing the psychological impact of the pandemic not only on students but also on teachers.

At this time, not all school institutions, whether public or private, are sensitized to the situation of physical and mental limitations of teachers, students and family members. One must also consider the substantial differences between the students and the confined families. Some parents can't help their children. Other aggravating factors, such as the amount of time available to devote to their children's studies, others in remote work, fulfilling their activities at home, and still, others need to go out to work and ensure income for the survival of the family. It is also necessary to consider the socio-economic and cultural conditions of the family, the possibilities of access to online materials; the difficulty of helping the child, and the differences in how the parents learned. In addition, numerous other issues can be taken into consideration regarding the role of parents in the education of their children in times of pandemic. This whole situation will generate an increase in inequality in Education and student progress (CIFUENTES-FAURA, 2020).

For Maia and Dias 2020, despite the students, the education authorities and school managers must also preserve the mental health of education professionals, even if they are also fragile. If educators become mentally exhausted and approach physical and mental exhaustion, they cannot help themselves or their students.

Image 1 - Result of the poll "How are you feeling now, with the remote teaching" made during a training of the researcher to 137 teachers. April/2020

A third scenario begins after the realization that the pandemic would last longer than planned, the school and educators were encouraged to tinker a little more in the methodological approach. Teachers, seeking to rescue concepts of their potential, not only focused on technology, glimpsed that the biggest challenge was not only to appropriate technology but new methodologies and pedagogical practices.

It points out that a large part of the population does not have access to quality computers, cell phones or the Internet and a considerable number of teachers have had to learn to use digital platforms, insert online activities, evaluate students at a distance and produce go and insert in the platform's contents of the disciplines, and help students to use them, in addition to recorded and/or online classes (asynchronous or synchronous,[2] respectively).

It is also noticed that in addition to disadvantaged students (whether on the outskirts of large cities or in rural areas), teachers also face the lack of adequate equipment, computers or cell phones, software and good quality Internet. In addition, in the pandemic, most schools and universities seek to explore and ensure the use of digital tools, but without having the time to test them or train the technical staff, faculty and students to use them properly.

2 The Tools that allow the simultaneous participation of students and teachers at scheduled times and specific spaces (Any Place/Real Time), are classified as synchronous. Those that are independent of time and place (any place/any time) are classified with the asynchronous. Available in: <http://proec.ufabc.edu.br/uab/index.php>. Accessed 28 Aug. 2020.

2 METHODOLOGY

The methodological basis addressed was that of participant research, which according to Brandão (1990) allows an active and critical positioning, as well as an intervention and search for transformation through the construction of new concepts and values from the collective dialogical-dialectical participation. In this sense, it can be seen that this methodology allows the articulation of research extension and results in a learning process, which clarifies its importance, as well as the inseparability of the tripod: teaching, research, and extension, of an essential character in an academic institution.

The expected results were achieved mainly through the formation of a collaborative network, of dialogue, seeking the expansion of the horizons of information on technological and pedagogical issues. One can see the importance of research for the academic community, for society, and for Education as a whole. For Brandão (1990) the identification of problems and their possible outcomes can reflect on the institutionalization of action programs and add knowledge and procedures that can be used with the help of traditional or innovative techniques, as well as collaborative activities, documentary research, group dynamics, living information and active participation of the members involved.

3 DISTANCE EDUCATION AND REMOTE LEARNING

Law 9394 (LDB) in its article art. 32, determines that "Elementary education will be face-to-face, and distance learning will be used as a complement to learning or in emergencies." However, in article 80 of the same law, "distance education, organized with special openness and regime, will be offered by institutions specifically accredited by the Union." (BRAZIL, 1996)

Ordinance No. 343, dated March 17, 2020, of the Ministry of Administration, regulated the replacement of face-to-face classes by classes in digital media during the situation of Novel Coronavirus - COVID-19 pandemic, authorizing on an exceptional basis, the replacement of face-to-face courses, through the use of means and information and communication technologies, implying a distinction between distance education and remote learning. (BRAZIL, 2020)

Decree 9,057, of May 24, 1997, regulates article 80 of Law No. 9,394, of December 20, 1996, which establishes the guidelines and bases of national education.

> Art. 1 For this Decree, distance education is considered the educational modality in which the didactic-pedagogical mediation in the processes of teaching and learning occurs with the use of means and technologies of information and communication, with qualified personnel, with access policies, compatible monitoring, and evaluation, among others, and develops educational activities by students and education professionals who are in different languages and times.

And in its Article 4, it adds:

> Art. 4 The face-to-face activities, such as tutoring, assessments, internships, professional and laboratory practices, and defense of works, provided for in the pedagogical or development projects of the educational institution and the course, will be carried out at the headquarters of the educational institution, in the poles of distance education or a professional environment, according to the National Curriculum Guidelines

Thus, it is possible to establish that Remote Learning is not the model of Distance Learning (EAD), which has their regimes, regulations and characteristics. Although face-to-face activities are being provisionally replaced by remote classes, the format used is different from the traditional EAD (Distance Education) modality, in which the content is mostly asynchronous, self-instructional, with learning tracks, with the support of tutors who are professionals trained for the distance learning modality. In the case of Remote Teaching, institutions have been able to offer specific classes with remote activities, to meet the program of the disciplines planned for the face-to-face course, but with the use of synchronous or asynchronous technological tools.

4 TECHNOLOGIES AND PEDAGOGICAL PRACTICES IN EMERGENCY REMOTE TEACHING

Before starting the discussion, it is important to rethink the antagonistic view between online and distance. Remembering that the opposite of presence is absence, not distance. Thus, it is necessary to reflect on the fact that it is possible to think of an online proximity, recognizing in virtual spaces a possibility of a community of exchanges, of practices. Bouchard (2000) points out that the concept of proximity permeates traditional concepts of space, and in an educational perspective, can be understood in the educational act, face-to-face or at a distance. Face-to-face education may also be possible through hypermedia resources. For the author, the breadth of distance through the epistemological perspective and the respective pedagogical approach can be considered by how it separates or brings together teacher and student.

> "There is a set of aspects that indicate coherence with the epistemological conception that interfere in the distance and communicational direction created between teacher and students, which are present both in face-to-face education and in distance education. Distance, which can distance or bring people together, refers to pedagogical mediation, being designated by Moore as "transactional distance", whose amplitude can be measured by the level of educational dialogue that can vary from low to frequent and by the degree of the variable structure between rigid and flexible" (Bouchard, 2000, p. 76).

With the ease of access and use of digital technologies, enhance ond learning and the student is the active subject in the process, based on interaction and collaboration. For Kensky (2005)

> Just as each teaching modality requires the differentiated treatment of the same content - according to the students, the objectives to be achieved, the space and time available for its realization - each of the media supports has specific care and forms of treatment that, when used, change the way education is given and how it is done (KENSKY, 2005, p.1-2)

Thus, when it comes to the use of technologies in educational projects, our imagination articulates us directly to the newest digital technological opportunities of information and communication, that is, the internet and all its developments and innovations. However, it is possible to also think about the use of so many other forms of technologies (still in force) such as the use of television programs, movies, radio, the newspaper and all forms of printed media etc. – even if known and used in teaching activities, including chalk and the blackboard. For Kenski (2003)

> "It's not the technologies that are going to revolutionize teaching and, by extension, education as a whole. But the way this technology is used for mediation between teachers, students and information. This can be revolutionary, or not. The processes of interaction and communication in teaching have always depended much more on the people involved in the process, than on the technologies used, be it the book, the chalk or the computer and the networks." (Kenski, 2003, p.121)

Freitas (2006) points out that new technologies appear in the educational context slowly, with the school culture still stuck to rites, and with resistance to welcoming the new.

> [...] a new school organization more decentralized, a curriculum the most flexible, the installation of new school times, less rigid and scheduled, changes in the very space of the classroom. And this does not happen overnight: it requires time, specific aids, incentives, and a whole support structure (FREITAS, 2006, p. 197).

The assertions of Libâneo (2003) present a freshness in the contemporary situation, when he already defended the need for the education professional to adjust his didactics to the new realities of society, the valorization of the knowledge built by the student in the evaluations, of the different cultural universes, of the present media, given the existence of:

> [...] of a broader general culture, the ability to learn, competence to know how to act in the classroom, communicative skills, mastery of informational language, knowing how to use means of communication and articulate classes with media and multimedia (LIBÂNEO, 2003, p. 10).

Just as each teaching modality requires the differentiated treatment of the same content, focused on the reality of the student and the objectives to be achieved, the space and time available, the media resources, the care and forms of treatment to be used, form among themselves a particularized form of the way education is given and how it is done

5 EXPERIENCES AND ACTIONS AS A WORKING GROUP

Due to the situation of the coronavirus disease (COVID-19) pandemic, declared by the World Health Organization (WHO), the institution of the researcher through ordinance 645/2020, to maintain uninterrupted school activities, in an institutional effort to maintain remote activities, as well as reduce the impacts arising from social isolation instituted a working group. It aimed to discuss and define guidelines, standards, and technological solutions to support remote activities, as well as to support the operationalization of these guidelines and standards by users.

Through a collaborative format, some actions were established that were well accommodated and brought a positive impact to teachers, students, and the community, establishing some standards and technical guidelines to support remote activities and the enhancement of successful practices shared by the units that make up the institution. Moran (1998, p. 185) states that:

> Our focus cannot remain only individual, but must also be directed to the community, to the important groups in which we participate. The more we can insert ourselves in spaces of community action, the more we will grow, learn, and live. Within this perspective of personal and community integration, we will find in technologies.

To assist those involved in the creation and consumption of teaching objects that will be used during the period of validity of the emergency plan, the working group established technical-pedagogical guidelines, aiming to enhance the achievement of the expected results, considering the limitations imposed by the situation of exceptionality, and standardizing what was possible in institutional teaching activities. Among these actions, the following stand out:

1. The sharing of materials between professors of the same disciplines among the units of the institution, through the Moodle collaborative environment;
2. Elaboration and dissemination of video tutorials to students, also taking into account the aspects that some students did not have or had limited access to the Internet so that their use should be optimized as much as possible. Elaboration of tutorials to teachers, with tooltips and considerations In this sense, the following suggestions are made to content creators:
3. Encourage and plan possibilities of assistance among students, to contribute to those with difficulties of access, or with learning difficulties.
4. Differentiated strategies for generating and delivering content to the class.
5. Assistance to teachers in planning the integration of synchronous and asynchronous activities, taking into account that activities that require simultaneous participation by students represent an important mechanism for teaching, but at the same time consume technological resources that may not be available to everyone at all times. Synchronous

video activities require student bandwidth and low latency. Depending on the situation, the student may not have a data franchise available at the time, or the connection is delayed, generating interruptions in audio and video. Therefore, these activities should also be made available through recordings for those unable to participate.

6. In presentations at video conferences, prioritize the use of objects that are easily visible to students, who may be experiencing instability or poor quality in the video, which results in low video resolution.
7. Whenever possible, make the presentations available for download by the student before the beginning of the activities. In the same way that downloading the teacher's video in real-time consumes Internet resources, sending the student's video in real-time is equally costly. Whenever possible, make it optional for the student to participate with video in the conference.
8. Guidance on appropriate forms of recording, seeking special attention to audio quality and availability of headphones with built-in microphones.
9. Recording of lessons and availability in advance. Thus, students can assist them with their possibilities and participate later in the discussions.
10. Considering the need to standardize the means of interaction with students, the institution promoted several pieces of training in the use of *Google Classroom and Moodle* as content and communication platforms. The units that chose to use other tools also received training.
11. Community program for the donation of equipment;
12. Institutional program of monthly assistance to disadvantaged students for hiring internet links or cell phone chips with a mobile data plan.
13. Support groups and knowledge-sharing experiences with teachers of the institution were formed. Some groups have been formed through the WhatsApp app to share ideas and successful experiences.
14. Virtual training with approximately 400 teachers of the institution:
15. Virtual training with approximately 60 thousand teachers and education professionals of the State of Minas Gerais, through an agreement between the institution and the state government, to present to teachers/education professionals in the state of Minas Gerais, ideas, actions, practices, teaching methodologies to be applied in teaching in this period of pandemic caused by COVID-19.
16. For teachers and education servers in the State of Minas Gerais, 7 free virtual webnários were offered and open to embroidering the challenges of implementing Emergency

Remote Teaching in face-to-face classes with valid participation certification as Initial and Continuing Education to teachers:

1. Remote Education in Times of Pandemic
2. Assertive Communication for Technology-Mediated Education
3. Lesson Plans for Remote Education
4. Evaluation in Distance Education
5. Active Methodologies for Distance Learning
6. Pedagogical Sequence Applied to Online Teaching
7. Google Classroom.

Image 2 - Presentation screen during the first round of training for teachers in the State of Minas Gerais, through the program "Conexão Se Liga" presented by the researcher to 2800 teachers present - Agostol/2020

During the training rounds, there was a concern to offer, even through a virtual environment, a little support for emotional health, enabling proximity to teachers. Prado and Valente (2002) assert that participating in a digital environment is close to being together virtually since acting in an environment means expressing thoughts, making decisions, dialoguing, exchanging information and experiences, and producing knowledge. Interactions through the resources available in the environment provide individual exchanges and the constitution of collaborative groups that interact, discuss problems and themes of common interests, research and create products at the same time as they develop.

For the authors, Prado and Valente (2002, p. 29) the approaches to distance education through ICT can be of three types: broadcast, virtualization of the classroom in person, or being together virtually. In the *broadcast approach*, technology is used to "deliver the information to the student" in

the same way as occurs with the use of traditional communication technologies such as radio and television.

The virtualization of the classroom occurs when the resources of the networks are used in the same way as the classroom, which seeks to transfer to the virtual environment the paradigm of space-time of the class and two-way communication between teachers and students. This approach is the closest to the remote learning model, which does not rule out the use of the other two approaches.

Virtual being together, also called technology-assisted learning, explores the interactive potential of ICT favored by multidimensional communication, bringing students and teachers closer together, and allowing the creation of learning and collaboration conditions.

However, it is necessary to understand that it is not enough that students are inserted in the digital environment, nor can they admit that access to hypertexts and multimedia resources account for the complexity of educational processes, but for meaningful interactions to occur and the content to be appropriate, the teacher must perform appropriate interactions and measurements, what it means to reinvent oneself, as Kensky (2003) asserts

> The teacher, in a networked world, is a tireless researcher. A professional who reinvents himself every day, who accepts the challenges and unpredictability of the time to improve himself more and more. Who seeks to know himself to define his paths, at every moment. (2003, p.90).

On the technological aspects, Kensky (2007, p. 120) also announces that:

> What can be affirmed is that other languages, resources and methodologies must be permanently incorporated into the school environment, among them the technologies stand out [...]. New hybrid and interactive ways of using digital technologies incorporate all types of devices that have a small screen and transform them, also, into virtual spaces of networked learning. Through these screens, whether from televisions or wristwatches, students can interact with teachers and peers, talk, and perform educational activities together.

6 FINAL CONSIDERATIONS

For UNESCO, it is essential that the global crisis be addressed through solidarity, empathy and appreciation for the human being, and that in the future, it can provide a reflection on the fundamental lessons of the past, necessary to mitigate the negative effects of the disturbances caused in our lives. COVID-19 does not discriminate, but it redefines reality. It is essential to reflect on the future of Education, including an articulation between distance education and face-to-face teaching (Hybrid Teaching).

In our view, in addition to thinking about school and teaching, it is essential to think about the other. Provide the reception even if virtual, and maintain the bond and the care. Thinking about school in this context is thinking about interactions, always being attentive to emotional issues, valuing the

experiences of the other, and openness and responsibility towards the other. The important thing now is to preserve life and to be together in a commitment to our students and community

In addition to the need for technological fluency for interactions to be consolidated, especially in this time of the pandemic, we must think about the future, the need for an efficient and intrinsic connection between remote education, face-to-face education, distance education, literacy and digital inclusion, remembering that all are forms of education. Not that one can be a substitute for another but as a complement to another.

Let us also think about the need to work on the development of skills related to literacy and digital inclusion so that students can have more access to non-face-to-face training. It is observed that there are interactive digital learning environments capable of promoting the development of the expression of thought, allowing the student the opportunity to discuss, express himself freely, and develop individual and group productions of quality.

Finally, with the pandemic new (re)learning is emerging, overcoming the focus only on the content, the product delivered or the task, but in the process of what is being produced, be seen from a learning point of view. The group witnessed many positive situations and many encouraging reports. Teachers manage to give shows of classes, creative and attractive, awakened leadership in students, promotion of collective work, stimuli to the protagonism of the student, respect for diversity and individuality, collaborative productions and sharing of knowledge. Teachers also reported greater ease of articulation, using formative and in-process assessments, the use of more motivating dynamics to the student's activity/production based on active methodologies, more meaningful learning for the student and the use of technologies with more responsibility.

In conclusion, we realize that collaboratively, with the contributions of new technologies, and with planning and action, we can learn a lot from this crisis and evolve in search of quality education, taking advantage of the richness of each modality, promoting new educational policies, and thus, be able to democratize access to education, forming conscious and critical citizens transform Education in Brazil and the world.

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CHAPTER
2

Physical therapy in female urinary incontinence in times of COVID-19 pandemic: A contemporary proposal

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ABSTRACT
Introduction: Urinary incontinence is defined as a multifactorial urogynecological disorder, of high incidence, and physiotherapy is one of the main treatments indicated. Group therapies, in turn, are viable to reduce the lack of care and demonstrate good cost-effectiveness, in addition to promoting autonomy and integration among subjects, resulting in good results, when correctly indicated. Objective: to verify the effect of a group follow-up for urinary incontinence on the variables; sexual satisfaction, sleep quality, and body perception. Method: This is a case series study that followed 5 participants, mean age of 50 years, urinary losses on exertion and urgency, assessed for sleep quality (Pittsburgh Sleep Quality Index), sexual performance (Female Sexual Function Index) and body perception (Body Image Scale). The intervention consisted of 10 sessions of remote, synchronous, group physiotherapeutic telecare, based on kinesiotherapy associated with fast and slow pelvic floor fiber contractions. Results: From this intervention model, a slight worsening of sexual performance was observed, general improvement of all patients in the sleep quality variable, and significant improvement in body perception were observed. Conclusion: The FSFI Sexual Satisfaction Index showed post-intervention worsening, showing improvement only in Desire. The Pittsburgh Sleep Quality Index showed an improvement in the population's sleep quality after the intervention, but it was not enough to differentiate in the final scale. There was little suffering with the image after the physical therapy intervention using the Body Image Scale, with no significant changes with the pre-intervention result.

Keywords: Urinary incontinence, Physiotherapy, Telemonitoring.

1 INTRODUCTION

Urinary incontinence (UI) is a pathology that is characterized by the inability to control urination for various reasons such as obesity, parity, smoking, menopause and gynecological surgeries. It is estimated that about a quarter of women end up developing this condition at some point in their lives (IRBER; MARTIN; FRIGO, 2016).

Fragility in the pelvic floor is a relevant factor for UI since it is a musculature composed of muscle fibers of slow contraction or type I and fast or type II, where 70% of the total is of slow contraction and responsible for the maintenance of tone, being worked with voluntary contraction; the other 30% are of rapid contraction, that is, low resistance (BERNARDS *et al.*, 2000).

When we talk about UI we can classify it into four types: stress urinary incontinence (SUI), caused by hypermobility of the urethra or some type of sphincter deficiency; urge urinary incontinence (UUI) that is associated with an uninhibited contraction of the detrusor muscle; mixed urinary

incontinence (MUI), characterized by the combination of the two types mentioned above; and overflow urinary incontinence (IUT), very common in elderly and debilitated patients who do not pay attention to voiding (IRBER; MARTIN; FRIGO, 2016).

The treatment of first choice indicated since 2005 by the International Continence Society is physiotherapy, however, few public services provide this treatment adequately, either by the cost or by the lack of knowledge of the patients about the treatment, so group care comes to cheapen public spending and promote health in an accessible way (CAIXETA NETO *et al.* , 2018).

Health promotion comes as an alternative to transform actions to improve living conditions, just as collective work arises with the idea of greater participation and interaction of patients with the same pathological complaint, so a positive and expanded view of health is necessary, making the treatment environment a place focused on lifestyle and distinct characteristics of the population to be treated (SILVA *et al.*, 2008).

Group practices allow the participation of the population in their comprehensive care according to their specific needs, agreeing with what is recommended by the SUS and its principles of universality of access, integrity of care and social control (RASERA; ROCHA, 2010).

A pelvic floor with reduced or inadequate function is a relevant etiological factor in the occurrence of UI and the physiotherapeutic treatment results in the strengthening of the muscles promoting urinary continence (BERNARDES *et al.*, 2000).

The fear of being in public and having an episode of urinary loss causes patients to have a certain tendency to social isolation, as well as sexual difficulties, sleep changes and quality of life. Thus, there is a decline in self-esteem and several symptoms and associated diseases appear as irritability, anguish and depression (CARVALHO *et al.* , 2014).

The impairment of physical, emotional, social and sexual well-being brings to patients with urinary incontinence a strong impact on their quality of life. It is estimated that, in the world, 200 million people suffer from this disease, bringing an annual cost of more than 26 billion dollars to the public coffers of different countries (SANTOS *et al.* , 2009).

The patient's fear of seeking a health service to treat UI causes the signs to worsen greatly until the arrival at the specialized health service, being necessary, in this context, a surgical intervention, increasing the expense for the Unified Health System, so the importance of health promotion and collective work with this population (IRBER; MARTIN; FRIGO, 2016).

Considering the demands of the Unified Health System (SUS) corresponding to the impairment of the female urinary system, the proposal of collective care aiming at the collective health and well-being of patients affected by urinary incontinence arises, using conservative and low-cost methods (MAGALHÃES; COAST; RODRIGUEZ, 2018).

In the past, only surgical treatment was recommended for patients suffering from urinary incontinence. Nowadays we have treatments based on behavioral therapy, pelvic floor muscle exercises, electrostimulation, vaginal cones and biofeedback (OLIVEIRA; GARCIA, 2011).

Individual care brings to the patient affected by urinary incontinence, at first, a sense of welcome and directly interferes in treatment adherence, causing the patient to react positively to the interventions made by the physiotherapist (OLIVEIRA; GARCIA, 2011).

However, group physiotherapeutic care is efficient in several diseases, because it enhances the capacities of individuals, helps to develop autonomy and copes with the suffering involved in the natural process of the disease. To minimize the gap of the existing care shortage in public health, this type of care is configured as a viable possibility, because it contemplates a greater number of patients through a better cost-benefit for the service, being performed with two or more patients who have a similar degree of functional capacity (OLIVEIRA; GARCIA, 2011).

Treatment with electrical stimulation can increase intraurethral pressure through direct stimulation of efferent nerves to the periurethral muscles, but also increases blood flow to the pelvic floor reestablishes neuromuscular connections and improves the function of the muscle fiber, hypertrophying it and modifying its pattern of action with the increase in the number of fast muscle fibers. However, due to the differences in parameters and forms of evaluation, the results of electrostimulation are conflicting with a cure rate between 30 and 50% and clinical improvement of 6 out of 10 patients. Studies indicate that for a promising result, electrostimulation must be married to other forms of treatment, also cited in this work (SANTOS et al., 2009).

Vaginal cones represent a simple and practical way to identify and strengthen the pelvic floor muscles, using the principles of biofeedback. The cones are devices of the same shape and volume, with weights ranging from 20 to 100 g, depending on the manufacturer, numbered increasingly. The evaluation consists of identifying which cone the patient can retain in the vagina for one minute, with or without voluntary contraction of the pelvic floor muscles (active cone or passive cone). Vaginal cones are particularly indicated in mild and moderate cases of stress urinary incontinence, with success rates ranging from 14 to 78% (SANTOS et al., 2009).

Biofeedback is a device that aims to measure the action potentials of pelvic floor muscle contractions, translating through visual signals which muscle group is being worked. Thus, it provides the awareness of the muscles and consequently the potentiation of perineal exercises (SILVA et al., 2014).

Regarding behavioral therapy (CT), studies emphasize that it can be introduced even if incontinence is not in its initial phase. This means that with CT it is possible to avoid a surgical

intervention. The great advantage is that CT has minimal side effects and does not preclude future surgical treatment if necessary (CALDAS et al., 2010).

Pelvic floor kinesiotherapy has determined the improvement or cure of several patients with lasting effects for more than five years. It comprises in the training of the pelvic floor muscles, which aims to work on strengthening the muscles for the treatment of hypotonia, strengthening the urethral resistance and improving the supporting elements of the pelvic organs (OLIVEIRA; GARCIA, 2011).

Another relevant point is the low cost and ease of performing kinesiotherapy of the pelvic muscles, because it does not require specific and high-cost instruments, kinesiotherapy can be performed by the patient herself at home, with intervention and prior demonstration of a professional, as well as with self-explanatory booklets and groups of patients, where the group itself is made as a form of stimulation and adherence to treatment (BIRTH; RIBEIRO, 2018).

Given all the aspects mentioned above, it is of fundamental importance to make women aware of the need for treatment, as well as to inform the benefits that it can bring to the quality of life of those who suffer from UI (CAIXETA NETO *et al.* , 2018).

Thus, the objective of the present study was to verify the effect of a group follow-up for urinary incontinence on the variables; sexual satisfaction, sleep quality and body perception.

2 METHODOLOGY

This is a case series study, which, according to the literature, is characterized by comprising 3 to 10 cases. It is a type of observational study that analyzes the objectives for further evaluation and sensitization.

The study included 5 women, aged 37 to 61 years, with symptoms of urinary loss for at least 6 months. Participants who had already had individual care, with knowledge of the perineum muscles, and had at least grade 3 strength assessed by the AFA (Pelvic Floor Functional Assessment) were included.

The project was approved by the Ethics and Research Committee of Universidade Presbiteriana Mackenzie under CAEE number 80676517.6.0000.0084 and opinion: 2.488.109, and after approval and free informed consent of the participants, we started data collection.

The evaluation and reassessment were done via *Google Forms* containing questionnaires about sexual satisfaction, sleep quality and body perception. In addition to a form containing basic information, history of the current disease, history of previous disease, behavioral habits, daily fluid intake and gynecological and obstetric history.

For the evaluation of sexual function, the Female Sexual Function Index (FSFI) was used and its main proposal is to evaluate the female sexual response in six domains: 1) sexual desire; 2) sexual

arousal; 3) vaginal lubrication; 4) orgasm; 5) sexual satisfaction; 6) pain. It consists of 19 questions that assess sexual function in the last 4 weeks, whose options receive a score from 0 to 5 in an increasing way, except for the questions about pain, where the score is defined in an inverted way. A final score is presented at the end of the application, from the sum of the scores of each domain (PACAGNELLA; MARTINEZ; VIEIRA, 2009).

To assess sleep quality, the Pittsburgh Sleep Quality Index (SPQI) was used, which consists of 19 items, grouped into seven components scored from 0 to 3. Its components are, respectively: 1) the subjective quality of sleep; 2) sleep latency; 3) sleep duration; 4) the habitual efficiency of sleep; 5) sleep alterations; 6) the use of sleep medications; and 7) daytime dysfunction. The scores of the seven components are added together to give an overall IQSP score, which ranges from 0 to 21 and the higher the patient's sleep quality, the worse (CHELLAPPA; ARAUJO, 2007).

The patient affected by UI may also suffer changes in her body image, to measure the degree of this possible body distortion we will use the Body Image Scale (BIS), composed of 10 items to measure affective, behavioral and cognitive symptoms of body image. Each item receives a score from 0 to 03 (0 "nothing" and 03 "a lot"), which together generate a final score from 0 to 30, with a higher score being a higher level of body image disorder (MELISSANT *et al.* , 2018).

The service was performed via the online platform Zoom, with all patients present, synchronous care, for 4 months, once a week, totaling 10 sessions, lasting 60 minutes each. This type of care had as its proposal the social conviviality in times of pandemic and engagement of the participants in the treatment.

As a conservative treatment protocol, kinesiotherapy was used, with exercises that promoted pelvic mobility, stretching and strengthening of the global muscles and metabolic exercises, all associated with fast and slow pelvic floor contraction, as well as functional activities.

The participants were guided at the end of the sessions about the pathology, fluid intake and consumption of foods that may affect the condition, as well as exercises that can be reproduced at home during the week and possible doubts resolved.

At the end of the 4 months of care (10 sessions), all patients were reassessed and the data were compared with each other. These data were analyzed and presented descriptively.

3 FINDINGS

Initially, 20 women with a mean age of 54±9.18 years, with complaints of urinary legs of effort and urgency, participated in this project. However, 15 patients were excluded for more than 03 absences in online care or for not completing the evaluation and/or reassessment data, which led the

study to end with 5 participants with a mean age of 50.4±8.21 years and 80.8±16.48 Kg/^{m2}, presented descriptively below.

3.1 PARTICIPANT 1

V.M.J.A, 46 years old, from home, complete elementary school, 78kg, does not undergo medical follow-up, denies smoking, elitism, hypertension and nephropathies. Multiparous with 3 pregnancies, with 2 normal deliveries and 1 cesarean section, denied the use of hormones or hormone replacement.

In the pre-intervention, the patient presented a total FSFI score of 25.8, with the best points in the variables Lubrification, Orgasm and Pain. In the post-intervention, an overall score of 24 was observed with a decrease in the variables Desire, Arousal and Lubrication (Table 1).

Table 1: Data of Participant 1 regarding the FSFI.

	I wish	Excitement	Lubrication	Orgasm	Satisfaction	Pain	Score
Pre	3,6	3,6	5,4	4,4	1,6	7,2	25,8
Post	3	3,3	4,5	4,4	1,6	7,2	24

The Pittsburgh Sleep Quality Index (PHEI) indicated in the initial evaluation of the patient's poor sleep, with an overall score of 5, with the worst score in Sleep Disorders, with a score of 2 out of 3. In the post-intervention there was a slight worsening of 1 point in the overall score, adding 6 points and classifying in poor sleep, without relevant changes (Table 2).

Table 2: Data of Participant 1 regarding the IQSP.

	Quality	Latency	Duration	Efficiency	Disorders	Medication Use	Dysfunction	Score	Classification
Pre	1	1	1	0	2	0	0	5	Poor Sleep
Post	1	1	1	1	2	0	0	6	Poor Sleep

The Body Image Scale (BIS) had an initial score of 1 point, indicating little suffering of the patient with the image. In the post-intervention, an increase presented a score of 3, indicating little suffering with the image (Table 3).

Table 3: Data of Participant 1 regarding BIS.

	1	2	3	4	5	6	7	8	9	10	General	Classification
Pre	0	0	1	0	0	0	0	0	0	0	1	Little Suffering
Post	1	0	1	0	0	0	0	0	0	1	3	Little Suffering

3.2 PARTICIPANT 2

A.C.V, 54 years old, accountant, complete higher education, 100kg, performs medical follow-up, denies smoking, elitism, hypertension and nephropathies. Primiparous of cesarean delivery, reports hormone replacement with Levothyroxine 175mg.

The patient presented a pre-intervention total FSFI score of 14.6, with the worst points in the variables Arousal, Lubrication, Orgasm and Pain.

After the intervention, an overall score of 13 was observed in the FSFI with a significant drop in variable Satisfaction (Table 4).

Table 4: Data of Participant 2 regarding the FSFI.

	I wish	Excitement	Lubrication	Orgasm	Satisfaction	Pain	Score
Pre	5,4	1,2	1,2	1,2	4,4	1,2	14,6
Post	5,4	1,2	1,2	1,2	2,8	1,2	13

The Pittsburgh Sleep Quality Index (PHEI) showed an overall score of 9, showing poor sleep of the patient, with the worst results in the variables; Sleep Latency, Sleep Disorders and Dysfunction during the Day.

The Pittsburgh Sleep Quality Index had an improvement accounting for a total of 4 points in the overall score, classifying subject 2 as good sleep (Table 5).

Table 5: Data of participant 2 regarding the IQSP.

	Quality	Latency	Duration	Efficiency	Disorders	Medication Use	Dysfunction	Score	Classification
Pre	1	3	0	0	2	1	2	9	Poor Sleep
Post	0	1	0	0	2	0	1	4	Good Sleep

The Body Image Scale (BIS) had an initial score of 18 points, indicating moderate suffering with the image. An exponential improvement was observed in the Body Image Scale, where the final overall score was 0 indicating, indicating little suffering with the image (Table 6).

Table 6: Data of Participant 2 regarding BIS.

	1	2	3	4	5	6	7	8	9	10	General	Classification
Pre	3	1	3	1	2	3	2	1	3	0	18	Moderate Suffering
Post	0	0	0	0	0	0	0	0	0	0	0	Little Suffering

3.3 PARTICIPANT 3

C.N.M, 37 years old, data operator, complete high school, 95kg, performs medical follow-up, makes use of Amitriptyline and Venalot, denies smoking, elitism, hypertension and nephropathies. Nulliparous, denies use of hormones and hormone replacement.

The patient presented a pre-intervention total FSFI score of 28.2, his best score in the variable Excitation. After the intervention, an overall score of 30 was observed with a slight improvement in the variables Desire and Orgasm (Table 7).

Table 7: Data of Participant 3 regarding the FSFI.

	I wish	Excitement	Lubrication	Orgasm	Satisfaction	Pain	Score
Pre	4,8	5,4	4,8	4,8	4,4	4	28,2
Post	5,4	5,4	4,8	6	4,4	4	30

The Pittsburgh Sleep Quality Index (SPQI) indicated a sleep disorder with a final score of 19, the patient scored maximum on all variables, except Sleep Disorders and Dysfunction during the day. Sleep quality had an improvement accounting for a total of 13 points in the overall score, where it still classifies subject 3 with sleep disorder. However, there was a significant improvement in the variables Duration and Habitual Sleep Efficiency (Table 8).

Table 8: Data of participant 3 regarding the IQSP.

	Quality	Latency	Duration	Efficiency	Disorders	Medication Use	Dysfunction	Score	Classification
Pre	3	3	3	3	2	3	2	19	Sleep Disorder
Post	3	3	0	0	2	3	2	13	Sleep Disorder

The Body Image Scale (BIS) had an initial score of 16 points, indicating moderate suffering with the image. The scale did not show a significant improvement with a final score of 15, maintaining a moderate suffering with the image (Table 9).

Table 9: Data of participant 3 regarding BIS.

	1	2	3	4	5	6	7	8	9	10	General	Classification
Pre	3	2	2	1	0	0	0	2	3	0	16	Moderate Suffering
Post	2	2	3	2	1	2	0	1	2	0	15	Moderate Suffering

3.4 PARTICIPANT 4

M.L.O.S, 54 years old, maid, incomplete elementary school, 61 kg, performs medical follow-up, reports use of Hydrochlorodiazide, denies smoking, elitism and nephropathies, reports hypertension. Multiparous of normal delivery, denies use of hormones.

It presented a total FSFI score of 29.1 pre-intervention, being its best score in the variables Lubrication and Orgasm. After the intervention, an overall score of 30.2 was observed with an improvement in the variables Arousal, Orgasm and Satisfaction (Table 10).

Table 10: Data of participant 4 regarding the FSFI.

	I wish	Excitement	Lubrication	Orgasm	Satisfaction	Pain	Score
Pre	4,8	4,5	6,6	5,2	2,4	5,6	29,1
Post	4,2	5,4	6,6	5,6	7,2	5,6	30,2

The quality of sleep qualified by the Pittsburgh Sleep Quality Index (IQSP) indicated poor sleep with a final score of 9, indicating only the variable sleep disorders with a score of 2, classifying the patient as having good sleep. Sleep quality improved with a final score of 5 points, but the patient remains in the classification of poor sleep by the Index (Table 11).

Table 11: Data of Participant 4 regarding the IQSP.

	Quality	Latency	Duration	Efficiency	Disorders	Medication Use	Dysfunction	Score	Classification
Pre	3	2	2	0	2	0	0	9	Poor Sleep
Post	1	1	1	0	2	0	0	5	Poor Sleep

The Body Image Scale (BIS) had an initial score of 0 points, indicating little suffering with the image. After the intervention, the patient presented a little expressive worsening with a final score of 1, maintaining a classification of little suffering with the image (Table 12).

Table 12: Data of participant 4 regarding BIS.

	1	2	3	4	5	6	7	8	9	10	General	Classification
Pre	0	0	0	0	0	0	0	0	0	0	0	Little Suffering
Post	1	0	0	0	0	0	0	0	0	0	1	Little Suffering

3.5 PARTICIPANT 5

W.I.F, 61 years old, the dentist, complete higher education, 70 kg, performs medical follow-up, reports use of Somalgim, denies smoking, elitism, hypertension and nephropathies. Primiparous of cesarean delivery, denies hormonal use, however, performed hormone replacement for 10 years with Totelle.

It presented a total FSFI score of 14.6 pre-intervention, being its best score in the variable Desire. After the intervention, an overall score of 24.9 was observed with an exponential improvement in the variables Arousal, Lubrication, Satisfaction and Pain (Table 13).

Table 13: Data of Participant 5 regarding the FSFI.

	I wish	Excitement	Lubrication	Orgasm	Satisfaction	Pain	Score
Pre	5,4	1,2	1,2	1,2	4,4	1,2	14,6
Post	4,8	6,9	2,4	1,2	7,2	2,4	24,9

The quality of sleep qualified by the Pittsburgh Sleep Quality Index (PHEI) presented a final score of 2, indicating only the variable sleep disorders with a score of 2, classifying the patient as having good sleep. However, it had a post-intervention worsening with a final score of 5 points, with a minimal worsening in Quality and Latency classifying the patient in poor sleep (Table 14).

Table 14: Data of participant 5 regarding the IQSP

	Quality	Latency	Duration	Efficiency	Disorders	Medication Use	Dysfunction	Score	Classification
Pre	0	0	0	0	2	0	0	2	Good Sleep
Post	1	1	1	0	2	0	0	5	Poor Sleep

The Body Image Scale (BIS) had an initial score of 4 points, indicating little suffering with the image. After the intervention, the scale did not show a significant improvement with a final score of 3, maintaining a classification of little suffering with the image (Table 15).

Table 15: Data of participant 5 regarding BIS.

	1	2	3	4	5	6	7	8	9	10	General	Classification
Pre	1	0	0	0	1	0	0	0	1	1	4	Little Suffering
Post	1	0	1	0	1	0	0	0	0	0	3	Little Suffering

When we evaluated the instruments comparing the 5 participants, the mean results regarding sexuality, evaluated by the FSFI (Table 16), found before the period of care a higher degree of average satisfaction in the variable Desire and Lubrication with an average of 4.8 out of 6 points. And the worst degree of satisfaction was observed in the variable Arousal with 3.6 out of 6 points.

The overall mean of the patients was 25.8 out of 36 points. After the 10 sessions of care, a worsening in the overall average of the patients about sexuality was observed, with an overall average score of 24.9 out of 36 points. There was a slight drop of 0.3 points in the lubrication variable and a significant drop of 1.6 points in the satisfaction variable. All the others presented the same score, only in Desire presented a score of 0.6 points.

Table 16: General data of the participants regarding the FSFI.

	I wish	Excitement	Lubrication	Orgasm	Satisfaction	Pain	Score
Pre	4,8	3,6	4,8	4,4	4,4	4	25,8
Post	5,4	4,5	4,5	4,4	2,8	4	24,9

The Pittsburgh Sleep Quality Index (PHEI) applied before the intervention indicated 60% of the population with poor sleep, 20% with good sleep and 20% with sleep disorders. Being the worst variables of Sleep Disorders and Latency. After the intervention, the Index showed the same results as

the first evaluation. However, the scores of all patients were lower, but not to the point of improving sleep quality in the evaluation of the scale (Table 17).

Table 17: General data of the participants regarding the IQSP.

	Quality	Latency	Duration	Efficiency	Disorders	Medication Use	Dysfunction	Score	Classification
Pre	1	2	1	0	2	0	0	9	Poor Sleep
Post	1	1	0	0	2	0	0	5	Poor Sleep

The Body Image Scale (BIS) applied before the intervention showed us that 60% of the patients had mild suffering with the image and the other 20% moderate suffering. After the intervention, according to the scale data, 80% of the patients presented mild suffering with the image and only 20% moderate suffering with the image itself (Table 18).

Table 18: General data of the participants regarding the BIS.

	1	2	3	4	5	6	7	8	9	10	General	Classification
Pre	1	0	1	0	0	0	0	0	1	0	4	Little Suffering
Post	1	0	1	0	0	0	0	0	0	0	3	Little Suffering

4 DISCUSSION

UI is not a condition associated with the risk of death, but it can generally have an extreme impact on the lives of affected women, and one of the fields usually little addressed is the relationship of UI with sexuality (BRASIL *et al.* , 2018) .

The existing evidence does not allow us to raise certainties that an improvement in UI is directly linked to an improvement in the sexuality of patients. Since, the theme of sexuality is much broader and more complex with an interaction of social, economic and religious factors and does not disqualify the technique used for the treatment of UI (BRASIL *et al.* , 2018).

Studies on the impact of UI on female sexual satisfaction are scarce, but it is possible to affirm that this condition impairs sexuality in several aspects, such as worsening the quality of the sexual act, lower frequency of sexual intercourse and especially in psychosocial factors (AUGE *et al.* , 2010).

However, an integrative review by (BRASIL *et al.* , 2018) showed that the FSFI when related to UI does not present an improvement in scores, only in some domains. This is due to the complexity of sexuality and the subjectivity of patients affected by UI, justifying the results found in the present study.

The body image of incontinent women can be affected due to the shame that this functional alteration causes, and because they do not find themselves more attractive (TAVARES, 2020). However, in the present study it can be observed in an improvement of 80% in body perception after the intervention and this can be due to the improvement of UI and the regular practice of physical

activities. These data can be justified because women with UI are more concerned with the functionality of their bodies, which can alter their image perception. With the improvement of functionality, there is a change in body perception since the image revolves more around functionality than appearance (TAVARES, 2020).

Some symptoms associated with urinary incontinence affect women's sleep quality, such as nocturia (getting out of bed more than once at night to urinate) and nocturnal enuresis (involuntary loss of urine during sleep) (FREITAS *et al.* , 2018). The lack of continuous sleep can bring cognitive and motor impairments to patients being incontinent patients susceptible to sleep disorders as a consequence of excessive trips to the bathroom for bladder emptying and/or the need for changes of sanitary pads, we consider of great importance the evaluation of the sleep habits of these patients (FREITAS *et al.* , 2018).

According to the Secretary General of the Brazilian Society of Urology (SBU), Alfredo Canaline, treatments for urinary incontinence fell by about 60% in 2020. The population affected by UI was afraid to seek treatment due to the COVID-19 pandemic, resulting in the worsening of symptoms and consequently worsening of quality of life (ALANA GRANDA, 2021).

With this, the Federal Council of Physical Therapy and Occupational Therapy (COFFITO) following the recommendations of the World Health Organization (WHO), authorized, through Resolution No. 516, published in the Official Gazette on March 23, 2020, the services of Teleconsultation, Teleconsulting and Telemonitoring. That allowed professionals to continue and/or begin their work with patients during the COVID-19 pandemic remotely. Interfering with less intensity in the worsening of patients affected by different pathologies (COFFITO, 2020). However, not all people are eligible for remote care, and the physical therapist is responsible for determining which people or cases can be attended to or monitored at a distance, taking into account the risks and benefits to these patients (COFFITO, 2020).

During the COVID-19 pandemic, there has been an increase in anxiety and sedentary lifestyle and we owe this to the imposition of social distancing that makes it impossible for the population to maintain the routine of work, studies and even physical activities since public and private spaces for exercising have been temporarily closed (MILEO, 2020). Concerned about the increase in sedentary lifestyle, the World Health Organization (WHO) created a program to influence physical activity at home, but we can observe in the present study how the home-office routine and the gradual reopening of cities directly and negatively impact this sudden and frequent change of routine.

Thus, the study suffered from limitations regarding evaluation and reassessment due to the lack of completion of the patients invited to participate in the project. The limitation with the use of

technology was a very important aggravating factor for us to have such a high number of excluded patients, as well as the number of absences in care.

The initial proposal was to compare online care with face-to-face care for patients with urinary incontinence, but with the onset of the COVID-19 pandemic, the project became entirely online.

We can observe that with the gradual opening of the city of São Paulo, the patients were failing to attend the appointments, which is also a justification for the number of absences observed. It is a suggestion for future research to enable the evaluation and reassessment in person so that this limitation does not occur with the collection of data and continues with the proposal of comparison of online service and face-to-face service.

Thus, the results observed in the reassessments do not corroborate the clinical improvement observed in the participating patients. We concluded that this is due to worry, lack of routine and commitments during the COVID-19 pandemic. In addition to the high levels of anxiety and depressive episodes that some of them presented during the research.

5 CONCLUSION

The Sexual Satisfaction Index (FSFI) showed a worsening in the mean of the post-intervention participants, showing only improvement in the variable Desire.

The Pittsburgh Sleep Quality Index (SPQI) showed an improvement in the population's sleep quality after the intervention, but it was not enough to change the final scale.

There was little suffering with the image in the patients after the physiotherapeutic intervention by the Body Image Scale (BIS), without significant changes with the pre-intervention result.

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CHAPTER
3

Teaching programming for students remotely during social isolation due to the COVID-19 pandemic

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ABSTRACT
Due to the Pandemic caused by Covid-19, schools had to quickly adapt teaching to students. Faced with this situation, teachers had to overcome the challenges during this experienced period, and students had to learn to assimilate the contents remotely. Despite the difficulties and challenges faced by the professors, it was also an opportunity to learn how to use new technologies to assist in teaching and learning. The work had as a data collection instrument an online questionnaire produced in Google Forms, a questionnaire answered in person with the students, and an interview with two programming teachers of the school, anonymous and voluntary, being sent to the José Pacifico School of Moorish. It is noteworthy that we are going through moments of transformation and adaptation, in which we continue to learn and create new forms of teaching strategies. In this sense, technology becomes a positive strategy and contributes to student learning in remote learning, providing new ways to teach and learn.

Keywords: Remote teaching, Technologies, Learning, Teaching, Challenges.

1 INTRODUCTION

Technology has, throughout its trajectory, assisted teachers in teaching and seeking to contribute to student learning, and for many years, the school made predominant use of blackboard and projector. That reality has been altered as a result of the pandemic, caused by the spread of COVID-19.

This context imposed significant changes in society and, in particular, in the school. With this transformation and the search for adaptation to the new scenario of technology experiences, new possibilities were emerging regarding the ways of learning and teaching. According to Nhantumbo (2020), unexpectedly, the search for technological tools has become an important means of methodology for teaching in the period of remote classes.

In this context, this research yearns to contribute and understand the reality that we are experiencing within the teaching and learning process.

It is understood that in this new context, the teacher needs to break through the barriers that prevent him from seeking to update himself, in addition to seeking new knowledge to meet the new reality that we are experiencing. According to Charnei (2019), there is a possibility of using

technology to improve teaching in the format of remote classes, being necessary, however, that the teacher who breaks the barrier to learn more and more, using new forms of knowledge.

Within this educational context, it is verified that there are technological disciplines such as the teaching of programming being taught amid remote classes. This teaching and learning may have become a little more difficult for some teachers and students because, in the pandemic, they were prevented from using the computer labs of the schools, an ideal structure for the remote model.

By experiencing these challenges in the day-to-day and the midst of reflections on teaching activities, the School selected to be the universe of study was the José Pacífico de Moura Neto Professional Education Center, for being a field school of the Pedagogical Residency Program, of the Coordination for the Improvement of Higher Education Personnel (CAPES).

This Program provided this relationship between the University and the contact with the basic school to initiate the qualification of teachers and, thus, to know and live the reality of which they will be part. Because we feel difficulties in the operationalization of remote classes and for reflecting on the teaching of programming for Students in the virtual teaching model during social isolation, due to the COVID-19 Pandemic, and in the case of a school that has an agreement with IFPI - Federal Institute of Education, Science, and Technology of Piauí, we decided to choose to be part of our research.

We believe that considering the problem that involves this process of challenges, of the process of teaching and learning the programming content, faced in times of pandemic in the modality of remote classes, in which specific technological tools are needed to help the applications of practical classes for better learning of the student, is fundamental in this period experienced.

In this perspective, because of the imposing character of associating technological tools and their applicability to education, this article aims to present the challenges of the teaching and learning process of programming content, faced in times of pandemic in the modality of remote classes of the Campo School - Center for Professional Education José Pacífico de Moura Neto.

The outline of these analyses, in this work, consists of four moments, articulated among themselves, designated as Identify the difficulties faced daily by teachers in the context of remote classes at school; Describe the challenges faced by students in building knowledge during remote classes with Programming teaching; Present the difficulties of teachers with the teaching of Programming in the Field School - Center for Professional Education José Pacífico de Moura Neto durante the remote classes; Relate the difficulties of students in assimilating the subject of programming during remote classes.

To this end, a research form was applied to the students and teachers of the Technical Education of Informatics of the 1st year B of the Escola Campo Centro de Educação professional José

Pacífico de Moura Neto, aiming to identify what the Students and Teachers think about this theme. It is expected that this reflection can be analyzed and proposed strategies to contribute to the development of methodologies for teaching and learning in technological education in remote teaching.

2 THE INFLUENCE OF COVID-19 ON EDUCATION

In the world and Brazil, the school context since the year 2020 has been going through troubled times, caused by the COVID-19 pandemic. Due to this, we are experiencing moments of uncertainty, questioning, ideological, political, and infrastructure conflicts, among other issues to promote quality education to students.

Due to the social distancing recommended by the WHO - World Health Organization, this was a form of containment and proliferation of COVID-19, a measure adopted worldwide, as well as guidelines, state and municipal decrees and strategies used in an attempt to develop activities schoolchildren, and among the many teaching strategies, some institutions chose remote classes, using various resources aided by technology. Nationally, Ordinance No. 188 of the Ministry of Health, of February 3, 2020, declared a public health emergency of national importance in Brazilian territory (BRASIL, 2020).

Consequently, the traditional teaching and learning process was adapted in an emergency way, bringing a great challenge to students, teachers, and school management.

In this sense, it is worth emphasizing the concept of learning as a process that occurs from the beginning to the end of life, and for all life. On this, Davidoff believes that:

> Learning is an activity that occurs within an organism and that cannot be directly observed; in a way not fully understood, the subjects of learning are modified: they acquire new associations, information, insights, aptitudes, habits, and the like (DAVIDOFF, 1984, Q. 158).

Learning encompasses all the moments of the individual's life and does not occur only in the school environment. We also learn, in social and family life, among others. In addition, we can add that learning is not modified, only if new information and habits are acquired.

Throughout history, society has always sought to perfect its tools and techniques. This is due to the need to push the boundaries of skills. Thus, various technologies are developed and incorporated into people's daily lives, such as the computer that, currently, is present in almost all the tasks of society, making it dependent on this technology. For the school, the task of facing the obstacles that society imposes is established, defining new competencies and learning strategies.

For Papert (2008), the use of the computer by students helps in a way that did not happen simply with pencil and paper. Learners develop interpersonal and self-directing skills in their ideas and also learn to put them into practice more easily. Remote teaching presents itself as a viable alternative,

focusing on learning, using the technology available amid internet access to make use of modern and educational resources, seeking to contribute to the increase of students' autonomy, making the student a participant in the process of apprenticeship.

2.1 THE CHALLENGES OF THE TEACHING AND LEARNING PROCESS IN A TIME OF PANDEMIC

There have been many challenges faced during the pandemic, especially as it relates to the teaching and learning process. During face-to-face classes, students had access to the library and laboratory, spaces where low-income students had access to technology. With the changes imposed by social isolation, for some students, there was difficulty in accessing virtual learning, considering that the pandemic reflected on the economy and other factors, causing financial difficulties that had repercussions on remote learning.

It can be understood as "remote teaching all that content that is made available in virtual environments or transmitted synchronously, where the teacher teaches following an adaptable schedule of face-to-face teaching" (COSTA apud JACOB, 2020, p. 23). Still for this author, "remote teaching is similar to Distance Learning (EaD), especially about the aid of technology" (COSTA apud JACOB, 2020, p. 24).

In this sense, distance education has a characteristic of support for teaching, with a workload distributed in different types of technological resources, which does not happen with remote classes, which happen, in general, in a non-strategic way, so little administrative and technological preparation, in addition to which it should be taken into account that the teachers had no preparation or contact and even skill in handling and starting virtual meetings, planning, and teaching classes virtually.

To Gife (2020, p. 33), "Students and teachers are not very different, both have difficulties with technology", allied with this, it is emphasized that teachers need to plan and learn the workings of different technological tools. In the routine of your day-to-day, remote teaching is carried out by the teacher of the discipline, whether in classes broadcast live or recorded, through videoconferencing or similar resources.

In remote learning, the workload is no different from essential classes. Teachers and students have faced several challenges with classes in this model, after all, these changes were very abrupt. Changing your routine and the dynamics of your day-to-day from the face-to-face classroom to virtual platforms requires investment and time in technology.

Faced with all the difficulties already described, the teaching of programming awakens the ability of logical reasoning, and the ability of abstraction, in addition to developing the ability to solve

problems efficiently, using a series of mental tools that reflect a vast field of computer science. Therefore, for the teaching of programming, it is necessary to develop skills.

To Campos; Bortoloto; Felicio (2014, p. 33), competence can be understood as "the ability to use more than one resource to solve something in an innovative, creative, and timely way".

Thus, it is common for students of Logic Programming to have difficulty at first. Because it is a complex discipline with practice, thus becoming challenging, it can cause fear and insecurity to those involved in the process. However, the younger you are, the easier it is to learn.

According to Zanetti and Oliveira (2015), the teaching of Programming in schools encourages students to develop their creativity and their ability to solve and deal with problems.

However, technology has been a strong ally to the teaching and learning process, but we must observe the various difficulties and obstacles faced by teachers and students. Charnei (2019) states that it is possible that the Technology can assist the teacher in educational activities, but he is also open to new experiences.

Abruptly exiting face-to-face teaching and undergoing virtual and remote teaching is a major challenge for the school community. Even understanding that Information and Communication Technologies (ICTs) enable opportunities and mechanisms to teach and learn, Pimentel and Nicolau (2018) describe that the school community does not have basic access to these ICTs, where from the beginning of training this same community should count on these technologies capable of providing the construction of Computational Thinking.

On this, Christian Brackmann clarifies that:

> Computational Thinking is a distinct creative, strategic and critical capacity to use the concepts of computing in the most diverse areas, with the ability to solve problems individually or collaboratively (BRACKMANN, 2017, p. 25).

There arises, then, the need to understand the difficulties and challenges faced by students and teachers involved in this teaching and learning process, to reflect and instigate reflections that seek every day to improve this process. In this way, this research aims to collect information about the experiences of students and teachers in the teaching of programming, in the modality of remote teaching, seeking to know their difficulties, challenges, anxieties, perceived opportunities or even moments to know new learning methods with this new modality.

2.2 TEACHING PROGRAMMING REMOTELY IN HIGH SCHOOL

The teaching of programming is present at various levels of education in this computerized era. This discipline is related to elementary, secondary, higher education and even graduate school.

They propose the insertion of computing in Basic Education, to provide computational skills and competencies and to support science and its areas of knowledge. The emphasis in high school is on enhancing problem-solving ability through the realization of projects and the development of skills related to critical analysis.

It is a programming language that does not require prior knowledge of other programming languages, having been developed to help people in learning mathematical and computational concepts, with it it is possible to create games, animated stories and interactive programs. For Zanetti and Oliveira (2015), the teaching of programming should aim to lead the student to think and develop skills capable of solving problems.

Solving a problem with the help of a program using the aid of a computer collaborates with learning, since it creates a link with the factors of knowledge construction that are the description, execution, reflection and debugging of problems. Depending on how it is taught, the student may have great difficulty producing and assimilating programs that are difficult to understand and apply, which can generate demotivation in students.

Computational Thinking is one of the difficulties of the students presented by the students in this first contact with programming.

In the scope of education, Barr and Stephenson (2011) proposed an operational definition of Computational Thinking focused on basic education. It is made up of a set of problem-solving skills that can be broken down into six dimensions: Formulating problems in a way that machines can help solve; logically processing data; Represent data abstractly; Algoritmizar automatic solutions; Solve problems efficiently; and Use knowledge and skills in solving other problems.

They propose the insertion of computing in Basic Education to provide computational skills and competencies and support science and its areas of knowledge. The enfase in High School is in the improvement of the ability to solve problems through the realization of projects and the development of skills related to critical analysis.

3 METHODOLOGY

This study is exploratory research with qualitative approach. Regarding exploratory research, Raupp and Beuren (2006) understand that This occurs when one has little knowledge about a certain subject and through it one seeks to know in greater depth the phenomenon studied.

This study aims to provide greater knowledge about the topic under discussion for the researcher.

The qualitative approach, according to Flick (2004), results in different lines of thought and in several theoretical approaches to be based, to consider subjectivity, its particularities and studied

subjects, which are an integral part of the investigative process. Thus, the reflections, observations, impressions and feelings of the researchers become data, constituting part of the interpretations. In addition, qualitative research is used in this work because it is a tool in which the focus does not require the use of statistics for data analysis, but the study of a situation in which it surrounds a certain problem.

Participants in this study were the professors and students of the discipline of Programming. To verify how the students felt the impacts of the sudden transition from face-to-face to remote teaching modality and how this impacted on the learning process, as well as what changed in the teacher's routine considering the change from face-to-face to remote teaching and how the teacher achieved the objective of the your lesson plan.

> Thus, data collection was carried out at Escola Campo - Centro de Educação Profissional José Pacífico de Moura Neto, with 02 teachers of the discipline of Programming, and all teachers are celetistas of the school. This school operates in three shifts (morning, afternoon and evening), all with ProgramAction teachers. The first 1st year begins with Logic Programming; 2nd year Schedule I, and each period may change in its capacity. All teachers choose the discipline of Programming by affinity and the profile of the students are high school students (1st, 2nd and 3rd year) of the Programming disciplines.

For data collection, a mixed online questionnaire was applied in Google forms. To verify the perception of students and teachers about the changes arising from the pandemic period with virtual classes. The questionnaire is an important tool for scientific data collection , generating a set of ordered and predefined questions with appropriate language.

According to Parasuraman (1991), the questionnaire is only used to construct a set of questions, where enough data are generated to achieve the objectives of the research project , but the author points out that not all research use this type of resource.

The questionnaire was produced in Google Forms Online, with an average of 12 questions, being objective and discursive questions, elaborated to evaluate the context, analyzing the challenges of the process of teaching Programming in the period of COVID-19 pandemic. The questionnaires were applied online. The participants of the research were the students of the 1st year B and teachers of the field school of the face-to-face courses Technical and High School. To this end, students and teachers were invited to participate optionally.

The first stage of the study consisted of surveying the profile of students regarding their school routine in the non-face-to-face teaching modality and the impacts on remote teaching.

In the second stage, the students were asked to answer the online questionnaire that was made available in the Whatsapp group of a class of 35 students.

4 RESULTS AND DISCUSSIONS

Discussions about remote learning and social distancing have many convergences. Thus, attention and direction should be paid to educational, professional and human relations. In the midst of this, one should minimize the educational problems generated by COVID-19.

In the survey of the data of the students of the class of the 1st year B of the technical course of medium level of CEEP - Center of Professional Education José Pacífico de Moura Neto, 34 students of a class of 35 students participated.

4.1 DIFFICULTIES PRESENTED BY STUDENTS DURING REMOTE CLASSES

To carry out this research, it was necessary to ask each student to answer the Free and Informed Consent Form (ICF). Next, questions were asked related to the teaching of Programming to students of remote form during social isolation due to the Covid-19 pandemic. The results of the analysis can be seen in Table 1, Table 2 and Table 3.

In the characterization, the students were 64.7% female (N=22) and 35.3% male (N=12). These students come from public schools with a percentage of 91.2% (N=31) and private 8.8% (N=3). Regarding the ease of access to the internet, it was found that 91.2% (N=31) said they have internet at home and; 8.8% (N=3) did not, but use broadband/internet package on their mobile phone. Regarding the question whether they have a computer or notebook at home, 41.2% stated that they do not have it (N=14) and 58.8% (N=20) that they have it.

Table 1 – Technological infrastructure of students (N=34)

Question	Variable	Frequency	%
1) Have you had contact with any programming logic before joining CEEP José Pacífico? *You can check more than one option*	No, I had the first contact at Ceep José Pacífico	27	79,4%
	Yes, Python	2	5,9%
	Yes, with PHP	0	0,0%
	Yes, with Python	2	5,9%

	Yes, with C/ C++/C#	1	2,9%
	Yes, with Pascal	0	0,0%
	Yes, with Portugol	0	0,0%
	Linux	2	5,9%

Source: Data collected. 2021.

It is observed that students know how to use technological resources, which contributes to teaching and learning in the classroom using ICTs.

It was found that most students (91.2%) come from public schools and only 8.8% are from private schools. However, it is also evident that 79.4% of the students had no contact with any programming language before joining CEEP - Escola Campo José Pacífico de Moura Neto, thus verifying the difficulty in having a first contact with a type of language remotely.

These changes are explained by Santos Junior and Monteiro (2020), who report that:

> Students' routines have been modified and for many, time is now divided with other activities. However, it is necessary to reflect on the need for students to adapt to this new moment, as well as the impacts that such changes can cause, including in the emotional conditions of each subject. (SANTOS JUNIOR; MONTEIRO, 2020, p. 14).

Analyzing the equipment that the students had at home, although the students knew how to handle, as was verified in the questionnaire applied, it can be observed that these resources are not always available for the use of the students.

Only 91.2% of students have easy access to the internet and 8.8 % have broadband/ mobile internet packages, making teaching and learning a little more difficult. Being that 58.8% of the class has a computer, and 41.2% of the class does not have any computer to use for the studies. In addition, 94.1% of the students stated that the device used to access the internet is the mobile phone and 44.1% use the smart TV. It was verified that 64.7% have the exclusive use of their technological equipment and 14.7% of the students have to share with the family at home. As for the access to the internet and computers the results are the same when compared with other researches, in which access to the world wide web is limited in the scenario and data (ARRUDA, 2020).

In this perspective, the inequalities of our students are evidenced by the difficulties of access and to the technological equipment itself. This disproportionate distribution of income at different levels that occurs in Brazil increasingly distances education (XAVIER, 2020). In the field of analysis

of the research, the return of non-face-to-face activities took place remotely, being mediated with the use of ICT, in which students are online receiving guidance for the contents and exercises to be performed during the orientations.

Table 2 – Characterization of students of difficulties faced (N=34)
(continues)

Scale	1	2	3	4	5
Rate your internet access as good quality.	2.9% (N=1)	8.8% (N=3)	20.6% (N=7)	32.4% (N=11)	35.3% (N=12)
How difficult were you to learn programming logic remotely?	8.8% (N=3)	17.6% (N=6)	26.5% (N=9)	32.4% (N=11)	14.7% (N=5)
How difficult have you been to move from in-person to remote teaching?	11.8% (N=4)	17.6% (N=6)	38.2% (N=13)	14.7% (N=5)	17.6% (N=6)

Source: Data collected, 2021.

Table 3 – Students' perspective regarding difficulties during remote classes

Issues	Answers
13. What difficulties felt in learning the programming content during classes Remote?	**Student.1** - Access to the cell phone, internet and the way of sending the activities. At the beginning until the middle of the year, it was a cell phone for me and my brother.
	Student.2 - I could not understand the subject so well.
	Student.3 - Due to the first contact with programming , I felt difficulties in understanding the structures and functions in the Codes.
	Student.4 - For me it was not so difficult, but when I had Questions I asked the teachers. What else did I have difficulty was not having the presence of teachers in feeling very general.

Source: Data collected, 2021.

The main difficulty reported in the period of remote classes, mainly focusing on research in the discipline of Programming among students was the fact that the first contact with the language took place remotely and the students did not have the computer to practice the codes, in addition to access to the internet.

In this research, students report that they use the telephone in remote classes due to lack of a computer and even share devices with family members at home, so this interaction between teacher and student is not guaranteed, as happens in face-to-face teaching.

4.2 DIFFICULTIES PRESENTED BY TEACHERS DURING REMOTE CLASSES

When teachers were asked about being properly prepared for this reality of change from face-to-face to remote teaching, the answer was 100% no.

In the process of teaching learning, there must be a fusion of information, enabling learning. For Sousa et al. (2020), in any pedagogical action in the classroom that is mediated by technology, we must never forget the objectives integrated with practice.

When verified with the teacher about having difficulties in teaching the discipline of Programming remotely, given being a discipline that encourages logical reasoning, Professor A answered no, Professor B answered yes, which he puts as divisions of opinions. By asking teachers how many of the skills you have in ICTs (Communication Technologies).

> Teacher A - Uses Smartphone, Uses Email, Uses Google Classroom, Uses Instagram, Uses Whasapp, Uses Youtube, Uses Google Meet, Uses Gamification, Uses Moodle Platform , Google Drive.

It is possible to infer that teachers are making videos and follow-ups through technological tools. When asked about the strategies used in teaching programming in the remote period, the teachers answered the following:

> Teacher A - Use of video lessons recorded by me, live classes by Google Meet, use of Google Classroom for activities, indication of mobile app for students to program at home.
> Professor B - Challenge of questions, studies and applications of technologies in practice to develop small sites and projects.

When teachers were asked about their support for offering Programming subjects in the remote format during the pandemic, the answer was 100% yes.

When asked about the difficulties perceived in the teaching of Program in the remote period, about their teaching practice, the answers of the teachers were as follows :

> Teacher A - The difficulty of access to the Internet by the students, the lack of mathematical basis and logical reasoning on the part of the students, the social crises raised by the pandemic: depression, anxiety, this affected the students and many felt discouraged, the lack of preparation and the delay of adaptation to this type of teaching.
> Teacher B - Some students do not have computers at home.

According to Nhantumbo (2020), the difficulties in adapting to remote teaching, in this pandemic period, have been varied and range from the lack of accompaniment of a teacher to the students, associated with insecurity and even the lack of handling in the use of the different digital platforms.

When asked if remote learning can bring positive and/or negative reflections to student learning, we obtained the following answers:

> For Teacher A - It had positive aspects, but also negative aspects such as: Positive, since the student becomes the protagonist of his education1717ção; Negative, since the change was sudden and with little time for adaptation; Positive, new perspectives of teaching and learning with the acquisition of new technologies; Teacher burnout, and who was overwhelmed by

the activities and multiple challenges in dealing with the number of students classrooms as well as adopted specific technologies, providing teaching.

Professor B - Only had positive reflections such as, positive, new perspectives of teaching and learning with the acquisition of new technologies; positive, increased creative capacity of both; Positive, Increased basic social skills such as communication and empathy; Positive, The use of the appropriate instruments already existing in the digital world.

Given the difficulties encountered and related to technological difficulties during remote classes, it is necessary to overcome all these obstacles and try to adapt to this new scenario, minimizing the impacts caused, whether economic or otherwise, seeking to adapt to quality education and for all in an efficient and egalitarian way.

5 FINAL CONSIDERATIONS

When tracing the panorama of education in the face of the results obtained, it was found that the current scenario experienced by the participants of teaching is challenging. In this context, the obstacles range from the lack of equipment and support from parents and educational institutions to social inequality, among others, which decisively influenced this pandemic period, making it necessary to create several strategies to ensure that it is possible to remedy the difficulties that have been raised.

Thus, the main difficulties of the students evidenced in the research are the lack of internet at home, as well as technological devices such as the computer. For teachers, the main complaint is precisely the lack of access to the computer at home by students, so that they can follow the online classes.

Another fact revealed by the research with teachers is that the pandemic has brought both positive and negative reflections related to student learning. Among the positive elements, we can mention the protagonism of the student in the which refers to their education, as well as new perspectives of teaching and learning with the acquisition of new technologies. In the negative context, the change in the modality of teaching occurred suddenly and with little time for adaptation. However, the research also showed that the positives stood out over the negatives.

In addition, the main difficulty reported by the students in this period of remote classes in the discipline of Programming is related to the fact that in addition to being the first contact with the remote modality and not having a computer to practice the codes, access to the internet was very bad or when the students had to share devices with other family members, aligned with the lack of the teacher to promote direct interaction as happens in face-to-face teaching.

Despite all the challenges and difficulties faced amid COVID-19 to return a quality education, these results run with other themes of this research, evidencing the importance of using technology to

promote learning in times of pandemic, presenting itself as an important and safe strategy for the execution of the classes in schools.

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CHAPTER
4

Experience report on presential and remote teaching during the COVID-19 pandemic

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ABSTRACT
The need for teacher training is a reality among teachers with a bachelor's degree. Based on this, the present work was developed to describe the experience report of a student of the Pedagogical Training Course for Unlicensed Graduates, about the mandatory teaching internships, drawing a parallel between the internships for reflection. The choice for this report was motivated by seeking to understand the main difficulties and challenges during this period. The activities carried out, from document analysis to conducting classes (face-to-face or virtual) were a unique preparation, the conversations with students, the exchange of experiences with teachers from the technical school, and also with colleagues from the training course, were fundamental lessons learned for preparing for teaching in the classroom.

Keywords: Pedagogical practice, Teaching, Remote teaching.

1 INTRODUCTION

The need for teacher training is a reality among teachers with a bachelor's degree. Several courses are offered at the level of specialization or degree in pedagogical training, aimed at university professors and technical education.

I have a bachelor's degree in agronomy, a master's, and a doctor's degree in agronomy, and I currently work as a professor at a community university. Throughout the postgraduate courses, improvement through teaching in the classroom was not a priority, but scientific research was. Starting teaching, I realized that I was missing knowledge about teaching methodologies to perform better in the classroom and that's why I looked for the Pedagogical Training Course for Unlicensed Graduates. Thus, the objective of this work is to describe the experience report of a student of the Pedagogical Training Course for Unlicensed Graduates about the mandatory teaching internships, drawing a parallel between the internships for reflection. The choice for this report was motivated by seeking to understand the main difficulties and challenges during this period.

According to Pachane and Pereira (2004), when teacher training is mentioned, the connotation of teacher training for basic education is common and it is difficult to understand the need for teacher training for other levels of education. This is because, for many years, there was the conception that theoretical knowledge or experience in the area was enough to be a good teacher (CASTAMAN; VIEIRA; OLIVEIRA, 2016). For many years, university teaching training was linked solely to research activities, based on the idea that a good researcher would be enough to be able to be a good university professor (KOURGANOFF, 1999), a fact that does not reflect the current reality.

Associating this complexity with the responsibility of the teacher's performance, teacher training is the tool to face the challenges of education (SPEAR; COSTA, 2018). Due to the requirement of many higher education institutions to hire teachers, masters, or doctors with teaching training, many postgraduate students, in addition to teachers who already work in teaching, needed to seek pedagogical training.

Different teaching methodologies were used during internships I and II, since in the pedagogical training course it is necessary to carry out two mandatory supervised internships, providing a better understanding of the teaching-learning tools and reflection on the teaching methodologies, bringing us about the future of teaching.

2 EXPERIENCE DETAILS

The methodology applied in this report is qualitative research, based on a literature review on teacher training and an exploratory report of supervised internship in person and remotely, due to COVID-19.

The approach is qualitative, emphasizing not the quantification or description of the collected data, but the importance of the information that can be generated from a careful and critical look. With a reductionist character of many important aspects that influence the arrangement of the observed phenomenon.

The exploratory research was divided into two stages, related to supervised stages I and II. Exploratory research is the initial contact with the theme to be analyzed, providing greater familiarity with the problem, with the subjects to be investigated, and with the available secondary sources (GIL, 2010).

In the Pedagogical Training course for Unlicensed Graduates of IFSul, the internships are supervised by the advisor professor and the supervisor professor (in the internship field) of the class in which the student is assigned to work, receiving instructions from the educational institutions that receive them and develops its classes, based on the learning obtained during the training course.

To carry out the Supervised Internship I, it was necessary to carry out document analysis, observation of the teaching action, conducting, and reporting.

In the discipline of Supervised Internship II, in which the undergraduate student takes on the teaching function again, intending to integrate the dimensions of teaching in Brazil, at the current moment. The curricular component was developed through studies and activities in the Moodle virtual learning environment. Initially, the theme of the seminar that replaced the face-to-face stage II, seminar preparation, presentation, and report was determined.

3 DISCUSSION

The Teaching Internship was divided into: supervised internships I and II, and these were subdivided according to the schedule of the internship disciplines of Pedagogical Training for Non-License Graduates, and at the end of each internship a complete report was prepared on the experience and experiences.

The Supervised Internship I provided face-to-face teaching experiences at a technical school with weekly, pre-scheduled meetings. The internship was carried out in person in the second half of 2019, at the State School of Professional Education of Carazinho-EEPROCAR, in a subsequent technical training class. This school was chosen because it has technical education in agriculture, in addition to being located in a city close to my place of work. Initially, a documentary analysis of the internship location was carried out. The documentation was provided by the teaching coordinator and analyzed according to the organizational and physical structure of the school and the socioeconomic context of the school.

The Curriculum Organization of the Technical Course in Agriculture in the subsequent modality offered by EEPROCAR is organized in three stages distributed in 1st, the 2nd, 3rd stage, lasting 1,920 hours of face-to-face, theoretical and practical classes, and Supervised Mandatory Curricular Internship with the workload of 400 hours of, making a total of 2,320 hours, with student registration at the beginning of each stage, according to the current Curriculum Matrix. The school aims to integrate with the community, acting as a rural development hub, supporting and promoting community education activities, collaborating for the growth of local and regional agriculture, promoting the integral formation of the student as a citizen, developing habits, values, and attitudes, so that its graduates are agents of transformation of the family and the community, developing socially just and ecologically viable agriculture.

After the documental analysis, together with the teaching coordinator, the class that would do the internship was defined, as being a subsequent 2nd-year class of 12 students in the Great Cultures discipline. The students in this class already had a good base in terms of the agricultural context, they were students aged between 16 and 20 years old, most of them from rural backgrounds. Talking to the head teacher of the discipline, it was possible to verify the programmed content and plan the contents that could be worked on with the class.

In a second moment, the teaching observation was carried out, to get to know the class and the teaching methodologies of the regent teacher. In this class, students learned to identify diseases and pests in wheat crops by observation. First, the teacher reviewed the theoretical content seen in other classes, explained the purpose of the class, and the students were sent to the field. The teacher used questioning as a strategy to instigate students' curiosity about the subject addressed in class. It was

possible to verify the integration of this class with the course curriculum, in addition, the students had prior knowledge of previous classes about the theoretical content. To verify the degree of achievement of the proposed objectives, a questionnaire was applied and material was collected in the field. The objective of monitoring the crop for pests and diseases was partially achieved because only diseases were present during the field visit. Thus, the presence of pests was not observed. The students were given the task of finding a pest and a disease of importance in the wheat crop, which is extremely important for learning and practical application of the content seen in the classroom. At the end of the class, the students returned to the classroom to discuss the collected material. It was possible to verify that the teacher's behavior interfered directly with the student's behavior and learning. Already in this first activity, it was possible to observe the challenges of the teacher, and the need to instigate students to participate. Some students are not proactive, in fact, they need the teacher to call them “constantly” for the activity.

This first contact with the class and conversation with the conducting teacher was important for planning the classes as conductor, regarding the content for the defined time, in addition to preparing for the student's questions.

In the following week, I started teaching practice, as a conductor, I taught seven classes and in these classes, the activities developed were based on insect pests of soy, wheat, and corn. I taught practical and theoretical classes, consisting of dialogued and practical expository classes (technical visits), reading of the recommended bibliography, directed studies, works (individuals, pairs and/or groups), critical-descriptive readings of texts related to the discipline, debates and discussions in the classroom. The objectives of the activities were to train the student in terms of scientific and technological knowledge and skills, for the management of soy, wheat and corn pests, to recognize and describe the main pests of large crops and to know the main control methods for these pests.

For the conducting classes, it was necessary to plan the content, seeking to distribute the content in the seven planned classes. I tried to prepare myself, and study, the topics I would address, bringing up-to-date, relevant information that would encourage students to interact.

The class was dedicated, they sought to participate and interact in the classes. Students come from rural areas, that is, they live in the agricultural context daily, which adds positively to the discussions during classes. Many students brought situations of their own to be clarified in the classroom. In general, the class had a good performance, interacting, and showing interest in the subjects addressed, in addition to good retention of the content. During classes, she asked questions to use as a form of evaluation and, after finishing the internship, the regent teacher applied an evaluation (test) with questions about the content taught. According to the information provided by the regent teacher, the students perform very well in the evaluations.

In the first class I taught, I worked with some projected images, based on the images I questioned the students and sketched out on the whiteboard some relevant points about the subject. I realized that I had captured the attention of the class, they were interested in the subject, and it was a positive first experience. Over the weeks, I worked on some content using projected material, I noticed that many students did not pay attention or ended up dispersing with other subjects. At this moment I realized that I needed to take a break from class using the projector and activities that would provide greater interaction with the students.

In the field class, held to collect and identify insects, the students' interaction was very positive, through questioning and proactivity, demonstrating that the teaching-learning process, when practical and theoretical methodologies are used, results in the best result. In this class, the students used an entomological net, cutting shovel and entomological aspirator. The entomological net allows the collection of adults, with emphasis on the high infestation of the scraper bug in black oats and white oats, and moths in several cultures. With the use of the cutting shovel it was possible to carry out a sampling of coros in the corn crop and fallow areas, the students were able to collect and identify them. The entomological aspirator made it possible to collect small insects, such as ants, aphids and bedbugs. I realized that, for the best performance of the class, it is important to carry out more field activities during the semester, because a class to show the content of six theoretical classes in the field is not enough time. In this way, the importance of prior planning of classes returns.

Despite the interest of the students, as already reported, it is important to highlight that it was possible to identify among the students that some were attending technical education of their own free will and others attended at the initiative of their parents. These issues become clear when talking to students about practical experiences and activities that can be developed based on the content I was teaching. It is worth noting that knowing is not enough, it is important to know how to transmit it to someone, it is important and necessary to understand knowledge, be able to organize it, reorganize it, elaborate and re-elaborate it and adapt it whenever necessary in the classroom (SILVA & BARBOSA, 2019).

At the end of the internship at the technical school, it was necessary to prepare a report, which was structured as follows: introduction; development, with the identification of the internship field; characterization of the institution, observation and teacher management; Theoretical Reference; final considerations; and evaluation sheets of the guiding and supervisory teacher. The elaboration of the report was an important activity for the reflection on the teaching practice performed. Making it possible to verify that in some classes I taught the result was positive, but in others, there was a lack of planning and with that, the objective was not achieved. I arrive at this perception after comparing the performance of students in classes that I dedicated more time to planning, comparing classes in

which this did not happen. I see that prior planning of classes, and throughout the two months or semester, is of paramount importance because in such a period it is necessary to work with certain subjects in class. The lack of planning can lead to a "lack" of time to work on certain content.

The second stage, Supervised Internship II, provided contact with remote teaching strategies. This was carried out remotely, via Google Meet, due to COVID-19. In this way, the internship was adapted, with seminar presentations for the students of the Polo UAB Constantina-RS class, initially it was necessary to divide the class into smaller groups, which were the groups for which the seminar was presented. Seminar presentations lasting 40 minutes per student. The seminars had as their central theme the impacts caused by Covid-19. This adaptation allowed the use of different tools, certainly a challenge in terms of adapting to the reality of teaching. The groups, together with the pole tutor, defined a schedule for the presentations and topics for the seminars. After that, having defined my theme as "Higher education, agronomy course, in times of pandemic", I organized a presentation and defended it for the training course class, teachers and tutors. I believe that the adaptation of stage II was of great value since at that moment all educational institutions were adapted to remote teaching.

The curriculum component was developed through studies and activities in the Moodle virtual learning environment. The resources used to carry out the activities were diversified, including discussion forums, observations, descriptions, various analyses, reports, reading texts, production of slides, and production of videos on the topics addressed. Every two weeks, the guidelines and activities that were carried out were published in the discipline's space.

The preparation and presentation of the seminar was an important experience, as I was able to reflect on my "adaptation" regarding teaching methodologies, it was possible to verify that the activities did not stop. I started the presentation by showing that I had planned the first practical field activities with the students for the first semester of 2020. But, in the fourth week of classes, classes were interrupted due to the pandemic. An initial perspective projected the return of face-to-face classes in two weeks, meanwhile, it was necessary to send activities to students. Two weeks passed and the situation only got worse, it was necessary to adapt to remote activities. How to work with digital platforms and tools? This was not a reality for me, my classes were always based on a projector, field activities, and exercises. I needed to look for training, the university I work for, Universidade de Passo Fundo, provided us with some courses, but I saw that it wasn't enough so I took a short course at another institution.

In-person classes were interrupted due to the coronavirus pandemic worldwide. In April 2020, forecasts were for two to three months of isolation. But the scientific projections published from that same month onwards indicated the need to extend quarantine periods, albeit intermittently, and for the return to face-to-face activities to occur in a controlled manner. Using the "new" reality of higher

education as a basis, the general objective of the class/lecture is to train listeners/participants, in terms of general knowledge and particularities regarding adaptation to remote teaching.

The challenge had been launched, how to hold students' attention with synchronous and asynchronous activities? How to know if the student was present in the synchronous class? In fact, would the student be performing the asynchronous activity? Who is carrying out the assessment activity (test)? How to evaluate these students? And the work environment, how can I adapt my home to teach classes? How do we separate work and leisure time and environment? Countless uncertainties, an overload of work, a mixture of feelings and a lot of anxiety.

Reflection on these questions was extremely important a lot of adaptation was needed in teaching methodologies and terms of the use of teaching tools. I tried to evaluate students in different ways, using online questionnaires, and oral tests, among other ways. Some evaluation methodologies obtained a good return and I continue to use them, others were not successful because it was evident that the student had access to the support materials and in fact, could not know if the student had understood the content. A strategy that helped to reduce “cheating” was to carry out synchronous assessments with the camera and audio-activated, making it possible to see the movements and conversations of the students.

Working from home was not easy, adapting the environment, avoiding exposing my privacy, problems with internet quality, and interference with external noise were the main points during recordings or synchronous classes. Defining work hours and rest hours was and is the main problem for me, I feel obligated to be working because work is “there” by my side, and this leads to long-term anxiety issues.

Living in a different time in our lives, due to the pandemic, we need to collect ourselves, isolate ourselves, and look for ways to continue living, working, studying, and doing only what we are allowed, to protect ourselves and others. And, with that, the teaching of both basic education and higher education worldwide, in addition to the most different sectors of the economy, are suffering abruptly due to the pandemic of the New Coronavirus - Covid-19, which is being responsible for the stoppage of the entire world, since the beginning of 2020. This seminar addressed our doubts, our anxieties, as students, parents, teachers, nurses, and administrators, among other professionals, and enables integration aimed at exchanging experiences in this time of pandemic. Furthermore, it provided moments of learning, knowledge, and intellectual and human growth and seeks new perspectives to face the reality experienced.

4 FINAL CONSIDERATIONS

The internships provided unique experiences, and fundamental moments for teacher training, highlighting the importance of teacher training for my professional future. They were opposite realities of supervised stage I and II, as one before and during the COVID-19 pandemic. Initially, the search for pedagogical training aimed at preparing teachers for how they should work in the classroom with "traditional" methodologies, linking them to active methodologies. The first teaching internship held at an agricultural college made it possible to work with this reality, working with theoretical classes using presentations supported by projected slides and practical classes in the field.

The activities carried out, from document analysis to conducting classes (face-to-face or virtual) were a unique preparation, the conversations with students, the exchange of experiences with teachers from the technical school and also with colleagues from the training course were fundamental learning for the preparation for teaching.

Teachers must seek permanent training as their great challenge, seeking theoretical and practical subsidies to exercise their teaching and also seek to understand all the content to be worked on, conducting the class and transmitting knowledge in a way that causes concerns with the intention of these students. advance even further in the process of learning more and more (SILVA & BARBOSA, 2019).

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CHAPTER
5

Internship experience report: During the pandemic

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ABSTRACT
The article in question is an internship experience report: during the pandemic, it addresses the routines and questions regarding the difficulties, which is only possible due to the practices and theoretical background provided during the 3 years of course by the institution, thus preparing for this moment the internship and long training and the work environment. I use this work as a general objective: to report experience experience in the internship during the pandemic, in addition to applying the knowledge acquired in the classroom and take it into practice applying it in the laboratory routine. In its methodology, it is concerned with bringing the motivations and showing the main practices of a laboratory: HDL, VDRL, rheumatoid factor and PCR, PCR and VDRL dilution, ASO, Blood typing, NCOVA, calcium, ESR, glycated hemoglobin, HCV, HBSAG, HIV, Troponin T, Occult blood, already in the development we have the rapporteur of the experience in general and individual of each place in which it was passed. Finally, considering the experience of extreme value, where it was possible to learn a lot, both for each place passing, as due to the possibility of internship in a pandemic can make a difference in people's lives, and seeing in practice the difficulties passed by the professionals of the area due to all the circumstance. Concluding that without the internship it would not really be possible to really have a complete formation, where it is possible to see everything and improve even more.

Keywords: Internship, Report, Pandemic.

1 INTRODUCTION

The experience report according to UFJF is nothing more than a text that describes in detail a given experience that can add considerably to its follow-up of action. It is the characterization that an author or a group makes of a professional experience considered positive or not, but that contributes to the discussion, exchange and proposition of ideas for the improvement of health care.

Being this report of extreme importance for obtaining the degree in Biomedicine, without it you can not conclude the graduation being thus of fundamental importance, so that there is the obtaining of the title and more for biomedicine, it also determines the area of qualification, which is the field in which the staff choose to act, so that the same can come to be released to act in this same segment in which he trained.

The internship field chosen by me was clinical pathology, which is a science of the health area where the Biomedical responsible for performing microscopic examinations of cells, organs and tissues of the human body, or even macroscopic of cells, organs and tissues of the human body, or even macroscopic of surgical parts.

The first stage was the internship period from February 22 to 26, where then there was a break of 1 month due to the pandemic situation, where it was returning on March 30 and continued until June 30, stopping now for the holidays, where this period of time I went through three locations, being the

UPA BH, I spent 3 weeks with the preceptor Mara Aline then I went to Wilson and spent 6 weeks with the preceptor Vinicius Pharmacist, where after that time I returned to UPA BH, where I only spent 1 week, going soon after to the PAM where the first week of internship occurred before the break of a month, in the PAM I spent a month with the preceptor Letícia Fernandes, where I had the opportunity to go through several sectors, collection, uroanalysis, parasitology, biochemistry, despite being all automated.

Stage 2 started a few weeks after the holidays in the period from August 19 to October 22, where this period of time was divided into two locations, in which I spent 5 weeks in each with the preceptor and my duo for these internships, the first internship camp was the CEPAC with the preceptor Nayara Gurgel who taught me a lot, showing the care for each patient, concern, thus doing the work with more humanity, humanized, the concern with each patient in provides the faithful result, working thus with duplicate, doing test, for the second and sometimes even third as it presents some alteration and also having a team in which it has a support laboratory, for tests that are not done directly in the laboratory and in cases of result that need even more attention.

2 OBJECTIVE

2.1 GENERAL OBJECTIVE

Report experience experience in the stâgio during the pandemic, in addition to applying the knowledge acquired in the classroom and take to practice applying in the routine of the laboratory.

2.2 SPECIFIC OBJECTIVE

- Developing greater technique and aptitude with routine;
- Gaining greater skill.

3 METHODOLOGY

3.1 EXPERIENCE RAPPORTEUR

The experience report according to UFJF has according to its essence motivations or methodologies for the actions taken in the situation and the considerations/impressions that the experience provided to the person who experienced it. The report is made in a contextualized way, with objectivity and theoretical contribution. Therefore, it is not just any subjective narration , nor just a narration of facts.

3.2 HDL

- Tube 1 – 100 µl reagent – colest Enz. + 100 µl patient sample = homogenizes and centrifuges for 4 min.
- Tube – Removes from the centrifuged tubes 50 µl of the supernatant + 500 µl of the total cholesterol.
- Go to the water bath for 10 min and then do the reading in Bioplus.

3.3 VDRL

- Kline plate
- 50 µl of the sample
- 20 µl of the reagent
- 4 min in the shaker
- Visualization under the microscope

3.4 RHEUMATOID FACTOR AND CRP

- 25 µl of the sample on the latex plate
- 25 µl of the reagent in the latex plate at the same site of the sample
- With the pipette lock homogenize the sample and reagent distributing it well in the circle
- Place the plate in the stirrer for 2 min, so it is taken for viewing under the microscope.

3.5 PCR AND VDRL DILUTION

- If any sample gives reagent is made the dilution;

- And s-numbers and the tubess. Ex: 1/2, 1/4, 1 ⁄8

physiological;

100 µl of the serum is placed in each tube

- In the 1/2 tube, 100 µl of the patient's serum was placed and homogenized with the tip;
- From this homogenized tube 100 µl was removed and placed in the next tube - 1/4,
- From the 1/4 tube, 100 µl is also removed as it did in the 1/2, thus doing so in tubes, always removing 100 µl from the dilution prior to which it is being made.
- After dilution, 25 µl was placed in the black plate plus 25 µl of reagent is mixed with the pipette tip and distributed well in the circle;
- The agitator was taken to the agitator for 4 min in the case of VDRL and 2 min for PCR.

- In the case of VDRL, 50 µl of the dilution of each tube was placed in the wells of the kline plate + 20 µl of the reagent

3.6 ASO

- Black background plate – latex
- 25 µl of the sample
- 25 µl of the reagent
- Distributes and mixes well throughout the circle
- Agitator for 2 min
- Removes 20µl or 25 µl for viewing under the microscope

3.7 BLOOD TYPING

- 4 tubes
- 1000 µl saline solution
- Remove 50 µl from 1000 µl
- Add 50 µl of the sample in the 3 tubes identified with the patient's number and with A another B and in another RH;
- One drop of the specific referring reagent was placed in each corresponding tube.
- Centrifuge for 1 min
- Shakes and checks the formation of buttons or not;
- Reagent buttons and no buttons, no reagent.

3.8 NCOVA

- Swb in reagent
- Pinga 4 drops on k7 and counts 20 min.
- Check result as soon as you give the time

3.9 CALCIUM

- Plastic tube
- 15 µl of the patient's serum + 1000 µl of the reagent
- 2 min in a water bath
- Takes to do reading

3.10 VHS

- Insert the capillary into the patient's whole blood
- Let the blood travel through the capillary. It doesn't let fill everything.
- When he reached a few inches near the blue tip, he covered himself with his finger.
- be careful not to move, turn the capillary;
- Dough was placed at the opposite end of the blue marker.
- Wait 1h
- Then check and check by the card for hematocrit reading

3.11 GLYCATED HEMOGLOBIN

- 5 µl of whole blood was placed in the ependophilus
- The pipette was washed inside the ependophilus
- It was taken to the homogenizer for 3 min with increased speed
- Took the kit with the K7 and buffer solution
- Identified the K7
- K7 was turned over and 25 µl of the ependophilus solution was placed
- Plus 25 µl of the buffer solution
- It took to do the reading on the equipment
- Where the calibration of the equipment is done before

3.12 HCV

- 10 µl of serum
- 3 drops of the reagent
- Result verifies within 10 to 15 min, no more than that and no less.
- Always identify tests

3.13 HBSAG

- 100 µl of serum
- Result verifies within 10 to 20 min, no more than that and no less.
- Always identify tests

3.14 HIV

- 10 µl of serum
- 3 drops of the reagent

- Result verifies within 10 to 20 min, no more than that and no less.
- Always identify tests

3.15 TROPONIN T

- Collects blood in the heparin tube of the green cap
- Leaves in hematological homogenizer
- I inserted in the cobas h 232 the troponin T test
- Identifies
- Removes 150 µl from the blood
- The 150 µl of blood was placed in the cobas h 232
- Collects blood in the heparin tube of the green cap
- Leaves in hematological homogenizer
- I inserted in the cobas h 232 the troponin T test
- Identifies
- Removes 150 µl from the blood
- The 150 µl of blood was placed in the cobas h 232
- After processing, check: result above 40mg the person will be infarcting.

3.16 OCCULT BLOOD

- Take the occult blood test, check if it is sealed
- Take tube and open takes the toothpick of the tube and pin all the feces
- Then seal again and shake
- Let it act for 15 minutes
- Then take off the tip and prick 2 drops at the base of the test
- Already identified everything, let act 15 minutes and check the result
- Must in all tests always presents, sample the control the trace in C.

4 DEVELOPMENT

The internship is nothing more than the practical experience of what was learned throughout the graduation is the preview of what awaits when we form the knowledge of the routines and the field, of the details that it is onlypossible to learn by living, where we put into practice everything that was learned over these 3 years, Only by reaffirming our capacity in the face of what has already been experienced in college and passed by the professors, in addition to what is provided by Rodizio, realizes that each laboratory has its routine, and dynamics according to the demand and that it is

necessary to be respected so that everything works well. It was also possible to notice the loneliness of the health professional, having to deal due to the pandemic to be away from family, often having to leave home or stay in one as away, not being able to touch his family and friends, without at least seeing. In addition to the exhaustion of the hospitals, UPAS and laboratory crowded and the teams getting sick, in addition to the thousands of dead, it was also possible to realize how important the stages in the teams are to be able to cope.

4.1 CLINICAL CENTER

Municipal center clinical , where goes all the demand of the municipality in examinations of different types. Starting his routine in the laboratory with the collection at 6:30 and goes until 8 am, going to parasitology of 15 to 20 feces per day on a normal day and urinalysis that is routinely in a range of 70 to 90, but both have their peak days, seeing after holidays, recess and on Mondays and Fridays.

Going to the laboratory itself where tests are done: blood typing, cholesterol, tri, tgo, tgp, pcr, hiv, hbsag, hcv, urea, creatinine, psa, prolactin, VDL, blood count, hemoglobin, eas, epf, uric acid, sodium, potassium, TSH, T4, total proteins, iron, ferritin and serum iron.

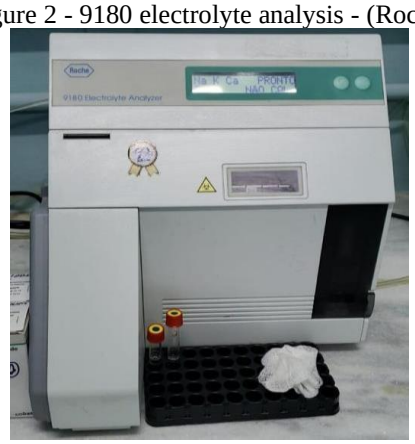
Being an automated laboratory, but that even so it was possible to circulate through the various areas of the laboratory and really participating in the routine, also doing blood smears, blushing and viewing under the microscope the slides of blood, urine and feces.

Below are some images of the lab:

Figure 1 – Centrifuge

Source: Self-authored, 2021.

Figure 2 - 9180 electrolyte analysis - (Roche)

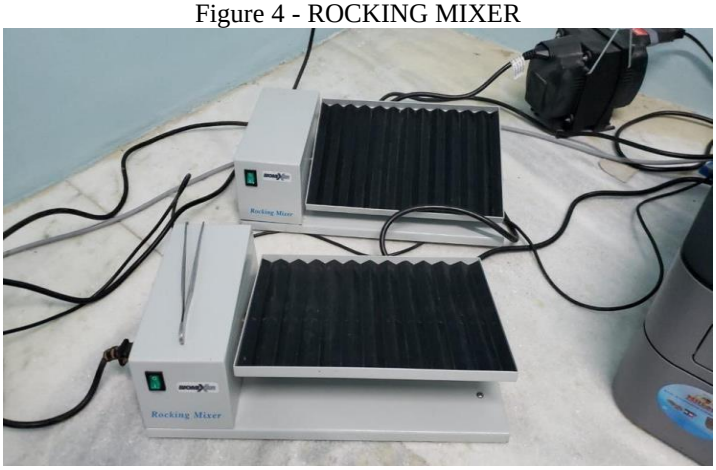


Source: Self-authored, 2021.

Figure 3 - pH Measuring Tape

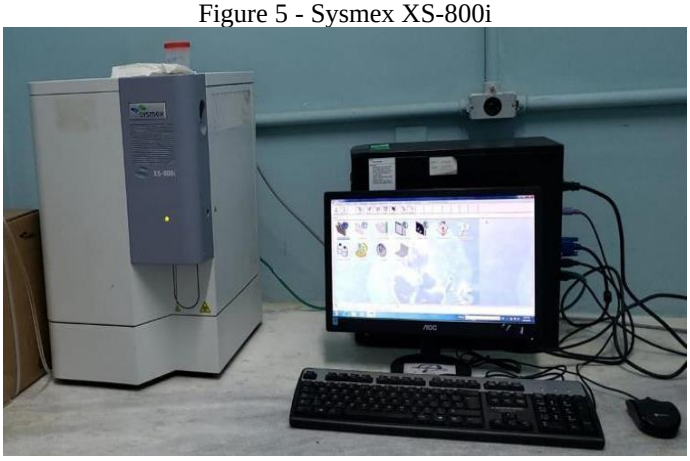
Source: Self-authored, 2021.

Figure 4 - ROCKING MIXER



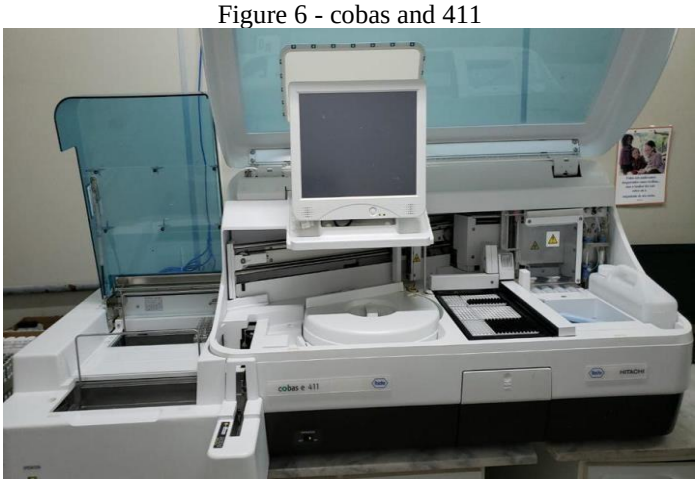
Source: Self-authored, 2021.

Figure 5 - Sysmex XS-800i



Source: Self-authored, 2021.

Figure 6 - cobas and 411



Source: Self-authored, 2021

4.2 UPA

TheEmergency Care Unit (UPA), it is being used in the fight against COVID-19, making the care and hospitalization of people with covid and suspects.

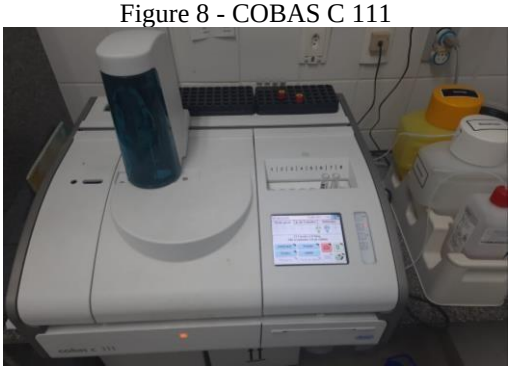
The routine currently of the upa laboratory is basically being to treat hospitalized patients of covid and some suspect, where you have the most intense routine in the morning and afternoon only some examination that seems, usually is lighter in the afternoon, the demand reduces a lot.

The tests done in the laboratory are rapid covid test, rapid covid swab test, swab, The Immuno-RAPID Troponin, rapid dengue test, EAS, biochemical tests that are all performed at COPAS C111, having in its menu of tests: Substrates: Iron, Lactate, Phosphorus, Cholesterol, HDL Cholesterol, Direct Bilirubin, Total Bilirubin, Calcium, Glucose, Magnesium, Total Protein, Triglycerides, BCG albumin, creatinine, urea, uric acid; Enzymes: Creatinine Kinase (CK), CK-MB, Amylase - pancreatic, Amylase - total, Lipase, Alkaline Phosphatase, ALT, AST, GGT, Lactate, Dehydrogenase; Proteins, CRP, D-dimer, HbA1c (hemolyzed), HbA1c (whole blood), Microalbumin; ISE: Chloride, Potassium, Sodium M.

Figure 7 – Microscope

Source: Self-authored, 2021.

Figure 8 - COBAS C 111



Source: Self-authored, 2021.

Figure 9 – Sysmex

Source: Self-authored, 2021.

Figure 10 - Cobas h 232

Source: Self-authored, 2021.

4.3 HOSPITAL

The Hospital is a private hospital where it has one of the greatest demands of the municipality, where I had the opportunity to intern for almost 2 months.

The hospital laboratory has an intense routine for blood counts, biochemicals, there was also a demand every day there was urine and feces, also had the rapid tests for covid, HIV, syphilis, but there was no demand to do every day but every week you had.

Routinely, every day I did blood smears, colored the slides, and visualized in the microscope where I did the count and observed the cells, and also made urine every day visualized them in the microscope observing them and reporting with the help of the preceptor always checking if everything was correct.

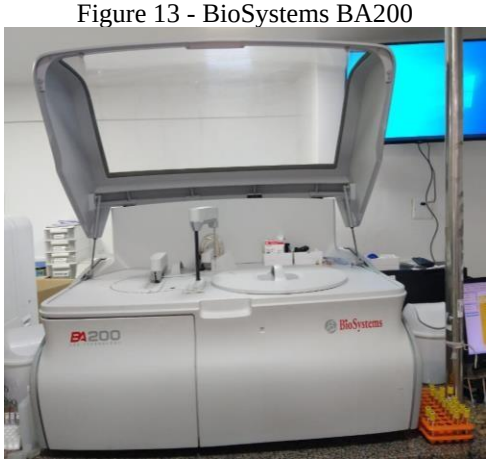
Figure 11 – Centrifuge

Source: Self-authored, 2021.

Figure 12 - Sysmex XT-1800i

Source: Self-authored, 2021.

Figure 13 - BioSystems BA200



Source: Self-authored, 2021.

Figure 14 – IMMULITE

Source: Self-authored, 2021

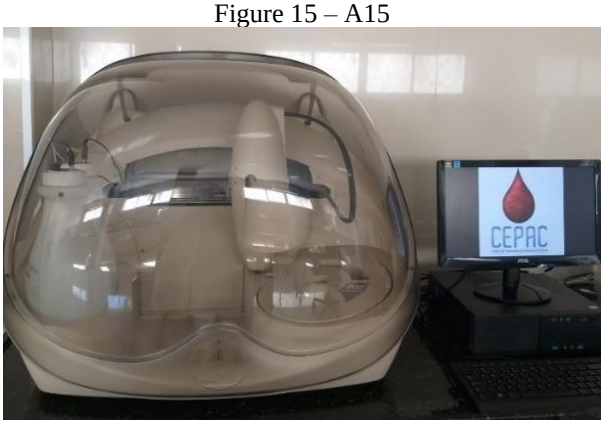
4.4 LABORATORY

The Laboratory is a private clinic, where I had the opportunity to learn a lot in the laboratory, where there is a very intense routine where almost all your routine is manual which required a lot of the team, attention and dedication but is still all under our control.

From the collection that starts at 6:30 a.m. and goes until 8 a.m. to 9 a.m., where the blood is separated those that go to the Hematology Homogenizer that are the weak edta and heparin hemogram tests, tests such as: blood count, blood typing, glycated hemoglobin the common ais in the routine of CEPAC. Those who go to centrifuge to obtain the serum for the performance of various tests, being the most frequent in the day-to-day are: HIV, HCV, HBsAg, BetaHCG, PCR, HDL, Ferritin and ASO. Where these tests almost all are done in a Manuel way, just not the blood count.

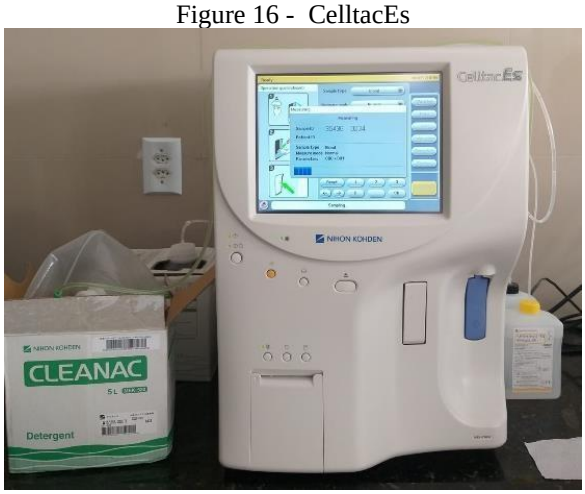
In the laboratory is provided the most diverse tests. Below are some images of the main equipment used:

Figure 15 – A15



Source: Self-authored, 2021.

Figure 16 - CelltacEs

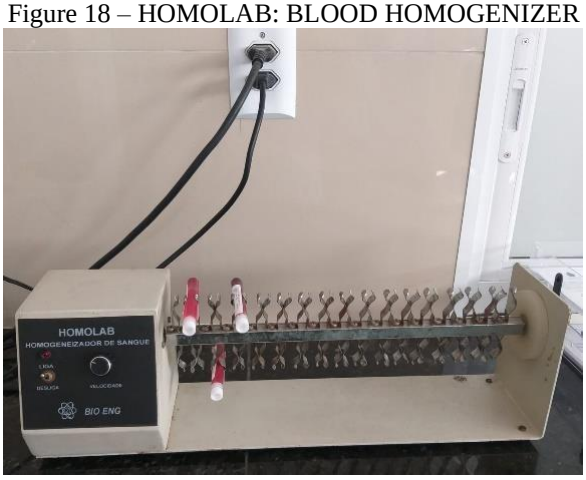


Source: Self-authored, 2021.

Figure 17 – GT-201BD Kline Shaker

Source: Self-authored, 2021.

Figure 18 – HOMOLAB: BLOOD HOMOGENIZER



Source: Self-authored, 2021.

Figure 19 – FANEM – WATER BATH

Source: Self-authored, 2021.

Figure 20 – Centrifuge

Source: Self-authored, 2021.

4.5 UPA

The routine currently of the upa laboratory is returning to its normal little by little, since the cases of covid have reduced and not being more frequent appear suspicious people, where you have the most intense routine in the morning and afternoon only some examination that seems, usually lighter in the afternoon, the demand reduces a lot.

5 FINAL CONSIDERATIONS

The report of internship experience in Clinical Pathology (clinical analyses) during the pandemic, in which the internship was provided by the educational institution in order to contain the title of Clinical Pathology, behind in its didaca rotations by several clinics, was essential for my training for a better preparation for the job market, allowing to see several routines, participate, contributing with my services, working within all sectors from collection, separation, hematology, biochemistry, rapid tests, calibration of devices, visualization under the microscope, uroanalysis, parasitology. In addition to having gone through all these processes and, an atypical situation, during a pandemic, I became even more prepared. In addition to teamwork always using ethics, biosecurity and patience. All this made me a qualified professional to already enter the market to work, taking the title of Biomedical qualified in Clinical Pathology.

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CHAPTER

6

Zoonosis and reverse zoonosis of SARS-CoV-2 from the perspective of the One Health

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ABSTRACT

According to the WHO, as of July 26, 2022, there were 568,773,510 confirmed cases of COVID-19 and 6,381,643 deaths recorded because of this disease worldwide (WHO, 2022). The etiologic agent of COVID-19 is the SARS-CoV-2 coronavirus, an RNA virus of the family Coronaviridae and subfamily Orthocoronavirinae (XAVIER et al., 2020). Humans infected with SARS-CoV-2 have clinical signs such as fever, non-productive cough, shortness of breath, and may progress to pneumonia, acute respiratory syndrome, and kidney failure, although a few other signs, symptoms, and clinical forms may be observed less frequently (SAXENA et al., 2020). The evolution of the infection to severe acute respiratory syndrome can lead to death from COVID-19. These patients have a strong inflammatory response, like that of cytokine release syndrome, and increased migration of neutrophils to lung tissue triggered by inflammatory mediators released by epithelial, endothelial cells of infected tissue and by immune system cells attracted to the site of infection (MANGIAVACCHI et al., 2020; MERAD et al. 2022; BHARDWAJ et al., 2022; LI & LI, 2022).

Keywords: COVID-19, Zoonosis.

1 INTRODUCTION

According to the WHO, as of July 26, 2022, there were 568,773,510 confirmed cases of COVID-19 and 6,381,643 deaths recorded because of this disease worldwide (WHO, 2022). The etiologic agent of COVID-19 is the SARS-CoV-2 coronavirus, an RNA virus of the family Coronaviridae and subfamily Orthocoronavirinae (XAVIER et al., 2020). Humans infected with SARS-CoV-2 have clinical signs such as fever, non-productive cough, shortness of breath, and may progress to pneumonia, acute respiratory syndrome, and kidney failure, although a few other signs, symptoms, and clinical forms may be observed less frequently (SAXENA et al., 2020). The evolution of the infection to severe acute respiratory syndrome can lead to death from COVID-19. These patients have a strong inflammatory response, like that of cytokine release syndrome, and increased migration of neutrophils to lung tissue triggered by inflammatory mediators released by epithelial, endothelial cells of infected tissue and by immune system cells attracted to the site of infection

(MANGIAVACCHI et al., 2020; MERAD et al. 2022; BHARDWAJ et al., 2022; LI & LI, 2022).

Coronaviruses generally infect various animal species and cause respiratory, enteric, hepatic, renal, neurological, and in some cases, systemic diseases. Most coronaviruses have specificity for one type of host (WANG & YOO, 2022), but some may acquire the ability to infect a wider range of animal species from mutations (CAVANAGH & BRITTON, 2021).

Coronaviruses were not considered highly pathogenic among immunocompetent humans until the emergence of SARS-CoV-1 in China in 2002. quickly spread around the world (LEE et al., 2003; PEIRIS et al., 2003), but no cases of disease were reported after 2004 (MANN et al., 2020). MERS was a coronavirus reported in 2012, with the isolation of the previously unknown virus from respiratory samples from a patient in Jeddah, Saudi Arabia. The dynamics of MERS virus infection are still poorly known, but research indicates dromedary bats and camels as intermediate reservoirs (PEIRIS & PERELMAN, 2022). The virus is still circulating in the Middle East, with more than 2600 cases reported in 27 countries as of July 2022 (EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL, 2022). SARS-CoV-2 emerged in Wuhan, China, in December 2019, and by March 2020 had established itself as a pandemic, being the coronavirus with the greatest impact on global public health to date.

The SARS, MERS, and COVID-19 outbreaks share many similarities in clinical presentation and form of transmission. Although acute respiratory tract infections are the most common clinical manifestations, other organs can be affected, and systemic diseases are not uncommon in these viruses. Another striking feature is the zoonotic origin. According to Su et al. (2016) and Forni et al. (2017), analyses of genetic similarities allow us to affirm that all coronaviruses that affect humans have their origin in viruses that originally affected animals. The emergence of SARS-CoV-2 as a human pathogen is no exception, since more than 60% of emerging infectious diseases originate in wild animals (JONES et al., 2008). Zoonoses do not occur in a single sense in the dynamics of infection, from animals to humans. Like other diseases, the ability of animals to be infected by SARS-CoV-2 from contact with humans has already been demonstrated.

The objective of this work is to perform an analysis of the current scientific literature, regarding the possibility of zoonosis and zooanthroponosis of SARS-CoV-2 from the perspective of Single Health and possible implications for the future of the evolution of the virus.

2 METHODOLOGIES

The present work has the methodological design of a narrative review of the literature on the incidence of SARS-CoV-2 in animals and the impacts of the virus as an agent of zoonosis and reverse zoonosis. The review evaluated scientific articles available in the PubMed, SciELO and Google

Scholar databases, as well as medical and veterinary microbiology books. The descriptors used, in various combinations, were: "SARS-CoV-2"; " animals", "zoonosis", "reverse zoonosis", "spillover", "spillback", "One Health", "interspecies transmission". Due to the theme addressed, the time frame of the literature review was established between the years 2019 and 2022. The inclusion criterion of articles was the verification of results consistent with the objective of the research. Of these studies, studies that presented laboratory confirmation by PCR, serology and equivalent diagnostic resources were selected. Articles that did not meet the criteria for evaluation were excluded, such as deficient or inadequate methodology, inconsistent data, and lack of laboratory confirmation. After reading the title and abstract, the material that presented consistency with the researched theme and the articles and reports read in full were selected. Then, the analysis of the material was performed, distribution of the results by related taxonomic groups, considerations on aspects of Single Health and writing of the critical review.

3 DISCUSSIONS

The identification of virus receptors contributes significantly to the understanding of cellular and tissue tropism and the ability to infect hosts, in addition to explaining aspects of the pathogenesis of the virus (EVANS, 2008). Like the first coronavirus (SARS-CoV) of greater pathogenicity for humans, SARS-CoV-2 uses the angiotensin-converting enzyme 2 (ACE2) receptor to primarily enter hair cells of the bronchial epithelium and pneumocytes (XAVIER et al., 2020; SHANG et al. 2020; ZHOU et al., 2020). Diverses mammals have compatible ACE2 receptors in their cells, and the degree of affinity between these receptors and the SARS-CoV-2 spike protein is a predictor of the possibility of infection (ALEXANDER et al., 2020; BOURICHA et al., 2020; LAM et al., 2020; KUMAR et al., 2020; SHEN et al. 2020; DEVAUX et al., 2021). The possible presence of other relevant factors in the interaction of SARS-CoV-2 with the host cell, such as compatible receptors for type C lecithin, heparan sulfate, and sialic acid (CLAYTON et al., 2022; KUCHIPUDI et al., 2022) may or may not contribute to the success of viral infection capacity according to the physiology of each animal species.

The origin of SARS-CoV-2 is uncertain, but many studies point to evidence that bats of the species *Rhinolophus lepidus* were the original hosts of the virus that gave rise to the pathogen that caused the pandemic in humans, with the possibility of an intermediate host (ZHOU et al., 2020). Studies analyzing the genetic composition propose that coronaviruses originating from bats are the basis of all other types of coronaviruses that infect mammals (VIJAYKRISHNA et al., 2007; WOO et al., 2012). Thus, the search for reverse zoonosis of SARS-CoV-2 in bats is a very plausible hypothesis (OLIVAL et al., 2020; COX-WITTON et al., 2021), although virus replication in lab-grown renal cells of *Rhinolophus lepidus* bat is considered limited (AUERSWALD et al., 2022). A survey of 129 bats

in Italy revealed no positivity for SARS-CoV-2 (DAKROUB et al., 2022). The dynamics of interaction between humans and bats may not be favorable for the spillover of SARS-CoV-2 between species, however, they do not exclude the hypothesis of reverse zoonosis. One factor to consider is that bats have a great diversity of species and the structure of ACE2 receptors varies substantially among chiropractor species (YAN et al., 2021). And in an experimental study, Schlottau et al. (2020) intentionally infected nine bats of the species Rousettus aegyptiacus, of which et (78%) developed transient infections with viruses detectable by PCR, in the nasal cavity, trachea and lung, presenting Symptoms of rhinitis. Among three bats not inoculated and put in contact with the infected animals, one individual acquired the virus by contagion.

Rats' ACE2 receptors are poorly matched with the SARS-CoV-2 virus spike. For this reason, genetically modified acts using the CRISPR/Cas9 technique with the addition of the human ACE2 receptor expression gene have been used as a model for studying the pathogenesis and transmission of SARS-CoV-2 (SUN et al., 2020; STOLP et al. 2022). There is little affinity of the rat natural ACE2 receptor for the SARS-CoV-2 spike protein (KOLEY et al., 2021; SHOU et al., 2021). This low compatibility of the receptor in the genus Rattus explains the result of Miot et al. (2022), that among 217 rats of the species Rattus *norvegicus and Rattus tanezumi* found negative results in all PCR tests. These authors, however, verified that in one of the rats the serological test for detection of antibodies against SARS-CoV-2 was positive, indicating that this individual came into contact with the virus and obtained an immune response. Some emerging variants of SARS-CoV-2 have mutations that have the potential for greater adaptability to the murine ACE2 receptor, with the possibility of evolving to a greater tropism for this group of animals (SHUAI et al., 2021). The possible adaptation of SARS-CoV-2 with the acquisition of infective capacity for domestic rats could have a major impact on global public health.

The analysis performed by Preziuso (2020) of ACE2 receptors in rodents of the Order Lagomorfa, which include rabbits and hares, pointed to a high compatibility for the spike protein of SARS-CoV-2 and the possibility of susceptibility of these animals to the virus. Mykytyn et al. (2021) conducted experimental infection tests on three rabbits (*Oryctolagus cuniculus*) in the Netherlands to verify the feasibility of developing SARS-CoV-2 in these animals. The tests demonstrated the susceptibility of this species to the virus. The following year, Fritz et al. (2022) examined blood samples from 144 rabbits raised as pets in France and reported positivity in one animal (4.86%), based on the results of detecting both antigens and antibodies. These authors assess that the low prevalence may be an indication that rabbits are little susceptible to natural infection by SARS-CoV-2 and that, at least in relation to the currently circulating strains, they do not represent a risk of becoming reservoirs for the virus.

Golden hamsters (Mesocricetus auratus) are animals of the family Cricetidae widely used in laboratory experimentation and as pets. It was already known that this species demonstrated susceptibility to SARS-CoV-1 by the natural compatibility of ACE2 receptors (ROBERTS et al., 2003). Sai et al. (2020) infected golden hamsters via intranasal spray to evaluate the replication capacity of SARS-CoV-2 in this species. The virus replicated in cells of the nasal mucosa, bronchial epithelium, and areas of the lung. Viral antigens were found in the epithelial cells of the duodenum and viral RNA detected in the feces. The researchers reported that infected hamsters were able to transmit SARS-CoV-2 to other individuals of the species occupying the same cages, mainly by direct contact and through droplets, a result like that of the experiment conducted by Dowall et al. (2021) regarding transmission between animals in the same environment. Song et al. (2021), in a similar experiment, further found that SARS-CoV-2 infected hamsters systemically, with diffuse alveolar damage, and damage to the spleen, lymph nodes, different parts of the digestive system, liver adrenal gland, ovary, vesicular gland and prostate. Blaurock et al. (2022) state that the high susceptibility of golden hamsters to SARS-CoV-2 and the development of the virus in these rodents from viral loads considered small are indicative that these animals can be considered as potential sources of transmission to humans.

Yen et al. (2022) sequenced the SARS-CoV-2 genome obtained from golden hamsters and humans caring for these animals in pet shops. These authors presented evidence that pet hamsters can be naturally infected with SARS-CoV-2 and transmit the virus to humans. Comparison of coronavirus genetic sequences shows strong evidence of transmission of the Delta variety of SARS-CoV-2 from hamsters to humans, followed by human-to-human transmission of this virus. The movement of animals imported from one country to another, as observed by testing in Hong Kong among hamsters from the Netherlands, can be a means of diffusion of new strains (KOK et al., 2022), contaminating other animals and humans.

Other species in the family Cricetidae were also susceptible to experimental SARS-CoV-2 infections. Fagre et al. (2021) demonstrated that the deer rat (Peromyscus maniculatus) and the desert rat (Neotoma lepida) are susceptible to infection and can transmit the virus between individuals through direct contact or by aerosols. Unlike the golden hamsters investigated in the other studies, these are native species in North America, and the possible spread of the virus to wild deer rats poses a risk to the populations of these species and to the balance of the environment.

Ferrets (Mustela putorius) are mustelids highly prized as companion animals in several countries of the world and are susceptible to SARS-CoV-2. Giner et al. (2021) investigated the prevalence of SARS-CoV-2 in 127 ferrets kept in captivity in Spain. Dois individuals (1.57%) presented anti-SARS-CoV-2 antibodies, which remained detectable in the ELISA test for the following

129 days, demonstrating the exposure of these animals to the virus. Gortázar et al. (2021) performed quantitative PCR tests on 71 ferrets belonging to seven owners of these animals in the same country and detected SARS-CoV-2 in six individuals (8.4%), with viral loads indicative of infection. The authors concluded that ferret infection occurs in circumstances where the viral load to which they are exposed is high. Račnik et al. (2021) also presented a case report of SARS-CoV-2 transmission from an owner to the pet in Slovenia, in which the animal was hospitalized with gastroenteritis, vomiting, anorexia, and profuse diarrhea. For the diagnosis of infections in humans and animals, PCR and genotyping tests were performed, which confirmed that the viruses belonged to the same lineage. There is evidence that ferrets exhibit some resistance to infection when exposed to low viral load (SHI et al., 2020; Ryan et al., 2021; MONCHATRE- LEROY et al., 2021), confirming the hypothesis of Gortáz ar et al. (2021). However, after experimental infections become effectively established, these animals are highly susceptible, developing acute broncheolitis, presenting high levels of viral replication and contamination among individuals who share the same environment through direct contact, or through urine, feces and aerosols (KIM et al., 2020; Kutter et al., 2021; Richard et al., 2021; SAWATZKI et al., 2021) The contamination of ferrets by SARS-CoV-2 through viral particles dispersed by aerosols in the air by infected animals can exceed one meter away (RICHARD et al., 2021).

The mink anduropeum (Mustela mink) and the mink american (Neovison mink) are mammals of the family Mustelidae widely bred in various countries for the use of the skin as a material for clothing. In April 2020, Oreshkova et al. (2020) investigated the first outbreak of SARS-CoV-2 in mink on two breeding farms in the Netherlands. At least 18 animals died from the infection, most of them from interstitial pneumonia. In the following months, several other mink farms recorded outbreaks of SARS-CoV-2 in the same country (MOLENAAR et al., 2020; LU et al., 2021; MUNNINK et al., 2021) and in other countries such as Denmark, Poland, Spain, United States, Sweden, Italy, France, Lithuania, and Canada (HAMMER et al., 2021; Rabalski et al., 2020; ECKSTRAND et al., 2021; SHARUN et al., 2021). The rapid expansion of SARS-CoV-2 in mink from commercial breeding is linked to an adaptive mutation of the virus, which has made the spike protein more compatible with these animals' ACE2 receptors (STATENS SERUM INSTITUT, 2020; DYER, 2020; FRUITS & DEVAUX, 2020; LARSEN & PALUDAN, 2020; BARUA et al. 2022). Cases of SARS-CoV-2 transmission from mink to humans have been reported in Denmark and the Netherlands (STATENS SERUM INSTITUT, 2020; DYER, 2020; HAMMER et al., 2021; Munnink et al., 2021). Authorities in the European Union have declared that all mink farms are considered at risk and active monitoring should be carried out for the early detection of infection and the elimination of herds in which cases of SARS-CoV-2 infection are verified (EUROPEAN FOOD

SAFETY AUTHORITY AND EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL et al., 2021). Harrington et al. (2021) warned of the possible risk of extravasation of the strains most adapted to wild mink populations, a hypothesis confirmed by Aguiló-Gisbert et al. (2021) a few months later, when they found two free-living mink carrying SARS-CoV-2 in Spain. The rapid transmission of species-adapted SARS-CoV-2 and high mortality rates in confined animals make the consequences of the spread of the novel coronavirus in wild mink populations alarming and unpredictable. Manes et al. (2020) suggest that the rapid adaptation of ASRS-CoV-2 in mustelids may initiate panzoonosis.

Padilla-Blanco et al. (2022) reported the presence of SARS-CoV-2 in a European otter in a water reservoir in Valencia, Spain. The researchers detected the virus through two PCR-type test kits and performed genotyping of the found virus. Analysis of the genetic sequence showed that much of the SARS-CoV-2 genetic material infecting the otter was common to strains circulating among humans, but other sequences were divergent from the known strains. This genetic arrangement constitutes a unique variety of the virus and suggests that SARS-CoV-2 mutations may be evolving in host populations of the family Mustelidae.

Species of the family Procyonidae have shown some susceptibility to SARS-CoV-2. Freuling et al. (2020) conducted an experimental study with infection induced by intranasal spray containing SARS-CoV-2 that demonstrated that raccoon (Procyon lotor) is susceptible to infection by the virus and can transmit to other individuals by direct contact. The infected raccoons showed subtle clinical signs. The histopathological study showed evidence of viral replication and tissue lesions only in the nasal turbinates. The study also demonstrated that experimentally infected animals can transmit SARS-CoV-2 to other uninfected animals through direct contact. Allender et al. (2022) performed PCR-type tests on nasopharyngeal samples in animals at the Chicago Zoo, United States of America, and found positivity for SARS-CoV-2 in a coati (Nasua nasua). The animal showed no clinical signs of the disease. Further studies on the possibility of infection in free-living Procyonidae are needed, since these animals often frequent anthropic environments in search of food (DEMENY et al., 2019; BARCELAR et al., 2022), with the possibility of direct or indirect contact and contamination by humans.

Domestic dogs (Canis familiaris) are the most popular companion animals in the world, in close contact with their owners, and for this reason much more studied than other species of animals regarding the possibility of infection by the new coronarivus. SARS-CoV-2 has been detected in domestic dogs (Canis familiaris) in several studies, but these animals are asymptomatic or with mild signs and symptoms during infection (SIT et al., 2020; HAMER et al., 2022; BARROSO-ARÉVALO et al., 2022; JAIRAK et al., 2022; Medkour et al., 2022; Rivero et al., 2022; ZAMBRANO-MILA et

al., 2022). Although the affinity of the ACE2 receptor in dogs for SARS-CoV-2 is considered high (WU et al., 2020; Koley et al., 2021; MA & GONG, 2021; ZHANG et al, 2021), this factor is not the only predictor of susceptibility to the virus (WU et al., 2020; Koley et al., 2021; MA & GONG, 2021; PIPLANI et al., 2021). Patterson et al. (2020) examined 919 domestic dogs in Italy at the height of the pandemic in this country, finding antibodies against SARS-CoV-2 in 3.3% of these animals, but no dogs tested positive for viral particles. Barroso et al. (2022), in research with 22 dogs in Portugal whose owners were positive for SARS-CoV-2, found seropositivity in 50% of the animals, but PCR was reactive in only one dog. These results show that Canis familiaris does not constitute a good host or has efficient immune defense mechanisms for the virus strains circulating in those countries. To date, there is no evidence of transmission of SARS-CoV-2 from dogs to humans (NADERI et al., 2022; OLIVEIRA et al., 2022).

Zambrano-Mila et al. (2022) analyzed the oral and nasal smear samples of three dogs from Amazonian indigenous communities with high prevalence of COVID-19 among humans. Two PCR kits that analyzed different viral particles were used to confirm the presence of the virus. The result showed positivity for the three dogs examined. The authors point out that the occurrence of SARS-CoV-2 in dogs living in the Amazon rainforest is worrisome, due to the risk of transmission to other animals of the native fauna that interact with the pets, representing a risk from the perspective of unique health.

Domestic cats (Felis catus), like dogs, are pets exposed to contact with the SARS-CoV-2 virus by proximity to infected humans. Cats have susceptibility to the virus, verified both by experimental infections (GAUDREAULT et al., 2020; BOSCO-LAUTH et al., 2020; Halfmann et al., 2020; SHI et al., 2020; BRAUN et al. 2021; PATANIA et al., 2022) as well as by the discovery of animals that acquired the infection naturally (RUIZ-ARRONDO et al., 2020; AART et al., 2021; BARROSO-ARÉVALO et al., 2021; CURUKOGLU et al., 2021; BRANDÃO et al. 2021; HOSIE et al., 2021; Klaus et al., 2021; Natale et al., 2021; PAGANI et al., 2021; BARROSO et al., 2022; JAIRAK et al., 2022, MOHEBALI et al., 2022). Many cats have had clinical manifestations (GAUDREAULT et al., 2020; BOSCO-LAUTH et al., 2020; Halfmann et al., 2020; SHI et al., 2020; AART et al., 2021; BRANDÃO et al. 2021; BRAUN et al. 2021; HOSIE et al., 2021; Natale et al., 2021; PAGANI et al., 2021; PATANIA et al., 2022) with varying degrees of severity. Brandão et al. (2021) point out one of the most common characteristics in the domesticated cats examined: free access to the environment outside the home. This habit is particularly important for a potential increase in the viability of virus dispersal, since these cats in the circulation outside the home have contact with humans, cats and animals of other species. The possibilities of zoonotic and reverse zoonosis transmission of SARS-CoV-2 are even more plausible since research shows transmission of the virus directly between cats

(GAUDREAULT et al., 2020; Halfmann et al., 2020; BRAUN et al., 2021; SHI et al., 2020; BARROSO et al., 2022), and among cats and other species, such as the acquisition of mink-borne viruses (AART et al., 2021). Although Chaintoutis et al. (2022) state that there is no record of adaptive mutations in SARS-CoV-2 strains found in cats when compared to strains circulating among humans, Braun et al. (2021) found that the Ômicron variety with mutation in the position of the amino acid H655Y sees rapid transmission between cats under experimental conditions, resulting in an affinity specific that calls for further investigation. The mutation in the position of the amino acid H655Y in the spike of the virus is found in many of the "subvariants of interest" according to the classification of the World Health Organization, with the potential to escape the immunity conferred by the vaccine antigens currently used (HARVEY et al., 2021; OU et al., 2022).

Big cats are susceptible to SARS-CoV-2 infections. Cases of natural infection have been recorded in cats of the genus Panthera, such as lions (Panthera leo) in the wild (MISHRA et al., 2021) and in zoos (BARTLETT et al., 2021; FERNÁNDEZ-BELLON et al., 2021; MCALOOSE et al., 2021; Karikalan et al., 2021; NAGY et al., 2022); captive tigers (Panthera tigris) (MCALOOSE et al., 2020; WANG et al., 2020; BARTLETT et al., 2021; CUSHING et al., 2021; GROME et al., 2022; NAGY et al., 2022); leopards (Panthera pardus) in the wild (MAHAJAN et al., 2022); and snow leopards (Panthera uncia) in zoo (WANG et al., 2022). SARS-CoV-2 infection has also been reported in suçuarana (Puma concolor) (GIRALDO-RAMÍREZ et al., 2021). As with domestic cats, some animals showed signs and symptoms with varying severity (MCALOOSE et al., 2020; BARTLETT et al., 2021; CUSHING et al., 2021; FERNÁNDEZ-BELLON et al., 2021; Karikalan et al., 2021; GROME et al., 2022). The incidence of SARS-CoV-2 of the Delta variety, with symptomatic individuals among wild Asian lions (MISHRA et al., 2021) is worrisome due to the threat to the population of only 523 remaining individuals of this subspecies in the wild, in a restricted region of the province of Gujarat, India, according to an estimate made in the year 2018 (SINGH, 2018).

White-tailed deer (Odocoileus virginianus) are the most common deer in North America. These animals are highly susceptible to SARS-CoV-2 infection. In a survey of 151 deer in Iowa, United States of A, Kuchipudi et al. (202 2) found genetic material of the virus in 33.2% of the animals, with an epidemic peak between November 23, 2020, and January 10, 2021, in which 82.5% of the individuals examined were positive for PCR tests for the detection of SARS-CoV-2. The genetic analysis identified 12 different strains of SARS-CoV-2, and the coincidence in the predominance of the circulating strains in deer and humans according to geographic distribution suggests that there were multiple events of spread by reverse zoonosis, in addition to the transmission of SARS-CoV-2 between deer. Hale et al. (2022) conducted a similar survey in the state of Ohio, and among 360 animals, 129 (35.8%) were positive for the detection of SARS-CoV-2 through the PCR technique, with records of

three different strains of the virus. Vandegrift et al. (2022) detected SARS-CoV-2 through PCR testing using material obtained from nasal smears of white-tailed deer on Staten Island, New York, and found positivity in 7 of the 68 (10.29%) of the deer sampled. Viral genome sequencing identified that the Ômicron variety of SARS-CoV-2 circulating among deer is phylogenetically close to that prevalent in humans in New York City. Marques et al. (2022) conducted a survey in the state of Pennsylvania, United States of America, in which they examined 123 Odocoileus virginianus nasal smear samples analyzed by PCR, of which 20 (16.3%) were positive for SARS-CoV-2. Alpha and delta variants were found.

Chandler et al. (2021) investigated in four states of the same country that involved the serology analysis of 385 blood samples from white-tailed patients living in the vicinity of cities that revealed that 485 of the animals had antibodies against SARS-CoV-2, confirming exposure to the virus. The serology of white-tailed animals in free-living animals in Texas revealed that in the year 2020 no sample was found with positive serology for antibodies against SARS-CoV-2, but among the 54 samples collected in the year 2021, 20 (37%) were positive (PALERMO et al., 2021). These results point to a high prevalence rate of SARS-CoV-2 in populations of this species in a wide geographic distribution in the United States of America.

Experimental infections of white-tailed deer individuals confirmed a high rate of transmission of the virus among the animals, as well as tropism and multiplication of SARS-CoV-2 in several organic tissues of this species. The infections were considered subclinical, but the viral load dispersed through the nasal secretion and feces of the infected animals was considered high, as well as the transmission rates among individuals of Odocoileus virginianus (PALMER et al., 2021; MARTINS et al., 2022).

In addition to the high incidence rate, an important feature for the epidemiological course of SARS-CoV-2 in white-tailed deer is the multiplicity of strains circulating among these animals, as verified by Chandler et al. (2021), Marques et al. (2022) and Kuchipudi et al. (2022). Marques et al. (2022) found that the alpha strain persisted in the deer population after replacing the prevalence in humans with the delta variety, and the genotype of the alpha variants obtained from deer diverged significantly from those infecting humans, presenting mutations consistent with adaptability to the new host species. Hale et al. (2021) indicated that deer-to-deer viral transmission of viruses B.1.2, B.1.582, and B.1.596 allowed the virus to exhibit changes in the spike protein, including the receptor binding domain, and other infrequent mutations in strains circulating between humans. Pickering et al. (2022) have identified a new highly divergent strain of SARS-CoV-2 in a white-tailed deer in Ontario, Canada. This lineage has the highest number of genotype changes identified to date, with 76 mutations, including 37 changes in the viral genotype previously associated with non-human hosts.

Although there is no evidence of contamination of humans by contact with white-tailed deer (HALE et al., 2022), there is great potential for eventual transmission, including new variants of SARS-CoV-2, since these animals frequent peri-urban environments (CHANDLER et al., 2021; HALE et al., 2021; KUCHIPUDI et al., 2022). White-tailed deer are appreciated as game meat (BRICEÑO-MÉNDEZ et al., 2021), and the consumption of this animal in human food offers an atypical, but not unlikely, risk of infection due to the multiplication of the virus in a wide variety of tissues and organs in this deer species (PALMER et al., 2021; MARTINS et al., 2022).

The structural characteristics of the ACE2 receptor of old-world primates are predictors of a high susceptibility of these animals to SARS-CoV-2, as they bear up to 99% similarity to the human ACE2 protein (DAMAS et al., 2020; MELIN et al., 2020; SHI et al., 2020). Great apes are susceptible to many of the diseases that affect humans by genetic affinity, especially respiratory viruses (SPELMAN et al., 2013; Negrey et al., 2019). Experimental infections have verified the susceptibility of rhesus monkeys (Macaca mulatta and Macaca fascicularis), with signs, symptoms, and evolution of pathogenesis similar to that of COVID-19 in humans (LU et al., 2020; MUNSTER et al., 2020; ROCKX et al., 2020; SHAN et al., 2020; ZHENG et al., 2020). Contact with humans has been the source of gorilla contamination in zoos (NAGY et al., 2022; ISLAM et al., 2021; GIBBONS, 2021), with mild symptoms of respiratory infection. The possibility of reverse zoonosis for great apes, including chimpanzees and gorillas, has prompted the implementation of protective measures in wildlife reserves across Africa and Asia (GIBBONS, 2021). Non-primate New World monkeys have low susceptibility to SARS-CoV-2 (LU et al., 2020; LIU et al., 2020), possibly due to the lower affinity of the ACE2 receptor, which has a similarity of 92% in relation to the human os cellular receptor, with four differences between the twelve binding sites considered essential for the coupling of SARS-CoV-2 (MELIN et al. 2020; BHATTACHARJEE et al. 2021; ABREU et al., 2021). Research conducted in Brazil with free-living monkeysfound no signs of infection in these animals (SACCHETTO et al, 2020; ABREU et al., 2021).

Other captive animal species have tested positive for SARS-CoV-2, such as hippos (Hippopotamus amphibius) (BBC, 2021), Asian cat bear (Arctictis binturong), spotted hyena (Crocuta crocuta) and mandrill (Mandrillus sphinx) (USDA APHIS, 2022), demonstrating the possibility of a greater number of hosts for the pandemic virus.

According to the Food and Agriculture Organization of the United Nations, One Health is an integrated and unifying approach that aims to balance and sustainably optimize the health of people, animals, and ecosystems. It recognizes that the health of humans, domestic and wild animals, plants, and the environment in general (including ecosystems) are closely linked and interdependent (ONE HEALTH HIGH-LEVEL EXPERT PANEL, 2022). It is a comprehensive approach to understanding

the risks to human and animal health, including domestic animals and wildlife, and the health of the ecosystem. These principles are fundamental to a critical analysis of collaborative and interdisciplinary approaches to responding to emerging and emerging diseases. A key factor in this analysis is the inclusion of animal health and the balance of the environment as a component of the prevention, surveillance, control, and mitigation of global diseases. The analysis of the pandemic through the perspective of Single Health is, therefore, the most appropriate approach due to the zoonotic origin and possible reverse zoonosis of the dynamics of transmission of SARS-CoV-2. According to Winck et al. (2022), outbreaks of zoonotic diseases are the result of an ecological, socioeconomic and demographic interconnection that determine conditions for greater contact between the vulnerable human population and wildlife in areas in environmental degradation and for the rapid geographical spread of infections. These circumstances are verified both in the hypotheses of the emergence of SARS-CoV-2 as a human pathogen and in the possible perpetuation of the virus through reverse zoonosis, characterizing the pandemic as an event inseparable from environmental conditions.

The evolution of the various variants of the virus may be related to the continuous spillover between species. Wei et al. (2021) and Sun et al. (2021) analyzed the genetic sequencing of the Ô micron variant and found that this strain had mutations adapted to rodents, which suggests that the Ômicron may have evolved from these hosts. Mutations in the cell receptor-binding protein of Ômicron have potential implications for the progression of the pandemic and for the possible escape of some types of vaccines that use the virus spike as an antigen in immunization (SUN et al., 2021; SHRESTHA et al., 2022; KONISHI, 2022). The variant adapted to mink, with mutations in cluster 5, infected up to 68% of those employed on farms breeding these animals (MOLENAAR et al., 2020; ORESHKOVA et al., 2020; HAMMER et al., 2021).

Cui et al. (2022) points out that the Delta variant was the predominant among infections in animals, but infections were detected by all other variants of greater circulation in the different species investigated, indicating that there are few barriers to transmission between species. According to Bashor et al. (2021), as of October 2021, 14 emerging variants of the SARS-CoV-2 virus had been detected in animals, with mutations in the structure of the capsid, spike and in non-structural genes. These researchers warn that the rapid selection of SARS-CoV-2 variants in animals illustrates that the spillover of infection to new hosts accelerates the evolution of new viral strains, revealing the adaptive plasticity of this coronavirus. A worrying aspect is the great capacity of coronaviruses in general to recombine RNA, expanding the genetic diversity of this pathogen through new strains (GOLDSTEIN et al., 2021). Genetic combination is the process by which nucleic acid molecules of viral RNA exchange fragments, generating a new molecule, with differences in gene expression with possible changes in viral structure or infective capacity. Recombination processes are, together with mutations,

the main means of increasing genetic variability. The evolution of the virus by natural selection in different species, with diversity in biochemical and immunological characteristics, selects more adapted varieties that guarantee the perpetuation of viruses with new characteristics. New varieties may exhibit abilities in terms of infectivity and transmission different from the varieties that originated them, including the development of capacities for the jump between species that characterize the zoonotic process. In this sense, the adaptation of SARS-CoV-2 as a viable pathogen in animals poses multiple risks in the evolution of the virus to other mammalian species, including those not yet susceptible to the virus, and to humans.

Animals can become reservoirs of strains that are no longer prevalent in humans, so they can be reintroduced into the population by zoonotic route. The multiplicity of hosts also reflects in the variety of adaptations by mutational pathway, generating a greater number of variants and increasing the possibilities of new epidemic waves between animals and humans. The greater abundance of mutations may also have consequences in the escape of the immune response induced by vaccines that use viral proteins from strains with different structural characteristics from those existing in new variants.

The introduction of new pathogens into sensitive populations can have dramatic impacts on the environment. Yellow fever epidemics, for example, have resulted in the drastic reduction or local extinction of monkey species in Brazil and Argentina, (ALMEIDA et al., 2012; Moreno et al., 2015; ANDRADE et al., 2021; POSSAMAI et al., 2022), in addition to zoonotic transmission with reflexes in the human population. The consequences of the circulation of SARS-CoV-2 among animals susceptible and likely to develop the disease in wild environments goes beyond the issue of damage to a single animal species: the population reduction or extinction of a species affects the entire balance of the ecosystem, with results that can compromise even species not subject to infection by the new coronavirus due to environmental imbalance in food chains, seed dispersal, pollination and other regulatory mechanisms and interactions between biotic components.

In addition to the transmission of the virus through direct contact between humans and animals, SARS-CoV-2 has the potential to be transmitted indirectly, by environmental contamination. Several studies demonstrate the presence of viable viral particles in wastewater and sewage (BARCELO, 2020; BIVINS et al., 2020; LEE et al., 2020; MARTIN et al., 2020; Westhaus et al., 2021; ZANETI et al., 2021). Environmental pressure, with the exposure of animals to high loads of pathogens continuously, is a source of infection and maintenance of pathogens in animals that frequent aquatic environments contaminated by domestic sewage, especially regarding microorganisms with zoonotic potential (FENG and XIAO, 2011; ARMON and CHERUTI, 2012; NORBERG et al., 2020). Franklin and Bevins (2020) draw attention to the potential for perpetuation of SARS-COV-2 through wastewater

contamination and consequent colonization or infection of animals. The contamination of a European otter in a water reservoir in Spain (PADILLA-BLANCO et al.; 2022) may be related to this type of indirect contamination. Mustelids are among the animals most susceptible to SARS-CoV-2 and several species of this family have aquatic habits. We did not find in the current scientific literature investigations on the presence of SARS-CoV-2 amonglontras and otters in South America, animals potentially capable of sustaining an infection by the virus. Marine mammals, such as seals and whales, have ACE2 receptors with high compatibility for the SARS-CoV-2 spike, and represent a high-risk group for contamination by the virus circulating in contaminated waters (DAMAS et al., 2002; MATHAVARAJAH et al., 2021; GAO et al., 2021; LI et al., 2022).

Places with agglomeration of animals in contact with humans facilitate the transmission of the virus between species. Outbreaks on mink farms were facilitated by the accumulation of adjacent cages. These facilities allow both free airflow and contact with animals within facilities with a high density of individuals, which combined with poor hygienic conditions and stress factors resulting from the overpopulation of mink, have fostered the spread of SARS-CoV-2 and created opportunities for viral variants (DÍAZ et al., 2021). Zoos may have the same conditions as animal husbandry farms, and the greater circulation of visitors and keepers may reflect in a greater number of human-to-animal transmission events (MCALOOSE et al., 2020) and, consequently, infections by different strains, increasing the potential for adaptation of the virus to the most diverse species of animals confined in these establishments.

While monitoring on farms, zoos, and pets is relatively easier, with access to veterinary diagnosis and constant surveillance for possible signs and symptoms, research on free-living animals is basically fortuitous and relatively scarce. of susceptible species already affected by the incidence of SARS-CoV-2 may be underestimated. The finding of the incidence of SARS-CoV-2 in white-tailed deer in several parts of the United States of America shortly after the warning of the research conducted by Chandler et al. (2021) illustrates that the detection of the novel coronavirus as reverse zoonosis can be carried out late, when a population has already been widely affected. The lack of knowledge of the magnitude of the reverse zoonosis of SARS-CoV-2 in megadiverse countries such as Brazil represents a risk both for the mast fauna and for the ecosystem and human populations in a broader context under the prism of Single Health.

4 CONCLUSIONS

SARS-CoV-2 is a virus of zoonotic origin. Recent research indicates that the virus has shown potential for reverse zoonosis, infecting mammals in various parts of the planet. Mustelids, hamsters, felines, and old-world primates are the animals that showed the greatest susceptibility to SARS-CoV-

2. The reverse zoonosis of SARS-COV-2 favored the emergence of variants whose mutations were adapted to the various physiological characteristics particular to the affected species. The infection of many mammalian species with varied strains increases the risk of adaptability of the virus, as well as the potential for mutability and circulation of strains that can return to humans, with new characteristics and with the possibility of escape from vaccine immunization with antigens of different strains of the new variant. The process of evolution of the virus points out that SARS-CoV-2 is likely to be persistent among mammals after the pandemic wave that has affected humanity. Transmission events of SARS-CoV-2 from animals to humans have already been recorded, proving the interspecific infecting capacity of the virus. The spillover of SARS-CoV-2 to free-living animals sensitive to the virus may have consequences for the population of these species, with unpredictable morbidity and mortality aspects.

Actions to mitigate the processes of zoonosis and reverse zoonosis of SARS-CoV-2 require actions at three levels. The first level is that of the human population, as human-to-human transmission is arguably the main driver of the spread of the novel coronavirus. The intensification of prevention and immunization mechanisms for the entire population is essential to accelerate the decrease in the incidence of the virus. Updating vaccine antigens with viral proteins from emerging strains before they are prevalent is an important step in trying to stop the advance of new variants that can adapt to new hosts. The second level is in the relationship between humans and animals of direct contact. Social isolation of humans along with their pets and periodic testing to ensure that there will be no viral transmission after the lockdown period are measures that should be adopted in public health protocols. Testing for the presence of SARS-CoV-2 among humans dealing with animals or zoo visitors is also a type of measure that would help decrease interspecies transmission. The third level refers to animal populations in the environment. Control measures are challenging in free-living animals. The intensification of the number of samples and the increase of epidemiological surveillance for a larger number of species may be important for the recognition of new variants, threats to the health of the local fauna and possible control measures related to the dynamics in the relationship between animals and the environment that may cause zoonotic or interspecies transmission. Cui et al. (2022) suggests the use of commercially available veterinary vaccines against SARS-CoV-2, or the development of vaccines either for dispersal in water or environment, an experimental strategy used to control rabies in wildlife. An example of using this strategy was the vaccination of birds with the H5/H7 influenza virus vaccine, which not only successfully prevented influenza in birds, but also prevented human infection with the H7N9 virus in China (XIANG et al., 2022). These strategies, feasible in domestic and extensively farmed animals, would be effective only in small populations of free-living animals and require great efforts and costs. Comprehensive effects of the expansion of SARS-CoV-2 to other

species indicate that the adoption of measures to prevent reverse zoonosis are the most indicated to reduce the damage resulting from the evolution of viruses in relation to the number of hosts.

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CHAPTER

7

Impacts of COVID-19 on nursing care in the head and neck oncology outpatient clinic

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ABSTRACT
This study aims to analyze the impacts of COVID-19 on the care of cancer patients in the head and neck surgery outpatient clinic, through the procedures performed in the years 2019, 2020, and 2021. Method: Qualitative, descriptive study about the procedures performed by the nursing team in a head and neck surgery outpatient clinic. Data were collected from January 2019 to December 2021 and computed in an Excel spreadsheet. Results: They showed a negative disparity in the quantity of patient care in the head and neck surgery outpatient clinic in 2019 compared to 2020, in which there was a decrease of 33%. Comparing the results of the year 2019 with 2021 we noticed a drop of 25%. However, when compared to the year 2020 to 2021, there was an increase of 12%. In the number of procedures performed in 2020, there was a decrease of 31% compared to 2019, and, compared to 2021, there was a decrease of 26%, but in the year 2020 to 2021, there was an increase of 13%. Conclusion: The COVID-19 pandemic generated a strong impact on the care provided to patients of the head and neck surgery outpatient clinic, leading to a reduction in the care and provision of nursing care to this clientele, but at the beginning of the pandemic scenario the institutions had to redesign the care protocols to cope with the current situation of the country and the world, thus promoting safer and more efficient assistance.

Keywords: Nursing Care, Head and neck cancer, Covid-19.

1 INTRODUCTION

The incidence and mortality from cancer have been increasing worldwide, becoming the main public health problem, partly due to aging, population growth, as well as the change in the distribution and prevalence of cancer risk factors, especially those associated with socioeconomic development (Lagergren et al., 2016).

According to the National Cancer Institute (INCA), for each year of the 2020/2022 triennium, Brazil is expected to register 624,000 new cases of cancer. Among the cases of cancer, tumors in the

Head and Neck (PC) region have a high incidence and high mortality. In the region of the oral cavity will be 11,180 cases in men and 4,010 in women, while thyroid cancer will be 1,830 new cases in men and 11,950 in women (Brazil, 2019).

Regarding the cases of laryngeal cancer expected in Brazil, it will be 6,470 in men and 1,180 in women. The most frequent histological type is squamous cell carcinoma (SCC), which appears in more than 90% of cases (Brasil, 2019).

Surgery to remove the tumor lesion of the head and neck cancer patient, as well as tracheostomy are the most common procedures among the treatment modalities discussed by medical professionals due to respiratory complications arising from tumor progression, compromising self-image and their participation in social life (Mota et al., 2021).

The care developed by the nursing team in the outpatient clinic of surgery of the head and neck region is done in an individual and specialized way, valuing the social, economic, and cultural contexts, allied to the process of health promotion that must happen in an integrated way with the individuals involved in this scenario, but it suffered interference about access to these actions during the COVID-19 pandemic. Infectious disease caused by the SARS-COV-2 coronavirus (WHO, 2020).

Thus, it was possible to perceive that the pandemic caused a significant reduction in the number of surgeries for the treatment of cancer, the nursing procedures performed, and the number of visitors and companions, in addition to the effective reduction of professionals due to SARS-COV-2 contamination, as well as the suspension of meetings and meetings between patients, families, and professionals, which are extremely relevant for treatment efficiency, in the orientation for self-care, in the promotion and recovery of health and self-esteem of PC patients (Araújo et al., 2020).

The current pandemic has required healthcare professionals dedicated to cancer treatment to redesign cancer care, permanently updating the practice of care to promote safe and effective care, thereby mitigating the potential negative effects of COVID-19 infection on patients undergoing treatment (Ramos, 2020).

In this context, chronic disease conditions have required individuals to use long-term treatment, use strategies for home care, and restructure lifestyles as a way of taking care of themselves. Thus, the nursing care provided to head and neck patients is conceived as a complex and impactful experience, capable of interfering with the care and interaction between professional and patient.

In addition to the technical and emotional aspects, nursing exercises its capacity to overcome in carrying out the care processes for the patient treated at the PC surgery outpatient clinic, through one of the attributes most dear to this professional: the recognition of the human condition marked by the fortuity of life in an awareness of the constituent singularity of every individual (Santos, Santos & Silva, 2016).

Thus, this study aims to analyze the impacts of COVID-19 on the care of cancer patients in the head and neck surgery outpatient clinic, through the procedures performed in the years 2019, 2020, and 2021.

2 METHODOLOGY

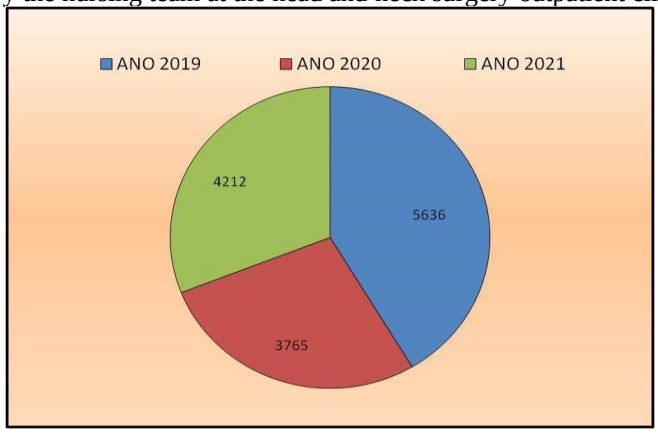
This is a descriptive study with a qualitative approach to the procedures performed by the nursing team in a head and neck surgery outpatient clinic of a Federal Hospital, located in the city of Rio de Janeiro/RJ. The primary data were collected from January 2019 to December 2021 and took place through documentary research using an instrument established by the institution in all outpatient clinics, where the results are entered daily by the nursing team. These data come from the nursing procedures book. The content analysis method was used to organize the data and analyze the results obtained. The data were computed in an Excel spreadsheet (Bardin, 2004).

3 FINDINGS

The results presented demonstrate the consequences of infections from COVID-19, affecting patients being treated for cancer more severely than others. As a result, some types of scheduled clinical and surgical treatments at the facility have been canceled or postponed due to the prioritization of hospital beds for the treatment of COVID-19 patients. This situation directly affected the treatment and care of patients with head and neck cancer, who needed first-time consultations to draw up the treatment plan as early as possible or subsequent consultations for continuity of care, since it is a type of cancer of rapid evolution.

The results shown in the following graph show a negative disparity in the number of patient visits in the head and neck surgery outpatient clinic in 2019 compared to 2020, a year in which there was a decrease of 33%. Comparing the results of the year 2019 with 2021, a drop of 25% was noticed. However, when compared to the year 2020 to 2021, in the services provided to this clientele, an increase of 12% was noted.

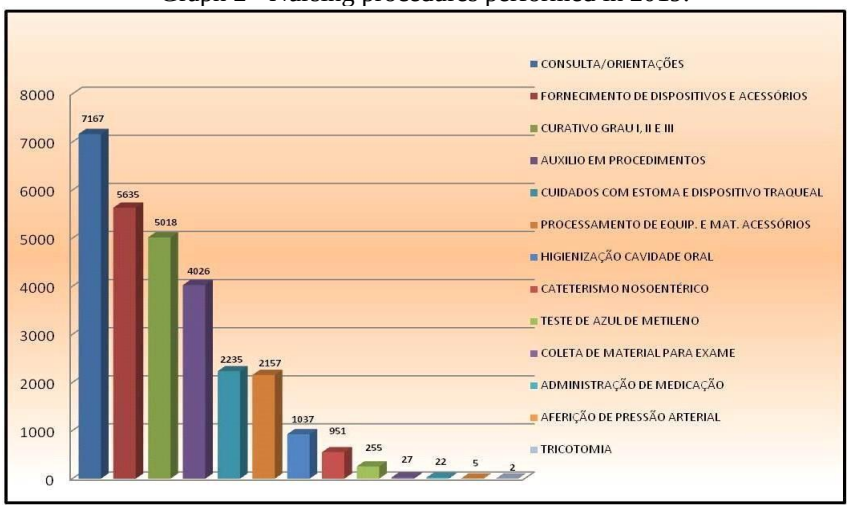
Graph 1 - Patients are seen by the nursing team at the head and neck surgery outpatient clinic in 2019, 2020, and 2021.



Source: INCA - HC1.

In the graph above it is noticed that in the year 2020, there was a significant drop in nursing care in the outpatient clinic under discussion, but in the year 2021, this difference was reduced.

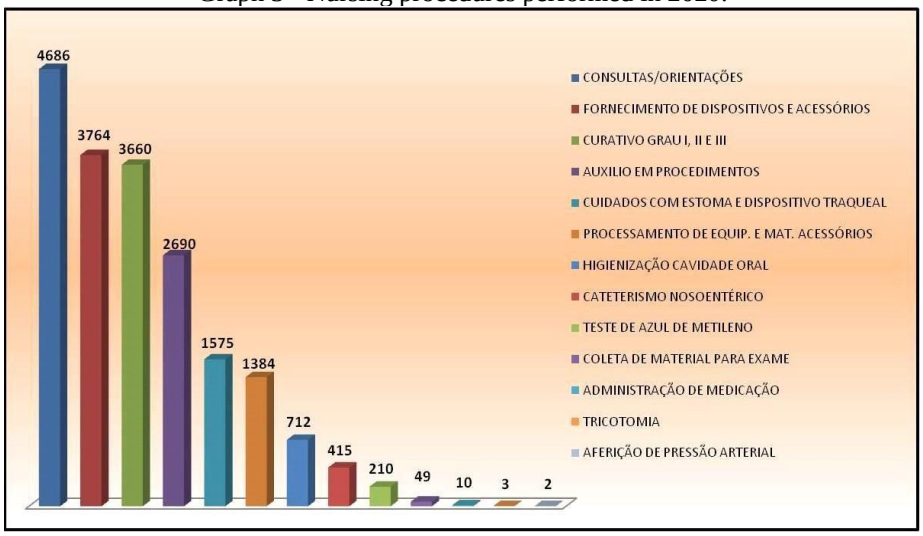
Graph 2 - Nursing procedures performed in 2019.



Source: INCA - HC1.

Graph 2 presents the most common procedures performed by the nursing team in 2019, with emphasis on consultations and orientations; the provision of devices and accessories for continuity of care at home, and the performance of dressings. It is important to highlight that in this last procedure, according to COFEN (2018), the nurse is the professional who coordinates and supervises the nursing team, as well as evaluates, prescribes, and performs care for patients with all types of wounds, regardless of the degree of tissue involvement. In addition, it participates in the choice of materials, equipment, and medicines for prevention and care.

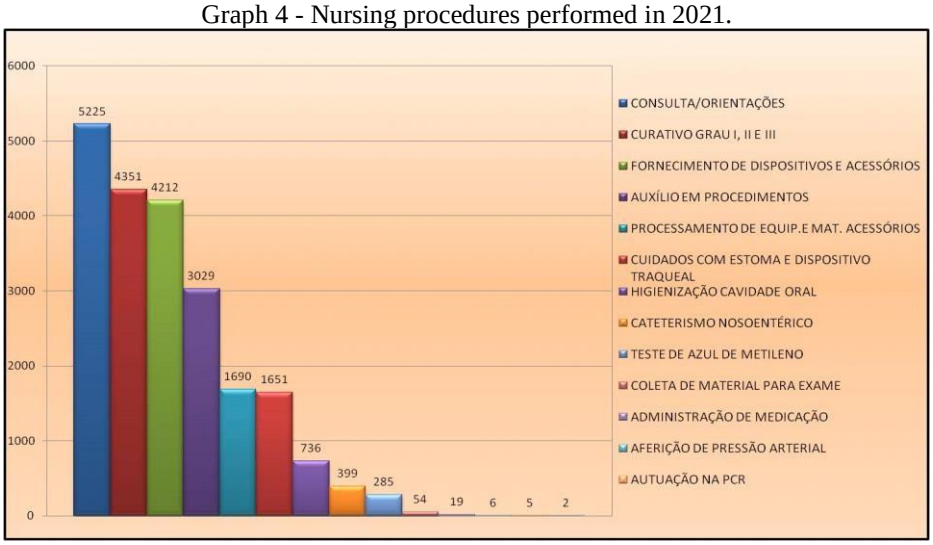
Graph 3 - Nursing procedures performed in 2020.



Source: INCA - HC1.

According to Graph 3, it is noticed that in 2020 there was no change regarding the procedures performed by nursing. However, when observing the quantity of the procedures performed, there is a drop in numbers, quite significant, which corroborates the decline in the number of patients attended. Thus, it is possible to notice that the guidelines remained in the first place since this procedure continued to happen in person to the patients when they were discharged from the hospital and via telephone when requested.

Graph 4 - Nursing procedures performed in 2021.

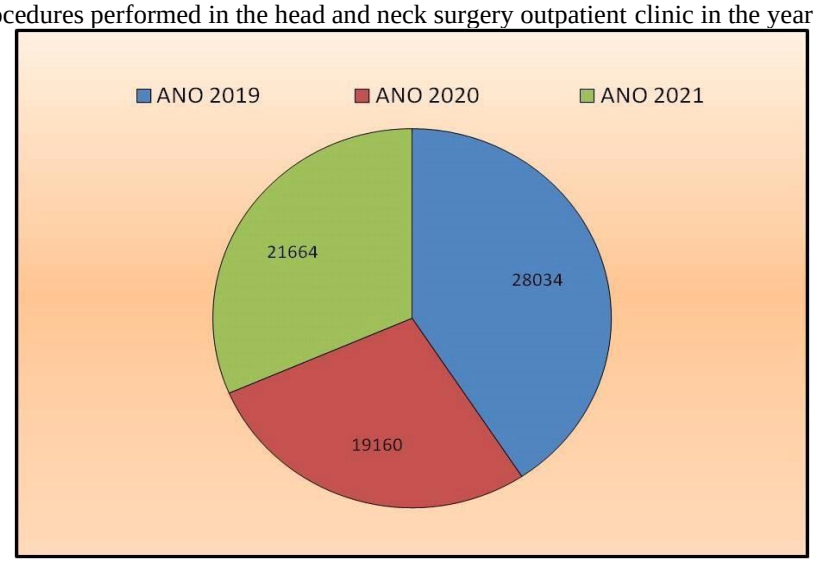


Source: INCA - HC1.

In Graph 4, it is noticed that there was a change in the ranking of procedures performed by the nursing team in the year 2019 and 2020, where the performance of dressings appears in second place. This result is justified by the adaptation and increase of the knowledge of the managers and the nursing team in the quality of the strategies implemented for the prevention of COVID-19, enabling the

increase of medical and nursing consultations, as well as the entry of companions in the institution, since the presence of the caregiver/family member with the patient, in the nursing consultations, provides better conditions for home care.

Graph 5 - Nursing procedures performed in the head and neck surgery outpatient clinic in the year 2019, 2020, and 2021.



Source: INCA - HC1.

About the number of procedures performed in 2020 (Graph 5), it was possible to observe that there was a decrease of 31% in 2019 and, compared to 2021, there was a decrease of 26%, but comparing the year from 2020 to 2021, there was an increase of 13%.

4 DISCUSSION

The experience of 20 years of one of the authors, the nurse responsible for the outpatient clinic for the care of patients with head and neck cancer, in a Federal Public Hospital, a reference in oncology in Rio de Janeiro, reports the high demand for the specific care of the nursing team and the need to offer comprehensive care in all phases of oncological care, that is, from confirmation of the diagnosis to rehabilitation.

The nursing actions provided to patients in this outpatient clinic are numerous, according to the results presented in this study, but some are more prevalent, regardless of the period before or after COVID-19, such as orientations, provision of devices and accessories for the continuity of care at home and the care of tumor and surgical wounds, respiratory stomas, and tracheostomy cannula changes.

The nursing team, as well as the multidisciplinary team, acts in the care of patients in a unique and qualified way, but the pandemic has brought difficulties to the development of nursing activities for the patient, both due to the concern of the patient to be in an environment susceptible to contamination by COVID-19, and to the professionals in the approach of the patient and family in the

referred outpatient clinic.

Due to the reduction in the scheduling of patients for first and subsequent appointments, as shown in Graph 1, clinical and surgical treatments were compromised due to the worsening of COVID-19 in the year 2020, also reflecting on nursing care. The patients were not able to access radiotherapy and chemotherapy sessions. According to Denys et al. (2020), in a study conducted with cancer patients, 43% of these reported having their treatment impacted by the pandemic. However, in 2021, medical and nursing consultations gradually returned to normality, because as in other health institutions, the hospital was improving in the strategies for implementing safety measures to cope with the pandemic.

Treatment for head and neck cancer derives from first-time consultations, some types of therapy such as surgery and scheduled radiotherapies were canceled or postponed due to the prioritization of hospital beds and professionals for those who were seriously ill with COVID-19 infection, as scientific literature has shown that this infection affects patients undergoing cancer treatment more severely (Araújo et al., 2020).

The care of the nursing team with the head and neck cancer patient is quite complex due to the degree of complication related to the treatment, and the clinical conditions, in addition to the cognitive difficulties perceived during the orientations provided during the nursing consultation or at the time of the performance of the procedures by the technicians.

Among the actions developed by the nursing team, it was possible to perceive in the results that the orientations provided to patients and companions emerged in the first place in all years, regardless of the pandemic situation in the country, because this care is necessary and extremely relevant in this type of clientele, to avoid intercurrences, such as infections in the surgical sites, myiasis infestations in the respiratory stoma or tumor wound, as well as to promote and encourage the patient to develop self-care (Origa & Costa, 2020).

Nursing is one of the professions in the health area whose essence and specificity highlight the care of the human being, individually, in the family or the community, developing distinct activities. It is responsible for the comfort, welcoming, and well-being of patients, either by providing care or by coordinating other sectors for the provision of care and promoting patients' autonomy (Valença et al., 2016).

The performance of procedures, according to the attributions of each component of the nursing team, contributes to an interaction between the professionals, as well as a correct understanding of the roles that each one performs in the institution, cooperating so that the activities performed to result in a comprehensive and quality nursing care provided to clients.

In coping with a diagnosis of cancer and especially in the head and neck region, the patient

responds individually to reactions such as fear, anxiety, sadness, revolt at the image alteration caused by the tumor lesion and the use of the tracheostomy cannula, which prevents him from expressing himself verbally and relationally socially.

Thus, the challenge of nursing care provided to PC patients lies in their various physical and psychosocial demands, which need to be met using different forms of communication and counseling, as well as theoretical and practical knowledge that involves care (Cruz et al., 2016).

Thus, it is possible to affirm that the pandemic scenario has provided damage to the quality of life of patients with head and neck cancer and that the greatest impact occurred in the biological dimension, as a result of the increased risk of complications associated with COVID-19, such as difficulty in accessing treatment (Corrêa et al., 2020).

The impediment of entry into the Institution of the patient with a companion made communication more difficult and inefficient, since the information provided to him, for the care of the hygiene of the cannulas, cleaning of the respiratory stomas, as well as the care of the tumor lesions or operative wounds, it is necessary to be provided to the maximum of people involved in the context of care with the PC patient, for understanding that this presents difficulties to manage the entire process of care related to pathology (INCA, 2020).

PC patients present communication difficulties that may occur before or after surgery, such as fear of performing hygiene care of the stomas, manipulation of the tracheostomy cannula, and maintaining body hygiene that corroborates the concepts and postulates of Dorothea Orem on the construction of knowledge in the field of theoretical and philosophical bases of nursing, as a strong guide for its practice, concerning self-care needs and health promotion through educational interventions (Santos & Mota, 2021).

According to Maslow's theory, when the individual achieves, either totally or partially, his needs, he can achieve higher levels of psychological health, which is imbricated with the way a being reacts to the demands, challenges, and changes of life and also with the way he harmonizes his ideas and emotions (Corrêa et al., 2020).

Thus, it is understood that the nurse should act to guide the actions developed with the patient, including the caregiver/family, who should be welcomed and included in the actions developed with the individual, actively participating in the entire phase of treatment, as well as the prevention of injuries in the home environment, because the treatment or even the pathology makes the communication process with the nursing team more exhaustive, which during the pandemic has become more difficult and ineffective.

Teamwork understood as a technical body, but also as a social group, favors the emergence of coping and support strategies for professional performance and source of problem-solving (Santos et

al., 2016).

The technical procedures reported by the nursing team in individuals with tumors in the head and neck region present us with an understanding of the nurse-individual relationship before, during, and after hospital discharge, and the findings should be considered by nurses who provide information for home care.

In this way, ensuring continuity of treatment for patients in the head and neck surgery outpatient clinic as well as throughout the institution has become a priority and a challenge in the course of the evolution of the COVID-19 pandemic, many technical and practical recommendations have been elaborated, apprehended and implemented (Araujo et al., 2020).

5 CONCLUSION

In 2020, the period of the beginning of the COVID-19 pandemic, health institutions, having to get used to the new form of patient care, had to develop and implement strategies to adapt care to them, suspending the circulation of companions, causing great difficulty to promote nursing care related to guidelines for the continuity of care at home, only for the patient, since in this context, the involvement of the caregiver/family member to this clientele is of paramount importance.

The strategies also permeated to protect the professionals from contamination by the virus, even so, there was a high rate of absenteeism in the care scenario, impairing the quality of the services provided.

The nursing team, for being closer and longer with the patient and their families and being responsible for providing care in general, needs to be in good physical and psychological condition to perceive patients and provide quality care, understanding them in all their needs and dimensions, during the illness process.

Care guidelines are considered essential in the prevention, promotion, and rehabilitation of the client's health. The challenge of nursing care provided to this population lies in its various physical and psychosocial demands, which need to be met through different forms of communication and counseling, as well as specialized theoretical and practical knowledge involving care.

Thus, it is concluded that the COVID-19 pandemic has generated a strong impact on the care provided to patients of the head and neck surgery outpatient clinic, leading to a reduction in care and the provision of nursing care.

Thus, it is suggested that further studies on the theme be carried out to make known the actions developed by the nursing team in the oncological scenario of other institutions.

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CHAPTER
8

The evolution of hepatites B and nutricional supports: Case report

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ABSTRACT
Heart failure (HF) remains with a poor prognosis and high morbidity and mortality. The SARS-CoV-2 pandemic may have influenced these parameters due to the overload of health services, although regional characteristics may have had an influence. OBJECTIVE: To assess the impact of the SARS-CoV-2 pandemic on HF morbidity and mortality in Northeast Brazil through data analysis from DATA-SUS. METHOD: The average length of stay, the number of hospitalizations and deaths, and the mortality rate from 02/2017 to 11/2022 were evaluated, subdivided into pre-pandemic (02/2017 to 02/2020), pandemic (03/2020 to 06/2021), peak (12/2020 to 05/2021), the first and second trimester of the peak (12/2020 to 02/2021 and 03/2021 to 05/2021), mass vaccination (06/2021 to 12/2021) and year 2022 (01/2022 to 11/20222022). The subdivisions of the total evaluated period were compared with the others. The results were expressed in percentages. RESULTS: In the pre-pandemic, there was the highest monthly average of hospitalizations, with a reduction of 29% in the pandemic and 12% in the period of mass vaccination. There was a reduction in the monthly average of deaths in the pandemic period compared to the pre-pandemic period, with this average being similar in the mass vaccination and pre-pandemic periods. However, there was a significant increase in the mortality rate in the pandemic period (12.45%) when compared to the pre-pandemic period (10.9%), with the highest percentage observed in the mass vaccination period (12.79%). %). CONCLUSIONS: There were relevant consequences of the SARS-CoV-2 pandemic on HF morbidity and mortality in the Northeast region of Brazil, with a lower number of hospitalizations and increased mortality. During the vaccination period, the increase in hospitalizations and the higher mortality rate may reflect the difficulty in monitoring the disease in previous periods and greater access to health services.

Keywords: Heart failure, COVID-19, Pandemics, Brazil.

1 INTRODUCTION

To date, it is known that COVID-19 is a multisystem disease, and the presence of viral material in several organs, including the heart and blood vessels, has been reported. (1) The involvement of the cardiovascular system occurs through vasculitis, immunological phenomena, and changes in the coagulation cascade, most commonly causing myocarditis, pericarditis, acute myocardial infarction

(AMI), arrhythmias, thrombosis, and bleeding. (2) (3) The main comorbidities of COVID patients are cardiovascular diseases, also associated with increased in-hospital mortality from infection, (4) and up to 5% of patients have heart failure (HF) (5) Among the complications of infection, two of the main ones are cardiovascular: arrhythmias (17%) and acute cardiac injury (7%). (6)

In addition to the characterization of the cardiovascular clinic of the disease, it is also necessary to investigate the consequences of the pandemic on hospitalizations and in-hospital mortality from cardiovascular diseases, especially HF.

The prevalence of HF in adults is estimated at 1 to 2 %, however, the estimate is based on recognized cases and is likely to be underestimated. In addition, there is a progressive increase with age, which may affect more than 10% of the population aged 70 years or older. (7) Worldwide, about 23 million people have HF, (8) with approximately 9906000 years lived with disability. (9)

This chronic condition presents an unfavorable prognosis and high morbidity and mortality (10) that requires, for its adequate management, a frequent follow-up of the patient. After the initial diagnosis, patients with HF are hospitalized, on average, once a year. (7) The symptoms of COVID-19 can be confused with those of HF, such as dyspnea, tachycardia, fatigue, and, eventually, rales at the pulmonary bases and cramps. (11) In addition, in critically ill patients, changes in serum markers such as natriuretic peptides and troponins may occur, which makes diagnosis more difficult. (11)

In addition to the clinical-epidemiological importance, the proposed investigation is justified by the overload of health services and changes in the flow of care during the pandemic, restriction of service delivery in contexts other than urgency and emergency, reduced access to services and decreased demand for fear of contagion. (12)

Brazil is the fifth country with the most cases of COVID-19 in the world, behind the United States, India, France, and Germany, however, it is the country with the second-highest number of deaths. (13)

In addition to regional singularities, Brazil exhibits evident inequalities, also noticeable in health. Regarding professionals, the national average is 2.27 doctors per thousand inhabitants. However, the average of the Northeast region is 1.69 doctors per thousand inhabitants, and all states have indicators below the national average and all municipalities in the interior have one or fewer doctors per thousand inhabitants. Meanwhile, the Northeast region accounts for 27.2% of the Brazilian population, but only 18.4% of physicians, with 1.69 doctors per thousand inhabitants, and all states have indicators below the national average and all municipalities in the interior have one or fewer doctors per thousand inhabitants. (14)

Thus, the present study aims to evaluate the impact of the SARS-CoV-2 pandemic on HF morbidity and mortality in the Northeast region of Brazil through the analysis of DATASUS data from 2017 to 2022.

2 METHOD

This is a cross-sectional descriptive study conducted through data collection in the morbidity and mortality information system on the DATASUS platform, comparing the periods defined by the authors as pre-pandemic (February 2017 to February 2020), pandemic (March 2020 to June 2021), which was considered the peak (December 2020 to May 2021), first and second quarters of the peak (December 2020 to February 2021 and March 2021 to May 2021, respectively), a period in which mass vaccination occurred (June 2021 to December 2021) and year 2022 (January to November 2022).

The variables number of hospitalizations and deaths, days of hospital stay, as well as mortality rate (calculated by dividing the number of deaths by the number of hospitalizations), were analyzed.

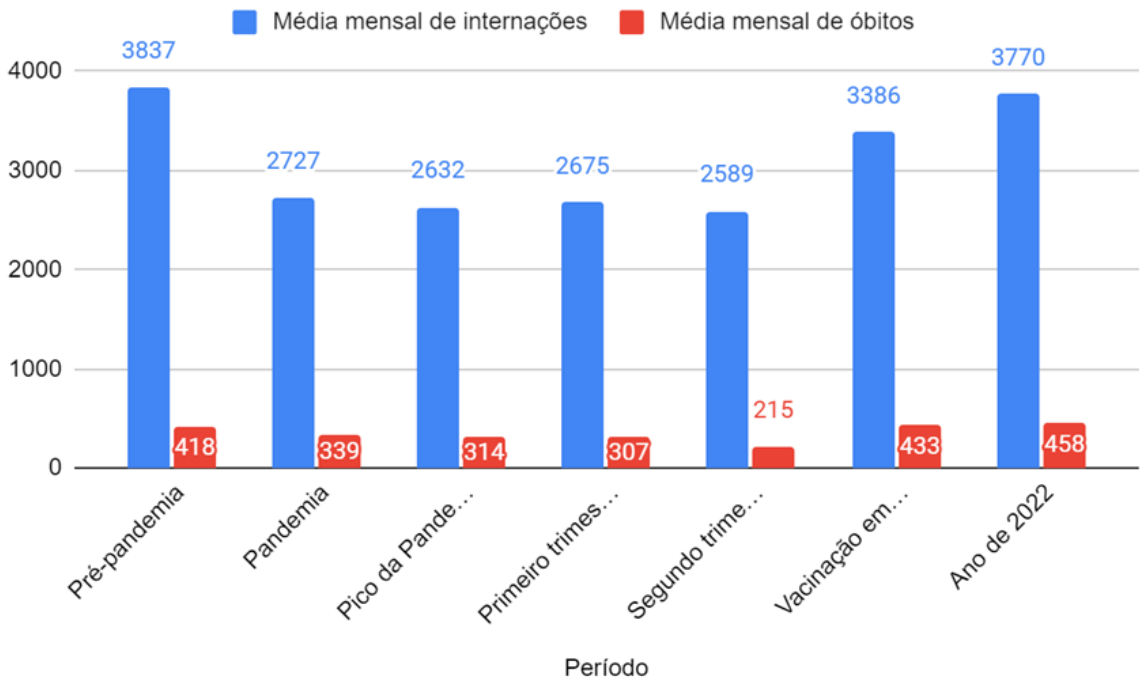
The means of each variable were calculated in general and by sex. The pre-pandemic and mass vaccination periods were compared with the others, with the results expressed as percentages.

3 FINDINGS

The numbers of hospitalizations in the pre-defined periods were: pre-pandemic (141,997), pandemic (43,633), peak (15,794), mass vaccination period (23,703) and during the year 2022 (41,475), and in the peak period most hospitalizations occurred in the 1st quarter, predefined as the 1st quarter of the peak (8,025).

As for the monthly average of hospitalizations, in the period defined as pre-pandemic the highest average occurred (3,837 hospitalizations per month), there was a reduction of 29% in the period defined as pandemic (2,727 hospitalizations per month) and 12% in the period of mass vaccination (3,386 hospitalizations per month). In the second trimester of the peak period, the lowest average number of hospitalizations was observed (2,589 hospitalizations per month). Compared to the peak period, there was a 50% increase in the number of hospitalizations and almost 30% in the monthly average during the mass vaccination period. In the year 2022, the average approach that observed in the pre-pandemic period, with 3,770 hospitalizations per month (Graph 01).

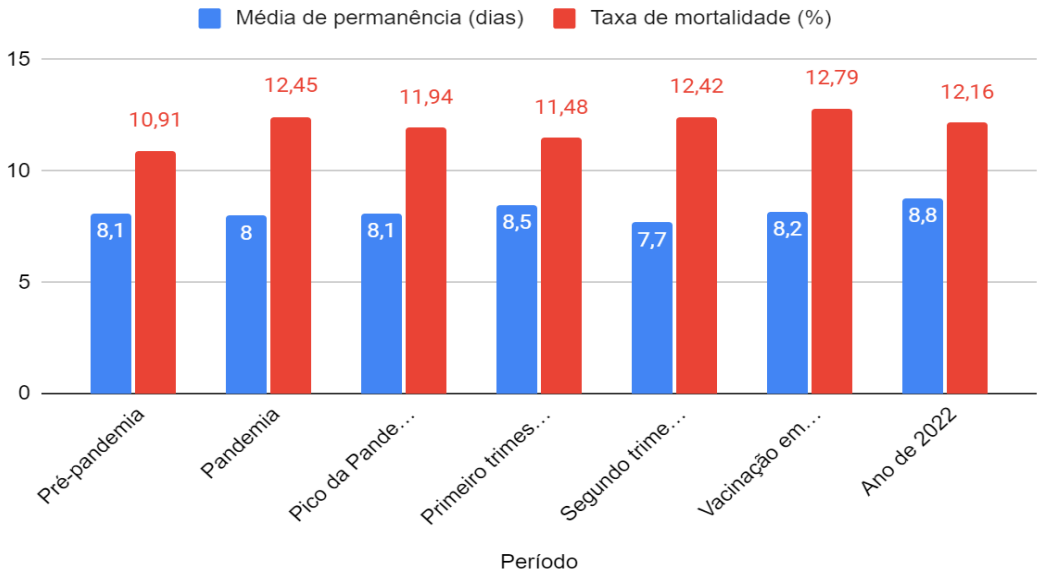
Graph 01 - Monthly average of hospitalizations and monthly average of deaths per period.



There was a reduction in the monthly average of deaths in the pandemic (19 percentage points) when compared to the pre-pandemic period, and this average was similar in the periods of mass vaccination, pre-pandemic and 2022 (Graph 01).

However, the mortality rate increased in the period defined as the pandemic (12.45%) when compared to the pre-pandemic period (10.9%). In the period of mass vaccination, the highest mortality rate was observed (12.79%) and in 2022, the mortality rate was 12.16% (Graph 02).

Graph 02 - Mean length of stay (days) and mortality rate (%) per period.



The average hospital stay, in days, was higher in 2022 (8.8), followed by the first quarter of the peak (8.5), pre-pandemic period (8.1) and lower in the second quarter of the peak (7.7) (Graph 02).

The mortality rate was higher and the mean length of stay was shorter in all periods for females (Table 01).

Table 01 - Data about pre-pandemic (February 2017 to February 2020), pandemic (March 2020 to June 2021), peak (December 2020 to May 2021), first and second quarters of peak (December 2020 to February 2021 and March 2021 to May 2021, respectively), mass vaccination (June 2021 to December 2021) and year 2022 (January to November) for males and females.

Period	Sex	Admissions	Average monthly hospitalizations	The average length of stay (days)	Deaths	Monthly average of deaths	Mortality rate (%)
Pre-pandemic	Male	76.497	2.067	8,2	7.926	214	10,36
	Female	65.500	1.770	7,9	7.570	204	11,56
Pandemic	Male	23.770	1.485	8,1	2.819	176	11,86
	Female	19.863	1.241	7,8	2.612	163	13,15
Peak of the Pandemic	Male	8.518	1.419	8,2	973	162	11,42
	Female	7.276	1.212	7,9	913	152	12,55
First quarter of peak	Male	4.316	1.438	8,6	463	154	10,73
	Female	3.709	1.236	8,3	458	152	12,35
The second quarter of peak	Male	4.202	1400	7,8	510	170	12,14
	Female	3.567	1189	7,5	455	151	12,76
Mass vaccination	Male	12.836	1.833	8,3	1.562	223	12,17
	Female	10.867	1.552	8,0	1.469	209	13,52
The year 2022	Male	22.708	2.064	9,0	2.644	240	11,64
	Female	18.767	1.706	8,5	2.398	218	12,78

4 DISCUSSION

According to the Panel of COVID-19 cases released by the Ministry of Health, (15) at the beginning of 2023, Brazil totaled more than 36 million confirmed cases, almost 700,000 cumulative deaths and 35 million recovered cases, resulting in an incidence of 17,544 per 100,000 inhabitants, mortality of 331.8 per 100,000 inhabitants and lethality of 1.9%. In the Northeast region, more than 7,200 million cases were registered, 134 thousand deaths, with an incidence of 12,768.9 per 100

thousand inhabitants, mortality of 235.2 per 100 thousand inhabitants and lethality of 1.8%, corresponding to the lowest coefficients in the country, except lethality, the second highest recorded, which may demonstrate an underreporting of milder cases of COVID-19.

Some of the possible contributing factors to the harmful consequences of the pandemic on the Brazilian health system include the lack of coordination between the different levels of government, acting with inadequate or late measures, (16) poor social distancing, non-identification of asymptomatic people, non-isolation of cases, lack of knowledge of the population about prevention measures, doubts about the management and effectiveness of masks, and the difficulty of acquiring vaccines. (17)

Based on the results of the present study, there was a decrease in hospitalizations during the pandemic, a reduction in the number of deaths, but an increase in the mortality rate. Such findings may reflect underreporting, worse clinical control that, due to the lack of follow-up, culminated in disease progression, hospital admissions of more severe cases and, consequently, with worse outcomes.

In 2020, in Brazil, an excess of deaths of 13.7% was recorded, with a ratio for deaths from COVID-19 (total number of deaths from all causes divided by the total number of deaths from COVID-19) of 0.90, suggesting a reduction of some causes of death in the period. In the country, the excess of deaths was heterogeneous, being higher in the Northeast, indicating a greater impact of the pandemic. (18)

The search for care for diseases with an incidence not influenced by COVID has decreased significantly during the pandemic. (19) A trend of reduction in hospitalizations due to HF, worse functional class and greater severity of hospitalized patients were observed in England, (20) as well as an increase in mortality due to HF was recorded in Germany. (21) In Brazil, by the end of 2020, there was a 17% reduction in hospital admissions for cardiovascular diseases, with an increase in lethality of 0.9 percentage points, (22) a reduction in the absolute number of deaths and a 45% decrease in the performance of diagnostic and surgical procedures. (23)

Some of the considerations of the American College of Cardiology in order not to expose professionals and patients to a higher risk of contagion, as well as to preserve limited resources, included the limitation of the performance of elective procedures, the prioritization of care for urgent and emergency cases and, when possible, the performance of non-face-to-face consultations, (24) although alternative clinical follow-up methods for therapeutic optimization of HF are not as successful as traditional care. (25) Such measures should be understood within the pandemic context, however, due to the dimensions reached in Brazil, the limitation of the population's access to technology and health services and the unavailability of professionals in the face of the existing demand, the usual

clinical follow-up was impaired, resulting in decompensation, delay in diagnosis and progression of the disease.

Worldwide, up to 83% of outpatient activities for diagnosing and monitoring cardiovascular disease have been canceled at some point during the pandemic. Echocardiogram decreased by up to 76% and coronary angiography by 55%. Greater reductions were seen in poorer countries, as well as lower availability of COVID-19 testing, personal protective equipment and access to telehealth. (26) Brazil was the 149th country in the ranking of testing per population for COVID-19, (13) and the Northeast region was second in the country in distribution of tests in absolute numbers. (27)

According to the 2021 European Heart Failure Directive, vaccination against the coronavirus is indicated in patients with HF, (7) since infection is a factor of decompensation of the underlying condition, and may culminate in up to 25% of mortality in HF patients hospitalized for COVID, while the in-hospital mortality of patients with decompensation for other causes is less than 3%. (28) However, the Northeast region of Brazil was among the places with the lowest vaccination coverage, presenting in December 2021 26.4% of the population with first dose immunization and only 2.7% with the second. (17) However, at the beginning of 2023, the same region was only behind the Southeast region in the number of vaccine doses administered, totaling more than 130 million doses, with 83% of the population with the first dose, 76% with the second and 48% with a booster dose. (29)

In the vaccination period, the increase in the number of hospitalizations, as well as a higher number of deaths and mortality rate may reflect the reduction in HF care in previous periods, greater access to health services and a greater sense of security on the part of patients in seeking care, reducing the patient's delay in seeking care.

It is assumed as probable that these results, evaluated in the Northeast region of Brazil, do not reflect the reality of the country as a whole, given the regional differences in access to health services, as well as the lack of uniformity of measures to control the pandemic.

5 CONCLUSIONS

There were relevant consequences of the SARS-CoV-2 pandemic on HF mortality in the Northeast region of Brazil, with a lower number of hospitalizations, and possibly, as a consequence, a lower number of deaths than expected. However, there was an increase in the mortality rate, thus demonstrating a worsening of the clinical picture of HF during the pandemic period due to the difficulty of clinical follow-up, associated with insufficient control of the pandemic.

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CHAPTER
9

Positivity rate for COVID-19 of RT-PCR tests of the first quarter of 2021 of the state of Amazonas

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ABSTRACT
The Ministry of Health (MoH) received the first notification of a confirmed case of Covid-19 in Brazil on February 26, 2020. Based on daily data reported by the State Health Secretariats to the Ministry of Health, from February 26, 2020, to May 15, 2021, 15,586,534 cases and 434,715 deaths from covid-19 were confirmed in Brazil. The pandemic in Brazil had already completed more than a year since the first reported case, but unfortunately, it was not possible to say that the situation was stable and that the epidemic was controlled in 2021 to opt for the relaxation of social isolation. In this sense, it is understood that testing in the population was a tool of great relevance to analyze whether cases were decreasing. The purpose of this research was to write the positivity rate for Covid-19 of the RT-PCR tests of the first quarter of 2021 in the State of Amazonas. The methodology used was a descriptive study using the e-SUS Notifica database. The results indicate that the average positivity of the State of Amazonas considering the tests carried out in the first quarter of 2021 was 36.47%, and the WHO recommendation is up to 5%, a level not reached by any Brazilian state.

Keywords: Covid-19, Testing, Notification.

1 INTRODUCTION

The Ministry of Health (MoH) received the first notification of a confirmed case of Covid-19 in Brazil on February 26, 2020. Based on daily data reported by the State Health Secretariats to the Ministry of Health, from February 26, 2020, to May 15, 2021, 15,586,534 cases and 434,715 deaths from covid-19 were confirmed in Brazil. For the country, the cumulative incidence rate was 7,360.60 cases per 100,000 inhabitants, while the cumulative mortality rate was 205.3 deaths per 100,000 inhabitants (Ministry of Health, 2021).

According to the Ministry of Health's Epidemiological Bulletin N. 36 (2021), the highest record of notifications of new cases in a single day (100,158 cases) occurred on March 25, 2021, and of new deaths (4,249 deaths) on April 8, 2021. It is noteworthy that the date of notification may not represent the day of occurrence of the events, but expresses the period to which the data were informed in the information systems of the Ministry of Health (MH). Previously, considering the period after August 2020, the day on which the lowest number of new cases (8,429 cases) was observed was October 12, 2020, and the lowest number of new deaths (128 deaths) was on November 8, 2020.

The highest tally of notifications of new cases in a single day (100,158 cases) occurred on March 25, 2021, and of new deaths (4,249 deaths) on April 8, 2021. It is noteworthy that the date of notification may not represent the day of occurrence of the events, but expresses the period to which the data were reported in the information systems of the Ministry of Health. Previously, considering

the period after August 2020, the day on which the lowest number of new cases (8,429 cases) was observed was October 12, 2020, and the lowest number of new deaths (128 deaths), was on November 8, 2020.

The pandemic in Brazil had already completed more than a year since the first case in the country, but unfortunately, it was not possible to say that the situation was stable and that the epidemic was controlled in 2021 to opt for the relaxation of social isolation. The World Health Organization emphasizes 3 criteria that guide governments to decide to relax social isolation: (1) when there is an indication that the epidemic is under control; (2) when the health system can respond to a resurgence of cases; (3) when the surveillance system can identify new cases and their contacts (WHO, 2020a).

It is in this sense that testing is an indispensable tool since the capacity to perform mass tests supports two of the three criteria pointed out by the WHO for flexibility.

Regarding epidemic control, the guidance is that the rate of positive results among the tests performed should not exceed 5% for at least 14 days. The WHO also recommends tracing everyone who has had contact with infected people so that they are advised and quarantined. This measure depends on local testing capacity and is effective in controlling the pandemic in Germany and Switzerland, which had lower death rates compared to other countries (SALATHÉ et al, 2020; ABELER et al, 2020).

In 2021 Brazil was the least-tested country in the world. According to the WHO, the percentage of positive cases among people tested also called the positivity rate, should not be higher than 5% for 14 days in a row, the benchmark of analysis adopted by the world's leading medical centers. According to a study published by John Hopkins University, Brazil has the highest percentage of positivity among countries that have been monitored, reaching the mark of 36%, a rate considered one of the highest in the world.

2 GENERAL CHARACTERISTICS OF HUMAN INFECTION WITH THE NOVEL CORONAVIRUS (COVID-19)

2.1 ETIOLOGIC AGENT

They are RNA viruses of the order Nidovirales of the family Coronaviridae. The SARS-CoV, MERS-CoV, and COVID-19 viruses are Betacoronaviruses and highly pathogenic and responsible for causing respiratory and gastrointestinal syndrome. In addition to these three, four other types of coronavirus can cause mild respiratory syndromes in the general population, rarely leading to severe conditions.

2.2 RESERVOIR AND TRANSMISSION MODE

Coronaviruses are a large family of viruses common in many different species of animals, including camels, cattle, cats, and bats. Rarely, animal coronaviruses can infect people and then spread between people with MERS-CoV and SARS-CoV. As recently as December 2019, there was the transmission of a novel coronavirus (SARS-CoV-2), which was identified in Wuhan in China and caused Covid-19, and then spread and transmitted from person to person.

3 CLINICAL MANIFESTATIONS

The clinical spectrum of coronavirus infection is very broad, ranging from a simple cold to severe pneumonia. However, for the novel coronavirus the spectrum is not fully established, requiring further investigation and time for the characterization of the disease.

The case definition of Influenza-like Syndrome (OS) is when the individual with an acute respiratory condition, characterized by at least two (2) of the following signs and symptoms: fever (even if referred), chills, sore throat, headache, cough, runny nose, olfactory disorders, and taste disorders.

Observations:

- In children: in addition to the previous items, nasal obstruction is also considered in the absence of another specific diagnosis.
- In the elderly: specific criteria of aggravation such as syncope, mental confusion, excessive sleepiness, irritability, and inappetence should also be considered.
- In suspected Covid-19, fever may be absent and gastrointestinal symptoms (diarrhea) may be present.

The case definition of the severe acute respiratory syndrome (SARS) is when the individual with OS presents: dyspnea/respiratory distress OR persistent pressure in the chest OR O2 saturation less than 95% in room air OR bluish coloration of the lips or face.

Observations:

- In children: in addition to the previous items, observe the nasal wing beats, cyanosis, intercostal draught, dehydration, and inappetence;

For notification in the Sivep-Influenza, the official notification system, hospitalized SARS cases or deaths from SARS regardless of hospitalization should be considered. According to the profile of confirmed cases in the first month of occurrence in Brazil in 2020, the most common clinical signs and symptoms in non-hospitalized patients were cough (73.7%), fever (68.8%), runny nose (37.4%), sore throat (36.2%) and dyspnea (5.6%). And among hospitalized patients, the most common symptoms were fever (81.5%), cough (79.8%), runny nose (31.1%), sore throat (26.1%), and dyspnea

(26.1%). The most prevalent comorbidities, in general, were cardiovascular disease (7.4%), diabetes (2.9%), chronic lung disease (2.1%), and neoplasia (1.0%).

4 DIAGNOSIS

4.1 CLINICAL DIAGNOSIS

The initial clinical picture of the disease is characterized as a flu-like syndrome. Diagnosis depends on clinical-epidemiological investigation and physical examination. It is recommended that in all cases of flu-like syndrome, the history of displacement and contact be questioned. This information should be recorded in the patient's medical record for eventual epidemiological investigation.

4.2 LABORATORY DIAGNOSIS

Since the beginning of the pandemic, the types of tests performed for diagnosis and screening of COVID-19 are (1) RT-PCR (reverse-transcriptase polymerase chain reaction) test; (2) serological test (detection of antibodies – IgA, IgM and IgG); and, (3) rapid antigen and antibody tests (IgM and IgG). The RT-PCR test is considered the gold standard in the diagnosis of Covid-19, while rapid and serological tests are used in the screening and spread of the virus, as summarized in Table 1.

4.3 DIFFERENTIAL DIAGNOSIS

The clinical features are not specific and may be similar to those caused by other respiratory viruses, which also occur in the form of outbreaks and eventually circulate at the same time, such as influenza, parainfluenza, rhinovirus, respiratory syncytial virus, adenovirus, other coronaviruses, among others.

TABLE 1. General characteristics of the existing RT-PCR test and IGM/IGG Rapid Serological Test for Covid-19.

RT-PCR	**RAPID SEROLOGICAL TEST (IGM/IGG)**
It detects the genetic material of the virus, RNA.	It detects the antibodies produced against the virus. There are two types of antibodies: IgM, when the infection was recent, and IgG, when the person is no longer infected and has antibodies.
Collection of material in the upper airways, preferably nasopharynx and oropharynx.	Capillary blood collection.
The collection should be performed from the 3rd day of symptom onset until day 10, when the amount of RNA tends to decrease.	At the end or shortly after the infectious period, with possible detection of two antibodies: – IgM, produced, in general, after 10 days from the onset of symptoms and allows detection of recent infection – IgG, produced after the end of the infectious period and allows detection of previous contact with the virus.

It identifies the virus in the period of activity in the body, making possible appropriate medical conduct, hospitalization, social isolation and tracing of people who have maintained contact with the infected individual.	It identifies the presence of antibodies in people who have had previous contact with the virus, allowing to measure the contamination and susceptibility of the population to the virus.

5 CARE AND TREATMENT

Proper management of suspected or confirmed cases of Covid-19 depends on early recognition of warning signs and continuous monitoring. Considering the general characteristics of the infection, clinical manifestations and possible complications.

6 AREAS OF STUDY

Amazonas is the largest Brazilian state in territorial extension, with an area of 1,559,167.878 km², part of the territory is in the northern hemisphere, being crossed by the equator.

The state of Amazonas borders 05 federative units: Roraima to the northeast, Pará to the east, Mato Grosso to the southeast, Rondônia to the south, and Acre to the southwest. The state's international borders are to the west with Peru, and the northwest with Colombia and Venezuela.

The predominant climate in the state is the Equatorial, characterized by high air humidity (80% on average) and high temperatures that last throughout the year.

The rainfall rates recorded for the state are the highest in the national territory, with averages between 1500 mm and 2500 mm per year, exceeding 3500 mm in some areas.

The most active climatic factors that define the conditions observed in the Amazon are the low latitude and continentality. The proximity of the dense forest also contributes to the control of the elements of the local climate.

The Amazon has 4,207,714 inhabitants, being the 13th state in the population of Brazil and the 2nd in the North region. In relative terms, the Amazonian population is equivalent to 22.5% of all inhabitants of the region. With a large land area, the demographic density of the state is one of the lowest in the country. Data from the 2010 Census indicate a value of only 2.23 inhabitants/km². Currently, this figure is 2.69 inhabitants/km².

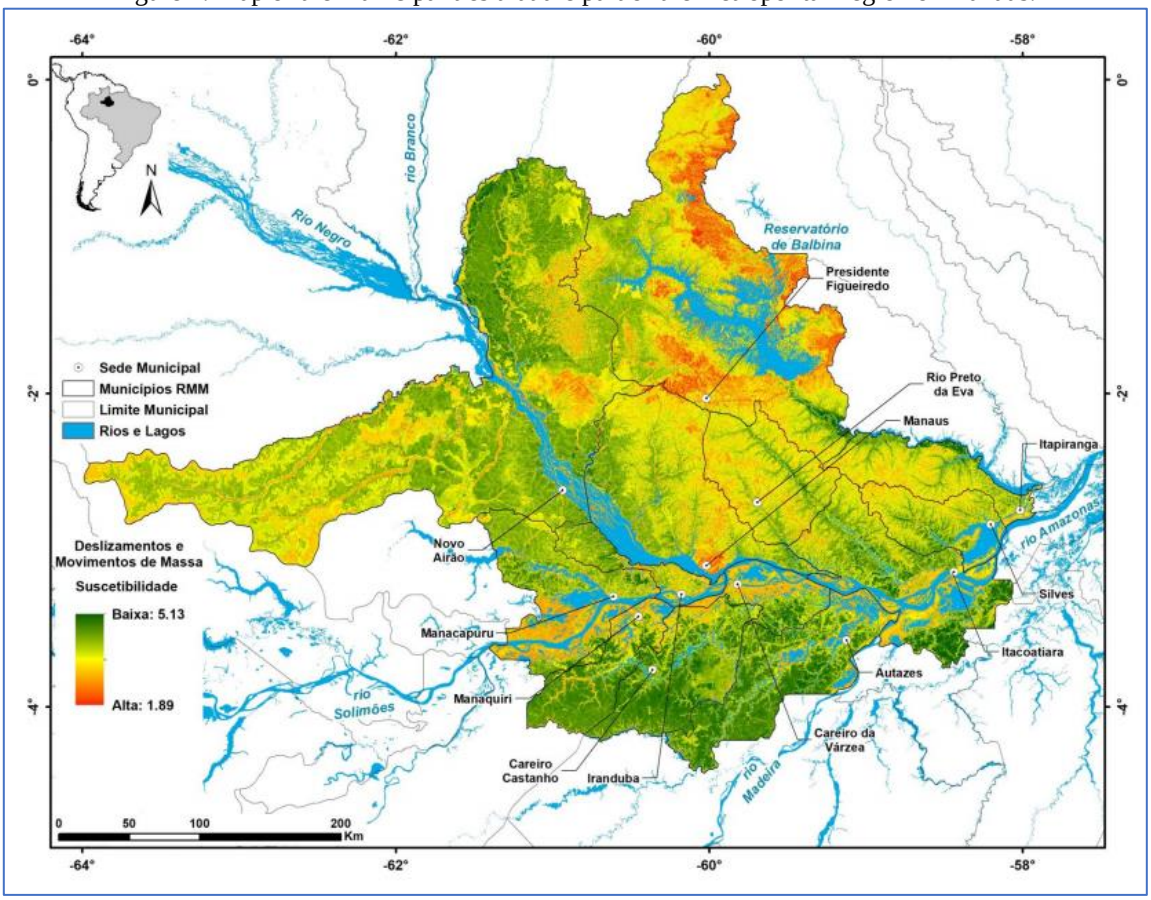
With an urbanization rate of 79,09%, we have that the largest portion of Amazonians live in cities. The capital, Manaus, is the municipality with the largest number of inhabitants in the state and the 7th most populous in Brazil, with 2,219,580 inhabitants. Next is Parintins, with 115,363 inhabitants.

The last Demographic Census, which dates from 2010, showed that Amazonas is the state that has the largest indigenous population in Brazil, with 183,514 people. The Amazonian Indians correspond to 20.46% of the Brazilian indigenous population, and 53.52% of the North region.

The Metropolitan Region of Manaus, which is also known as Greater Manaus, is the most populous, urbanized and wealthy in the state of Amazonas. It was formed through a conurbation process, which began in the early 1970s. It is the 10th most populous metropolitan region in Brazil and the most populated in the North region. Cities that are part of the Metropolitan Region: Manaus (host city), Autazes, Careiro, Careiro da Várzea, Iranduba, Itacoatiara, Itapiranga, Manacapuru, Manaquiri, Novo Airão, Presidente Figueiredo, Rio Preto da Eva and Silves (Figure 1).

The Government of Amazonas confirmed the first case of Covid-19 (novel coronavirus) in the state on March 13, 2020. The patient is a 39-year-old woman with a recent travel history to London.

Figure 1. Map of the municipalities that are part of the metropolitan region of Manaus.



7 JUSTIFICATION

This report is the first product, containing the positivity rate for Covid-19 of the RT-PCR tests of the first quarter of 2021 of the State of Amazonas to obtain the remuneration agreed in the contract.

8 OBJECTIVES

8.1 GENERAL

Describe the positivity rate for Covid-19 of the RT-PCR tests of the first quarter of 2021 of the State of Amazonas.

8.2 SPECIFIC

- Stratify the Covid-19 positivity rate of RT-PCR tests in the first quarter of 2021 by race/color, age group, and sex;
- Analyze the positivity rate for Covid-19 of RT-PCR tests of the first quarter of 2020 in the municipalities of Amazonas;
- Analyze the rate of RT-PCR tests with negative and positive results in the first quarter of 2021 of the State of Amazonas.

9 STUDY METHOD

This is a descriptive study to analyze the positivity rate for Covid-19 of the RT-PCR tests of the first quarter of 2021 in the State of Amazonas.

The database used for the analyses was e-SUS Notifica. The data extracted were those of positive cases of RT-PCR that were in the database, and the variables of race/color, age group, and sex were selected for the analysis.

9.1 SOURCE OF DATA COLLECTION

The Department of Informatics of SUS – DATASUS has made available the e-SUS Notifica, a new tool for recording the notification of suspected and confirmed cases of the Novel Coronavirus – Covid-19. The notifier has an intuitive design and high-performance infrastructure that provides agility in the notification process. The e-SUS Notifica was developed by DATASUS exclusively to meet the high demand for notifications due to Covid-19 in the country for non-hospitalized patients.

10 RESULTS

In Amazonas, in the 1st quarter of 2021, 38,734 RT-PCR tests were performed according to e-SUS data.

The results obtained show that the capital Manaus presented several tests much higher than the sum of the other 61 municipalities of Amazonas, however, the positivity rate was higher in the interior of the state which is equivalent to 41.94% (Table 2).

TABLE 2. POSITIVITY RATE OF RT-PCR TESTS OF THE 1ST QUARTER OF 2021 IN THE STATE OF AMAZONAS

	POSITIVE	NEGATIVE	%
MUNICIPALITIES	N	N	TX POSITIVITY (%)
CAPITAL	9745	16698	36,85%
INTERIOR	5155	7136	41,94%

Source: e-SUS Notifies, FVS-AM. Data extracted on 05/26/2021, subject to review.

Another variable analyzed with e-SUS data was the RT-PCR positivity rate by race/color. The Brazilian racial classification is characterized by complexity, ambiguity and fluidity, being based on the appearance of individuals. There are different classification systems, and the official one of the Brazilian Institute of Geography and Statistics (IBGE) consists of five categories: black, brown, white, yellow and indigenous.

The results indicate a high positivity rate in white individuals, even considering the brown race as the most common in the Amazon, which is the second highest in positivity (Table 3). It is noteworthy that this variable is filled by the individual himself based on how he assumes himself.

Concerning the positivity rate in RT-PCR tests in the 1st quarter of 2021 in the variable age group there is an increase in the 50-year-old age group upwards, the results of the e-SUS Notifica show that there is not a very large variation between the rates, all of them somehow remain above the desired (Table 4).

In the gender variable, the positivity rate of RT-PCR tests in the 1st Quarter of 2021 remained practically the same, considering the entire state of Amazonas, according to data from e-SUS Notifica (Table 5).

TABLE 3. POSITIVITY RATE OF RT-PCR TESTS OF THE 1ST QUARTER OF 2021 IN THE STATE OF AMAZONAS CONSIDERING THE RACE/COLOR VARIABLE

	POSITIVE	NEGATIVE	%
COLOR RACE	N	N	TX POSITIVITY (%)
Yellow	114	179	38,91%
White	1193	1464	44,90%
Indigena	282	1075	20,78%
Brown	10348	14084	42,35%
Black	178	310	36,48%
Not Informed	2782	6725	29,26%

Source: e-SUS Notifies, FVS-AM. Data extracted on 05/26/2021, subject to review.

TABLE 4. THE POSITIVITY RATE OF RT-PCR TESTS CONSIDERING THE VARIABLE AGE GROUP REPORTED IN E-SUS NOTIFIES IN THE 1ST QUARTER OF 2021

	POSITIVE	NEGATIVE	%
AGE GROUP	N	N	TX POSITIVITY (%)
1 to 4 years	190	554	25,54%
5 to 9 years	113	358	23,99%
10 to 19 years	847	1862	31,27%
20 to 29 years	2723	5290	33,98%
30 to 39 years	3572	6171	36,66%
40 to 49 years	3142	4750	39,81%
50 to 59 years	2134	2601	45,07%
> 60 years	2176	2261	49,04%

Source: e-SUS Notifies, FVS-AM. Data extracted on 05/26/2021, subject to review.

TABLE 5. POSITIVITY RATE OF RT-PCR TESTS CONSIDERING THE GENDER VARIABLE REPORTED IN E-SUS NOTIFIES IN THE 1ST QUARTER OF 2021

	POSITIVE	NEGATIVE	%
SEX	N	N	TX POSITIVITY (%)
Male	6922	10986	38,65%
Female	7975	12851	38,29%

Source: e-SUS Notifies, FVS-AM. Data extracted on 05/26/2021, subject to review.

The positivity rate of RT-PCR tests in the municipalities of Amazonas in the 1st Quarter of 2021 remained high according to data from e-SUS Notifica. These values also state that the performance of the RT-PCR test, even being considered the gold test for the detection of Covid-19, is not so common, because in the Amazon the use of rapid tests predominates (Table 6). The difficulty in the use of RT-PCR is due to the logistics of transporting the samples from the municipalities to the central laboratory located in Manaus. The limiting factor for the use of this type of examination, in addition to the difficulty in transporting the sample to the laboratory, is the registration of the sample, because there is a need for internet and not always the municipalities of the interior of Amazonas have quality internet at any time, a factor that also impairs the insertion of data in the e-SUS Notifica and SICEP Gripe systems.

TABLE 5. POSITIVITY RATE OF RT-PCR TESTS IN THE MUNICIPALITIES OF AMAZONAS IN THE 1ST QUARTER OF 2021

	POSITIVE	NEGATIVE	%
MUNICIPALITIES	N	N	TX POSITIVITY (%)
Alvarães	2	0	100,00%
Amaturá	0	10	0,00%
Anamã	29	35	45,31%

Anori	242	131	64,88%
Apuí	139	146	48,77%
Atalaia do Norte	3	4	42,86%
Autazes	13	345	3,63%
Barcelos	5	9	35,71%
Barreirinha	0	2	0,00%
Benjamin Constant	2	12	14,29%
Beruri	0	1	0,00%
Boa Vista do Ramos	1	1	50,00%
Boca do Acre	3	6	33,33%
Borba	43	291	12,87%
Caapiranga	1	2	33,33%
Canutama	4	2	66,67%
Carauari	9	21	30,00%
Careiro	1547	1411	52,30%
Careiro da Várzea	2	54	3,57%
Coari	1	4	20,00%
Codajás	4	2	66,67%
Eirunepé	25	11	69,44%
Envira	109	88	55,33%
Fonte Boa	0	1	0,00%
Guajará	8	5	61,54%
Humaitá	703	1436	32,87%
Ipixuna	2	3	40,00%
Iranduba	40	69	36,70%
Itacoatiara	26	255	9,25%
Itamarati	1	0	100,00%
Itapiranga	0	1	0,00%
Japurá	0	1	0,00%
Juruá	0	1	0,00%
Jutaí	52	50	50,98%
Lábrea	2	5	28,57%
Macapa	0	1	0,00%
Manacapuru	1667	1773	48,46%
Manaquiri	53	135	28,19%
Manaus	**9745**	**16698**	36,85%
Manicoré	16	81	16,49%
Maraã	0	1	0,00%
Maués	1	8	11,11%
Nhamundá	1	0	100,00%
Nova Olinda do Norte	11	33	25,00%
Novo Airão	4	75	5,06%
Novo Aripuanã	2	3	40,00%
Parintins	11	9	55,00%
Pauini	2	2	50,00%
Presidente Figueiredo	32	28	53,33%

Rio Preto da Eva	49	77	38,89%
Santa Isabel do Rio Negro	5	6	45,45%
Santo Antônio do Içá	1	2	33,33%
São Gabriel da Cachoeira	183	340	34,99%
São Paulo de Olivença	42	40	51,22%
Silves	2	7	22,22%
Tabatinga	6	10	37,50%
Tapauá	0	3	0,00%
Tefé	13	19	40,63%
Tonantins	21	59	26,25%
Uarini	1	0	100,00%
Urucará	4	0	100,00%
Urucurituba	10	9	52,63%

RT-PCR testing allows those infected to be identified and measures to isolate the infected person, such as quarantine for their contacts, and the resulting medical procedures, are adopted. Differently, the performance of rapid tests contributes to the tracking of the disease and analysis of the evolution of the pandemic. The identification of people with antibodies also supports social isolation and relaxation decisions. Thus, an effective strategy should show the use of both tests. The results indicate that this combination does not always occur in Brazil, as well as in the State of Amazonas.

11 LIMITATIONS

The limitations found were due to the feeding of information into the e-SUS Notifica database, arising from the lack of filling in important fields in the form.

In addition to the lack of filling in some fields, there is also a shortage of resources such as computers and still failures in the internet connection and some places the total absence of signal, making it difficult to feed the system in real-time. Given this, it is understood that one has an inconsistent database that often does not represent reality.

12 FINAL CONSIDERATIONS

The average positivity of the State of Amazonas considering the tests carried out in the first quarter of 2021 was 36.47%, and the WHO recommendation is up to 5%, a level not reached by any Brazilian state.

It is understood that the testing carried out in the Amazon was insufficient to identify the proportion of individuals who have already had contact with the virus.

There is also a gap in information about the presence and circulation of the virus among the population that is at the root of the underreporting of positive cases and makes physical distancing and relaxation decisions more sensitive to business pressure, politics, or subjectivity.

Given the facts, it is necessary to expand testing in the State of Amazonas and invest in health departments so that the correct notification is made in official notification systems. The population must have access to the information that should guide both physical distancing policies and those of their relaxation.

The lack of standards in measurements, testing, and the definition of strategies favor the insecurity of the population.

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CHAPTER
10

Levels of substance use among young brazilian adults during the pandemic period by COVID-19

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ABSTRACT
The pandemic caused by the novel coronavirus has brought with it several challenges not only the emergency development of pharmacological measures to cope but also a unique scenario of health, political, economic, and social crisis, not to mention possible effects that are yet to emerge. Given this scenario, the objective of this study was to evaluate the impacts of Covid-19 on the behavior of alcohol and medication use of young Brazilian adults between 18 and 30 years of age in the pandemic period from March 2020 to March 2022. To this end, an online study was conducted in which a questionnaire was applied with sociodemographic questions and questions about COVID-19 as well as, to know the levels of alcohol use, the AUDIT-C was used, followed by questions about the consumption of anxiolytics, hypnotics, and analgesics. Results: The study included a sample of 247 people, mostly women from the southeast region of the country, with socioeconomic levels A / B. As for COVID-19, participants signaled difficulty in following online activities during the pandemic period as a whole (38%); in the same way that anxiety due to isolation during the entire pandemic period was observed in 41.7% of the sample; nervousness or restlessness was also observed by isolation mainly during the first pandemic year by 22.7% of the sample and stress was observed throughout the pandemic period by 43% of the sample. Regarding the use of substances during the pandemic, it was observed that most participants did not use anxiolytics (60.7%) or hypnotics (72.1%), while a significant portion used analgesics or muscle relaxants (58%) prescribed (12.2%) or not prescribed (45.8%). Regarding alcohol consumption, use was reported by 16.6% of the sample in the first pandemic period and an increase to 19.8% considering the entire pandemic period.

Keywords: COVID-19, Pandemic, Substance use.

1 INTRODUCTION

Originating in December 2019, what began as a possible scenario of pneumonia of unknown etiology in patrons of a seafood market in Wuhan - China, Covid-19 spread rapidly around the world from the Chinese territory. Its widespread is also attributed to genetic diversity and the abundant recombination capacity of the viral genome (Munster et al., 2020; Chen et al., 2020). The challenges imposed on Brazil in the context of the pandemic go beyond measures to combat the new coronavirus if analyzed from the perspective of a complex period of enormous vulnerability (Bordiano et al., 2022). The lack of national coordination during the pandemic has contributed to a heightened sense of

uncertainty and lack of trust in authorities, as well as a lack of access to adequate prevention and health care (Ventura and Reino, 2021; Wang et al., 2020; Li et al., 2020; Henry & Vasconcelos, 2020; Assiri et al., 2023; Alpino et al., 2020).

In addition to the aggravation of pre-existing psychological disorders, the context of isolation and the possibility of contamination provoked negative psychosocial repercussions to favor the development of new conditions such as panic syndrome, anxiety, and depression (Pavani et al., 2021). The literature shows that the deprivation of physical/social contact and breakdown in routine were factors that generated stress. The circumstances provided a greater continuous state of alertness, since psychotherapeutic access was and is heterogeneous in different regions of Brazil. These are factors that when added to the helplessness in the face of such a health and political crisis, as well as the lack of rapid and effective measures for the preservation of the population, intricate the situation faced by Brazilians (Pavani et al., 2021; Castro de Araújo & Machado, 2020; Barreto et al., 2020)

Regarding emotional health, self-esteem represents feelings of self-worth possibly learned through internalization or introjection of the experiences of appreciation performed by others and it is believed that interaction with peers can be a predictor factor in its development (Bandura, 1982). The stability of self-esteem is related to the magnitude of fluctuations in feelings of self-worth in short periods, and while it appears to relate positively to effective coping mechanisms and higher quality of life, the more unstable the individual's self-esteem, the more intense their responses to external events are; in the same way that their depressive symptoms can be aggravated and/or triggered in adverse scenarios (Viscardi & Correia, 2016).

Concerning substance use, according to the III National Survey on Drug Use by the Brazilian Population coordinated by the Oswaldo Cruz Foundation (Bastos et al., 2017), 3.2% of Brazilians used illicit substances in the 12 months before the survey. This percentage is much higher among men: 5% (women = 1.5%) and also among young people: 7.4% of people between 18 and 24 years old had used illegal drugs in the last 12 months before the survey. The most commonly used illicit substance throughout life was marijuana (7.7%) and secondly powder cocaine (3.1%). Another fact to be mentioned refers to the use of opioid analgesics and benzodiazepines. It was observed that in the 30 days before the research these substances were used in a non-prescribed way, or used differently from that recommended by the doctor, by 0.6% and 0.4% of the Brazilian population, respectively. About legal drugs, if on the one hand tobacco consumption seems to be decreasing (13.6% used it in the previous 30 days and 33.5% reported having used it at some point), other emerging forms of tobacco use came to the fore with the increase in the use of electronic cigarettes and hookahs in the last 30 days (34% in the age group of 18 to 30 years). Regarding alcohol use, more than half of the Brazilian population aged 12 to 65 years reported having ingested alcohol at some point in their lives. Around

30.1% mentioned having drunk at least one dose in the 30 days before the survey and approximately 2.3 million people met the criteria for alcohol dependence in the previous 12 months.

During the pandemic, data from the Instituto de Medicina Integral Professor Fernando Figueira (IMIP) show an increase in marijuana consumption by 17.2%, cocaine by 7.4%, and benzodiazepines by 12.7%. Regarding alcohol consumption, the increase was 13.1%, slightly below the world average of 13.5%. The study entitled "COVID-19 Monitoring Brazil", conducted by the Federal University of São Paulo in conjunction with the State University of Rio de Janeiro, showed an 18% increase in alcohol consumption by the Brazilian population, while the use of marijuana and cocaine increased by 8.3% and 6.5%, respectively.

Given this scenario, this study aimed to evaluate the consumption of alcohol and anxiolytic, hypnotic, and analgesic/muscle relaxant medications prescribed or not during the pandemic period among young Brazilian adults aged 18 to 30 years.

2 METHODOLOGY

This study was submitted to and approved by the Research Ethics Committee of UNIFESP Nº.146171/2021.

Participated in this online study, 247 people who were invited to participate through social media (email, WhatsApp, Instagram, Facebook) by which they received a Google Forms form containing all the questionnaires, as follows.

The sociodemographic questionnaire developed by the authors of the research contains questions such as age, gender, education, region of the country in which they live, and economic situation (ABIPEME questionnaire), to evaluate the personal data of the participants. The impact of the pandemic on the personal lives of the participants was estimated through 10 questions also elaborated by the authors.

To evaluate alcohol consumption, the AUDIT-C was applied, a reduced format instrument of the AUDIT (Alcohol Use Disorders Identification Test, WHO, 1990), which consists of three questions based on the frequency of alcohol use and the concept of standard dose and margin of use from 0 (never) to 4 (4 times or more per week). Its objective is to contribute to the identification of possible abusive consumption patterns or dependence; The higher the score, the higher the pattern of alcohol risk consumption. The AUDIT-C score is made on a scale from 0 to 12 points so that any question of the instrument has five answer options, allowing a score from 0 to 4 in each. For men, a score from 0 to 3 is considered low risk; between 4 and 5 points, moderate risk; between 6 and 7 points, high risk and from 8 to 12 points, severe risk. For women, scores from 0 to 2 are considered low risk; between 3 and 5 points, moderate risk; between 6 and 7 points high risk and between 8 to 12 points severe risk.

Subsequently, questions were used regarding the use of anxiolytic, hypnotic, and analgesic drugs (and muscle relaxants), prescribed and non-prescribed, used specifically during the pandemic period.

It is worth noting that all the questions asked the participant to report their experiences related to the pandemic period, separated between the first period (from March 2020 to March 2021) and the second period (from March 2021 to July 2022), as well as the period of the pandemic as a whole.

3 FINDINGS

The sample of the present study was 247 people, composed mostly of women (71.7%) with a mean age of 25.4 years (SD=3.06), residents of the Southeast region of Brazil (70%), with complete higher education (37.7%) or incomplete (30.4%). Most participants belonged to classes A-B (52.2%) according to ABIPEME criteria. Participants reported difficulty tracking online activities during the first pandemic year (34.4 percent), and 38 percent mentioned having difficulties during the pandemic as a whole. As for social isolation, 29.6% reported episodes of anxiety in the first period and 41.7% reported episodes of anxiety throughout the pandemic. Regarding nervousness or restlessness, also due to isolation, 22.7% mentioned these symptoms during the first year; As for stress, 43% experienced these symptoms throughout the pandemic period. There was a greater demand for psychological counseling in the second year of the pandemic, by 27.1% of the participants. As for COVID-19, the majority of the sample did not contract the disease (57.1%) and did not lose close people (74.1%). The negative impacts of the pandemic period were observed by most participants (89.5%). On the other hand, 64.8% also mentioned positive aspects of the pandemic, such as being closer to family.

Regarding the use of substances, the use of different substances during the pandemic was verified and it was observed that most participants did not use anxiolytics (60.7%) or hypnotics (72.1%), while a significant portion used analgesics or muscle relaxants (58%) prescribed (12.2%) or not prescribed (45.8%). As for alcohol consumption, consumption was reported by 16.6% of participants in the first period, 13.8% also used it in the second period, and 19.8% of participants mentioned having drunk throughout the pandemic period. It was also possible to see that there was no increase in alcohol use in a significant portion of the sample (49.8%) between the first period and the second period. The median of the AUDIT-C scale was 3 for both females (SD=2.78) and males (SD=2.66).

4 DISCUSSION

Based on the results obtained, it can be stated that the sample of the research in question was composed predominantly of women, with a high level of education and income.

The analysis of substance use during the pandemic points to a significant portion of participants taking painkillers and muscle relaxants, as opposed to using anxiolytics and hypnotics. Muscle relaxants provide muscle relaxation and pain relief, which in individuals subjected to a lot of stress can help reduce muscle tension associated with such a mental state (VanTulder et al., 2003; Cashin et al., 2023). Stress can cause chronic muscle tension, leading to headaches, neck and shoulder pain, and back pain (Cashin et al., 2023). In the context of the pandemic, access to regular and quality therapy, regular physical exercise, alternative relaxation techniques, and the possibility of lifestyle change were cut off from the population that respected the virus containment measures, which may have directly influenced the effects of stress felt by the body, leading to the non-prescribed use of analgesics and muscle relaxants.

Regarding alcohol consumption, higher use was observed by the sample in the first year of the pandemic and during the pandemic as a whole. With increased stress, anxiety, and uncertainty caused by the pandemic, the escape from tension and negative emotions through alcohol is present in several places in the world (Henrique & Vasconcelos, 2020). Work overload and lack of contact were also influential factors in these aspects, especially in countries where social isolation measures and forty were imposed.

The results also showed that there was a non-significant difference between genders in the AUDIT-C score, however, the interpretation of the data in question indicates moderate risk consumption for women while for men the consumption is low risk. The onset of substance use disorder can be influenced by several factors such as biological, psychological, and social. In general, women are more susceptible to the negative effects of alcohol for biological reasons, for example, since they tend to have less water in their bodies and fewer metabolic enzymes from alcohol, which predisposes them to the scenario of greater and faster absorption of the substance. In addition, there is evidence of increased liver damage, cancer risk, and cardiovascular disease in females (NIDA, 2021). Regarding social and psychological factors, it is of great relevance the greater propensity of stigmas and social pressure related to alcohol on the part of women, which can hinder the search for help and treatment. There is still the scenario in which women, in addition to being more overwhelmed, are still more likely to go through traumatic events, such as sexual abuse and domestic violence, which through coping mechanisms of adverse situations has the excessive consumption of alcohol (Roberts et al., 2018).

5 FINAL CONSIDERATIONS

This study aimed to evaluate the consumption of alcohol and anxiolytic, hypnotic, and analgesic/muscle relaxant medications prescribed or not among Brazilians aged 18 to 30 years during

the Covid-19 pandemic during pandemic period. Thus, the result was a sample composed mostly of women with a high level of education and income. Even with low contamination and loss of close people due to the disease, a significant portion of the total sample indicated negative impacts on their lives, such as difficulties in adapting to the distance modality, difficulties in dealing with social isolation, stress, and anxiety. On the other hand, a portion of the sample reported positive aspects of the pandemic, such as being more time with the family, being at home longer, being able to follow the activities of the children, and having a less hectic life. During the pandemic period, there was a significant increase in the use of painkillers and muscle relaxants, both prescribed and non-prescribed, as well as higher alcohol consumption in the first year (March 2020 to March 2021). Women had a higher risk of consumption when compared to the parameters established by the World Health Organization.

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CHAPTER
11

Benefits of prescribing telemonitored exercises in patients with ankylosing spondylitis in the covid-19 pandemic: case series

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ABSTRACT
Introduction: Ankylosing spondylitis (AS) is a complex disease characterized by inflammation of the spine and large joints. Considering the various losses caused by the COVID-19 pandemic, especially in individuals with chronic diseases due to cancellations of appointments and treatments, telemonitoring or telecare has become a good alternative for patients with AS, providing continuity of care. Objectives: To evaluate the effects of telemonitored exercises in patients with AS during the COVID-19 pandemic. Methods: Seven patients diagnosed with AS were included, evaluated, and followed up via messaging application. In the evaluations, several clinical issues were investigated, such as pain (VAS), stiffness, sleep, functionality (BASFI), quality of life (HAQ-S), and exercise frequency. The prescription and telemonitoring of home exercises occurred for 10 months by sending evaluation forms, videos with exercise guidelines, and monitoring via messaging application. Results: The frequency of exercises performed by the patients was a median between 165 and 217 minutes per week. No patient reported any adverse effect to the exercises, and it was possible to observe the improvement of pain and morning stiffness when comparing the variables of the initial and final evaluations, but without statistically significant differences. A strong correlation was found between functionality, morning pain, and momentary pain, as well as between momentary pain and stiffness time. Conclusion: Patients with AS had adherence to telemonitored exercises, as well as important benefits regarding functionality, sleep quality, morning pain intensity, quality of life, pain, and stiffness. In the patients with AS studied it was observed that the lower the pain intensity and the time of morning stiffness, the better the functionality.

Keywords: Ankylosing spondylitis, exercises, telemonitoring, rehabilitation.

1 INTRODUCTION

The scenario of the COVID-19 pandemic has generated insecurity and fear for the population in general, in addition to bringing important losses, especially to individuals with chronic diseases. The fact of going to work, to the market, and even buying their medicines of continuous use, led these individuals to fear for their health and that of their families. In this context, many appointments and elective treatments were canceled due to detachment, interfering with health care and disease control and leaving this population even more vulnerable (ESTRELA et al., 2020).

Also, for the control of the pandemic, it was recommended that all individuals perform activities to stay physically active, such as physical exercises at home, daily activities of home maintenance, games that move the body with children, reduction of sedentary time intervals with activities with higher energy expenditure and performance of other pleasurable physical activities in daily life (FERREIRA et al., 2020).

Individuals with rheumatic diseases are typically less active than the general population (HOOTMAN et al., 2003; CDC, 2011) and, as a consequence, have a higher risk of cardiovascular diseases and muscle weakening, further reducing their physical condition (TURESSON and MATTESON, 2007). These aspects highlight the importance of encouraging individuals with rheumatic diseases to maintain a physically active lifestyle.

Before the context of the COVID-19 pandemic, patients with Ankylosing Spondylitis (AS) already had significant health impairments when compared to the general population, both in functionality and in mental and social aspects (DAGFINRUD et al., 2004). And this limitation of functionality can result from reversible factors, such as pain and stiffness, or irreversible ones, such as structural damage from the disease (ALETAHA et al., 2006; LANDEWE et al., 2008). The reduction of functional capacity in patients with AS, therefore, depends not only on the level of disease activity but also on the level of structural damage (LANDEWE et al., 2008), smoking, sedentary lifestyle, and lack of social support (WARD, 2002).

The benefits of performing home exercises in patients with AS are already known (LIM et al., 2005) and the analgesic effects of pharmacological therapy favor the adherence of patients to exercises (MASIERO et al., 2011). The association of educational-behavioral training with exercises favors the functional improvement of patients with AS (MASIERO et al., 2013).

Considering the state of the pandemic by the novel coronavirus, the Federal Council of Physical Therapy and Occupational Therapy (COFFITO), in resolution No. 516, of March 20, 2020, began to allow the realization of non-face-to-face care through teleconsultation, teleconsulting and telemonitoring (COFFITO, 2020). The authorization of these new modalities allowed many patients to be efficiently monitored, both in the evaluation and prescription of physical exercises, as well as for the monitoring and application of health education strategies.

The challenges of using social media to carry out telemonitoring in Brazil are diverse, among which are the infrastructure, economic, judicial, and social aspects. The most important aspects, however, are related to the conditions of the patients, such as age and education, and also of the therapist, which included lack of knowledge about computers, access to updated devices, and internet speed (DANTAS et al., 2020).

Despite the barriers observed, it is essential that the physiotherapist can make the necessary adaptations that allow the practice of telecare, aiming to achieve benefits for his patient. Still, with the growth and increasing ease of use of social networks and digital communication channels, this means of monitoring and therapy becomes easier to be performed and more accessible to patients and health professionals (PEGORARI et al., 2020).

Considering the pandemic context and the difficulty of access to face-to-face care, the objective of this study was to verify the benefits promoted by telemonitored exercises in patients with AS, as well as to correlate changes in functionality with the stiffness and intensity of pain reported.

2 METHODOLOGIES

A prospective convenience case series sample study was carried out, which was part of the Project "Aquatic physiotherapy for patients with neuromusculoskeletal disorders", approved by the Ethics Committee Involving Human Beings (seem n°4.050.304), carried out from the Free and Informed Consent of the participant recorded in audio.

Seven patients with a clinical diagnosis of AS were included, three women and four men. All patients were treated at the Aquatic Center of the Regional University Hospital of Northern Paraná (HURNP) in Londrina and, due to the distancing recommendations recommended by the COVID-19 pandemic, face-to-face treatment was interrupted. In order not to cause greater harm to health, patients were invited to be followed by the messaging application by forwarding videos and monitoring the performance of specific physical exercises remotely.

The patients who agreed to participate in the study by sending recorded audio confirmed their acceptance and were subsequently evaluated through the application of specific instruments via telephone call or in the form of online forms, according to the patient's choice and according to their availability of time.

For the evaluations, a questionnaire was applied to contain several questions addressing subjects such as medication use, pain, stiffness, quality of life, frequency of exercises, and expectations regarding the exercise program. The following were applied: the verbal analog scale (VAS) for pain intensity analysis (PARAIZO et al., 2019), the Bath Ankylosing Spondylitis Functional Index (BASFI) questionnaire for functionality (CUSMANICH et al., 2012), the questionary The Health Assessment Questionnaire for the Spondiloar arthropathies (HAQ-S) for quality of life (SHINJO et al., 2007), and a question about the patient's perception of their sleep quality.

The verbal analog scale (VAS) has its measurement from 0 to 10, where 0 is the absence of symptoms and 10 is the greatest pain, you have ever felt, to assess momentary pain and morning pain (PARAIZO et al., 2019).

The Bath Ankylosing Spondylitis Functional Index (BASFI) is an instrument composed of 8 questions about functionality in AS and 2 about how the patient deals with daily life. All questions are answered using a 10 cm horizontal visual analog scale with a score from 0 to 10. The average of the answers gives the BASFI score that has a minimum score of 0 and a maximum of 10, with 0 corresponding to the absence of disability and 10 to the maximum disability. The BASFI meets the criteria required for a functional index, is of quick and easy applicability, can be self-administered or applied by an interviewer, is also easy to understand, reliable, and sensitive to changes in aspects of the disease (CALIN et al., 1994). The BASFI was translated and validated into Portuguese (CUSMANICH et al., 2012).

The HAQ-S is an instrument for assessing the quality of life of patients with spondyloarthropathies composed of 22 questions and has 10 domains, namely, dressing and grooming, getting up, eating, walking, personal hygiene, reach, usual activities and activities associated with posture and driving. These domains are graded from 0 to 3 and their total score is the sum of the points of the components divided by 8, and the lower the score the better the quality of life (SHINJO et al., 2007).

In the monthly evaluations, sleep quality was assessed using a specific question, where the patient classified sleep as "good, regular, or poor". Morning stiffness was also assessed through a specific question, where the patient reported the time of morning stiffness, if any.

The follow-up of patients remotely occurred between May 2020 and February 2021, and in the first seven months guidance videos were sent and the following three months were only follow-up.

After the initial evaluations, videos, and booklets were sent through social media with guidelines and sequences of home exercises. The exercises aimed to improve mobility, flexibility, and maintenance of muscle strength in different decubitus, as well as guidance on the use of thermotherapy in periods of complaints.

As a strategy in health education, guidance for the use of thermotherapy was used, and two videos were sent with explanations of the use of cold and heat for pain relief. The application of the resource was demonstrated and oriented at which times they could be used, such as painful conditions, before or after the performance of the exercises, in addition to alerting the places of risk of application. The use of cryotherapy was recommended for acute pain, where it could have the presence of edema, with the application of an ice pack at the site of discomfort, without having direct contact with the skin, for 20 minutes. For the use of heat, it was recommended for chronic pain, preferably they could apply before the exercises to improve mobility or after the performance for muscle relaxation, where they applied a towel with hot water on the spot. The control of the use of the thermotherapy intervention

was performed together with the monthly reassessments, where the patient answered if he had used the resource, which application strategy he used, and in which places he applied.

Every four weeks, patients received a new sequence of video-guided exercises, in different decubitus positions and with adaptations according to individual conditions. The exercises were instructed to be performed at a place and time of each patient's preference and with a minimum frequency of twice a week and the reassessments were done monthly, as well as three months after the end of the video submission. Patients used messaging apps to clear up any questions about the exercises with individualized follow-up.

In the statistical analysis, the Shapiro-wilk normality test was used, being described as mean ± standard deviation when normal, and when not, they were described as the median and interquartile range (25-75%). For the correlation analysis between the variables functionality (BASFI), morning pain, momentary pain, and time of morning stiffness, the Spearman correlation coefficient (ρ) was used. The correlations were considered weak ($0.1 < \rho \leq 0.4$), moderate ($0.41 \leq \rho \leq 0.69$) or strong ($\rho \geq 0.7$). The SPSS 27.0 software was used for the analyses and the statistical significance was set at 5%.

3 FINDINGS

Seven patients were selected to participate in the study, but one of them did not adhere to the protocol, interrupting the treatment because he did not adapt to the intervention.

The study sample consisted of 6 patients (3 men and 3 women), with an ID of 54.2 (SD = 4.4) years, weight 78.0 (SD = 3.9) kg, height 1.6 (SD = 0.2) m and time of diagnosis of 9.0 (Md [25-75%] = [4.5-20.0]) years. The pain was the most frequent complaint. Considering that this is a series of cases, the particularities can be seen in Table 1.

Table 1: Characteristics of the patients included in the study.

Patient	Age (years)	Sex	Time since clinical diagnosis (years)	Main complaint
1	60	Female	4	Pain in hand fingers, knee and spine
2	51	Female	10	Pain in feet, shoulders and knees
3	48	Female	10	Pain in the spine
4	70	Male	31	Low back pain in the right shoulder and limitation of cervical movements
5	47	Male	5	Pain in the left foot
6	18	Male	4	Pain in the left hip and left knee

Regarding the frequency of exercises performed by the patients, a median (Md) was found between 165 and 217 minutes per week, with greater dedication to the practice in the fifth month (Table 2). None of the patients analyzed reported any adverse effects of the exercises.

In the evaluation of the effects of telemonitored exercises on the functionality of patients, it was possible to observe a median reduction of 1 point in the BASFI score when comparing the initial and final scores. These findings demonstrate improvement in function, because the lower the BASFI score, the better the individual's function (Table 3).

When the quality of life of the patients was assessed, there was a reduction of Md of 1.1 in the HAQ-S score (Table 3), indicating an improvement in the quality of life of the individuals, but in the last evaluation, this benefit was not maintained.

Regarding morning pain, there was an Md reduction of 1.5 points in VAS when the initial and final scores were compared. In pain at the time, there was an increase of 0.5 points when we observed the initial and final scores. In addition, there was a 32.5-minute Md reduction in the time of morning stiffness between the initial and final evaluations (Table 3).

The evaluation regarding the perception of sleep quality showed apparent improvement between the 1st and 2nd evaluations and worsening in the 6th evaluation, which can be observed in Table 5.

Despite the improvement in the absolute values of the outcomes analyzed, no statistically significant differences (P>0.05) were found between the evaluations for any of the variables presented in Table 3.

It was observed that during the evaluations, the BASFI score showed a reduction, indicating an improvement in functionality, as well as morning pain and momentary pain (Table 4). Thus, a strong correlation was found ($\rho = 0.771$; $P = 0.072$) between functionality (BASFI) and morning pain, which cannot be considered statistically significant, and between functionality and momentary pain ($\rho = 0.870$; $P= 0.024$), indicating that the lower the pain, the better the function.

Strong correlations were found between HAQ-S and morning pain ($\rho = 0.829$; $P= 0.042$) HAQ-S and momentary pain ($\rho = 0.725$, $P = 0.103$), moderate correlation between HAQ-S and weekly exercise frequency ($\rho = -0.429$; $P= 0.397$) and weak correlation between HAQ-S and morning stiffness time ($\rho = 0.290$; $P = 0.577$). Indicating that the greater the momentary pain and morning pain, the worse the quality of life of the individual. The correlation between the weekly frequency of exercise and quality of life indicates that the more active the individual remains, the better the quality of life.

Another variable that showed a reduction throughout the evaluations was morning stiffness (Table 4). Thus, it was possible to observe a moderate correlation ($\rho = 0.580$; $P = 0.228$) between functionality and morning stiffness, demonstrating that the shorter the time of morning stiffness, the better the quality of life of the individual.

Correlations were also found between weekly exercise frequency and morning pain, with a strong correlation ($\rho = -0.771$; $P = 0.072$), for momentary pain outcomes ($\rho = -0.058$; $P = 0.913$) and

stiffness time ($\rho = 0.232$; $P = 0.658$) weak correlations were found. Thus, it was possible to observe that the higher the weekly frequency of exercises, the lower the morning pain reported.

Table 2: Frequency of execution of telemonitored exercises throughout the follow-up period (n=6).

	Review 1	Review 2	Review 3	Review 4	Review 5	Review 6	Review 7	Follow-up
				Md [25-75%]				
Frequency Exercises (without)	5,5 [2,6-7,0]	5,5 [2,6-7,0]	4,5 [3,5-5,3]	5,0 [2,8-6,3]	5,0 [2,8-6,3]	5,0 [0,8-6,3]	5,0 [1,8-6,3]	4,5 [1,5-6,3]
Time Exercises (min)	32,5 [26,3-41,3]	32,5 [26,3-41,3]	37,5 [30,0-50,3]	42,5 [27,5-62,5]	42,5 [27,5-62,5]	36,0 [11,3-48,8]	35,0 [25,0-52,5]	35,0 [7,5-75,0]
Total Time Exercises (min)	165,0 [63,8-288,8]	165,0 [63,8-288,8]	187,5 [105,0-250,5]	187,5 [75,0-420,0]	217,5 [60,0-285,0]	198,5 [11,3-273,8]	192,5 [27,5-292,5]	192,5 [15,0-435,0]
Daily executions n (%)								
0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (16,7)	0 (0)	1 (16,7)
1	5 (83,3)	5 (83,3)	5 (83,3)	4 (66,7)	4 (66,7)	4 (66,7)	5 (83,3)	4 (66,7)
2	1 (16,7)	1 (16,7)	1 (16,7)	2 (33,3)	2 (33,3)	1 (16,7)	1 (16,7)	1 (16,7)
Another exercise n (%)								
Yes	4 (66,7)	3 (50,0)	2 (33,3)	3 (50,0)	3 (50,0)	2 (33,3)	1 (16,7)	3 (50,0)
No	2 (33,3)	3 (50,0)	4 (66,7)	3 (50,0)	3 (50,0)	4 (66,7)	5 (83,3)	3 (50,0)

Legend: Md (median); [25-75%] (interquartile range); without (week); min (minutes); n (absolute frequency); % (relative frequency).

Table 3: Changes in functionality, quality of life, pain, and stiffness at the beginning and end of the exercise telemonitoring period.

Variable	Initial	Final
	Md [25-75%]	
BASFI (points)	7,2 [4,1-8,4]	6,2 [2,6-7,8]
HAQ-S (points)	1,3 [0,9-2,3]	1,4 [0,9-2,1]
Morning pain (VAS)	7,0 [4,5-7,3]	5,5 [2,3-7,3]
Pain at the moment (VAS)	4,0 [1,5-4,3]	4,5 [0,0-6,3]
Stiffness (min)	40,0 [8,3-138,8]	7,5 [4,5-67,5]

Legend: Md (median); [25-75%] (interquartile range); cm (centimeters); min (minutes).

Table 4: Changes in symptoms, functionality and quality of life throughout the exercise telemonitoring period (n=6).

Md [25-75%]	Baseline	Review 1	Review 2	Review 3	Review 4	Review 5	Review 6	Review 7	Follow-up
Morning pain (cm)	7,0 [4,5-7,3]	5,5 [3,8-7,3]	3,5 [2,0-7,3]	3,5 [1,8-7,3]	3,5 [1,8-7,0]	3,5 [2,0-6,8]	4,5 [1,8-6,5]	5,5 [2,8-6,3]	5,5 [2,3-7,3]
Pain moment (cm)	4,0 [1,5-4,3]	3,0 [0,0-4,3]	3,0 [0,0-5,0]	0,5 [0,0-5,3]	1,5 [0,0-4,5]	1,0 [0,0-8,3]	3,0 [0,0-4,3]	3,5 [0,0-5,5]	4,5 [0,0-6,3]
Rigidity (min)	40,0 [8,3-138,8]	15,0 [6,0-93,8]	4,0 [2,0-90,0]	4,0 [1,5-90,0]	5,0 [2,0-75,0]	5,0 [1,5-90,0]	20,0 [2,3-75,0]	20,0 [5,0-75,0]	7,5 [4,5-67,5]
BASFI (points)	7,2 [4,1-8,4]	6,5 [3,3-7,4]	6,5 [3,0-7,6]	5,5 [3,1-7,0]	5,8 [3,0-7,9]	5,8 [2,3-7,7]	5,6 [3,4-8,0]	7,1 [2,6-7,8]	6,2 [2,6-7,8]
HAQ-S (points)	1,3 [0,9-2,3]	1,1 [0,8-2,4]	1,1 [0,9-1,9]	1,4 [0,8-2,3]	1,8 [0,8-2,1]	1,8 [0,9-2,1]	1,3 [1,0-1,9]	1,4 [1,0-2,1]	1,4 [0,9-2,1]

Legend: Md (median); [25-75%] (interquartile range); cm (centimeters); min (minutes).

Table 5 – Changes in sleep quality over time.

	Baseline	**Review 1**	**Review 2**	**Review 3**	**Review 4**	**Review 5**	**Review 6**	**Review 7**	***Follow-up***
n (%)									
Good	2 (33,3)	5 (83,3)	3 (50,0)	4 (66,7)	4 (66,7)	4 (66,7)	3 (50,0)	4 (66,7)	4 (66,7)
Regular	2 (33,3)	1 (16,7)	3 (50,0)	2 (33,3)	2 (33,3)	2 (33,3)	3 (50,0)	2 (33,3)	2 (33,3)
Bad	2 (33,3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Legend: n (absolute frequency); % (relative frequency).

4 DISCUSSIONS

Physical exercise is one of the main non-pharmacological treatments for AS, as it can interfere with several physical and psychological aspects (LIANG *et al.*, 2020). The exercise program is very important to improve or maintain the physical state of the patient and should be planned and applied individually according to the patient's needs (van der HEIJDED *et al.*, 2017).

The use of telecare has seen a major increase during the COVID-19 pandemic, primarily as a means of reducing the impact of discontinuing in-person treatments (KU *et al.*, 2021). In the present study, the strategy was used to promote the continuity of treatment of patients with AS, maintaining the benefits achieved during face-to-face therapies.

It was possible to observe in the present study that the performance of telemonitored physical exercises promoted improvement in the functionality of individuals with AS. Pécourneau et al. (2017), in a meta-analysis, concluded that protocols that include physical exercises are beneficial for this population, reducing the BASFI score, which corresponds to improved functionality, as well as reduced cardiovascular risk, improved respiratory function and prevention of osteoporosis (PÉCOURNEAU *et al.*, 2017).

Lim *et al.* (2005) conducted a study in which patients in the intervention group participated in an exercise program lasting 8 weeks, which was composed of exercises similar to those used in the present study, being performed by patients in their homes. As in the present study, the patients showed significant improvement in functionality and pain reduction, demonstrating that it is possible to achieve good results in these aspects through guided home exercises.

Masiero *et al.* (2011) conducted a randomized clinical trial comparing a group of patients who underwent rehabilitation with an educational-behavioral program and another group that performed only rehabilitation, which was composed of physical exercises guided by physiotherapists and performed by patients at home. As in the present study, the study used home exercises and a monthly follow-up through telephone calls. At the end of the study, significant improvements were observed in the scores of BASMI, BASFI, BASDAI, spinal mobility and other variables evaluated in the rehabilitation and rehabilitation plus educational program group. In the present study, conducted with a single intervention group, it was also possible to observe an improvement in the BASFI score, indicating an improvement in the functionality of the patients.

Hsieh *et al* (2014) conducted a randomized clinical trial with 44 patients with AS divided into two intervention groups, including home exercises, with one group performing mobility, breathing and stretching exercises and the other group receiving guidance to perform mobility exercises, muscle strengthening and aerobic exercises. The individuals participating in the study were monitored through telephone calls made every 2 weeks by a physical therapist. The program lasted 3 months and at the

end, the authors observed an improvement in aerobic capacity and functionality, assessed using BASFI, in the patients of the second group. The study reinforces the effectiveness of home exercises and adherence to this treatment modality by the population with AS (HSIEH *et al.*, 2014).

There are some similarities between the study by Masiero *et al.* (2011) and that of Hsieh *et al.* (2014), in the way telemonitoring was used. In both studies, the patients received face-to-face training regarding the exercises to be performed at home, guided by a professional linked to the program and periodic follow-up was performed through telephone calls. Telemonitoring, therefore, was applied as a means of monitoring and reassessing the patients of the program. In the present study, telemonitoring was applied integrally, both in the sending and orientation of the exercises and for monitoring and reassessments, thus allowing that, regardless of where the patient was, he could receive and perform the exercises without prejudice, with close and frequent contact of the project monitors.

Curbelo Rodrígues *et al.* (2015) observed the main barriers to the practice of exercises by patients with AS. These authors conducted a qualitative study with 11 patients who were interviewed and asked about the main barriers and difficulties that lead them not to practice physical exercises. The main barriers cited were lack of information, accessibility, and periods of breaks in exercise, such as during vacations or personal problems, among other factors. In contrast, a prospective cohort study by Ji *et al.* (2019) presents data that demonstrate that telecare can be an effective strategy to bring information and perform care, saving time and costs, and benefiting patients and health professionals.

It was possible to observe that the teleservice strategy was effective for the prescription of exercises for patients with AS, and can also be used for behavioral change, health education strategy and so that patients have the possibility of continuing the exercises during the holidays or periods that cannot attend a face-to-face service.

Some difficulties arose during the study, such as the adaptation to technological resources for the prescription of exercises, the adequacy of exercises to facilitate their execution by the patient in his residence and the difficulty in maintaining the motivation of the patients to the remote intervention after a few months of treatment.

The use of telecare can enrich clinical practice and can be used to add exercises to the routine of patients, as well as a strategy for continuity of therapies in periods when the patient cannot attend in person for the therapy, thus avoiding losses during this period.

Although a small number of patients have been investigated, several benefits of this strategy can be mentioned, such as the possibility of individualized attention throughout the follow-up period, as well as the adaptation of the exercises to the needs and difficulties of each one in a personalized way. Even in the face of individualized follow-up, two patients who agreed to participate in the study did not adhere to the protocol, being removed from the final sample of the study.

It was observed that, with the practice of home exercises and individual monitoring through social media, the patients with AS who participated in the study obtained important benefits, such as improvement in stiffness, morning pain, and functionality. Some limitations of this study can be mentioned, such as the small number of the sample and the prolonged time of asynchronous remote follow-up, in addition to some outcomes, such as "quality of life" and "momentary pain", having worsened at the end of the follow-up, which can be justified by the prolonged time of the asynchronous follow-up and loss of motivation of the patients.

The results found may be useful to demonstrate the effectiveness of telemonitored home exercises for individuals with AS, thus contributing to a new means of prescribing exercises to maintain the treatment and performance of physical exercises by patients even in situations of travel difficulties. As implications for clinical practice, it is suggested that telemonitored exercises be performed synchronously, as well as concomitant and/or interspersed with face-to-face consultations with a scheduled frequency that meets individual needs. Considering the small sample size of the present study, it is suggested that nine surveys be conducted including home exercises and telecare compared to face-to-face modalities with a larger sample to confirm the benefits.

5 CONCLUSIONS

The patients with AS studied adhered to the modality of telemonitored home exercises, presenting improved functionality, improved sleep quality, and reduced morning pain and morning stiffness.

Strong correlations were observed between functionality and morning pain and between functionality and momentary pain, thus demonstrating that the lower the patient's pain, the better his functionality. There was also a moderate correlation between functionality and morning stiffness, therefore, the shorter the duration of morning stiffness, the better the functionality of the individual. Similarly, the higher the weekly frequency of exercise, the lower the morning pain and the better the quality of life in the patients.

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CHAPTER
12

Relationships between socio-emotional skills and stress, anxiety and depression disorders in education professionals in the COVID-19 pandemic

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ABSTRACT
The COVID-19 pandemic has generated several challenges worldwide in different spheres of society, including education. This study examined the effects of the COVID-19 pandemic on teaching routine, its associated stress, anxiety, and depression disorders, and how educators' social-emotional skills are related to these disorders. The main hypothesis was that social-emotional skills have a significant protective effect on psychological problems, suggesting that they should be developed to reduce the prevalence of these disorders. Method: An online survey was conducted through a questionnaire sent to educators of Basic Education and Higher Education from all over Brazil. Results: Based on data from 231 education professionals, it was found that most participants had mild to moderate levels of stress, extremely severe levels of anxiety, and normal levels of depression. Participating teachers reported an abrupt and intense change in work routine during quarantine, but also demonstrated elevated levels of positive thinking, emotional self-control, ability to cope with stress, collaboration, openness to the new and another, and good self-management. It was also found that the more social-emotional skills, the lower the total rates of disorders. Conclusion: The results suggest that social-emotional skills were important factors for better coping with the pandemic, but that health and well-being involve other elements in addition to skills. It is expected that these findings can support intervention strategies aimed at professionals in the field of education.

Keywords: COVID-19, Psychological Disorders, Socio-emotional skills.

1 INTRODUCTION

The COVID-19 pandemic has generated numerous public health challenges, due to high transmission rates and millions of deaths worldwide, requiring the adoption of several preventive measures, such as social distancing, to contain the spread of the virus. At the social and political level, there have been significant socioeconomic impacts and increased individual, social and programmatic vulnerabilities, including unemployment, financial instability and amplification of inequalities (Duarte, Santo, Lima, Giordani, & Trentini, 2020; Farias & Junior Milk, 2020; Pavani, Silva, Olschowsky, Wetzel, Nunes, & Souza, 2020). In this context, research points to several consequences in the lives of individuals, particularly in terms of isolation, fear of infection by the virus and disruption in family relationships, social ties, academic life, work and finances. These effects have been directly and indirectly linked to the physical and emotional health of the population, such as increased rates of

anxiety, depression, harmful use of substances, among other psychological implications (Duarte et al., 2020; Ornell, Schuch, Sordi, Kessler & 2020; Rajkumar, 2020; Vindegaard & Benros, 2020).

In this scenario of prolonged confinement and restriction of interpersonal relationships and daily activities, in addition to other risk factors, individuals began to face new experiences and mental health challenges, with potential aggravation of psychological conditions before the pandemic, such as stress, anxiety, depression, sleep disorders, substance use, among others (Cui et al., 2022; Xiong et al., 2020)

A specific group significantly affected by the conditions imposed by the pandemic context was that of education professionals, who, compared to other professional categories, had a higher prevalence of negative mental health outcomes during the pandemic (Kush, Badillo-Goicoechea, Musci, & Stuart, 2022). In addition to the concerns and stressors inherent to their teaching career, education professionals faced a series of particular changes in their professional routine, such as the closure of educational institutions and the adaptation to the remote modality of work, with the use of technological tools for the continuity of distance learning (Araújo et al., 2020).

In Brazil, in a study conducted by Oliveira (2021) with a group of educators, it was found that these professionals felt more anxious and with greater work overload during the pandemic. In the same sense, a study conducted with Bahian educators on the impacts of the pandemic on their emotional life showed that 86.8% reported loneliness, anxiety and stress and 55.3% mentioned that social isolation intensely affected their mental health (Lima, 2021).

Among the various factors that influence these mental health indicators, social-emotional skills represent an important aspect to be considered. It is a construct that encompasses competencies that refer to knowledge and skills necessary to recognize and manage emotions, achieve goals, develop emotional resilience and demonstrate empathy, establish and maintain healthy relationships and make responsible decisions. Such skills establish a relationship with the quality of development and social and emotional adjustment, with positive effects on the promotion of well-being and quality of life of individuals, as they are associated with social, behavioral, academic and labor outcomes important for healthy development, as well as play a crucial role in the process of behavior change (Carvalho & Silva, 2017; Domitrovich, Durlak, Staley, Weissberg, 2017; Marin at al., 2017).

For education professionals, knowing how to express themselves, worrying about understanding the other, working in teams, setting common goals, postponing the satisfaction of individual needs in favor of collective goals, cooperating, managing time, among other skills, are qualities expected from the perspective of skills social-emotional. In the group-class, it is up to the teacher to configure the contours and nuances of personal relationships to promote meaningful and lasting learning in their students (Abed, 2014; Arace, Prino, Scarzello, 2021). Therefore, social-

emotional skills are considered essential for managing the social and emotional challenges related to the profession and for building positive relationships. Therefore, these aspects should be taken into account in the structuring and planning of training aimed at this audience, to promote their well-being and personal, social and professional success (Aldrup, Carstensen, Köller, Klusmann, 2020; Arteaga-Cedeño, Carbonero-Martín, Martín-AntónMolinero-González, 2022).

Given this, this study aimed to evaluate the presence of socio-emotional skills and the levels of stress, anxiety and depression in educators coping with the COVID-19 pandemic. The specific objectives were to describe the profile of the participating educators and to evaluate their routines during the pandemic period; assess the different socio-emotional skills and levels of anxiety, depression and stress of the participants; and analyze the relationships between socio-emotional skills and levels of stress, anxiety and depression . We started from the hypotheses that (1) the COVID-19 pandemic has altered the routine of education professionals, increasing the levels of stress, anxiety and depression and that (2) educators with higher rates of social-emotional skills have lower rates of stress, anxiety and depression.

2 METHODS

2.1 PARTICIPANTS

We used a convenience and reference chain sampling composed of 231 education professionals from Basic to Higher Education, located in different regions throughout Brazil.

2.2 INSTRUMENTS

1. Sociodemographic questionnaire: prepared by the authors of the study, containing questions about age, gender, who they live with, region in which they reside, level of education, financial status, whether they contracted COVID-19 and whether anyone in the family or close to them has died from COVID-19.
2. To evaluate the work routine of the participants during the pandemic, a semi-structured questionnaire prepared by the authors of the study themselves was used, containing questions about the work model, in which segment they teach, the number of hours dedicated to work, adaptation to the remote model and access to technology tools.
3. To assess the levels of stress, anxiety and depression, the DASS-21 questionnaire was used, a self-report scale that assesses negative emotional states of stress, anxiety and depression. It was translated and validated in Brazil by Vignola (2013). The instrument contains 14 items divided into a set of three subscales. The depression subscale assesses dysphoria, hopelessness, devaluation of life, self-deprecation and lack of interest. The anxiety

subscale assesses autonomic arousal, situational anxiety, and the subjective experience of anxious affect. The stress subscale is sensitive to levels of chronic arousal and assesses the difficulty of relaxing and whether the subject feels easily disturbed, agitated, irritable, overreactive and impatient. For application, the subjects are asked to answer the questions from a 4-point Likert scale from "Strongly disagree", whose score is zero, to "Totally agree" whose score is 3 (Cunha, 2007), about feelings that happened in the previous week. However, in the present study, the questions were asked considering the pandemic period, from March 2020 to February 2022.

4. To assess the levels of social-emotional skills, a semi-structured questionnaire was used, elaborated by the authors of the study, inspired by the Big Five model (Gomes & Golino, 2011), containing 15 questions, divided into 5 subscales composed of 3 questions each. Each scale relates to competence to be investigated. The subjects were asked to answer the questions from a 3-point Likert scale from "never", whose score was 0, to "often" whose score was 3. Similarly to the other questionnaires, participants were asked to respond considering the pandemic period.

2.3 PROCEDURES

This was an online study in which education professionals received, through virtual social media (e-mail, WhatsApp, Facebook, Twitter, Instagram, among others), electronic contacts and through the snowball technique (chain reference, in which one participant indicates another and so on), an invitation to participate in the research, in which they should answer four questionnaires structured on the Google Forms platform: (1) sociodemographic profile; (2) routine adjustments during the COVID-19 pandemic; (3) DASS-21; and (4) questions to identify the presence of social-emotional skills. Participation took place through agreement with the objectives and with the terms of consent available in full for consultation before access to the questionnaires.

2.4 ETHICS

The study followed all guidelines and regulatory standards for research involving human beings, as recommended by the National Health Council (CNS) and the National Research Ethics Commission (CONEP). The confidentiality of the answers provided for this study was ensured, as well as of the participants, who were initially informed about the objectives and potential risks arising from their participation. All participants signed the Free and Informed Consent Form (ICF). The project was approved by the Ethics Committee of the Federal University of São Paulo (UNIFESP, Proc.: 5.249.868).

2.5 DATA ANALYSIS

Mental health indices were assessed using thePressure, Anxiety and Stress Scale (DASS-21), an instrument adapted and validated in Brazil (Vignola & Tucci, 2014). This instrument, in Likert scale format and self-completion, consists of 21 questions with scores ranging from 0 (does not apply) to 3 (applies a lot), referring to feelings in a period of social isolation due to the COVID-19 pandemic. Items 1, 6, 8, 11, 12, 14 and 18 constitute the subscale for stress assessment; 2,4, 7, 9, 15, 19 and 20 for anxiety; and 3, 5, 10, 13, 16, 17 and 21 for depression. To obtain the respective severity levels for each disorder, following the cutoff points of the original scale (DASS-42, as shown in Table 1), all values were added and multiplied by two (Santos et al., 2022; Silva-Costa et al., 2022).

Table 1. Severity levels, according to DASS-21 cutoff points.

	Normal	**Lightweight**	**Moderate**	**Severe**	**Extremely severe**
Stress	0-10	11-18	19-26	27-34	35-42
Anxiety	0-6	7-9	10-14	15-19	20-42
Depression	0-9	10-12	13-20	21-27	28-42

The indices of social-emotional skills were evaluated by a semi-structured questionnaire, elaborated by the authors of the study themselves. This instrument, in the format of a Likert scale and self-completion, was composed of 15 questions with scores ranging from 0 to 3. To calculate the total index of skills, all items whose response was equal to or greater than 2 points were considered and summed.

Data were analyzed using the statistical software JAMOVI, version 2.3.16, at a significance level of 5%. Data analysis began with the performance of the Shapiro-Wilk test, to verify the assumption of normality of the variables, and the Levene test, to test homogeneity. Subsequently, the descriptive analysis consisted of the descriptive exploration of the variables, including calculation of the prevalences. The sociodemographic data of the different groups were compared using descriptive (mean, standard deviation and median) and inferential statistics.

For non-parametric data, the Mann-Whitney test was used for comparison between independent groups. The Kruskal-Wallis test was used to verify the relationship between the indices provided by the DASS-21 scale and the qualitative variables with three or more categories, to perform multiple comparisons in case of statistically significant differences between the groups. In cases where there was a significant relationship, multiple comparisons of the categories two by two were performed using the Dwass-Steel-Critchlow-Fligner (DSCF) test (Barros et al., 2022; Cunha et al., 2018; Lacerda et al., 2017).

Bivariate logistic regression models were used to identify variables associated with levels of severity of anxiety, depression and stress (dependent variables). For the dependent variable, 0 was

assigned to those whose scores did not correspond to the level of severity, and 1 was assigned to those whose scores corresponded to the level of severity (normal, mild, moderate, severe or extremely severe).

To verify the correlation of data regarding indexes of social-emotional skills and stress, anxiety and depression, the Spearman rank correlation coefficient was used, and coefficients from 0 to 0.3 were classified as insignificant correlation; 0.3 to 0.5 (-0.3 to -0.5) as low positive correlation (negative); 0.5 to 0.7 (-0.5 to -0.7) as moderate positive (negative) correlation; 0.7 to 0.9 (-0.7 to -0.9) as high positive correlation (negative); and 0.9 to 1.0 (-0.9 to -1.0) as a very high positive (negative) correlation (Almeida et al., 2011; Mukaka, 2012).

2.6 FINDINGS

The study had the participation of 234 education professionals. After checking all the answers obtained, 03 participants were excluded due to incomplete or incorrect completion of form items. In total, the data of 231 professionals were considered valid and analyzed. Specific cases, in which only a certain data has not been filled in or has been filled out incorrectly, were maintained or considered omitted, depending on the analysis performed and the test used.

As can be seen in Table 2, most participants were female (78.2%) with a mean age of 44.2 years (*SD* = 10.2) and living in the state of São Paulo (80.9%). The predominant level of education was complete lato sensu graduate (53.9%), followed by complete undergraduate (22.2%) and master's (10.4%). Most reported obtaining monthly income in the ranges of 4 to 5 minimum wages (32.6%) and 6 to 8 minimum wages (29.1%).

Table 2. Sociodemographic profile of the participants.

Gender	**n**	**%**
Female	179	78,2%
Male	50	21,8%
State	**n**	**%**
São Paulo (SP)	186	80,9%
Alagoas (AL)	12	5,2%
Minas Gerais (MG)	10	4,3%
Mato Grosso (MT)	04	1,7%
Rio de Janeiro (RJ)	04	1,7%
Distrito Federal (DF)	03	1,3%
Bahia (BA)	02	0,9%
Paraná (PR)	02	0,9%
Rio Grande do Sul (RS)	02	0,9%
Santa Catarina (SC)	02	0,9%

Goiás (GO)	01	0,4%
Maranhão (MA)	01	0,4%
Pernambuco (PE)	01	0,4%
Level of training	**n**	**%**
Postgraduate (lato sensu) complete	124	53,9%
Complete graduation	51	22,2%
Masters	24	10,4%
Incomplete post-graduation (lato sensu)	15	6,5%
Doctorate	10	4,3%
Post-doctorate	05	2,2%
Incomplete graduation	01	0,4%
Monthly income	**n**	**%**
4-5 minimum wages	75	32,6%
6-8 minimum wages	67	29,1%
2-3 minimum wages	46	20,0%
≥9 minimum wages	35	15,2%
≤1 minimum wage	07	3,0%

Regarding the type of institution in which they worked (table 3), 55.2% of the professionals were linked to private educational institutions, with Elementary Education (PE) being the main level of education in which they taught (34.3%). The majority (67%) of the professionals worked only in a school/educational institution, and the working day of 40 hours per week or more was the main work period reported by 50.4% of the participants. During the period of the COVID-19 pandemic, 45.7% of education professionals taught entirely online, which, according to the Kruskal-Wallis test with comparison between groups through the DSCF test, had statistically higher rates of stress compared to those who proceeded with the performance of fully asynchronous activities (p = 0.04), as well as those who developed activities both online and in person (p = 0.007); 72.2% characterized as "difficult" the process of adaptation to the remote teaching model, which presented statistically higher rates of stress (p = <,001), anxiety (p = <,001) and depression (p = 0.01) compared to those who considered the process "quiet"; 67.4% reported that the work demand was multiplied, which presented statistically higher indices of stress (p = <,001), anxiety (p = 0.007) and depression (p = 0.002) compared to professionals whose work routine did not undergo significant changes; and 54.3% needed to seek more access to digital media and/or acquire new equipment.

Table 3. Characterization of work during the pandemic period.

Type of institution	**n**	**%**
Toilet	127	55,2%
Public	87	37,8%
Both (public and private)	14	6,1%

No response	02	0,9%
Levels of education in which he teaches	**n**	**%**
Elementary School (EF)	79	34,3%
Early Childhood Education (EI)	43	18,7%
High School (MS)	34	14,8%
Elementary School + High School (EF + EM)	26	11,3%
Higher Education (ES)	19	8,3%
Early Childhood Education + Elementary School (EI + EF)	19	8,3%
No response	04	1,7%
Early Childhood Education + High School (EI + EM)	02	0,9%
Elementary School + Higher Education (EF + ES)	01	0,4%
Early Childhood Education + Elementary School + High School (EI + EF + EM)	01	0,4%
High School + Higher Education (EM + ES)	01	0,9%
Number of schools/institutions	**n**	**%**
01 school/institution	154	67,0%
02 schools/institutions	65	28.3 %
≥3 schools/institutions	07	3,0%
No response	04	1,7%
Working period	**n**	**%**
Full-time (40 hours per week or more)	116	50.4 %
Part-time	84	36.5 %
Three days (morning, afternoon and evening)	23	10.0 %
He was laid off during the pandemic	04	1.7 %
He was fired from one of the work shifts	03	1.3 %
Have you taught online classes?	**n**	**%**
Yes, all classes	105	45,7 %
Online and in person	81	35,2 %
Yes, but only a few classes	27	11,7%
No, the work occurred entirely asynchronous	10	4,3%
Took time off work for medical/health reasons	02	0,9%
No response	05	2,2%
How did you consider the process of adapting to the remote model?	**n**	**%**
Difficult	166	72,2%
No problem	53	23,0%
No response	11	4,8%
Have there been changes in the work routine?	**n**	**%**
The work was multiplied	155	67,4%
Had a little more work	58	25,2%
There were no significant changes in the work routine	07	3,0%
No response	10	4,3%
Internet access and media resources	**n**	**%**
Had to seek more access and/or acquire equipment	125	54,3%
It had easy access	77	33,5%
Had a lot of difficulty accessing the internet and media resources	21	9,1%
No response	07	3,0%

Most of the education professionals participating in the study presented mild (24.3%) and moderate (22.2%) levels of stress, extremely severe (37.8%) levels of anxiety, and normal (38.3%) levels of depression (Table 4). According to the Mann-Whitney test, there were no statistically significant differences between the female and male groups concerning the total indices and levels of severity of stress, anxiety and depression assessed by the DASS-21 scale (Table 4).

Table 4. Stress severity level of the participants. Data expressed as a percentage (%).

Stress		
Severity level	**N**	**%**
Normal	41	17,8%
Lightweight	**56**	**24,3%**
Moderate	51	22,2%
Severe	44	19,1%
Extremely severe	38	16,5%
Anxiety		
Severity level	**N**	**%**
Normal	66	28.7 %
Lightweight	20	8.7 %
Moderate	36	15.7 %
Severe	21	9.1 %
Extremely severe	**87**	**37.8 %**
Depression		
Severity level	**N**	**%**
Normal	**88**	**38.3 %**
Lightweight	28	12.2 %
Moderate	45	19.6 %
Severe	25	10.9 %
Extremely severe	44	19.1 %

A positive association was identified between not having contracted COVID-19 and having a normal level of stress during the pandemic period (OR = 2.54; CI = 1.62-3.97; p = 0.01). Negative associations were identified between higher income brackets and extremely severe stress level, i.e., the higher the source of income, the lower or no association with stress was identified. Compared to professionals whose monthly income was equal to or less than 1 minimum wage, education professionals with monthly incomes of 4 to 5 and above 9 minimum wages were more likely not to present extreme level of stress (OR = 5.99; CI = 1.07-33.29; p = 0.04; OR = 12.80; CI = 1.61-101.50; p = 0.01, respectively).

Negative associations were found between having contracted COVID-19 and having normal and mild levels of anxiety, meaning that participants who contracted the disease increased the chance of having increased anxiety levels. Participants who did not contract COVID-19 were less likely (OR= 3.45) to have normal and mild levels of anxiety, while those who contracted COVID-19 were more likely to have an extremely severe level of the disorder (OR = 3.45; CI = 2.50-4.76; p = <.001).

Negative associations were found between having contracted or having a family member or close person who passed away from COVID-19 and normal, mild levels of depression, meaning those who contracted the disease or lost someone to COVID-19 increased the chances of developing depression. Participants who reported contracting COVID-19 were more likely to have an extremely severe level of the disorder (OR = 2.75; CI = 1.86-4.07; p= <.001). Regarding socioeconomic status, in comparison with participants whose monthly income was less than or equal to 1 minimum wage, professionals with income from 4 to 5, 6 to 8 and above 9 minimum wages were less likely to present an extremely severe level of depression. Respectively, these participants had 7.9 (OR = 7.99; CI =

1.47-43.43; p = 0.01), 7.7 (OR = 7.76; CI = 1.40-42.87; p = 0.01) and 8.8 (OR = 8.86; CI = 1.41-55.5; p = 0.02) more chances of not presenting an extremely severe level of the disorder.

Through the Spearman correlation coefficient test, it was verified that the higher the indexes of social-emotional skills, the lower the total indices of stress (rho = -0.5; p = <,001), anxiety (rho = -0.4; p = <,001) and depression (*rho* = -0.5; p = <,001), demonstrating a moderate negative correlation between the development of social-emotional skills and each disorder (Table 9).

Table 9. Correlation between social-emotional skills (total index) and mental health indices (stress, anxiety and depression).

		Stress	**Anxiety**	**Depression**
Total index of social-emotional skills	*Rho*	-0.50***	-0.46***	-0.52
	p-value	<,001	<,001	<,001

Legend: * p = <.05; ** p = <.01; p = <,001.

Regarding specific social-emotional skills, it was found that the higher the indices of conscientiousness, extroversion, agreeableness and emotional resilience, the lower the total indices of stress, anxiety and depression, demonstrating a low to moderate negative correlation between the development of social-emotional skills and each disorder (Table 10).

Table 10. Correlation between specific social-emotional skills and mental health indices (stress, anxiety and depression).

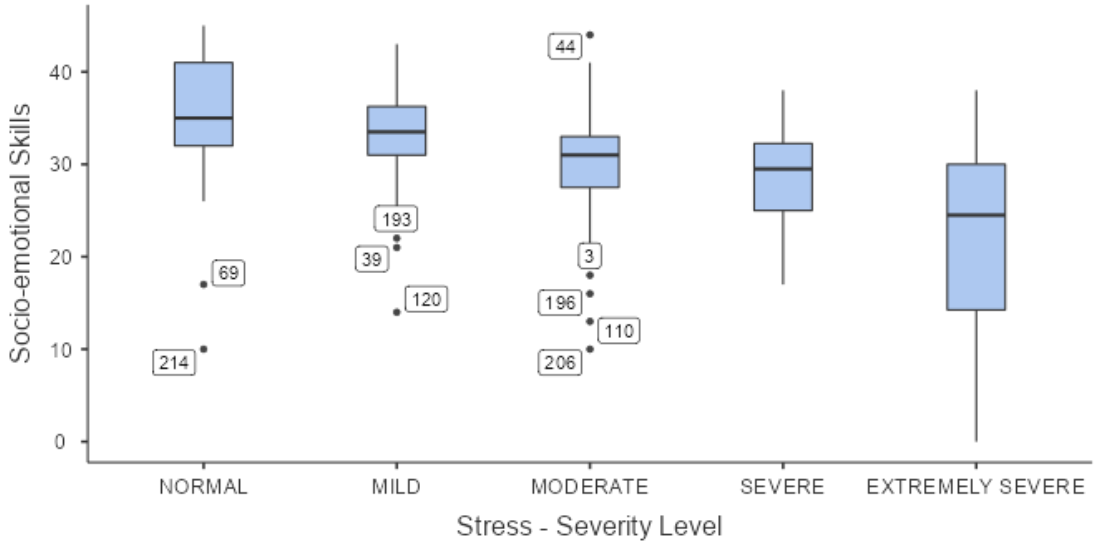
		Stress	**Anxiety**	**Depression**
Aperture	*Rho*	-0.09	-0.07	-0.11
	p-value	0.16	0.26	0.09
Conscientiousness	*Rho*	-0.43***	-0.42***	-0.48***
	p-value	<,001	<,001	<,001
Extraversion	*Rho*	-0.46***	-0.46***	-0.51***
	p-value	<,001	<,001	<,001
Amiability	*Rho*	-0.36	-0.36***	-0.40***
	p-value	<,001	<,001	<,001
Emotional resilience	*Rho*	-0.49***	-0.45***	-0.48***
	p-value	<,001	<,001	<,001

Legend: * p = <.05; ** p = <.01; p = <,001.

Through the Kruskal-Wallis test (one-factor ANOVA – non-parametric), for multiple comparisons of the total index of social-emotional skills , statistically significant differences were identified between groups of different levels of severity of each disorder with the indices of social-emotional skills.

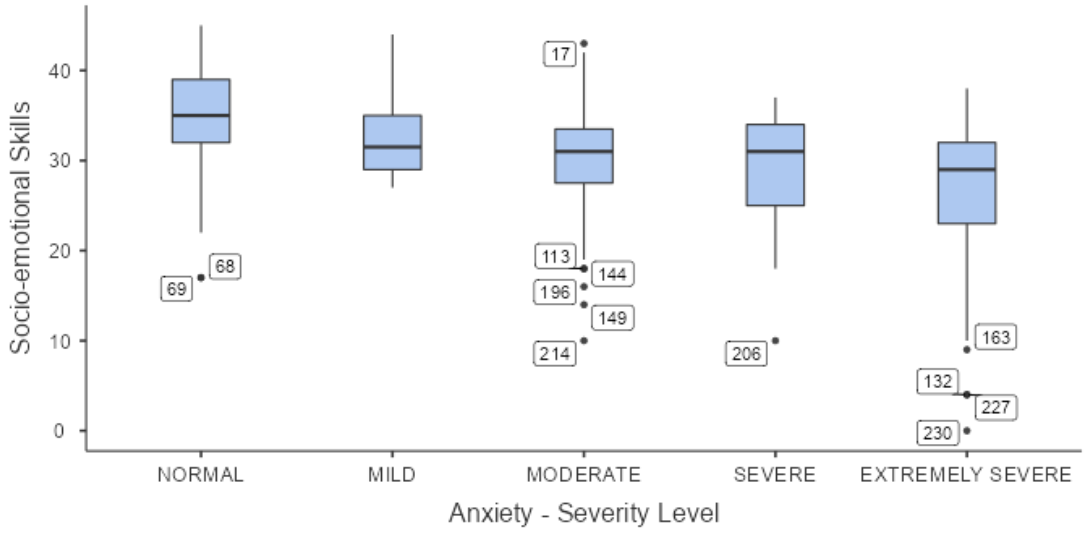
Education professionals with extremely severe stress levels had statistically lower rates of social-emotional skills compared to normal (p = <,001), mild (p = <,001) and moderate (p = 0.003) levels. Professionals with mild stress levels had statistically higher social-emotional skills indexes compared to participants with moderate (p = 0.006) and severe (p = <,001) levels. Professionals with normal levels of stress presented statistically higher indices of social-emotional skills when compared to professionals with severe level of the disorder (p = <,001) (Graph 1).

Figure 1. Multiple comparisons – Index of social-emotional skills between different groups of stress severity level.



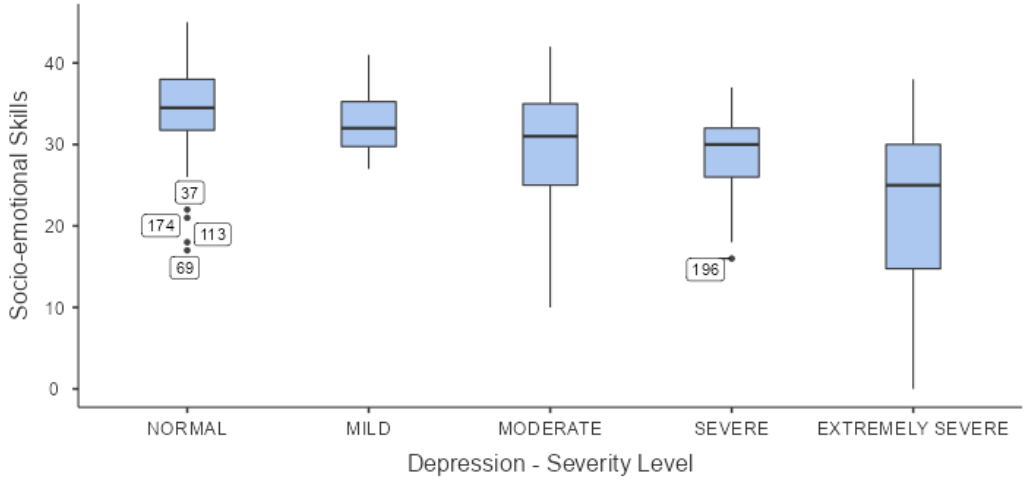
Education professionals with normal levels of anxiety presented statistically higher levels of social-emotional skills compared to professionals with moderate (p = 0.003), severe (p = 0.003) and extremely severe (p = <,001) levels of the disorder (Graph 2).

Figure 2. Multiple comparisons – Index of social-emotional skills between different groups of anxiety severity level.



Professionals with normal level of depression presented statistically higher indices of social-emotional skills compared to participants with moderate, severe and extremely severe level (p = <,001). Professionals with moderate level of depression presented statistically higher indices of social-emotional skills compared to professionals with extremely severe level of the disorder (p = 0.04) (Graph 3).

Figure 3. Multiple comparisons – Index of social-emotional skills between different groups of depression severity level.



By performing multiple comparisons of the indices of specific social-emotional skills for levels of severity of each disorder, through the Kruskal-Wallis test (one-factor ANOVA – non-parametric) and DSCF, statistically significant differences were observed between the groups.

Education professionals with extremely severe levels of stress presented lower levels of conscientiousness, extroversion, agreeableness and emotional resilience compared to professionals with normal and mild levels (p = <,001). On the other hand, professionals with normal stress levels presented higher indices of conscientiousness (p = 0.002), extroversion (p = <.001) and emotional resilience (p = <.001) about professionals with severe levels of the disorder.

Education professionals with extremely severe levels of anxiety presented lower indices of conscientiousness and emotional resilience than professionals with mild (p = 0.01; p = <,001, respectively) and normal (p = <,001) levels and lower rates of extroversion and agreeableness with professionals with normal level (p = <,001). On the other hand, professionals with normal levels of anxiety presented higher indices of conscientiousness (p = 0.01) and extroversion (p = <,001) than professionals with severe levels of the disorder.

Education professionals with extremely severe levels of depression presented lower levels of conscientiousness, extraversion, and emotional resilience compared to education professionals with normal (p = <,001), mild (p = 0.02; p = <,001; p = <,001, respectively) and moderate (p = 0.04 ; p = 0.006; p = 0.003, respectively). Professionals with mild levels of depression presented higher rates of emotional resilience than professionals with severe levels (p = 0.008). On the other hand, professionals with normal levels of depression presented higher indices of conscientiousness (p = <,001), extraversion (p = 0.004) and emotional resilience (p = <,001)

3 DISCUSSION

Regarding the profile of the participants, there was a higher prevalence of female education professionals, with a mean age of 44 years, a result similar to the research conducted by Carvalho (2018) on the profile of basic education teachers in Brazil, using IBGE data. Another fact that is related to the present study is the higher prevalence of participants with post-graduation, complete latu-sensu. This demonstrates that, in general, the education networks have been adapting to the requirement established by the educational legislation (Brasil, 2014), but that the exception of the secondary level, in the normal modality, is still allowed for teachers of early childhood education and the initial years of elementary school, a formative level that has been increasing in recent years (Carvalho, 2018)

Regarding the adaptation to the work model during the period of social isolation, due to the COVID-19 pandemic, 75% of the participants said they had worked with remote or semi-face-to-face models of teaching, and 72% said that this adaptation was very difficult. In a survey conducted by Santana et al. (2022), the difficulties experienced during the pandemic are similar, falling mainly on the use of different educational tools and on time management or personal organization to meet the various demands.

Concerning data on disorders such as anxiety, depression and stress, with the analysis of data obtained through the DASS-21 scale considering the conditions imposed by the pandemic, it was possible to verify that anxiety was the most present disorder among the participants.

To be able to evaluate this approach to teacher mental health, it is necessary to broaden the view of the concept of health and how the profession is contextualized in Brazil. In the health-disease process, work is considered a social determinant. Therefore, there is a high concern in the articulation between health, subjectivity and social context with broader factors, such as quality of life. Particularly, the professional activity in the educational area is evaluated as a complex activity with demands of continuous physical, psychological and social balance, which reflects on the perception of quality of life in general (Santos et al., 2020).

A survey conducted by Santos (2020) pointed out that the working conditions of most teachers in Brazil include lack of infrastructure, low remuneration, high number of students in the classroom and the feeling of devaluation before society, which can predispose them to physical and psychological problems, even in the period before the beginning of social isolation due to the pandemic. These data suggest that even in conditions given as "normal", mental health already represented a concern among professionals in the category.

In recent decades, it has been possible to notice an ascending indicator in the illness process linked to the working conditions of education professionals (Pereira et al., 2020). In a pandemic context, there was an intensification of this process, due to the closure of schools, social isolation and

the abrupt change to remote teaching modalities. According to Silva and Santos (2021) distance or remote learning put into practice in the field of education in a verticalized way, without a deep knowledge of the needs and particularities of this educational reality, further potentiated the precariousness of teaching work by triggering processes of loss of autonomy, imposition of pedagogical practices and overload of attributions. The issue of sudden, unstructured and difficult adaptation to remote or distance learning profoundly impacted the teaching work, which already came from a historical process of precariousness. Educators reported, in several types of research, increased working hours, pressure to achieve results and ensure the minimum bond with students, despite the most different variables that aggravated the difficulty in exercising educational practice (Santos et al, 2020).

In this scenario, Santos, Lima and Sousa (2020) pay attention to structural conditions, the absence of a formative process to face the new modality of work. This research also highlighted the pressure suffered by teachers to comply with the curriculum and the school calendar, in a hurry and without planning. The difficulty of students accessing remote learning and their families when accompanying their children on the new journey was also aggravating factor for teachers' mental health. Other research has also shown that the teaching work has increased intensely in the realization of pedagogical practice at a distance, to the extent that the schedules have been excessively extended by the conditions of technological access and/or family support (Santos et al., 2020). However, there was no strategic plan in Brazil to organize classes online, because, according to the opinion of the Ministry of Education, "the management of the calendar and the form of organization, realization or replacement of academic and school activities is the responsibility of the systems and networks or educational institutions" (Brasil, 2020, p. 5). This information coincides with the data collected by the present study about the increased demand for teaching work, the difficulty in adapting to remote models and the mental health problems of the participants.

Leão et al. (2021), Silva et al, (2022) and Bessa (2021), also evidenced the lack of resources for teaching work during the migration to remote teaching, the formative helplessness to exercise such a teaching modality, the increased workload and the physical and emotional overload.

As can be seen in the present study, stress, anxiety and depression showed rates of worsening during the pandemic period. It was found that the disorder that was most accentuated was anxiety, with a strong relationship between higher rates of disorders with low remuneration of professionals, having contracted COVID-19 and/or having lost a loved one during the pandemic. In consonance, the study conducted by Leão et al. (2022) with 15,641 teachers from 795 municipalities in Minas Gerais, pointed out that approximately 80% of the participants were not satisfied with their teaching work during the

pandemic. This "dissatisfaction" is related to the intensification of assignments related to teaching and the changes caused in the educational system in the face of the COVID-19 pandemic.

Despite the adverse conditions, the difficulty in adapting to the new and the increase in working hours, the data obtained prevail moderate levels of stress and depression, which refer to another objective of this research: to analyze the socio-emotional skills of the participants and verify if they were useful tools for coping with the adversities of the pandemic context. In convergence with findings from other studies, the data obtained indicated a negative association between the indices of social-emotional skills and the indices of severity for stress, anxiety and depression. Therefore, the higher the presence of socio-emotional skills, the lower the rates of behavioral disorders assessed (Marques et al., 2019; Nakano et al., 2021).

Thus, it can be inferred that social-emotional skills were important factors for better coping with adversity during the pandemic. It is worth remembering that skills are acquired through initial and continuous training and can be learned or improved intentionally, increasing the internal resources of the provider to exercise teaching (Marques et al, 2019).

4 CONCLUSION

Considering the analysis of the data obtained by the research, it can be considered that the previously established objectives were achieved. It was possible to evaluate the socio-emotional skills of the participating education professionals, the levels of anxiety, depression and stress, as well as to establish the relationships between the items evaluated.

It was also possible to validate the hypotheses indicated (1) the COVID-19 pandemic altered the routine of education professionals; and (2) educators with better indices of social-emotional skills presented lower indexes of stress, anxiety and depression. As observed, the routine was changed, but the increase in behavioral disorders was observed in participants with lower incomes and also among those who lost a family member or close person to the disease.

The present study may inspire future research on the importance of social-emotional skills and behavioral disorders in the teaching career with a target in larger samples and different contexts. It is expected that such data can also subsidize public policies for the valorization of the teaching career and strategies for the promotion of health and professional well-being.

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CHAPTER
13

General aspects of the inflammatory reaction in COVID-19

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ABSTRACT
COVID-19 has become a challenge in recent times in different scenarios including areas of health, economy, and education, among others. In the years 2020 and 2021, the world experienced a pandemic caused by the SARS-CoV-2 virus that causes the disease. Since then, understanding the etiopathogenic mechanisms of the new coronavirus has become a challenge. Thus, it becomes the objective to present the role of TCD4+ and TCD8+ lymphocytes in COVID-19, studying the mechanism of action of these cells, their activation, effects on the body, and immunomodulation. A bibliographic review was carried out on the PubMed platform, using literature published between the years 2020 to 2023, and the keywords: COVID-19, T lymphocytes, inflammation, SARS-COV 2, and cytokines. Analyzing published data, we found that after virus infection, CD4+ T lymphocytes are induced to release pro-inflammatory cytokines, such as INF-gamma, which activate cytotoxic CD8+ T lymphocytes, which, as the name implies, cause cell toxicity that ends in lysis of infected cells and destruction of the machinery used by the virus to reproduce. Lysis is brought about by proteins, such as perforins, which induce the appearance of pores on the surfaces of cell membranes. Although the inflammatory response is important for fighting the virus, it can occur in an exacerbated way, releasing a harmful amount of the inflammatory cytokine IL-6 and this overexpression is responsible for decreasing the efficiency of TH 1 cells, TCD8+ lymphocytes, and immunoglobulins. In short, it is important to understand how knowledge of the immunopathogenic of COVID-19 can be fundamental to learning more about the disease itself and to pave the way for its resolution. Thus, the chances of death from the disease decrease, as professionals are aware of its effects and can indicate more accurate treatments for its resolution.

Keywords: COVID-19, T lymphocytes, Inflammation, SARS-COV 2, Cytokines.

1 INTRODUCTION

Currently, we are faced with one of the most contagious viral infections in history, the pandemic produced by the SARS-CoV-2 coronavirus, the etiological agent of the disease identified by the WHO Organization as COVID-19. Coming to the knowledge of many at the end of 2019, COVID-19, already existing before that date, gained great prominence after promoting a pandemic that lasted the years 2020 and 2021 and claimed thousands of victims all over the world. Due to its pathogenesis and mechanism of attack being practically unknown and poorly studied so far, health organizations could do little in a short period, and many people from all over the world suffered the consequences of the disease, directly or indirectly. Side effects for each citizen were often different, ranging from the symptoms of a common cold to severe acute respiratory syndrome and becoming more lethal in patients with diabetes, high blood pressure, kidney failure, obesity, and cardiovascular disease. , among others. From then on, the existence of numerous clinical forms of COVID-19 was perceived, and the

need to carry out studies that elucidated how each one works by understanding the specific role of TCD4+ and TCD8+ lymphocytes in directing inflammation, in addition to understanding how the reaction happens and what "motivates" the lymphocytes to promote it (SURYASA et al., 2021; SETTE, CROTTY, 2021; GALVÃO, DELLALIBERA-JOVILIANO 2022).

2 OBJECTIVE

To evaluate the role of TCD4+ and TCD8+ lymphocytes in promoting an inflammatory reaction in COVID-19, studying the mechanism of action of these cells, their activation, effects on the body, and immunomodulation based on a bibliographic review.

3 METHODOLOGY

A retrospective study of the subject was carried out based on international literature found on the electronic platforms PubMed and SCIELO, using the keywords: COVID-19, inflammation, and TCD4+ and TCD8+ lymphocytes. The scientific articles chosen were published between the years 2020 and 2023, projects before 2020 were not chosen. The prerequisites for choosing the articles were recent publication dates, subjects that cover the proposed theme, and that demonstrate regulation of lymphocytes and pro-inflammatory markers. All information that did not embrace those previously selected was disregarded.

4 DEVELOPMENT

COVID-19 is a viral disease caused by the SARS-CoV-2 virus, with asymptomatic cases up to severe cases with a risk of death. It is often common for an inflammatory exacerbation to occur, occasionally excessive, related to the modifications that the virus causes to the leukocyte count, to the elevation of C-reactive protein, and to the viral load with which the individual is infected (the higher it is, the worse the infection will be) (PACES et al., 2020). It all starts with TCD4+ lymphocytes, which in the face of a new infection release pro-inflammatory cytokines into the circulation early, such as TNF-alpha and INF-gamma, which activate cytotoxic TCD8+ lymphocytes, cells of the adaptive immune system, which promote cell toxicity, destroying the infected cells and thus also the reservoir and machinery that the virus uses to replicate itself. Occasionally, cytokine release can be exacerbated, causing a so-called "cytokine storm", which in addition to causing tissue damage in patients can lead to septic shock. Cellular toxicity caused by lymphocytes occurs through cell lysis. Cytotoxic CD8+ T lymphocytes have cytoplasmic granules in their cytoplasm that contain proteins such as perforins and granzymes. These proteins are transported to the infected cell through contact between the membranes of the lymphocyte and the target cell, causing exocytosis and passage of proteins, which induce

cytotoxicity to the host cell. For example, perforins produce pores on the surface of the plasma membrane, which leads to lysis (COSTA SILVA et al., 2022).

Relating obesity as a potential risk factor for death in COVID-19, recent studies have found a close relationship between the lipid metabolism of the human body and the inflammatory reaction of the disease. This happens thanks to the existence of intracellular lipid droplets, which apparently can facilitate and enhance the viral replication of SARS-COV2 within the host cell, aggravating its pathogenesis (MUNAVALLI et al., 2022). Probably the virus regulates lipid metabolism and causes de novo synthesis and lipid remodeling to increase, increasing the number of droplets inside cells. How the virus accomplishes this feat is still unknown. In addition, there is a close relationship between lipid droplets and the production of inflammatory mediators and innate signaling of immune cells, producing a more pronounced inflammatory response through the greater release of pro-inflammatory cytokines and chemokines in obese and overweight patients. NADER, DELLALIBERA, DELLALIBERA-JOVILIANO, 2023; NADER et al., 2023). This explains why the population with these phenotypic characteristics suffers from such lethal cases of the disease. Monocytes infected with SARS-COV 2 have been shown to start synthesizing more leukotrienes (LTB4), more chemokines such as IL-8 and CXCL 10, more inflammatory cytokines such as IL-6, TNF-alpha, IL-10, and IL- 12, and decreased the manufacture of IL-4, an anti-inflammatory cytokine. Diacylglycerol acyltransferase 1 (DGAT-1) can be used to inhibit lipid droplets, making the infection milder and increasing the amounts of IL-4 (DIAS et al., 2020; PACES et al., 2020; NADER et al. ., 2023).

The exacerbated inflammation in COVID-19 may also be associated with the pro-inflammation cytokine IL-6, released during the illness. This cytokine has numerous functions in the immune system, promoting the differentiation of B lymphocytes, cytotoxic T lymphocytes, and the functions of macrophages and monocytes. However, many times, some individuals develop the severe form of the disease, producing high Il-6, which starts to influence a deficient and negative viral immune response, impairing the functionality of TH1 cells and cytotoxic CD8+ T lymphocytes in promoting cell lysis (MUNAVALLI et al., 2022). Furthermore, overexpression of IL-6 causes lymphocytopenia and a decrease in immunoglobulin production, which leads to further impairment in opsonization. To inhibit IL-6 and reduce its damage, a therapy using anti-IL-6 serum was developed, which showed positive results in interleukin blockade and does not seem to be harmful to SARS-COV-2 immunity in the long term. The anti-IL-6 serum declined inflammatory markers such as CRP and increased the rate of lymphocytes and antibodies, as well as their immune responses. The study showed that after one treatment with the serum, antibody levels remained high and much higher than in patients who did not undergo the therapy, with better INF-gamma responses and a lower propensity for infectivity (MASIÁ et al., 2022).

5 FINAL CONSIDERATIONS

Having seen how cellular immunity and inflammation occur in COVID-19, certain cases of aggravation that totalize the disease and require treatments that help improve clinical conditions and prevent sequelae and the chance of death. Analyzes of monocytes from patients infected with the pathology showed that these cells show accumulation of lipid droplets and the explanation is based on the summoning of transcription factors for lipogenesis after 24 hours of infection. This alteration in lipid metabolism could function as an important finding for the discovery of SARS-COV 2, as the droplets function as a “phenotype” for the disease. The use of DGAT-1 inhibits acyl-COA and interrupts lipid metabolism, preventing the prognosis of patients who use it. Likewise, therapy with anti-IL-6 serum prevents an inflammatory exacerbation by inhibiting IL-6 and its receptors and is recommended for the treatment of patients with the severe form of the disease. Thus, it is concluded that it is extremely important to know what happens in the human body when it is infected by the SARS-COV-2 virus, as a good understanding of this process can be crucial for finding key treatments for the various clinical forms of the disease. COVID-19.

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CHAPTER
14

Risk communication by community health agents in the prevention of COVID-19

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ABSTRACT
Unsuccessful prevention of the disease caused by the new coronavirus (COVID-19) can only be possible if everyone is willing to do their part, which has become a critical issue in facing the pandemic caused by this emerging virus. With the permanence of its circulation in the population after three years of the pandemic, prevention must also be permanent. This prevention must be centered on risk communication and community participation through popular health education. The object of the theoretical review and appreciation of this chapter focuses on the link between the concept of popular health education for communities, risk communication during health crises, such as the COVID-19 pandemic, and the role of the Community Health Agent (CHA) in this process. The CHA is the character of primary health care with greater capillarity, going from house to house, being able to disseminate information and develop knowledge in health, advising on preventive measures through a language of the community, based on scientific knowledge, but not laden with useless complexities for that target audience. Therefore, it is necessary to periodically train these very potential workers and, although the Health with Agent Program is in progress, it will bring future results with a generation of CHAs that are more prepared to carry out their attributions in critical moments of other epidemics that may arise. They need up-to-date specific actions of permanent education, being carried out promptly so that the communication practice is effective and quick in promoting equity in health in the Brazilian population.

Keywords: COVID-19 pandemic, Health Communication, Community Health Workers, Health education, Public health.

1 INTRODUCTION

The object of the review and theoretical appreciation of this chapter focuses on the connection between the conception of popular health education, which takes social reality as pedagogical content at the service of the emancipation of users of the Unified Health System (SUS) at the community level, the communication of risk during health crises, such as the pandemic of the new coronavirus disease (COVID-1), and the role of the Community Health Agent (CHA) as an educator and communicator in strengthening popular health education (DAVID, 2017). Their function goes beyond providing basic health care, as they are responsible for promoting health, preventing disease, and improving people's quality of life.

As an educator, the CHA has the task of disseminating information about health and promoting awareness in the community, although the participation of the CHA in educational actions, in practice, has been little explored by the teams and the local community, which has diminished their role in social change for better health conditions of the population (ARAÚJO et al., 2018). For these reasons, the

fundamental premise for this process of community health education interceded by health risk communication in times of pandemic could have, in the CHAs, important mediators of the Family Health Strategy (ESF). These professionals can transmit information about the risks associated with the disease, as well as the preventive measures that must be adopted to reduce the spread of the virus, considering that trust, engagement, and personalized communication are among the key concepts in health risk communication, and the lack of these components can hinder effective communication (WHO, 2017).

Epidemic prevention must be centered on effective risk communication and community participation, which can only be achieved through popular health education. In this sense, community involvement in preventing the COVID-19 pandemic has not yet been fully explored, and for this reason, this chapter highlights the role of community education in the prevention and control of infectious diseases in health crises of the magnitude of the pandemic that was declared in March 2020 and ceased to be declared a health emergency of international concern more than three years later.

The present work constitutes a narrative review to contextualize the results of a previous empirical study to provide a broader interpretation of its findings. From the dissertation of the Professional Master's Degree in Family Health in a national network (PROFSAUDE), the authors sought, stimulated by theoretical challenges experienced during the construction of the preferred course conclusion work, to answer questions related to facilitating the population's adherence to the guidelines non-pharmacological prevention measures recommended during the COVID-19 pandemic.

There are several possible approaches to consider questions related to this topic, and the focus was placed on health risk communication, in the context of the specific challenges faced by the population, such as unequal access to information, limited resources, distrust of health authorities, and governments, among others. By basing this analysis on scientific evidence, we sought to maintain a critical stance in its interpretation, to contribute to highlighting the role of key actors in the non-pharmacological prevention of contagion during health emergencies such as the COVID-19 pandemic: the FHS CHAs.

The previously mentioned empirical study was one of the arms of multicenter research that had the general objective of "analyzing how the population of the territories covered by the PHC perceives and translates prevention and control measures into everyday practices at the individual, family and collective levels. of COVID-19" (SCHWEICKARDT et al. 2020, p. 4), under the coordination of researchers from the Oswaldo Cruz Foundation (Fiocruz) and the Brazilian Association of Collective Health (Abrasco), teachers and managers of PROFSAUDE nationwide.

In this context, the centrality of communication in health emerged, which can be carried out by the CHA within the scope of the Unified Health System (SUS). In public health emergencies, "health

communication" is an integral part of risk communication, which is emphasized by the literature using the term "health risk communication" (BERG et al., 2021). Health communication and risk communication in public health emergencies, including pandemics, aim to improve outcomes by influencing, involving, and reaching different socially minorized audiences with health-related information.

Within a social context, in which part of the subjects' interpretation of reality is not achieved in a "pure" way, but only from the perspective of individuals within their communities, in the social construction of meanings about risk, as well as in the perception of these risks, the involvement of actors who are aware of this context is essential (PEDOTH et al., 2022). Thus, considering that community involvement is fundamental during epidemics to ensure contextually appropriate educational interventions and, therefore, with a greater possibility of achieving population adherence and engagement, communication processes constitute the cornerstone of this process.

Thus, communication with people, while providing information sharing, must be transparent and focused on the community's problem, with solutions that are likely to be accepted and put into practice. To achieve satisfactory results in risk communication, especially in situations of public health emergencies, technical information must be shared with careful attention to the ability of different target audiences to understand (PAULIK et al., 2020). In this regard, CHA also requires adequate training to perform these functions effectively, so that they have the knowledge, skills, and attitudes necessary to meet the health needs of the community in which they work.

2 PREVENTION IS PERMANENT: THE END OF THE COVID-19 PANDEMIC IN 2023 IS NOT THE END OF THE CIRCULATION OF THE 2019 CORONAVIRUS IN THE POPULATION

On May 5, 2023, more than three years after the start of the COVID-19 pandemic, the World Health Organization (WHO) Emergency Committee on COVID-19 recommended to the organization's Director-General, Dr. Tedros Adhanom Ghebreyesus, who accepted the recommendation, that as the disease no longer fit the definition of a Public Health Emergency of International Concern (PHEIC). That doesn't mean the epidemic itself is over, but the global emergency it caused is, for now. A WHO Health Regulation Review Committee, yet to be established, will develop long-term standing recommendations for countries on how to manage COVID-19 on an ongoing basis (WHO, 2023). Therefore, the COVID-19 pandemic, the global epidemic by the new coronavirus, the severe acute respiratory syndrome virus 2 (SARS-CoV-2), was considered a critical epidemiological fact that has evolved into a state of control at this time. However, with the continued circulation of the 2019

Coronavirus in the population after three years of the emergence of COVID-19, prevention must also be permanent.

The WHO has recorded nearly seven million deaths from COVID-19, although the actual death toll from the pandemic could be three times higher. According to Dr. Tedros Adhanom, a few thousand deaths are still being reported to WHO every week, and it is estimated that excess mortality is still around 10,000 deaths per day worldwide. In his virtual press conference (transcript of the virtual press conference on COVID-19 and other global health issues on May 5, 2023), he also urged all countries to do more to prepare for future pandemics:

> One of the greatest tragedies of COVID-19 is that it didn't have to be this way. Tools to better detect and respond to pandemics are available, but globally, lack of coordination, lack of equity, and lack of solidarity have meant that these tools are not used as effectively as they could have been. Lives were lost that should not have happened. (WHO, 2023, p. 4)

The WHO director-general also highlighted the ongoing impact of COVID-19: “Over the past week, COVID-19 claimed one life every three minutes and these are just the deaths we know of”, emphasizing that thousands of people across the world around the world are still being treated for the disease in intensive care units, and millions more are dealing with the lingering aftereffects of COVID-19 infections. “This virus is here to stay”, added the WHO director, [...] "It is still killing and it is still changing. There remains a risk of new variants emerging that cause new outbreaks of cases.”

Therefore, the need to learn lessons from this pandemic before a possible “next time” is essential. History has shown that infectious diseases can evolve and emerge unpredictably. Well-implemented community engagement strategies can be used to support planning interventions, building trust and community input, social and behavioral communication, risk communication, surveillance and contract tracing, and logistical and administrative support during HIV prevention and prevention. COVID-19.

Community-based healthcare, including outreach and campaigns, in the context of the COVID-19 pandemic, has challenged healthcare systems around the world. The growing demand for care for people with COVID-19 has been compounded by fear, misinformation, and limitations on the movement of people and supplies that disrupt the delivery of frontline health care for all people.

Brazil and 193 other countries have recently reaffirmed their commitment to the Sustainable Development Goals (SDGs) that guide the 2030 Development Agenda of the United Nations (UN). Thus, signing the 2018 Astana Declaration, which redefines the functions of Primary Health Care (PHC) in three platforms: service delivery, multisectoral actions, and citizen empowerment. Therefore, the SDGs cannot be achieved by providing health services alone. The community level is an integral platform for PHC, fundamental for essential public health functions, and for the engagement and empowerment of communities about their health (LOPES-SOUSA, 2021).

This community-based platform, with its distinctive capabilities for healthcare delivery and social engagement, has a critical role to play in the COVID-19 response and is essential to meeting the ongoing health needs of people, especially those most vulnerable. The community health workforce of these agents can be leveraged to strengthen the COVID-19 response, particularly for poorer citizens, because they are trusted members of the community and serve as important ESF links to community facilities, leaders, and organizations. community, contributing to a more effective response to the health crisis (MACIEL et al., 2020). This engagement and communication of individuals and communities with the health unit are essential to maintain their confidence in the health system's ability to provide safe and quality services, as well as to ensure adequate behavior in adherence to official public health recommendations.

3 RISK COMMUNICATION AND COMMUNITY PARTICIPATION IN THE PREVENTION OF COVID-19

The use of communication in its strategic dimension is fundamental for disease prevention and control actions and health promotion in the context of public health. Engaging and mobilizing affected and at-risk communities is essential for implementing context-appropriate public health measures to delay transmission in preparing the health system to reduce the incidence of COVID-19.

Health risk communication provides instruments that enable social mobilization, dissemination of information, and motivation for the adoption of healthy behaviors aimed at promoting the social and universal right to health. Communication for social change is a proposal based on the concept of mobilizing individuals to generate new meanings that circulate in a given society. This social mobilization requires communication strategies to promote the circulation of these senses toward effective prevention. Change is at the heart of social mobilization, which is guided by an ethical project for society, aiming at a new way of living together among social actors and new meanings for the future.

It is worth highlighting the role of social mobilization. Any step towards health can only be successful if all participants are willing to do their part, in an engaged way, which has become a critical node for facing the COVID-19 pandemic (PEDOTH et al., 2022).

Local transmission of COVID-19, which emerged in China at the end of 2019, has been reported in many countries on all continents. A poor understanding of the disease by the population could result in the rapid spread of the infection, which happened. The World Health Organization (WHO) declared the 2019 coronavirus outbreak as a Public Health Emergency of International Concern (PHEIC) on January 30, 2020, and as a pandemic on March 11, 2020. The evolution of a pandemic is one of the most complex problems for society, and its management and mitigation process

by governments are, therefore, a great challenge. Each national strategy plays a crucial role in meeting global goals and laying the groundwork for coordination at the national level and responses from the states of the federation (HOOKER; LEASK, 2020).

Sjölander-Lindqvist et al. (2020) describe how communication can make people change their behavior in correspondence with scientific knowledge and that trust in the actors who provide information is crucial for successful communication, although procedures and standards for communication are also fundamental. to increase audience understanding and acceptance of the message itself. Kurz-Milcke et al. (2008) emphasize that the role of communication is to educate and inform a target group about the real risks and benefits of certain actions, strategies, and policies. In the case of COVID-19, there are no specific target groups, as virtually the entire population is vulnerable to illness from the new coronavirus, although there are groups that more frequently develop the severe form of the disease. In this sense, risk communication strategies are strongly associated with the sense of threat, attitudes, and behavior change of a given population (BASCH et al., 2020).

Individual and collective perceptions of health risks drive decisions about populations' protective behaviors, but COVID-19 was an unknown risk until late 2019. The COVID-19 pandemic has affected the world in many ways. The lack of information, the need for accurate communications with the population, and the speed with which the virus spreads are important factors in this health scenario that took shape two years ago. On the other hand, the understanding and corresponding practice of preventive measures by the population requires the informed cooperation of entire populations.

A poor understanding of the disease among people, in general, could lead to delays in the institution of non-pharmacological preventive measures and increase the spread of infection. When there is an epidemic of an infectious disease that spreads rapidly, such as COVID-19, knowledge of population perceptions on the subject is essential for the public health response to be targeted and effective. Among these factors, communication in health to ensure the cooperation of the population represents one of the critical nodes in controlling the pandemic based on the principles of Universality, Integrality, and Equity of the Unified Health System (SUS).

A heated debate has emerged in Brazil on how to manage and mitigate the COVID-19 pandemic, which has resulted from a dissonant societal perception of the real meaning of the pandemic. In this sense, the Brazilian population was divided into two contrasting philosophical approaches: universalism - the understanding of life as a good of infinite value and, therefore, more important than the economic preservation of the country - and utilitarianism - in which the focus is on the mitigation of the economic crisis exacerbated by the COVID-19 pandemic, due to its potentially devastating effect on people's lives, thus leaving risk problems in the background (LIM; NAKAZATO, 2020).

Governments in many countries generally base decisions regarding tightening or easing restrictions on some combination of the epidemiology of infections and the social and economic consequences of the measures. Whichever combination is chosen, governments must be explicit about their objectives and transparent in decision-making, and the measures taken must form part of a clear overall strategy; however, this is not always the case (HAN et al., 2020).

According to the Pan American Health Organization (OPAS, 2021), in risk communication, community involvement and management of the so-called infodemic are fundamental, with participatory development in the implementation of plans and dissemination of risk information for all populations. Infodemic, according to PAHO (2020, p. 2), is "the excess of information, some accurate and some not, which makes it difficult to find reputable sources and reliable guidance when needed". In this sense, in 2020, the rapid spread of COVID-19 generated an impressive increase in the demand for information on prevention and care, aggravated by fear, misinformation and limitations in the provision of usual health care in primary health care.

In Brazil, there was a kind of federalization of decisions related to facing the pandemic supported by the Federal Supreme Court, since the management was under greater responsibility of the state governments to the detriment of the federal government, and those determined their actions based on epidemiological, political criteria and local assistance (PEREIRA et. al., 2020). Some municipalities differed in their guidelines from those of the state with more restrictive measures. In this context, the work of the ESF and the ACS varied beyond territorial differences, encompassing differences in official recommendations to combat COVID-19.

The current pandemic has demonstrated that preventive guidelines must reach personal beliefs, the worldview of each population, which is influenced by historical factors, and cultural and social experiences, so that it is possible for this communication to generate changes in behavior. In this context, the Family Health Strategy (ESF), through its teams and, considering the bond they have with the communities under their health responsibility, as well as with the families under their care, gains an important role in the communication of risks and of possible and viable protection measures to be adopted in those specific spaces, the territories.

De acordo com as teorias de decisões sobre comportamento de saúde, as pessoas que perceive greater risks are more motivated to implement protective behaviors (BRUIN; BENNET, 2020). Strict adherence to public health infection prevention and control protocols is required to contain the spread of the virus, and national, state and municipal governments in Brazil have directed efforts and resources towards implementing non-pharmacological (NFM) control measures and prevention in public places and institutions.

The success of prevention MNF and policies aimed at reducing the impact of COVID-19 depends on how well individuals are informed about the consequences of the infection and the measures that must be taken to reduce the impact of the disease. People's knowledge, attitudes and practices with COVID-19 are fundamental for understanding the epidemiological dynamics of the disease and the effectiveness, compliance and success of the MNF adopted in a territory.

Evidence-based policies and practices should incorporate accumulated knowledge about SARS-CoV-2 transmission to help educate the population. To educate society, communicating the practical use of technical-scientific solutions and their impact on everyday life, obtaining public support, effective, accessible and safe communication is necessary. Communicating science to people in the general population requires gaining their trust by sharing health risk information, and work procedures, so that they understand how science and technology can be beneficial. Researchers are generally concerned with goals and objectives, eliminating prejudice, but, in reality, the value of knowledge based on scientific evidence for society varies from region to geographic region, and from community to community, especially when it comes to solving problems complex and emerging (MATTA, 2020).

Adherence to NFM and its sustainability over time can be influenced by a variety of factors, such as context (life, work, community conditions), financial and social circumstances, and cultural and spiritual factors. This is particularly relevant for people of color who may be disproportionately impacted by the implementation of NFM, especially through unemployment and lack of social support (O'MARA-EVES et al., 2015).

Therefore, the social determinants of health need to be considered to promote adherence to preventive measures, messages must be adapted according to age, sex, gender, education, care responsibilities, as well as other socioeconomic or identity factors of individuals (BONELL et al., 2020). For example, men are more likely than women to report low levels of concern about the COVID-19 pandemic, including those in higher-risk age groups (CHAROENWONG et al., 2020). Women are more likely than men to report high levels of stress in their lives, in part because the pandemic may have exacerbated the gender divide in unpaid family work, and women are more likely to have childcare responsibilities or elderly relatives (ALON et al., 2020). Popular health education and communication strategies that consider these factors, and are adapted to other relevant factors, are essential to promote adherence to preventive NFM.

Information needs to be properly framed to be understood by a lay audience, which requires conveying contextual information rather than fragments of evidence. In this sense, the pandemic situation has suddenly taken the vocabulary of epidemiologists to the public and political spheres of the world. Its vocabulary, for example, entered the public lexicon, including words and concepts such

as “pandemic”, “quarantine”, “flattening the curve”, “social distancing”, “personal protective equipment, PPE”, “coronavirus” among others. (WEIBLE et al., 2020).

The PHC health teams play a fundamental role, as they comprise cultural and social elements present in the communities under their responsibility, capable of establishing educational, social, and assistance actions that can reach them both in terms of capillarity and adequacy of technical-scientific information for the diversity of the territory.

It is important to point out that, as in health education in general, when it comes to technical-scientific information on the prevention of COVID-19 for the Brazilian population, the core and primary source of knowledge on prevention is generated by technical areas of the Ministry of Health (MS) and its related entities, arising from the “[...] convergence of knowledge from different domains that merge with the practice of managing the Unified Health System [...] (BRASIL, 2012, p. 5). In this sense, the MS Executive Secretariat recommends that it is necessary to “ensure internal and external communication, contributing to the improvement of decision-making processes in the field of public health and strengthening social participation” (BRASIL, 2012, p. 5).

4 POPULAR EDUCATION IN HEALTH AND RISK COMMUNICATION

Community-based health care includes services provided by a range of health workers, laypeople and professionals, who support outreach campaigns at the population level, among which are the CHAs. These mediating agents adapt well to popular health education strategies in the community, an approach that seeks to empower people so that they can take better care of their health and prevent disease. This approach is based on community-based education itself, which values the knowledge and experience of people living in the territory as resources for health promotion.

Communication is a fundamental aspect of popular health education in the community. Educator Paulo Freire, one of the main theorists of popular education, emphasized the importance of communication as a process of dialogue between people. He argued that education should be a process of mutual exchange of knowledge and experience rather than a one-way transmission of information. Education as a dialogical process, in which the educator and the student are active subjects in the construction of knowledge, allows the community to also actively participate in health promotion actions, contributing with their experiences and knowledge.

In the community, communication is used to involve people in identifying health problems that affect the community and finding solutions to these problems. This involves creating spaces for dialogue and participation where people can share their experiences and knowledge and work together to improve community health. In addition, communication is used to provide clear and accessible health information. This involves adapting the language and content of health information so that it is

understandable to people in the community. It also involves using media and technologies that are accessible to the community, such as community radio, text messaging and social media.

It is for this and other reasons that popular health education in the community has proven to be a fundamental tool for health promotion and disease prevention. This community-based approach empowers people to be active agents in promoting their health, as well as that of their families and community, based on values such as participation, dialogue, respect and equality. These values are fundamental for building a relationship of trust between health professionals and the community, which is essential for the success of health promotion actions.

Therefore, communication is a key element in popular health education, just as popular health education is essential for health risk communication. It is necessary that health professionals can listen to the needs and demands of the community, and that the community feels heard and respected. In addition, health education actions must be integrated into public health policies, so that they can be continued and sustainable. Popular health education can contribute to improving the quality of life of the population, reducing the incidence of diseases and promoting healthy habits.

The EPS seeks, in addition to building a health awareness capable of reversing the population's health situation, the intensification of popular participation, contributing to the promotion of health knowledge. Education is constituted as a process of search and invention or reinvention that starts from man's action and reflection on the world, to transform it (AMARAL et al., 2014).

According to Câmara et al. (2012), health education emerged as a strategy to promote health and should be a social practice focused on questioning everyday life, valuing the experience of individuals and groups, concerning the reality in which they are inserted. It is the sum of all experiences that modify or influence an individual's attitudes or conduct with health and the processes that need to be modified. Ideally, educators need to understand the reality of the situation faced by people in a community (HAN et al., 2020).

Therefore, health education is conceptualized as a two-way dialogue between professionals and users, and, in this relationship, knowledge is built to increase the autonomy and empowerment of people in their care. EPS also enables debate between the population, managers and workers to enhance popular control, becoming a mechanism to encourage social health management (BRASIL, 2009). Education, also understood as a social practice, takes place amid expectations, desires, and frustrations, and implies the use of processes and techniques aimed at learning, which has a political ideology, even if veiled (FREIRE, 1979).

EPS starts from the assumption that the student has prior knowledge, built on his life history, and his social and cultural practice, which serves as a starting point for the acquisition of new knowledge. EPS can be understood as a particular way of recognizing and facing health problems

through dialogue with the popular classes, respect for their cultures, recognition of their knowledge as valid and having as a substrate the theoretical body of Popular Education, formulated by Paulo Freire in Brazil (VASCONCELOS, 2007).

The definition of Popular Education as technical and scientific training, mobilization and organization of popular classes is based on the relationship between popular groups and educators, as it is necessary to know the reality, the world and the way of life of a given community so that they can be directed education programs and content (FREIRE; NOGUEIRA, 2014). In the 2000s, when EPS was adopted by the State within the scope of the National Health Policy, which subsequently promoted the elaboration of a National Policy on Popular Education in Health, in 2012, by the National Health Council. This policy made it possible to increase popular participation in health and social control, with the production of a body of knowledge (AMARAL et al., 2014).

5 THE ROLE OF THE COMMUNITY AGENT IN RISK COMMUNICATION DURING THE COVID-19 PANDEMIC

The Community Health Agent (ACS) is a

> A worker who develops disease prevention, health promotion and citizenship incentive activities, working, under supervision, with families, social groups and collectivities by population assignment. (BRASIL, 2012, p. 15)

The emergence of the Community Health Agent (CHA) in Brazil took place in the 1970s, intending to reduce maternal and child mortality, through guidance on the prevention of health problems. The institutionalization of the ACS occurred in the 1990s, with the creation of the Community Health Agents Program (PACS) by the Ministry of Health. With the creation of the Family Health Program (PSF), replacing the traditional model of health care, the CHA established itself as an essential category to link the community to health service (BARROS et al., 2010; CORREA et. al. ., 2010).

As sole members of the PHC health care teams, these agents promote confidence and understanding in SUS users by sharing similar life experiences, participating in home visits and providing constant support and advocacy for users, and assignments that cover all particularities and specificities of the territory. By partnering with ACS, other ESF members also gain a better understanding of their patients, enabling them to provide culturally competent, patient/family-centered care. However, CHAs still do not reach their full potential (MARTINEZ et al., 2021).

CHWs may seem elementary in resource-intensive settings, but they have a valuable role to play in developing countries. Some basic steps are necessary to facilitate the improvement of its efficiency and effectiveness. A continuous process must be ensured by primary health care programs,

through which CHAs are offered opportunities to update their knowledge, improve communication skills and bring credibility to their personality as health educators (HAQ; HAFEEZ, 2009). In this context, it is essential to train the CHA to act in the face of public health policies together with the other members of the ESF team (BARROS et al., 2010). In 2002, the profession was created by law which, after several modifications, is currently governed by Law 13.595/2018.

With the publication of the first PNAB (National Primary Care Policy) in 2006 and the recognition of family health as a strategy, the CHA remains present as a strategic worker for the main operational model of this policy in Brazil, the Family Health Units (USF). They have been prepared to work in different roles, such as population registration, community diagnosis, identification of risk areas and promotion of priority actions to protect the health of children and women, given the vulnerability of these groups. These professionals "build a process of mutual responsibility in the community in which they work, seeking to link the assisted population to the ESF team as a whole" (NEPOMUCENO, 2021, p. 1641), to enable families' access to social policies and health services. They can contribute to local management actions to confront it, providing elements related to the dynamics of territories.

Despite the role of the ACS in PHC, the National Primary Care Policy (PNAB) published in 2017 (BRASIL, 2017), known as the "new PNAB", brought significant changes that can distort and harm the performance of these professionals. The new PNAB resulted from the "reorganization of conservative political forces in Brazil" (MOROSINI et al., 2018), facilitating the mischaracterization of the role of the CHA in the communities, impacting the work of the agents, hindering the carrying out of education, prevention and health promotion, in addition to compromising actions in areas of greater social vulnerability (FREIRE et al., 2021).

In 2022, to meet the needs generated by the changes in the PNAB, the Ministry of Health, through the Secretariat for Management of Work and Education in Health (SGTES), in partnership with the National Council of Municipal Health Secretariats (CONASEMS) and the Federal University of Rio Grande do Sul (UFRGS), instituted the "Program Health with Agent", aimed at the technical training of Community Health Agents and Agents to Combat Endemic Diseases, within the scope of the National Policy of Permanent Education in Health (PNEPS). Encouraging the technical training of health agents is of great importance for the Union, states, Federal Districts and municipalities, through the transformation of health practices and work organization itself, qualifying skills and competencies.

According to the pedagogical project of the Technical Course in Community Health Agents, the following specific objectives are included:

a) Promoting reflection, skills and competencies of students to adopt integrated work processes between health surveillance and primary care in the territory, in addition to intersectoral articulation;

b) Train the ACS to work with the multidisciplinary teams that work in the territory, through the development of promotion and prevention actions to protect the health of individuals and families, in the structure of epidemiological and environmental surveillance in the logic of primary care; It is

c) Develop skills in adopting strategies to mobilize the community and encourage participation in public policies aimed at health and socio-educational areas.

Local SUS managers hire CHAs through a simplified public selection process, lay individuals with deep knowledge of the culture of the communities they come from, with the expectation that they will require only a minimum of education and in-service training, although this depends on your scope of work. They are considered community health mobilizers, as their work also includes a public health surveillance component, monitoring non-adherence and researching prevailing health conditions in the community (MALLARI et al., 2020).

Recently, a law was enacted that recognizes community agents as health professionals. President Lula da Silva ratified, without veto, the law that regulates the professions of CHAs and endemic combat agents (ACE) as health professionals (Law 14,536, of 2023) (BRASIL, 2023).

As recognized health professionals and health educators by trade, adequate knowledge and communication skills of CHWs are critical to their confidence and critical to the success of the system. In this sense, knowledge about emerging health issues may be insufficient, and they must participate in continuing education. The CHA can empower the community to identify their needs and can assist in planning a strategy to achieve the desired results. To successfully achieve this, CHWs must be culturally sensitive, with the ability to build a strong relationship with the community (HAQ; HAFEEZ, 2009). This makes CHAs important agents in risk communication in health crises such as epidemics.

As CHWs are professionals who work closely with local communities, they are also well-positioned to effectively disseminate health information. They can communicate with people on a personal level and help dispel fears and concerns about the pandemic. In a health crisis of the magnitude of a pandemic, health risk communication is crucial to ensure that people understand the gravity of the situation and the steps they must take to protect themselves and others. CHWs are therefore essential in this process, as they can communicate with people on a personal level and help dispel fears and concerns about the pandemic.

Health risk communication by community health workers must be based on scientific evidence and accurate information about the pandemic. They should be able to explain the risks associated with the disease and how it is transmitted, as well as the preventive measures that can be taken to reduce the risk of infection. In addition, community health workers must be able to communicate with people on a personal level and adapt their message to suit each individual's needs. They must be able to provide information in clear, simple language and be available to answer any questions or concerns people may have.

The need for qualification of health workers, when it comes to EPS, falls, in a special way, on the ACS, due to the specificity of their work, which puts them in a permanent exercise of dialogue and Health Education with the population (AMARAL et al., 2014). As a publication by the Oswaldo Cruz Foundation (2020) shows, this exercise is not homogeneous from the sectoral and regional points of view. Thus, it was realized that, when fighting a global crisis, it is important to focus on the local impacts on a given population. In this local context, the population of each territory needs to have, in addition to understanding, also engagement with safety policies for physical distancing, personal and environmental hygiene, as well as the use of face masks and precautionary measures in schools and workplaces, based on communication to ensure trust and cooperation within the territories, in addition to protecting vulnerable populations with low socioeconomic support (GILMORE et al., 2020).

Currently, the ACS work within the family health teams, playing, in addition to the mediating role of the relationship between the team and the community, also between technical knowledge and popular knowledge (MACIAZEKI-GOMES et al., 2016). The CHA is, therefore, fundamental in the ESF, where he is, at the same time, a health professional and a member of his community, articulating technical knowledge and popular knowledge, which makes this agent a trusted community reference for the people in his space of work. coexistence. Therefore, CHAs can act as multipliers of information and guidance on prevention behaviors (MACIEL et al., 2020).

COVID-19 prevention behaviors in PHC are essential to ensure the safety of both health professionals and the general population. The CHA plays an important role in this process, as it is the professional responsible for carrying out permanent work on prevention and health education in the community where it operates (SANTOS et al., 2021). It is important to realize that the CHAs have played the important role of bringing data and epidemiological information from the territory to their health teams, due to their direct proximity to the population, which helps the strategic planning of the entire team (DUARTE et. al., 2020). From this point of view, the role of the CHA in risk communication is structured in a two-way street where he takes communication to his territory and returns data from it to the team, allowing the improvement of the information that must be disseminated.

CHAs can provide clear, accessible and culturally appropriate information about the epidemic, its symptoms, modes of transmission, prevention measures and seeking healthcare. They can help combat misinformation and myths circulating in the community by providing evidence-based information. With this intermediation, they can promote community mobilization, organize meetings in the territory, and carry out workshops and home visits to raise awareness about the importance of preventive measures, such as the use of masks, hand hygiene and social distancing. On the other hand, the CHAs know the community in which they work well and can identify vulnerable groups, such as the elderly, people with chronic diseases, or difficulties in accessing health services. They can direct specific efforts to ensure that these groups receive adequate information and have access to necessary health services during the epidemic.

CHWs are also in a privileged position to identify suspected cases or symptoms related to the epidemic. They can be aware of signs and symptoms, perform basic screening, refer suspected cases to appropriate medical care, and report this information to health authorities. Feedback and communication in this situation are two-way. They can gather information about community concerns, questions and perceptions and pass this on to health authorities, assisting in adapting communication and prevention strategies as needed.

It is important to emphasize that community health workers must receive adequate training, regular updates and access to quality educational materials to effectively play their role in risk communication. In addition, they must receive the necessary support from health authorities to effectively carry out their roles during epidemics.

In this sense, the Ministry of Health (MS) published a document for the CHAs entitled "Recommendations for Adjusting the Actions of Community Health Agents in the Face of the Current Epidemiological Situation Regarding COVID-19" (BRASIL, 2020b), to guide them to regarding the new coronavirus and help them reorganize their work process in the face of the pandemic. In this publication made in 2020, the MS highlighted the role of the CHA as a professional member of the ESF teams concerning the prevention and control of public health problems, emphasizing their fundamental role in "reinforcing the attribute derived from the PHC called community orientation" (BRASIL, 2020b, s. p).

In its Guidance on Risk Communication and Community Participation for COVID-19, WHO (2020) highlights that proactively communicating with the community is one of the most important interventions in response to major public health events. In addition to fighting the excess of unnecessary and false information, the quality of information helps the population to perceive the risks to which it is exposed, contributing to more effective community participation in disease control. Good

risk communication also makes it possible to discover how populations are interpreting the information received and guarantees them the exercise of their right to information.

As guided by the document of recommendations for CHWs regarding COVID-19 prevention behaviors, among the activities that CHWs can perform (BRASIL, 2020), the following stand out:

a) Correct use of masks: The CHA can guide the population on the importance of wearing masks and how to use them correctly, in addition to making distribution feasible for those who do not have access.

b) Hand hygiene: The CHA can advise on the importance of hand hygiene with soap and water or alcohol gel and distribute, if possible, hygiene materials for those who do not have access.

c) Social distancing: The CHA can advise on the importance of maintaining social distancing and avoiding crowds.

d) Identification of suspected cases: The CHA can identify people with symptoms of COVID-19 and guide them to seek medical attention.

e) Monitoring of confirmed cases: The CHA can monitor confirmed cases of COVID-19 and advise on home isolation.

f) Combating false news in the community.

g) Provide information to special risk groups, such as pregnant and postpartum women, the elderly and people with chronic diseases, such as hypertensive and diabetic patients.

h) Vaccination: The CHA can advise on the importance of vaccination against COVID-19 and help organize vaccination campaigns.

In the pandemic context, therefore, it is possible to perceive that in addition to the usual pre-existing health needs in the territories, the CHA needs to add new challenges to their daily lives, such as the acquisition of new knowledge, use of tools and technologies, such as those for distance communication (MACIEL et al., 2020). In addition, studies show that CHAs are the primary care professional category most susceptible to contamination by the coronavirus due to their proximity to the population (NOBREGA et. al., 2022).

In this way, considering the cruciality of their participation in the risk communication process, with the maintenance of cultural competence and community orientation attributes and their capillarity in reaching all points of the territory, it is necessary that the CHAs have access to PPE and the training of how to use them correctly, as well as being well trained as to the information they need to know to exercise good communication with the population, within their level of understanding (MACIEL et. al., 2020).

According to WHO, when trained and properly supported, CHWs can uncover and understand individual and community perceptions, beliefs and barriers and address them with evidence-based and contextually appropriate solutions, hence competency-based education and learning programs, adapted to the environment, will be needed to prepare CHWs in these activities, including highlighting the importance of preventing the spread of COVID-19; use and disposal of PPE; COVID-19 vaccines; develop interpersonal and communication skills, and community engagement skills (WHO, 2021). However, in the context of the pandemic, Méllo et. al. (2021) found that, until the time of the publication of their study, institutional support regarding training and permanent health education actions in Brazil was insufficient.

Another way to safely continue the work of the ACS is the use of remote technologies with internet access such as digital social networks, or even the telephone, as directed by ABRASCO in the document "Strengthening the Family Health Strategy in the Fight against COVID-19 – Positioning of the APS Network" published in May 2020. The PNAB already raised the possibility for municipalities to acquire and use individual portable equipment (tablets, smartphones) and specialized software to facilitate the routine of FHS professionals. In addition, with the advancement of the implementation of the e-SUS AB strategy (CIELO et. al., 2022), it is expected that such professionals have a connection with these instruments. In any case, bringing these new instruments to the CHA's work process demands investments from the public authorities in training, acquisition and permanent educational improvement, noting that the objective is to improve the efficiency and effectiveness of health care (MACIEL et. al. , 2020).

It is noteworthy that, although narrative reviews such as the present manuscript provide valuable information and a descriptive synthesis of available studies, they do not have the same methodological rigor as formal systematic reviews. Therefore, it is important to interpret the results of this narrative review with caution and consider that conclusions based on the best evidence may require further evaluation through systematic review studies. However, this review aimed to provide a qualitative and descriptive overview of a specific field of research and the exploration of emerging topics. Narrative reviews can be useful to explore areas of research in which there are few studies, or where the available studies have heterogeneous methods or contradictory results, as in the present review.

6 FINAL CONSIDERATIONS

The 2019 coronavirus disease pandemic highlighted how important health risk communication is, with emphasis on the need for information to be comprehensible and bilaterally constructed by each group of people involved, professionals and users of the SUS, in an education process popular in health.

The FHS teams, the main health care strategy in Brazil, are fundamental in generating quality information capable of being assimilated by its population, taking into account the locoregional characteristics of each one of them. The CHA, in this scenario, emerges as a key player in the process, as it is the FHS professional closest to individuals and family groups, knowing the social characteristics, vulnerabilities and needs of each one of them, being the main source of support. information regarding the functional mapping of the territory and allowing teams to assertively plan communication strategies.

In addition, the CHA is the character of primary health care with greater capillarity, going from house to house, being able to disseminate health information, and building knowledge, through a language of the community, based on scientific knowledge, but not laden with useless complexities to that target audience. Therefore, it is necessary to periodically train these very potential workers and, although the Health with Agent Program is in progress, which will bring future results with a generation of CHAs that are more prepared to carry out their duties in critical moments, such as in other epidemics that may arise, however, they require specific up-to-date actions of permanent education, as well as the entire team, being carried out promptly, so that the communication practice is effective and quick to promote equity in health in the Brazilian population.

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CHAPTER
15

Comprehensive health care for children and adolescents with congenital disorders: The impact of the COVID-19 pandemic on care

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ABSTRACT
Congenital anomalies are structural or functional changes that occur during intrauterine life. Approximately one in five deaths in the neonatal period are due to birth defects in Latin America and the Caribbean. There are several factors for their development, from infections, maternal nutritional status, use of medication, and environmental or genetic factors. Most anomalies are present in low-income countries where we have an inadequate prenatal context, a greater predisposition to infections due to precarious health, and the use of prohibitive substances (medicines and drugs) during pregnancy. From this, we have that several social determinants of health such as social, economic, cultural, ethnic, psychological, and behavioral factors influence the course of a disease in a certain population. When there is a system that integrates health care for children and adolescents with congenital disorders, including genetic syndromes, especially Down syndrome, care for children promotes better growth and development. A comprehensive health care service for children and adolescents inserted in a university hospital must be able to coordinate care actions. During the years 2020 to 2022, health services faced the covid-19 pandemic that the entire population experienced. There was an impact with a reduction in the number of daily visits to these patients and a reduction in the inclusion of new ones, leading to fragmentation or discontinuity of care.

Keywords: Congenital Abnormalities, Genetic Diseases, Comprehensive Health Care, Children, Adolescents, Covid-19.

1 INTRODUCTION

1.1 CONGENITAL MALFORMATIONS, DOWN SYNDROME AND HEALTHCARE

Birth defects or congenital malformations have significant public health impacts, affecting 3% to 4% of all live births and causing elective terminations of pregnancy or miscarriages. In the United States, approximately 150,000 babies are born each year with birth defects, these and genetic diseases being the main causes of infant deaths and important morbidities during childhood. Although they represent 15% to 30% of all pediatric hospitalizations, these children generate proportionately higher costs than other hospitalizations [1].

The overall incidence of birth defects in Latin America does not differ significantly from that found in other regions of the world [2]. In general, it can be considered that no less than 5.0% of live

births have some developmental anomaly, determined, totally or partially, by genetic factors, which will compromise their development and quality of life. Adding the disorders that manifest later, such as certain chronic degenerative diseases, the considerable effect that genetic factors have on health is even more evident [3,4].

In Brazil, an ecological study carried out by Siedersberger Neto et al. [5] analyzed deaths in children under one year old due to congenital anomalies between 1996 and 2008 and found that the proportion of infant deaths attributable to congenital malformations rose from 9.74% in 1996 to 18.22% in 2008, with an average annual increase of 0.71%, statistically significant values. In the year 2000, congenital anomalies were the third cause of infant mortality in Brazil, accounting for 13% of deaths [4]. In developing countries, diseases of predominantly genetic etiology account for 15 to 25% of the causes of infant mortality [6].

According to NUSSBAUM et al. [7] genetic factors are implicated in virtually all diseases, with a greater or lesser relative role depending on their interaction with the environment. Among the diseases in which the genetic component is preponderant, we can mention the monogenic, individually rare, but affecting as a group 2.0% of the general population; chromosomal, present in 0.7% of live births (and in half of the spontaneous abortions); and the multifactorial, responsible for most of the congenital malformations and also for many common problems of adult life.

Down Syndrome (DS) is a genetic alteration present in the human species since its origin. It is a chromosomal disease characterized by the presence and expression of three copies of chromosome 21. Its first description as a clinical condition with its own identity occurred in 1866, by the English pediatrician John Langdon Down. In 1958, the Frenchman Jérome Lejeune and the Englishwoman Pat Jacobs independently discovered the chromosomal origin, starting to be considered a genetic syndrome, naming it Down Syndrome or Trisomy 21 (T21), in homage to John Down who initiated the theme in the scientific environment [8,9].

DS is the most frequent chromosomal abnormality in humans [10,11]) and the most prevalent cause of intellectual disability [12]. People with DS have the potential to develop due to the broad neuroplasticity that can be stimulated from the first months of life by the family, health professionals, and education [13].

The National Down Syndrome Society (NDSS) reports that approximately one in every 700 babies in the United States is born with Down syndrome, about 6,000 per year [14]. No different, in Brazil, it is estimated that for every 700 births, there is 1 case of trisomy 21, totaling around 300,000 people with the syndrome, regardless of ethnicity, gender, or social class [15].

It is, therefore, a significant part of the Brazilian population, consisting of an important portion that may require timely interventions from the earliest childhood, as this chromosomal disorder is

related to organic changes and specific physical constitution and, a greater risk for developmental delay.

However, despite the impossibility of predicting the degree of autonomy that a child with DS will have in adult life, it is known that, when properly cared for from birth, and receiving adequate guidance and stimulation, they have the potential to lead a healthy and fulfilling life. social and educational inclusion [16]. This statement is also valid for all children born with congenital conditions.

The Ministry of Health's Guideline for Attention to People with DS, updated in 2020 by the Brazilian Society of Pediatrics, recommends that care for this population is guided by public policies and that the theoretical assumptions of the expanded clinic, integrality, and care be used. shared. It brings as a proposal for care conducts such as the expanded understanding of the health-disease process; construction shared by the multidisciplinary team of the situational diagnosis; and the individual care plan; definition of therapeutic goals and commitment of professionals, family, and individual with these goals [16, 17].

According to Roseni Pinheiro, "health care" is not just a level of care provided by the health system or a simplified technical procedure, but an integral action that has meanings and meanings aimed at understanding health as the 'right to be'. Through interdisciplinary work and the articulation of professionals, managers, and users, with active participation, care can be expanded and the social support network strengthened. Comprehensive health care is opposed to an economicist view and is concerned with the well-being of individuals, making them capable of judging what their health needs are, placing them as other subjects and not objects [18].

The Unified Health System (SUS) emerged in Brazil from a history of struggles by the Brazilian health movement to facilitate health care [19]. Comprehensiveness in the Unified Health System (SUS) should be widely applied to everyone, and I think especially to children and adolescents with congenital conditions, to promote a timely stimulus for their full growth and development. But also to prevent complications and carry out periodic investigations to detect comorbidities typical of malformations and congenital alterations or genetic syndromes [6].

Thus, congenital anomalies and genetically determined diseases represent an important public health problem in Brazil, and the understanding of their etiopathogenic mechanisms, their diagnostic elucidation, and comprehensive assistance to those who present these alterations and diseases should deserve special attention. The SUS, with a focus on this concern, instituted the National Policy for Comprehensive Care in Clinical Genetics in 2009, through Ordinance MS/GM nº 81 (BRASIL, 2009), but the Health Care Secretariat (SAS) did not disclose the necessary measures for the full implementation of this Policy. Thus, there is still a very large gap in the care of those with congenital and genetic conditions in Brazil [20].

The number of specific programs aimed at detecting these diseases and acting in health promotion and disease prevention is still very scarce in Brazil. What can be seen is that, as there is no broad structured public assistance for these patients, comprehensive care and the Health Care Network (RAS) have not been effective. It is frequent that non-governmental and philanthropic organizations, or even the private sector, end up taking on this care, which should be primarily the responsibility of the SUS [21].

Due to the capillarity of the UBS network, these actions must take place from the care provided in Primary Care, the main gateway to the SUS, with support from the RAS. However, for this to occur with quality, it is essential to train general professionals, from graduation and specialization, both in technical-scientific knowledge and in relational technologies, as proposed by Merhy [22]. The existence of medium and high-complexity Units and their integration into a regionalized network should guarantee support to the UBS and adequate care for the different needs of each patient.

Reinforcing this Comprehensive Care Policy, in 2014 the Ministry of Health instituted, through Ordinance 199/2014, the National Comprehensive Care Policy for people with rare diseases, which includes an axis for genetically determined ones. However, little progress has been made toward the recognition and adequate treatment of these people in the SUS [23].

1.2 THE COVID-19 PANDEMIC AND CHILD VULNERABILITY

In January 2020, the World Health Organization declared an international public health emergency with the worldwide spread of covid-19, starting the coronavirus pandemic that lasted until the beginning of May 2023, when after more than three years, the World Health Organization (WHO) declared in early May 2023 that Covid-19 no longer constitutes a public health emergency of international importance. According to the entity, the virus is now classified as an “established and ongoing health problem” [24,25]. In this scenario, the political response directed at the pediatric age group in the face of the pandemic is a constant concern, as these are individuals in a more vulnerable situation [26]. And, because the initial concern was with the disease itself, and with the multisystem inflammatory syndrome, much greater than with the care, follow-up, and impact on the growth and development of these children, demonstrated by the protocols at the time, which focused on this condition.

Also with the pandemic, there was a rupture in vaccination follow-up, both due to the overload of the health system due to covid-19 and the drop in the demand of families to vaccinate their children, whether due to social distancing or due to the very reluctance of communities in the face of the current scenario. This leads to increased susceptibility to vaccine-preventable diseases that have epidemic

potential. Children constitute an important group of people vulnerable to vaccine-preventable diseases and may suffer increased morbidity and mortality, further burdening health services [27].

The pandemic impact with social isolation measures, devastating economic damage, and closure of schools and so-called "non-essential" services also impacts access to health and how the relationship between health professionals and patients takes place, directly affecting basic health and prevention and health promotion measures, which with the pandemic gave way to care for patients infected with COVID 19 and its complications. Support networks, schools, physical activity, and social interactions were suddenly removed from children's daily lives. At the same time, routine consultations in pediatrics gave way to priority and urgent health care or those infected with SARS-COVID, and the health promotion measures so hard won and built in our country were distancing themselves from the reality of care in health for this age group [28].

2 FINAL CONSIDERATIONS

Childhood is a period of great vulnerability and adaptation to the environment in which the subject is inserted, therefore requiring continuous health monitoring that allows the promotion of good conditions for growth and prevention and treatment of diseases in this age group.

The covid-19 pandemic has emerged as an additional obstacle, important for the delay in the diagnosis and follow-up of patients with congenital anomalies. Many patients depend on public health services which changed mainly in the years 2020 and 2021 due to the pandemic and the need to face it. Schools and closed medical outpatient clinics, Basic Health Units, and health professionals (doctors and physiotherapists, among others) were redirected to the high demand of respiratory cases and led to the loss of follow-up of certain patients who need long-term follow-up to better growth and development.

Thus, this reflection on access to health and child care in health services is urgent and necessary, with the many new challenges brought by the pandemic and with the establishment of a new reality for everyone – patients and the health team.

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CHAPTER
16

Pregnancy and COVID-19: Study of trends in brazilian scientific production

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ABSTRACT
COVID-19 has variable symptoms, specific diagnosis, and no safe and effective treatment, in addition to prevention and vaccination measures. Among the risk groups are pregnant and puerperal women, with possible consequences for the fetus. In addition to hospitalization in the Intensive Care Unit (ICU), there is a high number of deaths classified as maternal mortality. Thus, the objective of this study is to identify the trend of Brazilian scientific production regarding pregnancy and COVID-19, with a review question: What is the trend of Brazilian dissertations and theses about pregnancy related to COVID-19? This is a narrative review of the literature, carried out in July 2022, in the theses and dissertations bank of the Higher Education Personnel Improvement Commission (CAPES) portal, with a search strategy "pregnancy AND COVID-19" and clipping temporal. As inclusion criteria, field research theses or dissertations that answered the review question and excluded studies with incomplete abstracts and/or not available in the database. In the analysis, a detailed reading was carried out with the external organization of the data, consisting of eight theses and dissertations. As for the results, six are dissertations and two theses; mostly published in 2021 and 2022; in the Southeast and Northeast regions of Brazil; through four federal universities, two state universities, and one private university. Regarding the approach, four studies were qualitative, two quantitative, and one quali-quantitative; predominating the area of Medicine, followed by Biotechnology, Dentistry, and Collective Health. There was a lack of studies produced by other areas of health sciences on the theme supported by the need for specialized and multidisciplinary care with support for doubts. Complications such as an increase in the prevalence of preeclampsia, laboratory, and vascular alterations have been identified in pregnant women with COVID-19. Thus, care strategies are needed to reduce the risk of infection, such as the development of digital technologies and the use of telehealth. In addition to clinical issues, this group suffered impacts on mental health due to social isolation and changes in maternal-fetal attachment. It concludes the vast approach that pregnancy and COVID-19 can be researched, with gaps in maternal mortality, and reinforces the potential of prevention actions to meet the Sustainable Development Goals (SDGs).

Keywords: COVID-19, SARS-CoV-2, Pandemic, Pregnant women, Complications in Pregnancy.

1 INTRODUCTION

In December 2019, in the city of Wuhan, in the province of Hubei, located in China, a case of severe lower respiratory infection of unknown cause was identified and reported to the World Health Organization (WHO) (WHO, 2021). The International Committee on Taxonomy of Viruses identified

the etiological agent as a BetaCoronavirus (βCoV) which was isolated, sequenced, and named SARS-CoV-2 (GUO et al., 2020).

On February 11, 2020, the WHO announced that the disease caused by this new Coronavirus would be known as "COVID-19", short for "Coronavirus disease 2019". A month after the announcement, on March 11, 2020, the number of countries involved in the outbreak tripled, with over 4,000 deaths and over 118,000 cases reported in 114 countries. The tragic circumstance led the WHO to declare COVID-19 a pandemic (CASCELLA et. al., 2022). Data up to April 30, 2023, bring the identification of 765,222,932 confirmed cases of COVID-19 and 6,921,614 deaths worldwide from the disease (WHO, 2023).

The number of deaths related to COVID-19 is because the infection can manifest itself, in addition to the asymptomatic form, to evolve into Severe Acute Respiratory Syndrome (SARS). Thus, the infection has clinical features ranging from mild or asymptomatic illness to severe or fatal illness. The main symptoms of COVID-19 are fever, cough, and myalgia while other minor manifestations include sore throat, headache, anosmia, nausea or vomiting, diarrhea, and dysgeusia (UMAKANTHAN et al., 2020).

The severity of COVID-19 cases has been variously classified, despite this, 80% of confirmed cases are mild or asymptomatic and show recovery without sequelae (RAOULT et al. 2022). However, 15% of affected patients develop symptoms that require oxygen support and 5% evolve to severe conditions and may use mechanical ventilation in a hospital environment. Individuals with risk factors, such as immunosuppression, hypertension, diabetes, or cardiovascular diseases, are more likely to develop a serious illness and have a higher mortality rate (WHO, 2021).

In addition to clinical diagnosis through symptomatology, diagnostic methods for COVID-19 are carried out in two ways. Through nasopharyngeal respiratory samples by laboratory diagnostic methodologies with RT-PCR (Real-time Polymerase Chain Reaction), or the detection of antibodies by immunochromatographic, immunosorbent, and chemiluminescent tests (NETO et al., 2021).

As for the transmission of COVID-19, it occurs directly from person to person, mainly through the inhalation of respiratory secretions or droplets contaminated by the virus that are suspended in the air. Viral shedding happens from the respiratory tract, saliva, feces, and urine, resulting in other possible sources of virus dissemination (LI et al., 2020).

The necessary precautions to avoid transmission include social distancing, mask-wearing, and hand hygiene. It is also recommended to follow the vaccination schedule for COVID-19 to prevent injuries. The National Operational Plan (PNO) for Vaccination against COVID-19, in addition to having guidelines for planning, operationalizing, and implementing the vaccine, prioritizes risk groups (BRASIL, 2021).

Despite the initial findings about COVID-19 showing that the most vulnerable people were only the elderly or those with comorbidities, the Ministry of Health (MOH) in April 2020 included pregnant women, puerperal women, and mothers of newborns (NB) with up to 45 days of life, in the risk group (BRASIL, 2020). Such inclusion was based on the guidelines of the National Policy for Integral Attention to Women's Health (PNAISM), since pregnancy modifies the response of the woman's immune system, especially when related to a previous clinical condition, such as hypertensive syndromes in the pregnancy, gestational diabetes mellitus or pre-gestational diabetes mellitus (MAIA et al., 2020).

It is known that during pregnancy, anatomical and physiological changes, especially in the respiratory system, and the state of immunosuppression contributes to the increased risk of respiratory infections in this population. Pregnant women symptomatic of COVID-19 have a higher hospitalization rate in the Intensive Care Unit (ICU) compared to the general population and, when compared to pregnant women without the disease, they have a higher death rate (VIVANTI et al., 2020).

Worldwide, maternal mortality from COVID-19 is similar to that of the general population and, in Brazil, a study that analyzed data from the Influenza Epidemiological Surveillance Information System (SIVEP Gripe), for the period from February to June 2020, revealed that 978 pregnant and puerperal women were diagnosed with SARS by COVID-19 and, of these, 124 died (AMORIM et al., 2020; TAKEMOTO et al., 2020). In Brazil, according to the Brazilian Obstetric Observatory of Severe Acute Respiratory Syndrome (OOBr SRAG), from 2020 to 2023, 24,365 cases of COVID-19 have been registered so far in pregnant and puerperal women, of which 2,054 evolved to death (OOBr, 2023).

In addition to COVID-19 offering risks to pregnant and puerperal women, other negative outcomes related to the NB were found, such as the risk of prematurity and fetal growth restriction (BEEN et al., 2020). Given the above, COVID-19 consolidates itself as a severe acute respiratory infection that deserves attention when it reaches the public of pregnant women, since in addition to offering risks to the pregnancy-puerperal period, it can trigger consequences for the NB.

Thus, the objective of this study is to identify the trend of Brazilian scientific production regarding pregnancy and COVID-19. For the proposed objective to be achieved by the research, the following review question was delimited: What is the trend of Brazilian dissertations and theses about pregnancy related to COVID-19?

2 METHOD

This is a narrative literature review. Narrative research is appropriate for carrying out the state of the art on the topic studied (ROTHER, 2007). It has a broad research question, its search sources

can be both databases and portals, virtual libraries, among others. The synthesis of studies can be developed through qualitative analysis (BRUM et al. 2016).

In addition, narrative reviews contribute to the theoretical foundation of scientific works, enabling the updating and coverage of a given topic in a short period. Finally, it also allows for broader critical interpretations from a theoretical or contextual point of view, highlighting production gaps (BRUM et al. 2016).

The search for data was carried out in the database of theses and dissertations on the website of the Higher Education Personnel Improvement Commission (CAPES). In the portal, the combination of the alternative term for the descriptor "Pregnancy" was used, "gestation", followed by the Boolean operator AND and after the descriptor "COVID-19" in the search box. It looks like this: "gestation AND COVID-19".

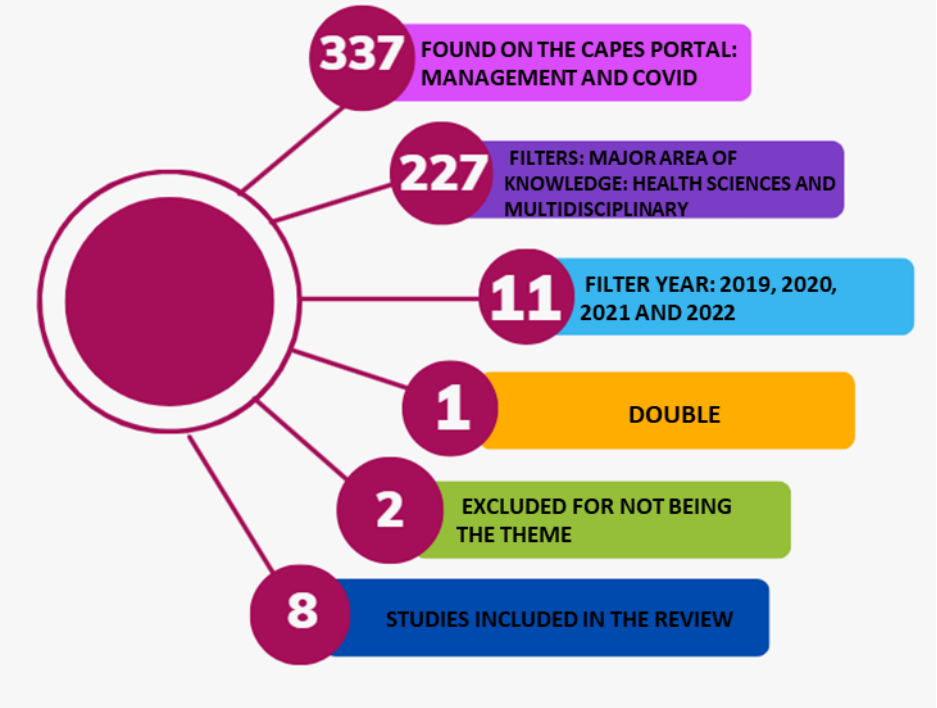
The research inclusion criteria were: theses or dissertations arising from field research that answered the review question. Exclusion criteria were: studies with incomplete abstracts and/or not available in the database. From the search, the titles and abstracts were read, applying the inclusion and exclusion criteria. Data collection took place in July 2022 and the results obtained made up a database that was later analyzed. A time frame was applied according to the time frame of the COVID-19 pandemic starting in December 2019 until the current year of collection, 2022.

Data analysis was based on a deep and detailed reading of dissertations and theses relevant to this research.

At first, in the CAPES portal of theses and dissertations, with the combination "pregnancy AND COVID-19" in the search box, 337 studies were found. Thus, the filter "Large area of knowledge: Health Sciences and Multidisciplinary" was first used, which resulted in 227 studies. After the filter "year: 2019, 2020, 2021, and 2022", 11 studies were found. Of these, 02 studies were excluded because they were not related to the theme addressed and 01 was a duplicate study. Finally, the database consisted of 08 dissertations/theses.

Thus, Figure 1 presents the flowchart for selecting studies.

Figure 1: Figure from the selection of studies about pregnancy and COVID-19 on the CAPES portal, 2022.



Source: elaborated by the authors, 2022.

3 RESULTS AND DISCUSSION

Regarding the characterization of the included studies, six are dissertations (65%) and two theses (25%) were published mostly in 2021 (87.5%) and subsequently in 2022 (12.5%). There was a predominance of studies carried out in the Southeast and Northeast regions of Brazil, with three studies for each region (37.5%), followed by the Midwest region and the South region with one study each (12.5%).

The country's Higher Education Institutions (HEIs) involved in the studies were four (50%) from federal universities (Federal University of Rio de Janeiro - UFRJ; Federal University of Rio Grande do Sul - UFRGS; Federal University of Alagoas - UFAL and Federal University of Espírito Santo - UFES), two (25%) studies from state universities (University of São Paulo - USP and University of Brasília - UnB) and two (25%) studies from a private university (Centro de Estudos Superiores de Maceió – CESMAC).

As for the approach of the studies, four were qualitative (50%) (BATISTA, 2022; BARBOSA, 2021; VANDERLEI, 2021; SILVA, 2021), two quantitative (25%) (BIANCOLIN, 2021; PAZZIM, 2021) and one qualitative study. -quantitative (12.5%) (MARINHO, 2021).

Regarding the areas of knowledge, there was a predominance of studies in the area of Medicine (62.5%); followed by Biotechnology (12.5%), Dentistry (12.5%), and Collective Health (12.5%). There was a lack of studies produced by other areas of health sciences related to pregnancy and COVID-19. However, it should be noted that pregnant women in a high-risk situations, such as

COVID-19 infection, need care from a specialized and multidisciplinary health team. Considering the importance of shared care, coordination must be guaranteed by Primary Health Care (PHC), about prevention and health promotion actions, allowing the pregnant woman to remain linked to the territory (BRASIL, 2022).

Prenatal care, even if shared, should continue to be offered by the unit of origin, considering the individuality of each clinical case. This assessment takes place through medical and nursing consultations and home visits. This guarantees the responsibility and resolution of the care of the pregnant woman and the fetus (BRASIL, 2022).

Also, prenatal care in PHC has, as one of the professional's responsibilities, the support doubts and anxieties in each consultation (BRASIL, 2013). Especially when dealing with COVID-19, which so far does not have a consensual treatment protocol for the general population, including pregnant women (FURLAN et al., 2020; MASCARENHAS et al., 2020). For Marinho (2021), during pregnancy, COVID-19 can result in important and often unknown complications for the pregnant woman and the fetus, requiring further clarification.

Although COVID-19 is considered a new infection, it is already known that, during pregnancy, women undergo several physiological changes necessary for fetal development, such as hormonal, circulatory, and immunological changes. Because of this, the response to COVID-19 infection, as well as its signs, symptoms, and complications, may be different in this population (ALVES, BEZERRA 2020; RIBEIRO et al., 2020).

As one of the outcomes of COVID-19 infection in pregnant women, there may be an increase in the prevalence of preeclampsia. This finding can be explained by endothelial damage caused by placental oxidative stress and by an anti-angiogenesis effect that causes hypertension, proteinuria, increased liver enzymes, renal failure, and even thrombocytopenia in infected pregnant women (SOUZA et al., 2020). This is in line with the findings of Batista (2022) who identified the deregulation of inflammatory, immunological signaling pathways and mainly vascular changes in pregnant women with COVID-19.

Thus, it becomes necessary to plan strategies to help reduce the risk of COVID-19 infection in pregnant women, such as the implementation of digital health technologies for prenatal care, such as telehealth. This tool contributes to reducing the frequency of face-to-face prenatal consultations and home visits while ensuring care (BRASIL, 2020).

In addition, the expansion of telehealth services expands the access of high-risk pregnant women to specialized, articulated, and interdisciplinary obstetric care (BRASIL, 2022). Concerning digital technologies, there has been an increase in the development of these tools for professional use, such as the example of the study by Barbosa (2021) who produced an application for monitoring

prenatal care with an emphasis on COVID-19, which, in addition to providing information on health to the community, acts in favor of health promotion and education for pregnant women.

Still, about interdisciplinary care, Vanderlei (2021) concluded that the creation and application of the mobile technology "Gestação Florescer" for oral health and stated that it will continue after the pandemic due to its thematic diversity and understanding that the use of these technologies qualifies the prenatal care.

In addition to the clinical issues related to the care of pregnant women, as specifically demonstrated by Biancolin (2021), when he concluded that the use of ultrasound (USG) and computed tomography (CT) is efficient for pulmonary evaluation in pregnant women. Other references indicate the need to assess the impact of the pandemic on mental health resulting from social isolation. According to Brooks et al. (2020), the COVID-19 pandemic associated with social isolation suggests the triggering of significant levels of anxiety, anger, confusion, and stress, which converges with the study by Soares (2021) who identified an association of lower scores in several domains of quality of life in pregnant women during the pandemic related to depressive episodes.

Also, corroborating this result, the study by Paixão et al. (2021) demonstrated that the pregnant women's need for isolation interfered with their contact with their social support network. This contributed to the increase in depressive signs and symptoms, anxiety, and insecurity, compared to pre-pandemic numbers in this same group.

The impact of the pandemic on maternal health was also reported by Pazzim (2021) who identified depression scores, normal and/or mild stress, and high anxiety, as well as negative effects on the quality of maternal-fetal attachment when there is a maternal illness.

Faced with the diagnosis of COVID-19 infection, the establishment of the maternal-fetal bond is also impaired, due to difficulties in breastfeeding and restriction in skin-to-skin contact with the NB. All of these situations cause anxiety and can lead to significant maternal-fetal complications such as premature birth, intrauterine growth restriction, obstetric complications during labor, and changes in the child's neuro psychomotor development, such as Attention Deficit Hyperactivity Disorder (ADHD).) (TRAPANI et al., 2020; DING et al., 2021)

Finally, the study by Silva (2021) points out the importance of establishing care practices that advocate active listening, the protagonism of women, and all the actors involved, so that it is possible to face the challenges that are already known and that have not yet been addressed. were overcome, such as the COVID-19 pandemic.

4 FINAL CONSIDERATIONS

The present study made it possible to identify that the theme of pregnancy and COVID-19 is broad and can be approached and researched by different areas of knowledge. The need to boost research involving the gap in maternal mortality and COVID-19 given its relevance as an indicator of health in the pregnancy-puerperal period.

As it is an unknown and recent clinical condition, there is still no indication of specific, safe, and effective drug treatment for COVID-19, in addition to preventive measures, which reinforces the potential of health promotion actions developed by the multidisciplinary team, especially the professional nurse.

Also, the WHO on May 5, 2023, declared the end of the international health emergency for COVID-19, however, the pandemic is not over. Thus, a plan was published for the long-term emergency response to COVID-19 until 2025, with a focus on preventing harm to risk groups.

This is fundamental, since the aim is to reduce Brazilian maternal mortality, in line with the Sustainable Development Goals (SDGs), which focus on sequential reductions up to the ratio of 30 maternal deaths for every 100,000 live births by 2030.

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CHAPTER
17

Social inequality and education in pandemic times

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ABSTRACT
The present work aims to show the dynamics of reproduction of social inequality within the educational system, highlighting the power relations intertwined in this scenario, especially in times of difficulties during the pandemic period, which led to an increase in social inequalities and conservation of the class dominant. Based on a survey carried out in two municipal public schools in São Bernardo-MA, one located in the rural area and the other in the urban area, which began in June 2021 until March 2022. Are developed by the school and that have an impact on combating the reproduction of social inequality, pointing out the difficulties faced by lower-class students during the pandemic in both rural and urban areas. The purpose is to describe and understand the impacts of the pandemic on access to education by students living in rural areas and students living in urban areas. In this way, we will look into and try to understand how this whole process is going, showing how teachers are dealing with this scenario of social inequality that was even more evident in this period of the pandemic and how students reacted to this new teaching modality. In this period of the research, it was possible to verify the difficulties of the teachers in handling the technological devices and in the process of evaluating the students. As for the students, the difficulties of accessing good quality internet and access to technological devices.

Keywords: Social inequality, Education, Pandemic.

1 INTRODUCTION

Social inequality is considered one of the biggest problems in the world, affecting the majority of the Brazilian population, and constituting a present element, evident and often neglected in schools. However, in everyday school life, there is a diversity of subjects coming from different social classes, remaining at disadvantages with this equality. In this scenario, such inequalities affect mainly the most basic rights of an individual, such as access to school, health, work, housing, that is, rights to a better quality of life, restricting access to equal opportunities.

In this sense, social inequality is legitimized at school, an environment in which the less favored people are more disadvantaged because they do not have access to certain cultural capital, recognized as valued by the dominant, hegemonic class and owner of the gears that hierarchize knowledge. Social inequality reflects the unequal distribution of the economic capital of a given society, but also of other capitals, such as social, cultural, and symbolic[1]. Thus, it is up to the school institutions to critically

[1] Symbolic capital is a credit, it is the power attributed to those who have obtained enough recognition to be able to impose recognition: thus, the power of constitution, the power to make a new group, through mobilization, or to make it exist by

analyze to what extent they act as reproducers of social inequalities, or as transforming agents of this social context, linked to an unequal access of opportunities.

The interest in this subject arose after my insertion in the school environment in a short period in which I had the opportunity to teach in two schools, one in the city of São Bernardo, in the state of Maranhão, and another in the rural area of the same city. Moreover, my own school trajectory in a reflection of this context.

However, it is worth mentioning an experience similar to this research, in which I was part of a project of PIBID, a program of initiation to teaching, of the Federal University of Maranhão which I participated as a scholarship holder in the period from November 1, 2020 to April 30, 2022. This period was directed to a state school in São Bernardo in which we applied questionnaires to the students and finished with the production of a booklet[2] entitled "O racismo presente nas palavras e expressões no português Brasileiro" (Racism present in words and expressions in Brazilian Portuguese). During this period we were able to observe how the students of this school were, some of whom were from rural areas, and how social inequalities affected them during the pandemic period. We were also able to count on the contribution of the project's supervisor, Jaison Castro, who was able to tell us about the difficulties faced during the pandemic and especially the lack of infrastructure at the school when we returned to classes. As in this research, which was directed to municipal schools, they have common elements. At this point, it was possible to see that access to certain capitals guaranteed school success or failure - emphasizing that the point is not to present this relationship in a deterministic way, but that inequality is a determining factor in the lives of students.

Therefore, the schools[3] that I chose to contribute to my research are from the city of São Bernardo-MA, located in the Lower Parnaíba of Maranhão, which has approximately 28,825 people, according to data from 2021. The municipality has 84 years of political emancipation and has 43[4] municipal school units in general, divided between the headquarters and the rural area, with 14 schools located in the headquarters and 29 schools in the rural area located in several villages belonging to São Bernardo, and has 492[5] official teachers. The school chosen for this research is located in the city center and the school located in the rural area is 10 km away from the city where students are received from approximately 5 different localities in the rural school..

proxy, speaking for it as an authorized spokesman, can only be obtained at the end of a long process of institutionalization, at the end of which a mandatary is instituted, who receives from the group the power to make the group. (BOURDIEU, 2004, p. 166).

[2] https://drive.google.com/file/d/1cOU4I3C5nCnVZeR-_pH4ZYoeKwQ5xR4_/view?usp=sharing

[3] All names of schools, students, teachers and managers are fictitious

[4] Information collected at the Municipal Secretariat of Education Technological Sciences and Innovation, of São Bernardo -MA. Obtained through the supervisor Maria Ivana Costa Santos- SEMECTI sector.

[5] https://cidades.ibge.gov.br/brasil/ma/sao-bernardo/pesquisa/13/78117

The predominant religion is Catholic with approximately 82.99%[6] of the population practicing. And although the evangelicals have gained more and more strength with the expansion of the number of churches, they still add up to only 11.08% of this population. The city is full of religious events and festivities being located in a strategic point where it borders with Luzilândia, Magalhães de Almeida, and São Quitéria.

Given this diagnosis of social aspects, the intention of this research becomes relevant to discuss the process of reproduction of social inequalities. Thus, we started with some questions: Is the school concerned about its role in social transformation? Does it fight so that, through it, its agents become mitigators of this inequality that haunts us so much?

Social inequality daily affects thousands of students all over the country. From the analysis made through this research, we seek to understand the difficulties produced outside the school, but that end up being reinforced inside it. What is increasingly noticeable is that inequality is becoming an element present in everyday school life, especially in small towns, where we can find different social groups that live daily and go through the social inequality crisis, the pandemic propels us to a more attentive view of the already existing inequalities. In a post-pandemic context, that is, we are no longer in a pandemic, due to the decrease and spread of the virus that occurred after a large number of people took the vaccine against Covid-19, showing effectiveness in reducing and spreading the virus, in this sense we are already experiencing, currently the return of classroom classes that occurred in the first period of 2022, in this sense needs greater attention, prioritizing students and giving full attention, because a city like São Bernardo, located in the interior of the state of Maranhão, the difficulties will be evident, even more whose socioeconomic indicators point that:

> From the point of view of average monthly income, workers in São Bernardo receive around 1.5 minimum wages. The residences do not represent a guarantee of sanitary security for the families that live there, with only 11.1% of them having adequate sewage treatment. Regarding water supply, the service is partially offered by the Environmental Sanitation Company of Maranhão (CAEMA). In the urban area, 56% of the population has access to piped water. In the rural area, 47% of the population has adequate access to water through collective and individual wells, according to the Final Report of the Municipal Sanitation Plan and the Municipal Integrated Solid Waste Management Plan. In the situation in which we currently find ourselves, which imposes the need for new hygiene habits as a form of disease prevention, these data are symptomatic of how the consequences of inequalities encompass various aspects. (COLASANTE & PEREIRA, 2021, p. 207)

In this sense, it is necessary a reflection from the understanding and perception of social contexts in which students are inserted, so teachers, managers, i.e., all school staff plan their content and their performance against such an adverse scenario. It is a fact that each student is inserted in a different social space, and each space determines and enables each one to have a different lifestyle,

[6] https://www.estadosecidades.com.br/ma/sao-bernardo-ma_religioes.html

because according to Bourdieu (2004) the perception of the social world is the product of a double structuring that can present different lifestyles and unequal possibilities as he points out:

> Social space tends to function as a symbolic space, a space of lifestyles and status groups, characterized by different lifestyles. Thus, the perception of the social world is the product of a double structuring: on the objective side, it is socially structured because the properties attributed to agents and institutions present themselves in combinations with very unequal probabilities: just as animals with feathers are more likely to have wings than animals with fur, so those possessing a refined command of language are more likely to be seen in museums than those who are devoid of this mastery. (BOURDIEU, 2004, p. 160-161).

In fact, the social space in which we are inserted interferes in our knowledge and development at school. Throughout life, the social space is a determining factor for our knowledge and, consequently, to change the social reality and, obviously, education is an important and main fact in this trajectory of the individual, even if the school is an environment initiated by the bourgeoisie, it is still the only hope for a person to achieve their goals as citizens and professionals.

Therefore, this work makes a path showing and evidencing the results of the research with reports and graphics collected in the pandemic period.

2 MAPPING THE METHODOLOGICAL PATH

This research started with the elaboration of the project, and was carried out in two schools in São Bernardo, one located in the rural area and the other in the urban area. This research was done with students from 10 to 15 years old from different 5th grade and 7th grade classes, and was also directed to some teachers of the basic education system, using quantitative and qualitative methodology, with the application of semi-structured questionnaires. In the first moment of the research, a bibliographical survey was carried out in which I delved into and studied works that contributed theoretically to the analysis of the proposed theme and the enrichment of the same, such as: Pedagogy of the Oppressed, Pedagogy of Autonomy, Education Writings, among others. Works by authors such as Paulo Freire, Bourdieu, and Passeron, among others. A second step was the search for the places where the field research would be carried out, and so we proceeded to the qualitative and quantitative research stage. Qualitative research according to Silveira and Córdova is characterized by:

> [...] Objectivation of the phenomenon; hierarchization of the actions of describing, understanding, explaining, precision of the relations between the global and the local in a given phenomenon; observance of the differences between the social world and the natural world; respect for the interactive character between the objectives sought by the researchers, their theoretical orientations, and their empirical data; search for results that are as reliable as possible; opposition to the assumption that defends a single research model for all sciences. (SILVEIRA E CÓRDOVA,2009, p. 32).

In this research, we seek to understand the social factors related to the reproduction of social inequality in the school environment. In doing so, through the reality experienced, to which I dedicated myself to the major objective of obtaining information and understanding the effects of the pandemic in the schools of São Bernardo/MA, obtaining information to guide actions that aim to understand and describe practices intertwined with the processes of vulnerability and precariousness, results of social inequality, put as results of this research.

The lack of expectation as to the possibilities of social mobility from education was an element to be mapped in order to measure to what extent this lack directly affects school dropout and success, creating a vicious circle between family generations inserted in processes of social exclusion.

In the third moment, with the choice of the base schools of this research, I started to present the theme to the principals of the schools in which the research was applied. First, I contacted the management of the Municipal School José de Farias, and the contact, because of the pandemic, was 100% online, using social networking applications to contact the direction and several teachers of this school. However, I had the help of a niece who studies at this rural school, who maintained a link between me and the school's teachers.

In a first stage, the research focused on interviewed teachers from the rural and urban public schools in São Bernardo. In this way, we sought to understand the role of the school in relation to social inequality and if it really achieves its objectives or still reproduces the dynamics of social inequality.

The research was carried out through questionnaires, sent to students and teachers of the schools, conversations and reports via WhatsApp and some visits to the school, following all the safety protocols established by the World Health Organization, because of the SARS-CoV2 pandemic[7].

The interviews with school teachers, already mentioned in these lines, were seen as crucial because, according to Lakatos and Marconi:

> The interview is an important working tool in various fields of social sciences or other sectors of activities such as Sociology, Anthropology, Social Psychology, Politics, Social Work, Journalism, Public Relations, Market Research and others (LAKATOS E MARCONI, 2003, p. 196).

The interviews through questionnaires and teachers' reports were central points in this research, and were conducted in a pandemic context, for the protection of the researcher and the interviewees, respecting the health security measures. Thus, these different moments aimed to evaluate how each

[7] SARS-CoV-2, also known as new coronavirus, is a strain identified in 2019 that unfortunately has some genetic characteristics that make it more transmissible and capable of causing more severe clinical pictures.

actor inserted in this context was affected and organized themselves to develop strategies to face the health crisis, while maintaining their teaching and learning activities.

The research had some difficulties, because during the field research it was necessary to move from a school that had already been chosen as a research field, due to problems related to the pandemic scenario. At this moment I could not be in this school due to the high rate of Covid-19 cases. In this scenario, I talked to the teacher who would help me in the research and suggested that she could put me in the online classes or in the groups with the students to explain the questionnaires that would be sent to them, the teacher agreed, but shortly after the teacher told me that I would have to talk to parents in person at the school on the day of the delivery of the activities. I did not feel safe and I found myself in a moment of isolation for fear of Covid-19, so I ended up directing the research to another school.

One of the great challenges of the school at the headquarters was the receipt of questionnaires from students who, when distracted, the teacher of the chosen class ended up returning the same along with the activities he received for correction, even though he was already aware of the research, which made this return difficult. Thus, it was necessary to send the questionnaires together with the students' activities, and we had to wait, remembering that, as Gil points out, in quantitative research there are also problems in receiving the data:

> It is impossible to deny that the social scientist deals with variables that are difficult to quantify. It is also difficult to disagree with the claim that the great progress of a science can be determined by the precision of its measuring instruments. However, the problem of quantification in the social sciences, if analyzed with the proper depth, will prove to be far less critical than it appears. (GIL, 2008, p.23)

It is impossible for us researchers to remain totally alien to what we research, since we are immersed in many social issues, issues that we are directly involved in on a daily basis. In reality, what we have to understand is that even if we are directly involved, we have to pay attention to what we want to bring to our reader, because according to Gil:

> Faced with social facts, the researcher is not capable of being absolutely objective. He has his preferences, inclinations, particular interests, whims, prejudices, is interested in them and evaluates them based on a personal value system. Unlike the researcher who works in the world of physical things - who is not naturally involved with the object of his study - the social scientist, when dealing with facts such as criminality, social discrimination or school dropout, is dealing with a reality that may not be alien to him. His values and personal beliefs previously inform him about the phenomenon, indicating whether it is good or bad, fair or unfair. (GIL, 2008, p. 24).

However, in a research, when we choose our object of study, it consists in being directly involved in the theme or by the curiosity that mobilizes us to want to study them, even to try to understand a certain research context and the subjects inserted. Especially in the rural area school, Escola Jose de Farias, where I got part of my school trajectory in which at the first moment I had a

conversation with the principal, presented the research proposal and was available to talk to teachers and students where I had a great return on the questionnaires that were sent to students in June 2021, having a better return in a class of 23 7th grade students, because I received 20 of the questionnaires sent, already in the class of 5th grade received only 7 questionnaires from a class of 20 students from the rural area already in the urban area class of 20 years I received 10 questionnaires answered, however this school has some problems causing the sending of these questionnaires twice which may have caused the receipt of these questionnaires this is a likely hypothesis.

At this school it was possible to watch some classes online, which allowed me to understand more about the dynamics of the school's activities. In this same school, the teachers were very receptive to answer my questions through the questionnaires and WhatsApp conversations, unlike the school in the urban area where I had some problems regarding the return of the questionnaires from both students and teachers. I don't know if it was due to the stress of the moment, to the accumulation of activities during the pandemic, but in Escola Maria do Rosário the return of the questionnaires was lower than expected. In a class of 20 students the return was of 10 students, a 5th grade class. However, it is worth mentioning that living in the city of this school made it easier to gather some information..

Despite the pandemic, it was possible to conduct the research with the support of questionnaires and social networks, having access to informal conversations with some teachers, where I could discuss all the challenges of this period, as well as the numerous difficulties faced during school activities.

This research is extremely relevant, because researching something that involves education goes beyond our expectations. Thinking about the educational system contributed for us to focus not only on the data, but also on the works of authors who deal with the theme in order to enrich this work. Therefore, the research brought us a range of opportunities; at the same time that we tried to provide the reader with relevant work, we also learned more and more from the research. As Freire points out:

> There is no teaching without research and research without teaching. These what-ifs meet in each other's bodies. While I am teaching, continuously, searching, seeking. I teach because I search, because I inquire, because I inquire and inquire myself. I research to verify, verifying, I intervene, intervening I educate and educate myself. I research to know what I do not yet know and to communicate or announce what is new. (FREIRE, 1996, p.14)

Therefore, research becomes increasingly important, because through it we learn and teach a lot, because everything we find in the research we try to pass on to the reader, that is, to communicate the novelty, as Paulo Freire pointed out. This is the proposal of this research, to bring to the readers the whole process and difficulties in teaching during the pandemic, starting from two schools in different contexts, with data collection both among teachers and students. This way, we can get a better idea of what happened in education during the pandemic period.

3 EDUCATION AND SOCIAL INEQUALITY IN BRAZIL

Social inequalities in Brazil continue to be a major problem that we have to face daily, since it is the reality of millions of Brazilians, and with the current crisis caused by the pandemic, it generates numerous uncertainties and directly impacts people with greater social vulnerabilities. The inequality that is already deep-rooted in Brazil has taken on greater proportions caused by the crisis; this social abyss in which we find ourselves starts when the poor distribution of income, which directly impacts education, causes educational inequality. It is evident that those who have a higher concentration of income have greater access and success in education, because they have greater advantages and access to elements that contribute to their learning, that is, the individual with higher concentration of income has access to the cultural capital that is more valued at school because it provides them with certain advantages. But what would be the cultural capital is a set of knowledge or skills acquired in the social environment that we are inserted, Bourdieu uses this concept to class analysis in society, ie, uses to understand how culture reflects in the living conditions of the student, in school success and society in general, and how this is reflected in social inequalities.

> "The notion of cultural capital imposes itself first of all as an indispensable hypothesis to account for inequality in the school performance of children coming from different social classes, by relating the "school success", that is, the specific benefits that children from different classes and class fractions can obtain in the school market, to the distribution of cultural capital among classes and class fractions. Bourdieu (2015, p. 81).

This concept of cultural capital is extremely important because it shows us the size of social inequalities and how they act in the process of maintaining them, and from this it determines the success of a student in the school environment

The school serves either to reduce or reproduce social inequality, but this is not the role we expect from it. However, certain issues such as distinctions, differences, and inequalities end up happening inside these institutions. In this sense, the school also separates and classifies individuals, as the following points out:

> It was in charge of separating the subjects - making those who entered it distinct from others, those who did not have access to it. It also divided, internally, those who were there, through multiple mechanisms of classification, ordering, hierarchization. (LOURO, 1997, p. 57)

The school also serves to separate different subjects from each other, to dictate rules and behaviors consciously or unconsciously. Besides playing a very important role, we can't forget to highlight that it is through school that the student has the chance to change his reality, becoming a critical citizen, but we must also be alert to the power that school exercises over the individual, because according to Louro:

> The school delimits spaces. Using symbols and codes, it states what each one can (or cannot) do, it separates and establishes. It informs the "place" of the little ones and the big ones, of boys and girls. Through its paintings, crucifixes, saints or sculptures, it points out those who should be models and also allows the subjects to recognize themselves (or not) in these models. (LOURO, 1997, p. 58)

Certainly, the school is welcoming and starts to have a role of reducing inequality extremely important in the individual's life, but unconsciously it also reproduces it due to its genesis. As Louro (1997) points out, school delimits spaces, separates individuals according to their differences and classes, because school is a result of the bourgeoisie and there are remnants of the initial role of the school focused on a certain class, although it has changed, because today school is aimed at everyone.

The important role that the school plays in the lives of individuals is primarily one of social development, but it goes much further. Therefore, the need for community participation in the role of knowing the school environment is extremely important to have a sense of its real role in the lives of students and the community in general.

3.1 THE IMPACT OF THE PANDEMIC ON THE REPRODUCTION OF INEQUALITIES

The year 2020 was marked by the appearance of the first case of infection by the COVID-19 virus in Brazil, and the calamitous situation of a pandemic with worldwide consequences. According to the WHO, COVID-19 is an infectious disease caused by the SARS-CoV-2[8] The year 2020 was marked by the appearance of the first case of infection by the COVID-19 virus in Brazil, and the calamitous situation of a pandemic with worldwide consequences. According to the WHO, COVID-19 is an infectious disease caused by the SARS-CoV-2 coronavirus and has the following symptoms: fever, tiredness, and dry cough, loss of taste or smell, nasal congestion, conjunctivitis, sore throat, headache, diarrhea, chills, or dizziness may also occur. In Brazil, the spread of this virus has caused schools to close their doors, as well as other educational institutions (universities and educational institutes, for example). In this alarming scenario, institutions had to adapt, migrating to a remote teaching modality, following the norms of municipal and state decrees. Thus, through a decree: "Provides for the replacement of classroom classes by classes in digital media, for the duration of the pandemic situation of the new Coronavirus - Covid-19, and revokes the MEC Ordinances No. 343 of March 17, 2020, No. 345 of March 19, 2020, and No. 473 of May 12, 2020. In view of this, a new organization of the school calendar was necessary, in which it was necessary to establish new

[8]Information taken from the website: https://www.paho.org/pt/covid19#:~:text=A%20COVID%2D19%20%C3%A9%20uma,febre%2C%20cansa%C3%A7o%20e%20tosse%20seca.acesso in 06-10-2022.

procedures to think about how the classes would be adopted, which until that moment were stopped, seeking to minimize possible damage to the students.

However, the challenges had just begun, because the new model that would have to be implemented, an emergency model, required investment and adaptation time from the educators. In addition, in order for it to be successful, the students would have to have access to technological means to avoid possible damage and obtain a higher performance. Unfortunately, not all students have access to the Internet, which makes the teachers' work even more difficult.

As research shows, access to the world wide web by the Brazilian population is limited, being reduced to a small portion of the population. In addition, in Brazilian homes, there is a lack of access to certain electronic objects, such as computers, cell phones and tablets. With the worsening of the economic crisis, and the increase in unemployment among the population, access to these products has become even more difficult and precarious.

According to data from the Continuous National Household Sample Survey (PnaC), in 2019, the state of Maranhão had the 2nd lowest percentage of internet access, with 67.4‰ of households having access to the World Wide Web[9].

In light of this, the educational system has come to possess a fundamental role in the process of resistance to the reproduction of social inequalities, because schools exercise strategies that enable better conditions to advance in life, socially and economically. For this to happen, education professionals need to escape the risk of maintaining traditional teaching methodologies and of wanting only to deposit knowledge, that is, to treat the student as chests where totally passive knowledge is deposited, as Paulo Freire highlights with his concept of banking education. In it, the author points out that: "In this way, education becomes an act of depositing, in which the learners are the depositaries and the educator the depositor" (FREIRE, 1987, p. 33).

Even today, in the middle of the 21st century, this teaching model highlighted by Paulo Freire (1987) is still being reproduced, and in the face of what we are experiencing in this pandemic context, this teaching model has nothing to add to the students, especially to those who experience greater difficulties related to social inequalities, especially the inequality of access to the Internet.

If we compare students from urban areas with students from rural areas, we can see that the chances of students from rural areas or places far from the city to achieve academic success are much lower, and this work seeks to identify precisely these difficulties. Therefore, in order to map a range

[9] For more details, access the following report: https://g1.globo.com/ma/maranhao/noticia/2021/04/14/maranhao-tinha-o-2o-menor-percentual-de-domicilios-com-internet-do-pais-em-2019-diz-ibge.ghtml Accessed on November 06, 2021.

of factors that interfere with the dynamics of reproduction, we chose to conduct qualitative research, with the application of questionnaires, data tabulation and presentation.

One of the biggest problems in Brazil is social inequality and, with the Covid-19 pandemic, this only amplified this inequality even more, especially those who were already in greater vulnerability, including a large number of students - our main focus.

Social inequality makes us think and reflect about how great this inequality is and how much it distances people. Brazil is among the most unequal countries in the world. This fact is accentuated, especially in school benches and is directly linked to the economic issue. Thus, the lack of money intensifies disparities of access between social strata, affecting school success or failure. According to Bourdieu (2015), the school plays an important role in the process of reproduction of social inequality. The author points out that:

> It is probably due to an effect of cultural inertia that we continue to take the school system as a factor of social mobility, according to the ideology of the "liberating school", when on the contrary, everything tends to show that it is one of the most effective factors of social conservation, because it provides the appearance of legitimacy to social inequalities, sanctions the cultural heritage and the social gift treated as a natural gift (BOURDIEU, 2015, p. 45).

While it is preached that school serves to reduce social inequality, it also reproduces this inequality, legitimizing it through school failure. Therefore, if the student abandons the educational system and gets into precarious jobs, becomes underemployed, or, even if at the end of his school career he doesn't succeed, he becomes the main responsible for his failure in society, without being inserted in this unfavorable social context that contributes to the reproduction of inequalities.

Many times the school preaches one thing and its collaborators do another, often treating the students as mere "chests", as already mentioned and presented by Paulo Freire (1987) in his concept of banking education. The only action offered to the students is to receive knowledge, which for Paulo Freire causes a distortion in education:

> In the "banking" view of education, knowledge is a donation from those who think they are wise to those who think they know nothing. This donation is based on one of the instrumental manifestations of the ideology of oppression - the absolutization of ignorance, which constitutes what we call the alienation of ignorance, according to which it is always found in the other. (FREIRE, 1987, p. 33).

In this case, the students become oppressed, seen as mere objects by the teachers, who comes from social classes different from their own and has a superior cultural capital. Students who allow themselves to be oppressed, end up affected by practices that reproduce symbolic violence, seeing their traditional knowledge, linked to their origins, belittled and causing psychological damage, because symbolic violence occurs without the need for physical violence in an invisible way, most often in a soft way that is used as social processes for domination that can cause irreparable damage, that is,

moral and psychological damage to the individual. According to Bourdieu (2015) it is a process of coercion.

Students, when they arrive in schools, already bring with them cultural capitals observed by teachers or by members of their family, as a kind of natural, innate gift, when they are actually the result of socialization processes. The structuring social hierarchy of a society as unequal as ours legitimizes certain cultural capitals and devalues others. Given this, we can understand that everything will depend on the capital acquired by the individual, that is, the social capital.

> Social capital is the set of current or potential resources that are linked to the possession of a durable network of more or less institutionalized relations of inter-knowledge and inter-recognition or, in other terms, to the attachment to a group, as a set of agents that are not only endowed with common properties (that can be perceived by the observer, by others or by themselves), but are also united by permanent and useful links. (BOURDIEU, 2015, p. 75).

The individual's social capital directly impacts the success in his life trajectory, and this same social capital will depend on his relationships and even the economic and cultural capital acquired, and this, within the educational system determines even the student's performance regarding success or failure. Thus, as emphasized by:

> The notion of cultural capital imposes itself, first of all, as an indispensable hypothesis to account for the unequal school performance of children coming from different social classes, relating 'school success', that is, the specific benefits that children from different classes and class fractions can obtain in the school market, to the distribution of cultural capital among classes and class fractions. This starting point implies a break with the assumptions inherent in both the common view that considers school success or failure as an effect of 'natural' 'aptitudes' and in theories of 'human capital'. (BOURDIEU, 2015, p. 81):

The student inserted in a social context of lower strata of society will have less chances of acquiring a socially valued cultural capital, not acquiring a previous baggage of knowledge sufficient to have a school development considered successful. With this, he already enters school at a disadvantage and this can lead to school failure, besides the feeling of being in a place he doesn't belong. There is also the aggravating factor that he feels responsible for his own failure.

In this issue of the legitimacy of social inequality in the educational system, it is necessary to think about the improvement of public policies and improve teacher training, in order to provide better assistance at school to students who experience daily difficulties related to socioeconomic inequality. Thus, if we do not agree with the legitimization and even the reproduction of social inequality at school.

According to Bourdieu, "It is easy to agree, and perhaps even too easy, with all of the above. But to restrict oneself to this would mean abdicating from questioning the responsibility of the school in the perpetuation of social inequalities." (BOURDIEU 2015, p. 58). For a long time, the school has

been seen as assuming a role in the mitigation of social inequality, and through it we expected education to guarantee equal opportunity for all individuals.

The competence we attribute to school is transformative and democratic, but, according to Bourdieu (2015), school is not neutral and ends up favoring the reproduction and dissemination of the dominant class ideology. At this point, it should be noted that we know that not all of us have the same cultural capital. This fact makes us vulnerable and disadvantaged at school, especially when it comes to school growth. About the cultural capital Bourdieu (2015) stresses the following:

> In reality, each family transmits to its children more indirectly than directly, a certain cultural capital and a certain ethos, a system of implicit and deeply internalized values, which contributes to define, among other things, attitudes toward cultural capital and the school institution. The cultural heritage, which differs, in two respects, according to social classes, is responsible for the initial difference of children from the school experience and, consequently, for the success rates (BOURDIEU, 2015, p. 46)

In fact, we all receive a certain cultural capital, but this is modified and enlarged when we have new experiences, get to know new cultures, go to places different from the usual ones (such as museums, theaters, cinemas, libraries, etc.), and all of this modifies the access we had to the cultural capitals of origin. Therefore, we realize that socioeconomic vulnerability, and the lack of private and public facilities that provide access to this cultural knowledge, affects the distribution of these cultural capitals. In view of this, we can think about how better public policies help more people to have access to equal opportunities.

Because of this, the school makes a distinction and privileges those who have a certain cultural capital, because it interconnects the school and has a fundamental role in the construction and formation of students. What ends up selecting privileged students, since, generally, the person who has access to the greatest cultural capital also has economic and social capital. According to Bourdieu (2015), this causes a disadvantage to the most disadvantaged.

> In fact, in order to favor the advantaged and disadvantage the disadvantaged, it is necessary and sufficient that the school ignore, within the contents of the teaching it transmits, the methods and techniques of transmission and the criteria for evaluation, the cultural inequalities between children of different social classes. In other words, by treating all students, however unequal they may in fact be, as equal in rights and duties, the school system is led to give its sanction to the initial inequalities before the culture (BOURDIEU, 2015, p. 59).

Therefore, the need to guarantee the right to all, regardless of social class. In this sense, it becomes necessary more and more investments in teacher training, because knowing that social inequalities, especially the socioeconomic one, interfere directly in the school performance of most affected students, and even with numerous changes over the years in the advances regarding education, the school can and should be an agent of transformation in the student's life.

According to the Federal Constitution of 1988: "Art. 205. Education, a right of all and duty of the State and of the family, will be promoted and fostered with the cooperation of society, aiming at the full development of the person, his preparation for the exercise of citizenship, and his qualification for work. But is this right really being put into practice, guaranteeing a quality education for all? Next comes the article that deals with education: "Art. 206. Education will be provided based on the following principles: I - equality of conditions for access and permanence in school." In other words, equal conditions for all. However, on a daily basis, what we are seeing are the inequalities leveraging more and more. The reality is that not everyone has the same equality of conditions for staying in school, so much so that a large number of school dropouts end up happening. What happens is that many times the student cannot keep up with his classmates and ends up giving up his school career.

3.2 CHALLENGES OF EDUCATION FOR RURAL AND URBAN STUDENTS IN THE MIDST OF THE PANDEMIC.

The teachers, when asked about the challenges faced by students in rural areas during the pandemic, pointed out that they already experienced numerous difficulties in the educational system in these locations due to the lack of infrastructure of the schools are not the same as those in the headquarters. Most of them live a different reality than the students in the urban area, a reality that often limits the displacement of these students to other environments, bad roads are one of the biggest problems, making it impossible to have contact with cultural capitals concentrated in central regions of the state and country. In fact, when we travel to other locations and cities, we acquire certain knowledge.

The school in the rural area where I conducted the research serves students from several nearby villages, each one with its own realities, which makes the distribution and application of the activities even more difficult. Among the difficulties of these students is the lack of a good internet connection or the nonexistence of one, which makes the teacher's work unfeasible, since the remote classes were mediated by the use of the World Wide Web and by applications accessed through it, In relation to the urban area, this internet issue was more feasible since the internet situation was better than in the rural areas. However, the school secretary in the urban area reported that one of the biggest difficulties was the delivery of the activities that many parents would not pick up at school, so they had to go to them to deliver the activities.

Some teachers chose to give classes on *Google Meet* and *Zoom*, however, with the existing difficulties, not everyone could access the classes due to lack of internet access. As we have already mentioned, not all students have the necessary technological equipment to watch the online classes. In one of teacher Luzia's reports, she pointed out that the difficulties were several, pointing out that:

> The difficulties at the beginning of the pandemic were greater, and several, one of them was in the development of activities because a diagnosis of the students had not yet been made, difficulty in knowing the applications to use in video editing and when it was found there was still the technical issue of having to learn how to handle them and the issue of textbook activities, because there were activities that were not proposed for the classroom, and the issue of evaluation was difficult, because it is not really known if these students were the ones who did their activities, because there was no such control. Despite creating groups on WhatsApp, many students did not do the activities, because they were asked to put the activities in the group, which often did not happen. (Interviews with Teacher on 12/07/2021, through WhatsApp)

Despite the numerous difficulties listed by teacher Luzia, she emphasized that in 2021 the classes were calmer and more profitable than the previous year, since the students were able to have a certain notion and had accumulated experiences from the previous year.

The teachers' speeches point out that schools in general, located in the headquarters of São Bernardo or that are part of this municipality, face similar problems, but the inequalities of students coming from rural areas became more evident in this pandemic context, since the conditions of these schools are more precarious and the lives of these students are conducted in a different way. The alternatives found were, right at the beginning of the pandemic, in June 2020, to start with the remote classes, setting up an activity schedule, in which parents or guardians would go to school to pick up these activities and return them on the date set by the teacher for correction. All the information passed on to them was through WhatsApp groups. With this, another big problem arises: who would help these students that don't have internet and many times no technological devices? As many of these parents had no way to help their children with the activities, they had to resort to other alternatives. As a 5th grade student from a rural area reports.

> I didn't have online classes, there is only a WhatsApp group to ask possible questions and it is very difficult, because my mother has little education, can't see well and had no way to help me, having to resort to my aunt, and as I didn't have a cell phone, at first, my sister who lives in São Luís was the one who got all the information, because she was in the WhatsApp group and passed on all the information about the delivery and receipt of activity. (Interview with a student at home on 09/10/2021)

She emphasizes that the most difficult thing was not having online classes, like other colleagues from the same school. It can be noticed that even though there were several applications that helped in online classes during the pandemic, some teachers, for some reason, stopped using them and only used *WhatsApp* groups for information or doubts, which the student often ended up not solving.

However, I noticed differences in the planning and execution of activities during the pandemic, during this research I realized that in the same school the activities were different, while some teachers preferred to teach via *Google Meet*, others chose only to use *WhatsApp* to answer questions, which ended up affecting some students, especially since they hardly ever answered questions, either because

of shyness or lack of internet. According to the 7th grade student, the average class lasted half an hour, with the participation of at most 10 students from a class of 23 students who hardly participated, which resulted in a class without interaction (Interview with student at home 01/10/2021).

The challenges are greater in schools that already have an IDEB[10] below desirable levels, which is the case of this school in the rural area. With an IDEB of 4.5 in 2019, the goal was 4.9 and they failed to achieve it, remaining in an alert situation. With the pandemic, most likely, the likelihood of the situation gets even worse. In this period, for every 100 students in this school, 11 did not pass. Thus, this school needs to improve and reach the expected score of 6.0. However, it becomes more difficult with the reduced communication and interaction difficulties during the pandemic period.

In this emergency teaching process, in a way, this evaluation process of the students becomes more complicated, since the students do not have control of who is actually doing these activities. In one report, teacher Mario points out that the evaluation process is more complicated, but that it occurred through the receipt of the activity notebooks:

> The main form of evaluation was the receipt of the activity booklet, which initially happened every 15 days, then became one per month, but there is no way to make a faithful evaluation. We also evaluate the participation in on-line classes and the correct frequency of delivery of the activities is also very important (Interviewed teacher on 13/10/2021, through WhatsApp).

This evaluation process is very complicated, the activities have to be well elaborated, once the teacher has no control over the activities sent home, the teaching and evaluation process is crucial to measure the student's learning, becoming fragmented:

> Evaluation, as a diagnostic act, aims at inclusion and not exclusion; inclusion and not selection (which necessarily leads to exclusion). The diagnosis aims to evaluate things, acts, situations, people, with the purpose of making decisions in order to create conditions to obtain greater satisfaction from what is being sought or built. (LUCKESI, 2012, p. 162- 163)

In this construction of knowledge, the evaluation process receives numerous criticisms, especially with the application of tests, but they are necessary. According to Luckesi: "The current practice of school evaluation stipulated as the function of the act of evaluating the classification and not the diagnosis, as it should be constitutively" (LUCKESI, 2012, p.34). In a way, during the pandemic, this resource became little viable and reliable, because according to Luckesi:

> The school practice usually referred to as assessment of learning has little to do with evaluation. It consists much more of tests/exams than evaluation. Tests/exams have the purpose, in the case of school learning, to verify the level of performance of the learner in a certain content (content being understood as the set of information, motor skills, mental skills, convictions, creativity, etc.) and classify them in terms of pass/fail (for this purpose, we can use various levels, such as: superior, upper-middle, middle, lower-middle, inferior, no

[10]https://qedu.org.br/cidade/5295-sao-bernardo/ideb/ideb-porscolas?dependence=3&grade=1&edition=2019.

performance; or grades ranging from 0 to 10, or something similar). (LUCKESI, 2012, p. 168-169)

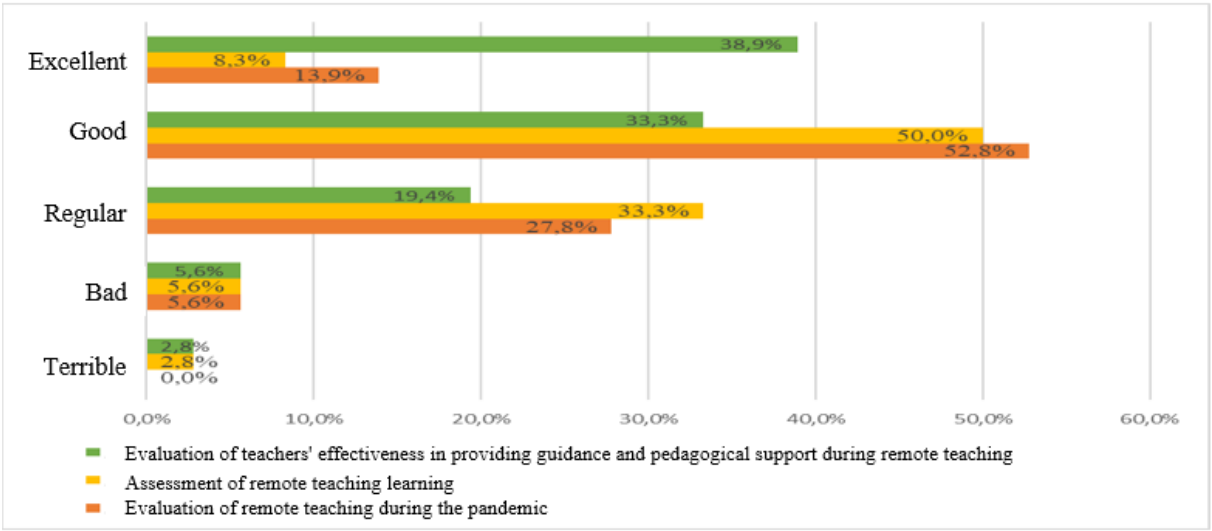
In a certain way, the evaluation process is based on the performance and success in the evaluation, the so-called tests, which disadvantages those who have difficulties, reproducing social inequalities. However, this evaluation process is given equally to all students, so it ends up being an unequal process, since in these school institutions there is a diversity of subjects.

4 ANALYSIS AND RESULTS

The following data are results from the questionnaires sent to students and teachers and data collection through WhatsApp. Below, it is presented data from this research through graphs according to the data collection that was conducted in two schools in São Bernardo-MA.

The first graph refers to three questions directed to the students, how they evaluated the effectiveness of the teachers in the orientation and pedagogical support during the remote teaching, in which the majority answered excellent, and the second refers to the student's own learning in which they answered good, and the third consists of how they evaluated the remote teaching during the pandemic, in which, in general, the majority highlighted as good as shown in graph 1, below.

Graph 1.



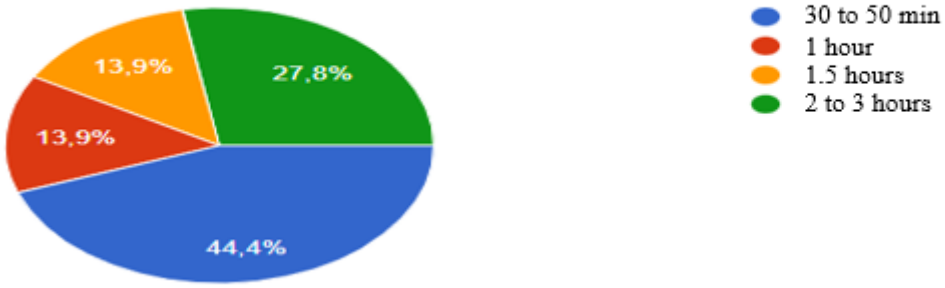
The devices and materials that were used during the pandemic were multiple. Although many students did not yet have cell phones, they used their parents' or a close relative's cell phone to obtain information or connect to online classes. See Chart 2 below for devices used during online classes during the pandemic period.

Graph 2.

Despite the variety of devices, the graph shows that the most used device was the cell phone. Despite this, a small portion of students said they did not have any device or had not taken an online class, a fact that is worrisome, since the classes functioned during the pandemic virtually.

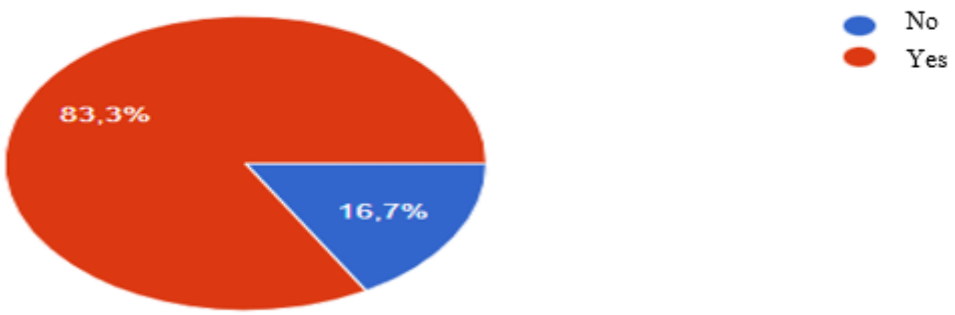
The duration of the online classes varied according to the application the teacher was using, and the availability of the internet, but most of the time it was 30 to 50 minutes, because it is difficult to keep the students' attention in virtual classes for a long time, as shown in graph 3.

Graph 3.



When asked if the school provided the necessary resources for learning at home, i.e., for remote classes, most students, as shown in the next graph, answered yes, causing a divergence in the answers of the teachers who answered that they did not get any help regarding resources for this teaching model, during the pandemic period. As pointed out earlier in the text, according to the teachers, they had to reinvent themselves with their own resources, however, when the students were asked if the school provided the necessary resources for learning at home came a surprise, because most of them answered yes, as shown in graph 4.

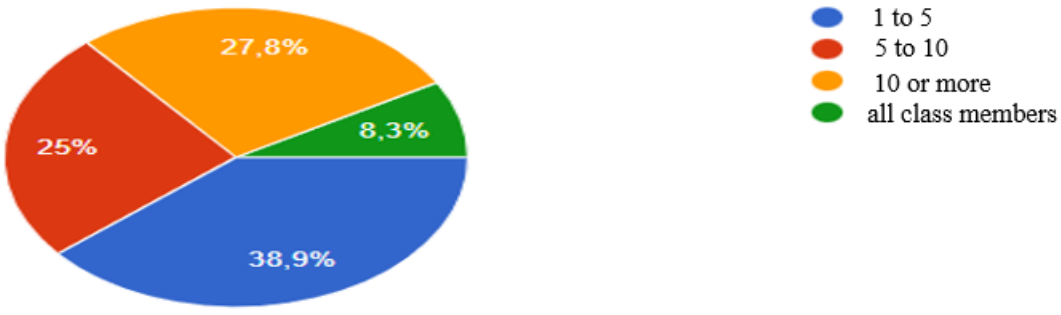
Graph 4.



However, one of the biggest problems for the teachers was precisely to get the attention of the students and get a significant number of them in online classes, also because of the internet, which was of poor quality or even nonexistent. What affected them the most in this period of online classes was the issue of internet crashes and instability.

During this research, I was able to watch some online classes referring to the schools in this research and I could see that the number of students was very low due to the lack of connectivity, or poor quality internet. Therefore, most of the time the number of students was lower than expected, as shown in graph 5. Most of the time, the number was 1 to 5 students, according to the students themselves.

Graph 5.



We asked the teachers what was the biggest challenge they faced in their profession in the face of the pandemic scenario they were experiencing? According to Rosa, a teacher with a degree in literature, who has been in education for 15 years, she stressed that: one of the legacies that the

pandemic left for education is the increased inequality in learning levels among students, since some did not adapt to distance learning and others did not even have access to the Internet.

For the lack of internet was a relevant factor in the teaching model adopted in the pandemic period, causing the absence of many students during online classes, according to teacher Rosa, even more in rural areas, education in rural areas still has much to develop, especially in this period of pandemic, rural schools are usually composed of only classroom without internet and without a good structure (Response obtained through the questionnaires on 20 /12 /2021).

This section is extremely relevant to situate the reader in the analysis of some results, showing some elements of the data collection, through the questionnaires resulting in graphics for a better understanding. Although this work was conducted in two schools with different contexts, according to the perception of the teachers, the schools have similar structures, what changes is the context of life of the students in which most of the contributors to this research reside in the rural area of São Bernardo, where access to the internet is the main point of difference between them, and access to certain cultural capital is more restricted because of the rural areas in which they reside, making it difficult to access other cities and consequently other cultural knowledge.

5 FINAL CONSIDERATIONS

The realization of this research made it possible to understand and carry out the various steps of a research, starting with the programming, i.e., the realization of the project that is the starting point of the research, and then through literature reading referring to the proposed theme and field research, made following a model questionnaire for students and teachers, and conversations via WhatsApp with teachers. In this research, there were several challenges, from the availability of the schools where I did the research to data collection. However, it was very important for us to understand how the educational system was structured during the pandemic period.

In this sense, this research propelled me to a new look in this research and learning process, while we have to keep our distance so that our common sense opinion does not influence, it is impossible not to get involved directly or indirectly, even because when we choose the theme of a research it starts from a certain interest, thus, there is an involvement of the researcher with the proposed theme, but we need to keep our distance as a researcher without putting our own opinions, that is, using the criticism.

Despite some difficulties during this research, especially because it started during the most critical period of the pandemic, when teachers were still adapting to the new teaching model, some difficulties were presented, such as the return of the questionnaires, but it ended up working out and we were able to have the dimension of teaching in this period of the pandemic. Based on this research,

we can get to know more about what was really happening in the educational system, and we can see the importance that the teacher has in society, because the teacher has the role and character of forming critical and intellectual individuals, but a more attentive look at the differences between their students is needed so that everyone can have, in fact, an equal and fair education. In this sense, it also needs improvements in public policies in order to have better quality structures and technological devices in schools.

In this research period we can see the teachers' difficulties in handling the technological devices and in the evaluation process, while the students' biggest difficulty was the access to a quality internet and the access to technological devices, even with all the difficulties the remote format classes were the best option at the moment. In this sense, according to the teachers, the main difference between rural and urban schools was the access to the internet, where rural areas were more difficult, and many times even non-existent, which ended up affecting the students' performance.

Therefore, despite the existing inequalities, education is the legitimate means for the transformation of the individual's social life, because it goes beyond a simple knowledge, education is a primordial phenomenon for the formation as a critical citizen, because it allows the individual to grow and rise professionally and intellectually, contributing to the transformation of a more just and egalitarian society in fact, despite the contexts that we experience social inequality, we must every day fight for a fair and quality education for all..

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CHAPTER
18

Impact of nutritional status on the emergence of coronary obstructive diseases: Integrative review

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ABSTRACT
Introduction: The change in the nutritional profile of the Brazilian population brought about by changes in the structure of the diet of individuals, which correlates with economic, social, demographic and health-related changes, has led to the worsening of nutritional problems, since the state of malnutrition to obesity, which corroborates the increase in non-transmissible chronic diseases. Objective: To describe the effect of nutritional status on the occurrence of coronary artery disease. Methodology: integrative review, carried out through a bibliographic survey, in July and August 2022, in the Virtual Health Library (VHL), Scientific Electronic Library Online (SciELO), ScienceDirect, Scopus (Elsevier), U.S. National Library of Medicine National Institute of Health (PubMED) and Web of Science, with the Health Science Descriptors (DeCS) and their correspondents in Spanish and Portuguese: "Coronary Stenosis", "Coronary Disease", "Coronary Artery Disease", "Coronary Occlusion" and "Nutritional Status", for crossing the DeCS, the Boolean operators "OR" and "AND" were used. With regard to ethical aspects, all authors of the articles were respected. Results: 433 potentially eligible publications were identified, of which 13 were selected. These came from nine different nationalities. Of which 23.07% were published in the year 2021. Regarding the level of evidence of the studies, most (53.84%) were level III. Conclusion: In relation to this work, it was shown that the low intake of proteins, fibers, vitamins, minerals and high intake of carbohydrates and fats were associated with the increase and severity of CAD. Thus, the most prudent and scientifically viable thing is for the general population to consume a balanced diet rich in antioxidants from fresh fruits, vegetables and whole grains.

Keywords: Nutritional status, cardiovascular diseases, food, diet and nutrition.

1 INTODUCTION

Cardiovascular diseases (CVD) are the main cause of death in the world population, and more people die from this disease than from any other cause. It is estimated that 17.9 million people died from cardiovascular diseases in 2019, which represented 32% of all deaths globally (WHO, 2021).

In Brazil, the largest country in terms of territory in Latin America and the fifth largest in the world, with a population of approximately 214 million people, CVDs also represented the number one cause of death, and among these, coronary artery disease (CAD) was the main cause of death between 1990 and 2019 (IBGE, 2022; OLIVEIRA et al., 2022). It is estimated that the prevalence of CAD is 6.1% in the Brazilian population, increasing since 1990 due to population growth and aging (OLIVEIRA et al., 2022).

It is pointed out that the number of patients with CAD, including acute myocardial infarction, stable angina and ischemic heart failure, increased by 3.52 million in a period of 29 years (1990-2019).

In a similar period, the crude prevalence of CAD increased by 0.86%, from 0.99% in 1990 to 1.85% in 2019, representing 12% of deaths in Brazil in 2019, totaling 171,246 deaths in the country, the which represents 43% of all CVD deaths (OLIVEIRA et al., 2022).

The risk factors that contribute to the development of CVD can be classified as intrinsic or extrinsic to humans. Among the intrinsic factors, systemic arterial hypertension (SAH), diabetes mellitus (DM), obesity, sedentary lifestyle, dyslipidemia (DLSP), age, biological sex, genetic factors and family history can be mentioned. Among the extrinsic factors are environmental and behavioral factors such as smoking and alcohol consumption (MASSAROLI et al., 2018; SILVA et al., 2018).

The change in the nutritional profile of the Brazilian population caused by changes in the structure of the diet of individuals, which correlates with economic, social, demographic and health-related changes (ABREU et al., 2001; LEE; LEE; JEON, 2020), led to to the worsening of nutritional problems, since they went from a state of malnutrition to a state of obesity, which corroborates the increase in chronic non-communicable diseases (NCDs) (FERREIRA et al, 2005; MEDEIROS et al., 2018).

The changes that occurred in eating habits, from the accelerated industrialization and the current state policies, affected the quality of food of the Brazilian population, since the variety of foods consumed is smaller, with less nutritional value and consequently worsens in the quality of the diet (OLIVEIRA et al. al., 2022)

The consumption of saturated fats is strongly associated with the occurrence of CAD, and sedentary lifestyle and overweight/obesity in contemporary society, due to unhealthy habits and the lipid composition of the diet, have a great contribution in this scenario of CVD (ABREU et al., 2001; LEE; LEE; JEON, 2020).

A balanced diet, with the presence of macro and micronutrients, in addition to being important for maintaining life and promoting health, is directly related to the nutritional status of individuals. An inversely proportional relationship is pointed out, where the less balanced the diet, the greater the risks of occurrence of CNCD, especially those of metabolic origin (SAMUEL et al., 2018).

In this context, it is highlighted that the main interventions in relation to CVD are clinical/surgical and nutritional/behavioral. Regarding the latter, which have slower results, attention is drawn to the contributions of the professional nutritionist, aiming at changes/improvements in the population's eating and living habits (SALAS-SALVADÓ et al., 2019; LEE; LEE; JEON, 2020).

The nutritionist's strategic role is to provide assistance to individuals/families/communities, undertaking actions ranging from health promotion to disease prevention, in relation to eating and behavioral habits (SALAS-SALVADÓ et al., 2019). For the proper assessment of patients, the nutritionist makes use of technical procedures, which aim to analyze the physical state of patients,

(LEE; LEE; JEON, 2020), with the aim of structuring interventions that minimize the impact caused by some diseases and maintain the nutritional status in good parameters from the nutritional intervention (SALAS-SALVADÓ et al., 2019; FELICE et al., 2020).

Nutrition is the science that studies the effect of food on the body in order to obtain the necessary knowledge to contribute to the health of the population, as it is known that food has the capacity to treat various diseases or provide their appearance, when considered. inadequate (CJR et al., 2017). Given this, this work proposes to describe the effect of nutritional status on the occurrence of CAD.

2 OBJECTIVES

2.1 MAIN GOAL

To describe the effect of nutritional status on the occurrence of CAD.

2.2 SPECIFIC OBJECTIVES

1. Identify the technical procedures used to assess the nutritional status of patients with CAD.
2. Outline how life habits and nutritional status impact the onset of CAD.
3. Explain the nutritionist's role in the prevention/treatment of CAD.
4. Demonstrate how dietary habits and supplements impact CAD.

3 METHODOLOGIES

3.1 NATURE OF STUDY

This is a qualitative, descriptive study, with an integrative literature review design. This method is intended to systematically analyze works on a given topic, previously published. It is noteworthy that the Integrative Review is characterized in a method that allows the synthesis of evidence from several studies on a given topic through a fragmented process in six stages, being, I) definition of the guiding question, II) search and selection of studies, III) observation of the main data, IV) evaluation of these studies, V) synthesis of results and VI) presentation of the post-analysis corpus (MENDES; SILVEIRA; GALVÃO, 2019).

3.2 SEARCH STRATEGY AND DATA COLLECTION

To guide the integrative review, the following question was formulated: “What is the effect of nutritional status on the occurrence of CAD?” The bibliographic survey was carried out in the following databases: Virtual Health Library (VHL), Scientific Electronic Library Online (SciELO),

ScienceDirect, Scopus (Elsevier), U.S. National Library of Medicine National Institute of Health (PubMED) and Web off Science, in the period of July and August 2022.

The PICOT strategy was used to delimit the integrative review (MENDES; SILVEIRA; GALVÃO, 2019). Being an acronym, representing in the present study: P) Population (adult individuals); I) Intervention (nutritional status); C) Comparison (not applicable); O) Outcome or results (occurrence of) and T) Time (studies published in the last decade 2012/2022).

The search was carried out interdependently by two researchers, using the controlled descriptors available in Descriptors in Health Science (DeCS) and their correspondents in Spanish and Portuguese from the Virtual Health Library: “Coronary Stenosis”, “Coronary Disease”, “coronary artery disease”, “Coronary Occlusion” and “Nutritional Status”, for crossing the DeCS, Boolean operators “OR” and “AND” were used. Thus, the search strategy used was: (“Coronary Stenosis” OR “Coronary Disease” OR “coronary artery disease” OR “Coronary Occlusion”) AND (“Nutritional Status”).

The Preferred Reporting Items for Systematic Reviews and Meta - Analyzes (PRISMA) guide was adapted for reporting this review (SARKIS-ONOFRE et al., 2021). For the characterization of the selected studies, an adapted data entry instrument was used, containing the following items: author, year, article title, country where the research was carried out, study objectives, method, sample, conclusion and level of evidence (GALVÃO, 2006).

The studies were selected by carefully reading the titles, abstracts and later the full articles. The defined inclusion criteria were similar scientific articles with the theme of this study, productions available in full, in Portuguese, English and Spanish, which dealt with the subject: impact of nutritional status on the onset of CAD. Articles that were repeated in the databases or that did not cover the main theme were not included in the analysis.

3.3 DATA ANALYSIS

Data analysis was done by reading the articles. The presentation of the results and discussion of the data obtained was done in a descriptive way, allowing the reader to assess the applicability of the integrative review prepared, in order to achieve the objective of this method.

3.4 ETHICAL ASPECTS

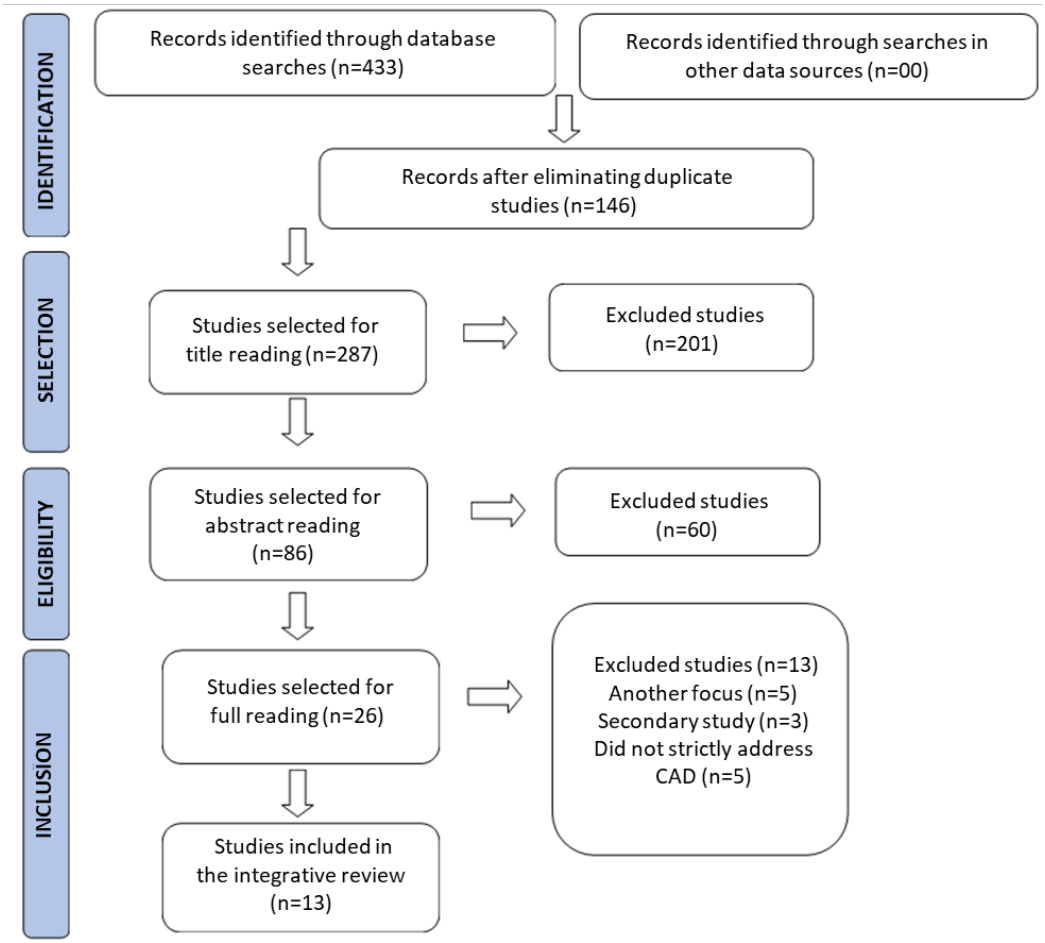
Literature reviews, as they are secondary studies, constructed with data already available in the public domain, do not need approval from the Research Ethics Committee.

4 RESULTS

In the search carried out in the databases, 433 potentially eligible publications were identified: VHL (n=4), SciELO (n=0), Science Direct (n=20), Scopus (n=172), Pub MED (n= 131) and Web of Science (n=106).

In an initial analysis by title, 146 articles were excluded because they were duplicated. Regarding the objective of the present study, 201 articles were excluded for not being related to the objective. The abstracts were then read, and after this, 60 publications were excluded for not addressing the subject under study in detail. Finally, 26 studies were read in full, of which 5 were excluded because they dealt with another disease/subject, 3 because they were secondary studies of an integrative or systematic review, and 5 because they addressed other diseases, and not strictly the DAC. Remaining 13 studies, which were selected to compose the sample of this review, as shown in Figure 1.

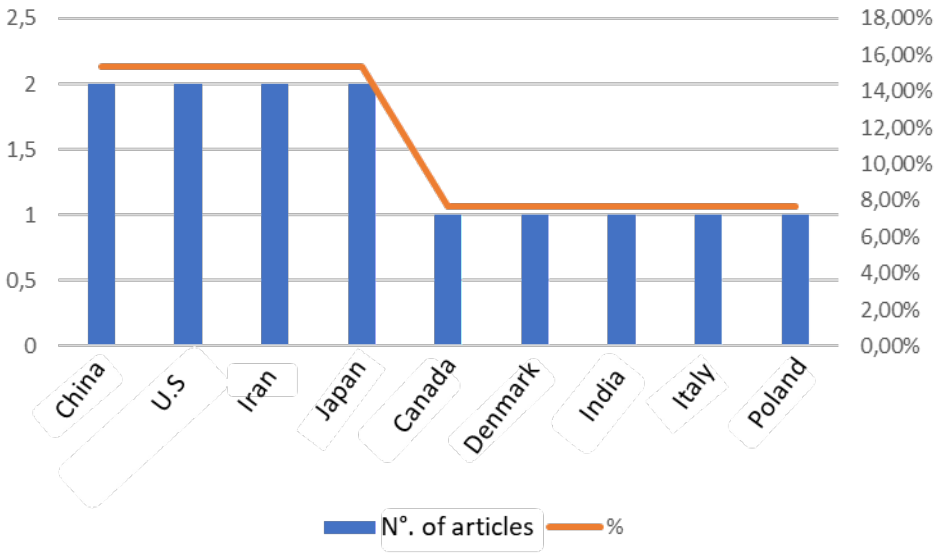
Figure 1: Flowchart of the strategy carried out for searching and including articles, according to the PRISMA model.



Regarding the year of publication of the studies, there were three (23.07%) studies published in the year 2021, two studies (15.4%) in each of the respective years 2014, 2016, 2017 and 2019. one article (7.7%) in the following years: 2015 and 2018.

Regarding the countries where the research was carried out, Figure 2 shows the origin of the countries where the studies come from.

Figure 2: Countries where the studies were carried out.



Regarding the level of evidence of the studies, seven (53.84%) studies are level III, three (23.07%) studies are level IV, two (15.4%) are level I and one (7 .7%) study is level V.

Table 1 presents the description of the characteristics analyzed in the 13 selected articles.

Table 1: Identification data of articles included in this review, 2022.

Author [Year]	**Title [Country]**	**Objective [Study type]**	**Conclusion [Sample]**	**NE***
GHANBARI et al. [2014]	Nutritional status and CAD: a cross-sectional study [Iran]	To study the nutritional status of patients with and without CAD [Transversal]	White mean and type of tea were the most important predictors of CAD. Dietary prevention strategies from childhood can prevent early CAD. [600 patients]	IV
VEDTOFTE et al. [2014]	Association between α-linolenic acid intake and risk of CAD [Denmark]	To investigate the association between ALA intake and risk of coronary heart disease in populations with different diets and across a wide range of ALA intakes. [Prospective Cohort]	There was a trend towards an inverse association between dietary ALA and CD risk among men, but it was not significant. No consistent associations were observed among women. The authors consider it to be the largest and most powerful study	III

			evaluating the association of ALA and CAD risk to date. Although there is no significant association, the authors suggest intake of food sources of ALA (eg canola oil, walnuts and flaxseeds) [229,043 patients]	
CHEN et al. [2015]	Effect of almond consumption on vascular function in patients with CAD: a randomized, controlled, crossover study [U.S]	To determine whether adding 85 g of almonds daily to a National Cholesterol Education Program (NCEP) Step 1 (ALM) diet for 6 weeks would improve vascular function and inflammation in patients with CAD. [Randomized, Controlled Clinical Trial]	This randomized, controlled, crossover study did not reveal a significant impact of adding 85 g/day of almonds to an NCEP Step 1 diet on foot-and-mouth disease and other measures of vascular reactivity. Adherence to the almond intervention was good, confirmed by an elevation of α-tocopherol level, and was associated with an improvement in diet quality reflected by increased intake of fiber, amino acids (especially arginine), the minerals calcium and magnesium, choline and proanthocyanins [45 usuários]	I
HUANG et al. [2016]	Nutritional status predicts all-cause death independent of comorbidities in geriatric patients with CAD [China]	Explore whether nutritional risk is associated with poor outcomes regardless of complicated clinical picture in elderly patients with CAD [Retrospective cohort]	Nutritional status is independently associated with the risk of death from all causes in geriatric patients with CAD. Whether nutritional support in appropriate patients [1772 patients]	III
MAHALLE et al. [2016]	Association of dietary factors with CAD severity [India]	To analyze the association of dietary factors with CAD severity in Indian patients. [Transversal]	Dietary factors are associated with CAD severity. Low intake of protein, fiber, vitamins, minerals and high intake of carbohydrates and fat were associated with increased CAD	IV

			severity. This association was independent of age, BMI, insulin resistance and inflammation, except for dietary fiber. [300 patients]	
MOGHADAM et al. [2017]	Nutritional factors and metabolic variables in relation to the risk of coronary heart disease: a case-control study in Armenian adults [Iran]	To evaluate the association between nutritional factors and CHD among Armenians in Yerevan [Prospective Cohort]	The intake of vitamins E, B6 and B12, folic acid, PUFA, MUFA and fiber seem to be predictors of CAD, regardless of other risk factors. [640 patients]	III
WADA et al. [2017]	Prognostic significance of nutritional status for cardiovascular outcome in patients with stable CAD [Japan]	To evaluate the prognostic value of malnutrition assessed by the CONUT score among patients with CAD undergoing elective percutaneous coronary intervention. [Retrospective cohort]	Nutritional status assessed by the CONUT score was significantly associated with long-term clinical outcomes in patients with CAD. Pre-PCI assessment of the CONUT score can provide useful prognostic information. [1,987 patients]	III
KOLARZYK et al. [2018]	Dietary intake of antioxidants and fats in the context of CAD prevention in the elderly [Poland]	Evaluate the estimation of the total antioxidant capacity of the food intake based on the Dietary Antioxidant Index (DAI), together with an evaluation of the contribution of certain food products in the DAI, and the evaluation of the consumption of all dietary fats and frequency of consumption of products which are a source of fat. [Transversal] When you put it transversal, you already understand that it is quantitative	Most seniors made mistakes in eating. The enrichment of natural antioxidants in the diet of the elderly and the normalization of their consumption of fats should become an important element in the primary and secondary prophylaxis of cardiovascular diseases. [143 patients]	IV

YEHLE et al. [2019]	A qualitative analysis of CAD patients' views on diet adherence and web- and mobile-based nutrition tools [U.S]	To examine the dietary challenges faced by patients with coronary heart disease, [Qualitative Description]	Web-based and mobile-based nutrition tools may be tools that CAD patients would value when making dietary choices and adhering to dietary recommendations, especially if additional resources are added to assist patients with changes. [20 patients and 7 informal caregivers]	V
FORMENTINI et al. [2019]	CAD and body mass index (BMI): what is the relationship? [Canada]	To verify the association between BMI and CAD severity, its risk factors and surgical and percutaneous treatment in patients admitted to cardiac units. [Prospective Cohort]	Obesity proved to be an independent risk factor for the early incidence of CAD, which is strongly associated with the presence of comorbidities such as DM, SAH and DLSP. [703 patients]	III
GIROLI, et al. [2021]	Effects of Mediterranean diet or low-fat diet on blood fatty acids in patients with CAD. A randomized intervention study [Italy]	To assess whether the Mediterranean diet, compared to a low-fat diet, favorably modifies the blood fatty acid profile in patients with CAD undergoing polytherapy. [Randomized Clinical Trial]	In polytherapy patients with CAD, both the Mediterranean diet and a low-fat diet alter the composition of blood fatty acids towards a healthier profile, with a more favorable effect of the Mediterranean diet on omega-3 levels. [130 patients]	I
WANG et al. [2021]	Malnutrition affects the cholesterol paradox in CAD: a Chinese cohort study of 41,229 [China]	To investigate the cholesterol paradox in patients with CAD and the effects of malnutrition. [Retrospective Cohort]	This study demonstrated that the cholesterol paradox existed in patients with CAD, but disappeared after accounting for the effects of malnutrition. [41,229 patients]	III
MARUYAMA et al. [2021]	Impact of nutritional index on long-term outcomes of	To evaluate the effectiveness of the nutritional index, Triglycerides × Total	The TCBI is a useful index for predicting long-term outcomes	III

	elderly patients with CAD: 5-year SHINANO registry subanalysis [Japan]	Cholesterol × Body Weight Index (TCBI) in elderly patients enrolled in the 5-year SHINANO registry [Prospective Cohort]	in elderly patients with CAD. [597 patients]	

* Evidence Level.

5 DISCUSSIONS

From the analyzed articles, it was found in relation to lifestyle habits that smoking, sedentary lifestyle, altered cholesterol, overweight, and SAH are directly linked to the onset and worsening of CAD (WADA et al., 2017; YEHLE et al., 2019; RIBEIRO et al., 2020; MARUYAMA et al., 2021; WANG et al., 2021).

Therefore, the importance of structuring and strengthening strategies that stimulate healthy lifestyles in the general population is highlighted. Since healthy lifestyle habits enable health promotion and disease prevention, including CAD (PRÉCOMA et al., 2019; PERES, 2022).

Regarding nutritional assessment in CAD, the literature is still scarce, and the clinical applicability of assessment instruments is still quite difficult, due to the complexity of most instruments/constructs used (MARUYAMA et al., 2021). Therefore, studies such as the present one is indispensable for grouping the literature and systematizing the "state of the art" regarding the subject.

The instruments/constructs cited for assessing nutritional status in the analyzed studies were: BMI (HUANG et al., 2016; FORMENTINI et al., 2019), Geriatric Nutritional Risk Index (GNRI) (HUANG et al., 2016), o Serum triglycerides (TG) (mg/dL) × serum total cholesterol (TC) (mg/dL) × body weight (BW) (kg) / 1000 (TCBI) (MARUYAMA et al., 2021), o Control Score of Nutritional Status (CONUT) (WADA et al., 2017), eating habits (YEHLE et al., 2019) and lipid levels measured in blood samples (WANG et al., 2021).

Regarding the applicability of the Body Mass Index (BMI), since it allows the use of both the patient's estimated weight and height, it is more feasible to use. And according to Formentini et al., (2019), both in adults and in the elderly, the increase in BMI is positively associated with the presence of DM, DLSP and SAH, that is, aggravating factors of CAD. However, the authors state that they did not find a direct association with the occurrence of CAD or its severity (FORMENTINI et al., 2019).

In turn, Huang et al., (2016) when conducting a cohort study for about six years in the city of Chengdu in China, analyzed nutritional status as a predictor of mortality in geriatric patients with CAD, and concluded that patients who had a higher nutritional risk, were smokers, were older (70 years or older) and had lower BMI (18.5 kg/m2 or less). This demonstrates the association of smoking, old age

and low weight/malnutrition with worse prognoses/outcomes in relation to CAD, as well as general mortality (RIBEIRO et al., 2020).

Thus, since BMI is related to height and body weight, it is relevant in the occurrence of CAD, but it is indicated that its association with CAD still needs to be better elucidated, especially with regard to which BMI value is most unfavorable for the occurrence of CAD. This, as a result of the BMI only making the ratio of weight to height. It does not correlate with life habits. This is even one of the criticisms made to the BMI. It does not distinguish whether the individual's weight has a high percentage of lean or fat mass. So, regardless of healthy habits, if the individual is active and sedentary, the BMI value will be the same (REZENDE, F. et al., 2007).

Aligned with the relevance of malnutrition in the outcome of CAD, Maruyama et al. (2021), in a study carried out in Nagano, Japan, with 1,665 consecutive patients undergoing percutaneous coronary intervention for CAD, found that a low TCBI index was an independent predictor of poor prognosis. Therefore, these findings reinforce the importance of nutritional monitoring, both to avoid overweight and to avoid malnutrition. In addition, the findings explain the importance of nutritional monitoring for the patient, so that he can maintain/reestablish his health globally (CUNHA, 2018).

In another study conducted by Wada et al. (2017) carried out in Tokyo, Japan, involving 1,987 patients with stable CAD undergoing percutaneous coronary intervention, used the Controlling Nutritional Status (CONUT) score, where the score is derived from serum albumin, total cholesterol and lymphocyte count values, to to evaluate the immunonutritional status of patients with stable CAD. It was observed that patients with a high CONUT score, that is, worse current disease condition, were significantly older, had a higher prevalence of SAH, lower levels of BMI, low-density lipoproteins (LDL-C), high-density lipoprotein -density (HDL-C) and triglycerides.

Wang et al. (2021) observed in a study carried out in Guangzhou, China, involving 41,229 patients aged over 18 years, of which 30,897 were male, that the “cholesterol paradox” occurs in CAD, that is, there is a paradoxical association of low levels of LDL-C with poor prognosis in patients with CAD. According to the authors, this is related to malnutrition, which was significantly higher in the group with low LDL-C concentration. The importance of having different forms of evaluation is evident, in order to avoid errors and unfavorable outcomes.

There is no consensus in the literature on the standard protocol regarding nutritional assessment in patients with CAD, therefore, each of the studies used in this review explains a direction for such an assessment. The lack of a standard protocol for assessing the nutritional status of patients with CAD means that each service applies what is most convenient for assessing the nutritional status of patients, which may imply empirical practices and cause harm to health. of the patient (CUNHA, 2018).

In this perspective, the importance of developing protocols related to nutritional assistance in patients with CAD, and of studies that validate and analyze these protocols, should be highlighted. This would contribute to advances in nutritional care in CAD, especially due to the fact that the analysis and monitoring of the nutritional level is an important clinical predictor (YEHLE et al., 2019; MARUYAMA et al., 2021; WANG et al., 2021).

It should be noted that most of the studies that make up this review evaluated the effects of supplementation and specific foods on the course of the disease, especially wine, coffee, herbal tea, legumes, vegetables, dairy products, fruits, meats and seafood. , nuts (GHANBARI et al., 2014; KOLARZYK et al., 2018; GIROLI et al., 2021), almonds (CHEN et al., 2015), oils, sauces and sweets (KOLARZYK et al., 2018), also the effect of macro and micronutrients was assessed (MAHALLE et al., 2016; MOGHADAM et al., 2017) and specifically alpha-linolenic acid (VEDTOFTE et al., 2014).

Ghanbari et al., (2014), pointed out in a cross-sectional study carried out in Tehran, Iran, involving 600 patients referred to a cardiology clinic with signs of acute coronary syndrome, that no significant difference was found between the groups studied in relation to the pattern of foods they consumed, emphasizing only that green tea constitutes a protective factor in CAD. It is noteworthy that it was well-marked by the authors as a limitation of the study, that its nature makes it impossible to determine direct causality (GHANBARI et al., 2014). Thus, the importance of studies with more robust methodologies, such as cohorts and clinical trials, is reinforced, being suggested as future possibilities for analyzing the effect of food on CAD.

Vedtofte et al. (2014) when conducting a study with a multicenter approach, led in Denmark, involving the United States, Finland, Sweden and other countries, with a population of 229,043 people aged 35 years or over (65% female), on diet style, and with the specific analysis of alpha-linolenic acid (essential acid from the Omega 3 group, which contains 18 carbons and three unsaturations). The authors found that increased consumption of alpha-linolenic acid is a protective factor for CAD in males. As for females, no association was found, the authors associate this with the fact that the female sample size was low. Thus, it is suggested that future studies build more robust methods with larger samples in the prevention/treatment of CAD.

Chen et al. (2015), in a study carried out in Boston in the United States with 45 patients with CAD, when evaluating the effects of almond consumption on the vascular function of patients with CAD in a clinical trial, pointed out gains, since almonds are rich in monounsaturated fat, fiber, α-tocopherol, copper and magnesium, and other nutrients that help modulate vascular function, which leads to beneficial actions on serum cholesterol, body weight, glucose homeostasis, inflammation and oxidative stress.

In other analyzed studies, low intake of protein, fiber, vitamins, minerals and high intake of carbohydrates and fat were associated with increased CAD severity (MAHALLE et al., 2016; MOGHADAM et al., 2017; KOLARZYK et al., 2018; GIROLI et al., 2021). In this perspective, Mahalle et al. (2016) through a study carried out in Pune, India, involving 300 patients with CAD, over 25 years old, signaled that this association is independent of age, BMI, insulin resistance and inflammatory factors.

Kolarzyk et al. (2018), through a study carried out in Kraków, Poland, with 143 people (73 women and 70 men) aged between 65 and 80 healthy years, reinforce the arguments above, by explaining that individuals who consumed few antioxidant foods, such as fruits, vegetables and vegetable oils, as well as low-fat foods, such as grains and cereals, fresh herbs and beverages, showed greater chances of developing/worsening CAD. Thus, the most prudent and scientifically viable thing is for the general population to consume a balanced diet rich in antioxidants from fresh fruits, vegetables and whole grains. It is also pointed out that the diet should contain adequate nutritional components, especially fats and fatty acids (both in quantity and quality) (MAHALLE et al., 2016; MOGHADAM et al., 2017; KOLARZYK et al., 2018).

In a clinical trial, Giroli et al. (2021) when evaluating 130 Caucasian patients of Italian origin, aged between 30 and 75 years, in Milan, Italy, explained that both a Mediterranean diet (with an antioxidant profile and low-fat content) and a diet with only a low-fat content of fat, produced some equivalent changes, which can be understood as "heart friendly" in blood fat. The authors also point out that the Mediterranean diet can add other beneficial effects, favoring a change in the composition of fatty acids in the blood towards a healthier profile in patients with CAD.

Nutritional interventions are necessary, not only in the hospital environment, but also in other instances of health care (primary and secondary care). Thus, reinforcing the need for the inclusion of nutritionists in all points of the Health Care Network (PEREIRA; NASCIMENTO; BANDONI, 2016).

It also appears that the expansion and reformulation of health care services is necessary, aiming at improving and expanding nutritional care, given its importance (CUNHA, 2018; YEHLE et al., 2019; MARUYAMA et al., 2021). In this perspective, Yehle et al. (2019) in a study carried out in West Lafayette in the United States, involving 20 patients with CAD and 7 informal caregivers of patients with CAD, regarding their perception of mobile applications that enable the selection of healthier products with detailed nutritional information, draw attention to a new possibility, that of developing interventions through applications, as well as in social networks.

The literature indicates that with the strengthening of nutritional care at the points of the health care network and with this (technological) adaptation, it is possible to envision a reduction in the risks of late complications resulting from unhealthy lifestyle habits (YEHLE et al., 2019; ARAÚJO, A. S.

B. et al., 2022). Finally, it should be noted that the nutritional status, as it directly influences the immune system and body functioning, is essential for better prognosis in relation to the disease, having a strong relationship with the reduction of hospitalization time, readmissions and health costs (CORREIA; PERMAN; WAITZBERG, 2017; FORMISANO et al., 2021).

The findings in the present study were mostly articles with a moderate level of evidence, which indicates a significant effectiveness of the actions mentioned above to improve dietary factors in CAD. In addition, with the present work, it is evident that the performance of the nutritionist is necessary, since only this professional has the support and technical-scientific knowledge to prescribe and monitor the effectiveness of the diet (BARROS et al., 2019).

It is noteworthy that despite the systematization in the search and selection of articles, it is recognized that it is impossible to exhaust the available literature on this subject. Therefore, among the limitations of the method, we highlight the search limited to six databases, the limitation of ten years referring to the search period, as well as the limitation of the author's domain languages (Portuguese, English and Spanish).

Despite these limitations, the present study synthesized evidence from 13 scientific articles, most of which were cohorts. It was clearly demonstrated that nutritional interventions help in the prevention/treatment of CAD, assuming that the absence of these interventions can compromise the health of individuals, culminating in poor outcomes. In view of this, this study contributed to the advancement of scientific knowledge and ratified the importance of the nutritionist, aiming at supporting patients/family members in the hospital, outpatient and/or home environment, both nationally and worldwide.

6 CONCLUSIONS

In this work, it was possible to conclude that the nutritional status influences the occurrence of CAD, since overweight and obese individuals, carriers of SAH, smokers, are more likely to develop it, it is emphasized that the nutritional status by influencing directly on the immune system and body functioning, it is essential for better prognosis in relation to the disease.

There was no consensus regarding the instruments/constructs used to assess nutritional status in CAD, but it is important to use these, as well as the development of protocols and studies that test their effectiveness in the nutritionist's practice.

Protective factors are linked to a good lifestyle, therefore adequate consumption of monounsaturated fat, fiber and supplementation of α-tocopherol, copper and magnesium, and other nutrients that help modulate vascular function, which leads to beneficial actions in the serum

cholesterol, body weight, glucose homeostasis, inflammation and oxidative stress, consequently leading to a timely nutritional status.

Analyzed studies brought as evidence the ingestion of foods with an antioxidant profile and with low fat content in the prevention/treatment of CAD. Therefore, the action/performance of the nutritionist is essential, since he is the professional who has mastery of this theme, and can therefore help in improving eating habits.

In relation to this work, it was shown that the low intake of proteins, fibers, vitamins, minerals and high intake of carbohydrates and fats were associated with the increase and severity of CAD. Thus, the most prudent and scientifically viable thing is for the general population to consume a balanced diet rich in antioxidants from fresh fruits, vegetables and whole grains.

The effects of supplementation and specific foods on disease progression were evaluated, including: wine, coffee, herbal teas, legumes, vegetables, dairy products, fruits, meats, seafood, nuts and oils. Macro and micronutrients were also evaluated, especially alpha-linolenic acid. Emphasizing only that green tea constitutes a protective factor for CAD.

Finally, further studies are needed to validate some of the results that have not been proven to have a significant impact on CAD, in order to deepen the theme and improve nutritional support strategies, since they play a fundamental role in maintaining health and preventing disease.

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CHAPTER
19

Prognosis of stroke in a patient with SARS-CoV-2 and coronary artery bypass graft surgery

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ABSTRACT
Objective: To report a case of a patient with ischemic stroke, previous coronary artery bypass graft surgery (CABG), and cardiovascular and endocrine-metabolic comorbidities associated with complications from SARS-CoV-2. Case details: A 75-year-old patient was admitted to a referral hospital in Brasilia/Federal District in June 2020 due to sudden loss of consciousness, hemiparesis in the right dimidium, and aphasia with conjugated ocular deviation for 1 hour. He has coronary artery disease with coronary artery bypass graft surgery 3 years ago, arterial hypertension, chronic kidney disease stage IV by the Chronic Kidney Disease Epidemiology Collaboration, hypothyroidism, metabolic syndrome, and obstructive sleep apnea syndrome. During hospitalization, RT-PCR was performed with the detection of the RNA of SARS-CoV-2 and chest CT showing opacities with ground-glass attenuation and inflammatory bronchopathy. Final considerations: In the presence of coronavirus, ischemic stroke occurs in the most severe cases of the disease, due to the neurotropism of the virus and the complications of the patient with cardiovascular comorbidities. Coronary artery bypass graft surgery represents a worse prognosis factor when in the immediate postoperative period in these patients with a high mortality rate. However, in the present case, the patient with a history of CABG had a favorable clinical outcome.

Keywords: SARS-CoV-2, stroke, myocardial revascularization.

1 INTODUCTION

SARS-CoV-2 is a betacoronavirus that causes the disease COVID-19. According to the World Health Organization (WHO), globally, in October 2020, 33,722,075 confirmed cases were registered, of which 1,009,270 deaths. The disease is usually mild, with the most characteristic symptoms being fever, dry cough, and tiredness. However, it is still possible to find in patients: dyspnea, chest pain, headache, diarrhea, anosmia, ageusia, and skin eruptions.

In addition, severe cases that required follow-up in intensive care units were accompanied by other comorbidities such as hypertension, cardiovascular diseases, stroke, chronic kidney disease (CKD), diabetes, and lung diseases (WORLD HEALTH ORGANIZATION, 2020; WHITTAKER A, et al., 2020; MONTALVAN V, et al., 2020).

The virus responsible for the current pandemic, SARS-CoV-2, acts similarly to the SARS-CoV that emerged in mid-2002. The current betacoronavirus binds to the angiotensin-converting enzyme 2 (ACE2) receptor as did its predecessor. This receptor is found in several cells of the human

body, such as endothelial cells, muscle cells of the tunica intima and media of the muscular arteries of the brain, glial cells and neurons. This finding demonstrates the potential neurotropic involvement of SARS-CoV-2, indicating the possible severity of the disease (ZHOU Z, et al., 2020; WHITTAKER A, et al., 2020).

The name “coronavirus” arose due to the crown shape that the encapsulated virus presents, when observed under electron microscopy. This crown is made up of membranous glycoproteins in a spiculated shape. Furthermore, the betacoronavirus contains genetic material consisting of a single strand of RNA, being considered one of the largest genomes of its group.

Coronaviruses belong to the domain Riboviria, kingdom Orthornavirae, phylum Pisuviricota, class Pisoniviricetes, order Nidovirales, family Coronaviridae, and subfamily Orthocoronavirinae. This subfamily is divided into four genera: Alphacoronavirus, Betacoronavirus, Gammacoronavirus and Deltacoronavirus. Alphacoronavirus possesses species HCoV-229E, HCoV-NL63 and Mi-BatCoV 1A. Betacoronavirus includes, among others, HCoV-OC43, HCoV-HKU1, MERS-CoV, SARS-CoV and SARS-CoV-2. Gammacoronavirus has IBV, TCoV and BWCoV-SW1 as examples. The Deltacoronavirus, in turn, presents, among others: BuCoV HKU11, WiCoV HKU20 and ThCoV HKU12 (WOO PCY, et al., 2012; CAROD-ARTAL FJ, 2020; BERGER JR, 2020).

There are dozens of studied coronaviruses, but only seven species have been proven to infect humans: MERS-CoV, SARS-CoV, HCoV-HKU1, HCoV-OC43, HCoV-229E, HCoV-NL63, and, finally, the current SARS- CoV-2. This has emerged in recent months, due to the excellent mutation capacity shown by the coronaviruses, even allowing its transmission among many species of mammals and birds (CAROD-ARTAL FJ, 2020).

Despite being the most common, the respiratory system (RS) is not the only gateway for COVID-19 in humans. Many reports in the scientific literature suggest the invasion of the virus through the gastrointestinal tract. This theory is supported by the clinical picture of many patients, associated not only with respiratory signs and symptoms but also with gastroenterological ones. Even though the mechanical process was initiated in the nasopharyngeal mucosa, it continues through the SR and/or gastrointestinal tract and, in response to the neurotropism of SARS-CoV-2, can even enter the patient's central nervous system (CNS).

The virus repeatedly manipulates the lymphatic, vascular, and even nervous systems, notably the enteric system, to work the CNS to its advantage. In this way, the betacoronavirus can cause stroke following several mechanisms: vascular involvement, with inflammation of its walls; hypercoagulability; myocardial injury; release of atherosclerotic plaques from their formation site, blocking blood flow to the brain, leading to tissue necrosis, among others (BOSTANCIJKLIJOGLU M, 2020; TREJO-GABRIEL-GALÁN JM, 2020).

According to Barrios-López JM, et al. (2020) and Trejo-Gabriel-Galán JM (2020), many neurological disorders were analyzed in patients with COVID-19. Among them, the ischemic stroke category was identified in 2-3% of patients hospitalized in the city of Wuhan, China. There was even an increase of 5-6% in the incidence of stroke in patients who expressed severe disease. Hypercoagulability associated with high levels of D-dimer attached to the outbreak of systemic inflammation confirmed by laboratory tests is a strong indication of stroke in these patients. Stroke can be divided into ischemic and hemorrhagic. The former is more common, accounting for approximately 70% of strokes worldwide. The second covers hemorrhage with an intracerebral focus and hemorrhage with a subarachnoid focus. With the technological development of medicine, the diagnosis of stroke had increased in its classification. More sophisticated imaging exams allowed a better stratification of stroke based on deeper studies of tissue lesions. When these injuries are not permanent, it is called a transient ischemic attack. When permanent, stroke is diagnosed (CAMPBELL BCV, et al., 2019).

The present work aimed to narrate a case of a patient with a stroke due to complications caused by the betacoronavirus. The study also presented relevant particularities for the unfolding of the pathophysiology of SARS-CoV-2 in the patient, such as cardiovascular, endocrine-metabolic comorbidities, obesity, history of smoking with a smoking history of 30 packs/year, and senility. In addition, the patient had had coronary artery bypass grafting (CABG) relatively recently (3 years ago), due to coronary artery disease (CAD), which justified the study and publication of the case in the scientific literature.

2 CASE DETAILS

A.I.P., male, 75 years old, was admitted to a reference hospital in Brasília/DF in June 2020 with a history of an episode of a sudden loss of consciousness followed by hemiparesis in the right side of the body and aphasia with conjugate ocular deviation for 1 hour. Computed tomography (CT) of the skull without contrast was performed, which ruled out ischemic or hemorrhagic lesions on admission.

Patient with a previous pathological history of CAD with CABG for 3 years, hypertension, CKD stage IV by the Chronic Kidney Disease Epidemiology Collaboration, hypothyroidism, metabolic syndrome, obstructive sleep apnea syndrome, hiatal hernia, and former smoker, with a smoking history of 30 packs/year (UTIEL FJB, et al., 2020).

Upon admission, a diagnostic hypothesis of ischemic stroke and complications of CKD stage IV with atrial fibrillation questioned was raised. The patient reported continuous use of a platelet antiaggregant, beta-blocker, loop diuretic, statin, synthetic thyroid hormone, and xanthine oxidase

inhibitor.

On examination, he was in regular general condition, drowsy, anicteric, cyanotic, feverish to the touch, pale, dehydrated, and eupneic with ventilatory support from a nasal catheter 5L/min. The cardiovascular system is uneventful with a blood pressure of 96x72 mmHg and a heart rate of 84 bpm. RS with diffuse reduction of physiological breath sounds, without adventitious sounds. Abdomen globular, distended, hyper tympanic, without visceromegaly, painless on superficial and deep palpation, present bowel sounds, and no signs of peritoneal irritation. Bilateral symmetric pedal and popliteal pulses with mild edema and hemiplegia on the right side of the body. He had aphasia with involvement in the Wernick and Broca areas.

After a week of hospitalization, the patient remained drowsy, with global aphasia, and using a nasoenteric tube since admission. A new brain CT without contrast showed a hypoattenuating area with involvement of the territory of the left middle cerebral artery (ACME), which presented difficulty in the irrigation of the frontal and parietal lobes, in addition to the insula, internal capsule, caudate and lentiform nuclei, striatum and part of the globe pale.

Effacement of the grooves in the cortical gyri was visualized. Presence of slight compression of the lateral ventricle and contralateral midline deviation of approximately 4 mm. Left brainstem with hypoattenuation. No signs of extra-axial collections or foci of intraparenchymal hemorrhage. Other anatomy-physiological findings on CT of the head were unchanged. With a conclusive report for acute/subacute ischemic stroke in the territory of the ACME, the patient still developed a productive cough, restless sleep, and the need for increased ventilatory support.

Laboratory tests showed sodium 130.7 mmol/L; potassium 6.3 mmol/L; chlorine 94 mmol/L; serum glucose 202 mg/dL; creatinine 2.26 mg/dL; urea 137.1 mg/dL; amylase 187 U/L; total bilirubin 0.33 mg/dL; direct bilirubin 0.04 mg/dL; indirect bilirubin 0.29 mg/dL; magnesium 2.7 mg/dL; total protein 6.0 g/dL; albumin 4.0 g/dL; globulin 2.0 g/dL; TGO 47 U/L; red blood cells 5.81 million/µL; hemoglobin 17.1 g/dL; hematocrit 52.4%; leukocytes 7,100/µL; neutrophils 82.3%; eosinophils 0%; basophils 0.9%; monocytes 8.9%; lymphocytes 7.8% and platelets 200,000/µL.

This allows us to infer the need to correct the hydro electrolyte disturbances presented with intravenous sodium replacement therapy due to its depletion, in addition to potassium restriction in the diet and increased elimination with loop diuretics administered orally. About high serum glycemia, and depending on the diabetes mellitus previously identified in the patient, therapy with an insulin analog is proposed to resolve the condition in question.

Due to the worsening of the clinical respiratory condition, in July 2020, a chest CT without contrast was performed, which showed opacities with ground-glass attenuation and bilateral intralobular lines of predominantly peripheral distribution. Pulmonary involvement is approximately

60%. Thickened-walled bronchi inferring inflammatory bronchopathy. Soon after, the Polymerase Chain Reaction with Reverse Transcription (RT-PCR) test was performed, being detectable for the RNA of SARS-COV-2, confirming the presence of the coronavirus infection.

The patient then underwent treatment for COVID-19 for 21 days until clinical improvement. Laboratory tests gradually improved with the reversal of sodium depletion and readjustment of potassium. Due to acute renal failure with elevated urea and creatinine levels, the patient underwent hemodialysis until renal function was restored. There was a slight improvement in neurological function. The patient evolved with hemodynamic stability, without the need for vasoactive drugs and signs of respiratory distress. On physical examination, he was lucid and oriented in time and space, cooperative to commands, with preserved physiological diuresis and evacuation. Despite the comorbidities presented by the patient, he had a good response to the proposed treatment and was discharged in August 2020.

3 DISCUSSIONS

According to Morassi M, et al. (2020), stroke is not a common finding in patients infected with SARS-CoV-2. However, when diagnosed, it can determine an unfavorable prognosis. The patient in the present study has several cardiovascular comorbidities and a relatively recent history of CABG, which, together, define a negative prognosis in the fight against COVID-19.

Yaghi S, et al. (2020), corroborate in their studies, the incidence of ischemic stroke of 0.9% in a total of 3556 patients. While Barrios-López JM, et al. (2020) and Trejo-Gabriel-Galán JM (2020) determine a greater appearance of ischemic stroke as complications of the coronavirus. According to both authors, 2.8% of patients diagnosed with COVID-19 evolved with stroke and this number is even higher (5.7%) in patients with comorbidities. It is important to emphasize the association of stroke with high D-dimer rates.

Despite reports of ischemic stroke in young people affected by SARS-CoV-2, the highest prevalence is still found in the elderly. The average was 71 years. COVID-19 was more deleterious in patients who previously had hypertension, dyslipidemia, diabetes mellitus, asthma, and cardiovascular and cerebrovascular diseases. The pathophysiology of the disease is correlated with inflammation and coagulation disorders, which justifies ischemic stroke (AVULA A, et al., 2020).

González-Pinto T, et al., (2020) also ratify the damage caused by SARS-CoV-2 in extending the prothrombin time, systemic inflammation, hypercoagulability, thrombocytopenia and increased risk for disseminated intravascular coagulation.

In the case reported in this study, the patient had cardiovascular, endocrine-metabolic and neurological comorbidities upon admission. The ischemic stroke led the patient to Wernick and

Broca's aphasia associated with dysarthria and hemiparesis of the right side of the body. After a week of hospitalization, the patient developed desaturation requiring ventilatory support. Non-contrast-enhanced chest CT scans have reported ground-glass opacities in approximately 60% of the lung parenchyma and significant inflammatory bronchopathy.

It was not possible to confirm anosmia or ageusia due to the clinical picture of the patient. However, as determined by the literature, the SR and CNS suffered significant injuries due to the pathophysiology of SARS-CoV-2. Patients often report headache, dizziness, ageusia, hypogeusia, anosmia, hyposmia, and disturbances of consciousness, due to the neurotropism of COVID-19 (HESS DC, et al., 2020; MONTALVAN V, et al., 2020).

The pathophysiology of SARS-CoV-2 permeates the panorama of myocardial, renal or pulmonary lesions, cardiac arrhythmias, coagulation disorders and their respective consequences. When related to surgical procedures, the coronavirus played a relevant role in the clinical outcome of patients. In a study carried out in Wuhan, China, 100% of patients had pneumonia, 44% required intensive care, 32% developed acute respiratory distress syndrome and 21% of patients died (PATEL V, et al., 2020).

Betacoronavirus is formed externally by a spiculated glycoprotein crown. These spikes are polypeptide chains that bind to cell receptors in the human body. This union is mediated by ACE2 located on the surfaces of these cells. SARS-CoV-2 is 100-150 nanometers in size and have positive single-stranded RNA. ACE2 receptors have a high affinity for the polypeptide spikes of coronaviruses. These receptors are abundant in the CNS, more specifically, in the ventrolateral side of the reticular formation and the nucleus of the solitary tract, both located in the medulla oblongata in the brainstem. In this region are neuronal clusters responsible for cardiovascular and respiratory function (MONTALVAN V, et al., 2020; BERGER JR, 2020).

Yandrapalli S, et al. (2020) reported an unfavorable prognosis for patients with COVID-19 and in the postoperative period of CABG. In the study, the patient developed hypoxia and fever on the first postoperative day (POD). In chest CT, came the report of bilateral consolidation and, in the RT-PCR study, detection of SARS-CoV-2. Sometime later, death from severe pneumonia. The authors also refer to other types of surgeries with a high postoperative lethality rate. All with cardiorespiratory complications and multiple organ failure.

Rescigno G, et al. (2020) demonstrated in a study an obese and chronic alcoholic patient in need of CABG due to unstable angina, unchanged troponin and cardiac catheterization indicating CAD with stenosis of the left main coronary artery. Prior stroke without sequelae. Despite successful surgery and echocardiogram without residual tricuspid regurgitation, the patient evolved with hypoxia, dyspnea and fever. Chest CT showed bilateral consolidation. Echocardiogram indicated left

ventricle functions adequately, despite considerable damage to the right ventricle. The ventilatory pattern worsened with death on the ninth POD. The authors show growing concern with urgent surgical treatments in patients with COVID-19, due to frequently unfavorable clinical outcomes, especially in cardiovascular surgeries.

In the current study, it was observed that the CABG was performed 3 years ago. The patient still had cardiovascular and endocrine-metabolic comorbidities and was admitted to the hospital with ischemic stroke and subsequent COVID-19 with a report established by RT-PCR and chest CT. However, the patient's clinical outcome was favorable, with a good response to the proposed treatment and medical discharge on August 28, 2020.

When a patient is admitted to the hospital with an ischemic stroke, the recommended treatment is intravenous thrombolysis or, in more specific cases, endovascular thrombectomy. Thrombolytic medication is designed to dissolve the clot that is obstructing blood flow. The ideal time for administering the drug is up to 4.5 hours. However, there are reports in the literature of benefits up to 9 hours after the stroke. Thrombectomy, as well as thrombolysis, are more effective the faster the treatment is started, being one of the determining factors for a good prognosis (CAMPBELL BCV, et al., 2019).

It can be concluded from the versed case report that the pathophysiology concerning the cardiorespiratory and neurological manifestations of COVID-19 still needs to be studied. Many studies published in the literature corroborate the neurotropism of SARS-CoV-2 and its complications, especially in patients with comorbidities. However, there is still much to be clarified about the pathological changes caused in the cells and tissues of patients affected by the disease.

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CHAPTER
20

Rectosigmoidectomy with colorectal anastomosis and nephrectomy due to adenomatous polyps, rectal adenocarcinoma and renal cell carcinoma in a post-COVID-19 patient

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ABSTRACT
Objective: To report a case of a senile patient with colorectal cancer, multiple adenomatous polyps, renal tumor and COVID-19. To analyze the proposed therapies and the relevance of rectosigmoidectomy and nephrectomy as a treatment for rectal adenocarcinoma and renal carcinoma. Case details: Male patient, 82 years old, sought a hospital in 2019 with abdominal pain crises, extensive ecchymosis in the right upper limb, petechia in the lower lip, chills, diaphoresis, hematuria and melena. Colonoscopy showed a vegetating rectal lesion, ascending colon polyps and colonic diverticulosis. In June 2020, developed dyspnea, fever, weakness and general malaise, confirming COVID-19 in laboratory tests, cured two weeks after treatment. In August 2020, the colonoscopy, several sessile polyps and a 5 cm polypoid lesion in the rectum were observed. Biopsy indicated rectal adenocarcinoma. Renal tumor on the right was identified by computed tomography of the abdomen and ultrasound of the total abdomen. The patient was then submitted to rectosigmoidectomy with colorectal anastomosis and nephrectomy on the right. Final considerations: The colonoscopy is still considered an excellent screening test for intestinal polyps. Regarding rectal adenocarcinoma, rectosigmoidectomy is considered an effective curative treatment. Finally, COVID-19 is considered a risk factor for high mortality in cancer patients.

Keywords: SARS-CoV-2, colonic polyps, adenocarcinoma, rectal resection, nephrectomy.

1 INTODUCTION

Coronaviruses have been present in nature for millions of years, with considerable subtypes of coronaviruses coexisting with numerous species of mammals. Some species of bats even have particular strains of coronavirus. However, the first coronaviruses were detected by man around 1960. The infection of these viruses is relatively common in human beings. Thus, respiratory infections may have no clinical relevance or become severe respiratory syndromes such as MERS – Middle East Respiratory Syndrome or SARS – severe acute respiratory syndrome (JOFFRIN L, et al., 2020).

COVID-19 is a relatively new diagnostic identity. It was first found in laboratory tests from December 2019. Its more specific signs and symptoms are tiredness, fever, dyspnea, chest pain and cough. Because it has neurotropism already corroborated in the literature, COVID-19 also leads to

anosmia and ageusia in some patients (MENEGASSI FGM, et al., 2020). The disease is expressed by SARS-CoV-2, which is a betacoronavirus with a spherical configuration shaped by spicules on its surface, giving it a crown-like appearance. Internally, it has an RNA strand of approximately 100 nanometers (SINGHAL T, 2020). At the current moment, the World Health Organization indicates 33,502,430 confirmed cases and 1,004,421 deaths (WORLD HEALTH ORGANIZATION, 2020).

Concerning polyps, they can be organized into different categories due to their behavior. Adenomatous polyps can conceive cancer at the intestinal tissue level. For this reason, these polyps are established as being a prodromal state of malignant neoplasm. These adenomas can be divided into tubular, villous and tubulovillous. Some polyps do not lead to cancer, such as hyperplastic and inflammatory polyps.

Polyps classified as serrated sessile are approached as adenomas of great clinical relevance in the context of colorectal cancer (CRC). It is important to consider, as risk factors for CRC: polyps > 1cm; more than 3 polyps in the intestine; dysplasia. Dysplasia results from the ongoing injury, genetic mutations, and imbalance associated with a cell's growth and repair.

The CCR is verified through 3 different paths. The first occurs via adenoma-carcinoma, accounting for approximately 70% of malignant neoplasms. The second stems from the rare Lynch Syndrome, accounting for about 5% of malignant tumors (MT). The third, known as serrated, comprises about 30% of all CCRs. Serrated polyps are most commonly found on colonoscopy. This pathway still has gaps in its understanding (SINGH R, et al., 2016; SZYLBERG L, et al., 2015).

The present study aimed to narrate a case of a patient with rectal adenocarcinoma, adenomatous polyps and right renal mass. The study also discussed rectosigmoidectomy with colorectal anastomosis and nephrectomy (RACN) as therapeutic measures proposed and implemented in elderly patients and recent post-COVID-19 cure.

2 CASE DETAILS

E.R., male, 82 years old, presented in May 2019 with abdominal pain crises, extensive ecchymosis on the right upper limb, petechiae on the lower lip, chills, diaphoresis, hematuria and melena. The patient had a past pathological history of arterial hypertension, labyrinthitis and heavy smoking, with a smoking history of 68 packs/year.

Computed tomography of the abdomen without contrast showed mild distension of the intestinal loops, circumferential parietal thickening in a segment of the loop in the hypogastric region, densification of the adjacent mesenteric fat. Such findings suggest an inflammatory-infectious process, and it is not possible to exclude, in the study without contrast, the possibility of intestinal ischemia. Nodular parietal thickening of the rectum. Renal nodule on the right.

At upper digestive endoscopy: record of mild enanthematic pangastritis. Total abdominal ultrasound: renal tumor on the right. At colonoscopy: sparse diverticular ostia; presence of a 3mm sessile polyp in the ascending colon; presence of a vegetating lesion with a villous aspect about 8cm from the anal margin, measuring approximately 5cm, occupying 30% of the circumference of the organ on the posterior wall of the rectum. The anatomopathological analysis revealed tubular adenoma with low-grade dysplasia in the ascending colon and villous adenoma with high-grade dysplasia in the rectum.

In June 2020, an 83-year-old patient developed dyspnea, fever, weakness and general malaise, confirming COVID-19 in laboratory tests. Patient was treated, evolving with the improvement of symptoms and cure of the disease after two weeks of treatment.

In August 2020, at the new colonoscopy, the fundus of the cecum was well visualized, presenting two flat, wine-colored lesions, with a vascular appearance, measuring between 2-3 mm, suggestive of angiectasia, without stigmas of active bleeding. Four sessile polyps were observed, measuring between 2-4 mm, with a regular surface, located in the ascending colon, hepatic angle, proximal transverse colon and descending colon.

Presence of sparse diverticular ostia, with a wide and narrow base, hypotonic, distributed throughout the sigmoid colon, without inflammatory signs or bleeding stigmata. In the upper rectum, approximately 12 cm from the anal margin, a polypoid lesion measuring approximately 5 cm, of soft consistency, with an apparent pedicle and a large vessel in between was recorded. The surface of the lesion was enanthematic and had discreet avascular areas that indicated adenocarcinoma. At the biopsy, the anatomopathological diagnosis determined: tubular adenomas with mild dysplasia in the colon, hyperplastic polyp without atypia in the colon and glandular lesion with severe atypia, favoring the diagnosis of well-differentiated rectal adenocarcinoma.

In September 2020, RACN was performed on the right. Initially, the left parietocolic gutter was released up to the splenic angle cranially. High ligation of the inferior mesenteric artery and vein. Descent and release of the peritoneum to the rectum caudally with visualization and preservation of the gonadal vessels and left ureter. Ligation of the sigmoid colon mesentery vessels close to the colon. Circumferential dissection and isolation of the upper and middle rectum.

Medium straight section with a linear stapler. Dissection and section of the sigmoid with the making of a tobacco pouch and placement of a circular stapler nose in the colon stump. Tension-free colorectal anastomosis was performed with a 33mm circular stapler passed through the anorectal route. Intact anastomotic rings. Rubber manoeuvre.

Subsequently, the right parietocolic gutter was released up to the hepatic angle. Identified, dissected, sectioned and ligated the left ureter. Renal dissection with identification and isolation of the

right renal artery and vein. Double ligation of the proximal renal artery and vein was performed. A right nephrectomy was performed. The right kidney was sent to pathology for analysis. Result: histopathological picture of renal cell carcinoma, clear cell type. Fuhrman nuclear grade II. Tumor measuring 3.0x1.5cm.

Tubular, trabecular architectural pattern and solid focal areas. The presence of tumor necrosis compromises 30% of the neoplasm. Neoplastic emboli in the tumor microvasculature not evidenced. Absence of tumor infiltration in the ureter, vessels of the renal hilum, capsule and perirenal fat. Surgical margins are free of neoplasia. Pathological staging: pT1a, pNx, pMx. On the 8th postoperative day, the patient evolved in good general condition, contact, with physiological eliminations, in good acceptance of the diet, walking without effort, restful sleep, physiological vital signs, with a surgical wound in good aspect, clean and dry. Hospital discharge on September 19, 2020.

3 DISCUSSIONS

The present case portrays a patient with a recent history of SARS-CoV-2 infection and an outpatient coloproctology follow-up since May 2019 with a diagnosis of adenomatous polyps. After exams performed the following year and after diagnosis of well-differentiated adenocarcinoma in the rectum and right renal mass, RACN was chosen. The clinical management of cancer patients has always been a great challenge. However, the current pandemic situation has made the management of cancer patients much more complex. It is essential to balance the damage of late oncological treatment for the patient with COVID-19. It is worth noting that studies have already proven the deleterious relationship of surgery or chemotherapy associated with SARS-CoV-2.

Even if cancer treatment is carried out months before the coronavirus infection, these patients tend to develop a more severe clinical picture. Cancer patients are 5 times more likely to develop severe forms of COVID-19 and 8 times more likely to die than the normal population (DENYS A, et al., 2020).

The patient in the present study had four 4mm sessile polyps, regular surface, located in the ascending colon, hepatic angle, proximal transverse colon and descending colon. In the rectum, there was a polypoid lesion measuring 5cm, mobile, with a soft consistency, with a pedicle and a large caliber vessel in between. At biopsy, the diagnosis established tubular adenoma with mild dysplasia, hyperplastic polyp without atypia and glandular lesion with severe atypia indicating well-differentiated adenocarcinoma.

Colorectal polyps are growths from the colon into the intestinal lumen. Polyps can be considered benign tumors and, in some cases, lead to CRC. Thus, in some contexts, surgical removal of polyps is necessary to prevent cancer. A polyp can be divided into benign, adenomatous (or

precancerous) and adenocarcinoma. It is still possible to group them into adenomatous and non-adenomatous polyps. Adenomatous tumors can be tubular, villous or tubulovillous (AMERICAN CANCER SOCIETY, 2017; NGUYEN LH, et al., 2019).

In addition to the 3 types of adenomatous polyps, there are serrated polyps that are considered adenomas due to their potential impact on CRC. These constitute a distinct group of polyps as they lead to serrated colorectal carcinoma. The serrated pathway is defined by DNA methylation and BRAF genetic alterations. Serrated polyps can be subdivided into three groups: hyperplastic polyp, conventional serrated adenoma and sessile serrated adenoma. Among non-adenomatous polyps, there are hyperplastic and inflammatory ones that are more common and do not tend to become malignant (BICALHO LGMF, et al., 2015; AMERICAN CANCER SOCIETY, 2017).

Polypectomy reduces death by approximately 50% from CRC in the first decade. The CCR is verified through 3 different paths. The first occurs via adenoma-carcinoma, accounting for approximately 70% of TMs. The second permeate the rare Lynch Syndrome, responsible for about 5% of MDs. The third, or serrated, comprises about 30% of all CCRs.

Serrated polyps are one of the most commonly found polyps on colonoscopy. This route still has gaps in its understanding. Excision of serrated polyps has a good prognosis in preventing CRC. However, many serrated lesions are difficult to diagnose and not all lead to cancer. Traditional serrated adenomas have a definite correlation with TMs. Sessile serrated adenomas are more complex. These are the polyps that most lead to CRC within the serrated pathway, however, they are easily confused with hyperplastic polyps in colonoscopy (SINGH R, et al., 2016; NGUYEN LH, et al., 2019).

At the molecular level of CCR, a triple path from benign lesions to their malignancy was observed. This path is supported by the genetic and epigenetic peculiarities associated with the lesions. 5 subtypes have been demonstrated. The serrated pathway is well defined in subtypes 1 to 3. Microsatellite instability and stability are correlated to subtypes 1 and 2. It is worth noting that microsatellite instability results from continued damage at the DNA level resulting from genetic and epigenetic changes that are transferred between cells in cell proliferation.

These mutations are generated in fragments of the DNA strand with patterned recurrence every 1-5 nucleotides that were called microsatellites. Subtypes 1 and 2 are characterized by the islet hypermethylation factor CPGs and alteration of the BRAF oncogene. Subtypes 2 and 3 are related to high mortality. Subtype 4 establishes the etiology of RCC linked to the traditional adenoma-carcinoma pathway. This subtype has low microsatellite instability, negative KRAS and BRAF oncogenes. Subtype 5 signals a family history of CRC and Lynch Syndrome cancer (SINGH R, et al., 2016; POPOUTCHI P, 2016).

According to Nguyen LH, et al. (2019), traditional tubular adenomas and serrated pathway polyps are most responsible for the appearance of RCC. The colorectal tumor results from the constant renewal of the tissues of the gastrointestinal mucosa. Epithelial growth takes place only at the base of the tissue structure. However, starting from the base, oncogenic cells proliferate towards the intestinal lumen, interrupting cell differentiation, DNA replication repair and occasional apoptosis. Thus, adenomatous polyps begin to acquire dysplastic properties, transmuting the normal epithelium into hyperproliferative. Finally, an adenocarcinoma will be generated.

Clinical manifestations of CRC can be symptomatic or asymptomatic. When asymptomatic, the diagnosis of cancer is made through screening tests. However, when symptomatic, the main signs and symptoms presented are: abdominal pain, change in bowel habits, melena hematochezia, asthenia, anemia and weight loss (THANIKACHALAM K and KHAN G, 2019).

In 2015, a CCR consortium that specified 4 subtypes was determined. The criteria are based on microsatellite instability and KRAS, BRAF, PI3KCA mutations (GUINNEY J, et al., 2015). The classes are: CMS1 (MSI-immune), CMS2 (Canonical), CMS3 (metabolic), CMS4 (mesenchymal), with an incidence of 14%, 37%, 13% and 23%, respectively (WIELANDT AM, et al., 2017). As for histological classification, the main form of CRC is represented by adenocarcinoma. The other forms described in the literature are mucinous cell carcinoma (PESTANA JSG and MARTINS SFF, 2016).

One of the main measures to reduce CRC mortality is colonoscopic surveillance, especially when one can identify and resect pre-neoplastic lesions. In Brazil, there are screening alternatives in addition to colonoscopy, such as: fecal occult blood test, flexible sigmoidoscopy every 5 years or biannual rectosigmoidoscopy, starting from the age of 50 (DE MENEZES CCS, et al., 2016; BRENNER H, et al., 2014).

CCR is the third most prevalent on the planet. About the gastrointestinal tract, it is considered the most frequent, especially in the elderly. Approximately 80-90% of patients have a late diagnosis, discovering the neoplasm already in an advanced stage. Thus, the guidelines recommend early screening in patients suspected of having cancer. As for renal neoplasms, attention must be paid to their main precursor: renal cell carcinoma. The concurrence of primary TMs is a very unusual phenomenon. However, in recent decades, a synchronism of these primary tumors in the same patient has increasingly been observed (SILVA AAM, et al., 2017).

The sites with the highest incidence of metastatic implantation are the liver, lungs, lymph nodes, peritoneum and, rarely, bones and central nervous system. Because the venous/lymphatic drainage differs between the colonic segments, there is a higher proportion of lung metastases from primary tumors of the distal rectum (drainage via the inferior vena cava) than in the other segments, which have a predominance of liver metastases due to drainage through the portal system. The main

complications of metastases are painful hepatomegaly, carcinomatous ascites, bladder dysfunction, pulmonary and bone involvement (THANIKACHALAM K and KHAN G, 2019).

Concerning renal tumors, renal cell carcinoma (CaCR) is the third most common cancer of the genitourinary tract, and represents approximately 4% of MTs. The most common histological subtype of this neoplasm is clear cell CaCR. The median age at diagnosis is 64 years and the incidence of this cancer has been increasing over the years due to the evolution of diagnostic methods and population aging. At the time of diagnosis, about 30% of patients in Brazil have metastases (SOARES A, et al., 2019).

Traditionally, the treatment for localized renal tumors (up to T2c) and larger tumors was radical nephrectomy, but this technique can result in complications such as chronic renal failure and cardiovascular compromise. However, currently, partial nephrectomy has shown to be a relevant option in the treatment of small masses, in addition to presenting itself as a promising alternative for the management of larger renal tumors (LI J, et al., 2019).

It can be concluded from the proposed work that colonoscopy is considered an excellent screening test in patients with non-adenomatous, adenomatous and serrated polyps. Regarding rectal adenocarcinoma, rectosigmoidectomy is considered an effective curative treatment. However, COVID-19 is a risk factor for high mortality in cancer patients. However, the case in question had a favorable clinical outcome with the patient being cured of the coronavirus and CRC.

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CHAPTER
21

The challenges faced by the nurse of the intensive care unit in the treatment of patients with Covid-19: An integrative literature

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ABSTRACT
Objective: to highlight the main challenges faced by nurses in the intensive care unit in the treatment of patients affected by covid-19. Method: integrative literature review, operationalized in the scientific electronic library online databases, database on nursing, sus collection and latin american and caribbean literature on health sciences. Results: through a search of the chosen descriptors, 14 articles were selected from a sample of 403. 3 main axes of analysis were categorized: challenges related to structural issues of the icu environment, environmental challenges related to the hospital environment and psychosocial challenges related to the nursing profession applied to the covid icu. Conclusion: there are structural and psychosocial factors that impact the nursing service in the icu, and these factors need to be mitigated to improve the quality of life and health of professionals, and consequently to improve health care.

Keywords: Intensive care unit, covid-19, role of the nursing professional.

1 INTODUCTION

The COVID-19 pandemic has posed a major challenge for the entire world population, but especially for healthcare workers. Given the high transmissibility of SARS-CoV-2 – severe acute respiratory syndrome, the pandemic has had a huge impact on the Health System (TZANNO-MARTINS, 2020).

In this way, it is possible to say that the pandemic has created unique challenges for workers around the world. While most of the workforce was asked to work from home to help "flatten the curve," health workers were asked to remain on the front lines, working long hours to combat this deadly threat, even though they lacked adequate conditions in terms of structure, personal protective equipment, and training (DE MOURA, FURTADO, SOBRAL, 2020).

The great speed with which viral reproduction occurred in COVID-19 made it a serious disease and certainly more contagious than influenza and even though a small portion of those infected required intensive care, it was possible to say that in the context of the pandemic, Intensive Care Units (ICUs) were simultaneously challenged in terms of limited resources, infection control, protection of

health workers and adaptation to a scenario of rapid progression of the pandemic (HUESPE et. al., 2021).

Because it is a place of intensive care for critically ill patients, the ICU must have great technological and human resources necessary for assistance and care to the patient, being often seen as a hostile, cold place, without human warmth where machines and technical actions prevail in relation to humanized care (FERNANDES et. al., 2012).

In this context, it is necessary to highlight that, among frontline professionals, especially nursing professionals, constant exposure to stressful situations due to the lack of supplies, fear of contagion resulting from direct contact with infected people and the great demand for work are factors that have become constant, especially in ICUs, subjecting them to occupational stress and Burnout Syndrome – SB (FREITAS et. al, 2021)

What was seen, therefore, were numerous challenges for health workers, especially those who maintained continuous contact with the patient during the intensive care period. Nurses were required to have the capacity for innovation, decision-making and leadership to create more favorable conditions for the implementation of care in the care of patients with COVID-19 (BUSANELLO et. al., 2020)

Thus, the aim of this study was to analyze the main challenges faced by ICU nurses in the treatment of COVID-19 patients through an integrative literature review.

2 METHODOLOGIES

To synthesize the state of knowledge on the theme of this study, an integrative literature review was conducted. This method of investigation was according to Sousa et al. (2017), has six distinct phases: identification of the theme and selection of the hypothesis or research question for the elaboration of the integrative review; establishment of criteria for inclusion and exclusion of studies/sampling or literature research; definition of the information to be extracted from the selected studies / categorization of the studies; evaluation of the studies included in the integrative review; interpretation of the results and presentation of the review/synthesis of knowledge.

The identification of the choice of theme was based on the professional experiences of the authors at the time of the pandemic, thus evidencing the importance of the discussion, elaborating the following guiding question: what are the main challenges faced by ICU nurses in the treatment of COVID-19 patients?

To answer this question, the description strategy "PECOS" was used, where P = Population (ICU nurses); E = Exposure (COVID-19); C = Comparator; (Not applicable) O = (Outcome) outcome (main challenges faced); and, S = (Study type) (types of studies) (observational studies).

Subsequently, the criteria for the selection of articles to be used in the integrative review were defined. For this purpose, the following health science descriptors (DeCS) were used: "COVID-19", "Intensive Care Unit" and "Nursing". To make a more precise search, the Boolean operator AND was used, with the equation as follows: "COVID-19" AND "Intensive Care Unit" AND "Nursing".

The selection of the databases was made through a search in the electronic address of the Virtual Health Library (VHL), being selected the databases SCIELO, LILACS, BDEnf and Collects SUS.

The inclusion criteria: articles published from 2019 onwards – considering the beginning of the pandemic and the scientific production on the subject, challenges of the ICU nursing professional, in the treatment of patients affected by COVID-19, in Portuguese, and complete. As exclusion criteria, theses and course conclusion papers were exempted from the sample, as well as bibliographic reviews and letters to the editor.

3 RESULTS AND DISCUSSION

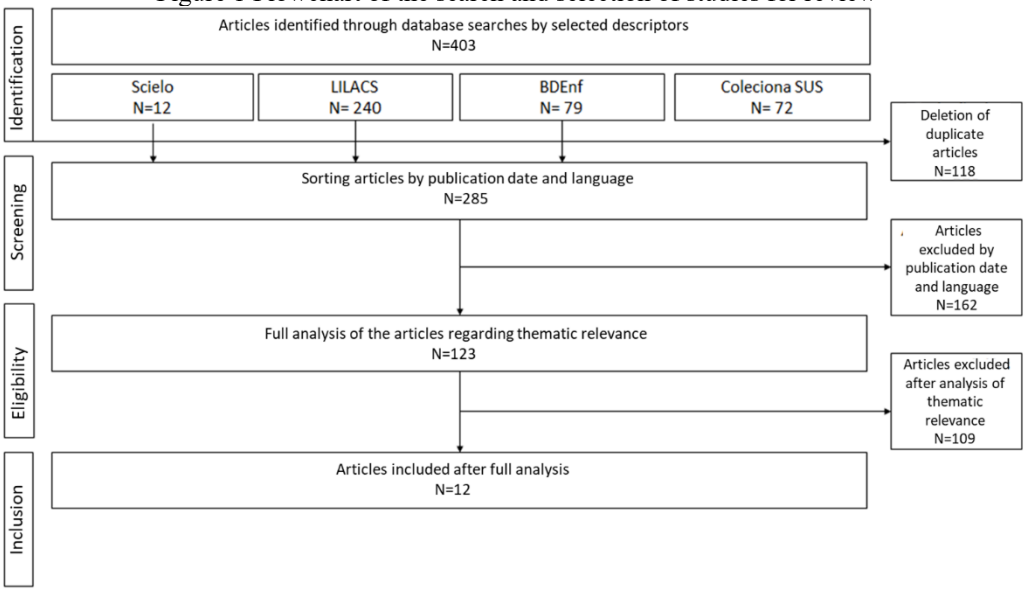
The articles that met the inclusion criteria were analyzed to the full extent and their data were collected by the researchers including the following variables: (1) author and year of publication; (2) study objective, (3) study design and (4) main results;

Considering the option to perform an integrative literature review, which, as mentioned, seeks the synthesis of practical information for the construction of theoretical information, the selection of articles that were developed through methods of practical analysis was intensified, in order to better systematize the information.

We also sought the analysis of the main results, considering more relevant articles that emphasized the role of nursing in the COVID ICU, as well as the existing impact on the nurse's performance in the face of structural, conjunctural or environmental and psychosocial obstacles.

The selection, after the application of these criteria, was ordered according to the flowchart below:

Figure 1 Flowchart of the search and selection of studies for review



Thus, 13 articles were selected for evaluation and interpretation of the results. The articles were systematized according to the following synoptic table:

Frame 1 Synopsis of the studies that highlighted the Key Challenges Faced by ICU Nurses in Treating COVID-19 Patients

Author/Year/Journal	Study Objective	Methodology	Major results
BUSANELLO et. al, 2020, Enferm. Focus.	Reflect on strategies for optimizing intensive care in the care of patients with COVID-19.	This is a theoretical-reflective study that rescues the updated considerations about the management of intensive care in the context of the pandemic.	Optimizing COVID-19 patient care requires reorganization of intensive care units, training, provision of personal protective equipment, and occupational health care.
MOURA, FURTADO, SOBRAL, 2020, Journal of Business Administration.	To evaluate the support of leadership in the prevention of burnout syndrome in health professionals.	Field study with 2,708 Brazilian physicians.	Report the importance of establishing high-quality relationships between supervisors and medical staff to mitigate the experience of burnout.
FREITAS et. al, 2021, J. bras. Psychiatr	To evaluate the prevalence and existence of predictive factors of burnout syndrome in nursing technicians working in intensive care units (ICUs) during the COVID-19 pandemic.	This is a descriptive, cross-sectional study with a quantitative approach with 94 intensive care nursing technicians.	The prevalence of burnout syndrome in nursing technicians working in ICUs who are on the front lines of the COVID-19 pandemic was high and sociodemographic, occupational, and behavioral factors were shown to be predictors of the syndrome.
SAINTS et. al., 2021, Cuid Enferm	Describe the actions to confront COVID-19 in an urgent and emergency unit of a teaching hospital	This is a descriptive case study carried out in an urgency and emergency unit of a teaching hospital in northwestern São Paulo	The actions developed in the urgency and emergency unit should serve as an experience and support to other health services.
SILVA JUNIOR et. al., 2021, Rev. Rene	To understand the impact of music in intensive care for COVID-19 as an instrument of humanization of care from the perspective of care nurses.	Qualitative study conducted with seven intensive care nurses working in an Intensive Care Unit for COVID-19 of a state public hospital	Evaluation of the humanization of care in the ICU

ALMEIDA et. al., 2021, Esc. Anna. Nery	Reflect on COVID-19 as a phenomenon of social representations for the nursing team of the Intensive Care Unit	Theoretical-reflective study, based on the framework of social representations, through the collection of official data in the databases of the Ministry of Health of Brazil and the World Health Organization	The proposition of care-education technologies that qualify the nurse's performance in the care of critically ill patients with COVID-19
CONZ et. al., 2021, Rev. esc. sick. USP	To understand the experience of nurses working in the Intensive Care Unit with patients infected by COVID-19.	Qualitative research, anchored in the social phenomenology of Alfred Schütz, who interviewed 20 nurses working in Intensive Care Units of public and private hospitals, between July and September 2020	To highlight the need to adapt to this new way of caring that includes the physical space, new institutional protocols, continuous use of protective equipment and differentiated care required by patients
DOS SANTOS et. al., 2021, Rev. baiana enferm.	To analyze the nurse's conception of professional satisfaction in the Intensive Care Unit environment.	This is a descriptive study with a qualitative approach, through semi-structured interviews with 11 nurses from a university hospital in the state of Sergipe	Highlight the importance of professional satisfaction in the provision of nursing services
FERNANDES et. al., (2021), Rev Plínio Leite University Center	To evaluate the influence of technology on the humanization of nursing in the context of the COVID ICU	This is an exploratory and descriptive study, through semi-structured interviews with the nursing team, which takes turns in this institution in shifts of 12/60 h per week, belonging to the active staff for at least one year of a public hospital in the city of Rio de Janeiro	Assessment that technology and humanization should always be together for the benefit of the patient hospitalized in an ICU
BITTENCOURT et. al., 2020, Text context - enferm	Report the experience in the process of structuring and managing a specific unit for COVID-19	Authors' experience report on the creation and management of the *Coronavirus Disease* 2019 (COVID-19) unit, in March 2020, in a philanthropic hospital in the State of Santa Catarina.	Highlight the role of the nurse in all interfaces of planning and management of the structuring of the COVID unit
MORAES, ALMEIDA, GIORDANI, 2020, Scientia Médica Porto Alegre,	Highlight nursing care in a COVID ICU	Authors' experience report	Emphasize the role of the nurse in putting together strategies to qualify care and, at the same time, promote the safety of professionals who work directly in the care of patients with COVID-19.
BELARMINO et. al., 2020, Av Enferm.	Report an occupational health experience of nursing in obstetric critical care during the Covid-19 pandemic.	Experience report focused on the professionals of a reference maternity hospital in Ceará, Brazil, during the activities in the intensive care unit in the face of the Covid-19 pandemic	To highlight the need to implement actions to mitigate the negative repercussions for nursing professionals involved in critical obstetric care during and after the critical phase of the pandemic.

3.1 CHALLENGES RELATED TO STRUCTURAL ISSUES IN THE ICU ENVIRONMENT

The COVID-19 pandemic has given rise to the need for rapid adaptation of institutions. Santos et al. (2021) highlights the participation of nurses in this adaptation, through permanent education in the admission of new professionals, preparation and training of the institution's collaborators, to

understand the new flow of patients, new protocols and use of PPE. However, this adaptation requires a reordering of the internal work processes, with the necessary technical and material support by the hospital institution.

It is also noteworthy that the ICU environment is the sector where the most in-depth care is provided to patients. Given this, Almeida and others (2021) claim that nursing professionals in this sector become more susceptible to infection, a fact corroborated by official data. This aspect, in particular, brings articulated the anxiety and fear of contamination in relation to oneself, the team and the family members, feelings that are accentuated when considering the availability of personal protective equipment in many health institutions, since in hospitals in Brazil and the world there was a shortage of such equipment.

Still, in relation to structural issues, it is noteworthy that the increase in demand has led, in many cases, to the need to increase and adapt the number of beds, causing the physical space to be affected, thus impacting the work of professionals. The study developed by Conz and others (2021) reports that the nurses they interviewed reported that the increased demand for ICU care due to COVID-19 cases made it difficult for professionals to provide care, considering that the physical space had to be adapted to care for this disease.

Allied to this, it is verified that the nursing workforce in the ICU is specialized, and that the work overload meant that qualified professionals to assume the jobs were not always found in the market. Belarmino and others (2020) point out that the progressive and rapid increase in critically ill patients occurs simultaneously with the growing number of sick leave of professionals from the maternal ICU due to Covid-19, which reveals another impact of the pandemic: the overload of work for substitute nursing professionals who provide care to the population. In addition, even with the replacements, another major challenge arose: the lack of qualified professionals to take over sectors that require qualification and experience in critical care.

Another relevant issue concerns the very nature of care in the ICU. Fernandes et al. (2021) highlight that the ICU environment is characterized by a work that involves a strong emotional load, in which life and death mix, composing an exhausting and often frustrating scenario. The stressful factors in nursing work in this sector can be exemplified by several situations, such as dealing with the suffering of the patient and the family, the specific work of the profession (which requires agility, attention and renewal of technical knowledge), the need for improvisation, bureaucratic issues, the interrelationship with the team and the constant noise of the devices. These aggressive factors do not only affect patients, but also the multidisciplinary team, especially the nursing staff who live daily in this context.

3.2 CHALLENGES RELATED TO THE HOSPITAL ENVIRONMENT

Given the high transmissibility of SARS CoV2, the need to provide adequate PPE for the protection of health professionals was detected from the outset, with the aim of promoting the care of patients with a reduced risk of infection. However, Moraes, Almeida and Giordani (2020) mention that one of the main problems related to the care of patients with COVID-19 is the guarantee of daily supply of PPE to all care professionals. Thus, it is essential for the safety of employees, the maintenance of a minimum necessary stock of PPE.

Still, regarding the ICU environment, it is verified that this sector is intrinsically linked to the need for a greater contribution of high-tech equipment. In this sense, although technology is a factor of greater health promotion, there is an impact on nursing work. Dos Santos and associates (2021) discussed this issue, when they mentioned that the nurses interviewed in their study, when asked about the technological contribution used in the ICU, stated that it contributes to the nurse providing safe care to critical patients. However, this professional needs to be able to associate their scientific knowledge with the use of technology and the patient's care needs, a training that is not always possible in the context of the pandemic, due to the overload of work and the need for urgency in care.

In this line, it is noteworthy that the pandemic has created a context in which the demand for labor in the health area has been oversized, also generating an overload on existing professionals. Bittencourt and others (2021) mention this in their experience report, emphasizing the role of the nurse in personnel dimensioning, placing the nurse – especially the managers – in a position to argue with the administration of the hospital institution about the demand for more professionals, especially punctuating the level of complexity of the care given to individuals suspected or confirmed of COVID-19.

3.3 PSYCHOSOCIAL CHALLENGES RELATED TO THE NURSING PROFESSION

A point that generates problematic issues in the hospital environment in general – and in the ICU, especially – concerns labor relations and the role of leadership in the sector. Moura, Furtado and Sobral (2020) highlight that the development of Burnout Syndrome (BS) follows two processes: the first process involves extreme work demands that lead to constant overload and, finally, to emotional exhaustion, and the second process is related to the lack of resources that prevents the fulfillment of work demands, leading to withdrawal behaviors, like shutdown. As a way of mitigating these issues, the authors argue that effective leadership acts in the attenuation of BS through its influence on employees' perceptions regarding the psychosocial demands and resources of work, which include perceptions related to social support, psychological demands and control over work.

Again, it is highlighted that psychosocial conditions related to nursing are also among the hindering factors in the work of nurses in the ICU, and susceptible to the generation of BS. Freitas and others (2021) highlight that some occupational characteristics are more often associated with the development of BS, such as working overtime and having a rigid workload – common situations in the ICU, in which the very nature of the service provided requires nurses to commit beyond normal working hours. In addition, there is the fact that, in order to guarantee better wages, nursing workers need to perform long professional work hours or double shifts, which may reflect on the process of psychological illness of these professionals.

Long working hours lead to an imbalance between effort and reward, characterize increased demands at work and may influence outcomes such as BS. Long working hours can vary in intensity, breaks, and repetition frequencies. The worse the working conditions in terms of psychosocial and workload, the more damaging the working day tends to be.

Psychosocial issues were also raised by Silva Júnior et al. (2021), who mention that in nursing care during the COVID-19 pandemic, professionals working in intensive care should be in continuous monitoring, so that their emotional needs are met as soon as they arise. They also highlight the need for a psychology service available during all hours of the care shift with qualified and qualified professionals to meet this demand, thus evidencing the need for actions to prevent mental illness in these professionals.

In the same line is the study by Busanello and others (2020) who report that the precariousness of support and support services to manage depression, anxiety, fear and psychological suffering arising from the experience of this context is extremely impactful in the context of nursing. Thus, to ensure a qualified and sufficient workforce to meet the pandemic demand, it is necessary to establish support strategies for health professionals.

4 FINAL CONSIDERATIONS

According to the study carried out, it was found that the COVID-19 pandemic left an indelible mark on the life of society and left us a message that we are not prepared to act in major disasters or pandemics, without planning or contingency plan to be able to carry out the assistance to the great demand that sought the health services, putting the authorities and health managers with difficulties in decision-making and increasing the overload of work and pressure on workers, as demonstrated and in this sense, ICU services have been widely used, necessitating the opening of more beds and field hospitals to assist citizens affected by COVID-19.

And among the challenges cited as the greatest need for training on the part of nurses, mainly due to the novelties that the disease was bringing in its context in the day to day, working under

pressure and with the eminence and often the certainty of death of patients, working with new light and hard technologies for care, sometimes lack of material resources and even PPE, emphasizing the fear of being affected by the disease and thus leading to a disabling mental illness that generated sequelae, bringing memories of the panic of these moments of the pandemic.

In this sense, it is necessary to have contingency plans for various situations and training of health professionals that can better support the process, in addition to psychoemotional assistance and appreciation of these employees, so that it can have repercussions in a reduction in morbidity and mortality in society.

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CHAPTER
22

Evaluating information on coronavirus in the Central-West region of Brazil using the database of the brazilian information system

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ABSTRACT
The present work addresses the importance of data analysis to understand the COVID-19 pandemic and its impact in the Midwest region of Brazil. The need for an accurate and correct analysis is highlighted to ensure the adequate allocation of resources in the fight against the disease. The text also describes the steps involved in conducting research on the coronavirus, including proposal, literature review, data quantification, and statistical analysis. According to the Ministry of Health, COVID-19 is caused by the SARS-CoV-2 coronavirus and can range from asymptomatic infections to severe controlled conditions. Most patients (about 80%) may be asymptomatic, while about 20% of cases may require hospital care and approximately 5% may require ventilatory support. The disease is caused by a virus that lives in the controlled tract of bats and may have undergone a mutation process to install itself in the human body. The main symptoms are fever, shortness of breath, dry or secret cough, and sore throat. So far, there is no specific vaccine for the new coronavirus, but at least eight types of vaccines are being made in humans in search of the most efficient immunization. Keywords: Coronavirus, database, perception, solution. Results are presented using line graphs and tables, providing a clear picture of the current situation and informing the public on how to identify and seek treatment for the disease.

Keywords: Corona Virus, Database, Brazil, Analysis.

1 INTRODUCTION

COVID-19 is a disease caused by the SARS-CoV-2 coronavirus, presenting a clinical picture ranging from asymptomatic infections to severe respiratory conditions. According to the World Health Organization (WHO), most patients (about 80%) may be asymptomatic, around 20% may require hospital care for respiratory distress and of these cases, about 5% may need support for the treatment of respiratory failure (ventilatory support). COVID-19 has resonated a lot since the beginning of the first half. In December 2019 there were already rumors. The first cases appeared in Brazil shortly after Carnival, when people became aware of the gravity of the situation. And unfortunately, the situation in Brazil is not very good, because many companies have already been closed and with this many people are losing their jobs. (Lai, 2020).

Data analysis is very important, as it helps in the dissemination of data by facilitating the understanding of people. Until then there had not been due importance to data analysis, recently through this resource researchers followed the evolution of the pandemic. Yes, it is evident that a perfect analysis with the proper visualization allows greater reach, but if it is not done with the required

correction can ruin a job. (Salje, 2020). Hence the importance of the correct use of data analysis. In this way, it is through the analysis of data tools that one can project the possible outcomes of the pandemic. Through the data it is possible to plan the best courses of action considering that it is necessary to define where and in which the few resources available will be applied. The present work consists of exploring, reviewing the existing bibliography and clarifying to the reader about COVID-19, its repercussion, data analysis, repercussion and applicability in the Midwest region, displaying the analysis of the graphs and numbers available in the Coronavirus Panel of the Ministry of Health, stratifying the data by UF of the Midwest region, by cumulative cases of COVID-19 by date of notification, cumulative cases of COVID-19 by an epidemiological week of notification, cumulative deaths of COVID-19 by date of notification, cumulative deaths of COVID-19 by Epidemiological Week of notification. (Ministry of Health, 2020).

In this way, the work will contribute to society, helping in the knowledge about COVID-19, so that the reader can identify the disease, if any, and seek the appropriate treatment.

2 COVID-19

According to the Ministry of Health (MoH) COVID-19 is a disease caused by the SARS-CoV-2 coronavirus, which presents a clinical picture ranging from asymptomatic infections to severe respiratory conditions. According to the World Health Organization (WHO), the majority of COVID-19 patients (about 80%) may be asymptomatic and about 20% of cases may require hospital care because they have difficulty breathing, and of these cases, approximately 5% may require support for the treatment of respiratory failure.

The Ministry of Health, 2020, states that the Coronavirus is a family of viruses that cause respiratory infections. The novel coronavirus agent was discovered on 12/31/19 after cases were reported in China. It causes the disease called coronavirus (COVID-19).

So far it is not known for sure how people were infected with the novel coronavirus in China. The suspicion, according to researchers, is that the virus that lives in the respiratory tract of bats has undergone a process of mutation to be able to settle in the human body, according to the WHO.

According to the MS, 2020, the main symptoms are: Fever, shortness of breath and Dry or secretive cough and sore throat and There is still no specific vaccine for the new Coronavirus. Many researchers are using different strategies to create the vaccine. According to the WHO (World Health Organization), at least eight types of vaccines are already being tested in humans, in search of the most efficient immunization for the control of the new disease.

2.1 THE REPERCUSSIONS OF COVID-19

The repercussion of covid-19 has been very great since the beginning of the first semester, at the end of 2019 rumors of the virus were already heard, but only when the first cases appeared in the country shortly after the carnival, that people began to pay attention to the gravity of the situation. And unfortunately, the situation in Brazil is not very good, because many companies have already been closed and with this many people are losing their jobs.

Since the beginning of the pandemic, the financial health of the country is destabilized, and the states with the highest numbers of infected, health are collapsing. And each day that passes has only increased the number of people who are dying.

The novel coronavirus has infected more than 5 million people worldwide. According to the Johns Hopkins University tally, 5,014,943 people have contracted the SARS-Cov-2 virus since it emerged. The United States leads in the number of confirmed cases (with 1,551,853 people infected), followed by Russia (317,554) and Brazil (291,579), which on Wednesday counted 888 more deaths and brought the total number of deaths to 18,859.

2.2 THE REPERCUSSION OF DATA ANALYSIS

Because of the latest events, data analysis is of paramount importance, as it has helped a lot in the dissemination of data and facilitated people's understanding. The importance of data analysis had never been noticed, as in recent months, because it is through it that researchers have been following the evolution of the pandemic.

According to the IGTI website, 2020, it is no use having a perfect analysis without a good presentation of the result. It may seem like an exaggerated claim, but the visualization created from the analysis has the potential to enhance every important aspect of being observed, but it also has the potential to ruin a job that may have cost months of effort. Hence the importance of using data analysis correctly.

Right now we have data analysis in our favor, although the data, for now, are not showing positive results with COVID-19 in some states, it is through this tool that we have a perspective of when the pandemic can be stabilized if the population takes all the necessary care suggested by the (WHO). It is through the data that it is verified how many beds each state needs according to how many people have already been infected by the virus and if there is a need for isolation and maintaining only essential activities. Hence the importance of data analysis.

Still based on IGTI, 2020, for the data to have value it is necessary to analyze them. In turn, for the analysis to be effective, it must be based on three fundamental pillars: first, on the acquisition of

the relevant data; then in the models/algorithms used to obtain the desired predictions; and, finally, in the visualization of the results, based on which concrete actions can then be taken.

So, with this framework in mind, let's consider some tangible examples of how data analysis can contribute to fighting the COVID-19 pandemic and consequently ensure our safety: Monitoring the location of people with a high probability of infection (even if without confirmation), Development of outbreak prediction models by geography, this prediction by geography would enable an allocation of health professionals (scarce and tireless resources) proactive rather than reactive, based on the zones in which the number of cases was estimated to increase the most shortly. Real-time visualization of data related to the supply of essential goods, and the creation of a signaling system/monitoring of the elderly in isolation, in the face of the declared state of emergency, is important to ensure that the elderly, one of the groups most fragile by this outbreak and with this is necessary a redoubled care.

3 METHODOLOGY

Research on the coronavirus in the Midwest region of Brazil, which is composed of the states of Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS) and the Federal District (DF). The present work consists of research by data collection, as well as a bibliographic review, through articles and publications of official bodies, addressing the main information about COVID-19, its repercussion, data analysis its repercussion and applicability. (Gelman, 2014).

According to Brito 2019, bibliographic research is a type of research that is based on the analysis and interpretation of written materials, such as books, scientific articles, reports and theses, intending to collect information on a specific topic. It is widely used in several areas of knowledge, such as academia, industry, health and public administration, to identify reliable and up-to-date sources of information, inform decisions and improve existing knowledge. The bibliographic research can be carried out systematically, using well-defined criteria of the selection of materials, or exploratory, seeking general information on a subject. It is an important tool for the production of new knowledge and for improving the understanding and use of existing information.

Bibliographic research can be used to analyze the state of the art in health-related studies. The techniques used in the bibliographic research present results that demonstrate the relevance of the analysis of the information so that one can make future projections as a field of study in rapid growth. The article is an important read for researchers and students who are interested in using bibliographic research to analyze the state of the art in a specific area (González-Monteagudo, 2020).

Step 1: Research Proposal. The research proposal was designated by the supervising professor. Stage 2: Bibliographic Research. At this time, the bibliographic selection was carried out, choosing articles and publications of organs, where the most relevant topics for the research were addressed,

with an approach to explore, review and clarify to the reader about COVID-19, its repercussion, data analysis, its repercussion and applicability.

Step 3: Quantification and Data Processing. A goal has been set to analyze the graphs and figures available on the Ministry of Health's Coronavirus Dashboard, stratifying the data by FU, from the Midwest region, by cumulative cases of COVID-19 by date of notification, cumulative cases of COVID-19 by an epidemiological week of notification, cumulative deaths of COVID-19 by date of notification, cumulative deaths of COVID-19 by Epidemiological Week of notification.

Step 4: Turn Data into Statistics. As a methodology for analyzing the data in the research and the evaluation of the COVID-19 scenario, its repercussion, data analysis and its applicability in the Midwest region. Screenshots were taken of the information contained in the graphs of the Coronavirus Panel of the Ministry of Health, analyzed evidencing the real situation of the disease and people's knowledge about the subject, as well as the appropriate conduct in the current times.

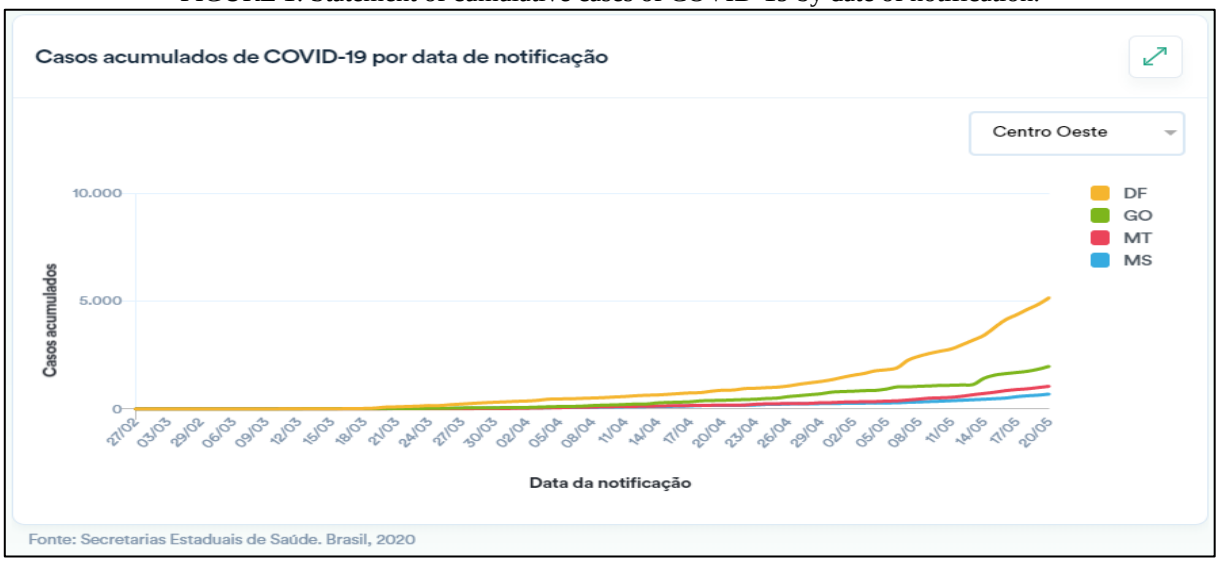
It should also be remembered that the generation and interpretation of statistics is extremely important in the health area, as it allows the evaluation of trends and the planning of effective public health interventions. Statistics can be used to identify population groups at higher risk of developing certain diseases, assess the effectiveness of therapeutic interventions, and identify inequalities in health care delivery. In addition, statistics are also essential for monitoring the spread of infectious diseases, assisting in identifying outbreaks and planning effective responses. Without the collection and interpretation of statistics, decisions made in the health area would be based on subjective assumptions and perceptions, which could lead to mistaken decisions and the implementation of ineffective interventions. Therefore, the generation and interpretation of statistics are fundamental to improving the health and well-being of the population. (DeSalvo, 2019).

4 FINDINGS

The research presented satisfactory results evidencing the information related to the behavior of the coronavirus (COVID-19) since the first case was confirmed in Brazil, especially in the Midwest region, evidencing in a visual way through graphs. As shown in Figures 1 to 4.

Figure 01 presents the information related to the **cumulative cases of** COVID-19 by date of notification on a linear scale. Data available as of February 27, 2020 for the states of Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS) and the Federal District (DF).

FIGURE 1: Statement of cumulative cases of COVID-19 by date of notification.



Source: Coronavirus Panel, Federal Government, 2020.

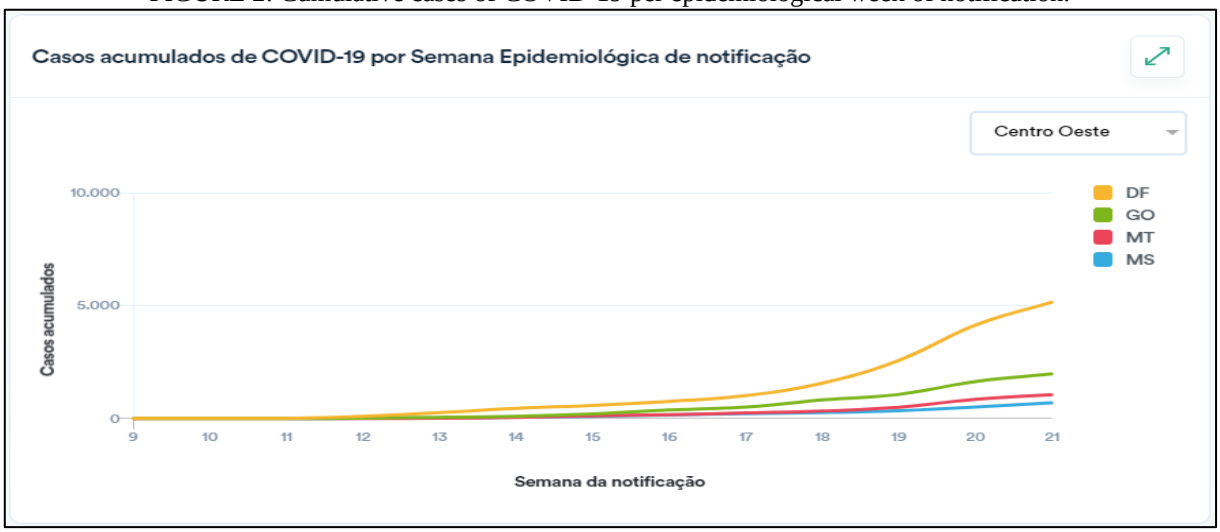
Figure 1 shows the results in a line graph and contains the evolution of the viral picture in the Midwest Region by date of notification. In yellow color the line represented the Federal District, where the first confirmed case was on March 10, on the 15th there were 8 cases, 100 on the 21st, 230 on the 27th. On the 2nd of March, there were 370 confirmed, 59 on the 8th, 651 on the 14th, 872 on the 20th, 1066 on the 26th. Already in May on day 02 were 1566 cases, 2442 on day 08, 3410 on day 14 and at 20:00 hours on day 20 the total confirmed cases was 5161.

Still about figure 1, in green color about the state of Goiás the first case notified was on March 13, 2020, on 03/20 the state had 15 cases, on 03/27 there were already 49 on 03/04 88, 191 on 04/10, on 04/17 335, 486 cases on 04/24, on May 1 808, in 08/05 1053, in 15/05 there were 1423 until the day 20 1978cases, revealing that in the last two weeks the state of Goiás had a greater growth in the number of cases.

The line in red color representing the state of Mato Grosso. On March 20, 2020, Mato Grosso had its first confirmed case of COVID-19. As of April 15, it had 151 confirmed cases. As of April 30, it has confirmed 297 cases. On May 15, 779 cases and on May 20, at 8 p.m. Brasilia time, notified 1054. In blue concerning the state of Mato Grosso do Sul-MS, according to the chart on May 17 had been counted 570 cases, and in the penultimate update, MS already had 693 cases of Covid-19.

Figure 2 provides information regarding the **cumulative cases of** COVID-19 per epidemiological week in the Midwest region, with information available from the 9th week of the year for the UFs (Federative Unit) of GO, MT, MS and DF.

FIGURE 2: Cumulative cases of COVID-19 per epidemiological week of notification.



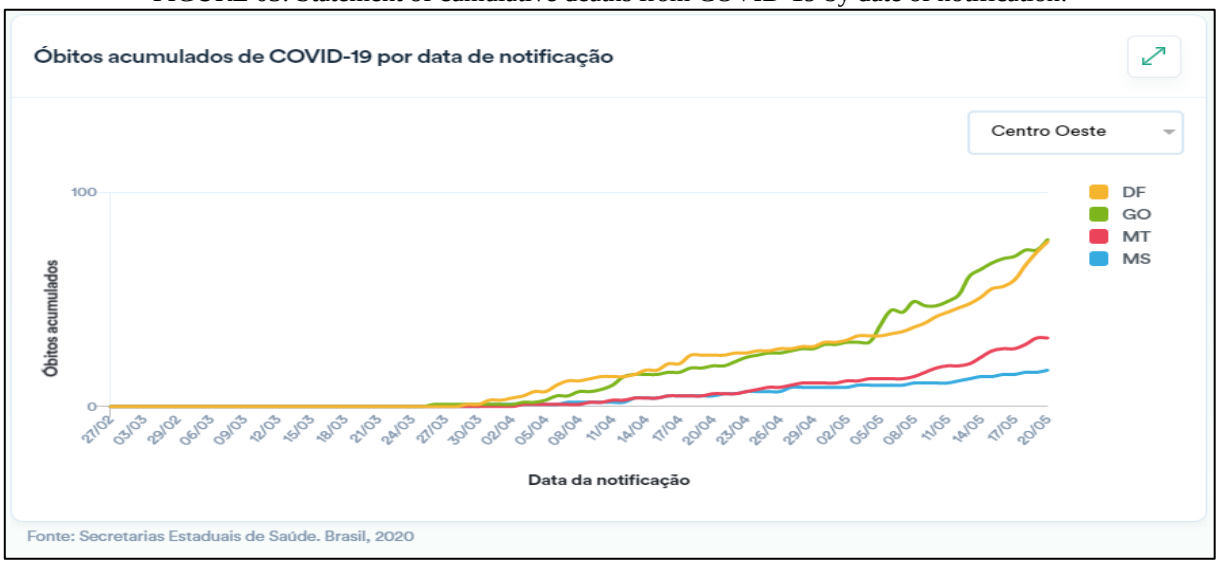
Source: Coronavirus Panel, Federal Government, 2020.

Figure 2 shows the cumulative cases of COVID-19 per epidemiological week of notification. In yellow the representative line of the DF with the first case in week 10, in week 11 there were 6 confirmed, 100 in week 12, 260 in week 13, 454 in week 14, 579 in week 15, 762 in week 16, 1013 in week 17, 1566 in week 18, 2576 in week 19, 4140 in week 20 and ending in week 21 with a total of 5161 cases. In green the state of Goiás that in the 12th epidemiological week, there were 20 confirmed cases, in the 13th 56, 14th 103, 16th 318, 17th 506, 18th 825, 19th 1069, 20th 1640, in the 21st week 1978, revealing greater growth of the nominal in the last 2 weeks.

Continuing with the analysis of Figure 2. In red the line referring to the state of Mato Grosso, which had the first confirmed case of COVID-19 in week 12, in week 15 there were 121 cases. At week 18 it had 331 cases. And in the latest update of the portal, it shows that in week 21 there were 1054 confirmed cases. In blue the representative line of the state of Mato Grosso do Sul-MS, from the day 16/05, They were registered more than 29 cases observing a very rapid growth. The epidemiological bulletin of cases updated on 21/05, MS recorded 18 new cases, adding up to a total of 693 cases.

Figure 03 presents the information about **the accumulated deaths of** COVID-19 by date of notification in the Midwest region, with information available for the states of Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS) and the Federal District (DF).

FIGURE 03: Statement of cumulative deaths from COVID-19 by date of notification.



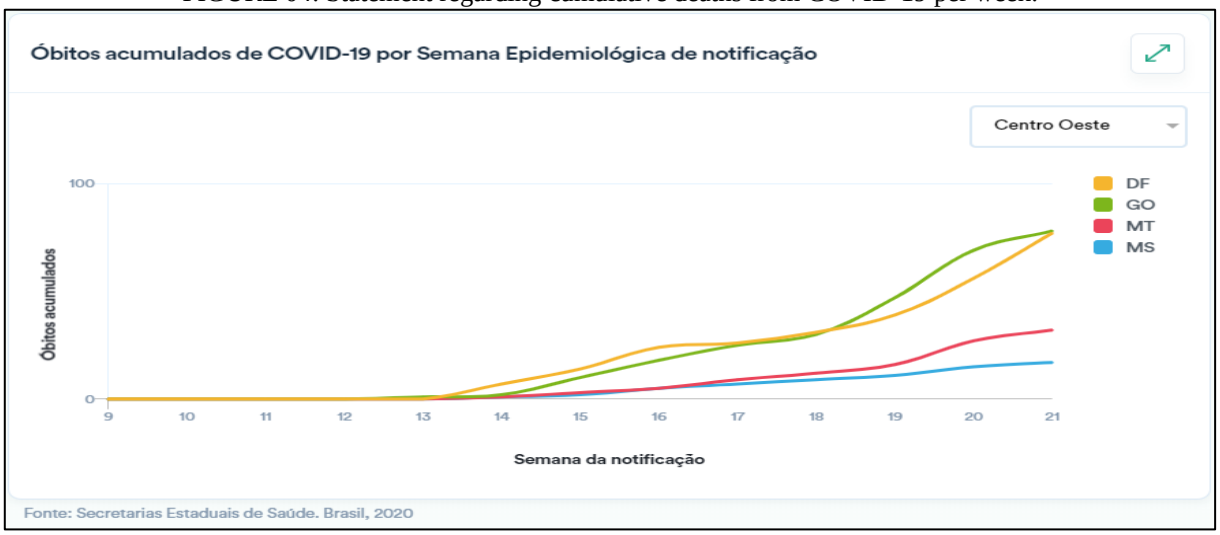
Source: Coronavirus Panel, Federal Government, 2020.

Figure 3 represents results regarding cumulative deaths from COVID-19 by the date of notification in the Midwest region. In yellow the representative line of the DF where the first death occurred on March 29, on April 2 had 04, 12 on day 08, 17 on day 14, 24 on day 20, 27 on day 26. On May 2 there were 31, on the 8th there were 37, on the 14th there were 51 and on the last day 20 there were 77 deaths. In green color the state of Goiás, as shown in the graph, had the first notification of death on March 26, this number remained unchanged until April 2, on 09/04 there were already 7 deaths, on 04/16 16 deaths, on 04/23 23 notifications, on 04/30 29 deaths notified, in 05/07 44 notifications, in 05/14 64 deaths and on day 20 there were already 78 notifications.

Still on Figure 3. On April 6, 2020, the state of Mato Grosso, in red, had its first death from COVID-19. On April 21 there were 6 deaths. On May 6, 14 deaths. And in the last update of the portal held on May 20, reported 32 deaths in the region. In the state of Mato Grosso do Sul, according to the visible blue crescent line, the first death occurred on April 2, 2020, and the number of deaths reported by COVID-19 grows gradually, managing to maintain the number of 16 deaths until the last update. Knowing thus that the measures of variation are in theory negative, totaling 17 deaths to date.

Figure 04 deals with the information related to the **accumulated deaths of** COVID-19 per epidemiological week in the Midwest region, with information available from the 9th week of the year for the UFs (Federative Unit) of GO, MT, MS, and DF.

FIGURE 04: Statement regarding cumulative deaths from COVID-19 per week.



Source: Coronavirus Panel, Federal Government, 2020.

Figure 4 shows results for cumulative COVID-19 deaths per epidemiological week of notification. In yellow is the representative line of the DF that had the first deaths reported in week 14 with 7 deaths, in week 15 there were 14 deaths, 24 in week 16, 26 in week 17, 31 in week 18, 39 in week 19, 56 in week 20 and 77 in week 21. In green the state of Goiás that in the 13th epidemiological week had the first confirmed death, in the 14th 2 confirmations, in the 15th there were already 10 notifications, 16th 18 deaths, 17th 25 deaths, 18th 30, 19th were 47, 20th 69 confirmed, in the 21st week 78, it is noted that the number of deaths in the last two weeks grew less.

Following on from the analysis of Figure 4. In red is the state of Mato Grosso, where the first death from COVID-19 occurred in week 14, in week 17 there were 9 deaths, in week 19, 16 deaths, and 32 deaths in week 21. In blue the state of Mato Grosso do Sul, the lines begin to rise from week 13, where the first case of death from COVID-19 was recorded in the state of Mato Grosso do Sul, represented by the blue line, and there were 10 deaths until the 19th week.

Figure 5 shows information related to the synthesis of cases, deaths, incidence, and mortality, with information for the states of Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS), and the Federal District (DF) until May 20, 2020, at 8 p.m.

FIGURE 5: Summary statement of cases, deaths, incidence, and mortality

Source: Coronavirus Panel, Federal Government, 2020.

Figure 5 shows the data for the Synthesis of cases, deaths, incidence, and mortality until May 20, 2020, at 8 p.m. Nationally there are a total of 291,579 cases, with 18,859 deaths, an incidence of 138.7/100,000 inhabitants. with a mortality of 9.0/per 100,000 inhabitants. Regionally there are 8,886 cases, with 204 deaths, an incidence of 54.5/per 100,000 inhabitants. with a mortality of 1.3/per 100,000 inhabitants. In the state of Mato do Grosso there are 1,054 cases, with 32 deaths, an incidence of 30.2/100,000 inhabitants. with a mortality rate of 0.9/per 100,000 inhabitants. The state of Goiás records 1,978 cases, with 78 deaths, an incidence of 28.2/per 100,000 inhabitants. with a mortality of 1.1/per 100,000 inhabitants. The Federal District has confirmed 5,161 cases, with 77 deaths, an incidence of 171.2/100,000 inhabitants. with a mortality rate of 2.6/100,000 inhabitants. Finally, Mato Grosso do Sul confirmed 693 cases, with 17 deaths, an incidence of 24.9/per 100,000 inhabitants. with a mortality rate of 0.6/100,000 inhabitants.

5 CONCLUSION

COVID-19 is a disease caused by the SARS-CoV-2 coronavirus that can present from asymptomatic infections to severe respiratory conditions. There is not yet a specific vaccine for the new coronavirus, but researchers around the world are working on different strategies for creating an efficient vaccine for the control of the disease. Data analysis has been instrumental in tracking the evolution of the pandemic and in determining the need for isolation and social distancing measures in different states and regions.

In addition, it is notorious that bibliographic research is a valuable tool to obtain reliable and up-to-date information on the subject. It is widely used in different areas of knowledge, including

health, and can be carried out in a systematic or exploratory way. In this context, it is essential to emphasize the importance of using data analysis correctly and effectively. The acquisition of relevant data, the proper choice of models and algorithms, and the clear visualization of the results are fundamental for the analysis to be efficient and for the decisions made based on it to be the most appropriate.

It is possible to notice that the Midwest Region of Brazil has faced significant growth in the number of cases and deaths related to COVID-19. The Federal District, Goiás, Mato Grosso, and Mato Grosso do Sul showed an increase in the number of confirmed cases and deaths throughout March, April, and May 2020.

It is important to note that the states showed different growth in the number of cases, which can be attributed to factors such as the social distancing measures adopted in each region, as well as the behavior of the population regarding the recommendations of the health authorities. In addition, it should be remembered that these data reflect only the reported cases and that there may be underreporting in some regions.

In short, the data presented show the need for effective measures to contain the spread of COVID-19 in the Midwest Region and throughout the country, to minimize the impact of the disease on the health of the population and the health system. The analysis of this information is fundamental to guide public policies and decisions made by health authorities, as well as to raise awareness of the importance of combating the pandemic.

It is also worth remembering the need to follow the guidelines of the World Health Organization and local health agencies to prevent the spread of the disease, including the use of masks, hand hygiene, and social distancing. The COVID-19 pandemic is an unprecedented situation and requires everyone's joint effort to control its spread and minimize its public health impacts.

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CHAPTER
23

Mobility in times of Covid-19: Effects of immobility on air transport

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ABSTRACT
The year 2020 brought with it several changes in society as a result of the emergence of the pandemic caused by the new Corona Virus (SARS CoV-2), initially an epidemic located in the province of Wuhan in China, but which quickly spread to the whole world, becoming a pandemic that has caused thousands of deaths, impacts on human life and economy of most countries around the globe. Like many sectors of the world economy, the airline industry is facing a severe economic crisis in the pandemic scenario due to travel restrictions (physical immobility) and border closures around the world. Based on the current situation experienced by air transport, this study aims to verify how the restrictions of physical displacement of individuals in the current pandemic scenario have impacted the Brazilian air industry through bibliographic research. As a result, Brazilian air transport has lost a significant number of passengers and that, although it is in a moment of crisis, it will need to devise strategies to survive the pandemic chaos and invest in adapting to the post-pandemic scenario.

Keywords: Pandemic, Mobilities, Tourism, Airports.

1 INTRODUCTION

The year 2020 brought with it several changes in society as a result of the emergence of the pandemic caused by the Corona Virus (SARS CoV-2), initially an epidemic located in the province of Wuhan in China, identified at the end of 2019, but which quickly spread to the whole world, becoming a pandemic that has caused thousands of deaths, impacts on human life and economy of most countries around the globe.

In addition to the millions of lives lost due to the disease, several sectors of the economy have suffered great losses, mainly due to border blockades and social isolation, measures that seek to reduce the number of contagion and flatten the contagion curve, which overload the health system (IACUS et al, 2020). Because of the mandatory isolation, mobility, purchasing power, employment opportunities, including the right to come and go have been drastically reduced. The order is for everyone to stay at home, a factor that contributes to the reduction of contagion, however it reinforces the existing inequalities in society, such as Cheibub and Freitas (2020), among other authors, as well as human egoism.

Among the most affected sectors, the air and tourism sectors stand out. Panosso Netto et al. (2020), Coelho and Mayer (2020), Mecca and Gedoz (2020) among other authors, show in their studies the fragility of the tourism sector in the face of external problems. For these authors, tourism, one of the first sectors to be stopped, has no return forecast, which implies job losses and impact on the entire

production chain, such as hotels, restaurants and air transport, especially in regions that have tourism as the main economic activity (PANOSSO et al, 2020). Rodrigues (2020), as well as other authors, argue that air transport and tourism were responsible for rapidly spreading the virus to the whole world by providing displacement of people.

Cruz (2020) argues that the airline industry has already been going through several crises before the pandemic, such as the price of kerosene for aviation, sensitive to the fluctuations of oil activity. The loss of thousands of passengers traveling daily severely impacts the financial stability of the sector, since it needs large investments to function. With aircraft on the ground, unable to carry passengers, airlines find themselves at risk of bankruptcy, especially in Brazil.

Based on the current situation experienced by air transport, this study aims to verify how the restrictions of physical displacement of individuals in the current pandemic scenario have impacted the Brazilian air industry through a bibliographic research.

2 PANDEMIC AND ITS IMPLICATIONS ON SOCIETY

Specifically on March 11, 2020, COVID-19 was declared a pandemic by the World Health Organization (WHO). Oliveira Neto et al (2020) explain that the pandemic occurs when a new disease or virus crosses the borders of the country in which it originally arose, contaminating individuals from other nations who are not immune to the disease. Since the pandemic began, the world has been going through days of uncertainty due to the lack of knowledge of the disease, treatment and the race to find a safe and effective immunizer in order to reduce the number of infected by the virus, the deaths and finally manage, as a society, to return to "normal".

For Coelho and Mayer (2020), this pandemic has been "the largest health emergency in recent history" (p. 3701). Thousands of new cases of infection and new deaths are counted every day, causing chaos in the health system. On March 9, 2021, Brazil recorded 1,954 deaths in 24 hours (G1, 2021), in addition to several people waiting for a vacancy for an Intensive Care Unit (ICU) bed.

Oliveira Neto et al (2020) explain that the displacement of infected people and objects facilitates the spread of a disease throughout the world, a factor that is possible thanks to the facilities arising from globalization and growth of mobility, which for De Sá (2020), "cooperated with the virus, which invaded and crossed borders without permission and without consent" (p. 2). Panosso et al (2020), recall that in 2003 the coronavirus (SARS CoV-1), also of Chinese origin, spread to 37 countries through international travel. For this reason, one of the first actions of countries in the face of the pandemic was to close their borders and prevent individuals from other nations from entering their countries, which drastically decreased tourist travel, business, visits to family members, among others.

In an attempt to contain the spread of the virus, governments around the world have been enforcing social distancing measures, urging people to stay home, as well as adopting mask-wearing and distancing of at least 2 meters from one person to another when necessary to be outside the home. In this reality, borders, tourist activity and various establishments needed to have their doors closed, such as universities, companies and commerce, resulting in considerable economic losses for these sectors. In case of non-compliance, fines would be imposed. Over the course of 2020, these measures were being relaxed, a factor that contributed to the increase in the number of infected cases.

With travel restrictions, people having to work from home, no leisure and entertainment options on the streets and commerce and many studying from home, society has been going through delicate times. In addition to the economic crisis caused by the pandemic scenario, polarization of society in relation to social isolation, this pandemic has highlighted the inequalities already existing in society, as well as human egoism, since there are several people who do not respect the safety measures against the virus, putting their health at risk, as well as other people. In addition, this selfishness is made explicit when opening the news or social networks. While some strive to stay in their homes, celebrities continue to travel to beautiful places, attend parties, among others, which corroborates the idea of Cheibub and Freitas (2020):

> In this "landscape", socioeconomic classes A and B (occasionally) enjoy the beach, the waterfront, the parks, travel and spread, in addition to the virus, alienation, ignorance, lack of citizenship-solidarity and exploitation of the working class, forcing a significant portion to move on public transport without proper social distancing to work in (even more) precarious conditions (p. 450).

In this scenario described by the authors, the concept of the mobility paradigm of Sheller and Urry (2006) is identified, which, summarized by Araújo and Godoy (2016), "is when the mobility of some occurs at the expense of the immobility (and contamination) of others" (n.p.). Those who are leaving home (furniture) are generating demands so that others have to leave home and stay immobile in their jobs, exposed to risks, to meet these demands.

Cheibub and Freitas (2020) reveal the various forms of inequality that are being highlighted in this context. For the authors, "social isolation as a coronavirus prevention measure has proven to be a privilege in Brazil" (p. 460). First, the fact of the need to stay at home is questioned, which has become a multifunctional space accumulating the function of residence, work and place of leisure. During the time of isolation, most of the leisure options are linked to the internet, home pool, games, among others. But how many poorer people have this vast option in their homes? How many people in Brazil have quality internet or cable TV to enjoy their idle time, without being able to be on the street? For the authors, access to the internet and leisure spaces, such as shopping malls, are unequal. Carneiro

and Allis (2021) reinforce by arguing that the mobilities (physical, virtual, among others) are not equal for everyone.

Another criticism of Cheibub and Freitas is related to the inequality that occurs due to work, an idea reinforced by De Paula and Allis (2020). While some enjoy the possibility of working from home (and go for a walk), many others need to go to the streets to risk contaminating themselves and their families so that these others can stay at home, like food delivery people, since delivery orders have grown significantly at the time of stricter isolation.

2.1 PANDEMIC AND ITS IMPLICATIONS FOR TOURISM

If on the one hand there has been growth of some economic sectors due to physical immobility, such as e-commerce, on the other hand several other sectors of the world economy have suffered significant economic impacts, such as tourism and air transport, since both are dependent on the physical movement of people. According to the World Tourism Organization (UNWTO) (2021), by March 2020 the world had already lost 67 million international entries and about 80 billion dollars of revenue from tourism. In Brazil, tourism corresponds to 3.71% of GDP and employs more than 7 million Brazilians (MECCA and GEDOZ, 2020), which will inevitably present significant falls.

Tourism, as well as air transport, was one of the first sectors to stop with the arrival of the pandemic (MECCA and GEDOZ, 2020), and although nations are already immunizing their citizens, there is no forecast of a quick return to the numbers of tourists transiting the globe as in 2019. For Cheibub and Freitas (2020), De Sá (2020) and Cruz (2020), tourism was an important vector for the spread of the virus around the world, due to the mobility of people.

Sheller and Urry (2006), Allis and De Paula (2020) as well as Carneiro and Allis (2021) argue that mobility goes beyond physical displacements. For Carneiro and Allis (2020), it is possible to do tourism without the need for displacement, and this activity is made possible through the internet, by imaginative mobility, widely used in this pandemic period, according to them. However, it is known that this modality does not generate significant economic impacts compared to conventional tourism, which includes displacement. Coelho and Mayer (2020) corroborate by arguing that not all tourism businesses can be offered to the customer online. It is only possible for some activities, such as sales, administrative activities, and operational support.

With the restriction of tourist activity in the pandemic, places that previously suffered from overtourism (excess of tourists in a locality), now suffer from the stagnation of the sector, as can be observed in the work of Panosso et al (2020), entitled "From Overtourism to stagnation". For these authors, as well as Cruz (2020), the negative effects of the absence of tourism will not be felt equally in the locals. The destinations that most depended economically on the tourist activity will suffer more

expressively, such as Spain, Italy, France, some Brazilian destinations such as Maragogi, Jericoacoara, Búzios, Bonito, among others.

From this difficult phase, Panosso et al (2020), as well as Mecca and Gedoz (2020) emphasize the need for learning in relation to the sector. Using tourism as the main economy of the locality is not recommended, since tourism is a sector vulnerable to political, economic, exchange rate changes, seasonality, crises in the production chain, terrorism, natural disasters, as well as epidemics and pandemics. It is necessary to recognize, value and work on economic alternatives.

3 IMPACTS OF THE PANDEMIC ON BRAZILIAN AIR TRANSPORT

Air transport is extremely important for the expansion of tourism worldwide, because, in addition to the possibility of reducing distances quickly, places that were previously difficult to access have become accessible (GOMEZ, 2014). Teles and Sarmento (2012) point out that in 2008 more than 40% of tourist trips used air transport. A decade later, according to data from the World Tourism Organization (UNWTO), this percentage has increased to 58% (UNWTO, 2020). Teles and Sarmento (2012) They understand that the relationship between the development of tourism and air transport is so clear that it is difficult to disassociate them.

Giraldo-Velásquez et al. (2016) go further. For them, air transport is what has contributed most to the broad globalization of travel and, to a large extent, to the economic growth of the planet, since the benefits generated by it expand to other sectors of society, such as trade, cargo transportation, food (ALAEERAD and KHOSHNOOD, 2016) and, in the current pandemic scenario established in 2020, of medicines, patients and the vaccine against COVID-19, all of which require speed and safety in displacement, often facing great distances between origin and destination.

On the other hand, because of this ease of rapid movement and the possibility of accessing several locations, air transport was responsible, as well as tourism, for the emergence of the pandemic, because it was through it that infected people and objects, even without knowing it, left their locations carrying the virus to hundreds of others (RODRIGUES, 2020; OLIVEIRA NETO et al, 2020). Panosso et al (2020) recall that in 1968 and 1965, it was through air transport that the Hong Kong flu (influenza) crossed borders and infected thousands of people.

In relation to Brazil, Rodrigues (2020) analyzes that the places that had the most infected people were those that maintained the airflow and that part of the "fault" of this mass contamination in the world, was the lack of an emergency plan for the global air sector, which should have been created by IATA and ICAO.

For this reason, since the beginning of the pandemic, the airline industry has operated on the basis of various restrictions in order to control the spread of the virus. According to Carneiro and Allis

(2021), by April 2020 all countries had already created travel restrictions, which will be relaxed according to the decrease in cases of the disease (KOUR et al, 2020), a factor that exposes the sector to financial crises. Allis and De Paula (2020) point out that in April 2020, there was an 80% drop in international flights, with an expected loss of US$ 84.4 billion by the end of the year. According to these authors, the sector is expected to reach the level of 2019 only in 2023-2024.

Because they are sectors that complement each other, as well as tourism, the airline industry was extremely economically compromised with the arrival of the pandemic, which imposed the closure of borders and impediment of tourist travel, which move more than half of air demand. Cruz (2020) argues that although the tourism sector is experiencing difficulties in this period, the airline industry was already facing crises before the pandemic, such as the price of kerosene for aviation, sensitive to the fluctuations of oil activity and the high costs to maintain itself. The loss of thousands of passengers traveling daily severely impacts the financial stability of the sector, since it needs large investments to function. With aircraft on the ground, unable to carry passengers, airlines find themselves at risk of bankruptcy, especially in Brazil.

As an example of difficulties, the author cites the Brazilian airlines LATAM and Avianca, which already had difficulties to maintain themselves, at the moment they are already in the process of judicial reorganization, unlike the United States. In this country, former President Donald Trump created the Aid, Relief and Economic Security Act, signed into law on March 27, 2020 (Panosso et al, 2020) with the aim of helping several areas, with the guarantee that the benefited companies would not lay off their employees until September of the same year. Cruz (2020) reports that an initial aid of 25 billion was granted to U.S. companies to maintain themselves.

In relation to airports, large real estate structures that require thousands of people to operate it (SHELLER and URRY, 2006), investment in high technology and, at the present time, sanitary adaptations demanded by the pandemic, continue to work, although travel has been reduced, since air transport also operates in other sectors of society. If these are working, it is still necessary to bear the same expenses, which can be a financial risk, given that fewer companies traveling, results in fewer fees paid to the airport. Fewer passengers, fewer non-airport fees[1] collected through the complementary services offered on the airport site.

In Brazil, the country's main airports suffered exorbitant drops in passengers in 2020 (table 1). In addition, several foreign airlines have stopped flying to Brazil, which results in large monetary losses for the airport.

[1] Revenues from the concession of airport space for the allocation of shops, parking, food and beverage establishments, advertising, among others.

Table 1: Passenger movements in 2019 and 2020

Airport	Mov. pax 2019	Mov. pax 2020	%[2]
Guarulhos - GRU	43.002.119	20.332.520	- 43,9
Brasilia - BSB	16.727.177	7.848.297	- 46,9
Galleon - GIG	13.507.881	4.635.123	- 34,3
Confins - CNF	111.198.78	48.119.42	- 43,27
Viracopos - VCP	10.585.018	73.648	- 0,69

In the table, the busiest Brazilian airports were selected, with the exception of Santos Dumont – SDU and Congonhas – CGH, which did not find data. It is noticed that the airport of Guarulhos, the busiest in Brazil, lost almost half of its annual demand, as well as the airport of Brasília and Confins. The airport that suffered the least loss of passenger movement in the pandemic period was Viracopos.

These significant losses result in large economic gaps for airport administrations, which require high investment to operate, and in the current conjuncture, do not have the expected return. The account does not close, which results in losses. For this reason, Kour et al (2020) understand that in these crises airports are extremely affected, and it is necessary to react and adapt services according to the new reality.

4 FINAL CONSIDERATIONS

The year 2020 brought with it economic and social challenges, which are extending into the year 2021. Even with the discovery of vaccines against the Chinese virus, the numbers of daily deaths, as well as of infected people, do not stop growing, which, in addition to the sadness for the significant loss of so many lives around the world, postpones the end of the economic and social crisis that the world is experiencing.

Several sectors of the economy are suffering from the restrictions imposed by governments in order to contain the spread of the virus, especially with regard to social isolation, closure of commercial establishments, service, leisure, beyond borders, which make it impossible to travel tourists, visit relatives, dream exchanges, among others. The moment demands that everyone stay at home, despite the social discomfort this causes.

Among the most affected sectors, tourism and air transport stand out, the latter being even more expressive. According to Panrotas (2021), the airline industry was the most affected by this crisis in the year 2020, which has extended to 2021, since there is no prediction, no matter how hard scholars try, for everything to return to "normal". Because it is a sector that requires large investments, proportionally there are risks of losses during crises.

Several authors have sought to understand this moment and to pass, through their studies, forecasts that can contribute to the planning of future actions to reduce the significant losses that worry

[2] The approximation was used.

entrepreneurs and that are responsible for the closure of small and large companies in the market. However, although this chaos affects the whole society with job losses, financial losses for entrepreneurs, among others, it is necessary, as challenging as it may seem, to care about human life, as Cheibub and Freitas (2020) point out.

By the end of 2020, some activities were already being resumed. The return of tourist movement, opening of bars, malls, and beaches, which resulted in a new wave of COVID-19, with numbers of deaths and infections like the beginning of the pandemic.

As understood in this paper, air transport has been drastically affected by the pandemic, however, even with reduced capacity, it has worked. Airlines have been flying and airports are open daily, which exposes workers to the daily risk of contamination. That is, for tourists (mobile), eager to return to travel can do so, workers (real estate) need to expose themselves to the virus. It is necessary that before the yearning for the return of activities and consequently of the profits arising from them, lives are prioritized.

Just like tourism, it is possible to realize that the predictions of return of the "normal" movement of air transport are not immediate. With such significant loss figures, it will take a few years to recover the same movement experienced in 2019. Until then, air transport will have to create strategies to alleviate the effects of the crisis, as well as adapt to the post-pandemic scenario, through more effective health policies and action plans in case of emergence of new health crises (RODRIGUES, 2020), in order to quickly control the spread of a disease around the world.

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CHAPTER
24

Impact of extended social isolation on spontaneous play in childhood

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ABSTRACT
The coronavirus pandemic led to the interruption of school's routine and the social isolation and confinement of thousands of children revealing different childhoods in different contexts and cultures, bringing out vulnerabilities and impacting the child's cognitive, social and emotional development. In view of this scenario, the objective was to understand the influence of extended social isolation on the frequency of children's participation in active play. Research with a cross-sectional quantitative approach, carried out in six municipal public schools of Alegrete with 164 children, 76 girls and 188 boys with twelve years of age. Data were collected via electronic form, and the descriptive analysis of qualitative variables was organized in tables of specific frequencies. The project was approved by the ethics committee with registration CAAEE44380221.8.0000.8091. The results showed that 46.3% of the children played computer games every day, 45.7% practiced some sport or dance, and 40% played outdoors. It is concluded that isolation brought profound changes in children's routine, affecting not only studies, but practically all aspects of their lives.

Keywords: Child, Pandemics, Social Isolation, Plays.

1 INTRODUCTION

When we think of children, most often come to mind, a group of boys and girls playing, running, jumping, cheerful, smiling, whether in the school space, in one in the square, or in the courtyard of the house.

Children seem to combine with the words movement, play, dance, play, fun, school and we would never imagine that from one day to the next, about 860 millions of these children from all over the world would stop going to school, move away from friends and be without the possibility of playing outdoors; all stemming from the extended social isolation imposed in the fight against the COVID-19 pandemic. In the blink of an eye, these children were left without routine, without time to do chores, feed, bathe, play with friends, and it is known that routine is fundamental in the process of growth and development of the child. Families, very quickly, had to organize, or rather reorganize. In some families, isolation also confined fathers and mothers, in others, fathers and mothers had to continue working to maintain sustenance. Many children stayed at home alone, others stayed with brothers and or sisters, others with grandparents, uncles. The increase in conviviality in some families was salutary for some children who had the opportunity to spend more time with their mothers, however, in other families it exacerbated the violence against the child. The whole point of it all is that the COVID-19 pandemic has opened social inequality in our country.

According to the Scientific Committee of the Science for Childhood Center (2020), the rupture in the social fabric, school, friends, grandparents, which welcomes the child and gives him the symbolic bases of thought and instrumentation for action has given rise to some functional and behavioral difficulties such as fear, anger, sadness; That is, it impacted both the emotional system and the health of the child's own body. In this sense, parental figures are central to child development, especially in early childhood (zero to six years) (ROOS, TRUCCOLO, 2021; LINHARES; ENUMO, 2020).

In the search for a way to alleviate the tense, uncertain moment that children have gone through and, in a certain way, continue to pass, playing, performing outdoor activities, dancing and playing, can be useful strategies for children. Through the game the child internalizes rules and finds solutions to the conflicts that are imposed on him in real life.

Thus, considering that childhood is the result of a long historical and anthropological construction, not being equal for all children; considering that there are different children living different realities, wealth, poverty, ethnic, cultural, social, affective differences, that is, considering that childhood is plural (BARBOSA, 2000), that we set out to investigate these childhoods and, considering that most of the studies that investigate children in the context of the pandemic are not directed at children, that is, research on children is not conducted with the children we set out to do so and the following research question arises: What is the impact of the expanded social distancing imposed by the coronavirus pandemic on children's participation in spontaneous play?

Thus, the general objective of this study was to understand the impact of extended social isolation on spontaneous play in childhood.

To achieve the general objective, the following specific objectives were outlined: to ask the child about the frequency with which he played outdoors; - investigate the frequency with which the child accessed the computer, tablet or mobile phone; question how often the child played freely, danced, or did physical activity.

2 METHODOLOGY

This is a cross-sectional quantitative approach, descriptive in relation to the objectives, and field as to its technical procedures carried out in six schools of the municipal public school system of Alegrete with 164 children, 76 girls and 188 boys with twelve years of age.

Data were collected via electronic form, and the descriptive analysis of qualitative variables was organized in tables of point frequencies. The project was approved by the ethics committee with registration CAAEE44380221.8.0000.8091. The criterion for selecting the schools was their location, that is, schools located in neighborhoods on the outskirts of the city because they have a greater number

of students with families benefiting from the "Bolsa Família Program", inserted in a territory of social and economic vulnerability. The research was conducted between the months of August 2021 to July 2022, that is, during the implementation of sanitary measures of social isolation and the use of remote teaching methodologies by the schools of the municipality and when the children return to the face-to-face form of teaching.

Both the researcher and the scientific initiation scholarship holder did not have, at any point in the research, direct contact with the children, ensuring that a vertical relationship was not established where the child felt pressured to answer the electronic form/questionnaire. The children received the invitation and the link to participate through their teachers, who are already accustomed and have established confidence. The teachers were instructed to explain that participation in the research did not constitute a school task, nor should it be considered an evaluation.

The electronic questionnaire was adapted from the instrument "Childhood Research in Times of Pandemic. 2020", which is part of a research conducted in Belo Horizonte, called "Childhood in Times of Pandemic – experiences of children from the great BH" and was provided by Dr. Isabel de Oliveira e Silva, Dr. Iza Rodrigues da Luz and Dr. Levindo Diniz Carvalho of the Center for Studies and Research on Childhood and Early Childhood Education (NUPEI), of the Federal University of Minas Gerais. An advantage that the person participating in the research has in answering an electronic questionnaire is that he chooses the time and time he wants to do it.

3 RESULTS AND DISCUSSIONS

The primary objective of this study was to understand the impact of extended social isolation on spontaneous play in childhood. For this, the following secondary objectives were outlined: to ask the child about the frequency with which he played outdoors; to investigate the frequency with which the child accessed the computer, tablet or cell phone; to question the frequency with which the child played freely, danced or did some physical activity.

A total of 164 children, 76 girls and 88 twelve-year-old boys participated in the study. The results showed that the most cited activities performed at home during isolation were helping the mother to tidy the house (38.46%), followed by playing (30.77%), doing school tasks (19.78%) and "fiddling" with the cell phone (11%). When asked how often they used the computer, tablet or cell phone for games or simply surfing the internet, that is, not using it for schoolwork, 46% (76) of the sample answered that every day and only 14% answered no day, suggesting not having any of the devices or not having internet. (TABLE 1). Many families, even before the pandemic, could no longer afford the costs of internet, tablets, computers to be used to attend classes remotely, a consequence of the inequality between social classes in Brazil. With the pandemic, this inequality was totally exposed,

and those who survived by working as self-employed and did not receive income from the government were left without work due to social isolation, and lockdown (SILVA, 2022). On the other hand, a study conducted by the Lemann &Itaú Social Foundation (2020) showed that 96% of households have at least one mobile device, and 77% have two or more devices; 42% have at least one computer or notebook and 46% have at least one TV with internet access. In the same study, only 58% of family members consider that the internet and equipment they have at home are enough for their children to perform the activities. There are practically no differences between the stages of teaching in this regard. Just over 4 in 10 students (42%) would not have, according to their families, adequate equipment and access conditions for the context of non-face-to-face education.

It is also added that recreational screen time has become the most frequent indicator of sedentary behavior in children and adolescents and according to the first Canadian Sedentary Behavior Guidelines for Children and Youth, it is characterized by recreational screen time above 2 hours per day (TREMBLAY et all., 2011). In the report on physical activity in Brazilian children and adolescents (2018), 26.9% of children had sedentary behavior in the pre-pandemic period (SILVA et all., 2018).

Table 1 Absolute and Relative Frequency with which 12-year-old girls and boys play on their computer, tablet or mobile phone during the week

Days of the week	Absolute Frequency	Relative Frequency
No day	23	14,02%
A few days	65	39,63%
Every day	76	46,34%
Grand Total	**164**	**100,00%**

When asked about the practice of sports, dance or physical activity, the highest percentage, 45.7% (75) answered that they practice a few days a week (TABLE 2). A systematic review of the literature, conducted by Kharel et all. (2022) showed that the countries where children suffered the most from the impact of the pandemic in terms of reducing habitual physical activity were Brazil and Spain, and the countries where children maintained or even increased physical activity levels were Australia and Germany. One explanation for this may be the fact that both Brazil and Spain are among the countries hardest hit by the COVID-19 pandemic, with many infections and deaths. Lockdown restriction in Spain was strict and children could not go outdoors. Most Brazilian children live in apartments and have limited access to outdoor space for physical activity and sports. Also, the availability of a larger outdoor space near the place of residence can positively influence the child's physical activity. In another study, conducted by Dallolio et all. (2022) with 77 Italian children, showed that time spent in daily and weekly activity decreased significantly from the pre-pandemic period to the pandemic. With regard to regular physical activity, studies show that prior to the COVID-19

pandemic for every four school-age youth, three did not meet the recommended minimum of physical activity for health, sixty minutes daily, on every day of the week (WHO, 2018).

Table 2 Absolute and Relative Frequency with which 12-year-old girls and boys practice sports, dances or plays

Days of the Week	Absolute Frequency	Relative Frequency
No day	25	15,24%
A few days	75	45,73%
Every day	64	39,02%
Grand Total	**164**	**100,00%**

The results showed that playing outdoors was no longer part of the routine of 34% of the sample, but it was no longer part of the routine of 18% of twelve-year-old girls and boys (TABLE 3). Living collectively, together with nature, is important at any time of life, especially in times of stress such as the coronavirus pandemic. The Brazilian Society of Pediatrics (2019) advises that children should have the daily opportunity to, at least for an hour, play, learn and live with nature. In this way they will be able to develop with full physical, mental, emotional and social health. Play is one of the main ways for children to develop sociability, experience their bodies, discover their abilities, be challenged to learn and overcome themselves.

Table 3 Absolute and Relative Frequency with which children played outdoors

Play outdoors	**Absolute Frequency**	**Relative Frequency**
From time to time	51	31,10%
No	29	17,68%
Yes, with my friends	56	34,15%
Yes, alone	26	15,85%
(empty)	2	1,22%
Grand Total	**164**	**100,00%**

5 FINAL CONSIDERATIONS

The results showed that the period of social isolation influenced the frequency with which the children participated in active, that is, free, games of their own choosing. The daily use of electronic equipment, performing activities with movement a few times during the week and the reduction to outdoor coexistence with other children was perceived in the research. These are results that concern and suggest the need for continuity of research in order to outline strategies that can help children resume their routines.

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CHAPTER
25

Development and remote management of projects using virtual methodologies in times of Covid-19: Case study in the industrial pole of Manaus, state of Amazonas, Brazil

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ABSTRACT
The Covid-19 pandemic has forced the use of means of interaction and project management in an iterative and non-face-to-face manner. Virtual interaction and monitoring tools were evidenced as a solution in this context. The legislation requires companies that manufacture computer goods in the region of the Manaus Free Trade Zone (ZFM), Amazonas, Brazil, to invest part of their revenues in Research, Development and Innovation (RD&I) activities. A project to create and develop applications for means of payment via card was executed through the joint action of Science and Technology Institutions (ICTs) in the Industrial Pole of Manaus (PIM) between University of the State of Amazonas (UEA), Federal University of Amazonas (UFAM) and Federal Institute of Amazonas (IFAM). Resources such as Google Meet, Jamboard, Scrum, Git, GitHub, GitHub Classroom, GitKraken, Google Sheets, Android Studio, Information Architecture, UML enabled the collective virtual work not in person between research professors and scholarship students in the development of 15 Android applications, allowing various sectors of the economy to manage their business in the palm of their hand.

Keywords: Computer Law, Suframa, Manaus Free Trade Zone, Android Applications, Research and Development, Innovation.

1 INTRODUCTION

The Manaus Free Trade Zone (ZFM), created by Decree-Law No. 288/1967, is an area of free trade of import and export with the strategic purpose of creating in the interior of the Brazilian Amazon an industrial, commercial and agricultural center. The regime of tax benefits (reduction/suspension of federal, state and municipal taxes) existing in the ZFM is a central point in attracting investments in

the Brazilian Amazon region. The Industrial Pole of Manaus (PIM) has more than 500 companies, among them many multinationals. The creation of the Industrial Policy of Informatics - Law 8.387/1991 of the ZFM, granted tax incentives to stimulate the competition and technical capacity of Brazilian companies that produce computer, automation and telecommunications goods in the Amazon. Suframa (Superintendence of the Manaus Free Trade Zone) coordinates the activities of ZFM (SUFRAMA, 2021, AMAZONAS, 2020).

Decree-Law 10.521/2020 defined RD&I activities as: basic research, applied research, experimental development and technological innovation, which are activities defined in the Frascati and Oslo manuals (OECD, 2015, OECD, 2018). Professional training or qualification and innovation management activities were also added and correlated. According to the Frascati manual, R&D is only one step in the innovation process including the creative work carried out systematically to increase the fields of knowledge and the use of these to create new applications (OECD, 2015). In this perspective, technological innovation encompasses both formal RD&I, carried out in RD&I laboratories, and informal or occasional RD&I, produced in other units and in different activities.

The Information Technology Law requires that all companies in the ZFM of this sector apply annually at least 5% of their gross revenues in the domestic market in RD&I activities in Science and Technology Institutions (ICTs) in the Amazon, being 2.3% in RD&I external to the company, in ICTs accredited with Suframa, and 2.7% to be applied in RD&I carried out internally in the company itself. Regarding the percentage of 2.3%, there is a requirement that at least 0.4% be applied in public ICTs (SUFRAMA, 2016).

The company Transire da Amazônia, leader in the production of electronic means of payment in card machines, especially the A910 payment terminal, is a pioneer in using the Android system in the design of interconnection with the largest operating system in the data transfer area (TRANSIRE, 2021). The company allocated resources related to the portion of 0.4% for the development of specific applications for the A910, aiming to provide various commercial sectors with the opportunity to use it in a personalized way and appropriate to their usual activities, through a financial contribution from the University of the State of Amazonas – UEA, the public ICT chosen for the project.

In UEA the place chosen for the development of the project was the School of Technology (EST / UEA) in Manaus and the Center for Higher Studies of Tefé (CEST / UEA) of UEA in Tefé, in the interior of the state. Professors from UEA Manaus-Tefé, students from UEA Manaus-Tefé, formed the majority of the team of this project, also counting on the support of professors and students from UFAM and IFAM. The project was managed by a research professor from UEA.

It is known that the human being is intrinsically a gregarious and social animal, and this characteristic is reflected in the most diverse human activities from leisure to work. The current stage

of computing makes software development a complex and laborious task, rarely able to be carried out by a single person. How could shared "shoulder-to-shoulder" tasks be developed in a pandemic context that required social distancing?

In this way, this work presents how the project was managed and developed in a context of pandemic that required social distancing, whose general objective is the development of 15 Android applications for the A910 machine, through the use of "non-face-to-face" virtual interaction means between participants due to the Covid-19 pandemic.

2 METHODOLOGY

The bibliographic research for the theoretical foundation involved initially knowing how project management is in times of the Covid-19 pandemic using the keywords "Project Management" and "Covid-19 Pandemic", searching for articles in the bases of Google Scholar and Web of Science. The articles were filtered and the most relevant were considered, as well as for the terms "Google Meet", "Entrepreneurship and Innovation", "Jamboard", "Scrum", "Git/Github", "Android Studio", "Information Architecture", "Kotlin Language", "UML", "DevOps" and "Iterative Virtual Development".

This is a case study, evidencing the experiences experienced in the remote development of the 15 Transire applications from virtual experiences developed in conjunction with collective assertive tools in teamwork (YIN, 2015). Initially, it will address the paradigm of project management under the Covid-19 pandemic and the collaborative non-face-to-face virtual tools used in the development of project applications. Subsequently, the development process of the applications developed for the A910 Transire card payment machine and the conclusions about this virtual project management experience will be presented.

3 THEORETICAL FOUNDATION

3.1 PROJECT MANAGEMENT IN THE COVID-19 PANDEMIC

The Covid-19 pandemic has forced the adoption of non-face-to-face medical care, overcoming difficulties and prejudices. Patient data was collected and stored in a database and analyzed by a team of physicians gathered virtually to determine the best treatments. Through telemedicine, 91% of infected patients were treated safely, with no increase in mortality related to medical decisions, while ensuring optimal medical treatment for infected patients (CASSAR et al., 2021).

New approaches in the treatment of diabetes were employed at the University of North Carolina (USA) in reducing the use of personal protective equipment and the exposure of patients and care teams, in a project of remote care of hospitalized patients, starting in July 2019 and moving to 100%

virtual in March 2020. The 15-week data suggested that the use of care through virtual doctor-patient interaction in diabetes management in the hospital is feasible and provided similar results to traditional face-to-face care (JONES et al., 2020).

The pandemic has accelerated the integration of digital technologies and healthcare. Cases in China, Europe and the US using digital technologies, such as the use of *big data*, artificial intelligence, cloud computing and 5G, are reported as effective combat weapons playing an irreplaceable role. It turned out that the key in China in avoiding the second wave of the pandemic was the integration of digital technologies and large-scale public health without hesitation. (WANG et al., 2021).

Projects in civil construction required a combination of remote project management principles with the use of sanitary measures to protect professionals in the field. Operations were divided into three phases: pre-construction, construction and post-construction. The FIDIC (International Federation of Consulting Engineers) guidelines regarding the working conditions and organizational risks of project teams during and after the spread of Covid-19 now follow determinations of local health agencies of prevention and care (CHAISAARD; NGOWTANASUWAN; DOUNGPAN, 2020).

Supply chain is essential to business continuity during the pandemic. A mathematical model was developed predicting expansion scenarios and a better supply forecast dependent on time, cost and risk. By tracking the *status* of the pandemic, managers can alter or update their decisions based on changing conditions of the pandemic outbreak (HAJIAGHA et al., 2021).

RD&I projects drive innovation and need to operate within a framework defined by companies. In times of crisis, such as the Covid-19 pandemic, additional conditions such as those determined by health authorities become relevant leading project managers to reorganize work packages in non-face-to-face environments. The use of IT allows teams to follow guidelines and use pertinent information, adapting work and distance learning to the home environment, avoiding the feeling of isolation by frequent virtual contact (KUHN, 2020, DĂNILĂ; ADAM, 2020).

The challenges faced in the pandemic in reorganizing people training programs and suggesting strategies to improve learning are significant. Problems such as lower completion rates of the course, pressures to deliver the curricular elements and decisions about distance learning format, whether synchronous, with online interaction, or asynchronous, with the recording of content and subsequent availability, are evidenced. The challenge of the asynchronous format is to provide solid foundations for students on meaningful tasks without direct support from teachers. The USA and Canada are pioneers in the asynchronous format in areas of knowledge where practical content is reduced, but in other countries *e-learning* is not very widespread and viewed in a prejudiced way. The synchronous format, even with direct support and instruction from facilitators, presents challenges such as involving

students with active participation in the content, considering limited communication. It is necessary to develop interesting content in an interactive way (SANTOS et al., 2021).

Educational institutions in several countries have launched large-scale online course modalities in response to the pandemic. In China, colleges and universities have adopted *online* learning platforms and the overall learning satisfaction of students is significant. Educators say online learning makes up for the absence of traditional face-to-face teaching. The Ministry of Education has adopted the method of "suspending face-to-face classes without stopping learning" by encouraging students in *online* courses or private lessons at home, with teachers selecting appropriate and interactive course platforms and teaching materials to attract students to their pedagogical content (WANG; LIN; SU, 2021).

The access to and use of *online* learning resources and their link to student satisfaction in the pandemic calls for deeper evaluation. In June 2020 a study among students in Pakistan and Brunei showed a positive relationship between student satisfaction with accessing and using online learning. Living in the urban area in relation to the rural one contributes to the satisfaction of access and the use of online learning for both. Bruneians are better suited to *Internet* access and accessibility of computing applications than Pakistanis. It is crucial that educational policies provide access to and use of consistent online learning resources amid the pandemic (QAZI et al., 2020).

Small and medium-sized enterprises (SMEs) generate more than 80% of the financial revenues from society's products and services. The pandemic has caused reductions in production and operations, requiring skilled human resources, methodologies and tools with agile and standardized processes for teams to support critical business activities with the right planning cadence for the delivery of critical projects more quickly. Virtual digital applications provide real-time project controls and information, allowing them to control activities and update their internal systems on new and achievable schedules, updating activities and their workflows and work plans, improving communication with customers (VICHOVA; TARABA, 2020).

The pandemic has created unprecedented challenges for project management, with 95% of the workforce becoming remote on platforms such as *Google Meet, Zoom, Microsoft Teams, Webex and Amazon Connect*. Phones go from commercial to mobile phones. *Google Meet* and *Zoom* are used in most educational institutions. The new normal features daily *check-in*, *company happy hours* and virtual training *workshops*, emerging alternative and hybrid work schedules, rotations and newly formed collaborations with partners and contractors (SEALS et al., 2020).

The identification of critical factors affecting the use of e-learning by college students during the pandemic was evaluated for the future of online learning systems post-pandemic, evidencing: (1) The easier it was to navigate an *online learning* platform the more students were willing to use it. (2) Ease of use and usefulness were associated with teachers' choice of platform and their ability to tailor

course design and navigation on the platform. (3) The positive attitude of teachers towards teaching increased students' perception of the use of *online* learning. (4) Family support is key, serving as support to teachers in online teaching, parents encourage students to learn and complete tasks *online* (MO et al., 2021).

In general terms, teachers began to use *online* teaching in early 2020 in the maintenance of school activities. The impact of online learning during the pandemic on students' attitude and behavior was evaluated, verifying that the effects of pushing (perceived safety risk, learning convenience and quality of service), pulling (utility, ease of use, teacher's teaching attitude, technology involved in the task) and anchoring (cost of change, habit), influence the change of users from face-to-face courses to *online* learning (LIN et al., 2021).

Training partnerships between Harvard and California Universities with Tulane Medical School (USA) and two international assistance programs – Uganda and India – have been established with virtual meetings through *the Zoom* platform. Didactic topics in palliative care, establishing global partnerships, access to essential medicines, access policies, resilience and well-being in global medicine were taught by both U.S. professors and professionals from local units, generating positive results (GLASS et al., 2020).

In times of pandemic, people's satisfaction in virtual teams depends on: (1) ensuring adequate technology, (2) work-life balance, and (3) clarity in the direction of activities, including leadership. Low-quality virtual tools generate frustration. Virtual teams are highly flexible, making it challenging to find a work-life balance. Clear communication and leadership diminish the feeling of isolation. (BERNEHJÄLT; CARLBOM, 2020).

The "new normal" is global virtual teams, groups of people from different continents or countries who interact through various forms of communication technology and rarely if ever see each other in person, and who operate in different time zones with common purposes in space, time and organizational boundaries. The success of projects can be achieved by making sure that appropriate training and access to computing and communication technologies are available and, above all, that members' effectiveness and willingness to communicate are actively encouraged (ADEWOLE, 2020).

Studies conducted in Germany and the U.S. indicate that project work under the pandemic fosters feelings of emotional exhaustion through the accumulation of unfinished tasks in function and related constraints. Identifying organizational resources useful for the mental health of employees is important, and agile management through Scrum is fundamental in the process allowing understanding between everyone (KOCH; Schermuly, 2021).

The sheer volume of *fake* information in the face of the pandemic, filled with rumors and speculation, has created an atmosphere of fear and panic-endemic. The basis of the changes lies in the

change of the decision-making paradigm in the management of projects and programs in the infodemic-pandemic system, considering the mutual and fruitful cooperation in the accomplishment of tasks, definition of the context and principles, clear interpretation of the mission, tasks, functions and professional terms, definition of norms and professional language, availability of professional skills adhering to the work and the creation of common space fostering professionalism and engagement (BUSHUYEV, BUSHUIEV, BUSHUIVA, 2020).

The future of project management sees a lot of money invested by organizations seeking significant change in recovering from hardship and governments that will promote economic recovery through fiscal stimulus. This injection of funds will lead to more and more projects, with acceleration of digitization and virtual work. A reminder to engineering faculty to continually value the principles of sustainable development with their students during the pandemic. (MÜLLER; KLEIN, 2020).

The problems of financial management of companies currently evidenced by the media, can lead university students to believe that companies survive only from the financial aspects, neglecting the environmental and social aspects. The training of professionals to consider the aspects of sustainability is evidenced now and should be used as learning in the implementation of projects (ANHOLON et al., 2020).

The pandemic has affected many aspects of the industry, most notably productivity. Due to safety regulations and new protocols in place, productivity levels at each job have changed. Whether in the field or in the office, productivity has certainly been affected, especially in the scheduling and financing of projects. Changes are envisioned in offices and the field to keep employees safe as the virus continues to spread around the world. Companies will begin to have their employees, from the perspective of management and projects, working from home, adapting ways to keep employees safe and productive (GONZALEZ, 2020).

Online learning supports educational continuity in the face of the pandemic and associated social isolation by altering the jobs of academic teachers, affecting the potential of their motivating work which has been found to have diminished during Covid-19 e-learning compared to previous periods, suggesting that *e-learning* Socially sustainable requires not only concentration on students but also on improving teachers' motivating work potential (KULIKOWSKI; PRZYTUŁA; SUŁKOWSKI, 2021).

A master's degree in project management and innovation has built a new educational program including the continuous use of IT, a virtual practical simulator of plastic injection process and also in the use of catapults and paper helicopters, in theoretical concepts of Six Sigma. The program and simulator used have successfully replaced the practices previously used in a face-to-face environment,

allowing students to acquire related competencies in a practical way in a non-face-to-face environment (UNZUETA; EGUREN, 2021).

Moroccan universities have been forced to convert face-to-face education into an *online* context in the pandemic. An implementation experiment in remote project management of undergraduate students was conducted, considering (1) communication and collaboration, and (2) data centralization and efficient monitoring, resulting that the integration of the agile Scrum strategy has a significant positive impact on student performance in *online* projects , using the digital tool Trello as the main interface in the coordination and sharing of knowledge among the members of the project team (MAHFOUD, 2020).

3.2 POTENTIAL TOOLS IN THE DEVELOPMENT OF PROJECTS ON A NON-FACE-TO-FACE BASIS

3.2.1 Google Meet

Google Meet, a Google Workspace (https://workspace.google.com/intl/) tool designed to address the need for real-time interaction between geographically separated members of work or study teams. This tool provides several benefits to the enterprises, enabling high-quality audio and video calls, as well as supporting large numbers of participants. Among the main advantages, we can highlight: (a) Great portability - allows remote use on mobile devices or computers, (b) Its free version allows up to 100 members participating simultaneously in a call of up to an hour in duration, (c) To hold a meeting, the administrator simply creates the room and sends the "invitations", a specific *link*, (d) It has *chat* tool , a space intended for the exchange of text messages, and (e) Enables screen sharing (videos, slides, data and other relevant documents) from one to the other participants.

In India, regulations have impacted on all aspects of the economy promoting the adoption of digital technology during the pandemic, accelerating the uptake of online platforms in the process of quality teaching and learning. The democratization of IT has been a critical and significant issue, with a transformation from chalkboards to Google Meet, enabling significant advances and paradigm shifts in college student learning (MAITY; SAHU; SEM, 2021). An online study conducted with 1,069 undergraduate students at a Brazilian university revealed a preference for the dynamics of group work and the Google Meet platform, especially for students of exact sciences (LAGO et al, 2021)

3.2.2 Entrepreneurship and Innovation

In a search on the portal of Capes journals in Brazil, articles were selected by the combination of search terms in English and Portuguese such as "*entrepreneurship*", "*innovation*", "education"; "Engineering" with the aim of approaching technological innovation from an educational perspective

and seeking to evaluate entrepreneurship in engineering education. Knowledge of the reality of innovative companies, encouragement to work in multidisciplinary teams, professional development with emphasis on the future with a critical and expanded view of social dynamics are key elements. Technological innovation and entrepreneurship are topics rarely discussed by students in general. (PEREIRA; HAYASHI; FERRARI, 2016). In higher education institutions, learning entrepreneurship on the basis of successful models encourages education for sustainable development. Entrepreneurship education related to students' entrepreneurial intentions, providing appropriate knowledge and skills, motivates them to develop entrepreneurial careers. It was evidenced in graduate students in Romania that entrepreneurial education based on successful models positively influences students' entrepreneurial attitudes and intentions for the social benefits of entrepreneurship (new jobs) compared to financial ones (profitability) (BOLDUREANU et al., 2020).

3.2.3 Jamboard

Jamboard is a *web-based* whiteboard system initially launched in 2017 as a combination of *hardware* and *software*, incorporating a 55" touchscreen and an annual maintenance fee. The app allows real-time co-authoring using a browser on any *laptop, tablet* or *smartphone*. Creating a new Jamboard is easy and can be automatically stored and updated in the user's Google Drive. To share with a group of learners, you duplicate the master version by selecting the share in the new copy, for anyone with the *link*. Writing tools include pen, highlighter, eraser, shape tool, and text box. Offers versatile collaborative experience modeled for use in higher education and with additional potential in research, professional development workshops or other creative environments (SWEENEY; BEGER; REID, 2021). A study in a public school in Brazil involving the teaching of mathematics with the use of Jamboard and Google Meet applications in remote learning concluded that the use of these applications enabled mediation, intervention and interaction, in real time, with students who demonstrated their mathematical thoughts on Jamboard boards and in the dialogues established by Google Meet with colleagues and the teacher (SILVA, 2021).

3.2.4 Project Management with Scrum

The last decade is characterized by the shift of the IT systems development lifecycle methodology from classic waterfall or prototype methods to the agile Scrum development methodology. The agile methodology that encourages software development was introduced in 2001 based on four values: (1) Individuals and interactions about processes and tools, (2) *Working software* on comprehensive documentation, (3) Customer collaboration in contract negotiation, and (4) Responding to change by following a plan. His main roles include the development team, the *Scrum*

master and the *Product Owner* who represents the customer and users. Effective communication with the various stakeholders in the development of a new product or *software* is essential. Scrum defines a series of *sprints*, two to four weeks, in which the team performs the tasks to be completed. The importance of communication in the management of IT projects that impact on the success of the project is highlighted, identifying and correcting its weaknesses (HOLZMANN; PANIZEL, 2013). Scrum is a structure in which teams work together and highly integrated where each member has a defined role, eliminating unnecessary, inadequate and bureaucratic controls, focusing on the essence of the systems or software development process. The practices of the PMBoK Guide can complement Scrum, even if the purposes are different (DA SILVA; LOVATO, 2016). New product development (NPD) is a sophisticated and necessary process for the successful introduction of the product to the market, generating customer satisfaction, benefits to the organization, new organizational and personal skills and experiences. Many authors use the classic PMI project management tools in the management of NPD processes. Recently, there is a growing interest in the agile Scrum methodology, initially introduced in IT project management, in other areas such as health, finance, consulting and education, giving good results (BETTA et al., 2019).

3.2.5 Github

Software developers use and contribute to repositories on GitHub. The documentation present in the repositories serves as an important source, helping developers to understand, maintain and contribute to the project (VENIGALLA; CHIMALAKONDA, 2021). The open source software (OSS) community plays a key role in the development of contemporary *software*. Different types of knowledge sharing affect an individual's contribution to open source projects. Collecting data from GitHub – the largest *online* platform for hosting open source software development, and Gitter – an instant messaging and chat room app designed for developers, it was found that sharing tacit knowledge has a positive relationship with the contribution of open source. In addition, sharing helps *OSS* platform designers gain a better understanding of the symbiosis between the different existing platforms (SHING, CHAKRABORTY; KADIAN, 2020).

3.2.6 Android Studio

Android Studio is the main tool that one can use to write *the software* of *Android* applications. Although there are a variety of other reliable software, the Integrated Development Environment (IDE) of Android Studio is fundamental to bring to life the most varied ideas in Android (ALLEN, 2021). Self-service can meet consumers' daily shopping needs. Many ordering and delivery systems are still done over the phone, with customers unaware of price lists and products from minimarkets, for

example. Self-service applications can be built using Android Studio software so that order delivery and delivery information is done quickly and accurately, allowing *online* purchases through *smartphones* (RIFAI; SARI; NURYADI, 2020).

3.2.7 Information Architecture

Information architecture plays an important role in how information should be captured in the user interface (UI). It takes into account the user's experiences with the interface – UX, defined as the relationship before, during and after the interaction with the product or service, allowing a fluid integration and communication in the interface. In UX, the user-product-service relationship needs to consider a heterogeneous audience, including people with physical and visual disabilities. It is very important that the UI is visual, auditory and tactile to find the interpretation of the data in an appropriate way (REYES; RODRIGUEZ; MUÑOZ, 2020). Persons with disabilities have the right to exercise their civil, political, social, economic and cultural rights on an equal basis with others. The process of designing the information architecture in the *e-learning* interface for users with disabilities allows these users to realize their right of access to education on an equal footing with other people (VELJANOVSKA, 2020).

3.2.8 Kotlin Programming Language

Google announced Kotlin in 2017 as one of the official languages for Android development. It's concise, easy to understand and adopt, expressive, and designed to be secure and compatible with Java and run on the Java Virtual Machine (JVM). Developers consider that Kotlin increases the quality of the code produced due to its security guarantees. Kotlin requires care, but its benefits seem to bring many advantages, especially in the aspect of adopting a modern language, consolidating the Java-based development environment (OLIVEIRA; TEIXEIRA; EBERT, 2020). An experiment performed on maintenance tasks (fixing defects and adding features) in Android apps written in Java and Kotlin, considering the number of defects fixed, effort, and code size, verified participants' perceptions of how to avoid known pitfalls. It turned out that Kotlin required fewer codes. The transition to Kotlin can provide some advantages to Java developers, especially in relation to the conciseness of the code (ARDITO et al., 2020).

3.2.9 UML

UML – Unified Modeling Language, is a standard language in the elaboration of the structure of software projects, employed for the visualization, specification, construction and documentation of artifacts of complex *software* systems. It allows you to represent a system in a standardized way, from

the modeling of corporate information systems to complex systems in real time. It is a very expressive language, encompassing all the visions necessary for the development and implementation of these systems (BOOCH RUMBAUGH; Jacobson, 2012). Its objectives are the specification, documentation, structuring for a secondary or subsidiary vision and greater logical visualization of the complete development of an information system. The architects of UML have stated that the accuracy of syntax and semantics is their primary goal (FRANCE et al., 1998).

3.2.10 DevOps

DevOps (Development and Operations) is one of the solutions to increase the quality of *software* development, focusing on increasing the speed, frequency and quality of its deployment. It is a mix of different developments and operations in the *software* industries, involving metrics at different stages to evaluate performance, culture and practices in quality assurance and factors such as usability, efficiency, maintainability and portability. Its goal is to eliminate the gaps between an organization's development and operations (MISHRA; OTAIWI, 2020). DevOps involves a set of activities and practices integrated in the development of automation *software*, for example. It allows developers to build, test and release deliverables quickly and reliably. Even if the various activities or steps *loop* and flow sequentially, iteration indicates that the flow must be constantly collaborative and repetitive to improve the entire lifecycle. (YARLAGADDA, 2021).

3.2.11 Iterative Virtual Development

In advancing strategies for digitization and downsizing of the workforce in organizations, knowledge management is central to building an evolving digital strategy. It highlights the way organizations achieve agility, innovation and competitiveness in the digital world. Virtual teams create possibilities and challenges in knowledge sharing in organizations. Knowledge transfer is key to effective management in a fast-paced digital world (SHEPHERD; COOPER, 2020). Virtual teams of global companies in Taiwan and China that have high integration and international cooperation, show that organizational proximity influences technical innovation through the contribution of knowledge, and that cognitive proximity influences technical innovation through the absorption of knowledge (HUNG et al., 2021).

4 CASE PRESENTATION

The development of the project called "Transire MyPay" for the company Transire da Amazônia, focusing on the development of 15 Android applications for the A910 payment machine,

the first device created in an Android environment in the Brazilian national market, required a multifunctional and interinstitutional work team.

The work team was selected from the interaction of the Innovation Agency – AGIN of UEA with research professors of UEA with students of the School of Technology EST-UEA, Center for Higher Studies of Tefé CEST-Tefé. By requirement of the legislation, UEA initially through FUEA – Fundação Universitas de Estudos Amazônicos and later through the Muraki Foundation controlled the resources, acquisitions and other financial activities of the project, as well as the subsequent process of accountability and technical report of the project with Suframa, always under the supervision of the UEA professor coordinator of the project. If the project is not executed in accordance with the legislation, there will be punitive consequences through fines and other sanctions.

It was initially determined in the project, the training of scholarship students and *designers* in programming language and methods of development of Android-based applications, as well as the development of applications that aim to allow different segments of entrepreneurs to use the A910 machine with specific application and parameterized basically for their branch of business. Two teams were created, one in the city of Manaus (with the goal of developing 10 applications) and another in the city of Tefé (with the goal of developing 5 applications).

It is verified that more qualified professionals with access to technological resources suffer less impact in the Covid-19 pandemic (MONGEY; PILOSSOPH; Weinberg, 2021). This is exactly the case for the project participants, where each of the members received a state-of-the-art hardware platform (IntelCore i7-10750H CPU @ 2.60GHz 2.59 GHz, 32 GB RAM), with the Windows 10 operating system factory installed and Internet access. In 2020, the year of the beginning of this project and the Covid-19 pandemic, there were already several tools that allowed video calls since Skype, launched in 2003 and today has about 560 million users around the world, to Zoom, through Google Meet, the iterative platform chosen to support the team of this project.

The tools and technologies described below were used in the development and management of the project, based on the academic literature review research initially carried out in this work.

4.1 GOOGLE MEET

As a virtual interaction tool, Google Meet was used in: entrepreneurship training; course on the Android operating system; Kotlin language training; meetings with the Scrum-master; daily meetings between the technical coordinator and the teams of programmers and designers; meetings between teams of developers, including for joint code development; meetings of the design staff, etc. Google Meet proved to be an efficient tool meeting the expectations and needs of distance interaction in this project.

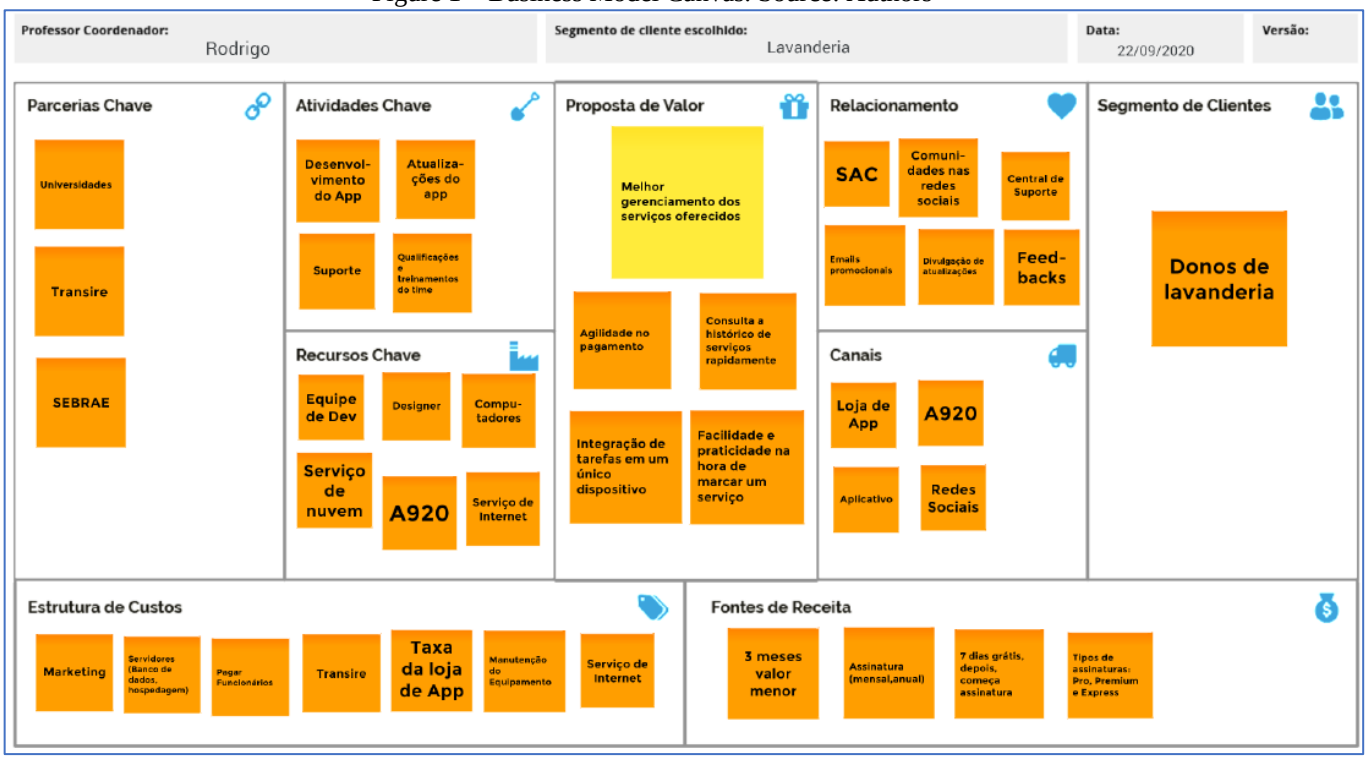
4.2 ENTREPRENEURSHIP AND INNOVATION – JAMBOARD

To start the activities of the teams, an entrepreneurship course was held, divided into a theoretical exposition with varied examples of the associated contents and group dynamics, which boosted the teams in the direction of the entrepreneurial profile and in the definition of potential applications to be developed, directing the company's RD&I efforts in the creation of a network of high-level human resources and competitive capacity in the development of Android applications for use in the A910 Transire payment terminals on the market. The contents were divided into 15 topics:

1. What does it mean without an Entrepreneur? Lost in Life? It's never too late to (re)start. Successful entrepreneurs. 2. Entrepreneurship is more happiness than money. Multiple intelligences. Level test intelligences. Types of entrepreneurship: high and low impact, internalization. 3. Entrepreneurship ecosystem. Entrepreneurship in Brazil. Dynamics - proposals to improve the entrepreneurial environment of the Amazon. 4. What is it to be creative? Exercising creativity. Dynamics – different product uses, toothbrushes and thimble. Factors that influence creativity. 5. What is it to be innovative? Innovation and creativity. Value Innovation. Blue Ocean Strategy. Case Cirque du Soleil. 6. Value Assessment Matrix: Cirque du Soleil and the Wine Industry. Dynamics – set up a value assessment matrix of innovative companies. Video Surfing in Opportunities – Endeavor Classics. 7. Opportunity analysis. Jeffry Timmons model (opportunity, resources, team). Scott Shane's model (industry dimensions and markets). Dynamics – multipurpose robot. 8. Sources of innovative opportunities. Peter Drucker and Josef Schumpeter. Changes that provide opportunities. Management team – human resources. Dynamics – Nortex case. 9. What is strategy? Strategic, tactical and operational planning. Balanced Scorecars (BSC). Mission, vision and values. Scientific method. Dynamics – use of the scientific method. Successful innovative project. Job to be done (JTBD). 10. What Job do the products actually perform? What would be the substitute products? Dynamics – customer, problem, solution, Job to be done, real case. The 4 phases of customer development. Minimum viable product (MVP). 11. User Experience (UX) and User Interface (UI). Business model. Introduction Customer empathy canvas, value proposition canvas, business model canvas. Presentation of Ipod and Facebook case. 12. User Experience (UX) and User Interface (UI). Customer empathy canvas. How do you feel? What do you hear? What do you see? What do you say and do? What are your pains and gains? Dynamics – Empathy Canvas modeling. 13. User Experience (UX) and User Interface (UI). Value proposition canvas. Customer Profile: gains, pains, tasks to perform. Value proposition: pain enablers, earnings creators, products and services. Example skateboard. Dynamics – Canvas modeling of Value Proposition. 14. User Experience (UX) and User Interface (UI). Business Model Canvas. Customer Segments. Value proposition. Relationship with customers. Key Activities. Key features. Cost structure. Sources of revenue. Dynamics – Business Model Canvas

modeling. 15. Dynamics – collective discussion and "questions raised". Presentation of application proposals (Mobile Recharge, Delivery Drivers, Doctors and Dentists, Cinemas, Pet Shop, Gas Station), presented from interactions made of the Empathy, Value Proposition and Business Model canvases (see Figure 1), developed virtually through the use of Jamboard. A brainstorming of ideas for potential applications was generated and a scoring/scoring spreadsheet was generated, choosing the 15 ideas with the highest score based on the model available in the academic literature, (KIELING et al., 2021).

Figure 1 – Business Model Canvas. Source: Authors



4.3 SCRUM

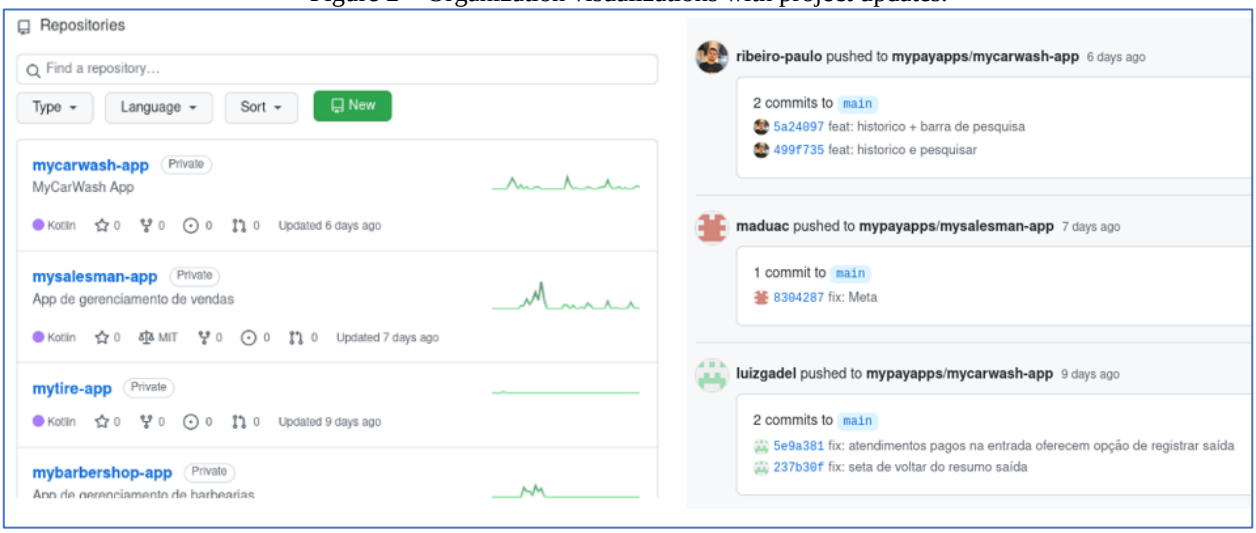
The agile Scrum methodology was used by defining 14-day sprints in conjunction with the Trello activity control tool, thus monitoring in real time the evolution of the tasks performed by the team members, making adjustments when necessary directed towards the achievement of the project objectives.

4.4 GIT – GITHUB – GITHUB CLASSROOM – GITKRAKEN – GOOGLE SHEETS

The Git tool is a version control system, which allows you to record changes inthe source code of a program and organizes r into versions. For Manaus students, more experienced and computer students, the tool allowed more than one student to work on different parts of the same program, because it has features of merging changes and conflict resolution. For Tefé's students, it was defined that only a single student would make changes to each team's application code.

The Git tool, in this case, was used as a centralizer of the source code, so that students who were not performing the programming could update the version on their machine and test the program being developed. GitHub is a Git server and project management tool. It was used for three purposes: to centralize the projects of the teams in a group, to monitor the progress in the course of Android and in the development of the applications. The platform allows you to group users into teams and a group of teams in an organization, with control of access permissions and update reports on projects. Figure 2 shows an example of a page where you can track the progress of teams.

Figure 2 – Organization visualizations with project updates.



Source: Authors

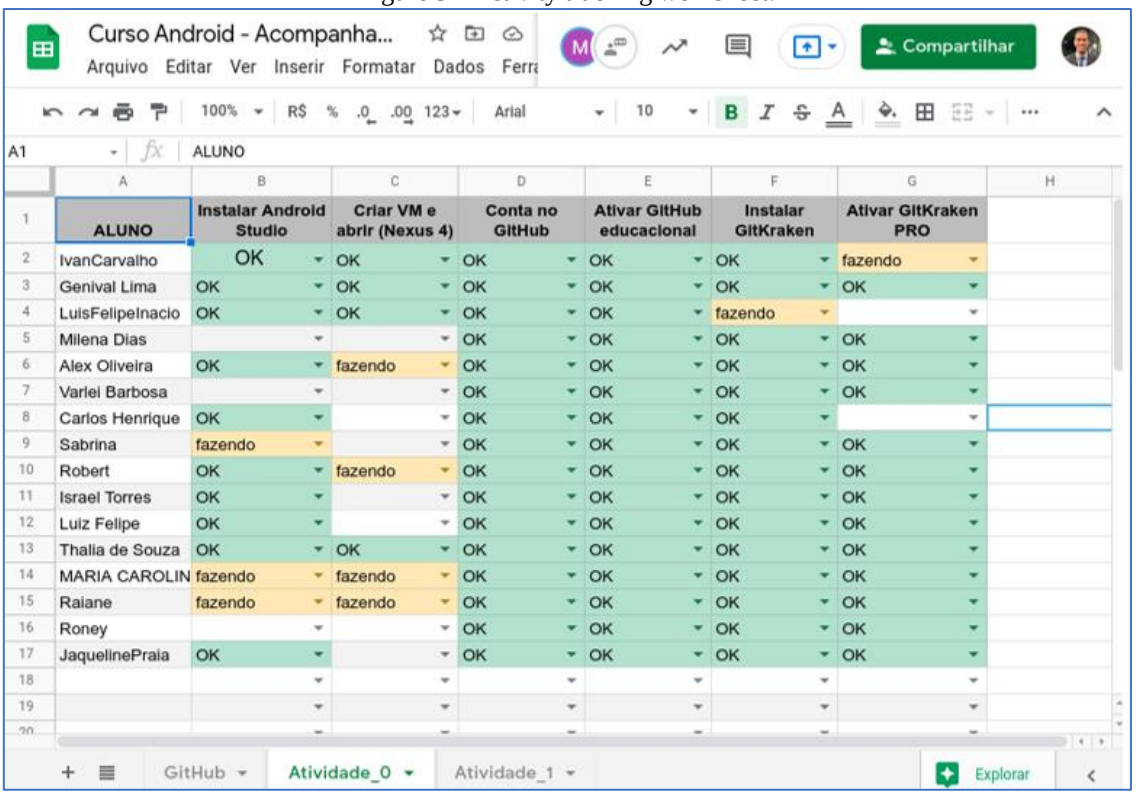
Using this platform, it was also possible to verify the most active students and projects. Progress was assessed periodically by identifying which teams needed the most help. In each activity of the Android course, students submitted solutions to Git projects that were accessible to all students in the class, being able to track in real time the progress of each student and share the solutions of the problems among them.

The GitHub Classroom platform was used to facilitate the configuration of Android projects used as an exercise during the Android course. When you accept the activity, a Git project with a starter code is created. This project is automatically added to the Github organization corresponding to the classes. This tool allowed an efficient control of the progress of each student and automated the process of configuring each activity on the students' machines.

The Git tool is a command-line program with no graphical interface. To facilitate understanding and accelerate learning, the GitKraken program was recommended to students. It has a graphical view of Git projects, where you can see in detail what has changed in each new version of the source code, as well as submit new versions and resolve conflicts when merging changes made by different students.

The Google Sheets tool was used as a way to track the progress of students during live tutorials in class, as well as to check the progress of past activities in class. It was especially helpful with Tefé's students, who had poor internet connectivity. A greater number of activities were worked to the students of Tefé, establishing an accessible and efficient way to check the progress. An example of a tracking worksheet is in Figure 3.

Figure 3 - Activity tracking worksheet.



	A	B	C	D	E	F	G	H
1	ALUNO	Instalar Android Studio	Criar VM e abrir (Nexus 4)	Conta no GitHub	Ativar GitHub educacional	Instalar GitKraken	Ativar GitKraken PRO	
2	IvanCarvalho	OK	OK	OK	OK	OK	fazendo	
3	Genival Lima	OK	OK	OK	OK	OK	OK	
4	LuisFelipeInacio	OK	OK	OK	OK	fazendo		
5	Milena Dias			OK	OK	OK	OK	
6	Alex Oliveira	OK	fazendo	OK	OK	OK	OK	
7	Varlei Barbosa			OK	OK	OK	OK	
8	Carlos Henrique	OK		OK	OK	OK		
9	Sabrina	fazendo		OK	OK	OK	OK	
10	Robert	OK	fazendo	OK	OK	OK	OK	
11	Israel Torres	OK		OK	OK	OK	OK	
12	Luiz Felipe	OK		OK	OK	OK	OK	
13	Thalia de Souza	OK	OK	OK	OK	OK	OK	
14	MARIA CAROLIN	fazendo	fazendo	OK	OK	OK	OK	
15	Raiane	fazendo	fazendo	OK	OK	OK	OK	
16	Roney			OK	OK	OK	OK	
17	JaquelinePraia	OK		OK	OK	OK	OK	
18								
19								

Source: Authors

4.5 ANDROID STUDIO

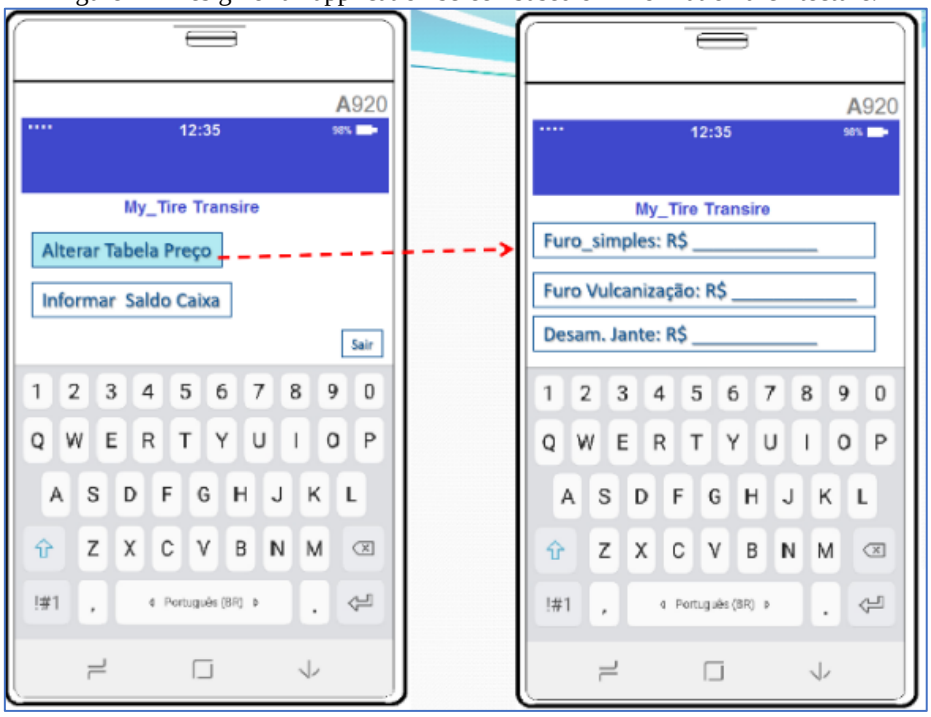
Android Studio is Google's recommended tool for Android development. The screen editor with graphical interface was the feature that most contributed to the success of student learning, especially in Tefé. The integration with the Android emulator also contributed a lot in testing solutions and advancing the project. Because it is a tool with many features, these were presented gradually, from an initial contact with few explanations and a lot of practice, to the presentation of several shortcuts and small features in more detail later.

4.6 INFORMATION ARCHITECTURE

An *online* course on UX Design for the students and teachers of the Transire project was taught, initially for the Manaus team and in another opportunity for the Tefé scholarship holders. In the first class the course had nine meetings held from 19:00 to 22:00 from Monday to Thursday, in the second

class the course had six meetings held from 7:30 to 13h on Saturdays. About 80 people participated. The learning reinforcement activities of the course were carried out with the application projects under development by the students themselves. They conducted *brainstorming* dynamics with the technique of face-to-face design, prototype development, heuristic analysis and usability testing. With this they assimilated with practice the concepts presented in the course. The class showed great commitment and participation during the course and took the opportunity to improve the usability of the applications under development. At the last meeting, each group presented the interface of their applications under development with several improvements in UX.

Figure 4 – Design of an application screen based on information architecture.



Source: Authors.

4.7 UML

The studies related to the technical training in application development carried out in the UEA-Transire Project, offered by UEA, also aimed at the Technical training of a group of teachers from the area of Licentiate (Mathematics, Physics and Chemistry) of CEST-UEA and engineering of EST-UEA with the possibility of professionalization for the area of Systems development.

The studies were developed relating theory and practice, introducing concepts from the area of Systems development, such as: Programming Logic, Object-Oriented Programming Language, Database Modeling and Systems Analysis, Entrepreneurship and Advanced Programming. These studies culminated in several reports of experiences on the training processes of these teachers.

Theoretical-practical workshops were also given in order to develop new skills, in view of the set of experiences present in the students, not all of them from the technological area. The concepts were presented in order to confront these experiences of the students to the understanding of basic concepts of programming and systems development. New technologies and tools to facilitate the absorption of knowledge in the shortest possible time were considered, since students would have to develop applications based on their own ideas.

The students were divided into groups with a teacher coordinating the team. Each team generated a Project Canvas and this model served as the basis for modeling the problem they wanted to solve using a mobile app. Each team studied and set up its business model and proposed an application to solve a certain demand. Thus, the students created an initial theoretical model and verified its practical application for the solution of a problem through information and communication technologies.

During the workshops, the concepts of Programming Logic were introduced. It was verified difficulties in the understanding of the concepts of programming logic and its materialization in executable codes in the Kotlin language by the students who were not of the computer courses. However, many of these difficulties were remedied from the meetings via meet and the discussion of solutions between the various teams. It is noteworthy that of the contents worked on in the project, programming logic was the most difficult to assimilate by students who were not from the computer courses.

Subsequently, they were presented to the UML (Unified Modeling Language) and Data Modeling (Entity-Relationship Model and Relational Model) systems modeling diagrams. Compared to the study of logic the problems were smaller, since the modeling represents a simplified view of the problem that is intended to be solved in a visual way.

To streamline and direct the work of each team, we focused on modeling the teams' applications instead of dummy examples. The intention was to make them work on their solutions and verify the understanding of the modeling diagrams. The teams did very well in this task, because the result of this step was the creation of the use case diagrams and their description, class diagrams, sequence diagrams, entity-relationship model and its mapping to the relational model, as well as the low-fidelity and high-fidelity prototype of the applications.

To perform these tasks, they met every day and discussed among themselves and with the guiding teacher to resolve their doubts and make adjustments to the models. They were also presented with tools to facilitate the modeling of systems, such as: Astah Community for UML and Argo UML modeling, MySQL for database creation, Git for versioning and shared code development, SQL

Language, Kotlin Language, Visual Studio Code for writing code and Intelij IDEA, Adobe XD for prototyping.

The work with this set of tools facilitated the design of the *software* and showed how the application would look after its implementation, as well as enabled the understanding of shared and collaborative work, since the concepts of code versioning were introduced, allowing to manage changes in files, including texts and images. Through code versioning it is possible to know whenever a change is made, who made it and why.

4.8 DEVOPS

The set of practices for integration between software development teams, called Devops, allowed the adoption of automated processes for the fast and safe production of application models. It was observed that the teams understood the purpose of the training and sought through the sharing of knowledge and mutual help and technical growth. It is important to note that the time to mature knowledge was not long, but it was observed that it is possible to train multidisciplinary teams to develop systems. It was also proven that the daily meetings and the focus on a goal, even with the difficulties notably verified, added with the help of the coordinating teachers of the teams to direct the work, enabled the discovery of talents by the students themselves that were not of their own knowledge.

4.9 APP INTERFACE

Regarding the activities linked to the interface, a *design* methodology based on the User Experience, or UX – User Experience, was followed, so some initial procedures were necessary even before proceeding with the configuration of a graphic structure, such as research, technical investigations and other approaches to the possible actors of the process.

Thus, for the interface, nine steps were defined a priori, namely: (1) CSD Matrix; (2) User Journey; (3) *Low fidelity wireframes* ; (4) *High-fidelity wireframes* (Adobe Xd); (5) Navigable prototype; (6) User Surveys; (7) Roadmap for Usability Testing; (8) Usability testing; and (9) UX/UI documentation.

In the CSD matrix, certainties, assumptions and doubts about the audience of each application were described, an initial stage that led to *insights* into what problems were to be solved with the apps, then moving on to the user's journey, where the step-by-step work of the user was documented, recording what he does, thinks and feels at each stage, as well as possible opportunities (*insights*) in the process.

The construction activity of low-fidelity Wireframes consists of the design of screens on paper, without great concern with details, with subsequent transfer to the Marvel application, where the screens were "linked" so that the team could visualize how the navigation would be, passing, later, to the activities of high-fidelity *Wireframes*, using Adobe Xd, to build screens with a greater aesthetic concern and with details.

After the construction of the *Wireframes*, we set out to structure navigable Prototypes, connecting the screens to each other to generate links of the interfaces to be submitted to the User Surveys, to verify if what was developed in the apps met the pains of the users. In addition, it was a form of recruitment for usability testing.

Initially, a roadmap for usability tests was developed to guide the performance of the tests. Then, the tests themselves were applied, where users tested the navigable prototype generated in Adobe Xd. At the end, after the adjustments made, some errors were corrected, some functionalities of the applications were modified and it was passed to the UX/UI documentation activities, where all the screens and all the activity flows within the applications were registered.

4.10 ITERATIVE VIRTUAL DEVELOPMENT

All activities related to the development of the applications were carried out remotely, using the virtual and iterative tools presented in this work. The mission, effort and practices in sustaining and leveraging a diverse and iterative workplace in virtual teams was fundamental and important of success in the project with the development of the 15 apps, with geographically dispersed people united towards the goal working in an integrated and targeted way, evidencing a competitive advantage to be exploited in future projects.

5 CONCLUSIVE SUMMARY

There were achievements in meeting project requirements and training application developers with knowledge of project management, programming language, design, entrepreneurship and innovation, among other technologies, even under difficulties imposed by the Covid-19 pandemic.

It was very important to distribute *home office kits* at the beginning of the pandemic with high-performance *laptops*, wireless *mice*, *mouse pad* and *quality head sets*.

The teams were instructed to set up a place at home reserved for the performance of the project activities and inform the family that at a certain time they would be working, aiming at a calm and tranquil environment.

We tried to follow Scrum in its entirety, even in the virtual environment, with the tools of Google Meet, Trello, among others. Updates were checked daily and each team/application leader acted in conflict situations addressing an appropriate solution together with team members.

For the creation of the UML diagrams we used the https://www.lucidchart.com/ where in a Google Meet room in integration meetings and monitoring in the lucidchart tool the interaction diagrams were created, it was very productive.

On days when there was a great intensity of working together, a room was created in the https://discord.com/ where members could come in and ask questions, for example a junior member could come in and ask something to some senior, giving the impression of a job in the same room.

The team of *designers* used the adobe XD tool, greatly improving the collaborative and remote work in the sense of planning the interfaces, wireframes and sharing the viable interface prototypes with the team.

Features such as Google Meet, Jamboard, Scrum, Git, GitHub, GitHub Classroom, GitKraken, Google Sheets, Android Studio, Information Architecture, UML, among others, have enabled collective virtual work not in person with absolute success.

15 applications were developed for the A910 payment terminals for the following economic sectors: Rubber Shops, Direct Sales, Parking, Grocery Stores, Laundries, Events, Coffee Shops, Car Washes, Aesthetic Clinics, Barbershops, Boat Tickets, Gas Stations, Ice Cream Shops, Petshops, Dental Clinics.

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CHAPTER
26

Covid-19 pandemic: Collective memory theory and the memory of older people

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ABSTRACT
In the last three years, humanity has experienced a state of pandemic. This global event was the result of the emergence of the SARS-CoV-2 virus, responsible for the disease called COVID-19 (Coronavirus Infectious Disease-19), whose severity and potential for lethality was quickly recognized, especially for certain groups, such as the elderly population. In this context, social isolation was considered as a preventive measure. Although distant, the pandemic was a phenomenon of planetary dimensions and, in this way, experienced in the core of society, translating, therefore, into collective memory. For Halbwachs (1990), collective memory is strongly anchored, finding strength and duration, in a set of men and women who are unique individuals, but operate as members of a group. In this sense, we understand that the group of elderly people who experienced, although distant, the consequences of the pandemic for their well-being and health, have their memories anchored in social milestones that they share as a group. The Theory of Collective Memory, therefore, becomes paramount as a theoretical resource to understand these impacts.

Keywords: COVID-19, Health of the Elderly, Collective Memory.

1 INTRODUCTION

> "[...] the same event can affect, at the same time, several distinct collective consciousnesses; From this we conclude that at that moment these consciousnesses approach and unite in a common representation." (HALBWACHS, 1990, p.115)

The global events experienced in the last two years resulted from an unexpected event that affected all of humanity. A virus – SARS-CoV-2 – that emerged in China has been responsible for several cases of severe acute respiratory syndrome caused by the *Coronavirus Infectious* Disease-19, whose severity and potential for lethality led the World Health Organization (WHO) to declare a state of pandemic. The elderly were quickly recognized as the main population at risk for the evolution of the severe form of the disease. In Brazil, according to data from the Influenza Epidemiological Surveillance Information System (SIVEP-Gripe), about 71% of all deaths from COVID-19 were elderly people (PALMER *et al*, 2020; OF LEO; TRABUCCHI, 2020; PETRETTO; ROBERTO, 2020; ROMERO *et al.* , 2021; VIEIRA, 2020).

In the context of this pandemic, social isolation was considered the main weapon to combat it. The feeling that "the universe has stopped" quickly settled between us. The impacts were prolonged and generated numerous repercussions, not only health, but social, economic, psychological and affective. Based on the theory of collective memory of Halbwachs (1990), the memories of experiences

lived in the past are added to data and references of the present and perceived as current, having implications for our future. In this sense, although the advent of a new virus with a peculiar propensity to infectivity and lethality is a current reference, our memory is able to correlate this information with memories of experiences and feelings previously experienced, which we assume has an impact on the way individuals experienced and interpreted the period of the pandemic.

Although distant, the COVID-19 pandemic was a phenomenon of planetary dimensions and, in this way, experienced in the core of society, translating, therefore, into collective memory. Our memories, even if they result from events or impressions that we experience in isolation, are reconstructed through the social frameworks in which our relationships are included (HALBWACHS, 2004). In this sense, the COVID-19 pandemic has impacted the lives of all, individually and collectively, also presenting a historical character. The memories raised from this period of our history will be composed of lived experiences of individuals in their groups plus information that will have been obtained by other means, especially the modern means of communication. Unlike other historical facts, which sometimes individuals do not actually experience them, but absorb reports and consequences of these, the pandemic and its consequences was and still are being experienced by all. And it is precisely in this lived history that our memories of this period are based. Those who have not experienced the period in question, will find in the future narratives and data in books, virtual encyclopedias, museums, monuments etc. whose information will not be complete, providing only a synthesis. In the lived past, however, memory finds support (HALBWACHS, 1990).

The different periods of history are, in fact, delimited and understood only after interest in the events of that time has subsided. Even if an event with great impacts happens and, from it, a new epoch is delimited, we in general are not able to perceive instantly (HALBWACHS, 1990). As human beings, living collectively, we are subject to the impacts of the various crises experienced by humanity, among them epidemics. Despite the numerous repercussions of these crises from the sanitary point of view, the great risk that affects us at this moment does not concern the virus itself, but the reactions resulting from the inner aspects of the human species, such as hatred, prejudice, discrimination, greed and ignorance. There are several possibilities of reaction to a crisis like the one we are experiencing with COVID-19, here we highlight segregation and cooperation as opposite poles that have been experienced in different measures around the globe. We cannot rule out the hypothesis of new future crises, which reinforces the importance of learning from the current one (HARARI, 2020).

As the pandemic has progressed and taken its course, it has become increasingly clear that information, overcoming isolation, combined with science and technology is being the biggest weapon in the fight against the coronavirus. Here we highlight the difficulties encountered by the elderly population in accessing reliable and intelligible information, especially the Brazilian elderly

population, mostly with low education and little access to technology. It is to be expected that, due to selective access to information combined with mobility restriction and social distancing, older people's memories of the pandemic period will be reconstructed using incomplete frameworks, which may not include aspects that we would consider to be common knowledge, including personal protection measures, income guarantee, access to health and immunization. We can think about the extent to which media and social networks have influenced the memories of older people regarding the period of the pandemic, and what their consequences have been for the physical and mental health of this population.

Halbwachs (1990) argues that memory capacity is closely related to belonging to groups, being:

> "[...] that each individual memory is a point of view on the collective memory, that this point of view changes according to the place I occupy there, and that this very place changes according to the relations I maintain with other media. It is no wonder that, from the common instrument, not everyone takes advantage of it in the same way. However, when we try to explain this diversity, we always come back to a combination of influences that are all social in nature." (HALBWACHS, 1990, p.51)

In this sense, we can assume that the repercussions of the COVID-19 pandemic were apprehended by older people in different ways and conditioned by the approaches and withdrawals experienced before and during the pandemic. The elderly population is, by itself, extremely heterogeneous and, although it constitutes a group marked by the characteristics of age, it can belong to many other groups whose natures - social, ethnic, religious, etc. - are also varied. Memory processing is largely dependent on these conditions, as well as having time and space limits (HALBWACHS, 1990).

Considering the time aspect, we can reflect on the experience of older people living through the pandemic. Halbwachs (1990) argues that older people tend to an inner life whose pace is slower, especially compared to a child's feelings of duration. For the author, this difference could be justified by the progressive weakening of the affective faculties. However, if we think about how the elderly and children were affected, at least at the beginning of the pandemic, we can assume that the interest from the affective point of view of the events was greater for the elderly individuals, since the children are still immature to understand the risks and consequences of the disease. If this is true, the pandemic may have also had impacts on the duration, the experience of time, for elderly individuals who have remained away from their usual relationships, with daily activities altered and with space restrictions imposed by quarantine.

For Halbwachs (1990), the relationships we establish are important with regard to memory, since it produces changes in the representations we make of facts and objects, or as he puts it "it is *the action that exerts on me, from outside, another consciousness, which imposes on me a representation*

to which it is attached. He is a person who crosses my path, and forces me to notice his presence" (HALBWACHS, 1990, p.97). One of the illustrations brought by the author is the experience of physical pain, highlighting that the representation of the sensation of pain and the understanding by others of what it represents, help us to endure it. In this sense, individual durations receive, to a large extent, influence from other durations, which configures a kind of collective thought, where affective impressions are manifested through collective images and representations. Aging is marked by limitations imposed by the degeneration of the various systems and, in variable and conditional measures to the environment, can result in physical pain and psychological suffering. Although experienced in a unique way by each individual, aging is common to all and its representations can be shared by the group.

Next, we have the relationship between space and memory, a space that appears with important symbolic references and constitutes one of the social frameworks of memory. We can establish that there is a relationship of societies with the space they inhabit and the configuration of these spaces, of different dimensions (the house, the neighborhood, the community, the city, the village), as well as with the other places full of symbols (churches, health units, schools, hospitals). Halbwachs (1990) goes further and discusses the importance of the objects that fill these spaces, "being among us as a mute and *immobile* society" (p.132). Objects are even more important to older people, and it's not uncommon to hear the phrase "I like my stuff" when asked about changing homes or resistance to traveling. An environment that remains with the same configuration over time confers a sense of continuity and security, which can be relevant when we think of people who gradually lose postural stability and communicative ability (vision and hearing, for example).

The pandemic has imposed significant changes on all inhabited spaces. Both homes and common places have had to adapt to measures to prevent the transmission of the virus and there have been changes in public spaces – expansion of hospital areas and field hospitals, closure of temples, churches and schools. Such changes are reflected in the collective memory and behavior of the groups. Halbwachs (1990) also brings the reflection on the way in which the stability conferred by the social space - for example, the city that is always busy - gives families in situations of loss or catastrophes similar comfort of continuity, which results from the perception that we - that particular group - are only part of the multiplicity that makes up this society. In the period of the pandemic, however, the common spaces became empty and the hustle and bustle of the city ceased, what gave us the sense of stability became unstable and the feeling of insecurity a constant. For the elderly, the inhabited space has become smaller and, in several cases, there have been even more forceful changes.

We also highlight the category of the family as a social framework of memory. In its expanded concept, family is understood as a group of individuals who establish bonds with each other, forming

support networks that are influenced by biopsychosocial, historical, cultural and economic factors (FALCÃO, 2010). Halbwachs (2004) states that the framework of family memory appears on a background of general impersonal notions whose contributions of each component of that group is not easily delimited. He adds that as families develop and their memories are apprehended and retold among their members, the personal aspect becomes less and less evident and progressively the family begins to interpret in its own way the different aspects of society, having traditions and a unique logic that resembles that of society in general, however, it has its own nuances with a high potential for continuity. The protective measures undertaken during the COVID-19 pandemic have had a restructuring impact on family coexistence and the structure of support networks, either by producing withdrawals or by generating a mandatory closeness, positive or negative, with regard to consanguinity and affective relationships.

According to the theory of the life cycle of the family, families in the mature phase experience their own challenges due to changes such as the marriage of children and, consequently, the inclusion of relatives by affinity and the third generation, as well as double care: elderly parents and children or young grandchildren (FALCÃO, 2010). Population aging and increased life expectancy have certainly intensified the challenges of this phase, and in the context of the pandemic, many seniors have had their routines greatly affected by the need to house or support very elderly parents and relatives and supervise children or grandchildren once schools were closed. How did these intergenerational relationships play out? Has it been positive, from the point of view of the very elderly, the repercussion of these changes and the relationships resulting from them? Halbwachs (1990) brings this intergenerational encounter as being, to a certain extent, a promoter of the perpetuation of traditions and customs that will be reflected in the future.

We still have families in their last phase of the life cycle: the couple in old age, who experiences peculiar situations - mourning, experience of finitude, loneliness, dependence, limitations (FALCÃO, 2010). The experiences of this phase are, in particular, conditioned by previous experiences and, we can say, especially marked by collective memory. This group of elderly people is recognized by Halbwachs (2004) as the one who finds the most favorable conditions to recall the events of the past and, to a certain extent, will expend a great energy in this activity of remembrance, producing a certain nostalgia for the past. In times of such intense changes, as experienced in the pandemic, this appreciation of the past tends to be accentuated, along with the feeling of anxiety for the return to the usual life, which we previously lived. Halbwachs (2004) reflects on the propensity of all individuals, more or less frequently, to nostalgia for the past. The interested memory of the past tends to select and give strength to that which produces happy feelings, doing the opposite with that which produces sadness. He states that *"the fact of lamenting the past rests, in effect, on an illusion, which is the work*

of memory or, more exactly, of the imagination" (HALBWACHS, 2004, p.132, our translation). It would be, in a way, a psychic strategy of survival, producing a kind of reverie. Here, society plays an important role in establishing the necessary connections, making cuts and touch-ups that bring the parts that matter from reality and, in fact, translating into memory (HALBWACHS, 2004).

For Halbwachs (1990), collective memory is strongly anchored, finding strength and duration, in a set of men and women who are unique individuals, but operate as members of a group. In this sense, we understand that the group of elderly people who experienced, although distant, the consequences of the pandemic for their well-being and health, have their memories anchored in social milestones that they share as a group. The Theory of Collective Memory, therefore, becomes paramount as a theoretical resource to understand these impacts. Memory is anchored in social landmarks and, in this sense, by analyzing the memories of the elderly regarding the pandemic period, we can recover all the social ties in which it would be inscribed.

Moreover, one of the main roles attributed to the elderly person is to be the collective memory of a social group. Remembrance is not a resumption of the past as it was lived, but an effort to reconstruct these experiences that are necessarily interpreted in the present, requiring reflection and effort of remembrance (HALBWACHS, 1990). Older people, through their narratives and positions in coping with the COVID-19 pandemic, occupy a privileged place, since they are not so busy with daily demands and with the return to a notion of normality.

2 FINAL CONSIDERATIONS

> [...] We must ask ourselves not only how to overcome the immediate threat, but also what kind of world we will inhabit once the storm passes. [...] humanity will survive, most of us will still be alive - but we will inhabit a different world (HARARI, 2020, p.15)

The advancement of science and public health policies implemented in the fight against the COVID-19 pandemic have managed to curb the spread of the virus. Today, although vigilant, we can return to our usual activities, socialize socially and the expectation is that, little by little, the usual life will be restored. However, it is possible to perceive that the experience of the pandemic caused individual changes and in interpersonal relationships. Today's world is not the same as the one we left in the year 2019.

Among the social groups most affected by these changes are, without a doubt, children and the elderly. Understanding how these changes took place and what their consequences were for these groups will be of paramount importance. The relevance of social institutions in the functioning of societies became clear: schools, universities, health units, hospitals, nursing homes. Experts warn of the possibility of new future threats. What will we have learned from the COVID-19 experience? What

memories will we use to strengthen our institutions, to equip ourselves for the future, to protect the world we live in?

We consider it extremely important to recognize the memories of the elderly population about the period of the pandemic and its impacts on the quality of their life and health, since the group while recognizing its past and becoming aware of its identity through time, expands its importance for all society.

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CHAPTER
27

Continuing education in times of Covid-19

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ABSTRACT
The chances of contamination of health professionals who work in symptomatic patients are high. The nurse sees in his role as caregiver, leader and educator, a reference in the team, in the prevention of COVID-19. The study is a bibliographical, systematic, and reflective review, using the descriptors Nursing, Continuing Education and COVID-19, accessing and selecting data in the Virtual Health Library. The need to update and modify the practices of health professionals made Permanent Education (PE) a health policy, turning the theme into a challenge to be faced by all health categories. The arrival of the COVID-19 pandemic required a rapid response, especially in diagnosis and preparation to receive the demand. The need to work with the techniques of contagion prevention, especially with the paramentation and undressing, demanded from the Nursing revision of techniques, in the use of the main individual protective equipment. Finally, the review and correction of contagion prevention techniques should be a daily practice, using PE as a resource to promote educational processes.

Keywords: Nursing, Continuing education, COVID-19.

1 INTRODUCTION

At the beginning of the year 2020 we were surprised by the appearance of a new disease in our country, which significantly affected our lives, as human beings inserted in a society and as health workers. (SILVA et al, 2020, p.228). In times of scientific technical advancement society is faced with a pandemic:

> Science is coming across a new type of coronavirus, named *SARS-CoV-2* and identified as the causative agent of the COVID-19 disease. The high transmissibility of this virus culminated in a pandemic, with significant impacts on the economy, health systems and the population. (RIOS et al, 2020, p. 247)

Culminating, according to statics, in Brazil, by February 10, 2022, "the disease had already reached more than 27 million people and caused more than 635,000 deaths." (JHU CSSE, 2022) The chances of contamination of health professionals who work in the care of symptomatic patients are high, according to the 2020 study:

> The chances of contamination of health workers working on the front line to COVID-19, the factors are greater due to multiple factors, such as the activities they perform, the length of the working day, the sizing of the staff, the exposure to the viral load (number of patients they serve), the correct use of personal protective equipment (PPE), This includes the wearing and undressing, correct disposal or sanitization (when not disposable) and the training of these workers on safety and health aspects related to the work environment. (MOREIRA & DE LUCCA, 2020, p.156)

The reasons cited are revealed in feelings reported by nursing professionals in a research conducted by the Regional Nursing Council of São Paulo:

> A survey of nursing professionals showed that about 80% of the workers interviewed were afraid to work during the COVID-19 pandemic, mainly because of the fear of contaminating family members and not having safe conditions to work. In addition, frontline professionals pointed out a lack of PPE, training, flows in care and work overload. (COREN-SP, 2020)

Alarmed by the high chance of contagion, the professionals saw in the qualification and training a way to prevent the new disease. In 2004, through Ordinance No. 198 of February 2004, the Ministry of Health (MS) proposed "the National Policy of Permanent Education in Health (PNEPS) as a strategy of the SUS for the training and development of its workers" (MS, 2004), seeking "to articulate the integration between teaching, service and community, in addition to assuming the regionalization of SUS management, as a basis for the development of qualified initiatives to face the needs and difficulties of the system" (MS, 2018), Permanent Education in Health (EPS) aims to "guide the training and qualification of professionals inserted in public health services, with the purpose of transforming professional practices and the organization of work itself based on the needs and difficulties of the system." (FERREIRA et al, 2019, p.224).

In the curricular bases of undergraduate nursing, nursing has in its curriculum, the preparation in addition to specific techniques the role of educator:

> The nurse, according to his training, should have in his professional profile, in addition to caregiver, that of educator, therefore, a possible facilitator of Permanent Education. On the one hand, this professional is expected to make decisions based on scientificity, the exchange of experiences and orientations aiming at a better perception of the individual, the team and the community. (MELLO et al, 2018, p.3)

In view of the latest events in our society at a global level and the emphasis on the importance of nursing in this context, and the insertion of nurses in the context of caregiver, leader and educator, we aim in this study to analyze the role of the nurse as a team reference in continuing education in times of the COVID-19 pandemic.

The motivation of this study occurred after experience and several readings on the subject, in an attempt to work permanent education in the nursing team, in times of COVID-19 pandemic and the unbridled search for personal professional safety, of the team and in relation to patients with suspected or confirmed diagnosis of COVID-19.

2 DEVELOPMENT

The present study is a bibliographical, systematic and reflective review, divided into three categories: in the first category the descriptors were used: Nursing and Permanent Education, in the

second category: Nursing Team and COVID-19 and finally, in the third category, the descriptors Nursing, Permanent Education and COVID-19 were used, being selected 43 articles from the databases of the Virtual Health Library (VHL) and after analysis of the abstracts, Fourteen articles were selected.

The choices of the categories occurred due to the low number of studies found, in the use of the descriptors already used. For a better analysis of the results, descriptors were chosen, which are the starting points for finding the answers to the initial question of this study.

2.1 NURSING AND CONTINUING EDUCATION

Nursing, being a profession that involves several ways of "educating", be it the professional or the patient, needs support to achieve the goal. Teaching and learning should be involved in everyday activities, as we find in the following reading:

> Permanent Education can be defined as learning at work, where learning and teaching are incorporated into the daily life of organizations. Through the local reality it is possible to establish actions that are effectively received by the workers. It is based on the possibility of modifying professional practices, using different ways to teach, going beyond the valorization of techniques and specific training, with dialogue as the main tool of education. It guides the development initiatives of the professionals, not removing the personal responsibility of the process of constant updating. (NOGUEIRA DE SÁ et al, 2018, p.88)

The need to modify and update the practices of health professionals made permanent education become a policy of the Unified Health System (SUS) in Brazil, through the National Policy of Permanent Education in Health (PNEPS). Within the strategies of the PNEPS, we find the training, one of the resources used to improve the safety of the professional and the patient.

> Training is recognized by the National Policy for Permanent Education in Health (PNEPS) as one of the most used strategies to strengthen knowledge, skills, attitudes and practices for the provision of care. Studies report that professionals see permanent education as an opportunity to update their knowledge, aiming at professional qualification to better serve their clients. Thus, as the results indicate that health work demands education as an opportunity for evolution, transformation and improvement. (MACEDO et al, 2019)

The insertion of the theme of Permanent Education in Health, within the health teams, whether in primary care or in the hospital is a challenge for all those involved in the scenario:

> Permanent Education in Health (EPS), in the hospital context, is a challenging theme, due to the diversity of patients and pathologies, added to the demand of the service, make this space conducive to the realization of educational actions directed to permanent education, since its principles enable the construction of knowledge of the subject's autonomy. (MELO, 2017, p.14)

In nursing, permanent education is one of the managerial competencies to be developed by nurses throughout their academic and professional training. "By taking into account these aspects, the

National Curricular Guidelines (DCN) for Undergraduate Nursing Education point out the general competencies for nurses with regard to their education" (MELLO et al, 2018, p.2), highlighting the nurse's education profile.

A study related to the theme, highlights that "all the interviewees considered permanent education as a fundamental part of their work" (NOGUEIRA DE SÁ et al, 2018, p.91), as well as: "permanent education contributed to the updating and improvement of their practices, thus improving the care provided. " (NOGUEIRA DE SÁ et al, 2018, p.90)

Finally, continuing education sessions should make use of active methodologies that may include workshops, practical trainings, conferences, slide presentations or interactive moments and discussions, employing multiple teaching modalities that meet the diverse learning styles and create an active and constructive environment, favoring a transformative education.

2.1.1 Nursing Staff and COVID-19

The arrival of the pandemic brought the need for the health system to provide a rapid response, especially in the diagnosis of the disease and the system prepared to receive this demand, as addressed in this study:

> In the case of COVID-19, it includes the need for readiness in the testing of the population, logistical and productive capacity of supply chains, for example, from the acquisition of personal protective equipment (PPE) to the availability of beds for hospitalization in hospitals, Intensive Care Unit (ICU) beds, as well as trained professionals to develop preventive and care actions. (CHAVES et al, 2020, p.12)

Nursing, because it is the first access of the patient, in the search for care, proved to be strong and pertinent, in the face of the unknown, as represented by the author of a 2020 study:

> Nursing is this body, represented by nurses, technicians and auxiliaries, always active in any circumstances of patient care, from emergency care units to hospitals, exposed to risks arising from the precariousness of health services. (GONCALVES, p. 1, 2020)

The high potential for transmission of SARS-CoV-2 by droplets, aerosols and contact has led health professionals to review appropriate work practices that ensure the prevention of biological risk and adopt policies to cope with daily stress, due to the high impact caused by the pandemic on the mental health of workers. Although the pandemic generates occupational stress and is an important indicator of psychic exhaustion, health professionals end up developing coping tactics when exposed to highly challenging or traumatic situations, as highlighted in the 2020 study:

> "[...] there are reports of psychic illness, such as the manifestation of generalized anxiety disorders, depression, changes in sleep quality, Obsessive-Compulsive Disorder (OCD), panic

> attacks, Burnout syndrome or professional exhaustion, Post-Traumatic Stress Disorder (PTSD), even in the case of suicide. (MOREIRA & DE LUCCA, p.158, 2020)

In addition to facing the unknown, nursing needs to deal with existing problems, but with the arrival of the pandemic the problems have become more evident and visible in the eyes of society:

> The nursing category faces problems associated with work overload, poor working conditions, lack of resources and low professional valuation, including issues of gender bias, leadership, regulation and the performance of multiple functions. (MOREIRA & DE LUCCA, p.157, 2020)

Finally, society showed solidarity with health professionals, with the launch of several campaigns in favor of Nursing, but it is necessary to emphasize the importance of being recognized full-time, because the pandemic will pass and the consequences will remain.

2.1.2 Nursing, Continuing Education and COVID-19

The coronavirus pandemic brought to the teams the need to work on permanent education with professionals, in an attempt to prevent professionals from contagion, working mainly on the techniques of dressing and undressing, as highlighted in the 2020 study: "Permanent Education in Health (EPS), staff training, the acquisition of personal protective equipment (PPE) and the removal of professionals from risk groups stood out as main agendas." (RIOS et al, 2020, p. 248). Continuing with the same author: "It was decided to suspend elective care and perform an immediate screening in the individual's access to the unit." (RIOS et al, 2020, p. 249)

According to Silva *et al*, we can add:

> The actions of permanent education carried out in a circle with active participation of the professionals as essential subjects of the process reached their initial purpose, the teaching and learning of the technique of dressing and undressing of PPE. (SILVA et al, 2020, p. 232)

Given the importance of the need to dress properly and know how to manage the disease, expressing the interest of the participants was observed, as highlighted below:

> "... In training, there was no dispersion but very attentive, worried looks. Some reports of fear of the new, in addition to demonstration of insecurity regarding the techniques, especially the undressing, since recent studies from other countries have evidenced the increase in contamination in the execution of this technique." (SILVA et al, 2020, p. 231)

The same study highlights the doubts that arose before the techniques of dressing and undressing:

> Basic weaknesses in relation to the techniques of dressing and undressing emerged, although the professionals have years of hospital experience, such as: correct technique of hand hygiene; adequate removal of the apron and gloves of procedure without becoming contaminated; notions of efficacy and differences of the surgical mask, N95 or PFF2. The professionals reported, in their great majority, the need for the use of gloves and many minimized the importance of hand hygiene demonstrated insecurity and distrust in the use of only one pair of gloves, as recommended by ANVISA. (SILVA et al, 2020, p. 231)

In addition to the techniques of dressing, nursing had to adapt to changes in work processes and patient flows, such as the use of specific areas for COVID-19 patients, exclusive elevators, redeploy employees from the risk group to non-COVID-19 areas, resize the number of professionals in the COVID-19 area and among others, Being necessary to adopt strategies, as an example we find in this experience report:

> One strategy found to alleviate this situation was to conduct the training together with the immediate managers and CCIH in sectors where the flows were in progress, so that the questions were heard and remedied with propriety, thus minimizing the anguish and insecurity of the professionals. (SILVA et al, 2020, p. 232)

The training of dressing and undressing of Personal Protective Equipment (PPE) became one of the priorities, so that it was possible to organize flows for care, with quality and safety:

> In the provision of services by professionals, the concept of biosafety is present and should be prioritized, and health services must meet the Regulatory Standards - NR, being NR 32, of the Ministry of Labor and Employment, which establishes the basic guidelines for the implementation of measures to protect the safety and health of workers in health services. It recommends for each risk situation, the adoption of preventive measures and the training of workers for safe work. (SILVA et al, 2020, p. 229)

The use of EPIS, in general is recommending the use of surgical mask, these "should be used to avoid contamination of the professional's nose and mouth by respiratory droplets when the professional acts at a distance of less than 1 meter from the patient suspected or confirmed of infection with the new SARS-Cov." (CARVALHO et al, 2021, p.2)

Equipment such as gloves, bonnet, *Full-face*, are used when there is dispersion of aerosols or contact with exposure of the professional to contaminated material, as already used in practice. Publication of the year 2021, highlights how protection should be in suspected or confirmed cases:

> In suspected or confirmed cases: use surgical masks and tissues (when coughing, sneezing or nasal discharge); frequently sanitize hands with soap and water and/or alcohol 70%; Health professionals (in procedures that do not generate aerosols): wear goggles or face shield, surgical mask, apron, procedure gloves and cap; sanitize hands; Health professionals (in procedures that generate aerosols): wear goggles or face shield, N95/PPF2 mask or equivalent, apron, procedure gloves and cap; sanitize your hands. (CARVALHO et al, 2021, p.3)

Finally, the review of the techniques of dressing and undressing, hand washing, the care with the installation and management of patients with oxygen support, the review of the care of patients in

cardiorespiratory arrest, are some of the examples, that nursing can work in continuing education, to avoid contamination of professionals with COVID-19.

2.2 DISCUSSION

Permanent education within nursing has always been a very discussed agenda, sometimes beneficial and/or sometimes controversial. The need to update the practices of health professionals has made permanent education a policy of the Unified Health System (SUS) in Brazil, being a more efficient and accessible strategies in strengthening knowledge and practical skills.

The Nurse, in the competence of his attributions, can and should make use of these strategies to ensure access to knowledge and review of practices, thus being a fundamental part of his activities and subsequent improvement in the execution of patient care. On the other hand, it is observed in practice and in the literature review, the work overload and the lack of support from some managers, ends up hindering the adherence to educational activities, occurring delay to achieve the objectives and demotivation of the team.

The arrival of the pandemic brought the need for the health system to provide a rapid response and meet a demand far above normal. In addition, the acquisition of essential equipment and supplies for patients with suspected or confirmed diagnoses of COVID-19.

Nursing, because it is the first access of the patient, in the search for care, proved to be strong and pertinent, in the face of the unknown, becoming the front line of coping with the pandemic of the new Coronavirus. Thus, the nurse had to approach with his team, with plans of different competencies and managerial focuses, in addition to dealing with daily stress, due to the high impact caused by the pandemic on the mental health of workers.

Nursing in the face of the pandemic used permanent education to prevent professionals from contagion, working mainly on the techniques of dressing and undressing. In addition, the changes in work processes and patient flows, relocation of professionals from risk groups and resizing of when of professionals. In addition to the reinforcement of hand hygiene, care with the installation and management of patients with oxygen support and other items that each care unit should have with its peculiarity.

3 CONCLUSION

The cases recorded since the beginning of the pandemic to the present moment are alarming, reaching more than 1,039,120 deaths in the world, in the first week of October 2020, and bringing us as the only hope the vaccine, which is in tests in several countries, with the research funded with the support of several research centers, from all over the world. While the arrival of the vaccine does not

occur, it follows the planning of organizations to avoid the second wave of the disease, in places where there has already been a drop in the number of infected and daily deaths.

The revision of techniques and their correction should be a daily work on the part of all members of the nursing team, because there are always chances of improvement, to prevent contagion.

Thus, permanent education can be understood as a resource to promote differentiated educational processes for the nursing categories (nurses and technicians). This is because the performance of their functions in the hospital is distinct, due to the division of labor, and this requires these professionals to develop unique skills in their work process, for this we highlight the importance of all members in the process of permanent education, to avoid the spread of the disease.

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CHAPTER
28

Implications of social isolation for children due to the new coronavirus (COVID-19)

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ABSTRACT
Social isolation, due to the COVID-19 pandemic, is a situation of adversity in the development of the child. Social withdrawal, deprivation of interacting with other people and changes in habits significantly increase children's daily stress. As a consequence of such measures, stress, anxiety, depression, emotional overload and worsening mental health have affected, especially children, as they still do not have the cognitive tools necessary to deal with this new reality. The objective of this work is to identify and discuss the implications of social isolation for children in times of a pandemic, in order to present its difficulties, consequences and recommendations. The present study consists of a systematic literature review, carried out from the selection of articles. The databases were taken from selected scientific articles from 2009 to 2020 through a search in the Scielo database. The bibliographic search was carried out using the following descriptors: child, isolation, covid-19 and coronavirus.
When considering the pandemic as a prolonged stressful event and with a measure of social distancing, it is relevant to note that the current situation has no precedent with similar characteristics. In this sense, it is still difficult to assess the psychological impacts and how much the development of children will be affected. In view of the current scenario, it is a fundamental role of those responsible to make the environment less stressful for children and to carry out conversations about the situation with language and an appropriate approach for the child's age.

Keywords: Covid-19, social isolation in childhood, pandemic.

1 INTODUCTION

For centuries man has been living in society. The feeling of belonging, relating and establishing bonds is inherent to human beings and necessary for their well-being and for human evolution.

The interaction, relationship and socialization with others occurs from intrauterine life and shapes the period of childhood, since it is in this period that the active development of identity occurs. It is through experiences with the other, frustrating or satisfying, in a dichotomous process of socialization and individuation, that the child progressively develops an image of himself and the other (Holper, 1982).

Thus, conviviality promotes a space for learning roles, cognitive and moral development, control of impulses and acquisition of global social skills (KENDAL & MORISON, 1983). Being in social isolation, due to the COVID-19 pandemic, is a situation of adversity in the child's development and in his interaction with society.

Social withdrawal, deprivation of interacting with other people and changes in habits significantly increase children's daily stress, leading to the case of toxic stress (LOUREIRO et al., 2020).

Toxic stress occurs due to the high level of stress generated in the child, which may be a repeated or prolonged situation that exceeds the child's ability to deal with this adversity, and may cause neurobiological and psychological damage (BRANCO & LINHARES, 2018).

Stressful situations affect homeostasis, causing physiological stimuli to increase childhood hormones such as adrenaline and cortisol.

These alterations can have short-term consequences for the child, such as sleep disorders, irritability, weakened immunity, fears; and medium/long-term consequences such as developmental delay, anxiety and depression disorders, drop in school development, among others (LOUREIRO et al., 2020).

In addition, the longer the isolation time, the greater the risk of developing psychiatric illnesses (AFONSO & FIGUEIRA, 2020).

Thus, it is important to discuss the impacts of social isolation on children, in order to preserve their mental health and good psychological development.

The present study aims to identify and discuss the implications of social isolation for children in times of a pandemic due to COVID-19, in order to present its difficulties and consequences.

This study consists of a systematic literature review, carried out from the selection of articles.

The sample is composed of infants who experienced social isolation during the pandemic period. The databases were taken from selected scientific articles from 2009 to 2020 through a search in the Scielo database, scholar google and a study by the European Pediatrics Association.

This content was produced in Brazil and abroad. The bibliographic search term was performed using the following descriptors: COVID-19, children and social isolation.

It was noticed that there is a growing recognition of the importance of social interaction for the development of children, who, from birth, have potential that is developed in the context of social interactions. In this way, a communication and metacommunication circuit are established between the child and those who live and interact with him or her (Branco & Valsiner, 2004; Branco & Madureira, in press), which is characterized by a continuous creation and negotiation of meanings that introduce the child into the cultural universe of their social group (PINTO & BRANCO, 2009).

The pandemic scenario due to COVID-19 required a policy of social distancing that is justified as the main way to control the contamination of the population by the virus. Although doctors believe that children who contract the new coronavirus often are not as affected as adults, they can still carry the virus and thus can infect others.

According to a study done in partnership between the WHO and the Chinese government, although younger people are less susceptible to the new coronavirus, they can contaminate themselves and transmit the virus to other people.

These clearly necessary measures, on the other hand, have negative effects, especially on children, because they still do not have the necessary cognitive resources to understand something abstract like the Coronavirus (CARVALHO, 2020).

In this context, children and family members will have to deal with highly stressful situations that are likely to threaten adaptive coping capacity.

Children start to deal with a reality of stress that they are not prepared for, which results in physiological changes such as a high level of cortisol (stress regulating hormone) compared to children who do not live in this context (SLOPEN, MCLAUGHLIN, & SHONKOFF, 2014).

The result of this alteration is closely related to the immune system and nervous system, which is related to emotion, memory and learning (SHONKOFF, RICHTER, VAN DER GAAG, & BHUTTA, 2012).

A preliminary study carried out in February 2020 in the province of Shaanxi (China) identified that the most common psychological and behavioral problems among 320 children and adolescents aged between 3 and 18 years were: distraction, irritability and fear of asking questions about the pandemic. Furthermore, in the subsample of children aged three to six years, excessive attachment to parents and fear of family members getting sick prevailed (Wen Yan Jiao et al., 2020).

When considering the pandemic as a prolonged stressful event and with a measure of social distancing, it is relevant to note that the lived reality has no precedent with similar characteristics. In this sense, it is still difficult to assess the psychological impacts and especially how much the development of children will be affected (LINHARES et al., 2020).

Furthermore, studies considering toxic stressful events that widely affected people such as natural disasters, terrorist attacks or wars had a high impact on people's lives and can serve as a comparison (LINHARES et al., 2020).

As an example, we can cite a study carried out in the United States that aimed to evaluate the psychological impact on children after the terrorist attack of September 11, 2001 in New York.

The study was carried out in a focus group with parents of children up to five years old. The results showed that, after this extremely stressful event, the children had dysfunctional problems such as: anxiety, new fears, signs of depression, irritability, excessive attachment and problems with sleep and food regulation (KLEIN, DEVOE AND MIRANDA-JULIAN, 2009).

It becomes evident, therefore, that those responsible for these children create a welcoming environment and that they provide adequate support so that the damage caused is minimized.

According to the Science Center for childhood, there are some recommendations that can be made to minimize the damage caused, such as:

a) Trying to understand reactions of tantrums, deceit, neediness or others as responses to a tense situation, and not as a challenge to adults;

b) Help her understand this relationship and reassure her;

c) Stimulate the performance of physical activities (as possible in the confinement space), preferably at certain times;

d) Preserve the child's sleep schedule in a way similar to that of their normal routine; dedicate time to strengthening the bonds of the family group, with games and activities that strengthen unity;

e) Enable the maintenance of the child's bonds of friendship; delegate tasks at home, as far as the child's possibilities;

f) Praise the child for well-done acts (from keeping silent when asked, to playing or communicating correctly), accepting any setbacks in stages that had already been overcome (such as sucking a finger or being naughty) as signs of insecurity that they should be treated with affection, not scolding (scientific committee of the science for childhood nucleus, 2020).

With the collected data, the importance of social interaction for the social and cognitive development of the child is reaffirmed.

This process allows them to form an image of themselves and the other. In addition, these data also demonstrate how this conviviality enables the learning of roles, the development of cognitive and moral skills, control of impulses and the acquisition of global social skills.

In this sense, social isolation as a measure to contain the spread of the new coronavirus has several implications for the development of children and adolescents, as a result, for example, of the role of day care centers and schools in social development at these ages.

In addition, the situation experienced may result in an increase in the child's stress level, both due to the difficulty in understanding the situation, as well as changes in their routines, family dynamics and distance from close people.

Therefore, the social isolation to which they were exposed can cause neurobiological damage, due to the generation of toxic stress and hormonal changes. In this way, it is a fundamental role of those responsible to make the environment as healthy as possible, by promoting physical activities, time outdoors and encouraging dialogue.

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CHAPTER
29

Leisure in times of pandemic: The use of free time by adolescents in a municipality in the interior of the Amazon

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ABSTRACT
This study sought to understand the main effects of social isolation during the COVID-19 pandemic on the use of free time by adolescents in a municipality in the interior of the Amazon. Participated in the research 70 adolescents, captured through digital platforms and indication of other adolescents who were accepting to participate in the study. The project was approved by the CEP of UEPA campus of Santarém. The data were collected through a form with closed and open questions produced in google forms and sent by Whatzapp to the participants. They only had access to the form after signing the ICF and Term of Assent. The data were analyzed with the support of Excel and Iramuteq software. The general results of the profile indicated that most of the participants were female (64.28%), with ages distributed between 11 and 19 years, the majority coming from public schools (58.57%), and the vast majority (90%) are residents of the urban area of the municipality, and (45.71%) live with up to two minimum wages.

Keywords: Leisure, COVID-19, Adolescents, Pandemic.

1 INTRODUCTION

In 2020 the world was ravaged by the outbreak of a new disease, which became known as COVID-19, transmitted by a new form of the corona virus in China, in January 2020, before the notification of the disease in other parts of the world, the World Health Organization (WHO) declared an international public health emergency (BEZERRA, SILVA E SOARES, 2020).

In Brazil, the first manifestation of the disease was reported in February 2020 in the city of São Paulo. As COVID-19 spread and advanced to all Brazilian states, the federal, state and municipal governments began to discuss with epidemiological authorities what control and prevention measures could be taken in an attempt to slow the spread of infection and the collapse of the health system. Each region began to monitor the disease and establish parameters for the implementation of biosecurity measures, since there were many divergences regarding the procedures presented by the central power of the country, in the fight against COVID, and at the same time there were differences in the form and amount of contagion, as well as in the power of reaction to the epidemic in the different states. However, the strategy adopted by all and recommended by the WHO was the use of masks and alcohol

gel and social distancing and/or isolation. (FARIAS, 2020; GARCIA LP, DUARTE, 2020, BEZERRA et al, 2020).

Even in the face of many protests and the social and economic consequences, social distancing was encouraged and often social isolation was implemented by controlling the mobility of the population, especially in the periods known as *lockdown*. Across the country schools, universities, non-essential commerce, public and private areas of sport and leisure, among others have been closed, with part of the Brazilian population supporting and adhering to social isolation in an attempt to change the curve of contagion by COVID in the country (FARIAS, 2020).

This process of social distancing/isolation has generated numerous economic, social, cultural and psychological consequences. People ended up staying longer in their homes and this led to the adoption of new habits and behaviors that impacted the active lives of many people. Given this, leisure so important for the mental and social health of human beings had to assume new configurations. Leisure is a right guaranteed in article 6 of the Brazilian Federal Constitution of 1988 to the population. According to Marcellino (2002), leisure is divided into two aspects, time and attitude. Leisure by the attitude aspect is characterized through the type of relationship observed between the individual and his experiences, which implies satisfaction for a certain activity. On the other hand, leisure related to the time aspect considers the activities developed in the "free time", after professional, family, social and religious obligations.

In the face of the pandemic, the impossibility or limitations for the use of squares, cinemas, churches, sports courts, clubs, bars, public libraries, museums, concert halls and parties, among many other options that generate crowding and approximations between individuals, has led to the replacement of these practices by more homemade options. Watching television programs, series, movies, soap operas that were already on the rise in daily life in many homes assumed the centrality of the use of free time. But other options also compete with this, such as book reading, virtual or board games in the family, physical activity at home, manual work, gardening, social networks, among others. Undoubtedly, the new habits can generate a greater sedentary lifestyle in the population and thus allow the manifestation of numerous diseases such as obesity, anxiety and depression.

However, it is important to consider that even the most homemade leisure activities are not available to everyone, there are barriers to leisure, and the economic factor is one of the most important. It influences the distribution of available time between social classes, and even access to education, favoring empowerment and unequal access to leisure (MARCELLINO, 2002). Many Brazilians live in cramped homes with many family members, without spaces or minimum conditions to maintain equipment or materials that guarantee the creative use of free time, in addition, many are concerned

about ensuring daily bread and even with all the measures of protection and isolation need to leave home to work and seek ways of survival in these times of decreased jobs.

According to the aforementioned author, other reasons that hinder leisure are: gender issues, where women had an accumulation of their family and work obligations; the age group, having as less favored the children and the elderly, for being restricted to the family environment, many times without appropriate conditions to guarantee space and options of activities (MARCELLINO, 2002). Mori and Silva (2010), address the issue of lack of access and knowledge about leisure activities, as a primary factor for the restriction of the elderly, who end up seeing themselves unable to acquire new habits.

Given this context, the concern of this study turned to adolescents, considering that this is a phase of great physiological, social and emotional changes, which generate needs for grouping and belonging for the construction of their identity. The spaces and times dedicated to leisure, in this phase of life, ends up assuming an important function in the process of self-knowledge and knowledge of the other and the world, the adolescent begins to take a position and define his personality mediated by the interactions that he also establishes in his free time. And it is considering this that this study seeks to understand the main effects of social isolation on the use of free time by adolescents in a municipality in the interior of the Amazon.

2 METHODOLOGY

This study is classified as a descriptive field study with a qualitative approach. (GIL, 2008; MUSSI et al, 2019). It was developed in a municipality located in the western region of Pará, in the middle of the Brazilian Amazon. Participants were 70 adolescents aged between 13 and 17 years of both sexes. The adolescents were invited by phone and through social media and adopted the snowball process, where a teenager indicated others from their school, neighborhood, family or social relationships. All ethical precepts of research with human beings were adopted and the study was approved by the CEP of UEPA Campos de Santarém by CAAE: . Data were collected through a questionnaire built in *google forms.* The ICF, the Term of Assent were sent by Whatzapp and once the acceptance was made the link of the form was sent to the participants.

The profile data were analyzed with the support of the Excel software, and the more descriptive/qualitative data were processed in the Iramuteq software through descending, similarity and word clouds analyses. This project was approved by the UEPA CEP with CAAE 46934521.4.0000.5168.

3 RESULTS AND DISCUSSION

A search was conducted for papers published on google scholar in the period from 2020 to 2021 with keywords: leisure, pandemic/COVID-19 and adolescence, using as filter articles, peer review and any language, 101 articles appeared. The reading of the titles per page began, of the first 30 articles, only 09 were selected, and it was noticed that from the fourth page no article was related to the theme under study. The 21 articles initially excluded referred to yoga for women; education, leisure and health in distance learning; cine drive as artistic leisure; tourism and social media; regional differences in the use of technology in higher education; change in workers' health habits; dissatisfaction with work by teachers; musical life declines; allergic contact dermatitis; women in home office during the pandemic; child violence and parenting, etc.

Of the 09 articles selected, two were excluded after reading because one was only a summary and the other was repeated, in the end there were 07 articles that can be viewed in the table below.

Table 1 – Works found in Google Scholar related to the theme under study.

CODE	TITLE	AUTHOR	YEAR OF PUBLICATION
1	Virtual leisure and the elderly in the context of the COVID-19 pandemic in the context of primary health care: interventional creativity	Alvaro Santos	2021
2	Effects of social isolation in the COVID-19 pandemic on the mental health of the population	Roger Rodriguez Jose Adelmo da Silva Filho Jessica Lima de Oliveira Jayana Castelo Branco Cavalcante de Meneses Camila Almeida Neves de Oliveira Antonio Germane Alves Pinto	2021
3	Scientific and cultural spaces and leisure during the pandemic: analysis of nine lives of São Paulo for children	Ana Luiza Cerqueira da Neves Barbara Perão Jessica Norberto Rocha Louise Massarani	2021
4	Motivations for being inactive in a pandemic period: an exploratory study with adolescents and young adults	Izabel Countess, Zélia Caçador Anastácio Celeste Anthony	2021
5	Physical activity in the midst of the COVID-19 pandemic: a population-based study in a city in southern Brazil	Ignatius Crochemore-Silva Alan Goularte Knuth Andrea Wendt Bruno Pereira Nunes Pedro Curi Hallal Leonardo Pozza Santos Jenifer Harter Deborah da Cruz Payão Pellegrini	2020
6	The second investigates leisure-time physical inactivity during the COVID-19 pandemic in university students in Minas Gerais	Giselle Elena Tavares Daniel Paiva de Oliveira Lucas Ramos Rodrigues Caroline Goncalves de Mota Thiago Ferreira de Sousa Maria Clara Elias Polo	2020

7	Physical Activity and Reduced Sedentary Behavior During the Coronavirus Pandemic	Francisco José Gondim Pitanga, Carmen Christina Beck, Cristiano Feathers Seara Pitanga	2020

Regarding the publications related to the theme under study, it was noticed that in the most critical period of the COVID-19 pandemic (2020 and 2021), on the Google Scholar platform, a considerable number of articles discussed various issues related to the pandemic since this disease, which claimed thousands of lives, needed to be understood in its most different dimensions.

The study by Santos (2021) turned to analyze the process of confinement of the elderly and the importance of encouraging leisure activities, typical of the tastes of the elderly person would be a way to reduce loneliness, physical problems, mental health, using virtual spaces. In this sense, it discusses the need for the public power to train people who can help the elderly, articulate with the UBS that is the gateway of the elderly, enable access to the internet and finally include the elderly in the virtual world, allowing leisure and socialization to be made feasible under new processes, thinking about the quality of life and a more active and participative life of this population group.

The study by Silva et al (2020) looked at the consequences of social distancing for the containment of COVID-19 on the mental health of the population. It was a review study and showed increased anxiety, depression, reduced sleep quality, increased concern with life, health, family, death, and at the same time observed a reduction in satisfaction with life, happiness, leisure and encounter. Finally, the authors indicated the need to adopt innovative care strategies to cope with this context.

The study by Neves et al (2021) sought to understand how museums, aquariums and zoos in São Paulo dialogued with the public during the pandemic through activities broadcast live through live. It was noticed that he hears a repetition of what was already done in person, prioritizing communicative processes of exposing information about different elements of the activities, which allowed to expand the dissemination and access of the public to leisure allied to educational experiences with themes focused on sciences.

The study by Condessa et al. (2021), sought to verify the motivation of adolescents and young adults to practice physical activity during the pandemic period. The authors found that there was an increase in BMI, including those who already had risks, there was an oscillation between those who practiced and those who did not practice physical activity, however there was an increase in those who started to do physical activity at home with tutorials and online guidelines. Regarding motivation, they concluded that the taste for physical activity and the pursuit of well-being led in relation to the concern with aesthetics.

The study by Silva (2020), was to describe the practice of Leisure Physical Activity (LPA) in the midst of the COVID-19 pandemic in a city of Rio Grande do Sul, evaluating inequalities between sexes, education and differences according to the level of social distancing. It was noticed that there

were no differences in relation to the level of adherence to social isolation, however, there were significant differences in relation to gender, men practiced more LPA in relation to women, likewise groups with higher education did more LPA than those with lower education. Of those who did LPA, most reported performing these activities at home and without support from a professional. The authors concluded that, in addition to encouraging the practice of physical activity at home, one should have a humanized and attentive look at the inequalities between people and social groups in Brazil.

The study by Tavares et al (2021) sought to estimate the prevalence of leisure-time physical inactivity and analyze the association between the practice of previous physical activities in school physical education and outside the school context, under leisure-time physical inactivity during the COVID-19 pandemic. The authors concluded that non-involvement with physical activity outside the school context is associated with a higher prevalence of leisure-time physical inactivity. Thus, the authors concluded that physical activities performed during leisure time in childhood and adolescence positively influence the maintenance of the practice, even in adverse situations such as social distancing caused by the pandemic.

The study by Pitanga et al (2020), discussed the importance of physical activity in people's overall health, especially in times of COVID-19 pandemic. He highlighted the influence of physical activity on the improvement of cardiovascular and metabolic conditions, its relationship with the immune system and reduction of sedentary behavior. It presented some orientations regarding the most appropriate place and activities, as well as their intensity and duration. The authors conclude that it is important to maintain physical activity in times of pandemic with mild and moderate intensity, preferably in open environments, but if it is not possible that it is indoors, reducing the time in front of the TV, computers decreasing sedentary behavior.

The studies presented did not focus on the use of free time during the COVID-19 pandemic by adolescents, nor did they seek to understand what changes in the use of this free time in the face of the process of social isolation. In this sense, the present study presents a differential, even if the search for a study did not involve different databases.

Regarding the profile of the participants, it is observed that the study managed to acquire a certain scope with regard to the type of school, distribution between sex, age, ethnicity and region of the municipality. Table 1 shows the most general profile data.

Table 1- General data of the profile of the participants.

VARIABLES	N	%
Sex		
Female	45	64,28
Male	25	35,71
Age		
From 11 and 12 Years	6	8,57
From 13 and 14 Years	6	8,57
From 15 to 17 years	51	72,85
From 18 and 19 Years	7	10
How it self-identifies		
Brown	37	52,85
White	28	40
Indigenous	1	1,42
Afro-descendant	4	5,71
Type of School		
Publishes	41	58,57
Private	28	40
Origin		
Urban area	63	90
Rural area	7	10

Source: 2021 survey data

In this study of the 70 participating adolescents, the majority were female (64.28%), there was a prevalence of students in the age group of 15 to 17 years (72.85%), (52.85%) self-identified as brown, the majority came from public schools (58.57%), and the vast majority (90%) are residents of the urban area of the municipality.

Table 2 – Socioeconomic data of the participants

VARIABLES	N	%
Type of house		
Apartment	7	10
House	63	90
The place he lives is		
Rental	8	11,42
Own	60	85,71
Given	2	2,85
Main means of transport		
Foot/Hitchhiking/Cycling	20	28,57
Public Transport	12	17,14
Own	38	54,28
Monthly income		
Up to 2 salaries	32	45,71
From 2 to 4 salaries	09	12,85
From 5 to 10 salaries	19	27,14
Above 10 salaries	10	14,28
How many people live with you		
1 person	2	2,85
2 people	5	7,14
3 people	12	17,14
4 people	29	41,42
5 or more people	22	31,42

Source: 2021 survey data

Regarding the socioeconomic situation of the participants, the vast majority (90%) live at home, with their own home (85.71%), and (54.28%) have means of transportation to get around. Regarding family income, it is noteworthy that a large part of the participants (42.71%) reported that they live with income up to 02 minimum wages and (12.85%) live with income between 2 and 4 minimum wages. Another important data is the number of people who live with the participants, (41.42%) live with 4 people and (31.42%) of the participants live with 5 people.

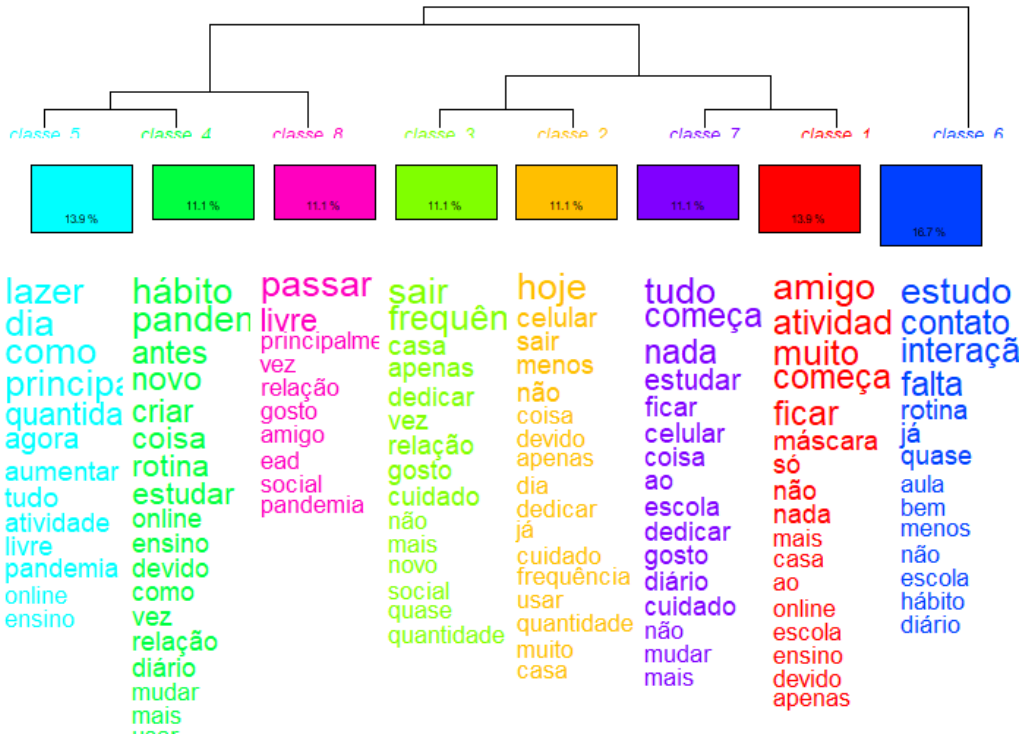
In a study of 17,254 people, aiming to describe, from the perception of respondents, aspects related to people's behavior and how they are being affected during the social isolation imposed by the COVID-19 pandemic, the researchers reported that 56% of their respondents felt a little stress and 17% stated that isolation generated a lot of stress in the home environment (BEZERRA et al, 2020). Other studies confirm the possibility of increased stress level, poor sleep quality, high blood cortisol level, and impaired physical and mental health in the face of confinement and restriction of the movement of people (PRESSMAN et al. 2005; MORAES, 2020).

Considering the above, a large part of the participants of the present study, due to their income condition and the number of people living in their homes (often reduced), during the COVID-19 pandemic, situations of personal and family conflicts with the potential to generate stress and compromise their physical and mental health.

It was not the focus of this study to analyze the increase or decrease in family income with the pandemic, however, the study by Bezerra et al, (2020, p. 2414), demonstrated that among their respondents those who had lower income reported having decreased or stopped making money during the COVID-19 pandemic "35% among those who reported having no income, 34.8% among those who earn up to 1 minimum wage and 24.76% among those who receive 1 to 2 minimum wages", presenting a significant result in the relationship "the perception of impact on income and that of family stress".

In relation to the question what has changed in your daily life and in the use of your free time with the COVID-19 pandemic, the answers generated the dendrogram below by the analysis Descending Hierarchical Classification (CDH) of the Iramuteq software.

Figure 1 - Descending Hierarchical Classification (HRC) referring to the change in daily life and in the use of free time with the pandemic.



Source: 2021 Survey

The participants' responses generated a textual corpus with two contexts: one related to the change in daily life with the pandemic (classes 3,2,7,1,6) and another related to the change in the use of free time with the pandemic (classes 5,4,8). By analyzing the textual corpus the software identified 41 segments of texts, of these it was able to classify 36 representing a use of 87, 80% generating a dendrogram with 8 classes. The classification process resulted in three partitions of the corpus: one in which class 6 is isolated, another that aggregates classes 1,7,2, and 3, and a last partition that aggregates classes 8, 4 and 5. These partitions demonstrate the classes that approach, those that complement each other, and those that present more specific themes. The classes with the highest percentage of text segments analyzed are classes 6 with 16.7%, 1 and 5 with 13.9%.

In relation to the change and use of free time in times of pandemic, in the dendrogram presented it is noticed, by highlighting the most frequent words in the speeches, that there was a great change in the lives of the participating adolescents in relation to the use of free time, starting to acquire new habits. Below are some significant statements that demonstrate this change.

> contact with my friends, study routine, etc. We stopped leaving the house, we did not receive visits (class 6);
>
> social interaction and studies an extra concern with the objects I pick up, [...] keep more contact via the internet and non-face-to-face studies (class 6)
>
> [...] with the distancing and the distance education was very complicated, we would have a

better use if we were in the classroom, this interaction of student and teacher was lacking, huge learning deficit (class 6)

online classes, I had to stay indoors for a long time [...] I started waking up a little later (class 1)

by teaching distance education you have more time to do the activities calmly, I started to get more tired, I move much more on the cell phone (class 1)

[...] I do not know how to organize my daily tasks, which leads to procrastination, I took more care of my family not exposing myself [...]

hygiene care [...] I started to get more stressed, [...] school confinement, everything the masks, the way of studying and the distancing [...] (class 7)

[...] I started to get more stressed, I started to get more tired, and I'm fiddling with my phone a lot, [...] (class 7)

the care when leaving and arriving from the street is doubled, [...] one no longer buys the same amount of things as before, seeking to save money (class 3)

I have difficulty managing my free time, I spent a lot of time in boredom and unmotivated [...], increased the amount of hours on the phone (class 2)

[...] now I play more on the phone, before I spent at friends' house or played ball [...] (class 2)

[...] currently I enjoy my free time with activities in which I can be alone or with few people (class 8) I

left my routine aside [...] I had to be more disciplined, because it is easier to lose focus, I created new hobbies [...] I changed my daily habits of studying (class 4)

[...] I did a lot of online courses, [...] (class 4)

I started to make use of activities more alone, I had to limit my leisure [...] (class 5)

[...] There is little time left for leisure on weekdays, but activities at home have now replaced those outdoors causing greater stress and feeling of being trapped (Class 5)

The statements indicate a great change in the routine of adolescents, online classes potentiated the use of the cell phone and at the same time "disorganized" the daily discipline of studies, facilitating the loss of focus and procrastination. On the other hand, confinement and biosecurity measures, which are important for reducing contagion, have brought sedentary lifestyle, anxiety, stress and fear of death as a possibility of consequence among adolescents. This reality is presented in several studies conducted in Brazil. Botero et al (2021) conducted a survey with 1,881 individuals over the age of 18 in order to investigate the impact of the 2019 coronavirus pandemic on the level of physical activity and sedentary behavior. Their study indicated a decrease in physical activity and an increase in sedentary behavior at all ages, with more than 50% indicating that the COVID-19 pandemic has reduced their level of physical activity.

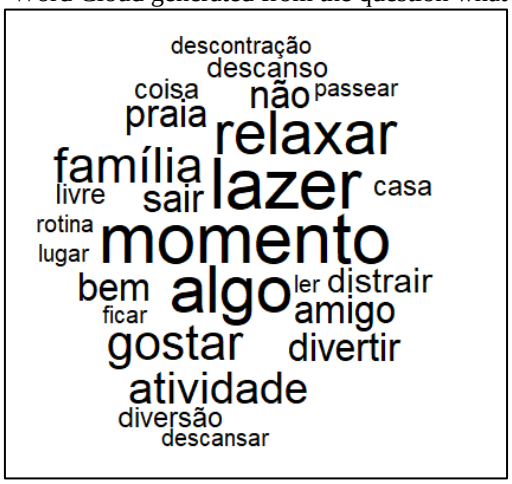
In another study conducted by Malta et al (2020) with 45,161 individuals aged 18 years or older, to describe changes in lifestyles, regarding the consumption of tobacco, alcoholic beverages,

diet and physical activity, in the period of the COVID-19 pandemic, indicated a significant increase in the use of computer or *tablet*, with an average time of use of more than 5 hours during the pandemic, which represented an increase of 1 hour and 30 minutes over the period before the pandemic. The longest time of use was with individuals aged 18 to 29 years 7 hours and 15 minutes, having an increase of almost 3 hours compared to the period before COVID 19.

On the other hand, several authors demonstrate the importance of friends and family in the lives of human beings, since we are sociable beings. The presence of other people helps to reduce anxiety, favor learning, help in overcoming fear, anguish and the construction of interactive behaviors, having a positive impact on physical and mental health (GARRIDO and GARRIDO, 2020; RIBEIRO, ROCHA, CUNHA et al. 2020; ALMEIDA, 2020; PEREIRA, et al 2020).

When the participants were asked what leisure is, the answers generated a textual corpus that was analyzed in the Word Cloud software tab, generating the figure below.

Figure 2 – Word Cloud generated from the question what is leisure.



Source: 2021 Survey Data.

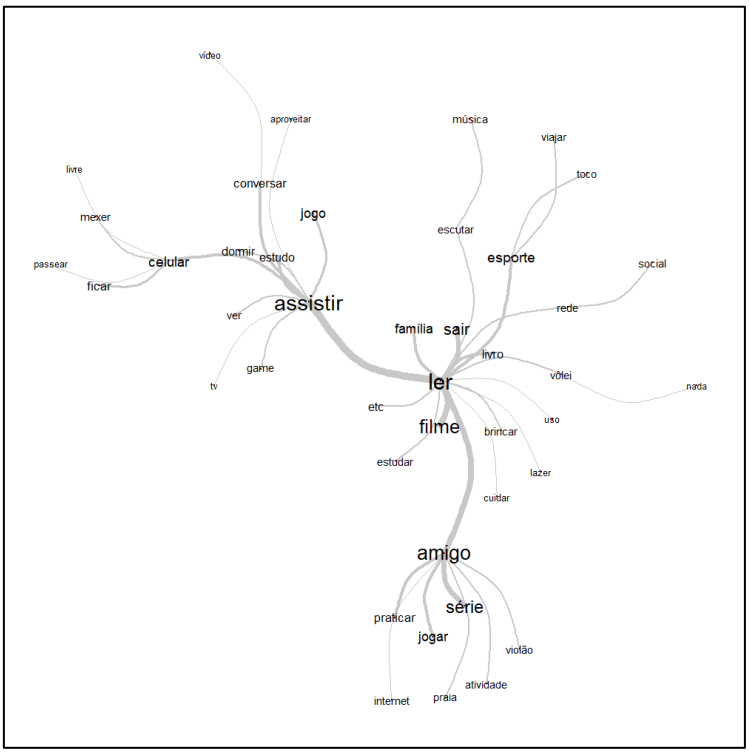
In the figure, the words most repeated by the participants and with a higher degree of significance appear with greater prominence, allowing to visualize how they perceive leisure: time to relax, rest, distract, have fun with family, friends, is to get out of the routine, feel good, is to leave the house, walk, go to the beach, read, do activities you like.

This perception is in agreement with Marcellino (2000) when stating that the word Leisure, in the common vocabulary, is endowed with immediate meanings, linked to the reality experienced or desired by the individual. In this sense, the adolescents abstracted the sense of leisure from what is close to their fundamental needs and desires, which is significant to them. Being oblivious to the multiple ways of conceptualizing or conceiving it in the context of societies, since this is a polysemic concept, its understanding being anchored to a vision of the world, society and life, and of the subjects

who live in a certain space/time (PADILHA, 2006). For teenagers, leisure is limited to fun, distraction, rest, walking, relaxing from moments of obligation or stress.

The textual corpus produced with the questions "what you do in your free time and which of these activities for you is leisure", allowed the similitude analysis, generated by the Iramuteq software, generating figure 3 below.

Figure 3 – Analysis of Similitude regarding the questions: what you do in your free time and which of these activities for you is leisure.



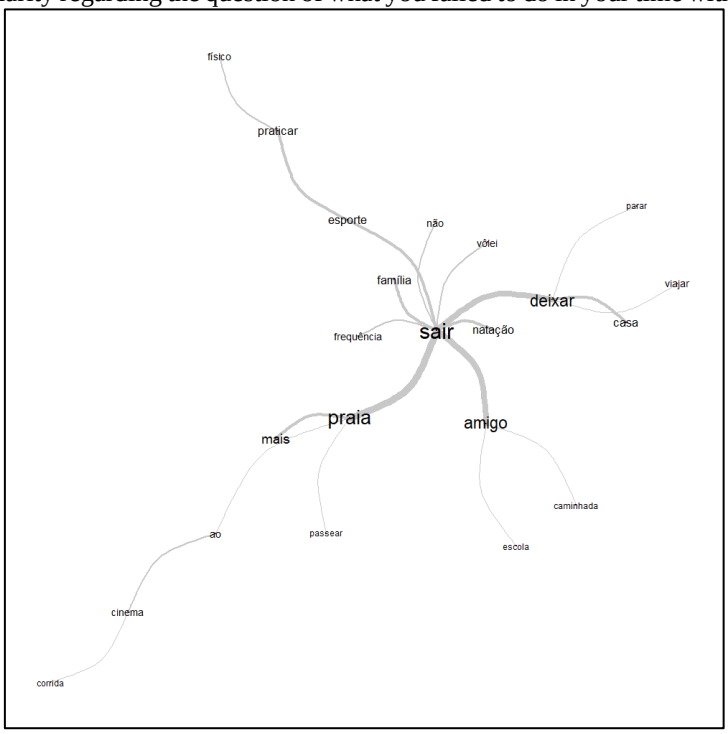
Source: 2021 Survey Data.

The stronger branches of this tree demonstrate greater frequency and strength of the words in the text, becoming central elements, while the narrower branches demonstrate less frequency and strength, however, it serves to connect words from the periphery to the more central words. In the figure the words watch, read and friend represent the strongest links of the text, establishing connection with other words allowing a more general understanding of the context reported.

The word read appears more strongly demonstrating a significant presence in the reports of adolescents, indicating that reading is strongly present in the daily lives of adolescents. Several words demonstrate activities related to leisure such as: watching games, videos, series, watching TV, fiddling with the cell phone, playing with friends, strolling, talking, reading books, playing, listening to music, traveling, staying on social networks, playing sports, playing, volleyball, guitar, using the internet, going out with the family. In this figure also appeared activities that adolescents do in their free time that are not considered leisure, such as: studying, caring.

It was also asked what the adolescents stopped doing in their free time with the pandemic, the answers allowed to generate figure 4.

Figure 4 – Analysis of similarity regarding the question of what you failed to do in your time with the COVID-19 pandemic.



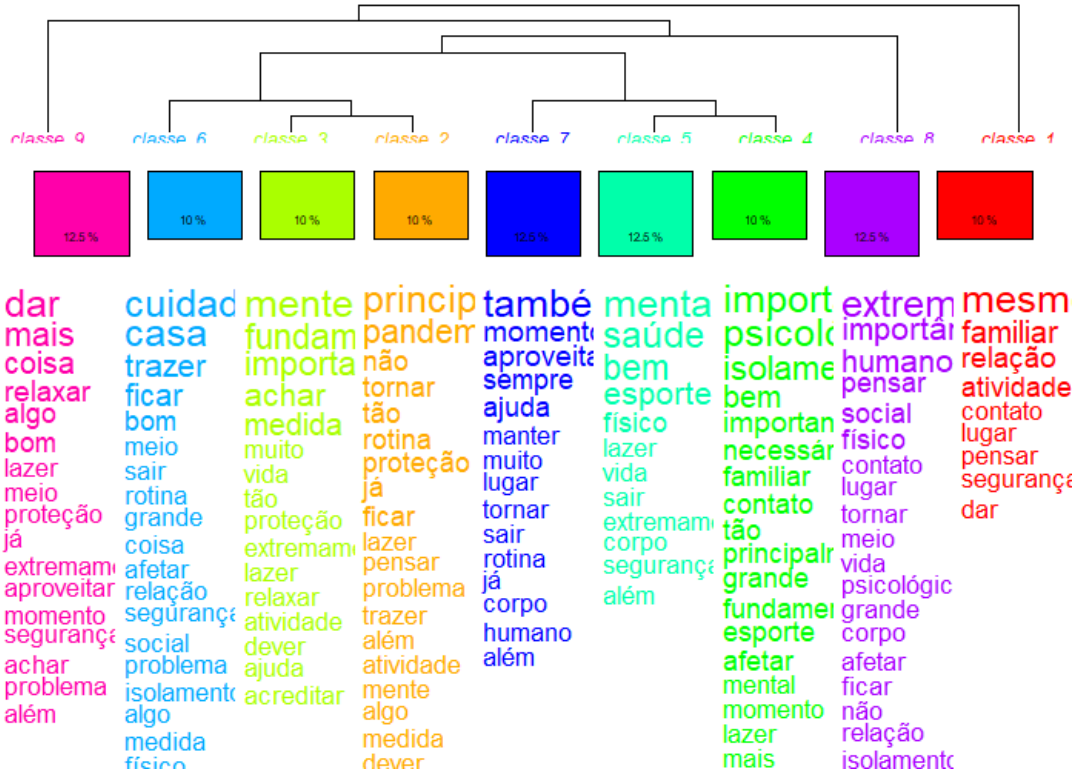
Source: 2021 Survey Data.

The central word, with the highest frequency of manifestation in the text segments, was Leave: go out to the beach, with friends, with the family go out to do sports, walk, go to the movies, stroll, travel; To leave is also linked to the word leave, meaning to stop leaving home, to stop traveling.

This reality is closely linked to the biosecurity measures adopted by families as a result of the guidance of public health agencies during the COVID-19 pandemic. The data indicated that there was an obedience of the adolescents to these measures, so important to contain the advance of the disease.

The adolescents were asked if they saw the importance of leisure in times of pandemic, considering the need for restriction and even confinement, the answers generated the dendrogram below.

Figure 5 – Descending Hierarchical Classification (CDH) referring to importance of leisure in times of pandemic.



Source: 2021 Survey data.

The participants' responses generated a single textual corpus. By analyzing the corpus the software identified 44 segments of texts, of these it was able to classify 40 representing a use of 90.91% generating a dendrogram with 9 classes. The classification process resulted in five corpus partitions: three in which classes 1, 8 and 9 are isolated, another that aggregates classes 4, 5 and 7, and a last partition that aggregates classes 2, 3 and 6. The classes with the highest percentage of text segments analyzed are classes 8, 5, 7 and 9, all with 12.5%.

Regarding the importance of leisure in times of pandemic, the dendrogram presented shows that the following words are highlighted by highlighting the most frequent words in the speeches that the participating adolescents understand the importance of leisure at times when there is a need for confinement and social distancing. Below are some significant statements that demonstrate this change.

> helps relieve stress, anxiety, sadness and boredom, I believe that leisure is essential in people's lives, but with the pandemic [...] prevention measures should be inserted [...] I think leisure is extremely important (class 3)[...]
>
> The laser is very important to relax the mind in such a chaotic context, taking time for leisure is fundamental, as long as it is in a conscious and responsible way (class 3)
>
> [...] To de-stress people and distract them from their duties and problems in the pandemic, leisure has become very quiet and limited, which harms the population [...] (class 2)
>
> [...] leisure is necessary for the person not to go crazy with all the obligations that seem to have

become greater with the pandemic (class 2)

in addition to relieving the feeling of anguish that the pandemic has brought to people, I believe that leisure helps not to feel so alone, to do something different and to occupy the mind, Some of the freedom of leisure has been lost, [...] (class 2)

I believe that leisure has fundamental importance in mental stability, because with Covid 19 people began to develop various types of psychological problems, both by isolation and the loss of important people (class 4)

I think it is important for our mental health, it has always been important, but in such a delicate scenario it is even more necessary, [...] leisure in the pandemic has great importance in combating anxiety and depression crises

(class 4)the [...] social and physical interactions have been greatly reduced in this context, to maintain good mental health it is extremely important that new means of distraction are found to replace such a gap (class 8)

it is an escape valve in relation to the pressure that social isolation brings, [...] isolation has made us realize how important human warmth is, being close to loved ones, a hug (class 8)

It is from moments of leisure that we relax, because it is usually when we do something that we like and that gives us a good feeling (Class 9)

I think it is extremely necessary that the person look for something that gives him this feeling of leisure, because you end up forgetting a little of the problems that happen (class 9)

In the phase of adolescence is very important, because it is the time to enjoy without worries, and in my opinion I lost a little of this phase, it helps to maintain mental health, unwind and de-stress, leisure is also a way to rest from the obligations of everyday life (class 7)

So it is crucial to have moments to distract yourself since the house has always been an environment where it was considered a place to rest and now it is also the workplace (class 7)

leisure is important for the human being to stay in a state of peace [...] maintain care [...] also prioritizing the health of the collective (class 7)

In addition to the ocular complications caused by the excessive use of electronic devices, it also helps with body well-being, endurance and personal satisfaction (Class 7)

The pandemic has affected the notion of free time, for those who can be isolated at home and, consequently, interpersonal relationships [...] bringing work home largely generates discouragement (class 6)

we must be careful, it is very good to have time just for us to reflect, social isolation has brought many health problems to people [...], many had to be creative to relax without leaving home (class 6)

I think that leisure is not a matter of rich, happy or unoccupied families, but a matter of necessity even, improving their mood, their family relationship, mental health, their inspiration (class 4)

During the pandemic many people locked themselves and isolated themselves, forgetting that within their own home [...] a place conducive to leisure, using various activities, preserving their habits, relationships and customs (class 4)

Even with the pandemic several leisure activities, such as a good walk on the waterfront, in the square, yoga at home, reading or online dance classes, are within the safety parameters of Covid 19 and can be done regularly (class 4)

Leisure, especially sports, is totally related to the health of individuals, and its lack can lead to mental and physical illness (class 1)

> Leisure is extremely necessary, [...] it is essential for our lives, because it enables the relaxation of body and soul, at a time when time is always assigned to work and studies (Class 1)

The adolescents were unanimous in highlighting the importance of leisure in human life, especially in times of pandemic, demonstrating how much it contributes to the integral health of individuals. In this sense, they agree/reinforce the expanded concept of health presented in the **8th National Health Conference (CNS)**in 1986 and published in the form of a law in September 1990 by No. 8,080, which defines health in Its overarching meaning:

> Health is the result of the conditions of food, housing, education, income, environment, work, transportation, employment, **leisure**, freedom, access and possession of land and access to health services. It is thus, first of all, the result of the forms of social organization of production, which can generate great inequalities in living standards. Health is not an abstract concept. It is defined in the historical context of a given society and at a given moment of its development, and should be conquered by the population in their daily struggles (8th NATIONAL HEALTH CONFERENCE: FINAL REPORT, 1986, p. 12 emphasis added).

The expanded concept of health has allowed great advances in public health policies in these 40 years of existence, however, much progress is still needed with regard to better living conditions. Many struggles are still waged to ensure work, income, housing, land, culture, education, etc., that is, equitable and universal access to health. Which also applies to leisure.

4 CONCLUSION

The study showed that the daily lives of teenagers have changed a lot with the pandemic, social isolation and biosecurity measures, and the news of death each day brought anxiety, worry for family members, fear of death. The distancing of friends and family was a factor of great frustration, affecting interpersonal relationships and socialization processes.

Another point highlighted was the classes in distance learning, as a positive point the learning of new skills, time to dedicate to other courses, to studies and do the activities more calmly; as a negative point the lack of organization and discipline, the increase of time in social networks, the lack of interaction with friends and teachers and learning difficulties.

Many pointed out that the activities of free time were impaired and restricted to the home or to the use of computers and cell phones. However, they highlighted the importance of maintaining isolation for public health reasons and care for their families.

In relation to leisure many reported changes in their daily lives, especially the substitution of active leisure for passive leisure, increasing time in front of the computer, cell phone and television. On the other hand, they sought other activities such as reading, doing physical activity with the support of online tutorial, games with the family and others. This reality is worrisome because it is associated

with an increase in sedentary lifestyle and consequently in obesity, indicating the need to draw strategies to ensure, in situations such as the one experienced by the pandemic, theoretical/practical guidance on the need and maintenance of physical activities in the home context.

Still in relation to the importance of leisure, the adolescents highlighted that leisure is of paramount importance in time of pandemic, especially in view of the mental health of the population.

This study is not conclusive, considering the number of adolescents who participated in the research, it is necessary to expand the number of participants, as well as to extend the research to other geographical spaces of the municipality, such as riverside communities, as well as to other ethnic groups, considering that it was not possible to access adolescents from quilombola and indigenous communities. It is hoped, however, to have contributed to the discussion of the theme and fostered curiosity for other research processes on the daily lives of adolescents in the context of the pandemic.

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CHAPTER
29

Leisure in times of pandemic: The use of free time by adolescents in a municipality in the interior of the Amazon

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ABSTRACT
This study sought to understand the main effects of social isolation during the COVID-19 pandemic on the use of free time by adolescents in a municipality in the interior of the Amazon. Participated in the research 70 adolescents, captured through digital platforms and indication of other adolescents who were accepting to participate in the study. The project was approved by the CEP of UEPA campus of Santarém. The data were collected through a form with closed and open questions produced in google forms and sent by Whatzapp to the participants. They only had access to the form after signing the ICF and Term of Assent. The data were analyzed with the support of Excel and Iramuteq software. The general results of the profile indicated that most of the participants were female (64.28%), with ages distributed between 11 and 19 years, the majority coming from public schools (58.57%), and the vast majority (90%) are residents of the urban area of the municipality, and (45.71%) live with up to two minimum wages.

Keywords: Leisure, COVID-19, Adolescents, Pandemic.

1 INTRODUCTION

In 2020 the world was ravaged by the outbreak of a new disease, which became known as COVID-19, transmitted by a new form of the corona virus in China, in January 2020, before the notification of the disease in other parts of the world, the World Health Organization (WHO) declared an international public health emergency (BEZERRA, SILVA E SOARES, 2020).

In Brazil, the first manifestation of the disease was reported in February 2020 in the city of São Paulo. As COVID-19 spread and advanced to all Brazilian states, the federal, state and municipal governments began to discuss with epidemiological authorities what control and prevention measures could be taken in an attempt to slow the spread of infection and the collapse of the health system. Each region began to monitor the disease and establish parameters for the implementation of biosecurity measures, since there were many divergences regarding the procedures presented by the central power of the country, in the fight against COVID, and at the same time there were differences in the form and amount of contagion, as well as in the power of reaction to the epidemic in the different states. However, the strategy adopted by all and recommended by the WHO was the use of masks and alcohol

gel and social distancing and/or isolation. (FARIAS, 2020; GARCIA LP, DUARTE, 2020, BEZERRA et al, 2020).

Even in the face of many protests and the social and economic consequences, social distancing was encouraged and often social isolation was implemented by controlling the mobility of the population, especially in the periods known as *lockdown*. Across the country schools, universities, non-essential commerce, public and private areas of sport and leisure, among others have been closed, with part of the Brazilian population supporting and adhering to social isolation in an attempt to change the curve of contagion by COVID in the country (FARIAS, 2020).

This process of social distancing/isolation has generated numerous economic, social, cultural and psychological consequences. People ended up staying longer in their homes and this led to the adoption of new habits and behaviors that impacted the active lives of many people. Given this, leisure so important for the mental and social health of human beings had to assume new configurations. Leisure is a right guaranteed in article 6 of the Brazilian Federal Constitution of 1988 to the population. According to Marcellino (2002), leisure is divided into two aspects, time and attitude. Leisure by the attitude aspect is characterized through the type of relationship observed between the individual and his experiences, which implies satisfaction for a certain activity. On the other hand, leisure related to the time aspect considers the activities developed in the "free time", after professional, family, social and religious obligations.

In the face of the pandemic, the impossibility or limitations for the use of squares, cinemas, churches, sports courts, clubs, bars, public libraries, museums, concert halls and parties, among many other options that generate crowding and approximations between individuals, has led to the replacement of these practices by more homemade options. Watching television programs, series, movies, soap operas that were already on the rise in daily life in many homes assumed the centrality of the use of free time. But other options also compete with this, such as book reading, virtual or board games in the family, physical activity at home, manual work, gardening, social networks, among others. Undoubtedly, the new habits can generate a greater sedentary lifestyle in the population and thus allow the manifestation of numerous diseases such as obesity, anxiety and depression.

However, it is important to consider that even the most homemade leisure activities are not available to everyone, there are barriers to leisure, and the economic factor is one of the most important. It influences the distribution of available time between social classes, and even access to education, favoring empowerment and unequal access to leisure (MARCELLINO, 2002). Many Brazilians live in cramped homes with many family members, without spaces or minimum conditions to maintain equipment or materials that guarantee the creative use of free time, in addition, many are concerned

about ensuring daily bread and even with all the measures of protection and isolation need to leave home to work and seek ways of survival in these times of decreased jobs.

According to the aforementioned author, other reasons that hinder leisure are: gender issues, where women had an accumulation of their family and work obligations; the age group, having as less favored the children and the elderly, for being restricted to the family environment, many times without appropriate conditions to guarantee space and options of activities (MARCELLINO, 2002). Mori and Silva (2010), address the issue of lack of access and knowledge about leisure activities, as a primary factor for the restriction of the elderly, who end up seeing themselves unable to acquire new habits.

Given this context, the concern of this study turned to adolescents, considering that this is a phase of great physiological, social and emotional changes, which generate needs for grouping and belonging for the construction of their identity. The spaces and times dedicated to leisure, in this phase of life, ends up assuming an important function in the process of self-knowledge and knowledge of the other and the world, the adolescent begins to take a position and define his personality mediated by the interactions that he also establishes in his free time. And it is considering this that this study seeks to understand the main effects of social isolation on the use of free time by adolescents in a municipality in the interior of the Amazon.

2 METHODOLOGY

This study is classified as a descriptive field study with a qualitative approach. (GIL, 2008; MUSSI et al, 2019). It was developed in a municipality located in the western region of Pará, in the middle of the Brazilian Amazon. Participants were 70 adolescents aged between 13 and 17 years of both sexes. The adolescents were invited by phone and through social media and adopted the snowball process, where a teenager indicated others from their school, neighborhood, family or social relationships. All ethical precepts of research with human beings were adopted and the study was approved by the CEP of UEPA Campos de Santarém by CAAE: . Data were collected through a questionnaire built in *google forms.* The ICF, the Term of Assent were sent by Whatzapp and once the acceptance was made the link of the form was sent to the participants.

The profile data were analyzed with the support of the Excel software, and the more descriptive/qualitative data were processed in the Iramuteq software through descending, similarity and word clouds analyses. This project was approved by the UEPA CEP with CAAE 46934521.4.0000.5168.

3 RESULTS AND DISCUSSION

A search was conducted for papers published on google scholar in the period from 2020 to 2021 with keywords: leisure, pandemic/COVID-19 and adolescence, using as filter articles, peer review and any language, 101 articles appeared. The reading of the titles per page began, of the first 30 articles, only 09 were selected, and it was noticed that from the fourth page no article was related to the theme under study. The 21 articles initially excluded referred to yoga for women; education, leisure and health in distance learning; cine drive as artistic leisure; tourism and social media; regional differences in the use of technology in higher education; change in workers' health habits; dissatisfaction with work by teachers; musical life declines; allergic contact dermatitis; women in home office during the pandemic; child violence and parenting, etc.

Of the 09 articles selected, two were excluded after reading because one was only a summary and the other was repeated, in the end there were 07 articles that can be viewed in the table below.

Table 1 – Works found in Google Scholar related to the theme under study.

CODE	TITLE	AUTHOR	YEAR OF PUBLICATION
1	Virtual leisure and the elderly in the context of the COVID-19 pandemic in the context of primary health care: interventional creativity	Alvaro Santos	2021
2	Effects of social isolation in the COVID-19 pandemic on the mental health of the population	Roger Rodriguez Jose Adelmo da Silva Filho Jessica Lima de Oliveira Jayana Castelo Branco Cavalcante de Meneses Camila Almeida Neves de Oliveira Antonio Germane Alves Pinto	2021
3	Scientific and cultural spaces and leisure during the pandemic: analysis of nine lives of São Paulo for children	Ana Luiza Cerqueira da Neves Barbara Perão Jessica Norberto Rocha Louise Massarani	2021
4	Motivations for being inactive in a pandemic period: an exploratory study with adolescents and young adults	Izabel Countess, Zélia Caçador Anastácio Celeste Anthony	2021
5	Physical activity in the midst of the COVID-19 pandemic: a population-based study in a city in southern Brazil	Ignatius Crochemore-Silva Alan Goularte Knuth Andrea Wendt Bruno Pereira Nunes Pedro Curi Hallal Leonardo Pozza Santos Jenifer Harter Deborah da Cruz Payão Pellegrini	2020
6	The second investigates leisure-time physical inactivity during the COVID-19 pandemic in university students in Minas Gerais	Giselle Elena Tavares Daniel Paiva de Oliveira Lucas Ramos Rodrigues Caroline Goncalves de Mota Thiago Ferreira de Sousa Maria Clara Elias Polo	2020

7	Physical Activity and Reduced Sedentary Behavior During the Coronavirus Pandemic	Francisco José Gondim Pitanga, Carmen Christina Beck, Cristiano Feathers Seara Pitanga	2020

Regarding the publications related to the theme under study, it was noticed that in the most critical period of the COVID-19 pandemic (2020 and 2021), on the Google Scholar platform, a considerable number of articles discussed various issues related to the pandemic since this disease, which claimed thousands of lives, needed to be understood in its most different dimensions.

The study by Santos (2021) turned to analyze the process of confinement of the elderly and the importance of encouraging leisure activities, typical of the tastes of the elderly person would be a way to reduce loneliness, physical problems, mental health, using virtual spaces. In this sense, it discusses the need for the public power to train people who can help the elderly, articulate with the UBS that is the gateway of the elderly, enable access to the internet and finally include the elderly in the virtual world, allowing leisure and socialization to be made feasible under new processes, thinking about the quality of life and a more active and participative life of this population group.

The study by Silva et al (2020) looked at the consequences of social distancing for the containment of COVID-19 on the mental health of the population. It was a review study and showed increased anxiety, depression, reduced sleep quality, increased concern with life, health, family, death, and at the same time observed a reduction in satisfaction with life, happiness, leisure and encounter. Finally, the authors indicated the need to adopt innovative care strategies to cope with this context.

The study by Neves et al (2021) sought to understand how museums, aquariums and zoos in São Paulo dialogued with the public during the pandemic through activities broadcast live through live. It was noticed that he hears a repetition of what was already done in person, prioritizing communicative processes of exposing information about different elements of the activities, which allowed to expand the dissemination and access of the public to leisure allied to educational experiences with themes focused on sciences.

The study by Condessa et al. (2021), sought to verify the motivation of adolescents and young adults to practice physical activity during the pandemic period. The authors found that there was an increase in BMI, including those who already had risks, there was an oscillation between those who practiced and those who did not practice physical activity, however there was an increase in those who started to do physical activity at home with tutorials and online guidelines. Regarding motivation, they concluded that the taste for physical activity and the pursuit of well-being led in relation to the concern with aesthetics.

The study by Silva (2020), was to describe the practice of Leisure Physical Activity (LPA) in the midst of the COVID-19 pandemic in a city of Rio Grande do Sul, evaluating inequalities between sexes, education and differences according to the level of social distancing. It was noticed that there

were no differences in relation to the level of adherence to social isolation, however, there were significant differences in relation to gender, men practiced more LPA in relation to women, likewise groups with higher education did more LPA than those with lower education. Of those who did LPA, most reported performing these activities at home and without support from a professional. The authors concluded that, in addition to encouraging the practice of physical activity at home, one should have a humanized and attentive look at the inequalities between people and social groups in Brazil.

The study by Tavares et al (2021) sought to estimate the prevalence of leisure-time physical inactivity and analyze the association between the practice of previous physical activities in school physical education and outside the school context, under leisure-time physical inactivity during the COVID-19 pandemic. The authors concluded that non-involvement with physical activity outside the school context is associated with a higher prevalence of leisure-time physical inactivity. Thus, the authors concluded that physical activities performed during leisure time in childhood and adolescence positively influence the maintenance of the practice, even in adverse situations such as social distancing caused by the pandemic.

The study by Pitanga et al (2020), discussed the importance of physical activity in people's overall health, especially in times of COVID-19 pandemic. He highlighted the influence of physical activity on the improvement of cardiovascular and metabolic conditions, its relationship with the immune system and reduction of sedentary behavior. It presented some orientations regarding the most appropriate place and activities, as well as their intensity and duration. The authors conclude that it is important to maintain physical activity in times of pandemic with mild and moderate intensity, preferably in open environments, but if it is not possible that it is indoors, reducing the time in front of the TV, computers decreasing sedentary behavior.

The studies presented did not focus on the use of free time during the COVID-19 pandemic by adolescents, nor did they seek to understand what changes in the use of this free time in the face of the process of social isolation. In this sense, the present study presents a differential, even if the search for a study did not involve different databases.

Regarding the profile of the participants, it is observed that the study managed to acquire a certain scope with regard to the type of school, distribution between sex, age, ethnicity and region of the municipality. Table 1 shows the most general profile data.

Table 1- General data of the profile of the participants.

VARIABLES	N	%
Sex		
Female	45	64,28
Male	25	35,71
Age		
From 11 and 12 Years	6	8,57
From 13 and 14 Years	6	8,57
From 15 to 17 years	51	72,85
From 18 and 19 Years	7	10
How it self-identifies		
Brown	37	52,85
White	28	40
Indigenous	1	1,42
Afro-descendant	4	5,71
Type of School		
Publishes	41	58,57
Private	28	40
Origin		
Urban area	63	90
Rural area	7	10

Source: 2021 survey data

In this study of the 70 participating adolescents, the majority were female (64.28%), there was a prevalence of students in the age group of 15 to 17 years (72.85%), (52.85%) self-identified as brown, the majority came from public schools (58.57%), and the vast majority (90%) are residents of the urban area of the municipality.

Table 2 – Socioeconomic data of the participants

VARIABLES	N	%
Type of house		
Apartment	7	10
House	63	90
The place he lives is		
Rental	8	11,42
Own	60	85,71
Given	2	2,85
Main means of transport		
Foot/Hitchhiking/Cycling	20	28,57
Public Transport	12	17,14
Own	38	54,28
Monthly income		
Up to 2 salaries	32	45,71
From 2 to 4 salaries	09	12,85
From 5 to 10 salaries	19	27,14
Above 10 salaries	10	14,28
How many people live with you		
1 person	2	2,85
2 people	5	7,14
3 people	12	17,14
4 people	29	41,42
5 or more people	22	31,42

Source: 2021 survey data

Regarding the socioeconomic situation of the participants, the vast majority (90%) live at home, with their own home (85.71%), and (54.28%) have means of transportation to get around. Regarding family income, it is noteworthy that a large part of the participants (42.71%) reported that they live with income up to 02 minimum wages and (12.85%) live with income between 2 and 4 minimum wages. Another important data is the number of people who live with the participants, (41.42%) live with 4 people and (31.42%) of the participants live with 5 people.

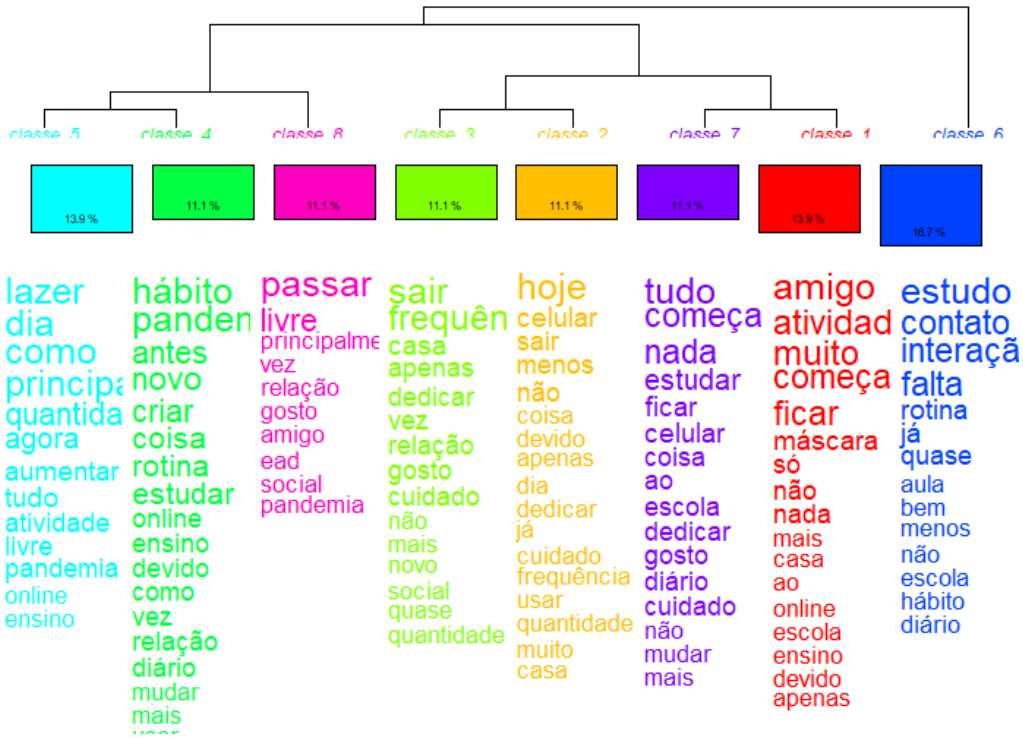
In a study of 17,254 people, aiming to describe, from the perception of respondents, aspects related to people's behavior and how they are being affected during the social isolation imposed by the COVID-19 pandemic, the researchers reported that 56% of their respondents felt a little stress and 17% stated that isolation generated a lot of stress in the home environment (BEZERRA et al, 2020). Other studies confirm the possibility of increased stress level, poor sleep quality, high blood cortisol level, and impaired physical and mental health in the face of confinement and restriction of the movement of people (PRESSMAN et al. 2005; MORAES, 2020).

Considering the above, a large part of the participants of the present study, due to their income condition and the number of people living in their homes (often reduced), during the COVID-19 pandemic, situations of personal and family conflicts with the potential to generate stress and compromise their physical and mental health.

It was not the focus of this study to analyze the increase or decrease in family income with the pandemic, however, the study by Bezerra et al, (2020, p. 2414), demonstrated that among their respondents those who had lower income reported having decreased or stopped making money during the COVID-19 pandemic "35% among those who reported having no income, 34.8% among those who earn up to 1 minimum wage and 24.76% among those who receive 1 to 2 minimum wages", presenting a significant result in the relationship "the perception of impact on income and that of family stress".

In relation to the question what has changed in your daily life and in the use of your free time with the COVID-19 pandemic, the answers generated the dendrogram below by the analysis Descending Hierarchical Classification (CDH) of the Iramuteq software.

Figure 1 - Descending Hierarchical Classification (HRC) referring to the change in daily life and in the use of free time with the pandemic.



Source: 2021 Survey

The participants' responses generated a textual corpus with two contexts: one related to the change in daily life with the pandemic (classes 3,2,7,1,6) and another related to the change in the use of free time with the pandemic (classes 5,4,8). By analyzing the textual corpus the software identified 41 segments of texts, of these it was able to classify 36 representing a use of 87, 80% generating a dendrogram with 8 classes. The classification process resulted in three partitions of the corpus: one in which class 6 is isolated, another that aggregates classes 1,7,2, and 3, and a last partition that aggregates classes 8, 4 and 5. These partitions demonstrate the classes that approach, those that complement each other, and those that present more specific themes. The classes with the highest percentage of text segments analyzed are classes 6 with 16.7%, 1 and 5 with 13.9%.

In relation to the change and use of free time in times of pandemic, in the dendrogram presented it is noticed, by highlighting the most frequent words in the speeches, that there was a great change in the lives of the participating adolescents in relation to the use of free time, starting to acquire new habits. Below are some significant statements that demonstrate this change.

> contact with my friends, study routine, etc. We stopped leaving the house, we did not receive visits (class 6);
>
> social interaction and studies an extra concern with the objects I pick up, [...] keep more contact via the internet and non-face-to-face studies (class 6)
>
> [...] with the distancing and the distance education was very complicated, we would have a

better use if we were in the classroom, this interaction of student and teacher was lacking, huge learning deficit (class 6)

online classes, I had to stay indoors for a long time [...] I started waking up a little later (class 1)

by teaching distance education you have more time to do the activities calmly, I started to get more tired, I move much more on the cell phone (class 1)

[...] I do not know how to organize my daily tasks, which leads to procrastination, I took more care of my family not exposing myself [...]

hygiene care [...] I started to get more stressed, [...] school confinement, everything the masks, the way of studying and the distancing [...] (class 7)

[...] I started to get more stressed, I started to get more tired, and I'm fiddling with my phone a lot, [...] (class 7)

the care when leaving and arriving from the street is doubled, [...] one no longer buys the same amount of things as before, seeking to save money (class 3)

I have difficulty managing my free time, I spent a lot of time in boredom and unmotivated [...], increased the amount of hours on the phone (class 2)

[...] now I play more on the phone, before I spent at friends' house or played ball [...] (class 2)

[...] currently I enjoy my free time with activities in which I can be alone or with few people (class 8) I

left my routine aside [...] I had to be more disciplined, because it is easier to lose focus, I created new hobbies [...] I changed my daily habits of studying (class 4)

[...] I did a lot of online courses, [...] (class 4)

I started to make use of activities more alone, I had to limit my leisure [...] (class 5)

[...] There is little time left for leisure on weekdays, but activities at home have now replaced those outdoors causing greater stress and feeling of being trapped (Class 5)

The statements indicate a great change in the routine of adolescents, online classes potentiated the use of the cell phone and at the same time "disorganized" the daily discipline of studies, facilitating the loss of focus and procrastination. On the other hand, confinement and biosecurity measures, which are important for reducing contagion, have brought sedentary lifestyle, anxiety, stress and fear of death as a possibility of consequence among adolescents. This reality is presented in several studies conducted in Brazil. Botero et al (2021) conducted a survey with 1,881 individuals over the age of 18 in order to investigate the impact of the 2019 coronavirus pandemic on the level of physical activity and sedentary behavior. Their study indicated a decrease in physical activity and an increase in sedentary behavior at all ages, with more than 50% indicating that the COVID-19 pandemic has reduced their level of physical activity.

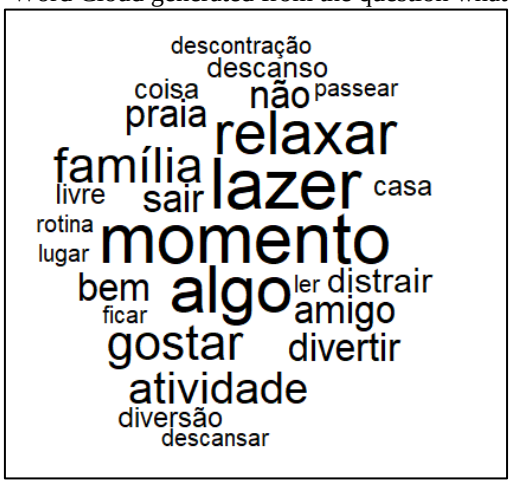
In another study conducted by Malta et al (2020) with 45,161 individuals aged 18 years or older, to describe changes in lifestyles, regarding the consumption of tobacco, alcoholic beverages,

diet and physical activity, in the period of the COVID-19 pandemic, indicated a significant increase in the use of computer or *tablet*, with an average time of use of more than 5 hours during the pandemic, which represented an increase of 1 hour and 30 minutes over the period before the pandemic. The longest time of use was with individuals aged 18 to 29 years 7 hours and 15 minutes, having an increase of almost 3 hours compared to the period before COVID 19.

On the other hand, several authors demonstrate the importance of friends and family in the lives of human beings, since we are sociable beings. The presence of other people helps to reduce anxiety, favor learning, help in overcoming fear, anguish and the construction of interactive behaviors, having a positive impact on physical and mental health (GARRIDO and GARRIDO, 2020; RIBEIRO, ROCHA, CUNHA et al. 2020; ALMEIDA, 2020; PEREIRA, et al 2020).

When the participants were asked what leisure is, the answers generated a textual corpus that was analyzed in the Word Cloud software tab, generating the figure below.

Figure 2 – Word Cloud generated from the question what is leisure.



Source: 2021 Survey Data.

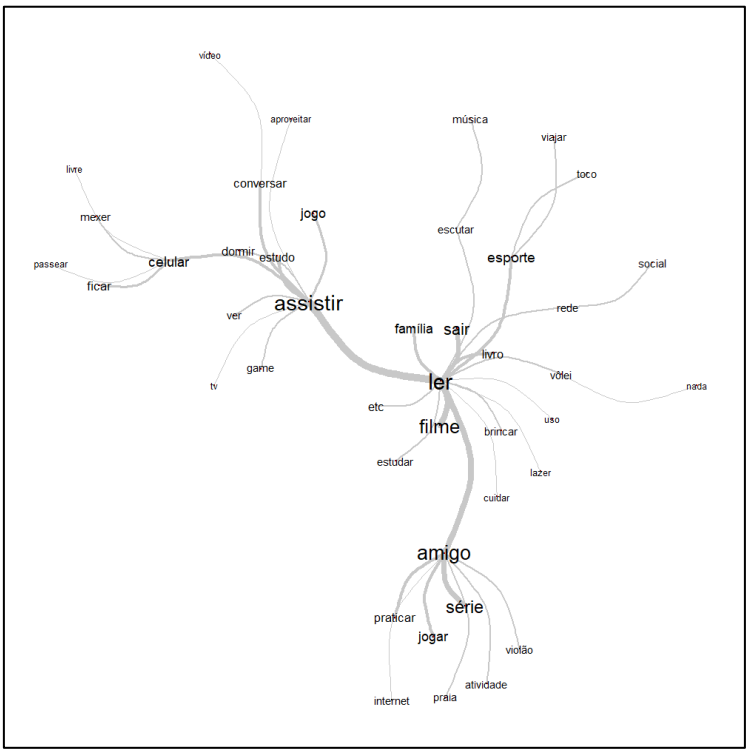
In the figure, the words most repeated by the participants and with a higher degree of significance appear with greater prominence, allowing to visualize how they perceive leisure: time to relax, rest, distract, have fun with family, friends, is to get out of the routine, feel good, is to leave the house, walk, go to the beach, read, do activities you like.

This perception is in agreement with Marcellino (2000) when stating that the word Leisure, in the common vocabulary, is endowed with immediate meanings, linked to the reality experienced or desired by the individual. In this sense, the adolescents abstracted the sense of leisure from what is close to their fundamental needs and desires, which is significant to them. Being oblivious to the multiple ways of conceptualizing or conceiving it in the context of societies, since this is a polysemic concept, its understanding being anchored to a vision of the world, society and life, and of the subjects

who live in a certain space/time (PADILHA, 2006). For teenagers, leisure is limited to fun, distraction, rest, walking, relaxing from moments of obligation or stress.

The textual corpus produced with the questions "what you do in your free time and which of these activities for you is leisure", allowed the similitude analysis, generated by the Iramuteq software, generating figure 3 below.

Figure 3 – Analysis of Similitude regarding the questions: what you do in your free time and which of these activities for you is leisure.



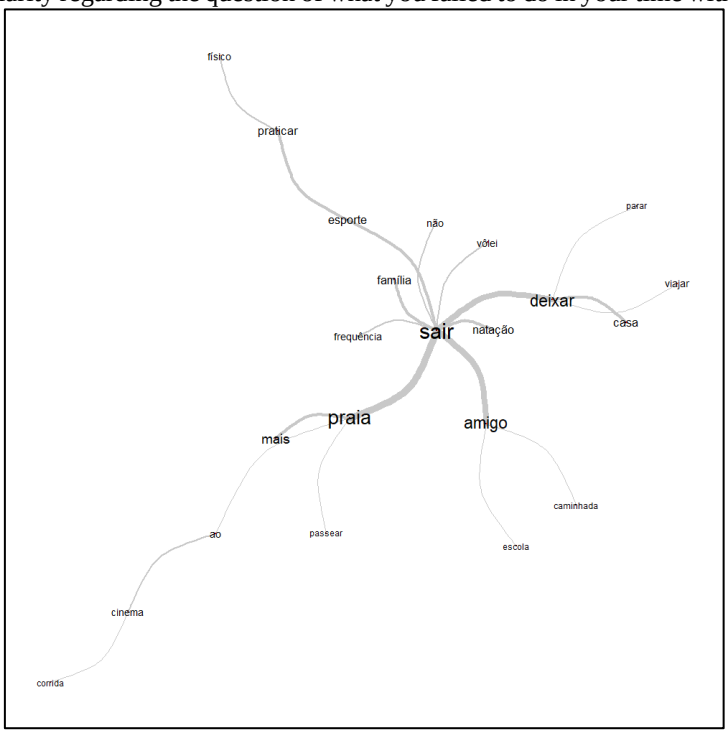
Source: 2021 Survey Data.

The stronger branches of this tree demonstrate greater frequency and strength of the words in the text, becoming central elements, while the narrower branches demonstrate less frequency and strength, however, it serves to connect words from the periphery to the more central words. In the figure the words watch, read and friend represent the strongest links of the text, establishing connection with other words allowing a more general understanding of the context reported.

The word read appears more strongly demonstrating a significant presence in the reports of adolescents, indicating that reading is strongly present in the daily lives of adolescents. Several words demonstrate activities related to leisure such as: watching games, videos, series, watching TV, fiddling with the cell phone, playing with friends, strolling, talking, reading books, playing, listening to music, traveling, staying on social networks, playing sports, playing, volleyball, guitar, using the internet, going out with the family. In this figure also appeared activities that adolescents do in their free time that are not considered leisure, such as: studying, caring.

It was also asked what the adolescents stopped doing in their free time with the pandemic, the answers allowed to generate figure 4.

Figure 4 – Analysis of similarity regarding the question of what you failed to do in your time with the COVID-19 pandemic.



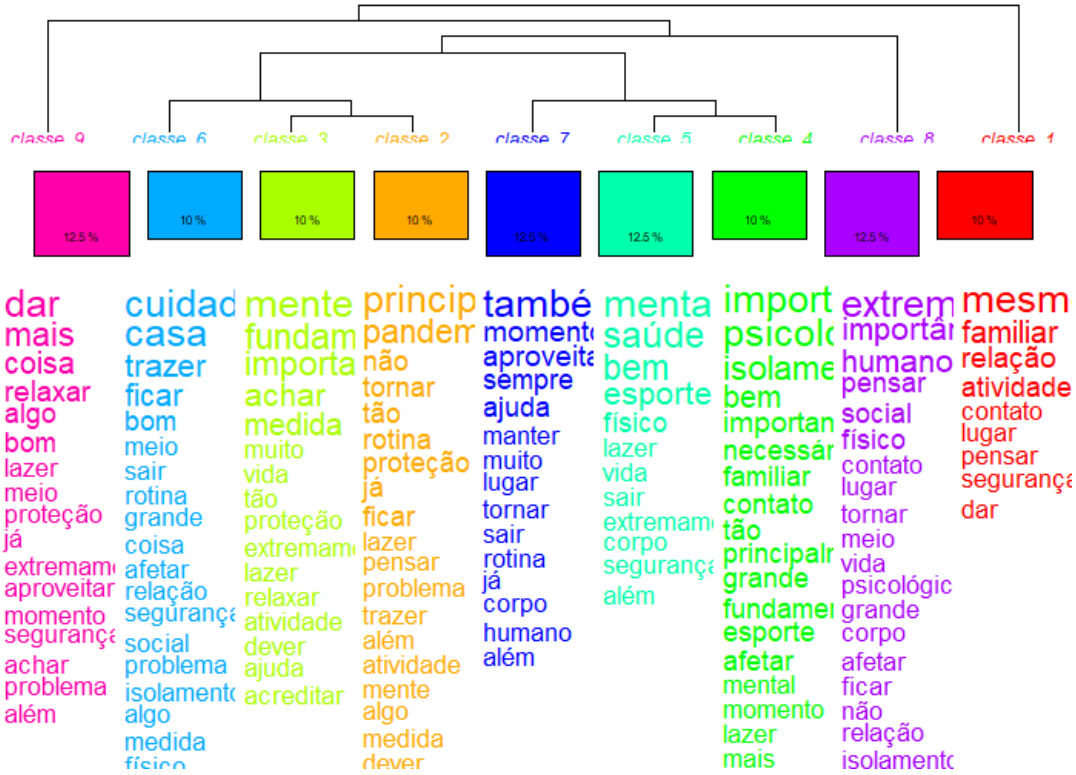
Source: 2021 Survey Data.

The central word, with the highest frequency of manifestation in the text segments, was Leave: go out to the beach, with friends, with the family go out to do sports, walk, go to the movies, stroll, travel; To leave is also linked to the word leave, meaning to stop leaving home, to stop traveling.

This reality is closely linked to the biosecurity measures adopted by families as a result of the guidance of public health agencies during the COVID-19 pandemic. The data indicated that there was an obedience of the adolescents to these measures, so important to contain the advance of the disease.

The adolescents were asked if they saw the importance of leisure in times of pandemic, considering the need for restriction and even confinement, the answers generated the dendrogram below.

Figure 5 – Descending Hierarchical Classification (CDH) referring to importance of leisure in times of pandemic.



Source: 2021 Survey data.

The participants' responses generated a single textual corpus. By analyzing the corpus the software identified 44 segments of texts, of these it was able to classify 40 representing a use of 90.91% generating a dendrogram with 9 classes. The classification process resulted in five corpus partitions: three in which classes 1, 8 and 9 are isolated, another that aggregates classes 4, 5 and 7, and a last partition that aggregates classes 2, 3 and 6. The classes with the highest percentage of text segments analyzed are classes 8, 5, 7 and 9, all with 12.5%.

Regarding the importance of leisure in times of pandemic, the dendrogram presented shows that the following words are highlighted by highlighting the most frequent words in the speeches that the participating adolescents understand the importance of leisure at times when there is a need for confinement and social distancing. Below are some significant statements that demonstrate this change.

> helps relieve stress, anxiety, sadness and boredom, I believe that leisure is essential in people's lives, but with the pandemic [...] prevention measures should be inserted [...] I think leisure is extremely important (class 3)[...]
>
> The laser is very important to relax the mind in such a chaotic context, taking time for leisure is fundamental, as long as it is in a conscious and responsible way (class 3)
>
> [...] To de-stress people and distract them from their duties and problems in the pandemic, leisure has become very quiet and limited, which harms the population [...] (class 2)
>
> [...] leisure is necessary for the person not to go crazy with all the obligations that seem to have

become greater with the pandemic (class 2)

in addition to relieving the feeling of anguish that the pandemic has brought to people, I believe that leisure helps not to feel so alone, to do something different and to occupy the mind, Some of the freedom of leisure has been lost, [...] (class 2)

I believe that leisure has fundamental importance in mental stability, because with Covid 19 people began to develop various types of psychological problems, both by isolation and the loss of important people (class 4)

I think it is important for our mental health, it has always been important, but in such a delicate scenario it is even more necessary, [...] leisure in the pandemic has great importance in combating anxiety and depression crises

(class 4)the [...] social and physical interactions have been greatly reduced in this context, to maintain good mental health it is extremely important that new means of distraction are found to replace such a gap (class 8)

it is an escape valve in relation to the pressure that social isolation brings, [...] isolation has made us realize how important human warmth is, being close to loved ones, a hug (class 8)

It is from moments of leisure that we relax, because it is usually when we do something that we like and that gives us a good feeling (Class 9)

I think it is extremely necessary that the person look for something that gives him this feeling of leisure, because you end up forgetting a little of the problems that happen (class 9)

In the phase of adolescence is very important, because it is the time to enjoy without worries, and in my opinion I lost a little of this phase, it helps to maintain mental health, unwind and de-stress, leisure is also a way to rest from the obligations of everyday life (class 7)

So it is crucial to have moments to distract yourself since the house has always been an environment where it was considered a place to rest and now it is also the workplace (class 7)

leisure is important for the human being to stay in a state of peace [...] maintain care [...] also prioritizing the health of the collective (class 7)

In addition to the ocular complications caused by the excessive use of electronic devices, it also helps with body well-being, endurance and personal satisfaction (Class 7)

The pandemic has affected the notion of free time, for those who can be isolated at home and, consequently, interpersonal relationships [...] bringing work home largely generates discouragement (class 6)

we must be careful, it is very good to have time just for us to reflect, social isolation has brought many health problems to people [...], many had to be creative to relax without leaving home (class 6)

I think that leisure is not a matter of rich, happy or unoccupied families, but a matter of necessity even, improving their mood, their family relationship, mental health, their inspiration (class 4)

During the pandemic many people locked themselves and isolated themselves, forgetting that within their own home [...] a place conducive to leisure, using various activities, preserving their habits, relationships and customs (class 4)

Even with the pandemic several leisure activities, such as a good walk on the waterfront, in the square, yoga at home, reading or online dance classes, are within the safety parameters of Covid 19 and can be done regularly (class 4)

Leisure, especially sports, is totally related to the health of individuals, and its lack can lead to mental and physical illness (class 1)

> Leisure is extremely necessary, [...] it is essential for our lives, because it enables the relaxation of body and soul, at a time when time is always assigned to work and studies (Class 1)

The adolescents were unanimous in highlighting the importance of leisure in human life, especially in times of pandemic, demonstrating how much it contributes to the integral health of individuals. In this sense, they agree/reinforce the expanded concept of health presented in the **8th National Health Conference (CNS)**in 1986 and published in the form of a law in September 1990 by No. 8,080, which defines health in Its overarching meaning:

> Health is the result of the conditions of food, housing, education, income, environment, work, transportation, employment, **leisure**, freedom, access and possession of land and access to health services. It is thus, first of all, the result of the forms of social organization of production, which can generate great inequalities in living standards. Health is not an abstract concept. It is defined in the historical context of a given society and at a given moment of its development, and should be conquered by the population in their daily struggles (8th NATIONAL HEALTH CONFERENCE: FINAL REPORT, 1986, p. 12 emphasis added).

The expanded concept of health has allowed great advances in public health policies in these 40 years of existence, however, much progress is still needed with regard to better living conditions. Many struggles are still waged to ensure work, income, housing, land, culture, education, etc., that is, equitable and universal access to health. Which also applies to leisure.

4 CONCLUSION

The study showed that the daily lives of teenagers have changed a lot with the pandemic, social isolation and biosecurity measures, and the news of death each day brought anxiety, worry for family members, fear of death. The distancing of friends and family was a factor of great frustration, affecting interpersonal relationships and socialization processes.

Another point highlighted was the classes in distance learning, as a positive point the learning of new skills, time to dedicate to other courses, to studies and do the activities more calmly; as a negative point the lack of organization and discipline, the increase of time in social networks, the lack of interaction with friends and teachers and learning difficulties.

Many pointed out that the activities of free time were impaired and restricted to the home or to the use of computers and cell phones. However, they highlighted the importance of maintaining isolation for public health reasons and care for their families.

In relation to leisure many reported changes in their daily lives, especially the substitution of active leisure for passive leisure, increasing time in front of the computer, cell phone and television. On the other hand, they sought other activities such as reading, doing physical activity with the support of online tutorial, games with the family and others. This reality is worrisome because it is associated

with an increase in sedentary lifestyle and consequently in obesity, indicating the need to draw strategies to ensure, in situations such as the one experienced by the pandemic, theoretical/practical guidance on the need and maintenance of physical activities in the home context.

Still in relation to the importance of leisure, the adolescents highlighted that leisure is of paramount importance in time of pandemic, especially in view of the mental health of the population.

This study is not conclusive, considering the number of adolescents who participated in the research, it is necessary to expand the number of participants, as well as to extend the research to other geographical spaces of the municipality, such as riverside communities, as well as to other ethnic groups, considering that it was not possible to access adolescents from quilombola and indigenous communities. It is hoped, however, to have contributed to the discussion of the theme and fostered curiosity for other research processes on the daily lives of adolescents in the context of the pandemic.

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CHAPTER
30

Presence of bruxism and temporomandibular joint dysfunction during the COVID-19 pandemic: Literature review

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ABSTRACT
The COVID-19 pandemic caused a series of deleterious changes to the health and well-being of the population, the literature points to an increase in cases of bruxism and temporomandibular disorders due to the tension, stress and anxiety experienced during the coronavirus outbreak in the world. Therefore, the objective of this study was to carry out a literature review on the increase in symptoms of temporomandibular disorders (TMD) and bruxism in the population during the pandemic period. Electronic searches were carried out in PubMed, LILACS and the Virtual Health Library (BVS) for articles published between 2019 and December 2022. The pandemic caused an increase in symptoms of stress and anxiety, important factors for a higher prevalence of TMD and bruxism among adolescents and adults. Although these conditions are routinely present in the population, they can lead individuals to pain and disability, so health promotion measures can be used to prepare the population for pandemic episodes.

Keywords: Coronavirus, facial pain, temporomandibular joint dysfunction syndrome, bruxism.

1 INTODUCTION

The Covid-19 pandemic caused a series of deleterious changes to the health and well-being of the population since it modified the pattern of licit and illicit drug consumption, as well as changes in sleep and reduced physical activity practices.1, 2

About the area of Dentistry, the literature points to an increase in cases of bruxism and temporomandibular disorders due to the tension, stress and anxiety experienced during the coronavirus outbreak in the world.3,4

Temporomandibular disorders are a set of symptoms and signs that affect the masticatory muscles, the temporomandibular joint and associated structures, causing damage to the functions of the stomatognathic system, impacting the quality of life of individuals.5

Its etiology is multifactorial and may be related to anatomical, systemic, pathophysiological, psychosocial and trauma factors.6

Bruxism, on the other hand, is a parafunction characterized by unconscious activities of the masticatory muscles rhythmically and constantly that manifests itself through the activities of squeezing and grinding the teeth.7

According to Almeida-Leite (2020)8, the pandemic had a major impact on the field of Dentistry, since it is evident that psychological factors increase the risk of developing and maintaining bruxism and TMD, so the dental surgeon must be aware of the factors that lead to its emergence, and then the definition of the correct management of alterations that afflict the temporomandibular joint and bruxism.

Therefore, this theme leads to the following question: What were the factors that led to the increase in TMD and bruxism during the COVID-19 pandemic? Based on what has been mentioned, this study is justified by the increase in cases of TMD and bruxism that were evidenced during the pandemic and also by the relevance of adequate knowledge of these cases for their correct dental management.

Therefore, the general objective of this study is to carry out a literature review on the increase in symptoms of temporomandibular disorders and bruxism in the population during the pandemic period. And to understand the theme, the following specific objectives were outlined: Knowing the general aspects of TMD and bruxism; understanding the importance of psychological aspects in the development of these conditions and describing the appropriate management of bruxism and TMD.

And to achieve these objectives, searches were carried out for articles on the following research platforms: Biblioteca Brasileira de Odontologia – BVS, Scielo, and Pubmed through articles published in the years 2019 and 2022 in Portuguese and English.

2 THEORETICAL REFERENCE

2.1 GENERAL ASPECTS OF TMD AND BRUXISM

The temporomandibular joint (TMJ) is a hinge-arthrodial anatomical structure, which encompasses the cranio-cervical-mandibular complex associated with the functions of phonation, mastication, swallowing, breathing and jaw posture.

Its close relationship with cervical structures associated with its complex neurophysiology makes it the focus of study in several health areas such as speech therapy, otorhinolaryngology, neurophysiology, psychiatry, psychology, and dentistry, among others.5

The term TMD is used to define a group of musculoskeletal conditions that involve pain and/or dysfunction in the TMJ, masticatory muscles and related structures. TMD is considered one of the main causes of orofacial pain of non-odontogenic origin.6

Its etiology is multifactorial, encompassing several factors: psychosocial components (depression, anxiety, stress, etc.), genetic and environmental factors (smoking), direct or indirect trauma, microtrauma due to parafunctional habits, and local factors.5,9

There are a consistent association with other pain conditions (such as chronic headaches), fibromyalgia, autoimmune disorders (such as Sjogren's syndrome, rheumatoid arthritis, and lupus erythematosus), psychiatric illnesses, and sleep apnoea.10

Its symptomatology includes orofacial and TMJ pain, headache, dizziness, tooth wear, clicking sounds, tinnitus, crepitus, pain in the neck, pre-auricular and auricular region, the sensation of aural fullness, hearing loss and restriction of amplitude in the opening of the ear. mouth.9

TMD can affect between 5 and 12% of the population, with at least 5% of patients seeking medical and/or dental treatment. As for gender and age, the female population under 30 years of age is more affected than men.10

Therefore, TMD is considered a chronic disease.5 For DC, given the combination of clinical, psychosocial and systemic manifestations, its diagnosis is a challenge. Therefore, TMD must be evaluated and treated by a multidisciplinary team composed of a CD, a speech therapist, a psychologist, a physiotherapist and a physician.11

The term bruxism refers to a repetitive, periodic, involuntary and excessive activity of the masticatory muscles through clenching/grinding of the teeth.7

Bruxism shows the same incidence in both sexes; however, it is more frequent in children and young adults, becoming less common in old age, its etiology is multifactorial.12,13

It is divided into two types: nocturnal and daytime. Awake bruxism (also known as daytime bruxism), occurs during the day or when the individual is awake, and in sleep bruxism. The latter is subclassified into primary or secondary and phasic or tonic.7

People who practice wakefulness bruxism may clench, grind their teeth, or have other parafunctional habits, such as biting the inside of their cheeks, tongue, or fingernails.

The movement of daytime bruxism is usually more like grinding than grinding and is usually not audible, and when accompanied by symptoms, they get worse as the day progresses. Daytime bruxism is more common in women.12

Sleep bruxism is a motor alteration characterized by the intense activity of the masseter and temporal muscles, causing non-functional contact of the teeth spontaneously.12 When primary, it has an unknown etiology. It is a chronic, continuous disorder, controlled by the central nervous system,

usually appearing in childhood or during adolescence.13 Secondary disorders are associated with neurological and psychiatric disorders, sleep disorders and medication administration.14

Bruxism can cause tooth wear, non-carious cervical lesions, tooth fractures, tooth hypersensitivity, fractures of restorations, crowns and partial and fixed prostheses.14,15

Incisal/occlusal wear is the loss of tissues in the tooth (dentin, cement and enamel) due to mechanical friction between the dental arches, causing changes in the morphology of the teeth.16

Generally, bruxism causes pain in the jaw muscles, headache and severe damage to the oral cavity such as loss of periodontal support, hypertrophy of the masticatory muscles, tendency and stiffness in the jaw muscles, pain in the temporomandibular and pre-auricular region.14

2.2 IMPORTANCE OF PSYCHOLOGICAL ASPECTS IN THE INCREASE OF TMD AND BRUXISM DURING THE COVID-19 PANDEMIC

During the proliferation of the virus, everyone's lifestyle changed drastically, profoundly affecting not only health systems, the economy but also social relationships.1

Although social isolation measures were important for controlling the spread of the virus, such measures generated psychological suffering for the population, such as anxiety, depression and sleep disorders.17

In addition to the increase in cases of bruxism and temporomandibular disorders. 3,4,8,18,19 According to Okeson (2019)9 the emotional centers of the brain influence muscle function.

The hypothalamus, the reticular system, and particularly the limbic system is primarily responsible for the individual's emotional state.

These centers influence muscle activity in many ways, one of which is through the gamma-efferent pathways. Stress affects the body by activating the hypothalamic-pituitary-adrenal (HPA) axis, which in turn prepares the body to respond to the autonomic nervous system.

The HPA axis, through complex neural pathways, increases the activity of gamma motor neurons, which causes intrafusal muscle fibers to contract.

The overall effect is an increase in muscle tone. therefore, emotional stress needs to be understood, as it often plays an important role in TMD.6,9

This relationship can be explained by the fact that the jaw and face muscles are responsible for expressions related to fear, anger, aggression and happiness.19

Parafunctional habits such as clenching/gnashing the teeth, biting the cheek, lips, tongue and objects, chewing and sleeping on one side, and biting nails have well-defined emotional aspects as a scenario, and serve as a means of releasing tension and, consequently, there is a strong association with TMD.20,21

Individuals with higher levels of stress are more prone to bruxism and TMJ disorders and, in general, excessive stress has several implications for quality of life, as it raises levels of the hormone cortisol, which in turn is responsible for adapting the human organism to stimuli from the external environment.22

In this scenario, through stressful situations similar to what was experienced during the pandemic, in addition to cortisol, the human body also triggers the release of adrenocorticotropic hormone, which, associated with cortisol, increases the degree of pain perception, especially in psychologically vulnerable individuals.18

According to Puppin et al. (2021)4 bruxism is a parafunction directly associated with psychological aspects, since most bruxism individuals are anxious and depressed, that is, emotional tensions are manifested in their own body as self-harm.

According to Generoso et al. (2022)19 during the pandemic, bruxism symptoms were more frequent and intense, profoundly affecting the well-being of individuals, as there was a sudden reduction in physical activities and interpersonal relationships.

Vladutu et al. (2022)23 assessed the relationship between bruxism and anxiety in students at the Faculty of Dental Medicine in Craiova, Romania, using questionnaires in the year 2021.

Stress was assessed by the presence of signs such as nervousness, tachycardia, tension, and symptoms related to sleep, such as difficulty falling asleep and disturbed sleep, as well as sleep deprivation and feeling tired during the day.

Anxiety was analyzed according to the following signs: panic, feeling that something bad was going to happen and feeling fearful for no reason. Bruxism was self-reported through the frequency of episodes that occurred. 328 students, aged 21 to 41, participated in the survey.

The presence of signs of bruxism was reported by 39.33% of the participants, mostly women, being related to older age.

Significant associations were found between the increase in stress levels after the onset of the COVID-19 pandemic with the frequency of self-rated bruxism, the main symptoms being pain in the muscles during chewing and in the neck muscles.

2.3 DENTAL MANAGEMENT OF BRUXISM AND TMD

During the confinement imposed by the Covid-19 pandemic, only essential services were allowed to operate under a strict hygiene scheme and with the use of personal protective equipment against the spread of the virus, this same dynamic happened in dental offices and clinics. In most countries, dentists have been instructed to limit their practices to emergency dental care.4

The diagnosis of TMD is generally performed by dental surgeons (CD) through consultation and oral clinical examination, and some imaging tests (radiography and magnetic resonance imaging) may be requested to corroborate the final diagnosis.

However, the DS must take into account that psychological factors such as depression, anxiety, and diseases such as Parkinson's and schizophrenia can trigger TMD, that is, the DS must verify the origin of this dysfunction.

In some cases, the treatment must be multidisciplinary, with a referral to a professional psychologist.4

Treatments are varied, due to the multifactorial aspects of TMD and should be performed in a multidisciplinary environment, however, these therapeutic modalities should be conservative, non-invasive and reversible whenever possible, and adapted to the patient's psychosocial condition.6,24

One of the first conservative management is self-care aiming at patient autonomy in controlling their symptoms in recurrent episodes of TMD.4

TMD treatments include pharmacological therapy, psychological interventions, physiotherapy, acupuncture, botulinum toxin application, surgical intervention, laser therapy, orthodontic treatment, thermotherapy, transcutaneous neuromuscular electrical stimulation, myofunctional exercises, dry needling and manual therapies.6,24,25

The treatment of bruxism, as well as TMD, demands a multidisciplinary approach, from dentistry to physiotherapy, being relevant to consider the oral, medical and psychological aspects of the patient.

And the earlier the better, as it is possible to minimize and/or prevent complications caused by bruxism.13

The treatment plan must meet the following objectives: reduction of physical and psychological stress, treatment of signs and symptoms, reduction of occlusal interferences and alteration of the patient's usual neuromuscular pattern.13

Some authors recommend sleep hygiene and relaxation techniques because they are easy to perform daily, and include maintaining a routine or habits that make sleeping as pleasant as possible.

By controlling the light, avoiding the ingestion of caffeine-based beverages and keeping the environment silent.13,26

The occlusal splint is also a recommended treatment for bruxism, its installation aims to improve painful symptoms, as it helps to reduce hyperactivity of the temporal muscle during rest and of the electromyographic activity during contraction for the masseter.14

In cases where the patient with bruxism has worn or fractured teeth, the DS must remove the cause and carry out the restorative treatment, taking into account the functional and aesthetic aspects, paying attention to the most appropriate choice of a resistant material similar to dentin.27

In the field of physiotherapy, the following methods are employed: ultrasound, therapeutic massage, infrared light, cryotherapy, kinesiotherapy and low-intensity laser therapy, microcurrent and transcutaneous electrical neuromuscular stimulation and microcurrent.28

Finally, the literature also points to the use of biofeedback psychotherapy for the treatment of bruxism and is based on the idea that bruxists can "unlearn" this parafunction.

This therapy is performed with the aid of an electromyographic monitor (EMG), and can also be applied through auditory, vibratory or gustatory stimuli.14

3 DISCUSSIONS

With the gradual return of dental activities, it was possible to observe an exponential increase in problems related to oral health arising from the pandemic.25

Emodi-Perlman and Eli (2021)3 published one of the first prospective studies on cases of TMD, orofacial pain and bruxism during the first year of the Covid-19 pandemic.

The study data revealed that people with chronic TMD had a greater deterioration of the psychological state and an increase in orofacial pain when compared to individuals with bruxism, despite this parafunction being strongly associated with psychological aspects such as anxiety and stress.

Data that agree with the study by Vladutu et al. (2022)23 in which the pandemic was a predictor for a higher prevalence of muscle pain, associated with greater anxiety and stress in adults.

Generoso et al. (2022)19 conducted a cross-sectional study that evaluated the repercussions of the covid-19 pandemic on psychological factors and their link with bruxism from a sample of 1476 individuals from five Brazilian macro-regions (north, northeast, south, southeast and central- west).

The results showed that all respondents stated that during social distancing they felt more stressed and nervous, 77% of them reported that muscle pain, headache, facial pain and muscle pain (neck and shoulder) worsened during this period. 87% of respondents reported teeth clenching symptoms during the day, 57% declared teeth grinding and 71% reported both teeth grinding and clenching during the Covid-19 pandemic.

Corroborating with the aforementioned authors, Dadnam et al. (2021)29 state that there has been an increase in patients with TMD characteristics and bruxism who have dental wear, orofacial pain and dental fractures attributed to grinding and jaw clenching, especially in individuals who have a worsened psycho-emotional status.

Wu et al. (2020)30 believe that patients with TMD have a high degree of sympathetic activity with greater release of adrenocortical hormones, leading to vasoconstriction and increased peripheral vascular resistance, triggered by the emergency and threat caused by the pandemic.

The studies, included in this review, evaluated the possible relationship of COVID-19 in the appearance and worsening of temporomandibular symptoms, despite the complexity that involves the etiological factors, clinical signs and symptoms of dysfunctions in the temporomandibular joint, the authors share the opinion that patients with TMD present psychological alterations such as sadness, anxiety and anguish.29,30,31

This fact can be explained by the rapid changes in people's lives that the pandemic brought, the fear of infection and death from the virus and mandatory quarantines.

Social distancing ended up triggering feelings of anxiety, and stress that in turn had repercussions on the human body, with bruxism being one of the alterations of the stomatognathic system most cited in studies that portray oral health during the pandemic.3,4,8,31,32

A survey conducted in China by Wu et al. (2020)30 compared patients with TMD with the general population and a population of orthodontic patients regarding the feeling of psychological distress (sadness, insecurity, mood swings, guilt, malaise, among other feelings). Individuals with TMD, when compared to two other population samples, had higher levels of psychological distress, especially young females.

Winocur-Arias et al. (2022)31 carried out a prospective study in Israel to assess the effects of the coronavirus pandemic on the prevalence of bruxism, oral parafunction and painful temporomandibular disorders and assess the influence of the pandemic on both sexes.

The study included 288 patients, where 108 patients were evaluated before the pandemic era and 180 during the pandemic. Data revealed that parafunctional activities were more prevalent in men (78%) than in women patients (62%) during the pandemic, however, bruxism (sleep and wakefulness) was more common in women.

Gaş et al. (2021)1 examined the association between sleep quality, depression, anxiety and stress levels, and the frequency of temporomandibular disorders in 699 dental students at a university in Turkey during the COVID-19 pandemic.

The results show that 77.5% of the students had TMD symptoms, the prevalence was higher among female students. In addition, it was observed that these students had high levels of anxiety, stress and depression that directly affected sleep quality.

Peixoto et al. (2021)32 evaluated the psychosocial status, sleep quality, TMD symptoms and bruxism in Brazilian dentists (DC) during the COVID-19 pandemic.

The sample consisted of 641 DS divided into three groups (CD in quarantine; DC in outpatient setting and frontline professionals), who answered an electronic form containing 5 questionnaires referring to screening for orofacial pain and TMD, sleep quality, scale of anxiety, depression and stress and waking bruxism.

TMD was found in 24.3% of respondents, while sleep bruxism was diagnosed in 58% and wakefulness bruxism in 53.8%, respectively.

Depression was more significant in CDs who were in quarantine than in those who were working on an outpatient basis and the frontlines in the fight against the coronavirus.

The results of Peixoto et al. (2021)32 suggested that social isolation had a more negative impact on the lives of CDs than the act of actively working.

4 FINAL CONSIDERATIONS

Due to what was mentioned in the literature review, the Covid-19 pandemic triggered not only changes in various sectors of society but also in people's lives, especially concerning psychological aspects due to social isolation measures.

It was observed during the preparation of the study that symptoms of stress and anxiety were important factors that influenced the increase in cases of temporomandibular disorders and bruxism.

Therefore, the knowledge gained from this study contributes to a greater understanding of the role of stress and anxiety as factors that promoted the increase in cases of TMD and bruxism in several individuals around the world during the covid-19 pandemic.

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CHAPTER
31

Physical Activity and Stress in employees of a public university in Bahia during the COVID-19 pandemic

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ABSTRACT

The research aimed to analyze the association between the practice of Physical Activity (PA) and the prevalence of stress in technical-administrative employees of UEFS during the COVID-19 pandemic context. This is a cross-sectional epidemiological study, conducted online, in which the instruments for data collection were the sociodemographic questionnaire, the International Physical Activity Questionnaire (IPAQ) long version and the Inventory of Stress Symptoms for Adults (ISSL). The statistical data showed that, among the 143 employees who collaborated with the research, 55.9% presented stress; among them, 53.8% were in the resistance phase. In addition, the data also showed that 60.0% had a high level of PA. Moreover, the data showed that there was no statistically significant association ($p<0.05$) between the practice of PA and the prevalence of stress (p-value = 0.635) and its phases (p-value = 0.183). Therefore, we need to think about people in an integral way and reflect on the various spheres in which they find themselves in society. In addition, the university needs to think about strategies of assistance and support to the servers, since they were in a psychic suffering during the context of the pandemic and with the return in person the demands became excessive. The purpose of the research was to contribute and think of strategies and improvements that contribute to the general health of these workers.

Keywords: Physical Activity, Stress, COVID-19.

1 INTRODUCTION

The current society has brought many advances in the various spheres of human knowledge such as culture, work, politics, education and health. However, technological advances have also contributed to several changes in working conditions, which have contributed to the development of Mental Disorders (MD), such as high rates of psychological diseases; especially the stress, in the working class, especially the university servers, subjects investigated in this research (AZEVÊDO, 2017; FERREIRA *et al*., 2022; RIBEIRO, 2019).

The COVID-19 pandemic has brought with it significant transformations in people's lives, especially that of workers. These, especially the female public, had to reconcile work with domestic activities, maternal responsibility and wife role, in which physical and mental exhaustion was present because of the high demand to which they were subjected (FERREIRA *et al*, 2022; DOS SANTOS *et. al*, 2023).

Some studies related to Mental Health (MH) already published have identified that the problems related to this theme will have an increase in the period of 25 years, surpassing alcohol dependence, mental deficiency, Alzheimer's disease, (FRANCO; DRUCK; SELIGMANN-SILVA, 2010; AZEVÊDO, 2017). Depression, schizophrenia and other diseases with the characteristics of MD are more prevalent than chronic degenerative diseases.

Thus, with regard to stress, Marilda Lipp, a Brazilian researcher responsible for validating the Inventory of Symptoms for Stress in Adults (ISSL), defines it as "a psychological reaction with physical, mental and chemical emotional components to certain stimuli that irritate, frighten, excite and/or confuse the person" (LIPP, 1984, p. 6).

According to Robbins (2002, 1999), there are three categories of potential stressors: environmental, organizational and individual. The first category concerns the uncertainties arising from the political, economic and technological spheres. The second, more directly linked to the scope of work, refers to the pressures to meet deadlines, tasks and overloads. And, finally, the individual ones correspond to the situations linked to the family sphere and to the difficulties of relationship. In addition, according to Silva and Silva (2015, p. 202), "the identification of the factors that cause this phenomenon can contribute to the elaboration of proposals for health promotion actions in the workplace."

Also, it is worth mentioning that stress has four phases, Filgueiras and Hippert (1999) highlight in their study that Hans Selye was the first researcher who tried to define stress and classified it according to its dimensions, the author addressed three phases, 1) alarm phase, which corresponds to the moment when the individual is faced with the stressor agent and is characterized by acute manifestations; 2) resistance phase, when the stressor is of great intensity or of long duration and the

organism needs to use its energy reserves in an attempt to return homeostasis and; 3) exhaustion phase, when the body no longer has energy reserves to face the stressor agent (SADIR; BIGNOTO; LIPP, 2010; AZEVÊDO, 2017; FERREIRA *et al*., 2021). In addition, Lipp (1984) identified a fourth phase which she called near-exhaustion, characterized by the intermediation between the resistance phase and the exhaustion phase. According to the author, the subject does not immediately enter into exhaustion, because the mental faculties enter into a prolonged period of resistance before reaching the phase of exhaustion. To this intermediate period where the subject still resists, the author called it near-exhaustion (AZEVÊDO, 2017).

Physical Activity (PA) is an important promoter/instrument for people's health and its constant practice has benefits that contribute to the physical, cognitive and social improvement of individuals (AMARAL, 2017; AZEVÊDO, 2017; COAST; SOARES; TEIXEIRA, 2007). In addition, the effects of regular physical exercise have great impacts on the health of the subjects helping/preventing cardiovascular diseases, diabetes, hypertension, cancer, among others (MACEDO *et al.* , 2003; POLISSENI; RIBEIRO, 2014); providing an increase in people's General Quality of Life (GHQOL), especially for the working class who may be subject to suffering from stress in their work environment.

Similarly, studies show that PA linked to leisure can relieve the symptoms of stress, collaborating with the maintenance of the health of the individual and, in particular, of the worker (BARROS; SAINTS, 2001; MELLO *et al*, 2005; NAHAS, 2003).

In view of a survey in the literature, it was identified that there are few studies on technical-administrative servers. In particular, the servers of the State University of Feira de Santana (UEFS), where specifically the research was conducted. The objective of this study was to analyze the association between the practice of PA and the prevalence of stress in the technical-administrative staff of UEFS in the context of the COVID-19 pandemic.

2 METHOD

This is a cross-sectional epidemiological study whose sample was composed of technical-administrative employees of the UEFS. The same is characterized by the sharing of the same experience and the direct analysis of a planned number of individuals in a single opportunity in which the measures are evaluated concomitantly (MEDRONHO et al., 2009). The sample was composed of 143 technical-administrative employees of UEFS, 42 men and 101 women, aged between 23 and 65 years.

For data collection, the following instruments were used, the sociodemographic questionnaire covering, in addition to questions about personal characteristics, socioeconomic and relationships with family and friends, questions about working conditions in *home office* (AZEVÊDO, 2017; FERREIRA

et al, 2022); the complete form of version 8 of the *International Physical Activity Questionnaire* (IPAQ). The IPAQ is an instrument that, in addition to the practice of PA, also considers the activities performed during leisure time, at home, and when commuting to work; the Inventory of Stress Symptoms for Adults (ISSL) was used, which aims to identify a) the existence of stress, b) the specific phase of stress and c) the prevalence of physical or psychological symptoms and presents three tables related to the phases of stress (LIPP, 2000; AZEVÊDO, 2017).

It is also noteworthy that the study was evaluated by the Ethics Committee of the State Department of Health of Santa Catarina, according to Resolution No. 466/12 of the National Health Council, under opinion number 1.437.801 and CAAE 44009814.2.0000.0115. In addition, the participants were informed about the purpose of the study and the guarantee of return of the results obtained and conclusions highlighted through the Term of Free and Informed Consent (ICF), which was forwarded along with the other questionnaires.

Regarding data analysis, the following steps were performed: a) descriptive analysis of the variables under study; b) bivariate analysis of the possible associations between the variables of interest (sociodemographic aspects, PA levels, stress and associated factors). In addition, the data were entered, processed and classified electronically through the SPSS 9.0 program for Windows.

3 RESULTS

A total of 143 technical-administrative employees participated in the research, 70.6% of whom were women. Among the participants, 9.15% were under 30 years of age, 32.40% were between 30 and 39 years old, 35.91% were between 40 and 49 years old, 18.31% were between 50 and 59 years old, and 4.22% were between 60 and 69 years old.

Regarding the occurrence of stress in the study population, the data showed that 55.9% presented stress, with 53.8% in the resistance phase (Table 01).

Table 01. Stress Prevalence (yes/no) and stress phases

Variables	**N**	**%**
Stress		
Yes	80	55,9
No	63	44,1
Alert Phase		
Yes	2	1,4
No	141	98,6
Resistance Phase		
Yes	77	53,8
No	66	46,2
Exhaustion phase		
Yes	1	0,7
No	142	99,3

Regarding the PA level, the study identified that most of the investigated servers were classified as having a high level of PA of 60%, and only 10% of the participants had a low level and 30% were classified as a moderate level of PA.

Moreover, by associating the classification of PA levels and stress (p-value = 0.635) (Table 04) and its phases (p-value = 0.183) (Table 05), it was shown that there was no association between the variables.

Table 04 – Association between the classification of the level of physical activity (IPAQ) and stress

Variables	**Physical Activity Level**					
	Low		**Moderate**		**High**	
	n	**%**	**n**	**%**	**n**	**%**
Stress						
Yes	6	9,1	18	27,3	42	63,6
No	5	11,4	15	34,1	24	54,5
p-value	0,635					

Table 05 – Association between the classification of the level of physical activity (IPAQ) and stress phases

Variables	**Physical Activity Level**					
	Low		**Moderate**		**High**	
	n	**%**	**n**	**%**	**n**	**%**
Phases of Stress						
Alert	1	50,0	1	50,0	-	-
Resistance	5	9,6	12	23,1	35	67,3
Almost exhaustion	-	-	5	45,5	6	54,5
Exhaustion	-	-	-	-	1	100,0
p-value	0,183					

4 DISCUSSION

This study sought to determine the association between PA and stress, whose data were collected during the COVID-19 pandemic, in which there were radical changes in the routine of the life of the institution's technical-administrative employees. Thus, analyzing the effects of these changes, linked to the context in which the country found itself, in a health, economic, educational and political crisis, in addition to a crisis in the MH of these workers, proved to be essential for the scientific field.

Also, with the increase in the rates of mental disorders currently, especially the stress studied in this study, which may be related to the accelerated lifestyle, there is a high interest for research with the same content. Thus, it is essential to investigate stress and associated factors in the working class,

especially in university environments, which are still little explored in the scientific environment, such as the institution of this research.

According to Scarcelli and Alencar (2009), one cannot think about the aspects that define man in separate parts, in this sense, reflect the relationship between health-disease linked to other social points (FREITAS, 2012; FERREIRA *et al*., 2022) is essential to understand the data from this study.

Therefore, the data collected in this study showed that 55.9% of the sample presented stress, with 53.8% in the resistance phase, a high percentage when compared to other studies of the same content, such as the one by Baptista *et al.* (2022) and Ribeiro (2019), which manifested 23.19% and 24%, respectively.

It is worth mentioning the importance of identifying the stress phase in which individuals find themselves to think, analyze and intervene in appropriate actions for their prevention/treatment (AZEVÊDO, 2017; FERREIRA *et al.* , 2022). In this study, most were in the resistance phase, this may have occurred due to the need to use their energy reserves to deal with the transformations and stressors to which they were subjected in the pandemic context, in an attempt to resume homeostasis (SADIR; BIGNOTO; LIPP, 2010; FIG TREES; Hippert, 2011; AZEVÊDO, 2017).

Regarding PA levels in this study, it was analyzed that 10% of the participants had a low level, 30% a moderate level and 60% a high level. In this way, the data emphasize that the study population was physically active during the pandemic. Such information may suggest that they sought to keep busy, distracted or even relaxed with the practice of PA (AZEVÊDO, 2017; DE SOUZA-JUNIOR, 2020; DOS SANTOS *et al*., 2022; MIRANDA *et al*., 2021).

In addition, when we associated the PA levels with the sociodemographic issues of the participants, it was identified that there was no association (p-value <0.05), which may be related to the fact that the practice of PA was regular and active in the individuals at the time the research occurred, with daily practice being an ideal level and recommended by the World Health Organization (WORLD HEALTH ORGANIZATION et al., 2020; BRAZIL, 2021).

However, even with the data demonstrating a high prevalence of stress in the population of this study, when we analyzed the association of PA levels with stress (p-value = 0.635) and its phases (p-value = 0.183) no statistically significant bases were found. Thus, the study raises a different result from the others found in the literature, which manifest an association between the variables PA and stress (AZEVÊDO, 2017; JUNIOR BIRTH; CHAPELRY; VIEIRA, 2012; NUNOMURA; TEIXEIRA; FERNANDES, 2009; RIBEIRO, 2019).

However, according to Scarcelli and Alencar (2009) we cannot think and classify individuals separately in the social spheres, since the high rate of stress verified in this research may be more related to sociodemographic aspects and labor changes to which workers were submitted than to the

absence of PA practice. Still, it is emphasized in this study that Physical Activity was a factor that directly or indirectly provided benefits to the overall Quality of Life of the participants who composed the sample.

5 FINAL CONSIDERATIONS

Modern society has brought technologies to optimize and improve people's lives, especially for the working class. However, these technological advances do not apply to everyone and have contributed to physical and mental illness, and mental illness has had a growing increase in postmodernity.

Thus, investigating the prevalence of stress in the employees of this study proved to be fundamental, both for the lack of research on this theme with this population and for the discovery of the impacts generated in the lives of these individuals during the pandemic, especially in mental health, in which the data showed a high percentage of stress in the sample (55.9%).

However, it was also verified in the data a high level of PA practice (60%) by the participants, in view of this, it was shown in the objective of this study, the non-association between the variables studied, stress (p-value 0.635) and stress phases p-value (0.183). These results demonstrate that even with the high prevalence of stress in the study population, PA being something regular in the lives of these individuals, was a protective/preventive factor for the health of these workers during the context in which this study was conducted.

Nevertheless, it is worth mentioning that as this is a cross-sectional study, there are some limitations, such as the very well delimited time frame and, when it comes to health, there may be other variables interfering in the results, since there are numerous factors that determine the health-disease process. Thus, it is not possible to conceive the physical and mental state of the individuals in this research only with the variables studied.

In short, the data presented indicate the importance of creating internal policies and strategies that provide adequate support to the employees of this institution, due to the psychological suffering to which they were subjected during the pandemic context in which this study was conducted, in order to verify, analyze and intervene to improve the general health of these workers.

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CHAPTER
32

Remote teaching and eating disorders in nursing students during the Covid-19 pandemic

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ABSTRACT
The context of the pandemic and the implementation of the remote teaching model brought changes to the usual lifestyle of most students. And in this way, inadequate eating behavior made nursing students susceptible to psychological eating disorders. Objective: to analyze the influence of remote teaching on the prevalence of the development of eating disorders (EDs) associated with image distortion in nursing students during the pandemic. Methodology: This is an observational, cross-sectional quantitative study with university students of the nursing course at the University of Pernambuco, located in the city of Petrolina, who were interviewed voluntarily in person. Eating behavior and image distortion were investigated using the Eating Disorder Examination Questionnaire (EDE-Q) and Silhouette Matching Task (STM) instruments, respectively. In addition, other data were collected from a sociodemographic questionnaire to verify the profile of the participants. Results: It was found that 92% of the evaluated students changed their eating habits after the pandemic, the majority being female. And that 48% of the students had positive results for the risk of developing ATs, and of these, 91% claim an increase in the frequency of key AT behaviors after experiencing remote teaching. Furthermore, it was observed that 85% of university students in the nursing course had alterations in their perception of body image. Conclusion: The statistical observational analysis carried out demonstrates that remote teaching implemented during the stress phase of the COVID-19 pandemic, influenced the increased risk of developing EDs and body dissatisfaction in students, reaffirming the need for preventive measures and awareness regarding the adoption of new teaching models. This emphasizes the importance of further studies on this issue.

Keywords: Eating behavior, distance learning, COVID-19.

1 INTODUCTION

Science classifies the pandemic as a phase in which a new disease spreads across different continents being transmitted from person to person. Thus, in Brazil in 2020 it was no different since there was the spread of a severe acute respiratory infection caused by the SARS-CoV-2 coronavirus, popularly known as COVID-19 (Ele & Deng, 2020; Ventura et al., 2021).

In this way, since the beginning of the pandemic outbreak, there has been a great concern of the population, in the face of a deadly disease, which spread easily in various regions of the world.

Given a new situation, in which there were no strategic plans ready to be applied, there was the implementation of containment and social distancing measures, where commercial places, leisure

spaces, schools, and universities were closed, causing the entire population to change their usual routine to adapt to a new way of living (Freitas, Napimoga & Donalisio, 2020).

As a means of preventing the disease, the World Health Organization recommended to governments the so-called Non-pharmacological Interventions (INF), with individual, environmental, and community reach, including measures such as hand washing, use of masks, and, with greater weight, social isolation. As a result, people began to practice less physical activity, more time in front of screens, increased consumption of ultra-processed foods and worsened mental status due to greater social restrictions due to viral dissemination (Sunde, 2021).

In this context, on March 17, 2020, Ordinance No. 343 of the Ministry of Education began replacing face-to-face classes with remote online classes throughout the entire education network for an indefinite period, depending on the duration of the COVID-19 pandemic. (Santana et al., 2021). And, given this circumstance, distance learning stood out, as it served as one of the educational tools in the evidenced context (Barreto & Rocha, 2020).

Educational institutions, both private and public, applied the emergency remote teaching model in order not to interrupt the pre-established flow. This meant that digital technologies were seen as great allies in the teaching-learning process at all levels of education, from elementary to higher education (Rondini, Pedro & Duarte, 2020). Thus, the implementation of this modality generated greater vulnerability in students to the development of psychological alterations, mainly due to chronic stress, lack of study management, strenuous workload, weariness, and a feeling of low performance in classes. In addition, eating behavior is directly related to the emotional state, which is responsible for the process of choice and quantity of food eaten (Magalhães, 2021).

Given this, WHO shows that the impact of the COVID-19 pandemic on people's mental health is extremely worrying. This risk becomes evident, above all, in the student population, since the interruption of classes in some universities created a climate of stress (Sunde, 2021). And, the changes in everyday life, associated with the material, social, economic, and psychological conditions of the university public to adapt to the new scenario, printed expressive anguish, generating possible mental suffering and changes in the sleep pattern and consequently in the eating profile, which may impact the quality of life (Santana et al., 2021).

In addition, it is clear that the context of the pandemic increased concerns about health and physical fitness during confinement, and these conditions served as a precipitating factor for the development of eating disorders (ED) in vulnerable individuals related to sociocultural and psychological aspects, also contributing to body image distortion (Fernandes-Aranda et al., 2020).

Given this, EDs are classified as psychiatric illnesses identified by significant changes in eating behavior and weight control and body image, which can cause emotional and clinical damage

(Timerman, 2021). And in this context, the inadequate eating habit tends to increase in stressful situations, which makes these students prone to the emergence of EDs. Since EDs have a multifactorial etiology, which is influenced by family experience, the sociocultural environment and behavioral aspects. These being the factors responsible for the installation and maintenance of this pathology (Siqueira et al., 2020).

Allied to this, body image is the perception that the being has of himself, since it is a set that encompasses the consciousness and social relations of the individual himself in an integral way (Francisco et al., 2019). This vision is associated with information, thoughts, feelings and actions related to the body, such as weight, muscularity, aging, appearance pressures or even comparisons with the other. Thus, although body perception is something complex and personal, many times, due to psychological disorders, image distortion can occur. And thus, body image displeasure is one of the risk behaviors for the evolution of EDs, which associates these two factors (Souza, Katibe & Dias, 2019; Mclean & Paxton, 2019).

The COVID-19 pandemic and the suspension of face-to-face classes and consequently the implementation of remote teaching, which despite being important, triggered greater discomfort and risk of developing pathologies, including those associated with food, inappropriate eating behavior around students susceptible to developing EDs (Silva & Rosa, 2021; Martins, 2018).

That said, Nursing undergraduates were subject to intense psycho-emotional changes, since with the pandemic scenario, many volunteered to provide support and care to those suspected or infected by COVID-19. In addition, studies indicate that such students tend to present, regardless of their nutritional status, risk behavior for the development of eating disorders and high concern for their body image (Franzoi & Cauduro, 2020; Mazzaia & Santos, 2018), since that generally, health students are in direct contact with fundamentals and discussions related to body care, being exposed to an environment of excessive information about health.

In addition, when dealing with health education remotely, they were susceptible to situations of stress and a feeling of low use of classes in the academic environment. This led to significant changes in eating behavior, risk of eating disorders and, consequently, body image dissatisfaction (Mazzaia & Santos, 2018; Baixinho & Ferreira, 2021). Therefore, it is important to develop integrated nutritional support actions to prevent both eating and psychological disorders in the face of changes in the usual academic routine (Oliveira et al., 2017; Padovani et al., 2014).

Because of the above, the objective of the present study was to observe the influence of remote teaching on the prevalence of the development of eating disorders associated with image distortion in nursing students during the COVID-19 pandemic.

2 METHODOLOGICAL PROCEDURES

2.1 STUDY CHARACTERISTICS

The present work was an observational, cross-sectional study with a quantitative basis on the influence of remote teaching on the prevalence of the development of eating disorders associated with image distortion of nursing students during the COVID-19 pandemic in a public educational institution., the University of Pernambuco, located in the municipality of Petrolina.

The research instruments were applied after approval by the Research Ethics Committee of the University of Pernambuco under Opinion number: 5,668,736, and signatures of the participants in the Term of Free and Informed Consent (TCLE) for voluntary participation in the study.

2.2 SAMPLE

The research took place with a maximum of volunteers who were regularly enrolled in the nursing course, aged 18 years or older, of both sexes, female and male, and who, perhaps, had experienced the remote teaching period during the COVID-19 pandemic. COVID-19. Thus, it comprised a total of 52 volunteers, taking into account that, to determine the prevalence of eating disorders in nursing students, it was appropriate to have at least a minimum sample size of 46 students for adequate results, according to the sample calculation performed.

Thus, the Survey System online software was used for sample calculation, based on the formula for a finite population, considering a prevalence of 18.4% of the occurrence of EDs in university students, with a confidence level of 95%, for an acceptable margin of error of 5%, with both plus and minus standard deviation. There was no refusal to participate.

2.3 OBSERVATIONAL APPROACH

Data collection was carried out by completing a structured questionnaire and applied in person in November 2022. The form contained instructions on how to answer each of the questions, being subdivided into: a sociodemographic questionnaire (Rocha et al., 2021), to collect information such as academic period, gender, income, race, mental aspects, self-reported weight and height, and student perception of the influence of the pandemic on their diet; an adapted questionnaire based on the Eating Disorder Examination Questionnaire (EDE-Q) instrument (Fairburn & Beglin, 1994) and a body image assessment test Silhouette Matching Task (STM) (Carvalho et al., 2020), to analyze the participant's perception of corporate.

The EDE-Q instrument was used to identify the key behaviors that are present in individuals with eating disorders for the last month. In this adapted version, the EDE-Q consists of 27 items evaluated on a Likert scale that can vary from 0 to 6 (Correia, 2021), classifying the AT into four

subscales related to dietary restriction; preoccupation with food intake; preoccupation with physical appearance and preoccupation with weight. Furthermore, some of the items present in the questionnaire are not related to the mentioned subscales but inform about key behaviors present in an individual with an eating disorder. The score for each subscale is global and provides an average of the degree of severity of the eating disorder whenever equal to or above 4.

Another instrument used was the SMT, which aims to assess the degree of image perception and/or satisfaction of the individual with their body shape. It consists of a scale with nine figures of silhouettes that vary from the figure corresponding to extreme thinness (nº 1) to obesity (nº 9) in which, the subject is oriented to choose one of the silhouettes that most correspond to his current body shape and another one that refers to the desired silhouette. Thus, an analysis of the result is made by the difference between the image they perceive as their current one and the one they would like to have, in which when the difference results in a negative value it is indicative of an "underweight" perception, while when it reflects a positive number indicates "overweight" (Carvalho et al., 2020).

2.4 DATA ANALYSIS

For tabulation of results, databases were created in Microsoft Office Excel 2016 and BioEstat software version 5.0 for descriptive analysis of data, to verify frequencies, as well as means and standard deviation related to the prevalence of each behavioral data exposed by the studied population through the chosen research instruments. For analysis and comparison between groups, OddsRatio (OR) and Confidence Interval (CI) 95% were calculated.

3 RESULTS AND DISCUSSION

52 nursing students who had experienced remote teaching participated in this research voluntarily, with an average age of participants of 21 years, ranging from 19 to 31 years. It is possible to observe, in Table 1, the main sociodemographic characteristics of the evaluated university students.

Table 1: Main sociodemographic characteristics of UPE nursing students, 2023.

Variable	nº	(%)
Gender		
Female	45	86,5
Male	7	13,5
Race/color		
White	22	42,3
Black	05	9,6
Brown	23	44,2
Yellow	2	3,8
Family income		
700-1200	12	23
1600-2600	20	38,4
3000-4500	09	17,3
5200-9200	11	21,1

Source: Research authors, 2023.

A higher percentage of female students can be seen in the analyzed group, since the student population, especially in nursing courses, is mostly made up of women (Fonseca et al., 2019). And, according to data from the Federal Nursing Council (COFEN), 85% of women make up the nursing workforce in Brazil (COFEN, 2023), since historically it is an area occupied mostly by this gender, and currently there is still a trend of feminization of nurses (Macedo, 2019).

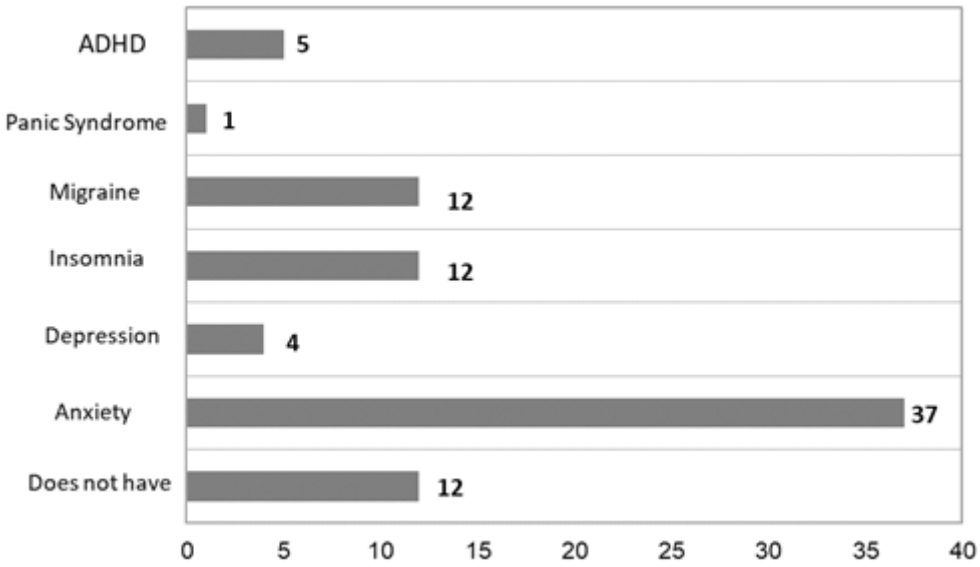
Allied with this, still in a study carried out by Macedo (2019) at a Brazilian university with 707 students, it was found that among the students, the largest group of students who were enrolled, attended the nursing course and were female, a finding similar to the present study.

It is also verified that, about the economic class, about 61.5% (n=32) of the participants belong to the lower middle class, since the family income is up to R$2,900.00 (IBGE, 2022), and 53 .8% (n=28) report being black or brown, which confirms that higher education is an important promoter of social inclusion, expansion of opportunities and access to education for different social groups (Macedo, 2019).

Still in the first instrument, two questions were asked about the health of the students to help outline a profile of these individuals, namely: “Do you believe that the pandemic affected your diet?” and “Do you have any of these illnesses or symptoms related to mental aspects?”. It was also advised that the symptomatology was stated by the participant according to a proven medical diagnosis.

Regarding the first question, 92% (n=48) of the students indicated that they believed that the pandemic had affected their diet, while 8% (n=4) stated that the COVID-19 outbreak had no impact on their eating habits. Using the second question, Graph 1 can be created, in which the occurrence of mental illnesses or symptoms self-reported by students is observed.

Graph 1 – Distribution of the number of nursing students who self-reported having one or more symptoms related to mental aspects, Petrolina, 2023.



Source: research authors. ADHD = attention deficit hyperactivity disorder.

Given this, it appears that among nursing students, 77% (n=40) of the sample reported having one or more symptoms related to mental aspects. Noting that the pandemic generated significant impacts on the physical and mental health of individuals, which can cause feelings of fear, anxiety, uncertainty and concern (Verticchio et al., 2020). Allied to this, it is known that the mind can directly influence the usual diet by regulating serotonin concentrations, generating comfort and acting as a way to treat the stress experienced (Totorra & Derrickson, 2012).

With, another fact observed is that the tension and social isolation due to COVID-19 directly influenced the food consumption of students, since they are susceptible to acquiring irregular eating habits (Souza et al., 2021).

In a study by Oliveira (2021), for example, carried out with 407 students from a university center in the city of Teresópolis - RJ, it was demonstrated that there was more time spent on screens, due to the implementation of the remote teaching model, and also had an increase in consumption of ultra-processed foods and a decrease in the intake of minimally processed and/or in natural foods. It is possible to note that, during this pandemic period, there was a tendency for changes in the eating behavior of university students, as observed in this study, since students also experienced remote teaching and reported changes in their usual diet during the pandemic period.

Thus, from Table 2, it is possible to see the characteristics regarding the age and BMI variables of the studied population, with the values that were obtained from the database. Being analyzed a homogeneity of the sample regarding the BMI of thinness and a greater variety of data regarding the nutritional status of overweight.

Table 2: Characterization of UPE nursing students regarding age and BMI, Petrolina, 2023.

Variables	Average	DP	Min.	Max.	Amplitude	Variance	Coef. of variance
Age	21	2,8	19	31	12	8,2	13,7
BMI Thinness	17,3	1,2	15,4	17,7	2,3	1	7,1
BMI Eutrophy	22	1,6	19,3	24,4	5,1	2,5	7,3
BMI Overweight	30,9	4,8	25,3	40	14,7	22,3	15,7

Source: Research authors, 2023. BMI = Body Mass Index

Thus, regarding nutritional status, it was observed that 38% (n=20) of students were overweight. Allied with this, the changes in eating habits experienced during the pandemic period and the greater tendency towards sedentary behavior in the face of academic demands, also associated with prolonged sitting, can directly affect unhealthy food choices, and thus, the increase of physical inactivity and caloric intake can contribute to changes in the lipid profile of students (Cruz-Sánchez et al., 2016).

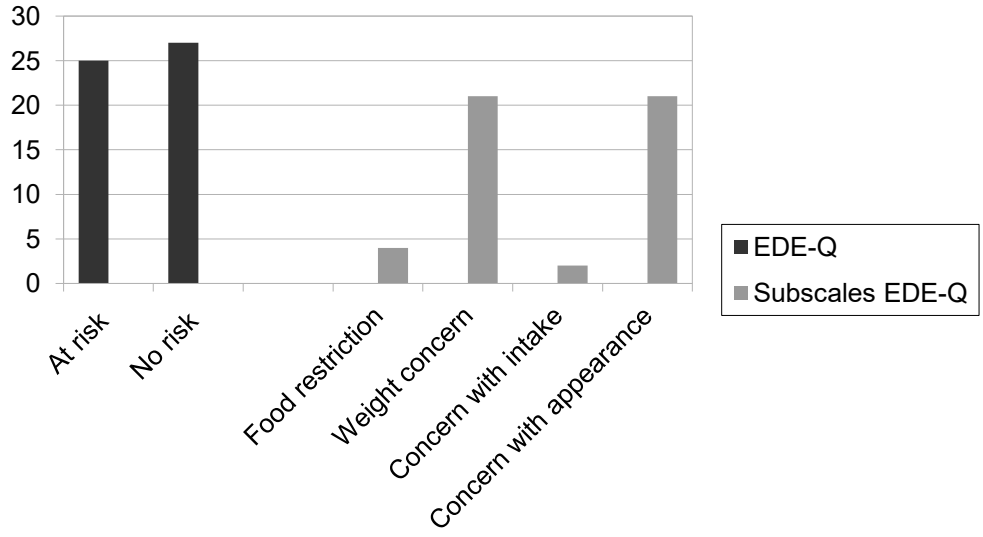
A similar finding was found by Macedo et al (2019) in their study, which found that nursing students at a university in Salvador - BA, stood out with 29.06% being overweight, mainly due to the low level of exercise physical activity and high sitting time, which makes it necessary to encourage a healthy lifestyle in academic education (Macedo et al., 2019).

In this way, it is also possible to observe through Graph 2 with the EDE-Q, in which 48% (n=25) of the sample presented a score greater than or equal to parameter 4, which is indicative of the presence of risk for the development of TA (Fairburn & Beglin, 1994).

Since studies have already shown that students in the health area are more susceptible to developing ED risks, since most courses in this area tend to suffer from social pressures, concerning healthy habits and good body appearance linked to the concept of health, and this type of present concern can directly influence changes in eating behavior (Barboza et al., 2022).

Mazzaia et al. (2018) observed in their study that 25% of the 120 nursing students analyzed, even with eutrophy, were at risk for developing ED with the presence of changes in eating behavior, which may be a factor that encourages a feeling of belonging in students. body dissatisfaction (Mazzaia & Santos, 2018). Furthermore, it is still possible to observe in Table 3 the percentage of students who presented some type of key behavior that indicates the presence of ED, according to the EDE-Q.

Graph 2: percentage distribution of students who tested positive for the subscales according to the ede-q, petrolina, 2023.



Source: Research authors, 2023. EDE-Q= Eating Disorder Examination Questionnaire.

Table 3: Distribution of students who showed one or more key ED behaviors after remote teaching, Petrolina, 2023. (n=25)

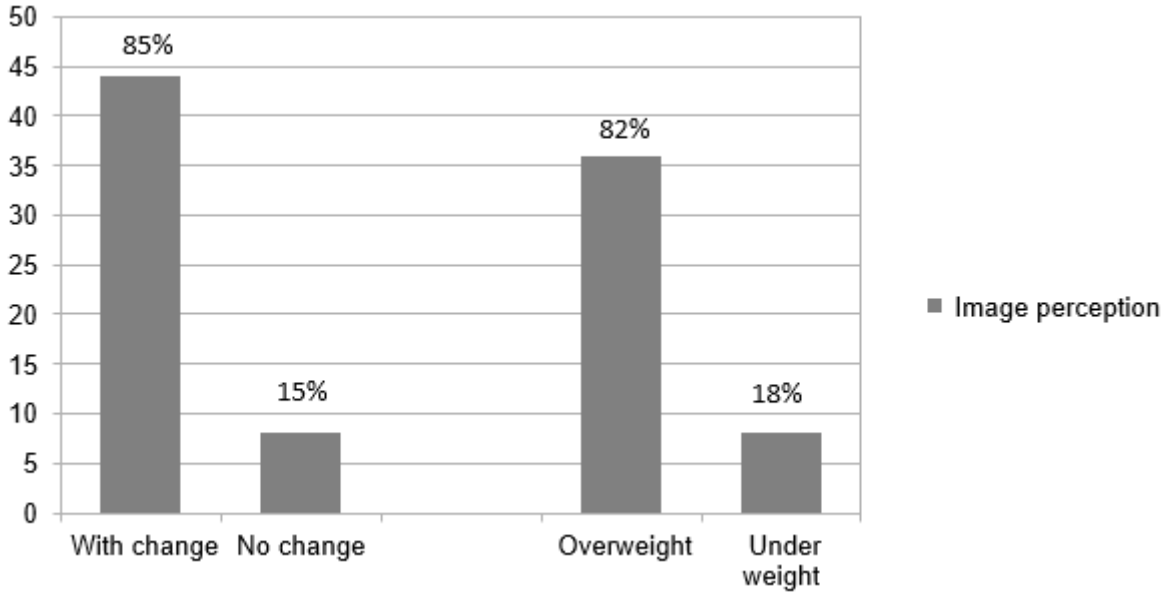
Key behavior	**nº**	**%**
Lost control of power	23	92
Felt guilty when eating	21	84
Vomited as a way to control weight and appearance	2	8
Excessive physical exercise as a means of controlling weight and appearance	15	60
Made use of laxatives as a way to control weight and appearance	4	16
ate excessively	21	84

Source: Research authors, 2023. TA: Eating Disorder.

About the SMT instrument, it was observed that 85% (n=44) had an alteration in the image perception for both "overweight" and "underweight", while 15% (n=8) did not present distortion of self-image. Also analyzing that among those who are dissatisfied, 82% report seeing themselves as “overweight” and 18% as "underweight”, as shown in Graph 3. This reflects that, in this study, most of the student from nurses were dissatisfied with their body appearance. Similar to the study by Maniglia et al (2021), which found that 80% of nursing students were unhappy with their physical body appearance.

Thus, it is noted that the feeling of body satisfaction is not only related to having a body within the personal standard desire but also to the pleasure of feeling good with the body aesthetics obtained (Maniglia et al., 2021). However, the cult of the perfect body can silently promote image distortion by treating the body as a desired commodity, which puts individual characteristics in the background (Silva, 2018).

Graph 3: Percentage distribution of students concerning body image perception, according to SMT, Petrolina, 2023.



Source:Research authors, 2023. SMT = Silhouette Matching Task or Body Image Assessment Test.

Thus, when associating self-image dissatisfaction with the students' nutritional status, as can be seen in Table 4, it appears that 67% of thin students demonstrate body dissatisfaction, while 33% are satisfied. To eutrophic students, it was analyzed that 82.7% of the sample said they were dissatisfied, while 17.2% did not present body dissatisfaction. So, among overweight students, 85% are unhappy with their body appearance, and 15% say they are satisfied.

The data reveal that the highest percentage of students who are dissatisfied with their body appearance are overweight, although the largest number of students are in a eutrophic state. A similar finding was found by Silva et al (2019), who, when using the same STM instrument, and when analyzing the prevalence of body dissatisfaction in 348 university students, found that it was also higher in overweight students, when compared to those with eutrophy according to the BMI, in addition, also found that in women, the chances of occurrence of dissatisfaction due to overweight were 12.5 times higher when compared to those with EN of eutrophy (Silva et al., 2019).

Thus, based on the results obtained in the OddsRatio calculation, it is also possible to observe, in Table 4, that nursing students with obesity were 15.2 times more likely to develop EDs when compared to eutrophic students, according to EDE-Q.

According to the SMT, the sample of overweight university students is more likely to present changes in image perception than eutrophic students. This reveals that in both studies, the prevalence of dissatisfaction was present in more than half of the percentage of students, which may be related to nutritional status. Since the desire for a so-called perfect body can help in the implantation of image disorders, in which the factor that is most associated with this fact is the nutritional status of the

individual, and in addition, according to the studies, a higher prevalence in overweight people (Alcantara-Silva et al., 2021).

Table 4: Distribution of the number and percentage of students who were at risk for developing ED and altering their body image associated with nutritional status, Petrolina, 2023.

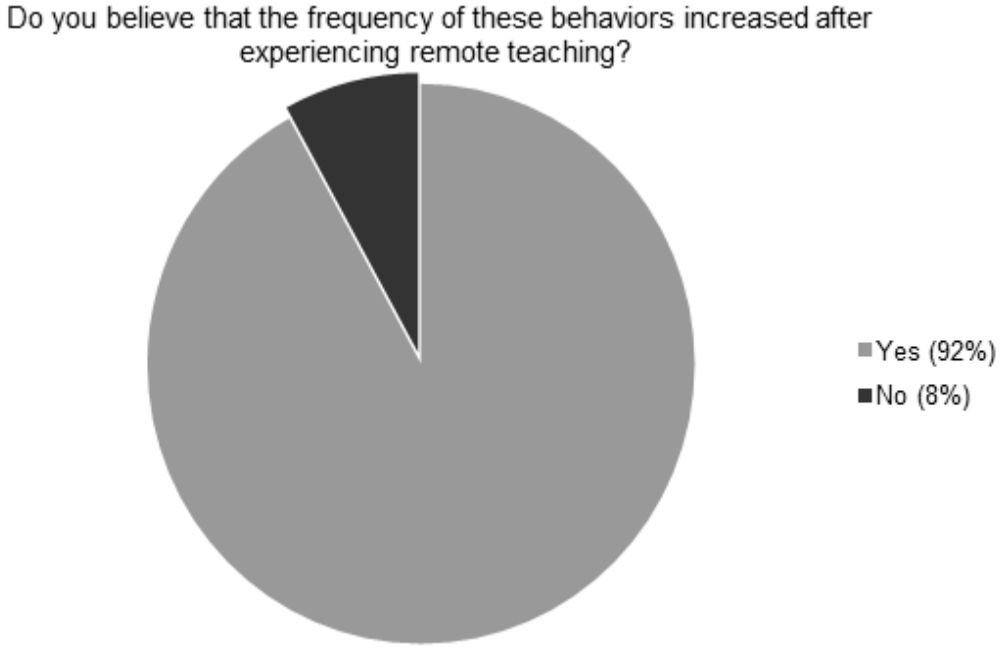
Instrument	Nutritional status			
	Thinness nº (%)	Eutrophy nº (%)	Overweight nº (%)	Obesity nº (%)
EDE-Q				
At risk	1 (33)	10 (34,4)	6 (54,5)	8 (88,9)
No risk	2 (67)	19 (65,5)	5 (45,4)	1 (11,1)
OR (95% IC)	0,63 (0,06-6,91)	1,00	2,28 (0,55-9,36)	15,2 (1,65-139,31)
SMT				
With the alteration of image perception	2 (67)	24 (82,7))	9 (81,9)	8 (88,9)
No change in image perception	1 (33)	5 (17,2)	2 (18,1)	1 (11,1)
OR (95% IC)	0,42 (0,03-5,53)	1,00	0,93 (0,15-5,72)	1,66 (0,17-16,48)

Source: Research authors, 2023. EDE-Q= Eating Disorder Examination Questionnaire, SMT= Silhouette Matching Task or Body Image Assessment Test.

Thus, from the data obtained, it is analyzed that 52% of university students do not have any risk factor for the development of ED, since they did not classify positively for EDE-Q. However, in Graph 4, it is possible to see that among the 48% who are at risk, when asked, 92% claim that there was an increase in the frequency of key behaviors for the presence of ED after experiencing remote teaching, while 9% reported not perceive changes in the frequency of episodes after the teaching model implemented during the COVID-19 pandemic.

This is a strong indication that the implementation of remote teaching influenced the eating behavior of these students. Since nursing undergraduates tend to present, regardless of their nutritional status, risk behavior for the development of eating disorders and high concern for their body image (Franzoi & Cauduro, 2020; Mazzaia & Santos, 2018). And besides, it is verified from the descriptive analysis of this study, that the data collaborate for this affirmation.

Graph 4: Percentage of responses from nursing students regarding the increase in the frequency of key AT behaviors after experiencing remote teaching, Petrolina, 2023.



Source: Research authors, 2023.

It is worth noting that the present study had some limitations, such as the use of BMI calculated from the height and weight values reported by the participants, since the reporting of these measurements may be underestimated or/and overestimated, in addition, it was not evaluated. the students' body composition to establish a more accurate diagnosis with analysis of adipose tissue and muscle mass. Since the dynamics implemented for data collection and the limited availability of time for university students did not allow for precise anthropometric measurement. Furthermore, despite the importance of the results obtained, this study was limited to a single institution, not encompassing the entire portion of nursing students who may have experienced remote teaching.

4 FINAL CONSIDERATIONS

From the applied cross-sectional observational study, it was possible to consider the relationship between the development of risk of EDs and body dissatisfaction in the period of the COVID-19 pandemic associated with the experience in the remote teaching modality by nursing students. In addition, a profile of university students with a prevalence of females, brown race, and lower middle class was verified. It is observed that there was a change in the eating behavior of the participants during the evidenced period, which is strongly associated with the lifestyle adopted due to the high academic demand and the stress witnessed.

Thus, it is noticeable that the pandemic and the measures adopted, such as the implementation of remote teaching, had a strong influence on aspects related to eating behavior in nursing students, bringing about changes in eating habits and an increase in the frequency of key ED behaviors in most

of the students. students. In addition, it was possible to analyze that most students had body image dissatisfaction. In which the difficulties faced, given the context presented, can directly reflect on the negative effects on food and lifestyle.

Thus, it is important that, when implementing changes in the academic routine, institutions act towards preventive and careful planning with biopsychosocial assistance associated with health care, aimed at eating and psychological disorders. Still, counting on the help of qualified professionals who can pass on knowledge and guidance on proper eating behavior.

Furthermore, more studies are needed to be related to the main causes of eating disorders and body dissatisfaction and with factors that address the issue of the development of eating disorders to demystify the concepts that involve physical and mental well-being in the face of stressful situations. It is suggested, therefore, that this study can positively assist in future research associated with this topic.

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CHAPTER

33

Characterization of forms of violence perpetrated against women during the quarantine period for COVID-19

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ABSTRACT
Introduction: Social isolation during the COVID-19 pandemic was considered effective in protecting the health of the population, however, it contributed to the emergence of barriers that prevented women from fleeing different situations of violence and seeking help. Objective: to characterize the forms of violence perpetrated against women during the quarantine period for Covid-19. Method: quantitative, cross-sectional, descriptive research. Approved by the Ethics and Research Committee of Universidade Federal Fluminense (CAAE: 45939421.1.0000.8160). Data collected by questionnaire from May and August 2022. Its participants were 278 women from social media. Included were those who had experienced some situation regarding domestic violence in their relationship with their current partner or with a partner from a previous relationship, and had access to the digital form and excluded women who had not experienced situations of domestic violence both in their relationship with their partner (a) current and with a partner (a) from a previous relationship, inability to complete the digital form. Data computed, stored and analyzed in software through tables, graphs and charts with simple and percentage frequencies. Results: It was found that 35.6% of the study participants had already been assaulted by their current partner, or from a previous relationship. Regarding the current partner, or a previous relationship that was already violent before the quarantine period, it was found that 12.2% of the study participants stated that their current partner, or a partner previous relationship was already violent before the quarantine period. Regarding the current partner, or a previous relationship having become more violent during the quarantine period, it was found that 10.8% of the study participants stated that their current partner, or from a previous relationship became more violent during the quarantine period. It was found that 33.5% of the study participants had already suffered physical violence committed by their current partner, or from a previous relationship. It was found that 14% did not suffer physical violence before the quarantine period, and started to suffer, 2.9% suffered physical violence before the quarantine period, and continued to suffer during the quarantine period, 3.2% suffered physical

violence before the quarantine period, and worsened during the quarantine period, 9.7% of the study participants had already suffered physical violence before the quarantine period. It was found that 44.2% of the study participants had already suffered psychological violence committed by your current partner, or from a previous relationship. It was found that 7.2% did not suffer psychological violence before the quarantine period, and began to suffer, 16.2% suffered psychological violence before the quarantine period, and continued to suffer during the quarantine period, 5% suffered psychological violence before the quarantine period, and it worsened during the quarantine period, and 11.2% of the study participants had already suffered psychological violence before the quarantine period, and now do not suffer. It was found that 21.2% of the study participants study had already suffered sexual violence. It was found that 1.8% did not suffer sexual violence before the quarantine period, and started to suffer, 1.8% suffered sexual violence, and continued to suffer, 1.8% suffered, and it got worse during the quarantine period, 7 .6% of women already suffered sexual violence before the quarantine period, and now they do not suffer. Conclusion: Domestic violence affects women regardless of race, social class and education. However, those with low education, single/separated/divorced/widow and lower family income suffered more violence. The elaboration of public policies to combat violence is reinforced considering race/class, since the absence of this view favors society's denial of inequalities that are not restricted to gender issues. The need for professional training and an empathetic look in the care of these women is highlighted.

Keywords: Violence against woman, Domestic Violence, Corona Virus.

1 INTRODUCTION

Restrictive measures aimed at containing the circulation of the SARS-CoV-2 virus were the most effective way to contain the rise in the number of COVID-19 cases. The COVID-19 pandemic has altered the routine of people around the world and in Brazil. Social isolation was considered the most effective means to protect the health of the population. However, women in social isolation had to face several barriers to flee situations of violence and seek help and protection (NOMAN et al, 2021).

As the virus spread around the world, it brought with it several consequences, including physical and psychological health risks, isolation and loneliness, closures of schools, universities and businesses, increased economic vulnerability and job losses. Under such circumstances, such homes can become sites for the occurrence of greater physical, psychological, and/or sexual abuse (NOMAN et al, 2021; JONES; ISHAM, 2020).

Social isolation established the ideal conditions for domestic violence to be enhanced, since women being isolated from social and family life would have fewer possibilities of seeking help. It is noteworthy that social isolation facilitated the impunity of the aggressor, in addition to creating a context that facilitated the use of violence at the slightest stimulus (ACOSTA, 2020).

The home is not always the safe place for women to live, since often in this space domestic violence occurs, where the power dynamics can be distorted and subverted by those who attack, often without the scrutiny of someone who does not directly belong to the family or live with the couple. This type of violence has repercussions both for the battered woman and for the children who live daily with someone who is abusive or controlling. Many newspapers reported that episodes of domestic

violence against women were followed by dramatic abuse against their children (SACCO et al, 2020; JONES; ISHAM, 2020).

Domestic violence refers to a series of violations that happen within a domestic space. This type of violence can be perpetrated by both a current partner and a former partner. Regardless of whether the relationship is current or former, violence against women will have a profound impact on women's health. This impact will depend on the time of exposure to violence and their health status prior to social isolation, both in terms of health problems caused by the violence itself and the existence of any other process or disease that may aggravate the violence (ACOSTA, 2020; JONES; ISHAM, 2020).

The impacts of domestic violence have been felt around the world. There was an increase in the incidence of violence cases by almost 30% in the city of New Taipei when the pandemic emerged in March 2020. While stay-at-home recommendations have not been implemented in Taiwan, people have been encouraged to stay at home in order to reduce social contact and the spread of the virus. The pandemic made it difficult for people to access their social networks, and increased the stress of families who spent more time at home in precarious conditions. The disruption of safety nets and inaccessibility to public services may have contributed to the exacerbation of domestic violence (KAH KHENG et al, 2020).

The Call Center for Women in Situations of Violence, channel 180 is a service that was created in 2005, currently this is offered by the Ministry of Women, Family and Human Rights (MMFDH), whose purpose is to register complaints of violence against women, in addition to providing guidance to women about their rights and about the service network for women. The following graph shows the total number of complaints registered by channel 180 in the months of March and April in the last 3 years. From this there was a continuous growth, from 14,853 complaints between March and April 2018 to 15,683 in 2019 and 19,915 in 2020, a period already affected by the pandemic. While the growth between 2018 and 2019 was 5.6%, between 2019 and 2020, the growth was 27% (DOSSIER MULHER, 2020).

To be able to break the cycle of violence, it is essential that women can distinguish that they experience a violent relationship not only when they suffer physical violence, which leaves visible marks, it is essential that women are able to recognize also the more subtle forms of violence, which often women can confuse with jealousy and / or care. Not infrequently, the victim does not formalize a complaint against his aggressor for fear of future repercussions or even for fear of the impact on the family. The absence of reporting cases of domestic violence leads to underreporting of cases and impunity of aggressors, allowing abuse to continue and harm the physical and emotional health of the victim and the domestic environment (SACCO et al, 2020).

It is noteworthy that even after the end of the pandemic and social isolation, domestic violence will have left deep scars, which will be permanent in the lives of battered women, corroborating the importance of the theme for the health of women and their families (MAJI; BANSOD; Singh, 2021).

Therefore, the present study aimed to characterize the forms of violence perpetrated against women during the quarantine period for Covid-19.

2 METHOD

This is a quantitative, cross-sectional and descriptive study. In the cross-sectional study all measurements are made on a single occasion or over a short period. A sample of the population is fixed and the distributions of the variables within this sample are examined, designating the predictor and outcome variables based on biological plausibility and information from other sources (HULLEY et al., 2008).

The cross-sectional study can be considered as a "time cut", in view of this, its full name is "cross-sectional study". This design is also called a prevalence study, because this epidemiological measure is typical of this type of study. Commonly, this type of research uses primary data, which are collected directly from the observation units for the purpose of the research (SANTANA; CUNHA, 2021).

In the quantitative study, it focuses on data collection and is equivalent to measuring, which is the process of linking abstract concepts with empirical indicators, through classification or quantification. In all quantitative research, the variables contained in the hypotheses are measured (SAMPIERI; GLUED; LUCIO, 2013).

The research was based on social media: WhatsApp, Facebook and Instagram, via direct contacts of the researcher and network of friends. Its participants were 278 women from the aforementioned media. As inclusion criteria: Women aged > or = 18 years who have experienced some situation in relation to domestic violence in the relationship with a current partner (a) as with a partner (a) of previous relationship, and have access to the digital form. As exclusion criteria: women who have not experienced situations of domestic violence both in the relationship with a current partner and with a partner in a previous relationship, inability to complete the digital form, or without access to the digital form, and those not oriented in time and space.

Data collection was performed through an electronic self-completion questionnaire with closed questions (62 questions - referring to age, race/color, marital status, and questions related to the situation of domestic violence both in the relationship with a current partner and with a previous partner, before and during the quarantine for Covid-19), the same was hosted on an online platform (Google Forms), and was forwarded to the women via a link forwarded to their social media contact.

Data were collected between the months of May and August 2022. It is noteworthy that data collection began after the approval of the Research Ethics Committee of the Fluminense Federal University (UFF), under no. CAAE:45939421.1.0000.816.

The confidentiality of the data and information that would enable the identification of the participants was ensured. There was no cost to the 278 participants, and they were informed about the possibility of giving up participating at any time, without causing them any harm. The participants were able to read and mark the field "I have read and accept to participate", if they agreed to participate in the research.

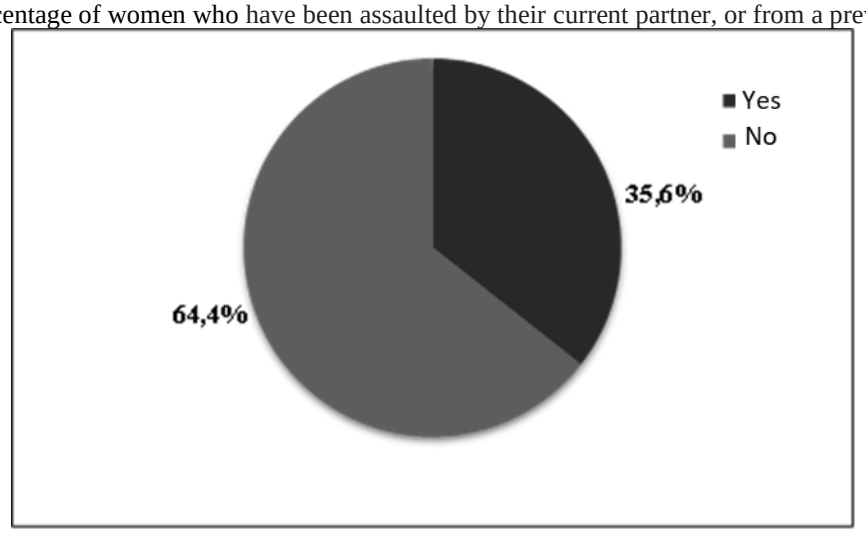
The strategy used to limit the receipt of forms was the Form Limiter. The variables used in this study are related to domestic violence before and during quarantine for Covid-19 and seeking help and health services and police due to the violence suffered.

The data were computed, stored in Microsoft Excel software and analyzed through tables, graphs and tables with simple frequencies and percentage, will be used the free software r versión 3.6.1 (2019-07-05). The descriptive analysis presented the observed data in the form of tables. Statistical analysis was processed using SPSS software version 26. The descriptive analysis presented in the form of tables the observed data, expressed by the mean and standard deviation for numerical data and by the frequency and percentage for categorical data. The criterion for determining significance was the level of 5%. Statistical analysis was processed using SPSS software version 26. 2.10.

3 RESULTS AND DISCUSSION

The present study showed that less than half of its participants reported having suffered some situation of domestic violence, as shown in the following graph:

Graph 1 - Percentage of women who have been assaulted by their current partner, or from a previous relationship:



Source: The Author, 2022

It was verified, as shown in Graph 1, that 35.6% of the study participants had already been assaulted by their current partner, or from a previous relationship.

The annual balance of Ligue 180, made available by the National Human Rights Ombudsman (ONDH), of the Ministry of Women, Family and Human Rights (MMFDH), for the period from January to December 2019 were registered in 2019, by the services "Dial 100" and "Call 180" 85,412 complaints, of which the most recurrent dealt with the following topics: 78.96% domestic violence, 4.35% attempted femicide, 4.08% moral violence and 3.81% threat. Regarding the degree of kinship, the records indicated the following degree of relationship between the victim and aggressor: 29.67% partners, 15.13% former partners, and 10.67% spouses (BRASIL, 2021).

A study conducted indicated that each month, on average, 49 women were active in the service, of these 30 agreed to participate in the research, 28 declared themselves cisgender and two transsexual. It should be noted that when isolating the responses of black women, 93% reported suffering from violence, against 83% of brown women and 75% of indigenous women and white women (PIUCHI; BARLETA; REAL, 2020).

Regarding the current partner, or some previous relationship was already violent before the quarantine period, it was found that 12.2% of the study participants stated that their current partner, or some previous relationship was already violent before the quarantine period, and 87.8% stated that their current partner, or from some previous relationship was not violent before the quarantine period.

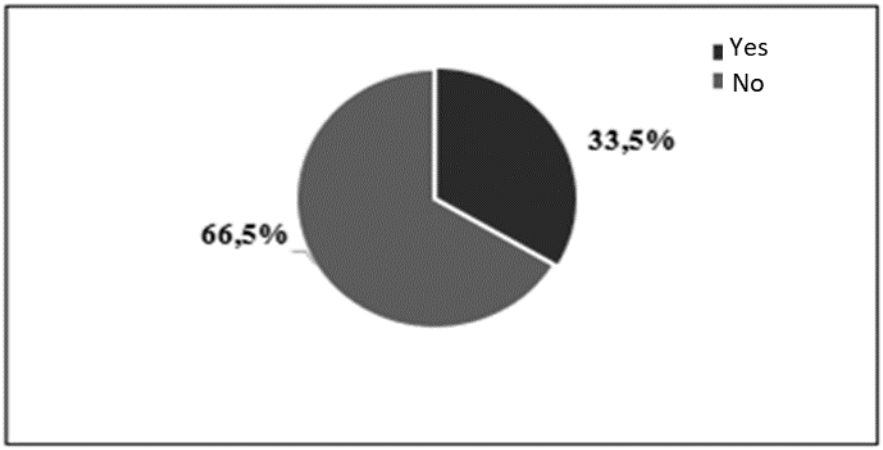
Regarding the current partner, or some previous relationship having become more violent during the quarantine period, it was found that 10.8% of the study participants stated that their current partner, or some previous relationship became more violent during the quarantine period, and 89.2% stated that their current partner, or from some previous relationship did not become more violent during the quarantine period.

The annual balance of Ligue 180 in 2019, was recorded a total of 1.3 million telephone calls, it is noteworthy that of this total, 6.5% were reports of violations against women. With the pandemic of the new coronavirus, the National Human Rights Ombudsman expanded the service service channels, it was found that in the first four months of 2020, there was an average growth of 14.1% in the number of complaints made through Ligue 180 compared to the same period last year (BRASIL, 2021).

According to the Brazilian Yearbook of Public Security for that year 2019, 1,206 women were victims of femicide in 2018. Of this total, 88.8% were victims of partners or former partners. It should be noted that 61% of the victims of femicide were black women. In the period of social isolation, women were more frequently monitored and prevented from talking to family and friends, which considerably increased the aggressors' scope for action regarding psychological manipulation. The

control of household finances has also become more fierce, with the presence closer to the man in an environment that is more commonly the domain of women (BRASIL, 2021; SCALLOP; GARCIA; MACIEL, 2020).

Graph 2 - Percentage of women who suffered physical violence committed by their current partner, or from a previous relationship kicking, pushing, pulling hair, tightening the arm.



Source: The Author, 2022

It was verified, according to Graph 2, that 33.5% of the study participants had already suffered physical violence committed by their current partner, or from a previous relationship. It was found that 14% did not suffer physical violence before the quarantine period, and began to suffer, 2.9% suffered physical violence before the quarantine period, and continued to suffer during the quarantine period, 3.2% suffered physical violence before the quarantine period, and worsened during the quarantine period, 9.7% of the study participants had already suffered physical violence before the quarantine period.

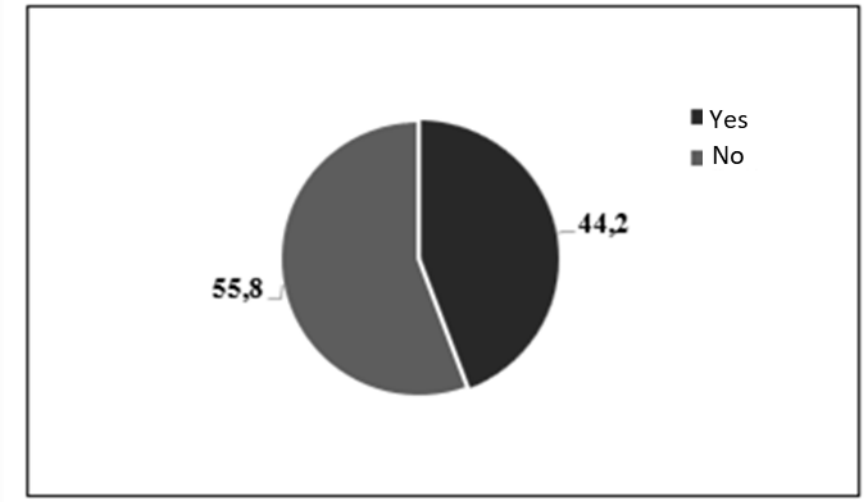
It is noteworthy that the levels of victimization for physical aggressions such as punching, pushing and kicking were, on average, twice as high among divorced women than in all other marital states, as well as the levels of victimization for sexual offense, beating and stabbing or shooting. That is, the numbers indicated that separated and divorced women were more vulnerable to suffering violence in a more severe and severe way than the others. It should also be considered that married women may feel less encouraged to report situations of violence experienced out of fear or shame (BUENO et al, 2021).

Regarding the place where the women were victims of physical violence committed by their current partner, or of some previous relationship, 6.1% reported that outside the house in a public place, 9.8% reported that it was outside the house in a reserved place, 28% reported that it was inside

the house in the presence of family/friends, and 56.1% reported that it was inside the house, when they were alone.

Regarding the place of aggression and the relationship of the victim with the aggressor, it was found that 43% (465,985) of the women who suffered physical aggression were in their residence at the time of the aggression, and that 48.9% (529,298) of the women assaulted were in a public place. As for race/color, 41.7% (197,758) of white women were assaulted at home and 51.6% (244,864) in a public place, while among black women, 44.1% (268,277) of the aggressions occurred at home and 46.7% (284,434) in a public place (ENGEL, 2020).

Graph 3 - Percentage of women who suffered psychological violence committed by their current partner, or from a previous relationship using phrases such as: you don't know anything; I did it because you deserved it; You're crazy, no one will believe you; You'll regret it if you do; If I go to court I will take my guard off; No man will want you.



Source: The Author, 2022

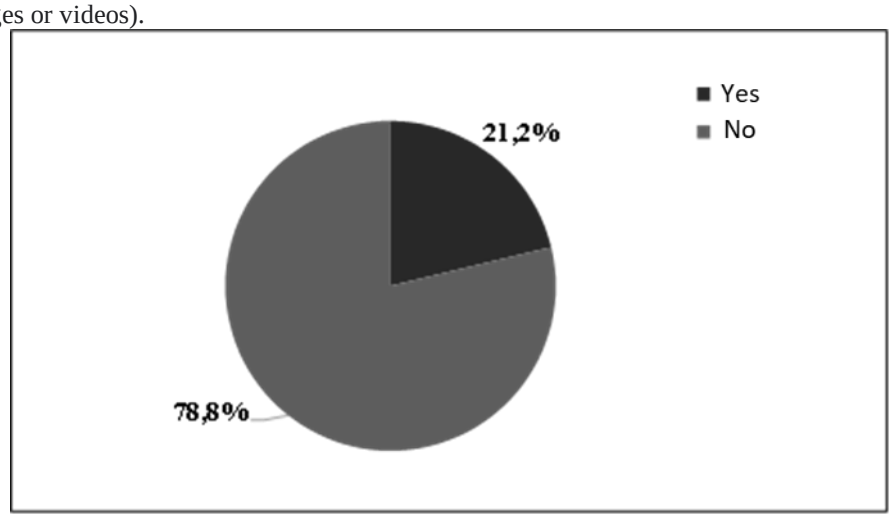
It was verified, according to Graph 3, that 44.2% of the study participants had already suffered psychological violence committed by their current partner, or from a previous relationship. It was found that 7.2% did not suffer psychological violence before the quarantine period, and began to suffer, 16.2% suffered psychological violence before the quarantine period, and continued to suffer during the quarantine period, 5% suffered psychological violence before the quarantine period, and worsened during the quarantine period, and 11.2% of the study participants had already suffered psychological violence before the quarantine period, he did not suffer.

It is noteworthy that in relation to the place where the women were victims of psychological violence committed by their current partner, or of some previous relationship, 4.4% reported that it was outside the house in a reserved place, 4.4% reported that it was outside the house in a public place, 27.2% reported that it was inside the house in the presence of relatives/children, and 64% reported that it was indoors, when they were alone. A study conducted with 12,719 women were treated between

2017 and 80 2021 at the reference center of Lauro de Freitas (Bahia). It was found that in the year 2021, the number of women assaulted was 4,177. In that year, there was an increase of 143% of the attendances when compared to the number of women attended in the year 2017. In these consultations, it was found that 44.5% of the women identified themselves as black, only 2% declared themselves as illiterate and 80.3% claimed to have suffered psychological violence (ROCHA; SOKOLONSKI, 2022).

The frequency of notifications of violence against women was approximately six cases for every 10 notifications in heterosexual relationships. Most of the cases were physical violence, followed by psychological violence. The highest proportion of notifications of violence were made among young adult women aged 20 to 39 years with low schooling. The episodes had a higher occurrence in the domestic sphere, were repeat offenders and committed by aggressors who had made use of alcoholic beverages The street appeared in 19.9% of the reports, and work appears as the third place with the highest incidence of violence with 9.4% (BUENO et al, 2021; MASCARENHA et al, 2020).

Graph 4 - Percentage of women who have suffered sexual violence committed by their current partner, or from a previous relationship (Force to have sex unwillingly; prevent pregnancy; force to become pregnant or abort; force to see pornographic images or videos).



Source: The Author, 2022

It was found that 21.2% of the study participants had already suffered sexual violence, and that 78.8% had never suffered sexual violence committed by their current partner, or from a previous relationship, according to Graph 4. It was found that 1.8% did not suffer sexual violence before the quarantine period, and began to suffer, 1.8% suffered sexual violence, and continued to suffer, 1.8% suffered, and worsened during the quarantine period, 7.6% of the women already suffered sexual violence before the quarantine period, and did not suffer, and 87.1% did not suffer sexual violence, and continued not suffering. It was found that 0.7% of the women answered that their current partner or partner from a previous relationship obliged, and worsened during the quarantine period, 2.5% did

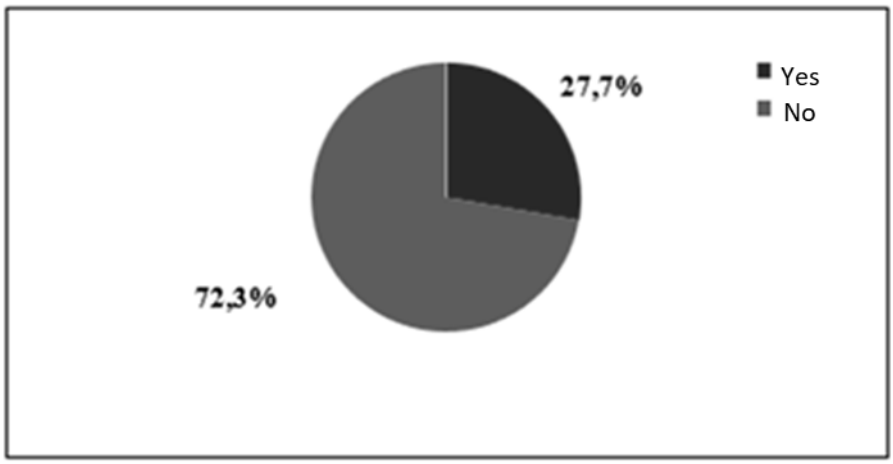
not oblige, and began to oblige, 2.5% obliged, and continued to oblige, 5.8% obliged, and started not obliging.

With regard to sexual violence, the data show that the profile of victims differs from other recorded violations, since there was a reduction in the age group, where the most recurrent victims were between 15 and 24 years old. There is also a change in the ethnicity of women, because they have declared themselves white. Regarding the relationship between the suspect and the victim, the data revealed that 34.7% were unknown, 34.4% did not inform the degree of relationship; and 13.6% are neighbors.

It is worth mentioning that brown women present a high percentage when it comes to this type of violence, it is noteworthy that when a joint analysis of sex and color or race is performed, there are differences that are accentuated pointing to a situation of greater vulnerability for women 81 black or brown (BRASIL, 2021).

A study conducted from the data extracted from the Information System of Notifiable Diseases (SINAN) that comprised the notifications registered in the period from 2015 to 2017, found that there was an increase in the number of notifications of violence of 49.3% among lesbians (from 2,177 in 2015 to 3,251 in 2017), 38.5%, 101.4% among bisexuals (425 in 2015 and 856 in 2017). With regard to gender identity, there was an increase of 77.9% in the number of notifications of violence against transvestites (from 339 in 2015 to 603 in 2017), 22.7% against transgender women (2,179 in 2015 and 2,673 in 2017). The analysis of the evolution of the completeness of these two fields between 2015 and 2017 indicates that the percentage of valid data went from 62.2% to 69.2% in the sexual orientation variable and from 55% to 62.2% in the gender identity variable (PINTO et, al, 2020).

Graph 20 - Percentage of women who suffered Moral violence committed by their current partner, or from some previous relationship with behaviors such as: slander, defamation or slander practiced.



Source: The Author, 2022

It was verified, according to Graph 5, that 27.7% of the study participants had already suffered Moral violence committed by their current partner, or from a previous relationship, and 72.3% had not suffered Moral violence committed by their current partner, or from a previous relationship. It was found that 9% did not suffer Moral violence before the quarantine period, and began to suffer, 6.5% suffered Moral violence before the quarantine period, and continued to suffer during the quarantine period, 2.2% suffered Moral violence before the quarantine period, and worsened during the quarantine period, 10.1% of the study participants already suffered Moral violence before the quarantine period, and he did not suffer.

With regard to the most recurrent violations recorded in Ligue 180, the records of domestic violence were divided into the following categories: 61.11% physical violence, 19.85% moral violence and 6.11% attempted femicide. The data from this report showed that the most recurrent group was that of women who declared themselves mulatto, and were in the age group between 25 and 30 years. In the records of domestic violence regarding the relationship of victims with aggressors, 33.15% were partners, 17.94% former partners and 12.13% spouse (BRAZIL, 2021).

According to study results, in 2021, the second most cited type of violence was morale 53.9% of the total number of visits, followed by physical violence 48.8%, threat of death 31.5%, property violence 29.1% and sexual violence 15.2%)(ROCHA; SOKOLONSKI, 2022). It was found that 18.3% of the study participants had already suffered, and 81.7% had not suffered property violence committed by their current partner, or from a previous relationship. It was found that 1.8% suffered, and worsened during the quarantine period, 7.2% did not suffer, and began to suffer, 4% suffered, and continued to suffer, 7.6% of the study participants already suffered property violence, and did not suffer.

Regarding the place where the women were victims of property violence committed by their current partner, or of some previous relationship, 1.7% reported that it was outside the house in a reserved place, 8.5% reported that it was outside the house in a public place, 32.2% reported that it was inside the house in the presence of relatives/children, and 57.6% reported that it was inside the house, when they were alone.

Patrimonial violence consists of actions that involve the withdrawal of money and goods earned by women with their own work, as well as the destruction of any patrimony, personal property or professional instruments (BRASIL, 2021).

In the period of the covid-19 pandemic, the home came to be considered the safest for much of the population. However, the same cannot be said for many Brazilian women, since 48.8% of the cases of violence experienced by women in the last 12 months happened inside the home, 19.9% of women reported having experienced situations of violence in the street environment, 9.4% at work and 1.8% at the bar/club (BUENO et al, 2021).

It was found that 48.4% of the women who were victims of violence continued to live with their current partner, or from a previous relationship, even after having suffered some type of violence, and 51.6% of the women did not remain living with their current partner, or from a previous relationship after having suffered some type of violence.

It is noteworthy that, among the women assaulted by a husband or partner, 79% say that the bond has broken down. This percentage is 100% among women who claim to have suffered aggression from their boyfriend. Among the women whose relationship with the aggressor ended, 90% stated that the violence suffered greatly influenced the woman to decide to end the relationship, which suggests that a significant part of the women victims of domestic violence are managing to put an end to abusive relationships (BRASIL, 2021).

It was found that 45% of the women who were victims of violence did nothing, even after having suffered some type of violence, 43.3% sought friends and/or family, 17.5% sought the police station, and 5.8% sought the health service. Among the women who claim to have been victims of domestic violence in the last 12 months, 36% declare having sought health care because of the violence suffered, 31% sought help from family members, 21% sought help in ordinary police stations and only 17% of the battered women sought help at the women's police station (BRASIL, 2021).

Although the numbers show the high rates of violence against women, these still do not portray the Brazilian reality, since for cultural reasons this phenomenon is still minimization in our country. Meanwhile, every day thousands of women continue to experience violence in the domestic environment and beyond. Another preponderant factor for the lack of knowledge of this reality lies in the fact that women still feel very afraid to seek help, thus increasing the lack of complaints (PIUCHI; BARLETA; REAL, 2020).

Although in recent years the debate about the justifiable motivations for not denouncing violence or leaving the relationship, whether they are financial and emotional dependence, children, non-nominable, subtle, non-typified violence, or even complex affective involvements, have been expanded, the expectation is that these difficulties will be broken and women will be able to denounce the violence suffered (ENGEL, 2020).

It was found that 59.6% of the study participants felt guilty after after suffering aggression from their current partner or partner from a previous relationship, and 40.4% of the participants did not feel guilty after suffering aggression from their current partner or partner from a previous relationship.

Among the women who had suffered physical aggression, only 18% reported the incident and sought a public health service to report the incident. However, 9% of the participants found the aggressions justifiable and felt guilty for the aggressions suffered, 28% of the participants reported that

they had already been prevented from working, studying or attending places by someone else. Of these 45% were prohibited by their own partners, 64% of them thought that the prohibitions could also be related to the fact that they were users of psychoactive substances and 36% saw no relationship between these facts. Already 81% of women related the prohibitions with the fact that they are female, and 19% do not see a relationship. Jealousy was mentioned 46% of the time, 8% reported the fact and only 9% reported what happened in a health service (PIUCHI; BARLETA; REAL, 2020).

Some explanatory hypotheses sought to understand how some socioeconomic factors such as income and schooling can contribute to the occurrence of this type of violence against women. One of the most robust risk factors for female victimization identified in the studies was low schooling. However, among the indicators of socioeconomic level, unemployment and low income seem to be more powerful predictors than schooling. In addition, although a higher educational level may represent the acquisition of skills and social resources to deal with situations of violence, giving protection to women, it can also involve them in situations of greater risk of victimization. Better levels of education enable women through relationship networks, self-confidence and skills in the use of information and resources of society, constituting protection against violent events (BHONA et al, 2019).

The result of a study found that separated and divorced women had higher levels of victimization of violence (35%) when compared to married (16.8%), widowed (17.1%) and single (30.7%) women, which accentuated the increase in the severity/intensity of physical violence. The attempt to break with the aggressor and the repeated histories of violence are vulnerability factors that can increase the chances of women being killed by their partners and former partners, which reveals that separation is, at the same time, the attempt to interrupt the cycle of violence, but also the moment when the woman becomes more vulnerable (BRASIL, 2021).

4 CONCLUSION

At the end of the present study, it should be noted that the hypothesis initially presented was refuted, since no relationships were identified between female vulnerability to domestic violence during the quarantine period for Covid-19. However, the fact that the hypothesis was refuted does not mean that this is true, what possibly occurred in this case was a selection bias, since most of the study subjects were women who had not suffered violence.

Thus, it should be noted that for this specific group, although it is composed of 278 women, which at first can be considered a robust N, for most of this group, the problem of domestic violence did not occur, which probably resulted in the rejection of the hypothesis, but does not mean that the problem is not present.

The results of the studies of the last two years have shown that the quarantine period for Covid-19 was a preponderant for the increase in violence against women, since they were compelled to live with their aggressors, which decreased the possibilities of reporting safely and seeking health services and police stations. However, the expansion of online reporting made it possible for women to use this channel to denounce their aggressors, especially black women, as found in this study. Violence against women is an old public health problem, of a structural nature and remains latent, since the patriarchal and macho culture remains ingrained in the country, based on this the men retain the right to dominate women, even if for this they use violence to show their power over the body and their desires.

The results pointed to the importance of the elaboration of public policies to confront violence against women considering the cut of race and class, since the absence of this look favors to society the denial of inequalities that are not restricted 86 to gender issues. The importance of professional training, especially in nursing, is highlighted, since these professionals are the first to take care of women when they are able to break the cycle of violence and seek health services. The importance of an attentive and empathetic look in the care of women victims of violence is highlighted.

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CHAPTER
34

Self-perception of dizziness and the relationship with the easing of COVID-19 social distancing rules, immunization and vitamin supplementation

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ABSTRACT
Objective: To analyze the behavior of people with dizziness when faced with the easing of the COVID-19 social distancing rules, immunization and use of vitamin supplementation. Method: A self-perception questionnaire was applied in electronic format, during the period of easing of the COVID-19 social distancing rules, with 19 closed questions. The following aspects were addressed: identification, general health (COVID-19, influenza, immunization and comorbidities), time of onset of dizziness, means of protection against COVID-19, vitamin supplementation, homemade recipes and use of teas. Results: 667 Brazilians were interviewed, all eligible to participate in the research. Of these, 261 (39.1%) self-reported the presence of dizziness, with a mean age of 37.91 years, with a prevalence of females. The use of masks and hand hygiene were protective measures that continued to be adopted during the easing of the COVID-19 social distancing rules, with 89.2% reporting, even after having been immunized, that they were afraid of contracting SARS COV -two. It was observed that 11.1% triggered dizziness after a positive test for COVID-19; in addition, 32.2% consulted a nutritionist to start the supplementation process (p=0.005), 65.1% used vitamin supplements (p=0.001) and 19.8% reported having used homemade recipes such as Espinheira Santa Tea and Chamomile, Ginko Biloba in order to minimize dizziness. Conclusion: Participants with dizziness were diagnosed with a vestibular disorder by a specialist, since there was a positive relationship with dizziness in the post-COVID-19 period. In order to reduce vestibular symptoms, the interviewees consulted a nutritionist to start vitamin supplementation and used vitamin complexes from A to Z, among others such as zinc, vitamin B12 and homemade teas. Even after the COVID-19 immunization, the participants continued to follow the guidelines for hand hygiene and the use of protective masks.

Keywords: Dizziness, covid-19, quality of life.

1 INTODUCTION

In the last three years, with the advent of COVID-19, the population has gone through several difficulties, due to the implementation of social isolation by SARS-COV 2, which culminated in a financial, emotional and social breakdown.

Among the symptoms of the disease are fever, headache, alteration in smell and taste, diarrhea, difficulty breathing, and the onset and worsening of dizziness, with this vestibular disorder being present in 7 to 12% of subjects who test positive for COVID-19 (Mezzalira, 2022).

It is known that dizziness is characterized by a sensation of spatial disorientation that causes instability, fluctuation, oscillations and may be associated with visual distortion, and such imbalance may occur due to proprioceptive, visual and vestibular changes (Neuhauser, 2016).

However, there are descriptions of the relationship between dizziness and emotional disorders, and the economic and social changes experienced by the population during the period of social confinement of COVID-19 generated changes in mental health. It is believed that the dizziness triggered during this period may be part of the persistent perceptual postural disorder (PPPD), which is caused by emotional disorders, which have been described in the literature as anxiety, depression, insomnia, among others (Marazziti et al., 2021; Shuja et al., 2020; Staab, 2020).

With the implementation of social isolation and the process of mass immunization of the population, the number of deaths and contagion dropped dramatically (FIOCRUZ, 2022). It is known that immunization does not prevent the contamination of SARS-COV2, but it does prevent the most drastic form of the disease.

However, the presence of dizziness in the infected individual, even if immunized, is described, since damage to the central nervous system can occur, which leads to the onset or worsening of the vestibular disorder (Carod-Artal, 2020). Studies also report that this disorder can last for up to 6 months after infection (Santos and Rodrigues, 2022).

In this way, as a preventive measure and even with the aim of reducing the effects and symptoms of COVD-19, the population adhered to vitamin supplementation with vitamins A, B, C, D, zinc, among others, often with use indiscriminately (Shakoor et al., 2021).

Furthermore, the use of supplementation is a common practice among Brazilians, and many people with dizziness also adhere to this integrative practice. In this way, it has been described that in benign paroxysmal positional vertigo (BPPV) there is a low dose of vitamin D, which can be considered one of the causes of dizziness, therefore, supplementation can help to improve this symptom (Abdelmaksoud et al., 2021).

Furthermore, there are also reports of the use of medicinal teas such as Espinheira Santa, Chamomile and Ginko Biloba, which are linked to cultural issues with anxiolytic, calming and anti-inflammatory action (Chaves et al., 2020; Laccourreye et al., 2017).

In relation to the improvement of the dizziness symptom, studies mainly elucidate the use of Ginko Biloba, which acts in vestibular compensation (Lindner et al., 2019).

In this way, the objective of this study is to analyze the conduct of the person with dizziness in

face of the relaxation of the rules of social distance of COVID-19, immunization and use of vitamin supplementation.

2 MATERIAL AND METHOD

This is a cross-sectional, quantitative, observational, analytical study with the general population, which went through the public emergency of COVID-19. The research was approved by CEP da UFS 51563521.5.000.5546 opinion nº 5.168.695.

All participants were informed about the purpose of the study and provided consent to participate in it, with digital acceptance of the free and informed consent form. Ethical precepts followed resolutions 466/2012 and 510/2016 of the National Health Council and the researchers complied with the use of personal data, as provided for in the General Data Protection Law - LGPD - No. 13,709, of August 14, 2018.

The casuistry was composed of adult individuals (over 18 years old), of both genders, for convenience. The means of linking the questionnaire was electronic with registration in Google forms, which is a format capable of enhancing data collection, since it reduces costs and allows coverage of several states and cities (Faleiros et al., 2016).

Initially, the research was disseminated virtually in the researchers' What's App groups and by e-mail to the scientific community. In this way, the participants who received the material (invitation and link with the electronic address for completing the questionnaire), in a virtual environment, were encouraged to disseminate the research among their peers.

The protocol used was a self-perception questionnaire with 19 objective, multiple-choice questions, structured and prepared by the researcher in charge.

The instrument addressed the following aspects: identification (gender, age, state of residence in Brazil), general health (COVID-19, immunization against influenza and COVID-19, comorbidities considered predisposing to contracting COVID-19: obesity, Diabetes Mellitus, heart and respiratory diseases, hypertension and chronic diseases), when tinnitus/dizziness appears, means of protection against COVID-19 and use of vitamin supplementation, homemade recipes and teas.

The questions sought to elucidate two periods permeated by the population: the period of social confinement of COVID-19 (period in which social isolation was imposed by the government with the closure of all non-essential activities, between 2019 and 2020) and the period of easing of social distancing rules (opening of non-essential activities and return of the population to face-to-face activities in 2021).

Among the eligibility criteria, participants should be adults over the age of 18, residing in Brazil, literate, and able to access the material sent via Google Forms. Participants who did not complete all questions in the questionnaire were excluded.

The instrument was released virtually between the months of January and June 2022 and had the participation of 667 interviewees, who met all the inclusion criteria, of which 261 presented self-reports of complaints of dizziness.

Furthermore, the data collection period took place during the easing phase of social distancing rules, which started in 2021, when all establishments were open and the population had returned to face-to-face activities (Martins and Guimarães, 2022).

In addition, the immunization policy was advanced, and in 2022, the data collection period, the 2nd booster dose of COVID-19 was being offered, since the population had already had access to three doses of the vaccine against to SARSC-COV 2.

For statistical analysis of the data, the Statistical Package for Social Sciences, version 20 (SPSS, Chicago, USA) was used. The critical level set was 5% ($P<0.05$) to admit difference in means as statistically significant.

Data were expressed as mean values ± standard deviation of the mean. The Chi Square test was used as well as the Pearson and Spearman tests to assess the correlation between the dependent and independent variables.

As a dependent variable there is the presence of a complaint of dizziness and the independent variables: gender, period in which the complaint of dizziness arose, influenza, measures taken to prevent the transmission of COVID-19 (use of masks and hand hygiene), consultation with a specialist doctor/nutritionist and use of vitamin supplementation.

3 RESULTS

In total, 667 questionnaires were answered by participants residing and domiciled in Brazil with at least one representative from each Brazilian state.

Most resided in the State of Sergipe, where the research was idealized; the average age of respondents being 36.68 years (±13.66) and most participants were women (79.8%).

Of the 667 questionnaires answered, 261 respondents self-reported the presence of dizziness, which is equivalent to 39.1% of participants.

The mean age of those with dizziness was 37.91 years (±14.53), with the majority residing and domiciled in Sergipe (66.33%).

At the time of the social isolation of COVID-19, 71.23% self-reported having followed government guidelines to the letter, and 18% reported belonging to the risk group (elderly and those

with comorbidities such as Diabetes Mellitus, hypertension, obesity, heart disease, respiratory and patients with chronic diseases) for SARS-COV2.

It was also observed that 97.9% of respondents were immunized against COVID-19, with 51.3% adhering to the second dose and 45.6% to the booster dose.

Furthermore, 52% (n=137) self-reported having been immunized against influenza. However, the fear of contracting the disease was still imminent among the participants, who reported making constant use of protective masks and hand hygiene (Table 1)

Table 1. Analysis of participants with self-reported dizziness, regarding variables related to COVID-19 (n=261).

Variables	**Presence of dizziness**	**Absence of dizziness**	**P value**
Gender	n (%)	n (%)	0,001*
Female	225 (86,2)	307(75,6)	
Male	36 (13.8)	99 (24,4)	
Fulfilled social distancing during the pandemic period			0,089
Ever	186(71,3)	259(63,8)	
Rarely	73(28,0)	139(34,2)	
Never	2(8,0)	8(2,0)	
Fear of contracting COVID-19			0,000*
Yes, even with the easing of the rules	105(40,2)	132(32,5)	
Yes, even after taking the vaccine	129(49,2)	224(55,2)	
No	27 (1,13)	50(12,3)	
Used a mask in public places during flexibility			0,585
Regularly	224(85,8)	340(83,7)	
Only in required places	37(14,2)	65(16)	
No	0(0)	1(0,2)	
Performed hand hygiene in public places during flexibility			0,726
Regularly	184(70,5)	286(70,4)	
sporadically	71(27,2)	114(28,1)	
Never	6(2,03)	6(1,5)	

Statistical analysis: Chi square test *p<0,05

Of the participants with complaints of dizziness, 18.4% self-reported aggravation of dizziness during the COVID-19 pandemic period. In addition, 55.6% (n=145) of the participants who were diagnosed with COVID-19, 11.1% (n=29) reported triggering post-contagion dizziness.

It was also observed that the search for a specialist professional to obtain the diagnosis of dizziness was statistically significant (Table 2).

Table 2. Analysis of participants, with self-report of dizziness, regarding the time of onset of dizziness, positive test for COVID-19 and use of vitamin supplementation (n=261)

	n (%)	P Value
Dizziness		
Didn't freak out in the pandemic	125 (47,9)	
Triggered in the pandemic	21(8,0)	
It got worse in the pandemic	48(18,4)	
Triggered after COVID-19	29(11,1)	
Sporadic associated with physician-diagnosed metabolic disease	38(14,6)	
Tested positive for COVID-19		0,001*
Once	106(40,6)	
Twice	30(11,5)	
Three times or more	9(3,4)	
Never contracted the disease	116(44,4)	
Contracted influenza		0,054
Yes	114(43,7)	
No	147(56,3)	
Consult a physician for the diagnosis of dizziness during the COVID-19 pandemic		0,000*
Yes	102(39,2)	
No	158960,8)	

Statistical analysis: Chi square test. *p<0,05

The majority (65.1%) of the participants in the present research, with self-reported dizziness, used vitamin supplementation, and the interviewees went to the nutritionist to start the supplementation process (p=0.001). Thus, 82.4% used vitamins: A, B, C, D, E, zinc and omega 3, in combination or alone; 17.6% of the participants self-reported using the vitamin complex from A to Z.

Furthermore, 19.8% also reported having made use of homemade recipes such as Espinheira Santa Tea and Chamomile, Ginko Biloba, in addition to Vitamin D, B12 and zinc, in order to reduce the vestibular symptom (Table 3).

Table 3. Analysis of participants with self-reported dizziness regarding aspects related to consultation with the nutritionist, use of vitamin supplements and teas (n=261).

	n (%)	P Value
Consultation with a nutritionist to start supplementation		0,005*
Yes	84(32,2	
No	177(67,8)	
Made use of vitamin supplementation		0,001*
Did not use during the pandemic	91 (34,9)	
Started using it during the pandemic	40 (15,3)	
Continued use during the pandemic	74 (28,4)	
Increased usage during the pandemic	40 (15,30	
Initiated post-influenza use	14 (5,4)	
Increased post-influenza use	2 (8,0)	
Made use of homemade recipes for dizziness		
Did not use	209 (80,1)	
Yes with medical prescription	25 (9,6)	
Yes without medical prescription	27 (10,3)	

Statistical analysis: Chi square test. *p<0,05

4 DISCUSSIONS

The present research was carried out in the period of easing of the social distancing rules of COVID-19; however, the study was carried out electronically and had the presence of 667 participants from almost all Brazilian states.

Accordingly, it is observed that answering the questionnaires electronically is capable of enhancing data collection, since it reduces costs and can cover several countries, states and cities (Faleiros et al., 2016).

It is known that with the advent of COVID-19, in 2019, all Brazilian states implemented social distancing, with a proposed lockdown, which culminated in the closure of almost all commercial establishments.

In the present research, 66.7% reported having adhered to the social isolation of COVID-19 (Table 1), which corroborates the literature, since studies show that adherence was approximately 70% of the Brazilian population (Aquino et al.., 2020).

Of the 667 interviewees, dizziness was found in 261 participants, which is equivalent to 39.1% of the sample. Furthermore, of the subjects complaining of dizziness, 71.3% reported having followed the rules of social distancing strictly, that is, they adhered to the lockdown.

The literature reports dizziness as a "pandemic effect" (Mezzalira, 2022), and there are reports of the triggering/worsening of the symptom, in the population that strictly complied with the social distancing of COVID-19, between 2019 and 2020, with a positive relation to emotional changes. (Oliveira et al., 2022).

It was observed that, among the interviewees, 8% self-reported having triggered the vestibular symptom and 18.4% presented worsening during the COVID-19 lockdown period. It is believed that dizziness may have arisen as a result of emotional problems triggered during the period of social confinement, such as anxiety, difficulty sleeping, these factors being considered as triggers (Ammar et al., 2020).

This vestibular disorder was named TPPP, by the International Classification of Vestibular Disorders in 2017, since there is a close relationship with emotional changes (Staab, 2020).

Furthermore, during the period of social confinement, there were significant changes in eating habits, such as higher intake of processed foods with high sodium content and indiscriminate use of alcoholic beverages, factors that may also predispose the population to trigger dizziness (Matsungo and Chopera, 2020).

Furthermore, the change from work activities to the home office generated ergonomic problems, and the residential furniture was not suitable for such activities, thus providing inadequate trunk posture, as well as long hours of work and excessive exposure to electronic devices, factors that

considered as triggering dizziness, which may be linked to muscle pain in the cervical region, known as cervicogenic dizziness (Wrisley et al., 2000).

It is known that the easing of social distancing rules was established at the end of April 2021, which culminated in a decrease in cases of COVID-19, as well as in incidence rates, occupation in ICUs and the number of deaths. In this way, measures to reopen commercial establishments were intended to reduce the economic and social impact experienced during the lockdown (Martins and Guimarães, 2022).

However, with the loosening of social distancing, a new wave of COVID-19 was observed, with an increase in the number of cases, and as a consequence there was an increase in the number of deaths, mainly in the male population and in the elderly (Escobar et al., 2021; Galvão and Roncalli, 2021).

However, clinical trials related to immunizers were already being produced and had to be accelerated.

Thus, the Brazilian Health Surveillance Agency approved the emergency use of Coronavac, which was produced on a large scale in Brazil, by the Butantã Institute (Agência Brasil, 2021).

Thus, immunization was implemented in January 2021, being considered one of the most effective measures to prevent the spread and contagion of the disease.

Therefore, after vaccination, the number of infected people and deaths from the disease dropped dramatically (FIOCRUZ, 2022; Guimarães, 2020).

Regarding immunization, the participants of this research adhered in masse to the COVID-19 vaccination, and 51.3% were immunized with the second dose and 45.6% with the booster dose.

On the other hand, the literature reports higher rates of adherence to the second dose (74.3%) in the general population (FIOCRUZ, 2022).

However, the fear of contagion of the disease in the participants of the present research was imminent (89.7%) and even with the immunization process, the infection or reinfection by COVID-19 generated a milder form of the disease, without the presentation of symptoms serious.

In the present research, the self-report of cases of reinfection, even after immunization, was 3.4%, and the interviewees reported having been infected 3 or more times, without association with the severe phase of the disease.

The literature confirms this data, since the lethality rate is 40.4% lower in immunized individuals (Passarelli-Araujo et al., 2022).

Even with the advancement of COVID-19 vaccination, the Ministry of Health (2021), FIOCRUZ (2021), the Brazilian Society of Infectious Diseases (2021) and the Brazilian Society of

Immunizations (2021) recommended maintaining prevention measures and control against the spread of SARS-CoV-2.

However, in April 2022, the Federal Government published an ordinance in the Official Gazette related to the non-mandatory use of masks indoors (GOV, 2022).

On the other hand, the subjects of the present research, with complaints of dizziness, did not abandon the old practices regarding preventive measures, and 85.8% of the participants, even with the loosening of social distancing, continued to use protective masks in environments public and 70.5% reported washing their hands regularly (Table 1).

In addition, government health agencies in Brazil instituted the National Vaccination Campaign against Influenza, since the symptoms of influenza are similar to those of COVID-19.

Immunization allows reducing the circulating burden of influenza in the population, as well as protecting against complications, mainly secondary bacterial pneumonia (BRASIL, 2023).

Initially, the vaccine was applied to the elderly and children up to 5 years of age, and was later expanded to the general population.

The vaccination target set by the Ministry of Health was 78 million; however, 63 million were vaccinated, with a deficit of 10 million people (BRASIL, 2022).

Thus, it was found that only 52% of participants with self-reported vestibular disorder were immunized against influenza.

Low adherence can be described by the data collection period (January to June 2022), which began before the Influenza vaccination period administered by the Municipal Ministry of Health in March 2022 (Brasil, 2020).

Among the participants, 29 (11.1%) diagnosed with COVID-19 complained of dizziness. The literature corroborates the findings, since infection with SARS-COV2, in addition to causing respiratory changes, can also trigger auditory and vestibular changes in different degrees of impairment.

The relationship of the viral action of COVID-19 on the neural pathways involved in balance is described; however, the mechanisms are still not well described (Fancello et al., 2021; Mezzalira, 2022).

It is hypothesized that the SARS-COV 2 virus is dependent on angiotensin-converting enzyme 2 receptor and serine transmembrane protease 2 to enter the central nervous system.

After viral binding to these receptors, there is infection of the vestibular nerve and, consequently, dizziness (Almufarrij, Uus and Munro, 2020; Luca, De et al., 2021).

In the present study, a statistically positive relationship was also observed for dizziness in the female population.

This fact may be due to the fact that women were part of the vulnerable group during the period of social confinement of COVID-19, since changes in daily life habits generated overload in activities, as well as the feeling of inability to protect family members against the disease and the pervasive economic and social difficulties.

During this period, they triggered mental health disorders such as anxiety, depression and insomnia, often with the use of psychotropic drugs (Marazziti et al., 2021). These emotional disorders may have triggered the PPPD (Hwang et al., 2019).

One of the ways used by the participants of this research, with self-report of dizziness to minimize contamination by COVID-19, in addition to immunization, use of a mask and frequent hand hygiene, was the adoption of vitamin supplementation.

Thus, 65.1% of the participants used supplements, with 17.6% using a complex from A to Z and 82.4% using vitamins A, B, C, D, E, zinc, omega 3 isolated or combined form (table 3).

Such use stems from the importance of increasing the action of the immune system. In this way, it is known that the B complex vitamin is a class of water-soluble vitamins, found in meat and vegetables (fish, cabbage), which act in the normal functioning of the immune system and participate in the regulation and production of energy in the body.

Vitamin C is known as ascorbic acid and is considered a water-soluble nutrient, which acts on the immune system during infectious processes and promotes phagocytosis of leukocytes, in addition to developing and maturing T lymphocytes (Jovic et al., 2020).

There are studies that relate vitamin C to the treatment of Covid, with high-dose intravenous injection to stimulate the immune system (WG, 2020).

Vitamin D is fat-soluble and acts on mineral homeostasis, mainly calcium, magnesium and phosphate and is present in fish oils and egg yolks, and increases immunity by promoting and releasing nutrients, which have antimicrobial effects (Jovic et al., 2020).

Studies also report that this vitamin is potent in reducing the incidence and severity of respiratory infectious diseases (Siuka, Pfeifer and Pinter, 2020).

Vitamin E is considered a potent antioxidant that neutralizes free radicals; acts on the immune system through the mechanisms of decreasing nitrogen oxide production, while Zinc blocks viral replication and acts on the anti-inflammatory process and is used in the treatment of Covid-19 positive subjects (WG, 2020).

The literature also reports that vitamins A, C, D, E, B6, B12 and folate act as promoters of improvement in the immune response, and the adequate supply of these nutrients increases the activity of T lymphocytes, antibodies, as well as providing regulation the production of cytokines, defensins and other compounds that participate in the immune response (Jovic et al., 2020; Shakoor et al., 2021).

There is a consensus in the literature that nutritional interventions and some bioactive compounds can be potential interventions for COVID-19 (Zhang and Liu, 2020).

In consensus, in the present study, participants with complaints of dizziness sought help from a nutritionist to perform vitamin supplementation, with a positive relationship (p=0.005), and there is a relationship between dizziness and vitamin D deficiency; therefore, supplementation may improve vestibular symptoms (Abdelmaksoud et al., 2021).

Furthermore, 19.8% of respondents in this research self-reported the use of medicinal teas to treat dizziness, such as Espinheira Santa tea, Chamomile and Ginko Biloba.

It is known that Espinheira Santa tea has healing, anti-inflammatory, gastroprotective, antiglycemic and antioxidant actions (Silva et al., 2023). vestibular symptoms. Espinheira Santa is used in the acute phase to relieve vertigo and nausea (Jeong, Kim and Kim, 2013).

Chamomile tea has a calming action, topical anti-inflammatory power, and reduces anxiety, insomnia, among others (Chaves et al., 2020).

Thus, it is believed that the sufferer of dizziness has used this tea, due to the close connection between psychiatric disorders in the population with vestibular disorder, mainly anxiety, depression and panic syndrome (Beh, 2021).

Furthermore, Gingko Biloba has antioxidant properties, acts to reduce lipid peroxidation, and the plant extract acts to protect outer hair cells, which can be an ally in the treatment of dizziness (fukaya; kanno, 1999)

It is common for all studies to present limitations, and the fact that it was done online, despite reaching a large number of participants, ended up restricting people without access to the virtual environment, or even people with difficulty in handling the data. electronic devices.

The research has self-reports of dizziness, and this complaint was not evaluated objectively, since the data collected follow the participant's perspective.

Diagnostic studies of dizziness in the population that tested positive for COVID-19, as well as those who went through the period of social confinement of COVID-19, are necessary in order to obtain more data related to the vestibular symptom.

5 CONCLUSION

Those with dizziness self-reported having been diagnosed with a specialist physician about the vestibular disorder (p=0.001), as well as consulting a nutritionist to start vitamin supplementation (p=0.005). They underwent immunization against COVID-19 and influenza, and even so, the fear of contagion made most of them continue to follow the guidelines for hand hygiene and use of protective

masks. Ademics, to reduce the spread of COVID-19 and minimize the symptom of dizziness, made use of vitamin complexes from A to Z, among others such as zinc, vitamin B12 and homemade teas.

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CHAPTER
35

Reception in a Family Health Unit: From the changes during the beginning of the experience with COVID-19 to the present day

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ABSTRACT
The objective of this experience report is to draw a comparison between the adjustments made in the Welcoming, in a Family Health Unit or FHU in the city of Recife, Pernambuco, from March 2020 to March 2023. The initial phase of this study comprised a descriptive and qualitative approach to the experiences, particularly directed to the welcoming of users. This one was from 37 professionals from the FHU of Vila União, in the city of Recife, State of Pernambuco. The professionals belonged to four Family Health teams. Considering the data obtained in the first half of 2021, the dynamics of welcoming were directed to screening, with little participation of the Oral Health team and problems related to dissatisfaction with the solution established for their problem. It was observed the need for adjustments in welcoming, with a view to a better level of satisfaction for both users and the care team. After an interval of two years or 24 months, it was found that there were few changes. The established organization remains with the Community Health Agent or CHA, triaging and referring users, with the Oral Health team being away from the reception and taking turns with another team. In this context, the current direction seems to reflect a recovery in the demand for care, not necessarily the quality of care. What has been found to be a problem is in a larger dimension, but is not discussed, at least until the month of March 2023.

Keywords: Welcoming, Primary Health Care, COVID-19.

1 INTRODUCTION

On May 22, 2023, Ordinance No. 635/2023 was published[1], published by the Minister of Health of Brazil, which institutes, defined and created federal financial incentives for the implementation, costing and performance for the modalities of Multiprofessional Teams in Primary Health Care (PHC). From this Ordinance, the previously NASF (Extended Center for Family Health and Primary Care),

which had recently undergone changes that signaled its extinction, observed in the Prevent Brazil Program (Ordinance No. 2,979, of 11/12/2019)[2].

A Ordinance no. 635/2023 has defined eMulti as:

> "Teams composed of health professionals from different areas of knowledge, who act in a complementary and integrated way to the other teams of Primary Health Care or PHC, with co-responsible action for the population and the territory, in intersectoral articulation and with the Health Care Network or RAS" (BRASIL, 2023, p. 11).

With this perspective, it should facilitate the population's access to comprehensive health care, expand the scope of health practices in the PHC scope, contribute to improve the resolvability of PHC, understanding the scope of its modalities.

However, improvement in the quantity of the care team does not directly ensure the best reception of users and their satisfaction. There is certainly a facilitation for this. Taking into consideration the concept of welcoming, which is conceptualized as qualified listening, in practice it is directed to the actions of care to emergencies or intercurrences; attention focused on the complaint conduct. It is known that it can happen in different spaces, including home visits, with a view to facilitating bonds. [3,4,5]

During the experiences in the different epidemiological moments of COVID-19, a disease caused by SARS-CoV-2, there was a new look and dimensioning of the importance of PHC and, in this context, a re-signification of the process of "welcoming". Refuge, protection, comfort, support, hospitality, accommodation. All of these represent synonyms of welcoming. However, the humanization of this process became associated with the definition and classification of priorities (according to the severity and complaints of users and reports of symptoms, among others) and referrals. There was a reinforcement of questions about personal hygiene and environments, distancing and the correct use of Personal Protective Equipment (PPE). [6]

There was a significant reduction in face-to-face care and absences not only of users, but also of the teams of professionals linked to diverse communities, usually in a situation of great vulnerability and that required a differentiated look, an inclusive care, in the best way that the implemented strategies managed, in the face of the "unknown".

If there were weaknesses in the care provided by the PHC, they were now amplified, in a perspective of great fear and panic, not only by the users, but also by the entire support and service delivery team. The present report considered the experiences in the Multiprofessional Residency in Family Health of UFPE, since the beginning of the COVID-19 pandemic, in March 2020 and accompanying the welcoming process until the month of March 2023. The survey of the problem of welcoming health care for the population evaluated, from the point of view of the care team, comparing the data obtained in March 2021 to those obtained in March 2023.

2 METHODOLOGY

In a first phase of research approved by the Research Ethics Committee of the Federal University of Pernambuco, under CAAE number 51664421.4.0000.5208, a qualitative and exploratory approach was adopted, considering as the object of study the welcoming, from the perspective of 37 professionals members of four teams of the USF Vila União, Sanitary District IV of the city of Recife, Pernambuco and by electronic form. [7]

The data collection of this second stage sought to highlight whether the weaknesses raised regarding welcoming were addressed during the last two years.

3 COMMENTED RESULTS

From the returns obtained, few changes were observed in the reception, with the greatest openness to care in PHC, from the year 2021 to March 2023, in the FHU of Vila União. Welcoming is increasingly directed to Community Health Agents (CHA), who perform risk screening and referral of users, and the oral health team is divided into two moments for care, due to the reduced space for activities and increasingly distant from this process of welcoming.

The structure that was found was maintained, from the reception of users to the search for the solution of the demands presented, with the greater focus of streamlining the number of visits, in an attempt to compensate for the time in which care was reduced.

The many dimensions that are involved in the health and quality of life of the individual, of communities with particular characteristics, are reinforced. COVID-19 does not represent the only or main challenge, but it has impacted not only immunity, but everyone's mental health.

As welcoming is part of the "gateway" to this assistance, may we find a balance and a possibility of better understanding the other, with empathy for the needs and characteristics they have, in addition to the moment they experience.

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CHAPTER
36

Pregnancy and COVID-19: Gestational profile of patients infected with SARS-Cov-2

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ABSTRACT
COVID-19 presents clinical manifestations from asymptomatic cases to deaths and causes vulnerability among several groups, pregnant women being one of them. Complications were related, as well as fetal death that seems to be associated with contamination by sars-cov-2. Method: this was a descriptive study of the case series type, which aims to identify the probability of occurrence of a disease or the clinical circumstance or the event that is the subject of the research. The data obtained after applying the semi-structured questionnaire to 61 out of a total of 132 pregnant women were descriptively tabulated and analyzed using a statistical program. Results: 53% of pregnant women had health conditions related to pregnancy: systemic arterial hypertension, diabetes mellitus, placenta previa, urinary tract infection, and placental displacement, among others. At the end of the pregnancy, 88.5% of the deliveries were full-term, 3.3% were premature and 8.2% did not complete the pregnancy due to miscarriage or fetal death. It was also found that the percentage of death was 2.3%. Conclusion: it was observed that the vast majority of the public interviewed in this study did not have clinical complications after infection with covid-19. The gestational outcome came to term, but a small group had maternal and perinatal sequelae.

Keywords: Pregnancy, covid-19, epidemiological profile.

1 INTODUCTION

At the end of 2019, a new virus called Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) was discovered in the city of Wuhan, China, responsible for a disease that causes respiratory symptoms in patients, the Coronavirus Disease- 2019 (COVID-19). In mid-March 2020, the World Health Organization (WHO) declared the COVID-19 pandemic, due to the high transmissibility of the virus, which quickly reached five continents and the state of public calamity that the disease caused throughout the world. world1,2.

COVID-19 is a disease with a variety of clinical manifestations, ranging from asymptomatic cases and mild infections of the upper airways to acute conditions that may involve pneumonia and respiratory failure, which may culminate in the patient's death1.

Due to several factors, some groups have a higher risk of developing the disease in its most severe form and with higher mortality, among them are the elderly, people with chronic systemic comorbidities (systemic arterial hypertension - SAH, diabetes mellitus - DM), among others and

immunosuppressed. Pregnant women also tend to be classified as more susceptible, since the physiological changes suffered by women during pregnancy can make them more prone to developing lung infections in which the outcome is worse than it would be in a non-pregnant woman3,1,2.

Some of the physiological changes that occur in the pregnant woman's body are lung volume and smaller residual and functional volumes due to diaphragmatic elevation, increase in the transverse diameter of the rib cage, airway edema, increased rate of oxygen consumption, state of hypercoagulation and altered cellular immunity1,4.

Experiences with complicated pregnancies in previous outbreaks that were caused by infections with other types of coronavirus, such as in the case of a severe acute respiratory syndrome caused by SARS-CoV in 2003 and middle east respiratory syndrome caused by MERS-CoV in 2012, corroborate the concern about the increase in the number of pregnant women who contract infections by SARS-CoV-2 and who, as a result, have a high risk of having a miscarriage, premature birth, and morbidity or mortality in the fetus and newborn1,5,2.

Due to the importance of the subject and the high number of pregnant women infected with SARS-CoV-2, studies on the impact of COVID-19 on pregnant women have already been carried out, but it is still characterized as a subject that requires further analysis and discussion1,2.

The objective of the study was to describe the clinical and epidemiological aspects related to the profile and gestational outcome of patients infected with SARS-CoV-2, from a municipality in the north of Minas Gerais.

2 METHOD

This is a descriptive study of the case series type, which aims to identify the probability of occurrence of a disease or the clinical circumstance or the event that is the subject of the research6.

The initial data were obtained through the database of the municipal health department of a municipality in the north of Minas Gerais, from registered pregnant women who had COVID-19 during the gestational period, between March 2020 and August 2021, and application of a semi-structured questionnaire by telephone.

In the aforementioned period, the municipality had 2,801 pregnant women registered in the Family Health teams, and the specific epidemiological data for the study comprised a total of 132 pregnant women.

Case series and case reports are generally initial studies for the elaboration of larger studies and are important in the identification of epidemics, description of characteristics of new diseases, the elaboration of hypotheses about possible causes of diseases, description of results of proposed therapies for rare diseases and rare adverse effects in common diseases7.

As for the inclusion criteria, all pregnant women residing in Montes Claros - MG with a laboratory diagnosis of infection by COVID-19, in the period covered by the research and who agreed to participate in the research through a term of free and informed consent, sent through a link via email or instant messaging application.

The exclusion criteria excluded pregnant women who were not found by telephone contact after three consecutive attempts on alternate days.

The investigation of the gestational profile and outcome of pregnancies of women who had COVID-19 was carried out through the collection of data obtained from the notifications contained in the database provided by the epidemiology sector of the municipal health department and the application of the semi-structured questionnaire carried out directly to the participants via phone calls.

The data obtained after applying the semi-structured questionnaire were descriptively tabulated and analyzed using the statistical program Statistical Package for the Social Sciences (SPSS) version 22.0, which allowed the construction of graphs and tables, subsidizing the analysis of the collected data, to answer the objectives proposed by this study.

This research was submitted and approved by the Research Ethics Committee under opinion nº 4,838,997, following the guiding ethical standards of Resolution nº 466 of December 12, 2012, of the National Health Council.

3 RESULTS

To determine the profile and gestational outcome of patients infected with SARS-Cov-2, data were obtained from 132 pregnant women who tested positive for COVID-19, from which it was possible to apply 61 semi-structured questionnaires.

Of the 68 pregnant women not included in the study, the reasons included: lack of response to calls, not authorizing the application of the questionnaire, unavailable or non-existent phone numbers, and pregnant women who did not have COVID-19 during pregnancy because they underwent the test before pregnancy.

Patients who died (03) had their epidemiological data from the questionnaire included, according to the information contained in the investigation form of flu syndrome suspected of disease caused by the coronavirus 2019 - COVID-19, of compulsory notification and were added to the total of the research, adding 64 cases.

The average age of pregnant women was 30.2 years, and the most prevalent age group in the study was 29 to 33 years, corresponding to approximately 44.3% of the total. Regarding marital status, 50% are married, 39.1% are single and 6.3% have a stable relationship. The predominant education of participants with complete secondary education, comprised 57.8% (TAB 1).

Table 1 – Level of education of pregnant women with COVID-19 in Montes Claros- MG – Brazil.

Level of education	Frequency	Percentage
Incomplete fundamental	1	1,6%
Full medium	37	57,8%
Incomplete high school	4	6,3%
Postgraduate	1	1,6%
Graduated	13	20,3%
Incomplete higher	5	7,8%
Missing	3	4,7%
Total	**64**	**100**

Source: Data consolidated by the authors themselves

As for the type of prenatal care, 57.8% of the participants had regular-risk prenatal care and 37.5% declared that prenatal care was high-risk.

Through the analysis of the data obtained, it was observed that only 6.3% of the pregnant women were asymptomatic at the time of care and notification for suspected cases of COVID-19, and among those who presented symptoms, 10% required hospital treatment, and 7, 8% represent the rate of those who needed to use oxygen.

Regarding complications after the diagnosis of COVID-19, of the 64 pregnant women in the study, 5 reported that they had complications from the disease (TAB 2).

Table 2: Pre-existing conditions and pregnancy complications after COVID-19 infection. Montes Claros – MG – Brazil.

Pregnant women	Preexisting diseases	Patients with complications after COVID-19 infection	Pregnancy-related health conditions
Yes	5	5	34
No	58	55	27
Uninformed	01	1	-
Missing (deaths)	-	03	03
Total	**64**	**64**	**64**

Source: Data consolidated by the authors themselves.

In this series, patients who had pre-existing diseases during pregnancy accounted for 3.1%, having reported chronic diseases such as SAH and DM, with one pregnant woman for each disease respectively, totaling two pregnant women.

Among the pregnant women participating in the study, 8.3% responded that they had complications during pregnancy after becoming infected with COVID-19, with more than one complication being described by the same pregnant woman (TAB 3).

More than half of the interviewees (53% responded that they had health conditions related to pregnancy, namely: SAH, DM, placenta previa, urinary tract infection - UTI, and placental displacement, among others.

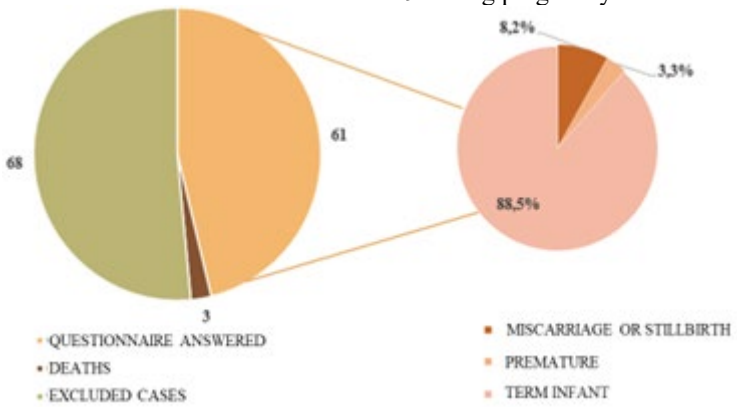
Table 3 – Clinical complications in pregnancy after COVID-19 infection. Minas Gerais – MG – Brazil.

Clinical Complications	Frequency
Fetal distress	1
Tachycardia	1
Hypertension	2
Gestational diabetes	1
breathing difficulty	1
Memory loss	1
Uterine growth restriction	1
Baby growth limitation	1
Delivery anticipation	1
Loss of amniotic fluid	1
Total	**11**

Source: Data consolidated by the authors themselves

When addressing the delivery and the outcome of the pregnancy, it was observed that 88.5% of the deliveries were full-term, 3.3% had premature labor and 8.2% of the interviewees did not complete the pregnancy due to abortion or fetal death. It was also found that the percentage of deaths in the study was 2.3% (Graph 1).

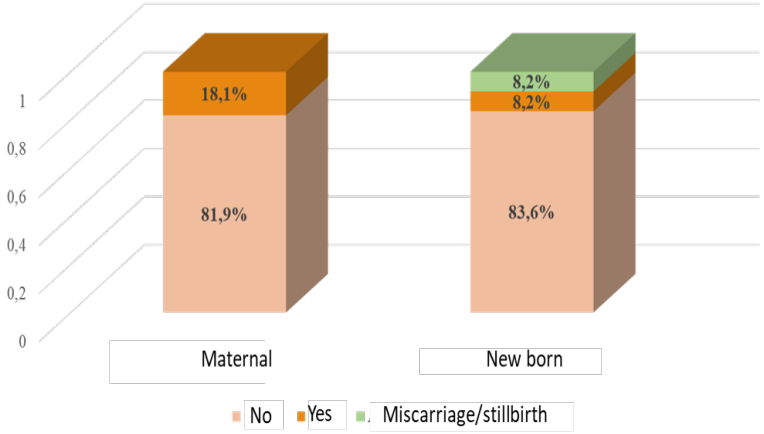
Graph 1: Gestational outcome of women with COVID-19 during pregnancy. Montes Claros – MG – Brazil.



Source: Data consolidated by the authors themselves

In the case series analyzed, the responses of the interviewees on maternal and perinatal sequelae due to the COVID-19 infection stand out, with 18.1% of the pregnant women and 8.2% of the newborns having sequelae (Graph 2).

Graph 2: Maternal and perinatal sequelae after COVID-19 infection. Montes Claros – MG – Brazil.



Source: Data consolidated by the authors themselves

Of the reported maternal sequelae, we can highlight and quantify their frequency in the study: pain in the joints and lower limbs (2), anosmia (1), anxiety (2), difficulty breathing (2), and memory loss (3). The consequences for the children were: heart problems (1) and low birth weight (1).

4 DISCUSSIONS

The clinical characteristics of pregnant women with COVID-19 can vary from asymptomatic cases to more severe cases, often requiring hospital intervention. The percentage of asymptomatic pregnant women in the present study was 6.3%, which is in line with data from the literature that points to a study that evaluated patients with clinical and laboratory diagnoses, and identified that up to a third of the sample did not present symptoms of the disease. SARSCOV-28 infection.

The clinical condition of the disease among pregnant women is still unpredictable, but it is believed that COVID-19 infection, in this life cycle, can lead to an unfavorable clinical evolution and obstetric outcome, causing fetal distress, spontaneous abortion, respiratory distress, prematurity and greater need for surgical delivery9.

So far, there is no scientific evidence to justify the differentiated management of pregnant women with COVID-19, it is recommended that the following be considered during the evaluation: gestational age, maternal condition, and fetal viability. Thus, suspected or confirmed pregnant women should be treated with supportive therapies, taking into account the physiological adaptations of pregnancy10.

The rate of pregnant women who had some complication after infection with COVID-19 was 7.8%, with reports of fetal distress, tachycardia, hypertension, gestational diabetes, respiratory distress, memory loss, restriction of uterine growth, anticipation of childbirth, and decrease in amniotic fluid. Regarding the use of oxygen treatment, it was 3.1%, a percentage lower than the 11.68% found in another study11.

The rate of miscarriage or fetal death represented 8.2%, a higher value when compared to a recent study that showed a rate of 1.4% 8. On the other hand, about prematurity, the rate found in the present study was 3.3 %, which is lower when compared to a literature review that showed an index of 18.52%11, which is justified by the association between the increased incidence of prematurity in women with COVID-19, when compared to women without affected by disease 2.

It is known that the situation of maternal mortality in Brazil is critical, it is not recent and carries socioeconomic and racial issues10. In the present study, it was observed that the death rate from COVID-19 in pregnant women was 2.3%, a figure close to the 2.7% observed in the review that addressed 39 studies involving a total of 1,316 pregnant women12.

The Ministry of Health, through FIOCRUZ, points out that until the beginning of the pandemic, Brazil had a maternal death ratio of around 55 deaths per 100,000 live births, which corresponds to 0.06%. In the first months of the pandemic, cases of maternal deaths began to be reported, and the lethality rate due to COVID in Brazil at the time of publication stood at a rate of 7.2% for pregnant women, more than double the lethality rate for the general population of the country, which was 2.8%13.

5 CONCLUSIONS

It was observed that the vast majority of the public interviewed in this study did not present clinical complications after infection with COVID-19., with the gestational outcome of term deliveries, with a small incidence of abortion and fetal death, followed by premature births.

Despite the low incidence, some maternal sequelae after infection with SARSCOV-2 were identified, such as pain in the joints and lower limbs, anosmia, anxiety, difficulty breathing, and memory loss; as well as fetal ones, such as cardiac alterations and low birth weight.

Given this, it is concluded that uncertainties about COVID-19 in the gestational period persist, requiring further studies with larger samples so that it is possible to analyze, with greater accuracy, the conditions, clinical evolutions, and sequelae manifested in this specific public.

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CHAPTER
37

"Lost virtually everything he had learned": Some thoughts on the impact of the pandemic on literacy and child development

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ABSTRACT
This paper discusses the impacts of social isolation and remote learning on the school life of children in the literacy phase during the COVID-19 pandemic, in the years 2020 and 2021, in Brazil. From the contributions of Historical-Cultural Psychology, an analysis of how remote teaching impacted the process of school literacy was carried out, so we used as a methodological procedure the application of a questionnaire, elaborated through the Google Form, which was sent to family members/guardians who, during remote education, had children enrolled in the final years of Early Childhood Education and the initial grades of Elementary School I in the State of São Paulo. The questionnaire was completed in August 2002. And the results revealed that remote teaching harmed the process of literacy and school development, whose greatest impact is related to the delay and difficulty in the process of acquiring reading and writing. Child behaviors of loss of motivation and interest, as well as attentional difficulty and anxiety during the remote teaching process, were also evidenced. Another important factor was the fact that the lack of follow-up of students by those responsible for child care during such activities at home, brought reflections on the importance of valuing the school context, a social institution that shares and teaches the knowledge necessary for literacy and human development.

Keywords: School education, historical-cultural psychology, pandemic, remote learning.

1 INTODUCTION

1.1 PANDEMIC, REMOTE LEARNING, CONTRADICTIONS, AND POSSIBILITIES

At the end of 2019, humanity faced an epidemic, caused by a viral agent similar to the flu, with symptoms of cough and fever, but with an ability to drastically affect the respiratory system, which can lead to the infected person dying. Since its transmission happens through interpersonal contact, the World Health Organization issued a pandemic alert and [1] it was necessary to comply with several measures to control viral proliferation on a global scale, such as social isolation and changes in work and education environments that went from face-to-face to remote (TOMAS, 2022).

Brazil was one of the nations most affected by the virus, the population, mostly the working class, suffered from high rates of hospitalization, when there were beds, resulting in many deaths[2] (TOMAS, 2022).

[1] A disease becomes a pandemic when it reaches global levels, that is, when a certain agent spreads in several countries or continents, usually affecting a large number of people, according to the World Health Organization.
[2]As of December 2021, the numbers of those infected and killed by COVID-19 in Brazil are heartbreaking: more than22 million infected and more than 620,000 deaths. Learn more at: https://covid.saude.gov.br/

Faced with this scenario, many changes occurred, such as the establishment of distancing between people and the closure of several commercial establishments (malls, supermarkets, among others) during the implementation of the quarantine; mandatory mask-wearing indoors and outdoors. Given this, each Brazilian state began to determine and establish its social distancing measures to try to stabilize and minimize the high rates of contagion and avoid the collapse of health networks.

In the State of São Paulo, in which this research was conducted, the Government established quarantine in mid-March 2020 and instituted the São Paulo Plan in[3] all 645 municipalities of the state.

Thus, the regions and cities were periodically classified according to the number of infected, hospitalizations and deaths.

The quarantine began with the determination of the general closure of services in environments with movement of people, and could only open services considered essential (such as pharmacies, supermarkets and gas stations), it is noteworthy that school institutions did not enter the framework of essential services in the year 2020.

Its functioning began to happen remotely, that is, students and teachers did not go to school, they remained developing school activities at home, which generated a great impact on the personal routine and the very format of the teaching and school learning process.

In January 2021, the process of immunization of the population with the vaccine against COVID-19 began, and at the end of March 2021, school institutions were included by the government of the State of São Paulo in the group of essential services, however, immunization for Basic Education teachers in this State only happened in June, July and August 2021.

It wasn't until the 2022 school year that school units returned to regular operation but permeated by fear, anxiety and contradictory news about the pandemic and its immunization.

The fact is that the pandemic caused the greatest interruption in the history of world education and, in Brazil, which already had serious problems regarding the school structure and numerous challenges regarding the contents and ways of teaching, there was an intensification of school problems.

Thus, the Brazilian educational system had to reinvent and readapt to continue the school years in the pandemic period. A new mode of education was instituted, remote teaching, classes became asynchronous or synchronous and content reached students through digital platforms such as Google *Meet*, *Google Classroom* or other means of educational platforms.

After the Ministry of Health's ordinance of March 2020, which established remote teaching in the pandemic period, Brazil's Secretariats of Education, in a few weeks and a hurried manner, had to reorganize their school plans to continue school activities and ensure student learning in a non-face-to-face manner. In it, remote teaching from the use of online platforms, recorded video classes and sharing

[3]See more at: https://www.saopaulo.sp.gov.br/planosp/

of digital materials was the strategy adopted by the state departments of education (CIEB, 2020).

In April 2020, the CNE, through opinion No. 5/2020, took a position saying that non-face-to-face pedagogical activities would be computed for purposes of compliance with the minimum annual workload.

The agency highlighted that these activities could be developed by digital means (video lessons, content organized in virtual teaching and learning platforms, social networks, electronic mail, and blogs, among others); through television or radio programs; the adoption of printed didactic material, with pedagogical guidelines, distributed to students and/or their parents or guardians; and by the orientation of readings, projects, research, activities and exercises indicated in the didactic materials (BRASIL, 2020).

For Behar (2020, p. 1), due to the exceptional nature of the pandemic context, this new school format is called Remote Teaching (RE), that is, "a teaching modality that presupposes the geographical distancing of teachers and students and was adopted temporarily at different levels of education by educational institutions around the world".

Remote learning exalts the real-time transmission of classes. The concept is that teachers and students of a class have interactivities at the same times that the classes of the discipline would occur in the face-to-face model.

Generally speaking, this means maintaining the classroom routine in a virtual environment accessed by different people in different locations.

According to the CNE / CP, opinion No. 05/2020, remote teaching consists of non-face-to-face activities that can occur through "printed material and delivered to parents or guardians", also focusing on that student who does not have access to quality internet and much less technological instruments, giving him the right to education according to the caput of article 205, of the Federal Constitution of 1988.

According to Garcia et. al (2020), although they are directly related, distance learning is not the same as remote learning or vice versa.

> Remote learning allows the use of platforms already available and open for purposes other than strictly educational, as well as the insertion of auxiliary tools and the introduction of innovative practices. The variability of resources and strategies, as well as practices, is defined by the familiarity and ability of the teacher to adopt such resources (GARCIA et al., 2020, p. 5).

It is important to consider that Brazil was one of the few countries that did not put education as an essential service, this only happened after a year and a half of the pandemic, like the state of São Paulo, which we consider neglect in education, because, while hotels and bars were already

being released by the rulers and health surveillance, Education wasn't[4].

The difficulty of access to digital media is a problem because Brazil is a country with different and discrepant social realities.

This research was developed in the State of São Paulo, where there is greater technological development and access to information technologies, however, this is not the reality of most Brazilian states.

It is necessary to emphasize that not everyone in modern society has the opportunity to participate in social practices mediated by technology, either due to lack of access to the internet or lack of technological competence, thus causing a digital divide that directly affected education during the pandemic.

Following the theme of technological infrastructure, there is also a lack of teacher training to deal with technologies, that is, Brazil is already a country that historically invests very little in teacher training and school structure (BARBOSA, 2014).

The teacher is not yet ready to face the new technological era, so a revision in the school curriculum at graduation is necessary so that the teacher does not present unprepared to teach.

It is also necessary to implement continuing education for the teacher, because the school requires, but does not provide the necessary help to level a room with good and interested students.

According to Barbosa (2014), the barriers that prevent a permanent aggregation of Information and Communication Technologies (ICT) in the pedagogical scope go beyond the difficulties related to school infrastructure.

Technology, by itself, will not arouse in the student a supposed interest and identification, favoring learning.

What is seen, in many schools, is the transfer of learning models taken as traditional to digital media and, often, with fragile interventions of teachers, unprepared and even inhibited in the face of technologies.

The use of technologies needs to be a learning vehicle capable of reconstructing knowledge critically and reflectively, recreating teaching practice.

However, the fundamental challenge of Brazilian education has become the adaptation to the new scenario imposed by the pandemic. One of the measures taken was the inclusion of emergency remote teaching in schools as an alternative to the interruption of face-to-face activities.

On June 1, 2020, the Ministry of Education pronounced on the pandemic ravaging the country and published in the Official Gazette the following text:

[4] As the SP Plan points out: https://www.saopaulo.sp.gov.br/planosp/.

> Following article 2 of Law No. 9,131, of November 24, 1995, the Minister of State for Education partially approves the CNE/CP Opinion No. 5/2020, of the Full Council, of the National Council of Education-CNE, which approved guidelines with a view to the reorganization of the school calendar and the possibility of calculating non-face-to-face activities, to comply with the minimum annual workload, due to the pandemic of the novel coronavirus-Covid-19, and fails to approve item 2.16 of said Opinion, which it submits for re-examination by the National Council of Education, considering the reasons contained in Technical Note No. 32/2020/ASSESSORIA-GAB/GM/GM, as stated in Process No. 23001.000334/2020-21 (BRAZIL, 2020, p. 32).

In addition to the schools that had their activities suspended on March 17, 2020, across the country, another rule emerged jointly regarding the ban on opening establishments, which came into effect as a way to prevent the spread of the coronavirus, which causes COVID-19, allowing people to work from home, many of them, for the first time.

A survey conducted by the United Nations Children's Emergency Fund (UNICEF), in partnership with Cenpec Education, found that children aged between six and ten years were the most harmed by school exclusion during the novel coronavirus pandemic. About 41% of the 5.1 million students No access to education in November 2020 they had this age group (Asscom| Tiradentes Group)

1.2 THE REALITY OF BRAZILIAN EDUCATION AND LITERACY RESEARCH IN THE PANDEMIC

Education in Brazil has its great differences, the main one between public and private schools. On the one hand, public school is a service provided by the government free of charge and a universal character (for all school-age children).

The gratuity of this service is possible thanks to the taxes collected by the State and support for the services of the community.

On the other hand, private schools, although guided by public educational policies, are not part of the public services of the state and become part of an education provided by a private for-profit business entity.

The maintenance of a public school depends on funds sent by the federal, state or municipal governments, according to the different spheres responsible, meanwhile, private school is maintained by the payment of students' tuition, they correspond to "educational establishments belonging to entities of the private or cooperative sector" (COTOVIO, 2004, p. 22) in which both the properties and the management are the responsibility of non-state entities.

It is not appropriate, in this work, to investigate the differences between public and private schools in Brazil, however, it should be noted that students who attend private schools often have access to technological equipment and the internet with greater frequency and quality than public school students.

However, in remote teaching, issues related to equipment and the internet have proved to be a challenge for both teaching modalities, especially when it comes to children's literacy.

Even though a significant portion of children were enrolled in school years essential for literacy, the alternative found by the rulers was remote teaching and teachers and school staff needed to rely on the support of the family.

Knowing that several children went through the process of literacy during the period of remote teaching and the acquisitions of this phase of life so essential, both for later school acquisitions and for all their development, it causes us disturbance to analyze how school learning has been configured through the direct responsibility of parents or guardians since the figure of the teacher has become distant.

Thus, through the voice of the family members who accompanied the children or tried to follow up in the period of remote teaching, we investigated the impacts of the lack of school for teaching and learning in the initial years of literacy, since there was no mediation of the teacher, emphasizing the greatest challenges that families faced during this period of social isolation.

For many families, the experience of remote teaching provided a certain empathy about the work of the teacher, that is, there was an appreciation, even if apparent, about the need of the school and the importance of the teacher for learning and child development.

In this study, we investigate, through questionnaires, the impact of remote teaching during the COVID-19 pandemic, through the conception of the families of children in the process of literacy.

The questionnaire was answered in August 2022, by 71 parents or guardians of students from public and private schools who had under their care children enrolled in the initial grades (6 to 9 years of age) during the pandemic period, the answers were later tabulated in graphs and tables for analysis.

The questionnaire aimed to raise opinions, beliefs, feelings, interests, expectations, and situations of family members in the face of remote teaching, therefore, through the use of this instrument, it was possible for parents and guardians of the children to expose their view on this modality and opine on its impact on the process of literacy and education of the child.

During stages of the research, firstly, the investigative purpose and ethical aspects were presented, and the participants were invited to answer online the questionnaire developed through the *Google Form software.*

The structure of the questionnaire aimed to explore what were the school level in which each child would be inserted, who was responsible for helping them during remote classes, the age of those who assisted if they had access to the internet if the child was from the municipal or private network, what were the negative or positive impacts if the child was able to learn through this procedure and what had been the greatest challenge in helping the child during that process.

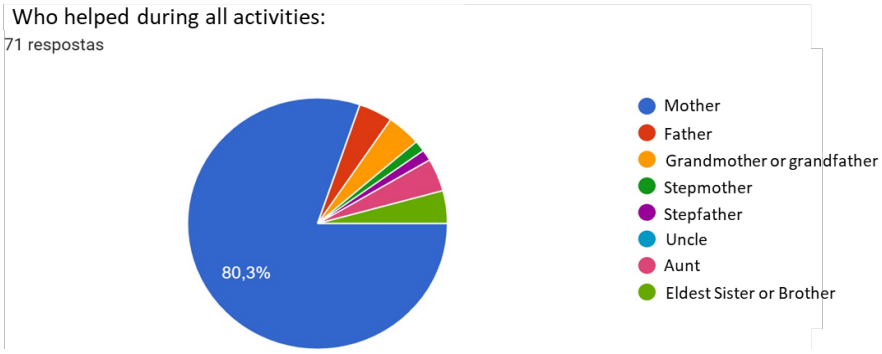
Chart 1 shows the questionnaire answered by the participants.

Table 1 – Questionnaire

1. Who helped during all the activity? a. mother / b. father. / c. grandfather(ó)/ d. stepmother. / e. stepfather/ f. tio(a)/ g. older brother.
2. Age? A.20 to 30 years/ B. 31 to 40 years/ C. 41 to 50 years/ D. 51 years +
3. What is your child's grade? a. Early Childhood Education / b.1st year of elementary school / c. 2nd year of elementary school / d. 3rd year of elementary school / and .4th and 5th year of elementary school.
4. Did you have access to the internet? a. YES/ b. NO
5. Does your child study in the municipal or private network?
6. Has teaching impacted your child's learning process? a. Much/b. little/c. Nothing
7. Are the impacts positive or negative?
8. Describe the impacts of remote learning :(if positive, describe the positives. If it is negative, describe the negative points).
9. Was your child able to learn/learn during remote learning? Yes, it did. No, it didn't.
10. What was your biggest challenge in helping your child through this literacy process remotely?

We present, below, the responses of family members and those responsible for monitoring the remote teaching of the child in the years 2020 and 2021. The first question of this study refers to the person who assisted the student in remote teaching activities, as shown in Graph 1.

Figure 1. Who assisted the child during remote learning activities?



Source: Prepared by the authors (2022).

As we can see, 80.3% of the children were helped by their mother, however, other people in the family circle were also placed in the role of auxiliary adult in remote education, such as the father with

4.2%, grandmother 4.2%, stepmother 1.4%, stepfather 1.4%, uncle did not receive a vote, aunt 4.2%, older sister 4.2%. It is clear the participation of the family during the literacy process, even more so in the period of remote teaching in which this became more present.

According to data from the Brazilian Institute of Geography and Statistics (IBGE, 2019), in 2019, women who worked outside the home (in formal jobs) had a load of 18.5 hours/week, performing care work or household chores, while men in the same situation performed only 10.3 hours/week.

Therefore, child care and domestic chores are seen as being attributions that are related to motherhood and not to fatherhood, denoting the sexual division of labor in the domestic sphere, something already pointed out by studies that sought to investigate the involvement of men and women in domestic work, in the family and the care of children (BRUSCHINI; RICOLDI, 2012).

Women, at the height of the COVID-19 pandemic, intensely tired, found themselves worried about maintaining their jobs, workload and family income, as well as the school monitoring of their children, without being able to count on a face-to-face support network.

According to the UN (2020), especially domestic violence, increase due to increased tensions at home and can also increase the isolation of women. Survivors of violence may face additional obstacles to fleeing violent situations or accessing life-saving protection orders and/or essential services due to factors such as restrictions on movement in quarantine.

From this perspective, the *Home Office* emerged as a possibility to continue the work of adults and transferred the obligations of the office into the home, contrary to the previously defended idea that the issues of the domestic environment interfere in daily work (ARAÚJO, LUA, 2021, p. 1).

Another factor that occurred during the time of social distancing was that women began to stay more indoors together with their partners, which often caused an increase in domestic violence against women. (VIEIRA; GARCIA; MACIEL, 2020, p. 5). Although it is not the scope of this research, we believe it is necessary to highlight this Brazilian reality.

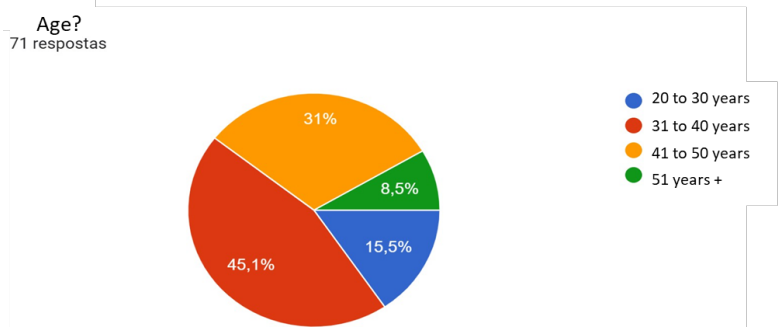
According to the data analyzed by the survey of *Gender and Number and SOF (Sempreviva Feminist Organization),* 91% of women believe that domestic violence has increased or intensified during the period of social isolation.

When asked about their personal experiences, 8.4% of them said they had suffered some form of violence in the period. The percentage increases among women in the lowest income brackets. Among women with a family income of up to one minimum wage, 12% claim to have suffered violence (ANDES, Sindicato Nacional, 2020).

The next question dealt with the identification of the age group of each person who provided some kind of assistance. Among the 71 responses, 45.1% of the people were between 31 and 40 years of age, 31% of the helpers were between 41 and 50 years old, 15.5% were between 20 and 30 years old,

and lastly, 8.5% were 51 years or older.

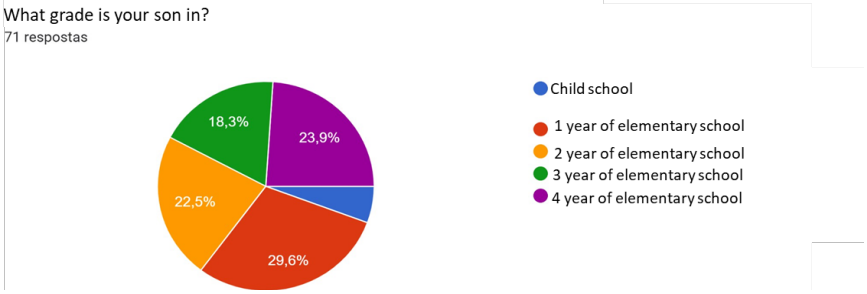
Figure 2. Age group of the family member responsible for helping the child



Source: Prepared by the authors (2022).

Subsequently, when asked which school stage their child would be in, 29.6% were in the 1st year of Elementary School, 23.9% in the 4th and 5th year of Elementary School, 22.5% in the 2nd year of Elementary School, 18.3% in the 3rd year of Elementary School and only 5.6% in Early Childhood Education.

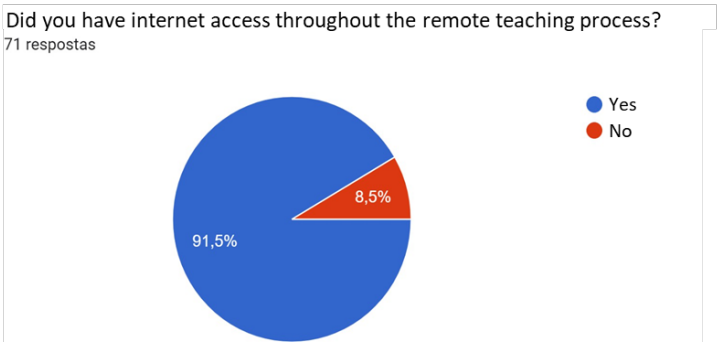
Figure 3. School stage



Source: Prepared by the authors (2022).

We also investigated the child's access to the internet during the entire period of remote education, we found that 91.5% had access to the Internet and the other 8.5% did not have access, as shown in the following graph.

Figure 4. Internet access



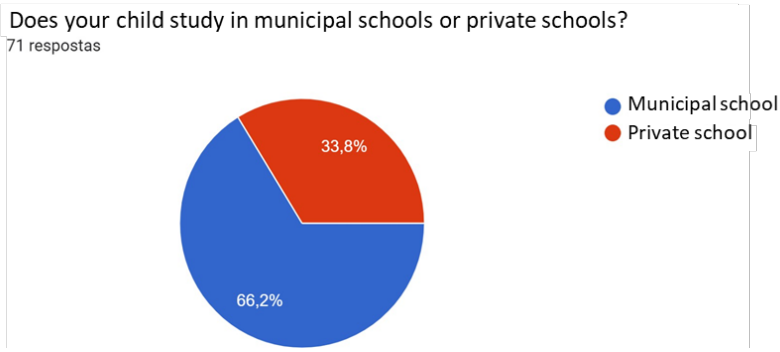
Source: Prepared by the authors (2022).

According to Machado (2020), the obstacles are numerous and faced by school communities, it is clear the unavailability of digital equipment (computers, cell phones and tablets) and adequate internet for access to classes by the population in a situation of social vulnerability.

Although in this research most of the answers evidenced an access to the internet, it cannot be forgotten the situation that many families that need to follow the activities of their children often end up having to share the equipment for two or more children.

The subsequent question referred to the child's school network (municipal school or private school) and revealed that 66.2% studied in the municipal school system and the other 33.8% were enrolled in private schools, according to Graph 5.

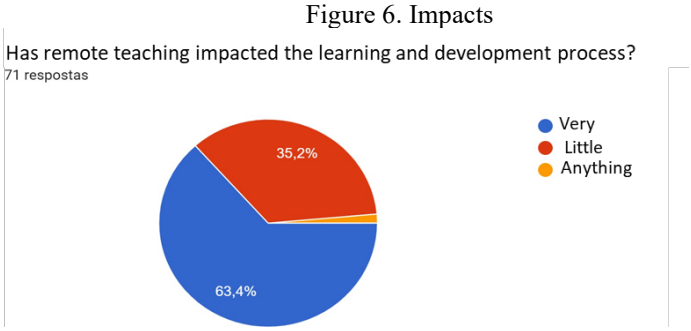
Figure 5. Municipal School (Public School) x Private School



Source: Prepared by the authors (2022).

Regarding the impacts of remote teaching on the teaching and learning process, 63.4% of the questionnaires scored that they were very impacted, 35.2% little impacted and 1.4% realized that it did not impact anything, according to Graph 6.

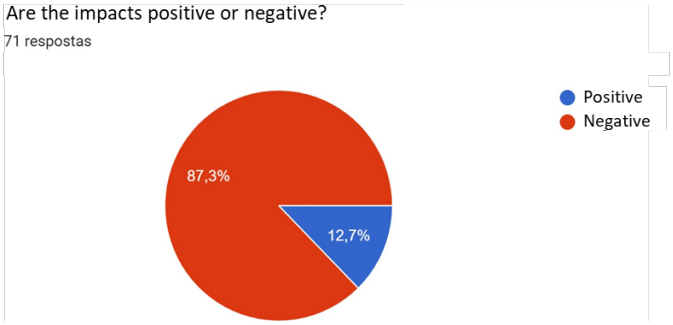
Figure 6. Impacts



Source: Prepared by the authors (2022).

When asked if the impact of remote learning was positive or negative, we obtained the answer: 87.3% negative and 12.7% were positive.

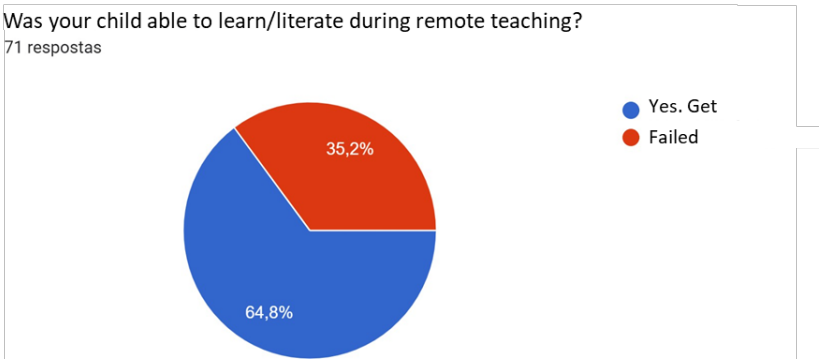
Figure 7. Positive or negative impacts



Source: Prepared by the authors (2022).

The next question was whether the child was able to become literate/learn during the remote learning period, and we obtained 64.8% of the answers that "yes", the child succeeded and 35.2% "no" were able to become literate/learn.

Figure 8. Literacy during remote learning



Source: Prepared by the authors (2022).

As an open question, we asked about the positive and negative points in remote teaching, and the answers were categorized in Chart 1:

Table 1. Demerits

Related to the general delay of teaching	Related to teacher explanations and didactics	Related to non-cognitive development	Related to behavioral problems	Related to internet access and the work of the person in charge
Literacy delay	Without the teacher's auzílio it was difficult	Lack of concentration, focus and discipline	A lot of stress, and dispersion during class.	No internet access
Literacy delay	Reduced content	Lack of attention		Do not know how to explain the content to the child
He lost practically everything he had learned in reading and writing	Very bad explanation	Difficulty concentrating	Not wanting to study because you're at home	Difficulty in reconciling teaching with the routine of home
He didn't learn mathematics	Lack of professional accompaniment	Lack of attention	Laziness	In the worst way inside the home with the parents also unfolding with

				remote work, the child had to fend for himself.
Delayed learning of cursive letter and literacy	Could not keep up with the proposed teaching, currently is at a level below	Can't pay attention	Lack of interaction with friends	Difficulty accessing the internet
Literacy delay	It had no material	Dispersion in classes	Lack of social interaction	
Difficulty in reading, remote classes did not meet the needs	We don't have the same didactics that teachers have, I think it slowed down the literacy process	Tiredness and difficulty concentrating	No focus on studies	
Didn't learn enough for next year	We do not have the didactics of the teacher	I didn't focus on the explanation, because I thought that studying was only in school	Too much time in front of the computer	
Difficulty of the child in learning to write correctly,	Nothing replaces the face-to-face class	Difficulty keeping the child's concentration	Anxiety crisis	
Slowed down his learning even with the help of his parents		Lack of discipline	Too much time in front of the computer	
Difficulty reading and writing.		Lack of attention and concentration	Anxiety	

Source: Prepared by the authors (2022).

Literacy is a phase that requires a greater approximation between students, an experience that was absent during *online* activities.

Learning and writing are distinct processes, however, they complement each other, before learning to write it is necessary to learn to read. Thus, both are important for the teaching-learning process of reading and writing.

Throughout this process, students must have contact, manipulate, enjoy and create different texts, which circulate in their community in a non-simulated way and that have meaning for them.

They must understand the objectives of the different textual genres and their particular characteristics.

By carrying out activities that involve reflection on these aspects, we enable children to raise their level of literacy and can make effective use of written language in different social contexts (BRASIL, 2012b, p. 21).

When the child is delayed or difficult in reading and even in writing they end up being impaired in all areas, because, according to Ribeiro (2005, p. 73), "children with reading and writing difficulties are often at a disadvantage in all curricular areas, which sometimes leads to the existence of insurmountable repercussions".

In line with Graph 7, the open question about the positive and negative points, as observed in

Chart 1, reveals many complaints about remote teaching, so we divided into the categories: general delay of teaching/literacy; teachers' explanations, school and family didactics; development of psychic functions; behavioral problems; Internet access and work of family members.

Only three responses pointed out positive points: "monitoring the child's performance", "greater family life" and "having more contact with the child".

The last question, also open, is related to the greatest challenge in helping the child during the literacy process remotely, so we categorized the answers from: class schedule/remote activity; family environment and lack of school routine; lack of didactics and school knowledge of the family; lack of attention and child behavior; lack of socializing with other people.

Table 2. Challenges of remote learning

Schedule class / remote activity	Family environment and lack of school routine	Lack of didactics and school knowledge	Lack of attention and childish behavior	Lack of socializing with other people
Work schedule kind of difficult and ends up with no time to teach.	Lack of routine that the child has at school	Teaching math content in a way that I learned and the child is learning in another way.	Difficulty in helping in reading, in putting rules.	My daughter not being able to socialize with classmates
Missing to follow the classes with the child	The lack of discipline, because the school environment is essential for learning	A lot I didn't know	Not having the autonomy to study alone in front of the computer.	School as a socializing space, where children learn from peers and the teacher becomes a tool.
Time to help you	Do not have a suitable environment to study	I couldn't get attention	Make the child focus on studying	
Synchronize work, assignment and classes.	Establish a routine,	Keep his attention during the study.	Difficulty maintaining concentration	
Doing what was passed due to my work	Having to invest in a mobile device for each of my 4 children	A lot of things I couldn't explain.	Lack of patience	
Trying to synchronize my schedules with those of classes	Teaching in the evenings for both him and my daughter (that's when I got home)	Lack of appropriate didactics	Move you to do the activities	
The lack of time		Lack of material to assist in the study	Exhausting, valuing teachers, they are heroes.	
Need to work		Understand the given task	Hold the child's attention and interest	
Not being in touch with online classes		Unable to explain	He said I wasn't a teacher, he debated with me because he thought I was teaching wrong.	
Work on the child's least class schedule		Difficulty teaching	Holding attention was the biggest difficulty	

Time not available		Not knowing how to explain it the way it was past	Lack of attention	
Time, because he worked even more than before, fulfilling all the activities imposed by the school was almost impossible, even because little could explain the content.		Need to review and recycle myself with material and didactics to help. Need to hire an assistant educator so that my daughter could achieve the minimum expected learning.	I need to be practically 100% available, and next to him during classes for him to co-continue to do the activities, because when he was alone, he was distracted and could not carry out the lessons.	
		Lack of preparation to move the child forward. Many times, I didn't know how to drive to make him understand the matter.		

Source: Prepared by the authors (2022).

In this question, it was possible to verify the difficulty of the families concerning the knowledge of what should be taught as well as the didactics of teaching.

It is also interesting that the answers bring the challenge of time to be able to teach the children, which became an impediment for the families who continued to work and the time they had to stay at home and perform other activities with the children was focused on school activities.

Finally, one of the answers notes the need to value the school as an institution and the work of the teacher as necessary for teaching and human development. "I ended up valuing even more this profession so beautiful, which is to be a teacher is very difficult you have to deal with each child with their difficulties and respect their time of literacy, I as a mother do not have patience these teachers are angels."

We noticed that family members felt a great difference in the child's school learning, pointing out defections and difficulties, as well as in other aspects of development as reported, anxiety, inattention, difficulty in relationship with peers, among others.

However, when we start with the specific knowledge of education and child development, it is difficult to estimate the deficit caused by the shutdown of face-to-face classes.

Therefore, we present below a theoretical discussion on the constitution of human development and the importance of the mediation of the teacher and the school context for it to happen.

1.3 THE DEVELOPMENT OF THE CHILD IN THE SCHOOL PERIOD AND LITERACY

We defend, as pointed out by the Historical-Cultural Psychology, that the psychic development of the child happens through a dialectical process, between internal and external/social processes.

It is through the dialectic between the external and internal environment that internalization takes place, a process characterized by Vygotsky (1931) in his formulation of the general genetic law of development.

The author defends the thesis that in the human psyche social relations are transported to the interior and converted into psychological structures of the personality, in such a way that the passage of the external elements to the internal world modifies and transforms all its psyche and its subsequent social relations.

Historical-Cultural Psychology defends that the typically human characteristics are instituted from the appropriation by the human being, of the cultural collection, since we are not born human, but we humanize ourselves in the course of life.

Humanization is a dependent process, conditioned and subjugated to the conditions that are present in the relationship of the person with the world, that is, in the activity of the subject with the social world (MARTINS, 2015).

Humanizing oneself implies, therefore, the conquest, in each one of us, of the properties conquered by human beings in the historical process of cultural objectification.

This means that it is necessary to provide each individual in particular, each being that arrives in our world, the possibilities and conditions for them to appropriate and develop what the human race has already conquered and developed (DUARTE, 2013).

Thus, if we wait only for biological maturation, without the social conditions of development, it will not be possible to develop the maximum possibilities of humanization.

To elucidate how human characteristics are produced and appropriated, Vygotsky (1930, 1999) proposes the overcoming of naturalizing and mechanical explanations about the psyche and unveils the peculiarities of the complex psychic functions typically human, elucidating the process of formation of conduct and personality in man.

Vygotsky differentiates two types of functions existing in our psyche: elementary and higher. They are called elementary functions, or primitive, those that constitute the biological basis of the psyche, and that through the activity mediated by the cultural context are becoming more complex, mediatizing themselves, instituting themselves as **higher psychic functions**. It is worth mentioning that it is not the structure of the function that changes, but the functional interrelationship that it establishes with the other functional processes of the psyche, as the person inserts himself into a socially produced universe (MARTINS, 2015).

The new functions that are formed, the higher ones, are typically human and of a social and historical nature.

They are functions that have been qualified, from transformations conditioned by the activity that sustains the relationship of the individual with his cultural environment, of social work, which enable the complexification of human consciousness, that is, they have in human activity the base factor for their development (VIGOTSKI, 1931).

Thus, higher psychic functions are developed culturally through interpsychic activity, that is, within social relations.

The complexification of human behaviors derives from the appropriation/objectification of the human race, and such functions permeate the complex, typically human behaviors.

It is also worth noting that the development of higher psychic functions does not occur uniformly: the transformations that occur within the psyche occur in different rhythms and proportions, both from the organic and psychological point of view, because, equally, the activities performed by the individual do not homogeneously mobilize the psychic system.

Human acts require more decisively certain domains, sometimes others, so it is possible to verify that it is the richness of the person's bonds with the physical and social reality the engine of psychological development (MARTINS, 2015).

Vygotsky (1931) defends the thesis that the human psyche has a social nature, arguing that the historical development of man does not happen directly and evolutionarily, but rather mediated by multiple factors, both material and intellectual.

Thus, it proclaims that the determining factor for the formation of the human personality are the historical-social relations, through the intersection of the lines of natural and cultural development, without this meaning the suppression of biological determinations: "the course of development does not ascend in the natural to the cultural, but continuously and permanently imbricates these two lines" (MARTINS, 2015, p.79).

> Every function in the cultural development of the child comes into play twice, on two planes, first on the social plane and then on the psychological plane, at first among men as interpsychic categories and then within the child as an intrapsychic category.
> This fact also refers to voluntary attention, logical memory, the formation of concepts and the development of the will. (VIGOTSKI, 1931, p. 225).

To the extent that biological development occurs in a cultural environment, it becomes a historically conditioned biological process. In this path, what differentiates man from animals is the capacity for meaning, that is, the ability to create and employ signs. Vygotsky postulates that the **use of signs** is what distinguishes natural behaviors, arising from evolution and common to men and animals, from those social behaviors, typically human.

Therefore, the mediation by the signs transforms spontaneous behaviors into volitional behaviors, the psyche starts to have a qualitatively superior behavior, freeing itself from the biological determinants (MARTINS, 2015).

Signs are important psychological tools that mediate the relationships between human beings, enabling the organization, transmission, appropriation and objectification of social life, and thus modifying the human psyche.

It is from the development of external practical activities, coordinated by the sign in the condition of communication between men, that the specific human particularities develop and are instituted as achievements of the individual.

At first, the sign is a means of communication, becoming, later, a means of conduct of the personality. It is configured as an artificial stimulus that guides psychological conduct, helping in the process of mastering one's behavior.

The codes of the language are examples of means and resources used for an "inner activity, directed to dominate, the human being himself: the sign is oriented inward" (VIGOTSKI, 1995, p. 94).

The use of signs enables the social group to introduce norms, values and actions of conduct to other human beings, and from the point of view of psychic functioning, causes modifications that restructure the entire interfunctional system of consciousness.

This is because it instigates modifications and ruptures in the way of operating of specific functions, transforming spontaneous expressions into volitional expressions (VIGOTSKI, 1931).

The development of higher psychic functions involves a group of phenomena that initially seem distinct, but in reality, are completely united.

On the one hand we have the external elements: tools and signs that produce psychic transformations, such as drawing, speech, writing, mathematics. And on the other hand, we have the internal elements, which are the human psychic functions themselves, such as memory, perception, attention, thought.

The internal elements are modified in connection with the external elements, and both of them, taken together, form what we conventionally qualify as the process of development of the higher forms of conduct of the child (VIGOTSKI, 1931).

With the internalization of the signs, the development of the psyche is requalified, being possible, through them, to dominate the culturally mediated conducts in social relations.

For Historical-Cultural Psychology, "the higher psychological functions arise as specific neoformations internally linked to the development of the child's symbolic activity" (ASBAHR; MEIRA, 2014, p.104), which, in turn, is established from the internalization of the symbolic universe.

New formations are called the **new psychic formations, which restructure the personality and activity of the child; emerging from the social situation, they modify the consciousness of the child and his relationship with the environment, altering the entire course of his development in a certain period of child development.**

We have as an example, voluntary attention, which as a psychic function does not develop spontaneously or by maturational ways, but is formed by a long process of mediation, which necessarily needs pedagogical actions so that attention, of elementary and involuntary beginning, becomes voluntary and conditioned and the child can have control of his attentional conduct.

By highlighting the role of external means and signs in the process of (trans)formation of the psyche, Vygotsky (2021) brings us a perspective according to which the internal development of the child psyche is directly intertwined with school education.

The formation of higher functions is conditioned to school education as the school is configured, in our society, as an institution that enables the appropriation of the objectifications of culture, with emphasis on systematized knowledge (MARTINS, 2015).

Thus, Vygotsky argues that properly organized teaching promotes the formation and development of human psychic capacities. To explain the relationship of child development with that of school instruction, Vygotsky (2021) brings the concept of current or actual level of development, and **zone of imminent development**.

The first concept refers to the development of psychic functions that have already finished their development cycle: the current level of development can be identified, for example, with an evaluation or test that shows the current state of the child, portraying what the child can do alone and without the help of an adult or partner.

The zone of imminent development, on the other hand, reflects what the child cannot yet do alone, but with the help of someone more capable. It is a decisive concept for understanding human development, because it causes upheavals in every study of the relationships between the process of instruction and development of the child.

This concept shows that "what the child does today with the help of adults, tomorrow he will be able to do independently" (VIGOTSKI, 2021, p.258). Like this:

> First of all, it alters the traditional point of view on the question of how pedagogical conclusions should be made based on developmental diagnoses. Earlier the question was presented as follows. With the application of tests, we define the level of mental development of the child that pedagogy must consider, without exceeding its limits.
> Thus, already in the presentation of the problem was the idea that the instruction should be guided by yesterday of the development of the child, by the stages traveled and finalized. (VIGOTSKI, 2021 p.259).

Therefore, Vygotsky concludes that only instruction that advances development can promote

it. Conversely, if school instruction is oriented towards the development cycles already completed, it will be ineffective and will not guide such a process.

In the author's perspective, school instruction should focus on the zone of imminent development, setting the process of child development in motion. Referring to the law of internalization and the idea of mediation of psychological processes by cultural signs, we can understand that teaching is a condition for interpsychic functions to become intrapsychic, requalifying both the psyche and its social relations.

Vygotsky (2021) concludes that only instruction/teaching, which advances development, can promote it. Conversely, if school instruction is oriented towards the development cycles already completed, it will be ineffective and will not guide such a process.

Also, from the above, we can understand that it is not enough that human culture is placed for the child for his psyche to develop. Since development is not an evolutionary and spontaneous process, but historical-social, a mediated activity must occur, that is, that the activity of the child is shared with the adult and guided by him: it is through intentional and socially organized mediation that transformations in the development of the child will be produced.

School education should focus on the Imminent Development Zone, setting the process of child development in motion. Referring to the law of internalization and the idea of mediation of psychological processes by cultural signs, we can understand that teaching is a condition for interpsychic functions to become intrapsychic, requalifying both the psyche and its social relations (TOMAS, 2022).

In the school context, the child learns and develops through the process of appropriation of experiences and scientific knowledge that will happen through the mediation of the teacher, who must organize, systematize the teaching contents and the pedagogical activity with a view to the intervention in the Zone of Imminent Development of the students.

The teacher must be aware of who the student is and what are the implications of what he teaches for the process of child development.

The pedagogical practice must be coherent with the development of the child and, above all, be focused on the acquisitions that the child has not yet achieved, but with the mediation of the teacher will be about to achieve, that is, it must be thought within the Zone of Imminent Development of the student.

This means that the development process itself is dependent on the laws of teaching, that is, it is subordinated to the pedagogical practice.

About the peridoization of development, the entry of the child in elementary school, demarcates a qualitatively new change in the psyche of the child, which starts to have as its main activity, which

guides and guides its development, the study activity.

At school, the child has duties to fulfill, tasks to perform, and for the first time in his development, he has the impression that he is performing truly important activities.

Elkonin (2019) understands that the activity of studies differs from other activities, because it can modify the subject itself and not the objects with which it deals, that is, it requalifies its psyche, its consciousness.

The child's literacy process is a primary vehicle for propagating children's language skills, both in the preschool years and during the initial and subsequent schooling.

From the historical-cultural point of view, the evolution of man is the result of the evolution of culture and history, since they are forms mediated by signs and instruments that happen first in the relationship between social and historical subjects that, later, is internalized by the subject with the mediation of language and culture.

In this sense, Vygotsky (2021) considers symbolic writing a culturally elaborated construction, not only a motor activity, as it is part of a system of symbols and signs whose domination refers to a critical point in the cultural development of the child, and should not be achieved mechanically, but a long process of complex behavioral functions.

In the first school years, it is essential to build in children the interest in the study, to contribute so that they learn to direct their behavior towards the appropriation of new knowledge, making the contents meaningful for the children.

In the teachings on the influence of the school for the organization of the higher psychic processes for the acquisition of scientific concepts, Vygotsky (2021) observed that the scientific knowledge of one discipline influences the others.

Each discipline has its relationship with the course of development and the child, in the educational process, assimilates certain contents, before learning to use them consciously and freely.

Therefore, the very content taught—for example, letters and numbers—can be a driver of higher psychic functions, complexing these functions.

Davidov and Markova (1987) analyze that school education in the early years, in addition to the teaching of reading, writing and calculus, needs to prepare children for a complex and prolonged study. For these authors, this means that already in the first school years, children must have indispensable psychic development and good ability to study.

For Facci (2004), the teacher must have clarity of how teaching influences the intellectual development and psychological characteristics of students, the development of higher psychological functions and that he studies ways to value the effectiveness of the various teaching methods in the development of thought, memory and other mental processes.

Given the above, we emphasize that the school, the web of relations contained in it, the culture and the history mediated under forms of school contents, is fundamental for the development of the child that the human formation.

1.4 SOME EMERGING CONSIDERATIONS FOR EDUCATION DURING AND AFTER THE PANDEMIC

From the results obtained, we conclude that remote teaching had its vulnerabilities throughout the process in which face-to-face teaching had to be left aside, this includes the pedagogical unpreparedness of the child's tutors, the lack of attention of the children during the video lessons, the difficulty in literacy and even the lack of school interaction and also a certain absence in the mediation between teacher and student.

Initially we could question political positions that placed education as a non-essential item, that imposed digital platforms even knowing that the country was far from having a true digital inclusion and that many teachers did not have knowledge and training in Information Technologies. In this way, and understanding the abyss referent to social and educational inequality in Brazil, we could question why there was no suspension of the school year.

Emerging situations arose as a result of the conduct of remote teaching, and we can cite some observed, such as the gaps in the learning process due to the difficulties of effective mediations of school contents, essential for literacy.

Given this, we resort to the discussion sbore the National Pact for Literacy at the Right Age (PNAIC), a public policy that emerged in 2012, based on the Literacy Program at the Right Age (PAIC), in which a literacy cycle was decreed that is established in the 1st year and that is completed in the 3rd year of elementary school.

On the other hand, the National Common Curricular Base (BRASIL, 2017) establishes that children's literacy will have to occur until the 2nd year of elementary school, to guarantee the fundamental right to learn to read and write.

It is even more urgent to ensure the construction of knowledge to literacy, since we realize that the current educational scenario is with great impediments to guarantee these rights to the learner.

This scenario has caused school complaints post-pandemic to increase considerably.

Even though face-to-face classes have already resumed at the beginning of the first semester of 2022, one can observe how great and laborious the role of teachers will be at this time, as students need more recovery policies in learning than actions that pathologize the gaps in their development.

Another emerging factor in the current post-pandemic period is the epidemic of anxiety disorders, attentional difficulties and children's dependence on electronic equipment, as pointed out by

the research of Campos et. Al. (2023).

It is a fact that the pandemic period has considerably affected mental health and social relationships, and children have also been greatly harmed, it is necessary to rescue the interest of children in the study activity, it is necessary to reduce the time of children with electronic equipment, it is necessary to rescue a non-violent, non-individualistic social coexistence, which also develops in children respect for others, empathy and sorority.

This is a simple work that contributes with reflections to think about the post-pandemic and review the human development itself in the school connection.

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CHAPTER
38

Implications of COVID-19 on teachers' personal values

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ABSTRACT
The Covid-19 pandemic has reverberated throughout the world's society. In the area of education, in particular, the closure of teaching centers and the abrupt online work has impacted on teachers' mental health, including changes in values. From this perspective, this study investigated the possible effects of Covid-19 on teachers' personal values. Values are abstract structures, associated with emotion, influencing choices and behaviors, representing conscious and desired personal goals, and can serve as criteria used by people in their decision-making. Using the quantitative research method through the application of an online questionnaire by Google Forms, the Values Scale validated by Luiz Lapa in 2019 was used as an instrument. The scale is an adaptation of social psychologist Shalom Schwartz's Refined Value Questionnaire (PVQ-R). Among other results, there are indications of an increase in the values of universalism, benevolence (values of Self-transcendence), safety and conformity (values of Conservation) and a decrease in the importance of the values of stimulation (values of Openness to change) and power (values of Self-promotion). Therefore, in this context, there are indications of changes in teachers' personal values due to Covid-19.

Keywords: Personal values, Teachers, Covid-19, Schwartz value theory.

1 INTRODUCTION

Several researches have contributed to the theme of human or personal values, as a contribution to studies in Education, Psychology, Sociology, Administration, among other areas of knowledge.

Values are abstract structures, associated with emotion, influencing choices and behaviors, representing conscious and desired personal goals, and can serve as criteria used by people in their decision-making (SCHWARTZ, 1992; 2005; 2012). They can be interpreted as a "referential system, a preferred, positive and desired human orientation or attitude towards objects, people or situations" (PATO, 2011, p. 296) as enduring beliefs about desirable goals that function as guiding principles in people's lives (SCHWARTZ, 1992; 2005).

However, even if the values are long-lasting, they can undergo significant changes in individuals (SCHWARTZ, 2006) throughout life, motivated by situations such as a diagnosis of health problems (BLEIDORN; SCHWABA; HOPWOOD, 2021), migration to other countries (LÖNNQVIST et al., 2012), terrorist attacks (VERKASALO; GOODWIN; BEZMENOVA, 2006), a military mission as in Afghanistan (SUNDBERG, 2016) or pandemic phenomena such as Covid-19 (MALTA et al., 2020; SANTOS et al., 2020).

The Covid-19 pandemic and the absence of a vaccine against this virus have provided a high number of infections of people around the world, including Brazil (MALTA et al., 2020). In Brazil, several preventive measures have been adopted by states and municipalities, such as the use of masks, hand washing and social restriction (GARCIA; DUARTE, 2020), in addition to the closure of commercial establishments, schools and universities (BARROS; POST; LAPA JUNIOR, 2022).

In the educational scenario, there is a crisis in the emotional health of students and teachers (KHLAIF et al., 2020) motivated by the abrupt change in the routine and daily life of these people. Studies point to the importance of mental health care for teachers during the Covid-19 pandemic (ALVES; LEE; PRECIOUS, 2021; TALIDONG; TOQUERO, 2020) and personal, or human, values in the midst of the pandemic (VECCHIONE, 2022).

Given this, the objective of the research was to investigate the personal values of public school teachers from different communities in the Northeast Region during the Covid-19 pandemic.

2 HUMAN VALUES

Values are abstract structures, associated with emotion, influencing choices and behaviors, representing conscious and desired personal goals (SCHWARTZ, 1992), and can serve as criteria used by people in their decision-making (SCHWARTZ, 2005).

For Schwartz (2005), thinking about values is thinking about what is important for each individual and, according to Nepomuceno (2007), from the theoretical perspective of Social Psychology, the root of values is motivational, enabling the understanding and prediction of human behavior. In this way, the values function as internal references that justify our choices and conducts,

being necessary to perceive them and unveil them, in the educational field, in students and teachers to transform this discovery into daily practice (MARQUES, 2012).

In this educational dimension and in the idea that it is possible to change and improve society, Serrano (2002) affirms that education in values is a complex task, full of risks and uncertainties, requiring adequate training. Therefore, the act of educating in human values aims to awaken the awareness of values as inheritance and conquest of the personality, awakening renewing visions of respect for others, being able to define the human being according to his values and his practice (SCHIFFER, 2008).

In the field of contemporary psychology, values were born from two sources: personality psychology, inspired by philosophy, and social psychology, closely linked to sociology (CIECIUCH; SCHWARTZ; Davidov, 2015).

In the history of values psychology, many theories have emerged. But three had a greater influence on empirical research, the first, Allport's theory of values (ALLPORT; VERNON, 1931), purported to be a psychology of personality. Later, Rokeach (1973) proposed a theory of values as a central aspect of personality useful for understanding individual and group differences in attitudes and behavior. More recently, Schwartz (1992) presented a theory of content and value structure that integrated earlier approaches and facilitated value research in many branches of psychology, including personality, social, political, intercultural, developmental, and positive psychology as in the disciplines related to education, sociology, law, and economics.

The Theory of Human Values of Shalom Schwartz is the focus of this research, because, currently, it has been considered by numerous scholars in the various areas of the Sciences. According to Pato (2004, p. 37), Schwartz's theory of human values "has been pointed out as the most prominent on values, being one of the most promising perspectives of Social and Transcultural Psychology, advancing in relation to other perspectives", in several countries.

3 SCHWARTZ'S HUMAN VALUES

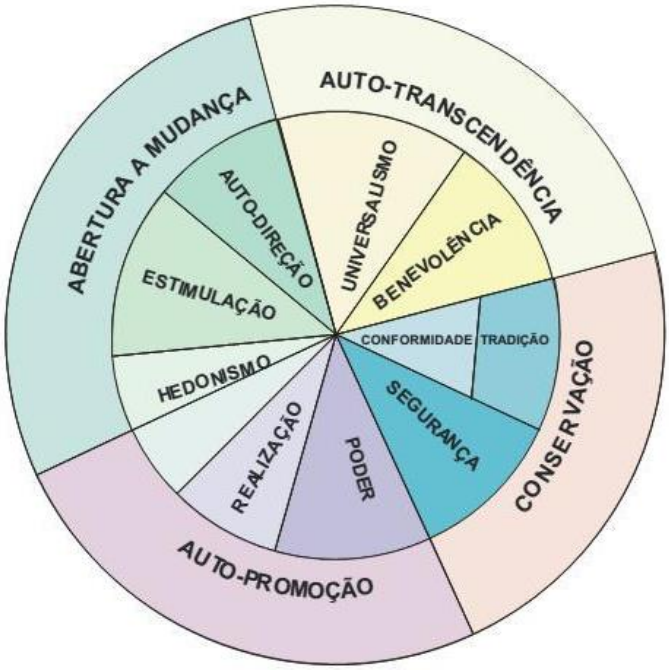
The present study proposes to investigate the values of teachers during the Covid-19 outbreak, an unprecedented event in recent history that has profoundly changed the daily lives of millions of people around the world (MALTA et al., 2020). In addition to the immediate effects on health, the pandemic has affected people's habits, their material and psychological conditions, the way they relate to others (SANTOS et al., 2020).

In this understanding, we adopted Schwartz's Theory of Human Values. The original theory (SCHWARTZ, 1992) identifies 10 values with different motivations: security, conformity, tradition, benevolence, universalism, self-direction, stimulation, hedonism, fulfillment and power. Values, also

called motivational types, are grouped into four higher-order dimensions: Self-transcendence, Conservation, Self-promotion, and Openness to change.

Schwartz's theory arranges the values in a circular structural model (Figure 1) that allows organizing the ten motivational values in a system of compatibilities and oppositions, placed on a *continuum of* motivations, with a two-dimensional structure composed of four important orientations that are accommodated in two major antagonistic and bipolar axes: (i) Openness to change in opposition to Conservation and (ii) Self-transcendence in opposition to Self-promotion.

Figura 1: Estrutura universal dos valores da Teoria de Schwartz (1994, p.24).



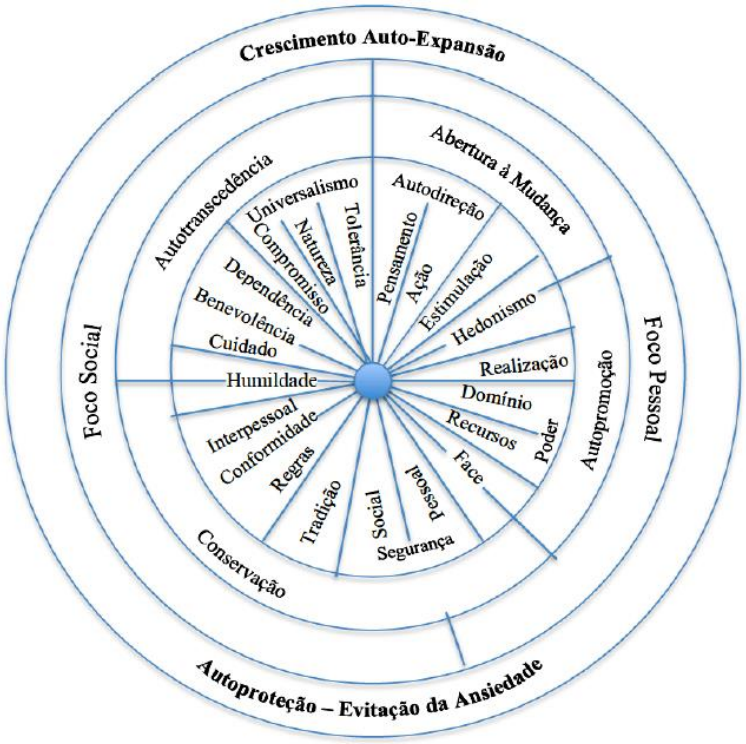
Source: SCHWARTZ (1994, p.24).

The values of 'Self-promotion' (achievement, power) promote success and dominance over others, those of 'Self-transcendence' (universalism, benevolence) foster the well-being of others, the values of 'Conservation' (conformity, tradition, security) emphasize self-restraint, preservation of the past, stability and predictability, while those of 'Openness to change' (self-direction, stimulation, hedonism) encourage autonomy and receptivity to change.

Subsequently, Schwartz *et al.*(2012) proposed the refinement of the ten motivational types, overcoming the view that the division of space between motivational types is arbitrary. As the motivational differences between the values must be understood as continuous, the revised theory proposes discrete values with greater universal heuristics, predictive power and a new division of the continuum between them (TORRES; SCHWARTZ; BIRTH, 2016). This current Refined Theory of Human Values proposes 19 motivational types: Self-direction of thought, and of Action; Stimulation;

Hedonism; Accomplishment; Power of Dominion, and over Resources; Personal and Social Security; Tradition; Compliance with Rules, and Interpersonal; Benevolence Dependence, Care, and Commitment; Universalism Nature, and Tolerance; Face; and Humility (SCHWARTZ *et al*., 2012) (Figure 2).

Figura 2: Estrutura circular dos valores da Teoria Refinada de Valores



Source: TORRES; SCHWARTZ; BIRTH (2016, p. 343)

By the refined theory of human values, scholars have the option of using the 19 values or a combination of them and working out the original ten motivational types. The structure of the refined theory of values (Figure 2) is composed of three external circles that identify the conceptual bases of the proposal. In the first circle, the values bounded by the top half express self-expansion, being more likely to motivate people when they are free of anxiety; those bounded by the lower half are geared toward protecting the individual from anxiety and threat. In the second circle, the values on the right have a focus of personal concern with results for oneself; The values located on the left have a focus of social concern with the results for others or for organizational institutions. The third circle most to the center indicates the four antagonistic and bipolar dimensions: self-promotion *versus* self-transcendence, and openness to change *versus* conservation. Table 1 shows the 19 motivational types of the refined theory of human values and their respective motivational goals:

Table 1: The 19 Motivational Types of Schwartz's Refined Value Theory

Motivational types	**Motivational goals**
Self-Direction - Thinking	Freedom to cultivate one's own ideas and skills
Self-Direction - Action	Freedom to determine your own actions
Stimulation	Excitement, novelty and change
Hedonism	Sensual pleasure and gratification
Accomplishment	Success according to social norms
Power - Domain	Power through control over people
Power - Resources	Power through the control of material and social resources
Personal Security	Safety in the immediate environment
Social security	Security and stability in society at large
Tradition	Maintain and preserve family, or cultural religious traditions
Compliance - Rules	Compliance with formal rules, laws and obligations
Compliance - Interpersonal	Avoid disturbing or harming others
Benevolence - Dependence	Be a correct and trusted member of the group
Benevolence – Caution	Devotion to the well-being of group members
Universalism - Commitment	Commitment to equality, justice and protection of all people
Universalism - Nature	Preservation of the natural environment
Universalism - Tolerance	Acceptance and understanding of those who are different from oneself
Face	Security and power by maintaining their public image and avoiding humiliation
Humility	Acknowledging its insignificance in the larger scheme of things
Cast iron: SCHWARTZ *et al.* (2012, p. 664).	

With the new adjustments, the Refined Theory of Human Values now has a greater accuracy of prediction and explanation for a set of attitudes and beliefs, in addition to indicating that values are good predictors of behaviors, only in the absence of strong norms. In this way, "it is a consensus among researchers that Schwartz's theoretical model is quite useful, particularly for the investigation of the relationship between values and behavior" (LAPA JÚNIOR, 2019, p. 24) or as in the present research, to address the question of whether and how the Covid-19 pandemic has affected teachers' values priorities.

4 METHODOLOGY

The *survey* survey took place in 2021, at the time of the Covid-19 pandemic, via an electronic form on *Google Forms*. It is based on the quantitative approach of descriptive exploratory method by presenting a numerical description of trends or opinions of a population, studying a sample of this population (CRESWELL, 2010).

Participants were 210 teachers from the public school system of the municipalities of the States of Bahia (schools located in the northwestern portion of the São Francisco Craton, far west of Bahia, regions with high altitudes and extensive mountains with plateaus) and Ceará (schools located in the microregion of Chorozinho, mesoregion of the North of Cearense).

As an instrument, we used the Human Values Scale (LAPA, 2019), an adaptation of the *Portrait Values Questionnaire–Refined* (PVQ-R) of Torres, Schwartz and Nascimento (2016) with 38 items

distributed in the four dimensions of Schwartz's Refined Theory of Human Values. The instrument has a five-point Likert scale where 1 = nothing important until 5 = extremely important. "Doing dangerous things that make my life exciting" and "Being a faithful friend and that everyone trusts me" are examples of items on the Human Values Scale (LAPA, 2019).

Data analysis was performed using the *statistical* software *Statistical Package for Social Sciences* – SPSS, version 23.

5 RESULTS AND DISCUSSION

The results indicate a predominance of females (N=154, 73.3%), most participants aged between 30 and 49 years (N=135. 64.3%) and with post-graduation (specialization) (N=106. 50.5%), as shown in Table 2.

Table 2: Descriptive statistics of the sociodemographic profile of teachers

Variable		Frequency	Percentage
Gender	Female	154	73,3
	Male	56	26,7
Age group	from 20 to 29	54	25,7
	from 30 to 39	73	34,8
	from 40 to 49	62	29,5
	from 50 to 60	21	10,0
Marital status	Single (a)	62	29,5
	married or stable union	135	64,3
	Requited (a)	8	3,8
	Separate (a)	2	1,0
	widower (a)	3	1,4
Religion	Catholic	159	75,7
	spiritist	2	1,0
	Evangelical	34	16,2
	other	15	7,1
Schooling	SUP COURSE. incomplete	13	6,2
	SUP COURSE. complete	76	36,2
	Post-graduation (specialization)	106	50,5
	Master's Degree (in progress)	6	2,9
	Masters	8	3,8
	doctorate	1	,5
Level of education that operates	Early childhood education	45	21,4
	Elementary School (early years)	54	25,7

	Elementary School (final years)	74	35,2
	Middle school	34	16,2
	Come on	3	1,4
Training	Languages and Codes	39	18,6
	Humanities and Social	29	13,8
	Natural Sciences	19	9,0
	Mathematics	20	9,5
	Pedagogy	96	45,7
	Other	7	3,3

Source: Research data.

To understand and interpret the results, the following codes were used for the four dimensions of the Value Theory: TA for Self-transcendence, CO for Conservation, AP for Self-Promotion and AM for Openness to change. Similarly, the corresponding acronyms for each of the 19 1st order values (or motivational types) of the Value Theory of Schwartz et al. (2012), shown in Table 1, follow.

Table 1: Acronyms of the 19 values (types motivational) by Schwartz (2012)

Universalism-tolerance	UNT
Universalism-nature	UNN
Universalism-commitment	UNC
Benevolence-dependence	BED
Benevolence-care	BEAK
Humility	HUM
Interpersonal Compliance	SEE
Rules Compliance	COLOUR
Tradition	BETWEEN
Social security	HIS
Personal safety	SEP
Face	I do
Resource power	BY
Dominance power	UNDER
Accomplishment	REA
Hedonism	HOT
Stimulation	EAST
Self-direction of action	OUCH
Self-direction of thought	AUP

Source: Research data.

By means of statistical means (M) and their respective standard deviations (SD), it is indicated that the dimension of Self-transcendence obtained predominant values, indicating that teachers accepted other people more as equals and were concerned with their well-being and that of others, as well as nature (Table 3).

A similar result was found in the longitudinal study conducted in Australia by Daniel et al. (2021), which examined the change in value before and during the pandemic (from 2017 to December

2020). The results showed that the values of Self-transcendence and Conservation increased in importance after the onset of the global COVID-19 crisis and decreased slightly at the end of 2020. The present research showed that the values of Self-transcendence and Conservation also obtained the highest averages. The findings allow us to infer that news about the pandemic, including the constant infections and deaths, has made people more sensitive and concerned about the well-being of others (SOUSA et al., 2021), since the prevention of contamination is a duty of all (SOARES et al., 2021).

Studies conducted in France during the first *lockdown of the* pandemic revealed that the values of the Conservation dimension were the highest, possibly driven by the traditional culture of its people, as well as safety by the spread of the disease (BONETTO et al., 2021). By several researches there are indications that the values of the dimension Self-transcendence are more perceived, following the present research.

Both the present research and that of Bonetto et al. (2021) demonstrated the values of the dimensions of Self-promotion and Openness to change with the lowest means (Table 3), showing that the values with individual focus are less present.

Table 3: Mean and SD of the HV dimensions in the subjects.

	Average (M)	Standard deviation (SD)
AT	4,42	0,48
CO	3,95	0,49
AP	2,83	0,48
On the	3,64	0,49

Source: survey data.

Table 4 shows the 19 values of the Refined Theory (SCHWARTZ et al., 2012) demonstrated by the teachers in descending order of mean and standard deviation. Among the values most present in teachers are those of the dimensions of self-transcendence and conservation, with the universalism-commitment value (UNC) being the strongest value detected, followed by the universalism-nature (UNN), benevolence-care (BEC) and personal safety (SEP) values.

During the Covid-19 pandemic, feelings of commitment to equality for access to vaccination and preventive behavior as protection of all people are justified in the values of universalism-commitment (UNC). Conservation and perceived threat during the outbreak were strongly related to compliance with movement restrictions and social distancing (safety-personal-SEP).

Comparing with studies prior to the Covid-19 pandemic (BARNI; DANIONI; BENEVENE, 2019) it is observed that teachers had high values of Openness to change (Self-direction of action-AUA, Self-direction of thought – AUP, stimulation – EST), as well as Self-promotion (power of resource – POR, power of mastery – POD, realization – REA) that were related to self-efficacy. Self-efficacy relates to teachers' beliefs in their ability to deal effectively with tasks, obligations and

challenges related to their professional activity. Plays a key role in influencing important academic outcomes (e.g., student achievement and motivation) and well-being in the workplace (BARNI; DANIONI; BENEVENE, 2019).

However, the pandemic has changed the well-being of teachers (BARROS; POST; LAPA, 2022) decreasing the importance of the values of Openness to Change and Self-Promotion and activating the values of Conservation (SEP, SES, COR). It is observed that the values of Self-promotion as power of domain (POD) and power of resources (POR) obtained the lowest averages, representing a value little present in this group. Historically, values of Self-transcendence are more present (COHEN, 2010; KARABACAK; KÜÇÜK; KÜÇÜK, 2019) in people, following the findings of this research.

Table 4: Means and SD of motivational types - teachers

Values	Average	Standard deviation		Values	Average	Standard deviation
UNC	4,58	0,57		AUP	3,80	0,71
UNN	4,56	0,62		SEE	3,72	0,86
BEAK	4,45	0,58		HOT	3,72	0,78
SEP	4,40	0,62		HUM	3,65	0,68
HIS	4,38	0,71		REA	3,54	0,75
UNT	4,27	0,71		BETWEEN	3,47	0,86
BED	4,22	0,71		EAST	2,81	0,65
OUCH	4,21	0,69		UNDER	2,05	0,79
COLOUR	4,06	0,70		BY	1,88	0,61
I do	3,85	0,93				

Research data.

6 COVID-19 AND VALUE ACTIVATION

The Covid-19 pandemic "is undeniably the most serious health crisis the world has known since the Great Flu of 1918" (BONETTO et al., 2021, p. 1). According to Choi et al. (2020), we are likely to have 'another pandemic': people's mental health crisis. With the pandemic, people became afraid (ASMUNDSON; TAYLOR, 2020), accompanied by anxiety, panic and depression (BAO et al., 2020), making them vulnerable to the manifestation of infection symptoms (STACHTEAS; STACHTEAS, 2020).

In the educational field, teachers were challenged to fulfill their activities in learning platforms (MEDAA; SLONGO, 2020), in "which only some teachers have skills with digital resources and ICTs" (CALDAS; SILVA; SAINTS, 2022, p. 3). The unexpected shift from traditional to online teaching (WANG; ZHAO, 2020) promoted differentiated levels of professional burnout (CHEN et al., 2020) without the necessary training (APERRIBAI et al., 2020).

The Covid-19 pandemic has mobilized millions of dollars in research to find a vaccine that would stop the spread and spread of the virus (JEYANATHAN et al., 2020) and an important amount

of research has focused on the psychological consequences of the recent health crisis (MODERSITZKI et al., 2020). In this period, dense studies on the Behavioral Immune System, which aims to monitor, detect and avoid physical contact with pathogens (SCHALLER; PARK, 2011), confirmed that the control of the advance of diseases is associated with social conservatism (adherence to norms and traditions) (VARNUM; Grossmann, 2016). This relationship may be linked to Schwartz Conservation values, in addition to people avoiding the risk of contagion and possibility of death, they have less Open to Change values (BOJANOWSKA et al., 2021).

In this context, there are indications of changes in values due to the Covid-19 pandemic. More precisely, an increase in the importance of universalism (UNC, UNN), benevolence (BEC, BED) (values linked to Self-Trancendence), safety (SEP, SES) and conformity (COR) (values linked to Conservation), followed by a decrease in stimulation (EST) (value linked to Openness to change) and power (POD, POR) (value linked to Self-Promotion).

According to Bonetto et al. (2021), relationships between threats and changes in personal values have also been observed in the context of other types of threats, such as the global financial crisis of 2008 (SORTHEIX et al., 2019), that is, beliefs in moments of danger and threat to people can lead to conservative attitudes and protection of themselves and others (DUCKITT; Fisher, 2003).

7 FINAL CONSIDERATIONS

The Covid-19 pandemic has made it possible to study whether adverse external factors influence what individuals consider important and valuable in life, namely values. In particular, changes in values can influence adherence (or not) to measures that pose a perceived threat, such as a deadly virus.

If values were initially theorized as stable, several contributions suggest that changes in values reflect external circumstances and important changes in specific contexts. The Covid-19 pandemic and lockdown restrictions implemented in many countries can be considered such threatening circumstances.

Consequently, investigating changes in values due to the Covid-19 outbreak in different cultural contexts and with different methods constitutes an additional test of predictions derived from the behavioral immune system and would allow for a better understanding of values in times of crisis. Such an understanding is essential to guide decisions about health-related behavioral and environmental constraints, not only during the Covid-19 pandemic, but also for future similar crises. In addition, it would contribute to a better understanding of the reactions of populations to a health crisis such as Covid-19.

It is proposed that further studies in this perspective can be carried out with groups of teachers to detect which values are still present and which were activated in this post-vaccination period.

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CHAPTER
39

Modeling and understanding social isolation in the evolution of the COVID-19 pandemic

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ABSTRACT
In December 2019, an outbreak that began in the city of Wuhan, China, sparked what would become a pandemic characterized by an infectious disease caused by SARS-CoV-2. Already at the beginning of 2020, the scientific community had been involved, along with political decisions, in a profound and protagonistic way in the development of measures to combat and contain the evolution of the pandemic. Among the issues discussed, social distancing gained prominence due to the uncertainty between the effectiveness and the economic and social impact generated by its implementation. In this work, we evaluated some epidemiological models that emerged because of the need to insert social distancing in the evolution of the number of infected. We discuss how such models help in understanding social isolation as a combat measure and conclude that such measures, when expressive, can help reduce the number of infections, especially when implemented at the beginning of the epidemic due to the low geographical spread.

Keywords: Modeling, Social Isolation, Epidemiology.

1 INTRODUCTION

Throughout history, humanity has lived and recorded major epidemics arising from contact with animals, sanitary conditions, and lack of etiological knowledge. Rezende (2009, p. 74) points out, as the largest recorded epidemics, the plague of Athens, the plague of Syracuse, the Antonine plague, the plague of the third century, the Justinian plague, and the Black Death of the fourteenth century.

In his book *History of the Peloponnesian War,* Thucydides relates the story of the plague of Athens, which occurred in 428 B.C. The author states that, a few days after the invasion of the Peloponnese's territory of Attica, an epidemic that began in the city of Lemnos attacked countless victims with disconcerting violence, leaving the population with little or no medical support, since "[...] the doctors could do nothing, because at first they did not know the nature of the disease and moreover they were the first to have contact with the sick and died first" (Tucídides, apud Rezende, 2009, p. 75).

Already in the second century AD, the Antonine plague was characterized by the great devastation of Rome and its extension throughout Italy, in addition to having two waves of growth, the first in 166 AD and the second in 189 AD (Rezende, 2009, p. 76)).

Later, in the fourteenth century, humanity experienced the most tragic epidemic in history, called the *Black Death* due to the dark spots that characterized the sick (REZENDE, 2009). The Black Death had large-scale economic and social impacts. The Archbishop of Winchester, for example, charged a rise in the rate of *heriots (*paid to the lord in case of transfer of lieutenants, in general, by death) from an average of 52 per 1000 to 500 per 1000 during the epidemic (SILVA, 1973, p. 388). Its spread began in the East, but reached France in 1348, by sea, followed by Italy in 1349 and later throughout Europe (REZENDE, 2009, p. 78).

After more than a century without experiencing this type of phenomenon, in December 2019, a pandemic caused by the SARS-CoV-2 virus began in the city of Wuhan, China. The high rate of transmission and spread across several countries, in addition to the first deaths recorded in January 2020 in China and in February 2020 in France, led the WHO to officially treat the problem as a global health emergency (OLIVEIRA; JANUARY; SALLES et al., 2021).

Thus, unlike previous epidemics, this was the first time that identification and combat could already be initiated in the first months of spread. The fight against the pandemic began with the use of mandatory sanitary measures in public settings, such as the use of masks and alcohol gel, as well as an intense scientific "race" for the development of vaccines, as an immunization mechanism, and epidemiological models as tools to assist in making decisions of social impact, such as isolation measures.

One year after the beginning of the pandemic, 261 vaccines were being developed worldwide, 79 of which were in human trials (phase III), and 9 with approval for emergency use (OLIVEIRA; JANUARY; SALLES et al., 2021, p. 26). In addition, several epidemiological models were developed to predict the progress of the pandemic, taking into account the scenarios of social isolation, geographical evolution, application of vaccines, among others. Much of this rapid development took place through *preprints* that allowed for rapid communication between the scientific community. Rocha and Araújo (2021), in a survey on the online attention of preprints, pointed out that until September 2021 56,690 preprints on the theme "covid-19" were shared in the *Dimensions database*.

In this paper, we discuss some epidemiological models that have emerged throughout and for the analysis of the Covid-19 pandemic. We extract theoretical consequences from the implementation of parameters for the evaluation of social isolation in these models. Finally, we have gathered the main results that can be used in the future in the fight against epidemics.

2 EPIDEMIOLOGIC MODELS

In an attempt to understand the mechanisms by which epidemics gain strength, mathematical models were created from various methodologies that aim to explore their dynamics, prediction and

control. Stochastic models, for example, analyze the probabilistic aspect of the spread of epidemics (ALLEN, 2008). Network models or agents, on the other hand, explore the interactions between individuals in the population analyzed to simulate the spread of the epidemic and can be very realistic, especially by employing a large amount of data, such as population density, age structure and social groupings in schools, businesses and the labor market (FERGUSON; CUMMINGS; FRASER et al., 2006). Finally, dynamic models based on differential equations and on the division of the population into compartments related to each stage of infection (e.g. susceptible, exposed, asymptomatic, infected, recovered, hospitalized) constitute a simpler alternative, both from a numerical and theoretical point of view, regarding the interpretation of the consequences of each simulated scenario for the end of the epidemic (LÓPEZ-FLORES; MARCHESIN; MATOS & SCHECTER, 2021).

The models we will discuss here originate from the 1927 work published by A. G. McKendrick and W. O. Kermack, who provided the first set of differential equations based on the compartmental methodology of populations (KERMACK & MCKENDRICK, 1927)). The SIR (Susceptible-Infected-Removed) model they created models a non-fatal epidemic, where individuals become infected from a susceptible population and recover from this infection, gaining immunity.

The set of equations of the SIR model is written as follows:

$$\begin{cases} \dot{S} = -\beta SI \\ \dot{I} = \beta SI - \gamma I \\ \dot{R} = \gamma I \end{cases} \qquad (I)$$

where β is the infection rate and the γ recovery rate of individuals. In this set of equations$S = S(t)$, is the fraction of the susceptible population, the fraction of the infected population, and the fraction $I = I(t)$ of the recovered population, so that $R = R(t)$ and $S(t) + I(t) + R(t) = 1. \dot{S}(t) + \dot{I}(t) + \dot{R}(t) = 0$

Other epidemiological models can be constructed from system-like structures by adding or removing new compartments for different populations. Table 1 presents other epidemiological models and their main characteristics:

Table 1 – Compartmental epidemiological models

Acronym	Equations	Populations	Constants
SIS	$\begin{cases} \dot{S} = -\beta SI + \gamma I \\ \dot{I} = \beta SI - \gamma I \end{cases}$	Susceptible Infected	Infection rate (β) Recovery rate (γ)
SIRS	$\begin{cases} \dot{S} = \delta R - \beta SI \\ \dot{I} = \beta SI - \gamma I \\ \dot{R} = \gamma I - \delta R \end{cases}$	Susceptible Infected Retrieved	Infection rate (β) Recovery rate (γ) Rate of immunity loss (δ)
SEIR	$\begin{cases} \dot{S} = -\alpha SI \\ \dot{E} = \alpha SI - \beta E \\ \dot{I} = \beta E - \gamma I \\ \dot{R} = \gamma I \end{cases}$	Susceptible Exposed Infected Retrieved	Exposure rate (α) Infection rate (β) Recovery rate (γ)

Source: the authors.

Each of these models presents different etiological characteristics since different causes of the epidemic are associated with different biological consequences. In the SIS model, for example, the main feature that differentiates it from the SIR model is the fact that recovered individuals lose immunity and return to the susceptible population. In the SIRS model, the same occurs, but with only a part of the population recovered. Finally, the SEIR model is characterized by the distinction between the population exposed to contact with infected individuals and the infected population, if a fraction of the interactions between susceptible and infected do not produce infections.

3 SIR MODEL WITH GEOGRAPHIC AND SOCIAL ISOLATION

Throughout the Covid-19 pandemic, one of the main issues raised in parallel with vaccine development has been the implementation and consequences of social isolation measures. In April 2020, we shared a preprint analyzing a model that aimed to adapt the system's equations to include the isolation effects associated with the geographic spread of Covid-19 across Brazil and social distancing measures (SCHULZ; COIMBRA-ARAÚJO & COSTICHE, 2020).

These adaptations arose, first, because it should be noted that the SIR model supposes, as well as the others presented in Table 1, that initially the entire uninfected population is susceptible to contagion, that is, that $S(0) = 1 - I(0)$. However, in a pandemic context like Covid-19, this assumption can lead to an exaggerated estimate of the number of contagions, especially in the initial modeling stage. For example, the first case of Covid-19 in Brazil was recorded on February 26, 2020, in the state of São Paulo. From this fact, it does not follow that the population of distant states such as Amazonas, Sergipe and Rio Grande do Sul can be considered as susceptible in February, since it is not reasonable to assume that individuals can spread the infection throughout the country immediately.

Thus, one way to alleviate this hypothesis is to assume that the *potentially* susceptible population $S(t)$ becomes susceptible to the extent that *natural isolation*, due to geographical separation, is reduced. Thus, if it is $\rho(t)$ the percentage of the population that is potentially susceptible, but that is not effectively susceptible due to geographic isolation, it is possible to assume that:

$$\rho(t) = \rho_0(1 - \Delta\rho)^t \quad (1)$$

where ρ_0 is the population initially geographically isolated, and the $\Delta\rho$ percentage reduction of the population in geographic isolation.

Secondly, the Covid-19 pandemic was marked by social distancing and isolation measures, characterized by policies of reducing/banning public events and gatherings such as schools, universities, concerts, sporting events, commerce, among others (PIGLET; FERREIRA; DE ABREU et al., 2021). Just like geographic isolation, social isolation measures act by reducing the potentially susceptible population, so that if it $\varphi(t)$ is the percentage of the population socially isolated, then the effectively susceptible population $S_e(t)$ can be obtained by taking:

$$S_e(t) = S(t)\big(1 - \rho(t) - \varphi(t)\big) \quad (2)$$

From the equation , the SIR system with geographic and social isolation becomes:

$$\begin{cases} \dot{S} = -\beta S_e I \\ \dot{I} = \beta S_e I - \gamma I \\ \dot{R} = \gamma I \end{cases} \quad (II)$$

which bears a natural resemblance to the system . In general, therefore, isolation measures, whether natural or intentional, constitute ways to reduce the susceptible population to only part of the total population and, consequently, to reduce the proportion of the infected population.

Also in 2020, other work addressing social isolation emerged based on the SIR or on more robust models, such as modified SEIR. Gomes, Monteiro and Rocha (2020), for example, used the SIR to predict the evolution of the Covid-19 pandemic in some Brazilian cities and proposed to model the isolation of the susceptible population by considering an effective infection rate$\beta_e = \beta p$, where $0 < p < 1$ is the percentage of the population in circulation. In addition, they suggested an effective recovery rate, $\gamma_e = \gamma + k$where k it is the rate of isolation of the infected population that goes into isolation and stops infecting new individuals. Using a modified SEIR model, Cardoso, Sousa, Cardoso and Utsumi (2020) modeled social isolation measures for the state of Minas Gerais and Brazil by considering a variable infection rate as follows:

$$\beta(t) = \begin{cases} \beta_0, & t < t_0 \\ \beta_{min} + (\beta_0 - \beta_{min})^{-r(t-t_0)} & t \geq t_0 \end{cases} \quad (3)$$

where is the minimum infection rate and β_{min} is the rate of decrease in the infection rate$r.\beta_0$

Each modified model allows an adaptation to the context from which the actual data is obtained. The equation, for example, can be useful when the actual scenario to be modeled is a country or continent, but it won't be as relevant to modeling a statewide or city-wide epidemic. The equation may not be satisfactory if the changes in the infection rate are abrupt, and do not decline continuously, as in the case of a significant and abrupt lockdown.

4 DYNAMICS IN ISOLATION

To understand how social isolation measures impact the dynamics of epidemiological systems, we must first analyze their natural dynamics, that is, without isolation measures. To do so, we will obtain the fundamental characteristics of the system and then we will go on to check how these characteristics change in the system. The SIR model was chosen for this analysis due to its simplicity, however, similar approaches may lead to obtaining equivalent results for the other systems presented in Table 1 (LÓPEZ-FLORES; MARCHESIN; MATOS & SCHECTER, 2021).

Therefore, note that the system can be rewritten as:

$$\frac{dS}{dt} = -\beta SI \tag{4}$$

$$\frac{dI}{dt} = \beta SI - \gamma I \tag{5}$$

taking $R = 1 - S - I$. So, dividing by :

$$\frac{dI}{dS} = -1 + \frac{\gamma}{\beta S} \tag{6}$$

which has as a solution the family of curves:

$$I = -S + \frac{\gamma}{\beta} lnS + C. \tag{7}$$

and the maximization condition of leads, by the equation , to:

$$S = \frac{\gamma}{\beta} = \frac{1}{R_0} \tag{8}$$

which implies two possible cases:

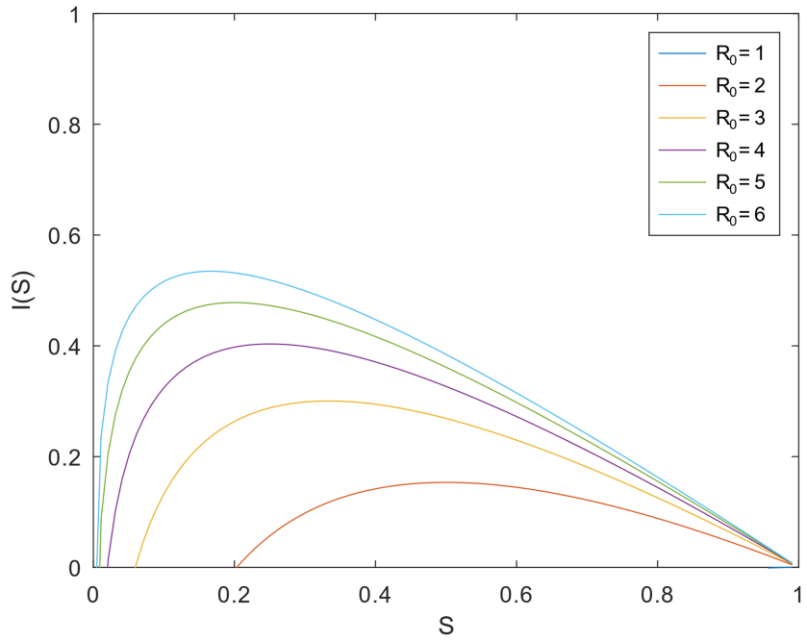
- If $R_0 > 1$, the maximum of I happens to some $S < 1$ and therefore a part of the susceptible population becomes infected.

- If $R_0 \leq 1$, the maximum I happens with $S \geq 1$ and therefore no susceptible individual becomes infected.

ThereforeR_0, the value of establishes a natural condition for the occurrence of an epidemic, namely, that the rate of infection must be strictly higher than the rate of recovery because, otherwise, any initially infected individual will recover before infecting new individuals.

Figure 1 shows the function $I(S)$ given by the equation for $C = 1$ arbitrarily chosen and different values of R_0:

Figure 1 – Function $I(S)$ with $C = 1$



Source: the authors

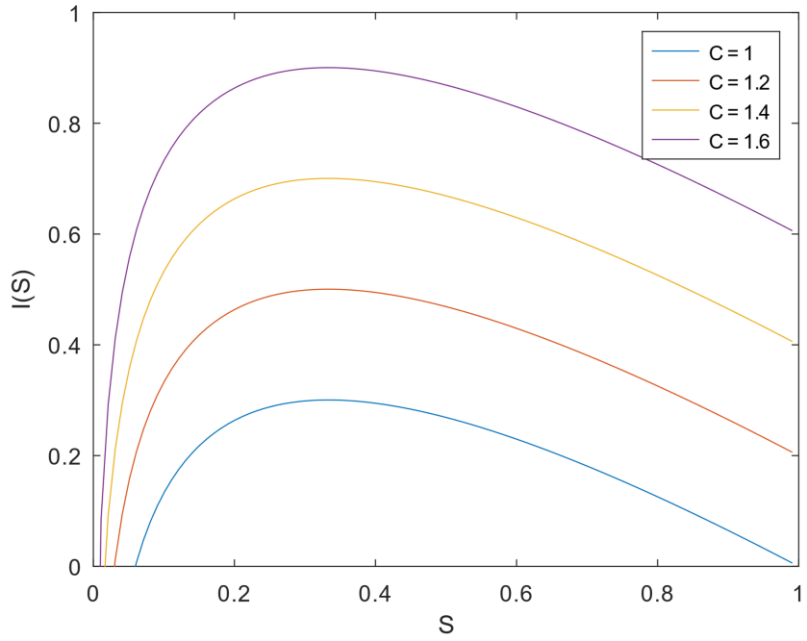
It is easy to notice that larger R_0 values of imply maxima for the function $I(S)$ happening for smaller values of S, as the equation predicts. The for curve $R_0 = 1$ is not displayed due to $I(S)$ being null in almost the entire domain.

Another naturally important characteristic that must be considered is the initial amount of infected individuals, which can be analyzed by the constant in the C equation , since as $S(t = 0) \approx 1$:

$$C \approx 1 + I\big(S(t = 0)\big)$$

and, in this case, the higher the value of , $I\big(S(t = 0)\big)$the higher the value of C and the curve $I(S)$ will be shifted vertically indicating a greater number of contaminations, as shown in Figure 2:

Figure 2 - $I(S)$ with $R_0 = 3$



Source: the authors

Briefly, therefore, these two characteristics determine the dynamics of the system, so that the modeled epidemic will be more expressive as much as the higher the values of R_0 and $I\big(S(t=0)\big)$.

For the system, the meaning and importance of the values of and R_0 $I\big(S(t=0)\big)$ remain the same. The difference, however, lies in the fact that any epidemic modeled by the system will have a lower number of infections due to . $S_e(t) \leq S(t)$ This difference is determined by the functions $\rho(t)$ and $\varphi(t)$ therefore it is necessary to analyze how each of them influences the susceptible population to understand the effects of social isolation on the system.

Let's start by noting that, unlike the system, the system can be controlled through the functions and , that $\rho(t)$ $\varphi(t)$is, we can find functions such that the number of new infections is null and the epidemic is eliminated. That's because the number of new infections (NI) can be determined by doing:

$$= \dot{I} - \gamma I = \beta S_e I$$

Therefore, if we want there to be no new infections, we must have:

$$= \beta S(t)\big(1 - \rho(t) - \varphi(t)\big)I = 0$$

which implies:

$$1 - \rho(t) - \varphi(t) = 0$$

or:

$$\varphi(t) = 1 - \rho(t) \qquad (9)$$

Thus, it follows that social isolation must be as comprehensive as the fraction of the population that is not geographically isolated. That is, especially in the early period of the epidemic, imposing a comprehensive social isolation on the susceptible population geographically located in the vicinity of the infected population is sufficient to mitigate the evolution of the epidemic. On the other hand, the longer the time interval between the beginning of the epidemic and the implementation of social isolation measures, the greater the fraction of the isolated population should be, since, by the equations and :

$$\lim_{t\to\infty} 1-\rho(t) = \lim_{t\to\infty} 1-\rho_0(1-\Delta\rho)^t = 1$$

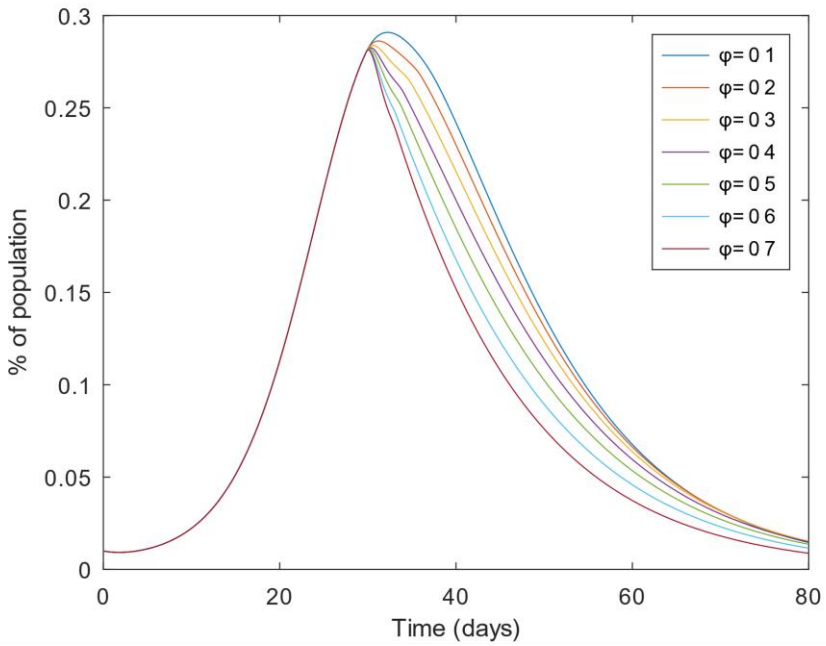
well $\Delta\rho \geq 0$.

To visualize this effect, consider an initial value problem for the system with , with$\big(S(0), I(0), R(0)\big) = (0.99, 0.01, 0)$, $R_0 = 3$ $\beta = 0.3$ and $\rho(t) = 0.8(1-0.01)^t$. In this case, after 30 days we will have $\rho(30) \approx 0.592$ and therefore we can define $\varphi(t)$ as:

$$\varphi(t) = \begin{cases} 0, t < 30 \\ \varphi_0, t \geq 30 \end{cases}.$$

Figure 3 shows the evolution of the number of infected for different values of φ_0:

Figure 3 - $I(t)$ for different values of φ_0



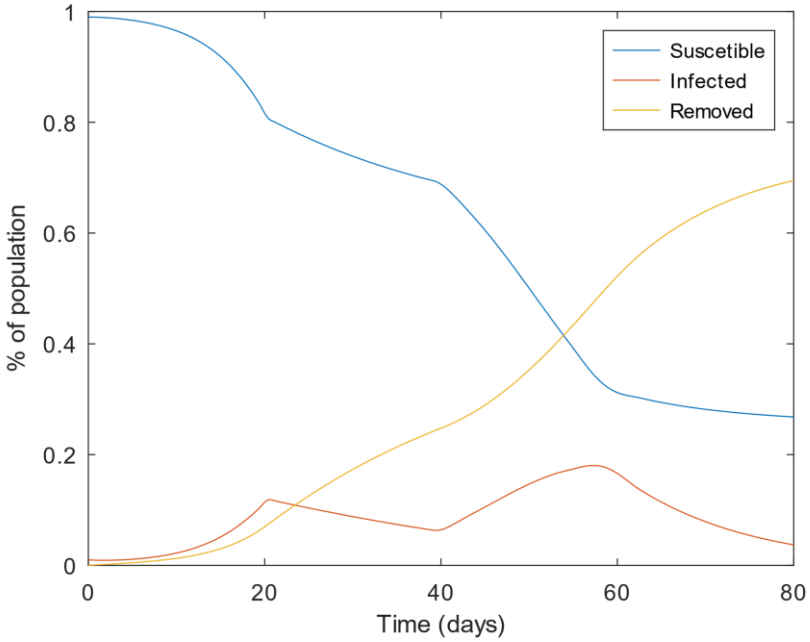
Source: the authors

It is possible to verify that the slope of the graph in Figure 3 becomes negative for values of $\varphi_0 > 0.4$, which agrees with the result predicted by the equation . In addition, the definition by parts of the function $\varphi(t)$ can lead to the creation of more than one wave of infection. For example, if:

$$\varphi(t) = \begin{cases} 0, t \leq 20 \\ 0.7, 20 < t \leq 40 \\ 0, 40 < t \leq 60 \\ 0.7, t > 60 \end{cases}$$

then, for the same initial value problem as before, the system dynamics are shown in Figure 4:

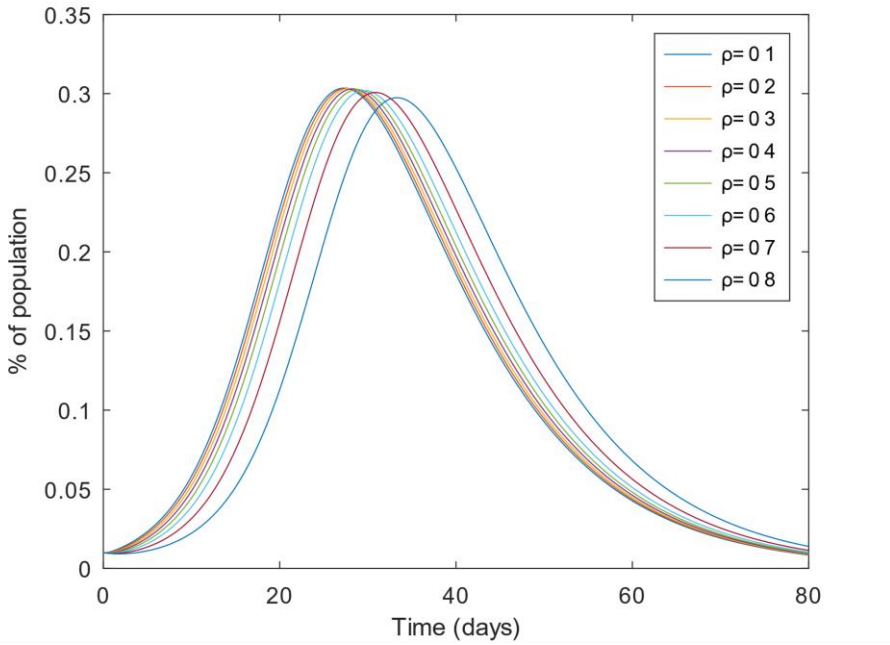
Figure 4 – SIR model with isolation and two waves of infection



Source: the authors

In addition, we can see how geographic isolation acts on system dynamics by delaying the peak of the curve. That is, higher values for the fraction of the geographically isolated population ρ_0 imply a horizontal displacement of the curve $I(t)$, as shown in Figure 5:

Figure 5 – Curve $I(t)$ for different values of ρ_0



Source: the authors

Therefore, while R_0 the values of e determine the criteria for the epidemic to evolve$I\big(S(t=0)\big)$, the values of e $\rho(t)$ $\varphi(t)$ determine the conditions of delay, reduction or creation of multiple waves in the infection curve $I(t)$. However, reproducing the conditions of $\rho(t)$ and , $\varphi(t)$in real epidemics, is a difficult task. This is because the implementation of isolation measures for the population can give rise to the appearance of mental disorders, such as anxiety and depression (FARO; BAHIANO; NAKANO et al., 2020), as well as economically harm the population (PORSSE; SOUZA; OAK & VALE, 2020).

Although the models exhibit objective conditions for an epidemic to be controlled, its real phenomenon is shown as a multifaceted problem that is beyond the hypotheses of the models, interfering in several of the life and health of individuals. However, since social isolation measures can be and have been adopted throughout the Covid-19 pandemic, for example, these models are useful tools for drawing comparisons between the effectiveness of these measures and the cost-effectiveness in relation to their adverse consequences.

5 FINAL CONSIDERATIONS

Throughout the Covid-19 pandemic, which began in late 2019, several epidemiological models have been proposed and modified to meet the need to understand the effectiveness of social isolation measures implemented in several countries.

In this paper, we present some of these models and discuss how measures of geographic and social isolation can be inserted into a SIR model, and from this we extract theoretical consequences that establish conditions of increase or reduction of the infection curve.

We conclude that the construction and use of these models allows us to understand, in an objective way, the effects of delay or reduction of the infection curve and, therefore, constitute useful tools for decision making in epidemic scenarios.

The algorithms used for the production of the figures and for the other models presented in Table 1 were built in the GNU Octave software, mostly using the ode45 function, and will be available to the interested reader through a repository[1] or request to the authors.

[1] Link to access: https://github.com/samuelcostiche/Covid-Algorithms.git.

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CHAPTER
40

Eating behavior of adult women during the pandemics

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ABSTRACT
The pandemic caused by the spread of the SARS-CoV-2 virus has caused several behavioral changes in the population, including eating behavior. This study aimed to evaluate the eating behavior of adult women in the Metropolitan Region of Recife during the lockdown period due to SARS-CoV-2 pandemic. Data collection was carried out through an electronic form with 431 women. The questionnaire contained questions about anthropometric data, social distance following, and the TFEQ-R21 questionnaire covering eating behavior and emotional feeding. The results obtained were that 80.5% of women were socially distant. About 37% of women were overweight, and 90.3% reported perceiving weight variation during the confinement period. An estimate of the risk of gaining or losing weight as a function of body condition was not found before and during social confinement. As for the TFEQ-R21 questionnaire, the domains addressed showed a positive correlation with weight variations in some of its items. It was concluded that an adverse emotional situation arising from a pandemic situation favors emotional eating. It is suggested that individualized nutritional care is necessary for the creation of efficient methods that aim to improve the relationship with food and to prevent the emergence of future eating disorders.

Keywords: Eating behavior, Pandemics, Eating habits, SARS-CoV-2.

1 INTRODUCTION

The disease resulting from COVID-19 infection, has high transmissibility and infectivity, and quickly spread to all countries, leading to a pandemic [1,2]. The most common symptoms are similar to those of the flu. The disease can bring sequelae to some individuals, but its main complication is severe acute respiratory syndrome [3,4]. Due to the pandemic, it was necessary to take some measures to contain the transmission of the virus and reduce its impact on the population. These measures included the adoption of stricter personal hygiene, sanitization of objects exposed to outdoor environments and the practice of social distancing [5].

Social distancing included the closure of spaces that gathered a large group of people, in order to reduce the transmission of the virus [6], which led to major changes in the daily life of the population. Schools and universities had to suspend activities and most workers were restricted to home office work [7]. At the beginning of the pandemic and social distancing, the lack of information about the disease linked to a longer period at home, led to emotional changes and increased negative feelings [8].

Under these conditions, the search for more palatable and, consequently, more caloric foods became common as a form of compensation for these feelings [9]. Emotional eating in turn is associated with momentary pleasure, since this search is for specific foods that stimulate the production of neurotransmitters responsible for generating the feeling of well-being in the short term [10].

The intake of caloric and highly palatable foods (usually ultra-processed) in a considerable frequency, can bring negative impacts to health, and generate consequent pictures of obesity. Obesity can bring several metabolic and hormonal changes, and increase the risk of developing chronic diseases, such as cancer, diabetes, systemic arterial hypertension (SAH) and cardiovascular diseases (CVDs) [11].

The choice and form of food intake is a personal characteristic that reflects the individual's relationship with food and their eating style or behavior. However, the changes in routine and behavior caused by confinement contributed to changes in the eating behavior of a large part of the population [12,13].

It is worth noting that a systematic review showed that females were the group that suffered the most from changes in this behavior [14]. This may be linked to the accumulation of functions commonly performed by women, such as domestic activities, paid activities, child care, among others [8].

Thus, the conditions linked to the COVID-19 pandemic contributed to negative repercussions on the mental health of the entire population, and may be a trigger for the emergence of "emotional eating" [15]. Thus, considering the greater likelihood of women seeking more palatable foods as a form of emotional compensation, this group may be more inclined to develop overweight and obesity through inadequate eating habits. The aim of this study was to identify the existence of an association between eating behavior and changes in body mass in adult women during a period of lockdown during the COVID-19 pandemic.

2 METHODOLOGY

The research was approved by the Research Ethics Committee (CEP) of the Federal University of Pernambuco (CAAE - 33048720.5.0000.5208). The study is cross-sectional and quantitative, with

a minimum sample of 10% (384 participants) of the female population of the Metropolitan Region of Recife.

The survey was conducted during the strictest period of social distancing due to the COVID-19 pandemic, between June 16 and 28, 2020. The inclusion criterion was people born with female biological sex, aged between 18 and 64 years, residents of the Metropolitan Region of Recife.

The recruitment of the research participants was carried out through the internet, randomly and by free adherence, through e-mail and social networks, such as *WhatsApp*® and *Instagram*®. Data collection was performed through an electronic questionnaire developed on the *Google Forms*® platform. All people with the address of the questionnaire were able to respond anonymously and voluntarily.

Self-reported weight and height data were used before and during social distancing to assess nutritional status by calculating the Body Mass Index (BMI). It was also asked if the participants were following social distancing according to the definition of Wilder-Smith and Freeman6, considering social distancing as being working from *home* and only leaving the house for essential activities such as going to the pharmacy or the supermarket.

The TFEQ-R21 questionnaire, proposed by Tholin et al, was used. [22], which assesses eating behavior, and assesses the food prohibition and its influence on weight or body shape; the emotional eating scale; and the tendency to lose food control in the presence of hunger or external stimuli. This questionnaire was used to assess whether emotional eating was present in the behavior of these women during the study period.

Statistical analysis was performed using the *Statistical Package for the Social Sciences* - SPSS (version 20.0, SPSS Inc., Chicago). Continuous variables were tested for normality of distribution by the Kolmogorov Smirnov test. The Gaussian distribution variables were expressed as mean and standard deviation. The variables with non-Gaussian distribution were presented in medians and their respective interquartile ranges. Categorical variable comparisons were analyzed using Pearson's chi-square test. Spearman's correlation was used to evaluate the correlation between the TFEQ-R21 questionnaire and the nutritional status of women. A significance level of $p<0.05$ was considered for all cases.

3 RESULTS AND DISCUSSION

A total sample of 431 women was obtained, with an age range between 18 and 64 years. There was a high concentration of women in the 18 to 24 years and 25 to 34 years age groups, understood as young adults, accounting for almost 70% of the sample.

Regarding compliance with social distancing, a high percentage of women who were following this measure (80.5%) was obtained, while 19.5% said they did not follow social distancing.

Table 1. Nutritional status of adult women before and during social distancing due to the COVID-19 pandemic, Metropolitan Region of Recife, PE, 2020

	Before social distancing		During social distancing	
Nutritional status	N	% valid	N	% valid
Low Weight	16	5,4	15	5,1
Eutrofia	166	55,9	169	57,7
Overweight	84	28,3	72	24,6
Obesity grade 1	25	8,4	27	9,2
Obesity Grade 2	4	1,3	6	2,0
Obesity Grade 3	2	0,7	4	1,4
Total Valid	297	100	293	100
I didn't know	134	-	138	-
Total	431	-	431	-

Results expressed as percentages. n: Number of participants. Low weight: BMI <18.5 kg/m2. Eutrophy: BMI ≥ 18.5 and < 25 Kg/m2. Overweight: BMI ≥ 25 and < 30 Kg/m2. Obesity grade 1: BMI ≥ 30 and < 35 Kg/m2. Obesity grade 2: BMI ≥ 35 < 40Kg/m2. Obesity grade 3: BMI ≥ 40 Kg/m2. Spearman's correlation test p=0.7677

Table 1 contains data on the nutritional status of participants before and during social distancing. Only the data of the women who were able to report their weight and height were considered to calculate the valid percentage, since about 32% of the women did not know how to answer in both moments. It was noted that before the pandemic the majority were within the eutrophy

category (55.9%), followed by overweight women (overweight and obesity) (38.7%) and finally, underweight (5.4%). The same distribution was observed in the data obtained during social distancing. There was no statistical difference (p = 0.7677) between the two moments.

The group presented a prevalence of overweight lower than percentages found by the Ministry of Health in 2021, through VIGITEL, where the frequency of overweight in Brazilian women is 55% [16].

Excess weight, in addition to being associated with metabolic changes and increased morbidity and mortality, is an additional risk factor to the prognosis of COVID-19 and can also bring impairments in quality of life in other aspects, such as psychological and social health [17, 18]

Table 2. Weight variation of adult women during social distancing due to the COVID-19 pandemic, Metropolitan Region of Recife, PE, 2020

Variation	N	% valid
Lost weight	122	42,2
Kept the weight	28	9,7
Gained weight	139	48,1
Total Valid	289	100
I didn't know	142	-
Total	431	-

Results expressed as percentages. N: number of participants. Valid percent: participants who answered BMI.

Table 2 refers to women's weight variation during social distancing. Among the sample, 32.9% did not know how to answer; In this case, only the responses of 289 women were taken into account for the valid percentage. It is noted that 40.5% reported weight loss, 9.7% said they had maintained weight and 49.8% reported weight gain during social distancing. This last data is very similar to that found by Santos et al, in which weight gain was reported by 45.7% of the total sample [19].

A very close percentage was observed between those who reported loss and those who reported gain in body mass, thus configuring a high variation in weight in the isolation period. In total, 90.3% reported having noticed some modification, either weight loss or weight gain.

These results are in agreement with other similar studies that have demonstrated both weight gain and reduction during this atypical period due to COVID-19 [20, 21]. Despite this, this study found values relatively close to reduction and increase in weight, although, in the literature, the numbers of weight gain are higher and more frequent than those of weight loss. This may be due to the fact that some people, in moments of anxiety, pathological or not, have the opposite behavior to that discussed until then, in which they reduce food intake and consequently do not supply the body energy demand, which culminates in weight loss [22].

The variation in weight can be justified by the change in routine that leads to changes in lifestyle and, consequently, emotional disturbances. A study of Canadian families showed changes in eating routine since the pandemic in more than half of the sample (70% of mothers, 60% of fathers and 51% of children), and some of the most common behaviors cited were eating more and snacking more [23].

In addition to the alteration of the eating routine, physical activity configures another very modified behavior. Similar work brings data showing both a decrease in and an increase in exercise during the pandemic. However, the amount of studies that have obtained a reduction in the practice of physical activity is much greater than the studies that bring an increase in this variable [24, 25, 26]. It is very likely, then, that such a change in the habit of practicing exercises favors weight variation, but it is not possible to affirm this hypothesis with the sample of the present research, since this variable has not been studied.

Table 3. Association between overweight women before and during social distancing and weight variation during social lockdown due to the COVID-19 pandemic, Metropolitan Region of Recife, PE, 2020

		Weight variation					
		Lost weight		**Gained weight**		**Total**	
		N	%	N	%	N	%
Excess weight before distancing	No excess weight	72	45,9	85	54,1	157	100
	Overweight	50	48,1	54	51,9	104	100
TOTAL		122	46,7	139	53,3	261	100
Excess weight during distancing	No excess weight	79	49,4	81	50,6	160	100
	Overweight	43	42,6	58	57,4	101	100
TOTAL		122	46,7	139	53,3	261	100

Results expressed as percentages. Overweight: BMI ≥ 25 Kg/m2. Spearman's correlation test. p = 0.822 (overweight before distancing). p = 0.283 (overweight during distancing)

Table 3 shows the comparison between overweight before social distancing and weight variation during social distancing. For this comparison, we selected women who reported some weight variation during confinement, whether it was weight loss or weight gain. Then, the groups were divided into those who were overweight before distancing and those who were not. The data show no association (p = 0.822) with an estimated risk of gaining or losing weight as a function of body condition prior to social confinement.

In the same way that inappropriate eating behaviors have been found during the pandemic, some studies have shown the emergence of improvements in eating [27]. As an example, healthy eating habits stand out in people who have adhered to the Mediterranean diet in European countries, in the purchase and consumption of vegetables; preference for organic products and higher consumption of homemade preparations [26, 28].

Regardless of nutritional status, people have different ways of relieving stress and negative emotions. The triggers from the pandemic can impair an individual's quality of life, but there are also chances that they won't cause such critical changes. A study conducted with a group of university students showed that there was no significant difference in the consumption of ultra-processed foods in the period before and during the COVID-19 pandemic, as well as, the consumption of *in natura* and minimally processed foods were maintained with the same frequency. [29]

In the following table (Table 4), it was evaluated whether there was an association between weight variation, weight loss or weight gain alone, and some components of the TFEQ-R questionnaire21. The items were enumerated according to the order of questions of the complete questionnaire used in the research.

Table 4. Correlation between the weight of women during the period of social distancing with questions from the TFEQ-R questionnaire21

Grouping variables		**Weight variation**	**Gained weight**	**Lost weight**
Sum of cognitive restriction questions (08, 12, 18, 24, 25 and 28)	Correlation coefficient	0,157(**)	1,000	1,000
	P	0,007	.	.
08) I deliberately eat small portions to control my weight	Correlation coefficient	-0,145(*)	-0,109	-0,161
	P	0,014	0,166	0,076
09) I start eating when I feel anxious	Correlation coefficient	0,239(**)	0,229(**)	0,241(**)
	P	0,000	0,003	0,008
11) When I feel sad, I often eat too much	Correlation coefficient	0,216(**)	0,226(**)	0,215(*)
	P	0,000	0,004	0,017

13) Being with someone who is eating, often makes me want to eat too	Correlation coefficient	0,163(**)	0,527(**)	0,621(**)
	P	0,005	0,000	0,000

** The correlation is significant at the 1% level
* The correlation is significant at the level of 5%
Results expressed as percentages. Overweight: BMI ≥ 25 Kg/m2. Spearman's correlation test.

The sum of the questions that cover cognitive restriction (questions 8, 12, 18, 24, 25 and 28), two questions from the emotional eating domain (questions 09 and 11) and one question from the eating control domain (question 13) had a significant and positive correlation with weight change, that is, the score in this variable was directly linked to the perception of variation in weight, be it weight loss or gain. Question 08 (*I deliberately eat small portions to control my weight*) also had a significant correlation with weight change, but in a negative way – as the weight variation increases, the score on this variable decreases.

Regarding weight gain or loss during distancing, in isolation, only questions 09 (I *start eating when I feel anxious) and* 11 (*When I feel sad, often like too much*) had a significant and positive correlation. The other questions of the questionnaire did not show significance with changes in weight in general, nor weight loss, nor weight gain.

Previously, in the literature, it was revealed that among the three domains of behavior addressed in the TFEQ-R21 questionnaire, the one most responsible for the lack of food control and exaggerated consumption resulting in weight gain is emotional eating [30]. Two questions in this domain (9 and 11) showed a significant correlation with the weight change of the studied group. However, the session that presented the most significance in this study was the cognitive restriction session. It was also observed that the questions correlated more with weight variation (weight loss and weight gain together), and less with weight loss or gain in isolation. It is understood, then, that an individual will not necessarily experience weight loss or gain, but eating because of emotions leads to inappropriate eating habits that, in the long run, can induce changes in weight.

"Emotional eating" stood out at the beginning of the pandemic period [15]. People who generally had healthier habits, who consumed natural foods and who worried about weight gain, ended up focusing on other concerns and thus, consumed foods that, at another time, would not be part of the routine [31]. However, the fact that it was confined also meant that people could have the opportunity to improve their eating habits [26].

These changes in eating behavior, associated or not with changes in body composition, emphasize the importance of individualized multidisciplinary care. The nutritional accompaniment should be based on respect for the reality of the individual and based on the preferences, socioeconomic

conditions and cultural experiences of each one, as well as aiming at the good relationship with food and walking together with psychological monitoring.

As limitations of the research, we highlight that there was no assessment of the nutritional status in person by a trained individual. Thus, weight and height were self-reported by the research participants, which may bring an error bias to the data, since they may not know for sure their weight, height and other information outlined in the questionnaire applied. However, due to the pandemic state and social isolation that occurred during the research period, the format of electronic questionnaires was used in several studies with validation. In addition, this method has already been used even before the pandemic, such as VIGITEL. Thus, the data collected in this study can be used from a scientific point of view.

4 FINAL CONSIDERATIONS

The information found in this study suggests that social distancing has had certain impacts on women's diet. There was no exclusive relationship between the presence of excess weight and social confinement, but changes in eating behavior and changes in weight were observed during this period. Through the EFTF-R21, common behaviors such as eating more because of anxiety or sadness were found.

It was concluded that emotional changes caused by adverse situations linked to the pandemic favored "emotional eating". By associating these behaviors with the conditions experienced during the COVID-19 pandemic, it is understood that emotional eating was present in the eating habits of most women, and it was not linked to a specific body condition.

Further research on this topic is necessary, both with women and with other groups, aiming to define the groups with the highest risk of suffering changes in eating behavior during troubled and emotionally charged phases.

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CHAPTER
41

Covid-19: Sudden changes in the academic landscape and their impacts on quality of life in teaching work

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ABSTRACT
Faced with the pandemic scenario and the consequent sudden changes in the academic environment, teachers were significantly impacted by the need to adapt their teaching strategies when they needed to transfer their work environment into their homes. Thus, it is important to study the QWL of teachers in order to understand how and how much they were impacted and what measures can be adopted to mitigate these effects, since QoL and QWL can influence the quality of the education offered. Thus, the present study aimed to analyze the Quality of Life at Work of teachers of a public educational institution in the face of a pandemic scenario. This research was classified as qualitative and descriptive. Data collection took place through the collection of primary data that occurred through field research with the application of a semi-structured questionnaire, whose questions dealt with the characteristics of the profile of the respondents and the impacts of the pandemic on the QWL of teachers. The tabulation of the data was done through the digital platforms Google Forms and Microsoft Excel 2013, where, through its resources, absolute numbers, percentages and the generation of graphs and tables were obtained. For qualitative research, content analysis was used. The partial results showed that the QWL of the professors surveyed was considerably impacted, especially due to the increased workload. It was concluded that the changes caused by the pandemic period negatively impacted the QWL of the respondents. The criteria of Work and total living space, working conditions and social integration in the organization stand out as the most impacted in the pandemic period. It is suggested, from the data collected, future studies on the investigated problem, for better understanding and mitigating suggestions.

Keywords: QWL, teachers, pandemic, impacts.

1 INTODUCTION

On December 31, 2019, the World Health Organization (WHO) was notified about the increase in pneumonia cases in Wuhan City, Hubei Province, People's Republic of China. It was then found that it was a new type of coronavirus, unheard of in humans. Subsequently, on January 30, 2020, the WHO declared that the outbreak of the disease was a Public Health Emergency of International Importance - ESPII (PAN AMERICAN HEALTH ORGANIZATION - PAHO, 2021).

Later, on March 11, 2020, through report No. 51, the WHO declared the COVID-19 pandemic, underscoring concern about the alarming levels of spread and severity of the virus that was already in various parts of the world (WHO, 2020).

Against this backdrop, a series of recommendations have emerged from health agencies to contain the spread of the virus; These include mask-wearing, alcohol gel and social distancing. Based on this same idea, WHO has also granted special guidance to ensure a safe school environment and

advised national and local authorities on how to adapt and implement emergency practices in educational facilities in order to mitigate negative impacts on learning while ensuring the health and well-being of all (WHO, 2020).

Taking into account the general configuration of academic environments, most often being organized in closed rooms, the place that was previously considered ideal for the dissemination of knowledge has come to be feared for favoring the spread of the virus.

To comply with the restriction measures, one of the strategies adopted was the replacement of face-to-face teaching with online teaching. At this juncture, 199 countries have chosen to close their schools, negatively affecting more than 1.5 billion school and university students (UNESCO, 2020).

In Brazil, this measure was taken after the publication of Ordinance No. 343, of March 17, 2020, of the Ministry of Education, which authorized the suspension of face-to-face classes and the replacement by the model of remote classes, taught through technological and digital means for a period of thirty days, initially (BRASIL, 2020).

The ordinance also established the responsibility of educational institutions in relation to the disciplines offered in this mold and the availability of tools to students that would enable the monitoring of the content offered and the realization of the activities opportune.

It was also emphasized that academic activities, previously suspended, should be replaced, granting freedom to institutions to make changes in the school calendars of vacations, so that they could comply with the teaching workload established in the legislation (BRASIL, 2020).

Faced with this scenario, the sudden change in the academic environment and in teaching-learning techniques, in addition to students, teachers were also significantly impacted when they needed to transfer their work environment into their homes.

This transition led them to deal with new situations, pressured by the need to quickly learn how to handle digital platforms, produce videos and adapt their teaching strategies. In addition, they had to adapt to the unknown moment of fear and emotional and psychological instability of a disease that was spreading every day, directly interfering in their Quality of Life (QoL).

QoL, according to Monteiro and others (2010), is very comprehensive, presenting objective and subjective aspects. It is associated with the feeling of well-being, quality of lifestyle, health and leisure, involving psychological, social, physical and economic factors.

Thus, it is essential to study how the Quality of Life and, even more, the Quality of Life at Work of these teachers, was impacted, taking into account the changes and potential factors of the COVID-19 pandemic.

In this perspective, the guiding question of the present study was: how is the QWL of teachers in the current pandemic scenario? The general objective of this study was to analyze the Quality of

Life at Work of teachers of a public educational institution in the face of a pandemic scenario.

2 THEORETICAL FRAMEWORKS

According to the World Health Organization, quality of life is defined as a perception that each individual has about the position he occupies in life, within his context of culture and values and in relation to his goals, expectations, standards and concerns (WHO, 1997).

In this same parameter, Rocha and Felli (2004) complement that the conceptualization of the term "quality of life" is quite complex, because it presents a subjective character and involves intrinsic and extrinsic factors. Currently, it is indispensable to value the quality of life, since contemporary society enjoys a longer life expectancy, compared to the past.

This means longer lifespan and a longer time frame of work and productivity. Proportionally, the awakening of conscience and the right to health, new habits and behaviors of this new social reality also grows (LIMONJI-FRANCE, 2004).

In this context, it is considered that having quality of life is an individual position measured within the reality, convictions, vision, beliefs and experiences of each one. Thus, what can be considered as a good quality of life for one individual will not necessarily be adequate for another.

A study conducted by Pereira and others (2014) demonstrated that the quality of life of teachers has a close relationship with the reduction of their workload. That is, the lower the weekly workload, the higher the quality-of-life index. In this research, the difference between effective and substitute teachers was demonstrated, since substitute teachers have a lower workload due to their contracts being 20 hours or less. On the other hand, effective teachers have a workload of approximately 40 hours.

2.1 QUALITY OF LIFE AT WORK (QWL)

For Freitas and Souza (2009), the issues related to QWL are broad and challenging, leading to interpretations from various perspectives. This is due to the fact that the theme is influenced by aspects related to the time, both social and organizational.

In accordance with the above definitions, Limonji-France (2004) explains that the term Quality of Life at Work (QWL) is a broad concept that includes from the actions that a company must take in relation to its employees, defined by legislation as a way to ensure their health and safety, to the actions that employees and employers can develop, voluntarily, in the areas of leisure and motivation in order to provide their well-being.

Within these factors, Limonji-França (2004) also shows that the theme of QWL transcends these common and general issues and focuses on the individual, contemplating occupational risks, the ergonomics of employees, their health and safety, repetitive efforts, mental load, communication,

behavior, loyalty, leadership and others.

Inserted in this compilation of elements, it can be said that, at the individual level, the quality of life at work aims to mitigate physical, psychological and social factors of the working class that directly influence the organizational scope and the performance of organizations. According to Vasconcelos and others (2012), organizations have always been concerned with issues related to quality.

However, before, this concept was only limited to the final quality of the products and the satisfaction of the external customer. Later, it was realized that, before talking about the quality of products and services, it is also necessary to think about the work context of those who will produce, that is, their QWL.

2.1.1 History

Some factors were responsible for triggering QWL in post-industrial society, among them: the bonds and structure of personal life (family, leisure, sports activities, changes in health care and nutrition, healthy lifestyle habits, among others); socioeconomic factors (technology, information, unemployment, consumption patterns); business goals (competitiveness, costs, corporate image); and organizational pressures (new power structures, variable remuneration, social projects) (LIMONJI-FRANCE, 2004).

According to Ribeiro and Santana (2015), the QWL movement emerged in England in the mid-1950s through Eric Trist, a renowned psychologist of the time, active in the area of Organizational Development. He began studies with his collaborators to understand the relationship between workers and organizations. One of the basic aspects of his research was the impact on the lives of individuals, who began to perform their work activities satisfactorily.

Concomitantly, in the 1960s, when employees became even more interested in their satisfaction and well-being at work, added to the concern that companies began to have to preserve the physical and psychological health of their employees, the movement intensified and gained more strength (RIBEIRO; SANTANA, 2015).

From the moment on, it was perceived that QWL was directly linked to indicators related to productivity improvement, giving more emphasis to movement, which impacted good economic and financial performance and international competitiveness (MONTEIRO *et al*., 2011).

In the 1970s, the concept of QWL was resignified, in the face of the competition of countries for the international market, through the methodology of Japan, which programmed a new perspective of management in its factories, causing other countries, such as the United States, to question and relate this paradigm shift to its promising results (FERNANDES, 1996).

In continuity, in the 1980s, this process was even more intense due to a greater participation that workers began to have in companies, in order to humanize work more (LACAZ, 2000). In the 1990s, according to Búrigo (1997), QWL was expanded to many countries in Europe and America, becoming the focus of studies that encompassed workers' health within organizations. In Brazil, studies related to QWL began around the 1980s, but with a very significant influence of international models.

In recent years, in Brazil, the Center for Ergonomics of Activity, Cognition and Health (ECoS), of the Institute of Psychology of the University of Brasília (UnB), and the Group of Studies and Research in Ergonomics Applied to the Public Sector (ErgoPublic), of the Institute of Psychology of the University of Brasília (UnB), stand out as centers of diagnoses and studies related to QWL (FERREIRA, 2011).

Through the studies and projects related to the theme of Quality of Life at Work, Ferreira (2011) elaborated a methodological model of QWL analysis with a focus on the public sector, which addresses the analysis of QWL in two aspects: analytical level of macro and microergonomic diagnosis. The first identifies QWL in relation to the organizational context in which workers are inserted, considering two variables responsible for the level of QWL: well-being at work and malaise at work.

The microergonomic analysis addresses the details, surgical and in-depth points about the factors that generate impacts on well-being and malaise at work, as well as the way in which workers deal with the impositions and conditions established in the middle of two dimensions: the human cost of labor (what must be spent by workers in physical terms, cognitive and affective to develop the tasks and activities proposed at work) and individual/collective mediation strategies (correspond to the way of thinking, feeling and acting of employees in the contexts experienced) (FERREIRA, 2011).

2.2 QWL OF TEACHERS

According to Sanchez (2015), teachers' quality of life and QWL are influenced by two factors: work and health. The first concerns income, time spent on administrative activities, overcrowding of classrooms and the characteristics of the environment, such as lighting, noise and temperature. The most important factors related to health were self-medication, the need to leave due to illness, poor diet, little leisure and sleep quality. The author also points out that there is an inherence between the personal and professional lives of teachers.

In this same sense, Pereira (2018) complements by emphasizing that the teaching profession is too stressful due to long working hours and few moments of breaks for rest and food. "In this way, the schedules are disrespected, hours of sleep are lost, one eats poorly, and there is no time for leisure" (PEREIRA, 2018, p. 29).

In this context, Santos, Mattos and Pinto (2011) also mentioned factors related to QWL

responsible for the discouragement of teaching work: non-recognition, remuneration, not knowing how to act in certain situations, mechanized activities, abuse of authority, precarious resources and lack of empathy among co-workers.

The importance of investigating the QoL and QWL of teachers is highlighted, since the strain resulting from the career of these professionals compromise their pedagogical performance and harm the teaching-learning relationship, negatively impacting the quality of the education offered (OLIVEIRA, 2019).

Thus, models emerge to identify and investigate potential factors that influence Quality of Life at Work. One of the most recognized proposed models in the literature and applied in the resulting studies is the Walton model, detailed in the following section.

2.3 WALTON'S MODEL

For Walton (1973), QWL can be measured through eight criteria, ranging from fair and adequate compensation to the social relevance of work. For him, these criteria are sufficient to offer a sophisticated structure for the analysis of the fundamental characteristics of QWL. Walton (1973) defines the criteria as:

1. Fair and adequate compensation: work is the means used to build and maintain needs throughout life, and the way it is obtained directly impacts QWL. The criterion of fair and adequate compensation is subjective, and there is no consensus to judge what is fair and appropriate in this criterion. On the other hand, factors such as required training, level of responsibility and harmfulness of working conditions determine the fair level of remuneration. The determination of this criterion is divided into adequate income and fair remuneration.
   - Adequate income: refers to the degree of adequacy of this income in relation to the socially determined standards that allow the worker to live according to their living standards.
   - fair remuneration: comparison of wages between workers of the same organization and in relation to the labor market in general.
2. Working conditions: refers to the satisfaction of employees in relation to the conditions offered for the development of their work, such as: adequate physical environment, which minimizes the risks of diseases and injuries; compatible schedules; availability of conforming materials and equipment; and absence of unhealthiness.
3. Use and development of skills: this factor consists of the opportunity that workers have to develop their skills and knowledge. Some variables contemplate this criterion

and determine the level that the organization allows these skills to be used:

- autonomy: permission that the worker has in relation to external controls;
- multiple skills: how much it is allowed to put into practice diverse skills;
- information and perspective: level of information that one has about the total process of the activities developed;
- entire tasks: opportunity to develop fully or significantly part of a task;
- Planning: opportunity to develop the planning and execution of activities.

4. Opportunity for growth and security: refers to the opportunity conferred for the employee's career. At the moment, the following aspects are observed:

- development: through activities and training, given the opportunity for the worker to expand their capabilities and be able to advance in their career;
- prospective: use skills and knowledge acquired or resulting from experiences in future work contributions;
- Advancement opportunities: career advancement in the organization;
- Security: Feeling secure about income and employment.

5. Social integration in the organization: the coexistence between employees influences the climate of their workplace and reflects directly on their QWL. This aspect can be characterized by the acceptance of individualities, without prejudice, equality of opportunity and incorporation of employees into the organizational community.

6. Constitutionalism: explicit establishment of norms and duties of workers and also of their rights, among them: freedom of expression, equity and attention to labor rights.

7. Work and total living space: the experiences resulting from organizational activities can have a positive or negative impact on other spheres of life. This criterion refers to the balance between work and personal life. It is important that the worker has a timesheet and tasks that also allow him to experience moments of leisure and rest with the family.

8. Social relevance of life at work: refers to the perception that the worker has of the company in which he works in relation to his social role, namely:

- institutional image: how the worker sees the company in view of its relevance to the community, his pride and satisfaction in belonging to the organization;
- social responsibility of the institution: the perception that workers have of the company and its relationship with the community with regard to its ability to help solve problems and not cause harm;
- social responsibility for services/products: quality of products/services offered to customers;

- Social responsibility for employees: how workers feel about the treatment received by the institution to which they belong (human resources policies).

3 METHODOLOGIES

This section addressed the methodology of the present study, which was divided and explained in the later sections, namely: type of research, collection, treatment and analysis of data.

3.1 TYPE OF RESEARCH

As for the approach, the present study was characterized as qualitative research, which according to Gil (2008, p. 175), "involves the selection, focusing, simplification, abstraction and transformation of the original data into summaries, organized according to the themes or patterns defined in the original objectives of the research".

The author also emphasizes the importance of properly choosing the way to codify the data obtained to have constructed and verifiable conclusions.

Taking into account that the qualitative method addresses the deepest and non-metric issues, enabling a greater understanding of the subject, this approach became essential to confirm the satisfaction of QWL in the perception of a significant portion of this population and subsequent conclusion about how this industrious class was impacted.

The research was descriptive, which, according to Prodanov and Freitas (2013), happens when the researcher records and describes the facts of the population studied through a questionnaire or observation, without interfering in them.

For the collection of primary data, through a semi-structured questionnaire, field research was carried out, which, according to Gil (2008), is characterized by the collection of data from a certain population in order to deepen the questions raised for the population studied, enabling its description. The collection of these data was described and detailed in the next topic.

3.2 DATA COLLECTION

To obtain the results of the research, information was collected from primary data. According to Prodanov and Freitas (2013), the primary data are obtained by the researcher, through field research. Before conducting the research, a formal request was made to the General Directorate of the institution for authorization of the study with the professors via the organization's electronic information system, which was met. Thus, the collection of primary data was made from the application of a semi-structured questionnaire, through field research. Initially, the respondents were invited to answer the questionnaire, the Term of Consent and Free Clarification, which dealt with the objectives and the way

in which the research was conducted.

It is noteworthy that, in order to proceed to fill out the questionnaire itself, these respondents had to agree with the guidelines presented.

The semi-structured questionnaire was divided into sections. The first section was composed of 08 (eight) questions that aimed to collect information about the profile of the respondents (gender, age, education, department that the professor integrates, level of education that teaches more classes, time that works in the institution, monthly income and work regime), characterizing them.

The second section addressed QWL and the pandemic, composed of five objective questions and one discursive question, created by the author of this study, and some questions were elaborated based on the criteria of the Walton model, where teachers had the opportunity to describe their experiences in relation to the pandemic scenario and its impacts on QWL.

The questionnaire was conducted on the electronic platform of *Google Forms.* A message was created to present the research with the provision of the *link* to access the questionnaire. The sending of this e-mail message was carried out by the official Communication Office of the institution, which has 162 registered professors, according to the sector.

The form was available to receive responses from January 18, 2022 to February 11, 2022, and the first date of sending the link *created through an email message by the institution's Communication Office was on January 18, 2022, and the second submission took place on January 26, 2022,* also by e-mail, being answered by 107 professors, that is, the response rate was 66.05%.

It is noteworthy that, before the application of the questionnaire to the entire population studied, the pilot test was carried out, by sending the form to two teachers, allowing a series of adaptations and improvements of the instrument and allowing a better understanding of the questions, average time to answer and, consequently, better research results.

The pilot test, or pre-test, according to Gil (2008), consists of a preliminary verification, before the definitive application of the questionnaire, which allows the identification of possible flaws and the clarity of the terms used, thus ensuring that the questionnaire is well prepared for the application.

3.3 DATA PROCESSING AND ANALYSIS

After the application of the questionnaire, the data were coded and tabulated using as a tool the digital platforms of *Google Forms and* Microsoft Excel *2013, using its resources to obtain absolute numbers and percentages, and the construction of graphs and tables.*

Initially, for the data of the first section of the questionnaire applied, referring to the characterization of the professors, which included: gender, age, schooling, department that the professor integrates, level of education in which he teaches more classes, time that works in the

institution, monthly income and work regime, percentages and absolute numbers were used for the construction of representative graphs for better illustration and visualization of the results.

For the second section of the questionnaire, the analysis was based on the statements of absolute numbers and percentages, arranged in graphs and tables. Finally, for the final question, which was discursive and optional, the analysis of the main converging (which align and approach) or divergent (which distance) points raised by the professors and described as a way to justify and complement the closed answers was carried out.

For the analysis of this question, the technique adopted was the content analysis, by Bardin (2011), which consists of a set of analyses of the communications, aiming to obtain conclusions of the messages. The technique is divided into three fundamental phases: pre-analysis, exploration of the material and interpretation of the results.

4 RESULTS AND DISCUSSION

In this section, the results of the research were presented and discussed. For a better understanding and analysis, the data were divided into subsections: profile of respondents and analysis of teacher QWL in the pandemic period.

4.1 PROFILE OF RESPONDENTS

The research data were obtained through the application of a semi-structured questionnaire to the professors of a public educational institution. The first block of the questionnaire contained 8 (eight) questions that dealt with the profile of the respondents: gender, age, education, department that the professor integrates, level of education in which he teaches more classes, time working in the institution, monthly income and work regime.

The questionnaire applied was answered by 107 teachers; of these, about 59.81% are male, and the remainder (40.19%,) female. Thus, the respondent population consisted mostly of male teachers. However, the percentage of women was also significantly representative.

Regarding the age of the teachers, about 47.66% are over 31 to 40 years old; 28.97%, over 41 to 50 years; 17.76%, over 51 to 60 years; 3.74%, over 20 to 30 years; and only 1.87% were older than 61 years. Overall, it was perceived that this is a mature population. Table 1 shows the crossing of the Age/Gender data.

Table 1 - Age and gender of respondents

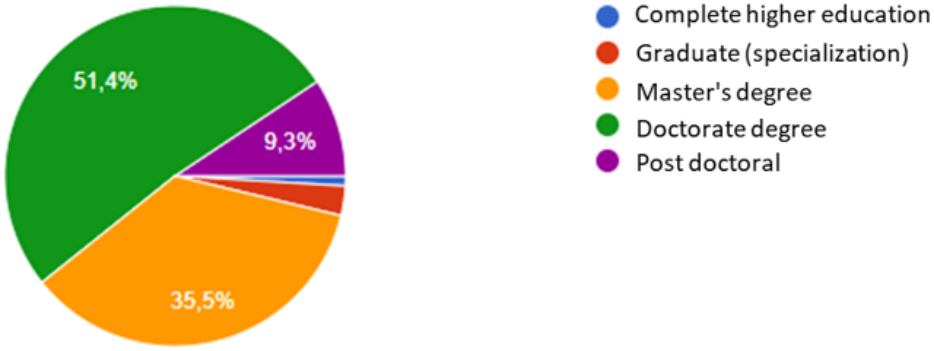
Age/Gender	Male (%)	Female (%)	Total (%)
Above 20 to 30	2,80	0,93	3,74
Above 31 to 40	26,17	21,50	47,66
Above 41 to 50	17,76	11,21	28,97
Above 51 to 60	12,15	5,61	17,76
Over 61 years	0,93	0,93	1,87
Total	**59,81**	**40,19**	**100,00**

Source: Survey data, 2022.

Regarding the level of education, 51.40% of the professors have a doctorate; 35.50%, master's degree; 9.30%, post-doctorate; 2.80%, postgraduate; and only 0.90% have higher education complete.

It was noted that the education level of the professors is high, where most of them have a doctorate (Figure 1).

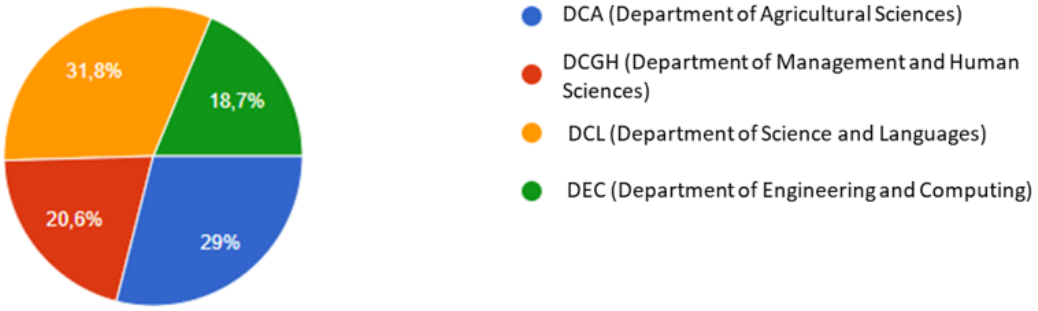
Figure 1 – Education



Source: Survey data, 2022.

Regarding the department in which each professor is full, it was noticed that the majority belongs to the DCL (Department of Sciences and Languages) - 31.80%; followed by the Department of Agricultural Sciences (DCA), with 29.00% of the respondents, as shown in Figure 2.

Figure 2 - Department in which the professors are crowded

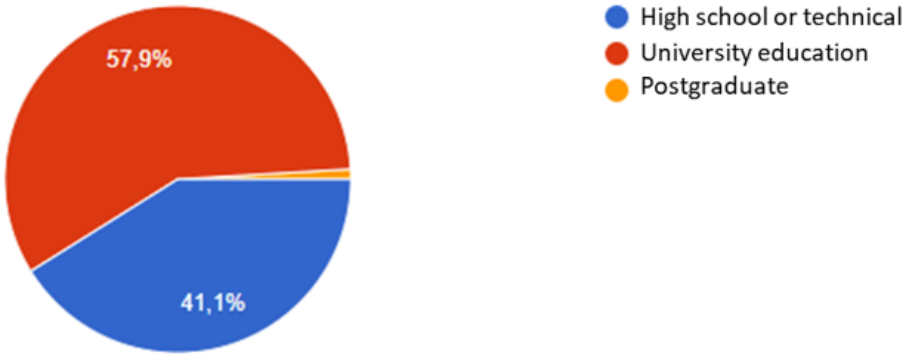


Source: Survey data, 2022.

Regarding the segment in which teachers most teach their classes, 57.90% said it was in higher

education; 41.10% teach most of their classes for high school/technical education; and only 0.90% have their disciplines concentrated in graduate education (Figure 3).

Figure 3 - Segment with the largest number of classes

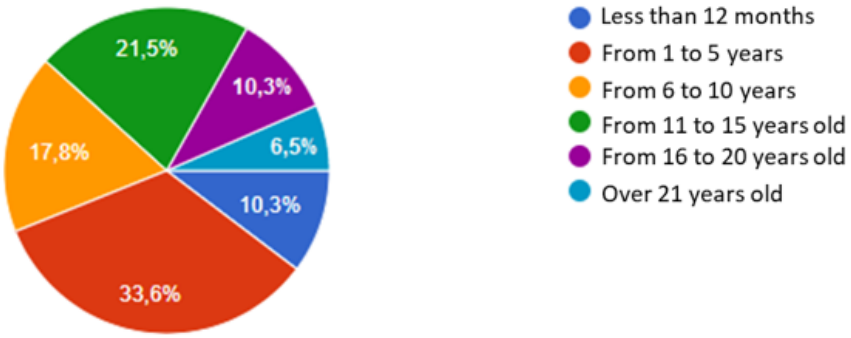


Source: Survey data, 2022.

The sixth question asked the interviewees about the time of work of each one in the researched institution. The results showed that 33.60% work in the institution from 1 to 5 years; 21.50%, from 11 to 15 years; followed by 6 to 10 years, with 17.80%; 10.30% have been working for less than 12 months; and 6.50%, for more than 21 years (Figure 4).

It was possible to notice that most of the professors have been linked with the institution for more than 5 years, suggesting greater familiarity with the environment, colleagues and norms, which may reflect on some analyzed criteria of QWL.

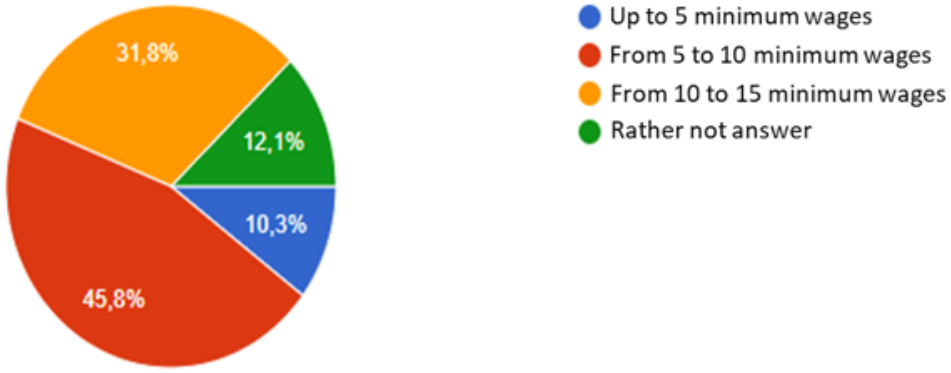
Figure 4 - Time of work in the institution



Source: Survey data, 2022.

The seventh question addressed the monthly income of teachers, as represented in the Figure 5.

Figure 5 - Monthly income



Source: Survey data, 2022.

Figure 5 indicates that most teachers (45.80%) receive from 5 to 10 minimum wages, followed by 31.80% who receive from 10 to 15 minimum wages, and 10.30%, up to 5 minimum wages.

The eighth and final question in this section was about the work regime of the responding teachers. About 88.80% have an effective link with the institution; 8.40%, temporary contract, acting as substitute teachers; 1.90%, visiting professor's bond; and only 0.90% work as volunteer teachers.

The high rate of effective teachers suggested greater financial and career stability, which presupposes an impact on QWL.

According to the data obtained in this section, it is noticed that most of the responding professors are male, aged over 31 to 40 years. Most of the respondents have a high level of education (doctorate) and are assigned to the Department of Science and Languages.

The responding professors have a higher workload of classes in higher education and work from 1 to 5 years in the institution. And finally, most of the professors stated that they earn from 5 to 10 monthly minimum wages and have an effective bond with the institution.

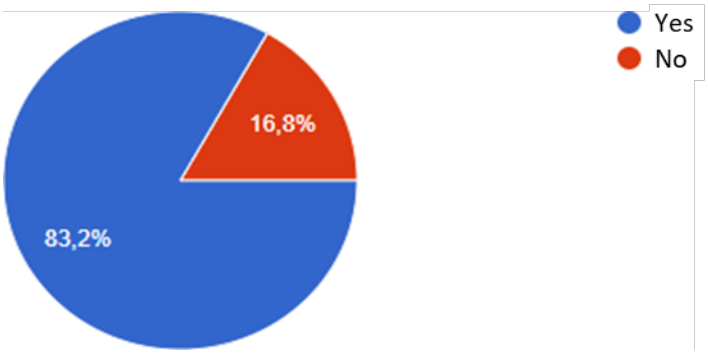
4.2 TEACHER QWL IN THE PANDEMIC PERIOD

In this section, the results obtained through the application of the questionnaire on the QWL of teachers in the pandemic period were presented. The first question asked them whether, in their perception, the pandemic affected QWL.

As illustrated in Figure 6, 83.20% of the respondents said yes, and this percentage refers to 89 teachers in absolute numbers.

On the other hand, 16.80% reported that their QWL was not affected by the changes in the pandemic scenario.

Figure 6 - Has your QWL been affected in the pandemic?



Source: Survey data, 2022.

The second question of this topic asked teachers to assess the general situation of QWL during the pandemic; 48.60% evaluated their QWL in this context as regular; 39.30%, good; 6.50%, very bad; 2.80% considered it excellent; and 2.80% preferred not to answer (Table 2).

Table 2 - Evaluation of QWL in the pandemic

QWL vs. Pandemic	Responses (%)
Excellent	2,80
Good	39,30
Regular	48,60
Bad	6,50
I'd rather not answer	2,80
Total	*100*

Source: Survey data, 2022.

With regard to workload during the pandemic, when compared to face-to-face teaching, the majority of teachers (57.90%) stated that it increased a lot, and 23.40% considered that it increased little, resulting in 81.30% who declared that there was an increase in their workload in the transition from remote learning.

On the other hand, 5.60% reported that it decreased slightly; and, to 0.90%, it decreased a lot. On the other hand, 9.30% answered that the workload remained unchanged, and 2.80% preferred not to answer (Table 3).

In this sense, Tsuboi (2019) highlights that work has occupied much of the lives of teachers, and the space that should be destined for family, leisure and other activities has been filled too much with academic activities, such as lesson planning, affecting the balance between the personal and professional lives of teachers.

Table 3 - Workload and the pandemic

Workload vs. pandemic	Responses (%)
It has increased a lot	57,90
It increased little	23,40
Remained unchanged	9,30
It has decreased little	5,60
It's slowed down a lot	0,90
I'd rather not answer	2,80
Total	***100***

Source: Survey data, 2022.

The fourth question dealt with the variable of Walton's model that the professors considered most important to have a good QWL, with 30.84% considering that it is the Work and the total space of life, that is, the balance between work and personal life.

The study conducted by Neves (2020) found an importance attributed by teachers to the criterion of work and life, which presented unfavorable results in relation to satisfaction, indicating the work overload that overlaps the total space of life. Group 1 of Broche's study (2020) revealed general dissatisfaction with QWL, mainly due to the total space of life, where it was contemplated that the professors most involved with the research had to reconcile classes and other academic activities, compromising their time to perform other personal activities.

The second most considered variable was "Working conditions - satisfaction of employees in relation to the conditions offered for the development of their work", such as: physical environment, compatible schedules, availability of adequate materials and equipment and absence of unhealthiness - with 28.03% of the responding teachers.

On the other hand, 12.15% considered the most important variable to be social integration in the organization: equal opportunities, without discrimination; healthy and mutual relationship, without hurting the individuality of each one, and the sense of community, in which the employee feels incorporated into the group and the organization.

The variable Constitutionalism was not considered by any respondent (Table 4).

Table 4 - Variable considered most important for QWL

Most important variable for a good QWL	Responses (%)
Work and total living space	30,84
Working conditions	28,03
Social integration in the organization	12,15
Opportunity for growth and security	8,41
Use and development of capabilities	7,48
Fair and adequate compensation	6,54
Social relevance of life at work	6,54
Constitutionalism	0,00
Total	*100*

Source: Survey data, 2022.

In this same sense, the next question addressed which of these criteria was most negatively

affected by the pandemic in the lives of teachers. First, 38.30% considered the variable "Work and total living space", which confirmed question 3 (the workload, during the pandemic due to the Novel Coronavirus, when compared to that of face-to-face teaching), where 81.30% affirmed an increase in their work and, consequently, a greater occupation in their total living space.

On the other hand, 34.60% considered working conditions as the most affected variable, and, according to 12.10%, the variable most impacted was social integration in the organization, which refers to equal opportunities, without discrimination; healthy and mutual relationship, without harming the individuality of each one, and the sense of community, in which the employee feels incorporated into the group and the organization (Table 5).

Table 5 - Variable most affected by the pandemic

Variable most affected by the pandemic	Responses (%)
Work and total living space	38,30
Working conditions	34,60
Social integration in the organization	12,10
Social relevance of life at work	4,70
Fair and adequate compensation	3,70
Opportunity for growth and security	2,80
Use and development of capabilities	2,80
Constitutionalism	0,90
Total	***100***

Source: Survey data, 2022.

It was observed, as shown in Tables 4 and 5, that the variable considered most important to have a good QWL was also the one most impacted by the pandemic (work and total living space), followed by the variables "working conditions" and "social integration in the organization", respectively, indicating this same trend, suggesting conformity and agreement between the variables analyzed.

On the other hand, the variable constitutionalism was not marked by any teacher as important for QWL, but had answers regarding the factor that was most affected in the pandemic.

The last question of this block was discursive, and aimed to provide an opportunity for teachers to express their opinions about their experiences in this context.

Respondents were asked to report the main positives and negatives that the pandemic has brought to their QWL. In this question, 69 professors contributed (64.50%), demonstrating how eager they were to expose their opinions and ideas.

The main positive point reported was the learning and the insertion of new technological tools for teaching. In addition, the convenience of working from home, not requiring displacement, was also mentioned; closer accompaniment of the family and the development of the children; better

reconciliation of work activities with those at home; greater flexibility of schedules; and opportunities for producing articles and participating in online academic events.

Some contributions, in full, of professors who reported their positive perceptions are shown in Chart 1.

Table 1 - Teachers' positive perception of QWL and the pandemic

Respondent number	Positive responses to the discursive question
16	During the pandemic, there was improvement in my QWL due to the low need for large displacements.
18	The implementation of new teaching technologies that had them Accelerated implementation in the context of need.
23	Learn new tools and methodologies.
29	More time to work with research.
67	The fact of being next to the family, mainly because I followed the growth of my daughter since birth, positively influenced the development of work activities, because it was possible to equalize the time dedicated to family and work, with a flexibility that is impossible when you are in the work environment (fixed schedules and far from home).
73	I produced a lot of written material, especially scientific articles.

Source: Survey data, 2022.

Regarding the negative points, the high volume of activities and meetings were reported; the increase in corrections; students' lack of interest; the oscillation of productive days and days of procrastination; the non-reconciliation of work and family, since this separation was compromised; the lack of coexistence with the academic community; the suspension of research and extension activities; the non-realization of practical classes essential for the realization of the teaching and complementation of the theory; greater collection by the institution and students; increased bureaucracy to perform certain tasks; the lack of recognition, on the part of society, that the teacher worked hard in this period, even performing homework.

Some contributions, in full, of professors who reported their negative perceptions are shown in Chart 2.

Table 2 - Teachers' negative perception of QWL and the pandemic

Number responder	Negative responses to the discursive question
7	The institution has not provided any financial or material support to support faculty during the pandemic. My *laptop* screwed up and I had no support, my internet was insufficient and I had no support, my media equipment such as camera, microphone, *software* was insufficient, and the institution did not even support with technical assistance.
11	The impossibility of going out and having a more active social life, the difficulties faced by the new teaching method (ENP), the lack of qualification for effective production and quality of teaching objects made us dedicate many hours of the day to work work, I was in a situation of, in the morning, afternoon and evening, doing work, in front of the computer, the school. This, over time, led to psychic problems, leading to the need for intervention by professionals in the area. Today I also have problems of pain in the wrist, I think due to to the intense use of keyboard and *mouse*.
62	I'm a teacher who likes to deal with people, the day-to-day contact.

	I didn't adapt.
69	The QWL has gotten much worse, because, the way we are, we don't even know our own students, they can't learn as they should, because they don't they can see their bond with the institution.
87	The pandemic has made my home, which was supposed to be my resting place, become my place of work, meaning I have worked harder and harder I rested less.
95	The pandemic has affected the teacher-student relationship, causing less progress in teaching-learning. The teacher does not have the freedom and dynamics to be able to implement teaching and evaluation methods that favor the assimilation of the contents passed on, as well as to diagnose the main difficulties presented by the students. What consequently has brought the lack of knowledge of the teacher about the gaps in the learning of the student, who feels unmotivated to study the discipline. This fact can be evidenced by the deadlines of the non-activities be fulfilled.
97	As I am a Physical Education teacher, the biggest difficulty was to be without the contact of the students and without developing the practical classes. The movement is The body practices we worked on in face-to-face classes further affected the health and quality of life of the students.
99	My quality of life at work has gotten a lot worse. I have been working harder and the return is very little. For me, it was very clear the impossibility of reducing education to digital and technological means. Or Human beings need closeness, contact, eye to eye.

Source: Survey data, 2022.

According to the answers obtained in this question, it was perceived that the pandemic had a more negative than positive impact on the quality of life in the work of teachers. Most respondents mentioned the same positive points, which were few, compared to the negative ones. It is noteworthy that part of the professors did not even point out the benefits they considered with the changes that occurred in this period, but pointed out several factors that impaired the QWL.

Other factors mentioned by the professors in this discursive question were in relation to the impacts that the pandemic caused on physical and psychological health due to the overload of work and the anguish experienced in this time of uncertainties and fears.

According to Sanchez (2015), teachers' quality of life and QWL are influenced by two factors: work and health. The most emphasized aspects related to health were self-medication, the need to get away due to illness, poor diet, little leisure and the quality of sleep.

The author also points out that there is an inherence between the personal and professional lives of teachers. In line with this author, they cited the following factors in their reports:

"I think that this whole picture contributes to increase the number of cases of *Burnout syndrome,* depression, and consequently, absences, making it very difficult to have a good level of Quality of Working Life" (REPORT IN DISCURSIVE QUESTION – RESPONDENT 67).

"My QWL worsened considerably with the pandemic, not only by the overload of work, but especially by the emotional and psychological conditions that were considerably affected by social isolation" (REPORT IN DISCURSIVE QUESTION – RESPONDENT 43).

In this same sense, Pereira (2018) emphasized the stress load to which teachers are subjected

due to long working hours and few moments of breaks for rest and leisure. The workload that should be destined to leisure and family life has been filled with the planning of classes. In this way, the responsibilities and obligations of functional departments are affecting the balance between the personal and professional lives of teachers (TSUBOI, 2019). Most of them reported experiencing this situation:

"I believe I have lost the balance between work and personal life. In this way, I've lost some of the Quality of Life at Work with the pandemic, but I feel like I've been able to keep my tasks to the same quality as before the pandemic. But the fatigue has been enormous" (REPORT IN DISCURSIVE QUESTION – RESPONDENT 39).

The study conducted by Sousa and others (2020), as well as the reports of teachers in the subjective question, pointed out a sensitive result for the criteria of working conditions and social integration at work. According to Neves (2020), the teachers surveyed showed dissatisfaction with the conditions of work and work and life, reporting fatigue caused by the volume of work and the compromise of hours of rest and leisure.

Finally, Oliveira (2019) reinforced the importance of studying QoL and QWL, especially of teachers, since the recurrent wear and tear of this profession compromise its pedagogical performance and affect the teaching-learning relationship, generating negative consequences on the quality of education offered. Therefore, it can be said that, in the case of this class, quality of life, quality of life at work and quality of teaching/education are inherent.

5 FINAL CONSIDERATIONS

According to the results obtained in the present research, it is concluded that the majority of the responding professors are male, but not discrepant from the opposite sex, because the institution has its staff of female professors well represented.

In addition, it is observed that the participating population of responding professors consisted of a significant percentage of teachers over 41 years of age, which may have directly influenced the pandemic period, as it was a time of acute and sudden changes, including in relation to the handling of new technological tools, and, due to the fact that the teachers were in an older age group, most are presumed to be less familiar with these factors.

It is noticed that the respondents have high levels of training, since more than half are doctors. When it comes to the department, most of it is crowded in the Department of Science and Languages (DCL) and teaches the largest number of classes for higher education.

A majority of the responding professors maintain an effective link with the academic institution and receive more than five monthly minimum wages, giving them a good level of security and stability. In addition, most have been working in the institution for more than five years, which proposes to

consolidate relations with the institution and with co-workers.

With regard to the impacts of the pandemic on the QWL of teachers, it is concluded that the quality of life at work of teachers was affected considerably, in a negative way, after the changes caused in the academic space, where residences became the work environment, and contact with students and colleagues was restricted.

According to the reports, these impacts transcended QWL and even affected the general quality of life of the respondents, which had, in some cases, physical and psychological health consequences.

For a better understanding and detailing of the problem investigated, it is suggested that more studies be made from the results obtained, especially an interview with the professors, to know more closely and weighted the other variables and factors that affect the QWL of this public and the formulation of mitigating suggestions.

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CHAPTER
42

Sleep bruxism in children and COVID-19: An integrative review of the literature

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ABSTRACT
Sleep Bruxism is a movement disorder of multifactorial etiology, characterized by grinding, tapping, or clenching of teeth associated with sleep physiology. This study aimed to raise whether there is evidence of the increase in the prevalence of bruxism in children during the period of living with COVID-19. This is an integrative review of the literature by the PRISMA method and based on the guiding question: - Is there an association between the prevalence of sleep bruxism in children and COVID-19? In this context, an exploratory search was conducted through PubMed, VHL, and SciELO, considering the health descriptors or MeSH terms: "sleep bruxism", children", and "COVID-19" in Portuguese, English and Spanish versions and for the past five years as of the time of publication. The Boolean operators "AND" and "OR" were used to combine and "NOT" to exclude. These, are by the defined inclusion and exclusion criteria. The process of search and selection of records was carried out by two researchers, independently. From 181 records, only three studies were included. Only one study directly raised the association between BS and COVID-19, mentioning the increase in its incidence.

Keywords: Sleep bruxism, Children, COVID-19.

1 INTRODUCTION

Bruxism is a parafunctional, rhythmic, and spasmodic involuntary activity of the SE, produced by rhythmic or tonic contractions of the masseter and other mandibular muscles characterized by the act of grinding or clenching the teeth. The habit of grinding teeth occurs frequently during falling asleep, periods of worry, stress, and excitement, accompanied by a noticeable noise. On the other hand, noiseless tightening is more common during the day, adding continuous and less tolerable forces, and can be considered more destructive[1]. In this context of stimulation dopamine is the main neurotransmitter[2].

During childhood, bruxism is more severe at preschool age, although it also appears in older children and permanent dentition. The psychological characteristics of parents, especially anxiety, may be associated with the development of sleep bruxism in their children[1].

Bruxism has a higher prevalence in children and adolescents, 17%, than in adults, 8%. When the child presents this parafunction, it can be understood as an indicator that something is happening wrong with their well-being, which should be investigated. The age group with the highest prevalence is between 5-8 years of age and decreases with advancing age[3].

As the main damages are irreversible, it is of great importance that the anamnesis and clinical examination are carried out thoroughly with the collaboration of the parents 4.

Based on the circadian cycle, bruxism can be classified into: sleep bruxism or waking bruxism; That is, it can occur when the patient is asleep (unconscious) or when he is awake, in this case, a semi-voluntary activity of the jaw, characterized by a habit or tic. respectively4.

As for the degree, bruxism, classified as primary, covers the simplest cases, without systemic or psychiatric involvement. Secondary bruxism is opposed to clinical, neurological, or psychiatric disorders, as well as iatrogenic factors (use or withdrawal of substances or medications) or other sleep disorders5.

If not detected at an early age, bruxism can unconsciously compromise the integrity of the teeth by clenching or grinding them. This act takes progressive lesion of the teeth and periodontal, damage to the oral mucosa, increased tension and hypertrophy of the masticatory muscles, chronic headaches, and neck pain, as well as abnormality of the temporomandibular joints and hearing problems6.

The most frequent symptoms of bruxism are headaches and muscle pain, tiredness, drowsiness, difficulty concentrating, hyperactivity, anxiety, aggressiveness, and attention deficit7. There is no cure for bruxism since it is a central and not peripheral disorder, but there are ways to treat it8.

The main attention in the clinical intervention should be focused on the protection of the tooth, reducing grinding, relieving facial and temporal pain, and promoting improvements in sleep quality, if deficient. Therefore, three types of strategies should be employed: dental, pharmacological, and psycho-behavioral9.

Multifactorial therapy becomes the ideal treatment involving pediatricians, pediatric dentists, and psychologists, and it is important to guide parents about behavioral aspects of the child10.

During the epidemiological phases of COVID-19; a disease caused by SARS-CoV-2, there has been a compromise in mental health, with repercussions on sleep, worldwide; particularly in the most vulnerable groups, such as children. This study aimed to analyze whether there is scientific evidence for a higher prevalence of BS in children during COVID-19.

2 METHODOLOGY

Integrative literature review based on the PRISMA model or Preferred Reporting Items for Systematic Reviews and Meta-Analyses, with the guiding question: - Is there scientific evidence about a higher prevalence of childhood bruxism in periods of coexistence with COVID-19?

The stages included: exploratory search, collection, and critical analysis of the included studies, followed by the presentation of a synthesis of the selected works and discussion of them. Following there was an exploratory search, the collection and critical analysis of the included studies, with the discussion of these

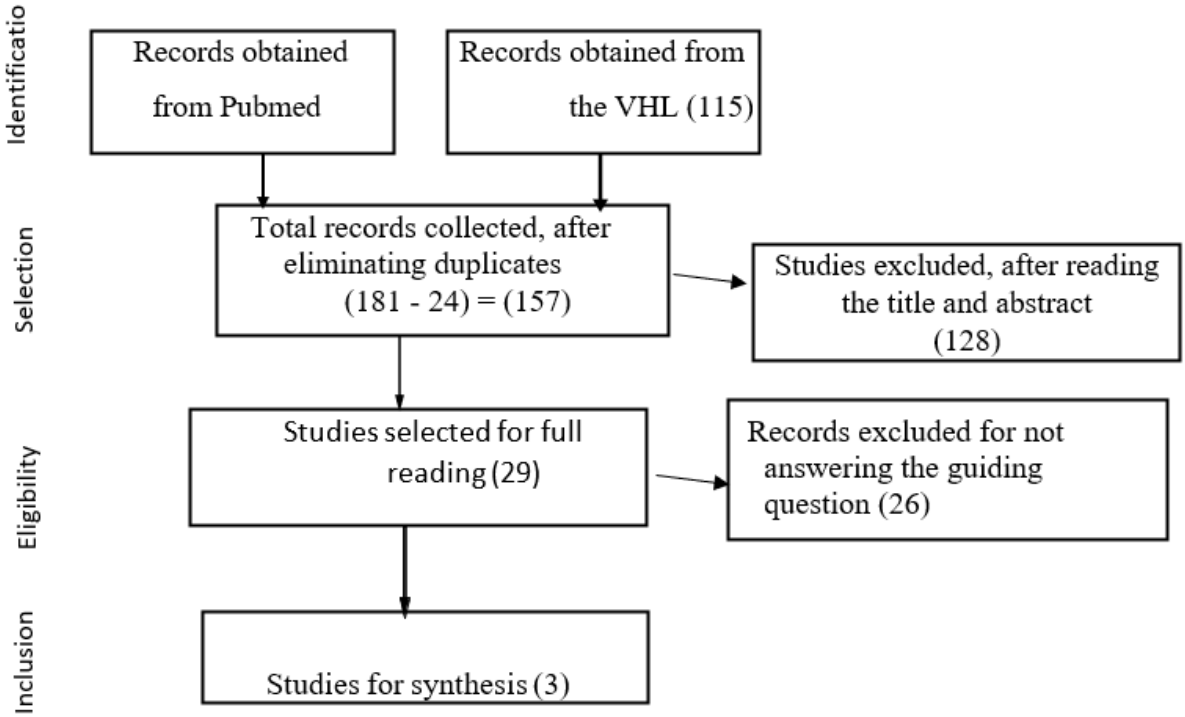
For data collection, the following virtual portals were used: PubMed (service of the National Library of Medicine of the United States) and VHL (Virtual Health Library). In Considering the databases MEDLINE (Medical Literature Analysis and Retrieval System Online) and LILACS (Latin American and Caribbean Literature in Health Sciences), in addition to SciELO (Scientific Electronic Library Online).

The descriptors in health or term MeSH Medical Subject Headings were considered: "sleep bruxism", "children" and "Covid-19", in their versions in Portuguese, Spanish, and English. Also the advanced search form and with the Boolean operators "AND", "OR" and "NOT".

As inclusion criteria, we considered all scientific articles, published between December 2017 and November 2022, that met the guiding question. Opinions, letters to the editor, or other works that were not formally characterized as scientific articles were excluded, as well as repeated studies (where only one was counted) and literature reviews.

The process of searching, collecting, and organizing the data took place between November and December 2022. Two independent evaluators selected the articles. There was the inclusion of work, from the reading of the title and the abstract of the records surveyed and, according to the inclusion and exclusion criteria adopted. In the case of repeated records, only one was included. The initial selection occurred by reading the title and abstract. Subsequently, the records were chosen for the full reading and, if included, with the summary presentation of the main information. This process can be better visualized by the flowchart (Figure 1).

Figure 1 – PRISMA Flowchart



3 RESULTS

From 181 records collected in the exploratory search, the final sample included three studies, presented in the form of a summary table (APPENDIX B). In it, you can observe data regarding the authorship, the year of publication, the country where the study was developed, the objectives, main results, or conclusions. Of these, two are available in PubMed, one exclusively in the VHL, and one in the two virtual portals. Most of the studies are in Portuguese-speaking countries (Brazil and Portugal) but with the language in English.

Figure 2. Table - Records included in the review according to authorship and year of publication, the country where it was developed and the original language, and the original language, objectives, sample, main results or conclusions

Authorship and year	**Country and language**	**Objectives**	**Type of study and sample**	**Main results or conclusions**
Lima CML et al., 2022	Brazil (English)	Establish the impact of COVID-19 on sleep quality and possible BS in children	This is a longitudinal and prospective cohort study.105 school children with (74) or without (31) sleep disorders and their guardians.	There was an increase in the incidence of BS when comparing the percentages before and during the first wave of COVID-19 (62.9% and 70.5%, respectively), associated with sleep disorders.

		aged eight to ten		
Almeida AB *et al*, 2022	United States (English)	To determine the prevalence of BS and its tendency with age in children.	Cross-sectional and retrospective covering 961 patients between 0 and 17 years of age assisted at the Lisbon Dental Service (and their parents) between August 2019 and December 2020	In the patients investigated, the prevalence of SB was 17.6%. The highest prevalence of SB occurs among male children, aged between zero and six years (20.7%) and tends to decrease from adolescence onwards.
Alves		To evaluate the prevalence of SB in children and establish its relationship with clinical and sleep-associated variables.		These students presented a
EG, Fagundes DM, Ferreira MC, 2022	Brazil (English)		Transverse. It comprised 239 students, from six to thirteen years of age, from public and private schools in São Luís, Maranhão.	prevalence of SB of 19.7%, with no significant association with the demographic and socioeconomic variables (age, sex, race, family income) of sleep (sleep quality, number of hours of sleep at night, sleeping during the day, with the light of the room lit or with the presence of
				noise), signs and symptoms presented (grinding of teeth, tooth attrition, pain in the TMJ region, fatigue in the muscles facial, earache, oral habits parafunctional).

4 DISCUSSION

The choice for the integrative review in this study occurred because, despite being an introductory research method, when searching, evaluating, and synthesizing findings of relevant research on a given topic, they base conduct and decision-making on the part of professionals in a critical way11.

According to the search and selection of studies, the correlation between BS and COVID-19 was directly established in one study, that of Lima et al. (2022)12, a study with a longitudinal or prospective cohort design, which, even considered as a primary study, provides strong scientific evidence13.

The first epidemiological wave of COVID-19, amid a lockdown; social isolation aimed at containing the waves of proliferation of the SARS-CoV-2 virus, as well as its variables. The atmosphere of uncertainty negatively impacted the psychological and quality of sleep, especially of children and adolescents; subjects in the phase of high cognitive, emotional, and social development. Reports of sleep disorders, stress, and habits such as bruxism, today are more directly characterized as a behavioral variable, with the increase in its incidence, leading to the suggestion of the development of new research, which analyzes the extent of this impact. BS is more common among children and tends to decrease with age, with no preference for sex 12,14.

In the context of school closures and remote learning, children presented greater difficulties in adaptation, with changes in routines, schedules, and circadian rhythm, associated with a lot of excitement, due to the increased use of screens or digital resources, such as smartphones (blue light emission). This led to an inadequate or poor-quality sleep pattern. Elevated cortisol levels were the trigger for BS. Other adverse effects would be the higher prevalence of orofacial problems such as temporomandibular disorder, correlated with anxiety and stress12.

According to Lima et al. (2022)12 there was an increase in the incidence of BS when comparing the percentages before and during the first wave of COVID-19. A significant contrast was seen between these periods, with the incidence of SB reaching 29.5%. The perception of children amid instability, either due to financial problems of certain families, as well as the reduced access to health services in this period, may have influenced the increase in anxiety. According to Generoso et al. (2022)14, evaluating the impact of this pandemic on psychological aspects and bruxism in the adult Brazilian population, all were feeling nervous or stressed during the period of social distancing, when 19.58% started symptoms of fatigue or pain in the muscles of the face when waking up and 21.54% started muscle fatigue and tooth discomfort upon waking.

Almeida et al. (2022)15 found a prevalence of 17.6% of BS, slightly higher in male children, establishing a prevalence with variations between 15.9% and 19.4% in pediatric patients. These percentages differ from the study by Calderan et al. (2014)16 which demonstrated a prevalence of SB in schoolchildren aged 11 to 14 years ranging from 5.9% to 49.6% and raised the influence of diagnostic criteria, geographical variation or locality and population of the study and socioeconomic conditions. The environment of greater poverty and low education of parents, particularly of the mother is associated with a higher prevalence of BS; results similar to the three studies included in the present study, but without significative associations, according to Alves, Fagundes and Ferreira (2022)17; which also agrees with the work of Schavarski18 (2021). For this author, when considering the university students of the Dentistry Course, there was no increase in the prevalence of BS or a

relationship between it and the fear of COVID-19, but variables such as age, personal and social issues, the major stressor being anxiety in entering the labor market.

For Betancourt et al (2021)19, the effects of the pandemic were observed in several dimensions, especially the psychological ones. Reactions of panic, anguish, anxiety, depression, irritability, and aggressiveness represented risk factors for the development of bruxism. And the BS brought damages to the dental structure: occlusal noise, non-functional occlusal wear, hypersensitivity, fractures, and mobility, in addition to cervical injuries. Other variables possibly associated with SB that were not explored in the included studies include facial pattern; this in adolescents from 12 to 19 years of age, according to Souza et al. (2020)20.

Among these, is the facial pattern. Adolescents of mesofacial biotype were more progress to bruxism, while brachyfacial were predisposed to fatigue, pain in the temporal muscle, and dental attrition in the posterior region.

One aspect that deserves to be emphasized is the non-performance of polysomnography in the included and other studies mentioned; examination of unique relevance for the diagnosis of sleep disorders; which leads to a great subjectivity in the investigations on the subject; even considering the difficulty of this monitoring, especially at the level of public health.

Particularly during the first wave of COVID-19, when vaccines were in the testing phase and the population had to follow lockdown rules, there was a huge information gap about people's oral conditions. Several health services and research have been interrupted to focus on combating viral infection. Currently, the world is recovering from a turbulent phase and more and more studies analyze the effects left by the pandemic, which remains in another epidemiological moment, but permeates our social life.

It is believed that more studies on the subject should be developed, especially in a multidisciplinary approach and with more specific examinations and criteria for diagnosis and treatment, particularly in the earliest age groups of the human being, to avoid or at least minimize the possibilities of damage.

5 CONCLUSION

There have been gaps in scientific evidence about BS and COVID-19 in children.

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CHAPTER
43

Between walls: Analysis of deaths from Covid-19 in the Brazilian prison system in 2020

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ABSTRACT
Objective: The objective of this study is to analyze the number of cases and deaths from COVID-19 in the Brazilian prison system in 2020. Methodology: This is an observational, analytical and ecologically designed study of COVID-19 deaths in the Brazilian prison system in Apr/Dec/2020. Data were collected from epidemiological bulletins at the National Council of Justice website. As a unit of analysis, the number of confirmed cases and deaths from COVID-19 were selected for the months of exposure to SARS-CoV-2, in the regions of Brazil and Federative Units in the year 2020. Correlation analysis and linear regression of the COVID-19 lethality percentage per month were performed. Results: In the year 2020 the total number of confirmed cases of COVID-19 through RT-PCR testing and rapid testing in persons deprived of liberty was 41,971, including the two cases from the Federal Prison System. The total number of deaths was 129. The case fatality rate decreased every month and the Southeast region presented a higher number of reported cases and deaths. Final thoughts: The pandemic due to the novel coronavirus has played a revealing role in the unsanitary and inhumane conditions of the Brazilian prison system. It is believed that from the panorama of the pandemic in the prison system in the year 2020, they can subsidize comparative studies of the subsequent years.

Keywords: Mortality, SARS-CoV-2, prison system.

1 INTRODUCTION

In December 2019 rumors of a new virus, known as SARS-CoV-2 was infecting thousands of people in China, however, it was still unknown how it behaved, but what was already known by everyone was its high transmissibility capacity. When it was observed that this virus could not be contained so easily and that infectivity rates only increased as the days went by around the world, the World Health Organization (WHO) declared a state of pandemic in March 2020.

From then on, everyone was hostage to COVID-19, a disease that has led to the death of thousands of people worldwide, regardless of race, color, age, sex and location. However, it is worth highlighting a population that is one of the most at risk of contagion in Brazil and other countries, due

to unhealthy conditions of survival and overcrowding, which are the people deprived of liberty who serve time in prison systems (MORAES et al., 2020).

The prison system is vulnerable to various diseases and injuries due to restricted spaces, high population density, humidity, dirt, poor lighting and ventilation that cause major impacts on health (BRAZIL, 2014). These can be classified as risk factors for the spread of the new coronavirus in the prison population, considering that it is a virus transmitted by respiratory route, disseminated in the air with high ease and difficult to be contained, which represents a risk for the population deprived of liberty in general, however, especially for the elderly and for those who have comorbidities (HEALTH COORDINATION; NATIONAL PENITENTIARY DEPARTMENT, 2021).

It is noteworthy that until July 2020, Brazil, along with Peru, the United States, India and Mexico, was among the countries with the most contaminated prisoners in the world. In Brazil, as of November 2020, 122 deaths have been recorded. Thus, measures were adopted such as suspension of visits, release of prisoners, hearings by videoconference, sanitization of prisons and isolation wards for respiratory symptomatics (SANTOS; FILE; SANTOS, 2021 *apud* BORGES, 2020).

In Brazil, COVID-19 prevention measures were adopted to contain the contagion within the prison system, guaranteed through the right to health with equity, integrality and universality, recommended by the Federal Constitution and the Penal Execution Law No. 7210, and this system is supported by Primary Care, which orders care through the Prison Primary Care Teams, who provide, however, assistance to this population (SANTOS; FILE; SANTOS, 2021 *apud* BORGES, 2020; BARSAGLINI, 2016; BRAZIL, 2014).

Thus, given the context presented, it is possible to identify the vulnerabilities found in the prison system and that these provide easy contagion by SARS-CoV-2 and the high probability of the outcome for deaths. Thus, the objective of this study is to analyze the number of cases and deaths from COVID-19 in the Brazilian prison system in 2020.

2 METHODOLOGIES

This is an observational, analytical and ecologically designed study of deaths from COVID-19 in the Brazilian prison system of Apr/Dec/2020. This type of study aims to compare the occurrence of a disease/condition associated with health, as well as the exposure of interest among aggregates of individuals to verify the existence of an association between them, however, in ecological studies there is no information about the disease and exposure of the individual, but of the population group as a whole. Among the advantages of this study is the possibility of examining associations between exposure and disease/condition related to the community (LIMA-COSTA; BARRETO, 2003).

Data were collected from epidemiological bulletins at the National Council of Justice website. These were recorded fortnightly in the prison and socio-educational system of people deprived of liberty, based on information from the executive and judicial branches of the state, including data passed on by the Prison System Monitoring and Inspection Groups (GMF), epidemiological bulletins from state secretariats and data reported by the National Penitentiary Department (DEPEN).

As a unit of analysis, the number of confirmed cases and deaths from COVID-19 for the months of exposure to SARS-CoV-2 in the regions of Brazil and Federative Units (UF) in 2020 was selected.

Data were processed using *the* Statistical Package for the Social Sciences (SPSS) 20 software, license 101011131007. These were organized in cross-tables with absolute and percentage frequencies, according to the month of exposure, region and FU. Correlation analysis and linear regression of the COVID-19 lethality percentage per month were performed.

3 RESULTS

In the year 2020 the total number of confirmed cases of COVID-19 through RT-PCR testing and rapid testing in persons deprived of liberty was 41,971, including the two cases from the Federal Prison System (SPF). The total number of deaths was 129.

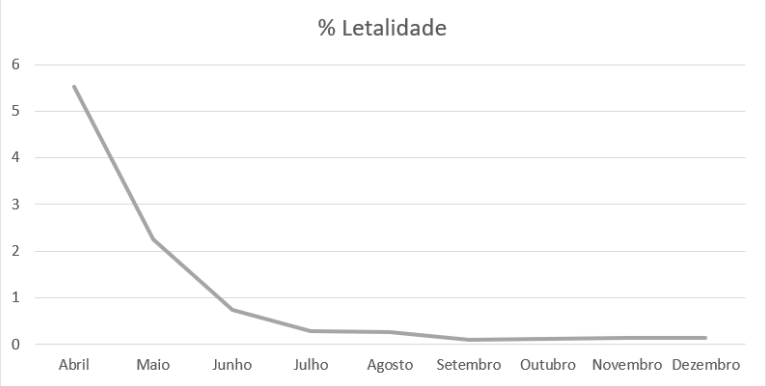
There was an increase in COVID-19 cases and deaths between the periods of April to August 2020, with a considerable decrease in subsequent months (Table 1). However, the case fatality rate decreased every month (Graph 1). When analyzing it, it was found that a strong and inversely proportional linear correlation was found (r = -0.739; Y= 3.51-0.488X; p= 0.023 (Table 1).

Table 1. Distribution of the number of cases and deaths, according to the month, Brazil, 2020

Month	Number of cases	Number of deaths	% Lethality
April	199	11	5,52
May	1108	25	2,25
June	2949	22	0,75
July	4409	13	0,29
August	12214	33	0,27
September	7354	7	0,1
October	6901	8	0,12
November	3253	5	0,15
December	3584	5	0,14

Source: National Council of Justice (2020). r = -0.739; p= 0.023; y= 3.51-0.488X

Figure 1. Distribution of the percentage of lethality, Brazil, April/December, 2020



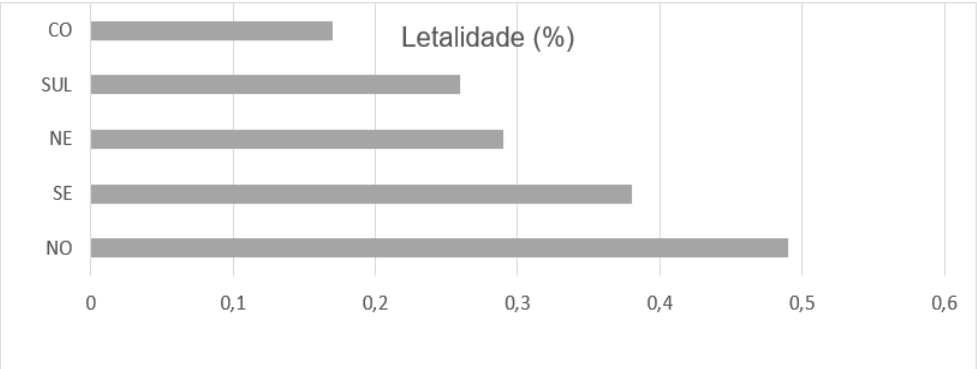
Regarding the distribution of the number of cases and deaths according to the region, the Southeast was the region with the most reported cases and deaths, and the Midwest region was second (Table 2). However, the percentage of the lethality rate was higher in the Northeast region and lower in the Midwest region (Graph 2).

Table 2. Distribution of the number of cases and deaths, according to the region, Brazil, 2020

Region	Number of cases	Number of deaths	Lethality (%)
N	2881	14	0,49
HERSELF	17040	64	0,38
NOT	6292	18	0,29
S	6430	17	0,26
CO	9326	16	0,17

Source: National Council of Justice (2020)

Figure 2. Distribution of the percentage of lethality due to COVID-19, according to the region, Brazil, 2020



Regarding the distribution of the number of cases and deaths according to the UF, São Paulo was the state with the most reported cases and deaths, followed by Minas Gerais. Alagoas was the state with the lowest number of cases. Regarding the reported deaths, São Paulo had the highest number, followed by Rio de Janeiro.

However, the states that did not present any death and consequent percentage of lethality null were Alagoas, Amapá, Bahia, Pará, Rio Grande do Norte and Tocantins. Roraima, Rio de Janeiro and Acre were the FUs with the highest COVID-19 case fatality rate (Table 3).

Table 3. Distribution of the number of cases and deaths, according to Federative Unit, Brazil, 2020

Federative Unit	Number of cases	Number of deaths	Lethality %
RR	203	8	3,94
RJ	484	16	3,31
AND	265	3	1,13
HERSELF	230	2	0,87
PB	271	2	0,74
On the	220	1	0,45
IT	911	4	0,44
ON	1924	8	0,42
GO	1801	6	0,33
BUT	320	1	0,31
SP	11423	35	0,31
THAT	1385	4	0,29
RO	708	2	0,28
DF	1946	4	0,21
MG	4222	9	0,21
PR	2397	5	0,21
MT	2046	3	0,15
SC	2248	3	0,13
PI	805	1	0,12
RS	1785	9	0,5
MS	3533	3	0,08
To the	72	0	0
AP	242	0	0
THREE	713	0	0
AND THE	703	0	0
RN	572	0	0
TO	540	0	0

Source: National Council of Justice (2020)

4 DISCUSSIONS

Based on the analyses, it was found that the nature of the deaths showed an increasing curve until the month of August and then decreased until the last month of analysis of the study – December 2020. It was identified that the peak in the number of infections (n= 12214) occurred in August, as well as the number of deaths (n= 33).

In contrast, April was the month with the lowest number of cases (n=199), however, the number of deaths in November (n=5) and December (n=5) were lower than in April (n=11). It is observed, therefore, that the percentage of lethality decreased about 0.488 each month.

It is also possible to highlight the lethality due to COVID-19 in the North region, which among the regions of Brazil, presented the highest percentage (0.49%). To the detriment of this, it should be noted that the state of Roraima, located in this region, presented the highest percentage of lethality

(3.94%), which corroborates with data presented by Barros (2021), which demonstrates that this state had a mortality rate of 235.7 in the prison population.

The results of this research corroborate the identification of spatial risk for the occurrence of COVID-19 cases among Persons Deprived of Liberty (PPL), with the regions with high risk for lethality, concentrated beyond the north, in the Southeast and in the Northeast, although there has been a decrease in the number of cases, which may be associated with the measures implemented (CARVALHO; SAINTS; SAINTS, 2020).

Faced with this problem, still during the beginning of the pandemic, on March 17, 2020, the National Council of Justice published Recommendation No. 62, which dealt with preventive measures to prevent the spread of SARS-CoV 2 infection, regarding the criminal justice and socio-educational systems.

From this, the Monitoring System of the National Council of Justice (MCNJ) was created, with the objective of monitoring the cases of COVID-19 in the prison system. Thus, the first confirmed case among the prison population and the first death occurred in April 2020 (CNJ, 2020). Since then, measures through the justice system have been implemented in order to reduce the number of contaminations and agglomerations, but that in the face of overcrowding in prison units, and the epidemic outbreak, have had greater visibility.

An analysis of the pandemic scenario in the prison system in the first months of the pandemic revealed that the rate of infection by the novel coronavirus was 62% higher than the overall rate in Brazil; a mortality rate of 15.1 deaths per 100,000 inmates and 0.4% of COVID-19 cases in prison resulting in death, while in the general population of Brazil this percentage was 3%.

From the collection of these data, it was observed that there could be probable underreporting of cases and deaths and that lower mortality and mortality rates could be associated with the predominance of young people in the prison population (BARROS, 2021).

Given the underreporting landscape and the Federal Government's low investment in mass testing policy, the reported number of infected in the prison system may not be exactly the real number. Such statements are consistent with information from the GMF, published on October 5, 2020, in which it reported that to date 70,519 tests for diagnosis of COVID-19 have been performed on incarcerated persons. Unfortunately, this represents only 9.42% of the prison population in the country (DUARTE, 2021).

Several factors that are intrinsic to the Brazilian prison system have implications for the high rates of spread of the virus within prisons, as well as the increase in its lethality. It is important to highlight that there is an abstention from structural conditions and human resources, overcrowding,

hygiene, inadequate food, unhealthiness, lack of energy, water and sanitary surveillance, diseases considered worrisome, since they directly influence the incidence of diseases (SÁNCHEZ et al, 2020).

The low visibility given to the Brazilian prison system and the absence of public debates about COVID-19 in this population, even with favorable conditions for the spread of the pathology, people deprived of liberty have rights to the same conditions of prevention and assistance as the rest of the population, as recommended in the Federal Constitution (DUARTE, 2021).

In addition, it is important to emphasize that the prison population is underserved in the health field. The number of health professionals and the precariousness surrounding employment contracts show the infeasibility of prisons accessing medical care within the prison system. The health teams and the working conditions, although outdated, are largely inserted in the units located in the urban centers of the capitals.

This fact results in the concrete infeasibility of access to health policy for people imprisoned in inland or small units, mainly because there is a disparity between the number of people deprived of liberty and the number of professionals (COSTA et al, 2020; BRAZIL, 2020).

Other countries, such as the United States at the beginning of the pandemic, have already stressed the importance of medical care within the country's prisons. Hawks et al. (2020) reported the importance of social distancing within the prison system at the expense of the high risk of infection. In addition, the importance of inmates having access to quality medicines and food within prisons.

The increase in the number of deaths of inmates due to COVID-19 expresses the violation of rights, permanent and structural, that historically constitutes the Brazilian prison system. It is an announced pandemic revealed by the public unveiling that focuses on society and the State in the perpetration of these rights violations (DUARTE, 2021).

It is believed that from the panorama of the pandemic in the prison system in the year 2020, they can subsidize comparative studies of subsequent years, in addition to opening spaces to foster discussions about urgent and effective solutions and public policies, so that the government, civil society and the scientific community can change the reality of vulnerable populations.

5 FINAL CONSIDERATIONS

The conception of the dignity of the human person cannot be linked to the criminal practices of the individual, but to his inherent condition as a human being. The novel coronavirus pandemic has shown that the unsanitary conditions and crowding of the Brazilian prison system may have contributed to the spread of the virus.

Regarding deaths, it is concluded that the Southeast region has the highest number of cases and deaths, while the North Region has the highest fatality rate. It should, however, be taken into account

that the results presented in this study may present bias, considering the influence of the population size of each penitentiary, the number of tests performed or not per prison unit.

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CHAPTER
44

A remote view of the city: Experiences during the COVID-19 pandemic

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ABSTRACT
The work reports the experience in the teaching of design and representation in architecture and urbanism, from the discipline Perspectivas (cód. 1703.000.295-7), offered in the course of Architecture and Urbanism of the Federal University of Mato Grosso do Sul, campus of Naviraí (MS), during the period of isolation due to the pandemic of COVID-19. Its starting point was the record of urban space through observation. One of the challenges faced was to make the content taught - traditionally associated with workshop practices, on-site visits, and face-to-face orientations - to virtual platforms. It was then decided to conduct the discipline through virtual meetings, using as tools the online meeting platform Google Meet, institutional email, as well as messengers such as WhatsApp (Meta). Thus, after the conclusion of the semester, it was found that the class not only welcomed the adaptation proposal but also engaged in online debates and discussions about the techniques of design and representation in architecture and urbanism. The results were satisfactory and the experience can support new incursions that require the interface of the practice of drawing between screens.

Keywords: Observation drawing, COVID-19, Teaching practices.

1 INTRODUCTION

This work seeks to present the experience and challenges experienced by professors of the Architecture and Urbanism course of the Federal University of Mato Grosso do Sul crowded in the campus of Naviraí (MS), specifically in the discipline of Perspectives, offered in 2020 for a class of the second semester. The country's public universities have long dealt with challenges that go beyond issues associated with the physical structure of institutions, such as demands for appropriate workspaces, resources for research, lack of faculty and technicians, and work overload among others, but they had never experienced the problem of social distancing, caused by the COVID-19 pandemic, which triggered new perspectives and visions about teaching.

Education systems around the world have had to adapt to the new reality. When faced with the new challenges, it was evident that the teaching methods would move towards a remote version of learning, very much in the style of Distance Learning (EAD) courses, already quite widespread in the country. The area of Architecture and Urbanism was no different. Although the distance learning methodology is not recognized by the Ministry of Education (MEC) and the Council of Architecture and Urbanism (CAU) as a form of graduation for architects and urban planners, distance education maintains little acceptance among teachers and students in the area.

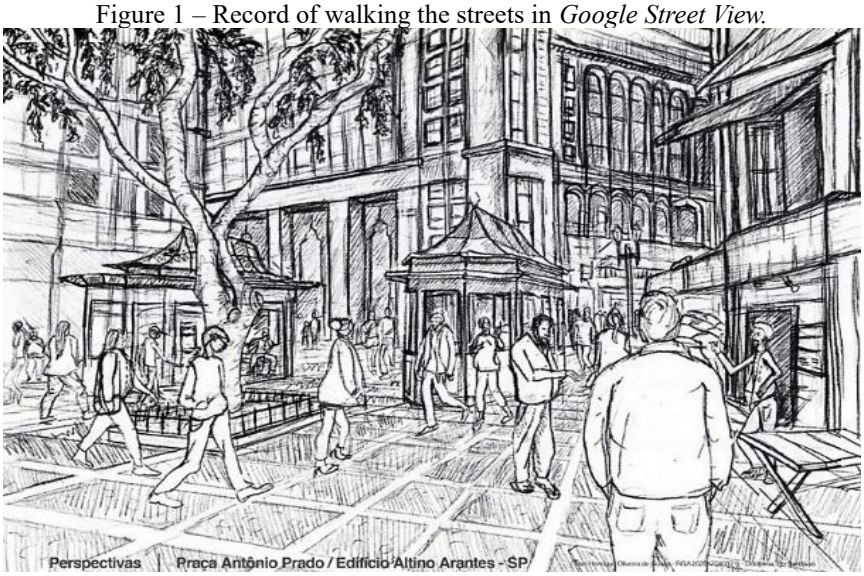
Social distancing, for those who were able to comply with it, conditioned people to new habits and a daily confrontation of activities once considered simple, such as the act of going out into the city and living with people nearby. The moment brought insecurity and considerable impacts on public health, politics, the economy, and the urban and private way of life. When searching for the term "coronavirus statistics" in the *Google* search engine, it is observed in the graphic data that at the beginning of August 2020, when the discipline of Perspectives was initiated, the state of Mato Grosso do Sul recorded 671 new cases of coronavirus infection and 14 deaths in weekly averages.

It is in this context that it was proposed an adaptation of the discipline to the online format [1] offered to a group of students in the second period of the Architecture and Urbanism course. Originally, the syllabus of the discipline foresaw in its methodological basis the development of meetings in the open air (through the streets of the city) and in drawing studios (internal), both face-to-face environments of contact and discussion. This format had to be postponed when the pandemic was officially enacted in March 2020, at which point health authorities exposed the risks of the disease to the academic community, recommending immediate social distancing.

Thus, a new format for the discipline was proposed, with practical effects for the teaching of perspective techniques to students of the Architecture and Urbanism course at UFMS in Naviraí. It was thought to use *Google Street View* as a pedagogical tool for urban immersion (Figure 1). However, the fear caused by the novelty of the proposed online format, as opposed to the traditional model of teaching drawings and representations from urban experiences and contact with their daily lives, brought some anguish and issues that throughout the process were dissipating. "However, given the present reality, it was believed that it would be an opportunity to test alternative forms of interaction with the city, despite the limitations imposed" (PEREIRA, 2021, p.4).

[1] The elective course "Perspectives (cod. 1703.000.295-7)" was conducted by professors Ramon Fortunato Gomes, Marcelo Carlucci, and Adalberto José Vilella Jr.com students of the second semester of the Architecture and Urbanism course of the Naviraí (MS) campus of the Federal University of Mato Grosso do Sul (UFMS) during August to December 2020.

Figure 1 – Record of walking the streets in *Google Street View.*



Source: Archives of the discipline Perspectives. Author: Ivan Henrique Oliveira de Souza (2020).

Physical presence, something inherent in this experience, was unfeasible in the context of total isolation to which we were subjected at that moment. Could the physical presence in the urban space, with its smells, sounds, lights, and contacts, be replaced by the intermediation of digital tools? What would it be like to undertake a discipline of a remarkably practical nature remotely? Is a distance education course being offered, contesting the demands of the MEC, the CAU, and our faculty and students? The answers to these questions permeated the entire development of the discipline throughout the semester.

> It was necessary to develop new technological skills and master tools such as Google Classroom, Moodle, Google Meet, Zoom, Google Books, Scielo, or Google Scholar – because, like classrooms, libraries were also closed. It was also necessary to adapt the teaching methods, without contradicting what was established and to build a new model of work, mediated by what was already practiced. The option to this would be to fall into the trap of exposing content to students with cameras off and asynchronous classes without any kind of control of pedagogical development. (BITENCOURT, 2022, p.88).

Through digital tools, the possibility of broadening the gaze and "presence" to places in the world where students would hardly have the possibility of being or going (Figure 2), such as Rome, Paris, Bogota, New York, or Tokyo, was opened. Walk through its streets, glimpse its landscapes, know the daily life of residents and their diversities that were there, visible, present virtually, and available on the screen for the students, simply exercising abstraction and sensitivity to feel the local daily life researched and record the scene analyzed in sketches, *sketches.*

Figure 2 – Schematic location map (A), frontal view (B), and perspective (C) of the Hirosaki Castle building located in Japan.

Source: Archives of the discipline Perspectives. Author Fabielle Carvalho Alva (2020).

The activity of the urban register in their daily lives in the form of free drawing has been practiced worldwide by *Urban Sketch groups and* [2] has proved to be an important tool for students of Architecture and Urbanism in the construction of a more precise look at the city, accentuating meanings and stimulating a way of representing ideas on paper, through strokes and sketches (PERRONE, 2018). Thus, "... they have in the location design the possibility of discovering the cities and the world where they live, bringing to light what is imperceptible or commonplace" (VALGAS, 2016, p. 352). To Silva (2019, p.26): "drawing reveals what is no longer present. It makes it possible to reconstruct the history of the place to understand the present. It takes up moments lived by others."

2 OBJECTIVES

The proposal in the discipline of Perspectives had as its main objective to promote the practice of drawing of observation and creation, having free drawing as a means of recording. In addition, develop skills and perceptions about urban space and its relationship with architecture and urbanism through the drawing of observation (urban *sketching*), propositions of maps of location and situation. For Silva (2019), drawing is an instrument of synthesis and through it the author exposes his look, being this act, the moment to rationalize the part and suggest the whole emphasizing what one wants to show, question, and argue.

Other specific objectives permeated the proposed activities such as: recognizing and developing techniques and forms of representation through observation drawing; developing plastic

[2] The Urban *Sketch (USk)* group was created in 2007 by Spanish illustrator and journalist Gabriel Campanario and is currently a group of international dimensions. In Brazil, the USk *was born from the initiative of the architect Eduardo Bajzek and the plastic artists João Pinheiro and Juliana Russo. Today the* USk Brazil is distributed in different Brazilian cities and regions. Every year, they promote regional, national, and international meetings stimulating practice, meeting, and sharing urban experiences, which can be consulted on the *Instagram.com* and *facebook.com* pages of the *USk group*.

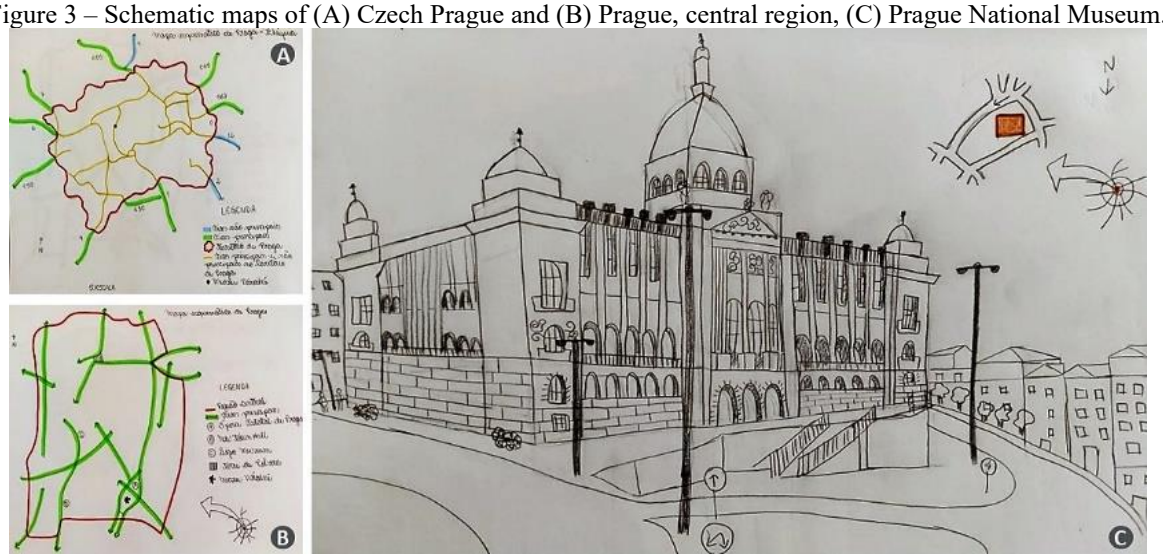
expression skills; Developing a more precise and attentive look at the urban space, its complexities, subtleties, and its visual and special structure. In addition to the proposed objectives, it was proposed the study of the means of composition, scales, and the use of materials as a means of stimulating creativity in the forms of representation in observation drawings.

3 METHODOLOGY APPLIED

The discipline was developed from design works of observation of urban spaces, carried out at a distance, through the *Google Street View* platform, a resource used due to the social distancing established as a result of the pandemic. At the beginning of the course, it was proposed that academics perform a "virtual drift" in *Google Street View* in cities of the world, of free choice, to discover new places and build a vision of urban spaces beyond everyday experience.

The "drift" through the paths *of Google Street View* proposed the identification of strategic locations, where the scholar can virtually circulate, observe and elect the best angle of view of the urban landscape for his observation record. In the urban landscape, there is a set of elements that constitute the city, the place. The act provides a more attentive analysis of the predominant features of the urban scene through which it is possible to achieve the synthesis of the image, through sketches, detached from small details. Thus, it is possible, above all, to record memories, moments, and places: "The drawing seeks synthesis through the understanding of the parts" (SILVA, 2019, p.28).

Figure 3 – Schematic maps of (A) Czech Prague and (B) Prague, central region, (C) Prague National Museum.



Source: Archives of the discipline Perspectives. Author: Kevelin Mayara Oliveira Silva (2020).

For the realization of the drawings, (Figure 3), the academics could choose only one of the following proposed metropolises as an example: Paris (France), Prague (Czech Republic), Rio de Janeiro (Brazil), Buenos Aires (Argentina), Recife (Brazil), São Paulo (Brazil), Berlin (Germany),

Rome (Italy), Medellín (Colombia), Barcelona (Spain) or another of their affinity. The criterion for choosing cities should meet the metropolitan phenomenon, whose characteristics are urban complexity, the diversity of landscapes, and the breadth of their cultural significance.

After choosing the metropolitan city, the observation drawings were conducted and guided by the teachers in four thematic groups, which guided the deliveries and discussions in the meetings made through *Google Meet*. It was suggested that the representation of the observation drawings be shown on location and situation maps for a better understanding of the urban context in which they were inserted. All maps should be freehand with the graphical scale from the information provided by *Google Street View*, as shown in Figure 3. About buildings for institutional use, it was suggested the inclusion of sketches on the technical drawings related to the building.

The thematic groups were divided into i) buildings of institutional use (temples, schools, public administration buildings or administrative centers, public markets, theaters or concert halls, museums); ii). squares, urban parks, and urban furniture; iii). monuments (landmarks of the urban landscape, not necessarily historical or commemorative); iv). urban scenes (landscapes that portray the specificities of the daily life of the city and its users, such as fairs, residential areas and their relationship with the street, spontaneous leisure areas, specific appropriations of urban space by users, urban furniture, etc.).

Each thematic group resulted in an evaluative delivery according to the schedule of classes. The deliveries were made by posting a portfolio called a *digital sketchbook*, prepared by the academic in a single portable document format file (PDF) in the virtual environment (*Moodle*). The *digital sketchbook* was composed of the observation drawings and along with the drawings, the students should carry out brief research on the place represented. Research that refers to history, cultural, social, or economic relevance, peculiarities about habits and customs related to the place, or any other data that would allow a more effective knowledge of the scene portrayed. Each drawing should be accompanied by sketches of the location map (urban scale) of the situation map (square scale) regarding the place depicted, both made by hand.

Seven remote meetings (lives) were held through the *Google Meet platform,* where the discipline was presented, and classes were held on observation drawing techniques (DOYLE, 2018), providing synchronous chats to resolve doubts and feed debates and reflections. Perhaps one of the most significant actions of all the work was the proposition of moments of the collective analysis of the products delivered by the students (digital sketchbook) and the process of elaboration of the observation drawings. Regarding the results obtained, the participation of the students in the discussion and the engagement of the class in the debates were quite satisfactory.

4 RESULTS

Through virtual tours in the foreground and at the level of the observer – guaranteed by the *Google Street View tool* – a new possibility of going to the streets, and observing the urban landscape, without, leaving home, was opened. Through observation, they constituted results that were the bases of discussion, exposure, and collective learning. As in the studios of the Architecture and Urbanism courses, where it is recurrent the assembly of exhibitions with the students' works at the end of each academic semester, broadens the debate about the results achieved, identifying advances, derivations, limits, and expansions concerning the proposed activities.

The exhibition itself becomes irrelevant without this important moment of collective reflection. It serves both for the student to contextualize his production before the group (and thus minimize the inhibition of expressing himself before the other) and to reflect on the infinite possibilities of thinking of solutions for a proposed action. Looking at the work of the other is, above all, to incorporate knowledge and universes beyond one's individuality, to recognize the importance of collaborative work, and to understand that the myth of the "isolated artist in the crystal tower" is far from what is expected of architects in contemporary times.

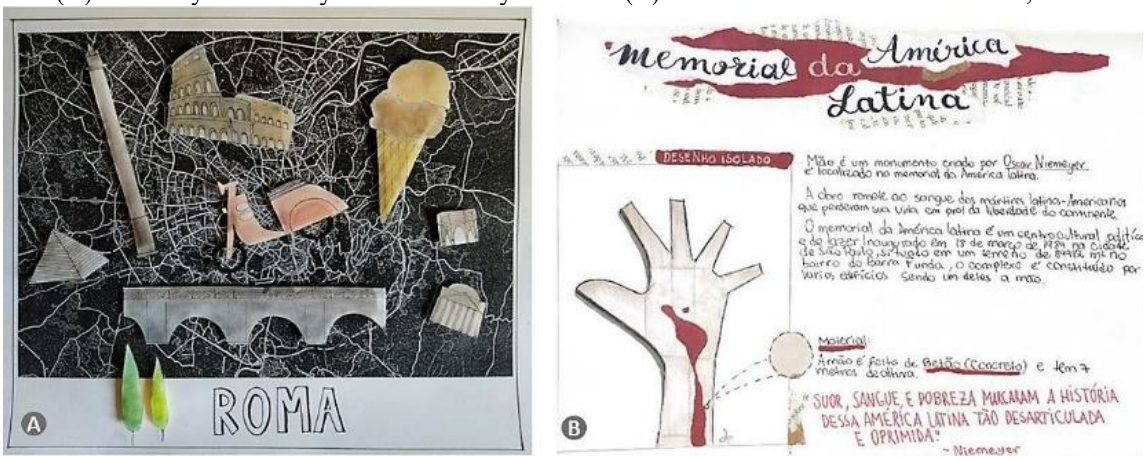
In the circumstances of isolation found, the exhibition proved to be unfeasible, hence the idea of sharing the work delivered remotely by the students in a digital meeting. The professors selected some works, presented them before everyone, and asked the author to comment on the elaboration process found, with the difficulties and discoveries undertaken, making some considerations about the product. Then, debates were opened so that the students could express their impressions about the work put up for analysis, such as an opening of a face-to-face exhibition, when there are sessions of debates.

About the set of drawings elaborated by the students of the discipline, some results stood out. In addition to the pure representation of the landscapes collected *in Street View*, the free research in other digital bases about the places portrayed allowed students a true immersion in other dimensions of urban space: the customs, traditions, symbols, and icons that mark cities around the world. What does Rome represent, besides the street images? In Figure 4 (A), the student seeks to identify and represent this symbolic dimension of the city. Imagine. To Ching (2012), the mind creates images that we try to draw, but the representation goes beyond a manual skill and goes through the construction of visual images that stimulate the imagination and feed our desire to draw.

We knew that in cases like this, there is a risk of approaching the city from stereotypes coined by tourism and its mercantilist logic (the city that sells itself as a product). That was one of the open discussions during the debates. But another Rome, hidden beneath the surface of its immediate symbols, could only be identified in a more specific and time-consuming approach, leaving the objectives of the discipline and entering the area of urban phenomena (Figure 4). The idea of the image

of the city as a cultural and ideological construct intermediated by the logic of capital was perhaps still a very complex debate for first-year students of an undergraduate course, especially in critical moments of isolation, uncertainties, and fears in which we were immersed.

Figure 4 – (A) Assembly from the symbols of the city of Rome. (B) Latin America Memorial Records, São Paulo (SP).



Source: Archives of the discipline Perspectives. Authors: Daniela Thiesen Pientka (A) and Mariane Gino Pereira (B) (2020).

Another result that has potentially been achieved is the development of students' perception of historical and political aspects of the city, in the sense of purging the idea that drawing is ideologically neutral.

> "In addition to perfecting the techniques of free drawing, [urban sketch practices] emphasize the critical eye, attentive to the urban landscape. It reinforces the practice of observation in the movements, in the social dynamics, in the contrasts that the city opens, in the inequalities, in the urban segmentation, and in the landscape that is static when one has a distracted look." (COZARUS, 2022, p.5).

The image as a manifesto is part of the urban form itself: the form is established as the language of the residents, communicating their values and desires, translating their experiences, and bringing to the surface anguish and dubieties. The use of text and infographic schemes by the students in their work was stimulated throughout the course to contextualize the form represented in the face of the political dimension treated here (Figure 4). The static and inert landscape acquires life and meaning from the effort of understanding and structuring an investigative and curious look: why this form and not another? Why in this place and not in another?

Within the limits imposed by the objectives of the discipline, the focus of the work should be the development of plastic expression by students, especially free drawing. Subsidiarily, the interest in the urban landscape appears as a corollary of this practice: "There is the development of the technique of free drawing, of the urban experience, of the affinity for the city [...]" (COZARUS, 2022, p.3). The recording of detail (Figure 5) matters more as a tool of knowledge and stoning of the gaze than as a

technique, or artistic virtuosity of the author. The drawing, the poring over the form, allows us to establish the deep relationship between the architectural object and its participation in the definition of the urban landscape. To draw the city is to draw the building.

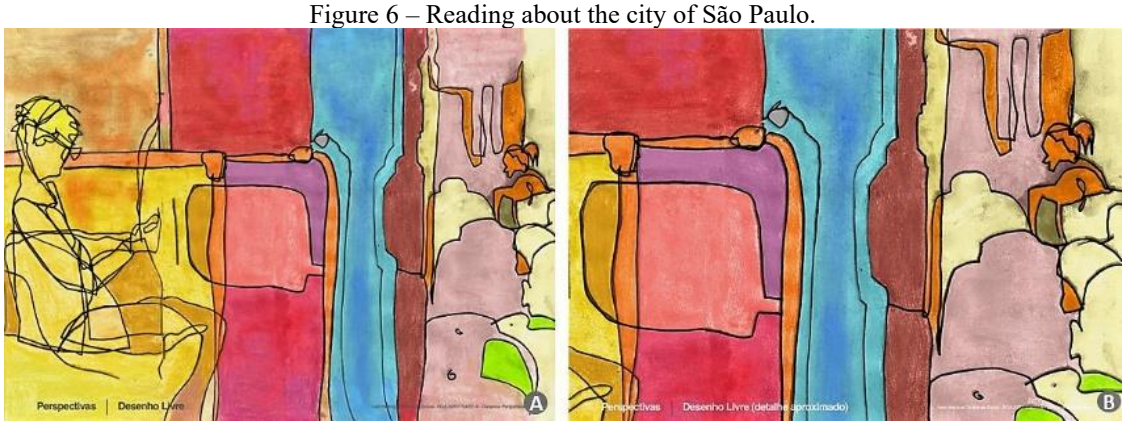
Figure 5 – Observation drawing on the city of (A) Rio de Janeiro and (B) Buenos Aires.

Source: Archives of the discipline Perspectives. Authors: (A) Gabriel Silva de Azevedo and (B) Edilaine do Santos de Souza (2020).

Another important result was the research undertaken by some students regarding the possibilities of using different graphic languages and techniques of representation drawing. During the discussion meetings on the papers, the students were asked to experiment with forms of expression beyond the realistic mode, if it is possible to say so.

A way of looking at urban space was also suggested through urban scenes, ways of life, activities, and emblematic actions that *Street View* images could show (Figure 6). Snapshots, rich and visually powerful about the city were present in the digital tool: this was an important discovery made by the students.

Figure 6 – Reading about the city of São Paulo.



Source: Archives of the discipline Perspectives. Author: Ivan Henrique Oliveira de Souza (2020).

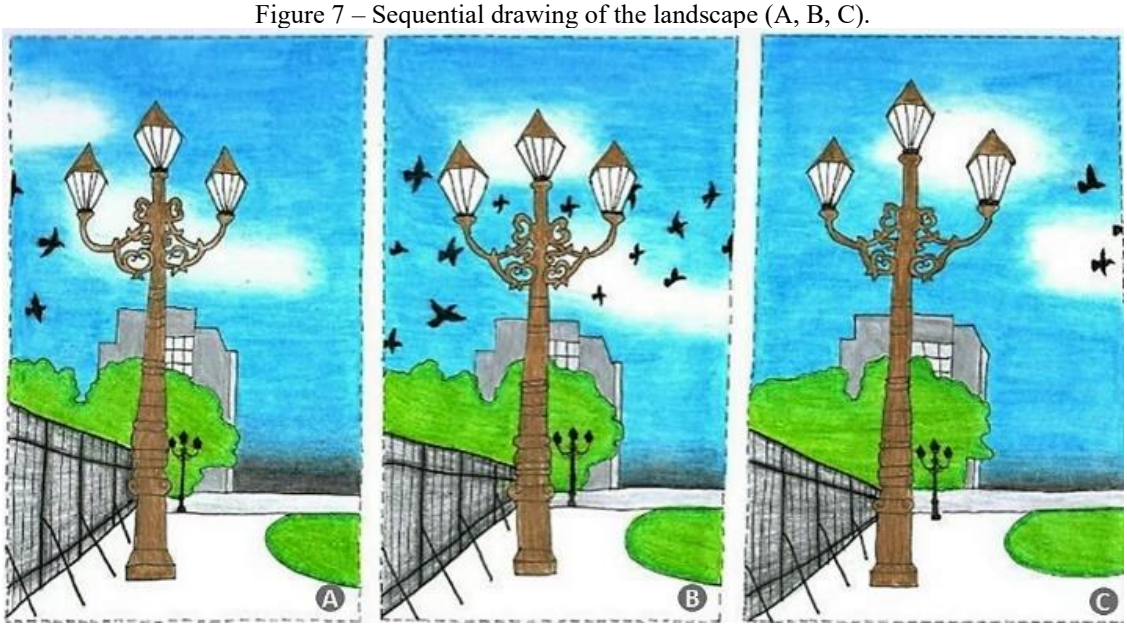
Thus, it is believed that the experience brought to the students the possibility, although timid because mediated by the remote digital, to understand the space as something dynamic and intimately linked to the movement, to "move through", to "pass-through", reinforcing concepts linked to the relative scale of the body about the city, as Bruno Zevi (1992) defends:

> All those who, however fleetingly, have reflected on this theme, know that the essential character of architecture – what distinguishes it from other artistic activities – lies in the fact that it acts with a three-dimensional vocabulary that includes man. The painting acts on two dimensions, although it can suggest three or four of them. The sculpture acts on three dimensions, but the man is left outside, turned off, looking from the outside at the three dimensions. In turn, architecture is like a large excavated sculpture, in whose interior man penetrates and walks (ZEVI, 1992, p. 34).

The observation drawing proved to be a powerful tool in the development of this perception and understanding of the scale of the urban landscape. To this end, the students were presented with the possibility of representing drawings that indicated a serial view of the landscape, precisely to provoke this notion of movement as something inherent to the urban space, also an important challenge in the case of a work with the use of remote digital resources in the circumstances described.

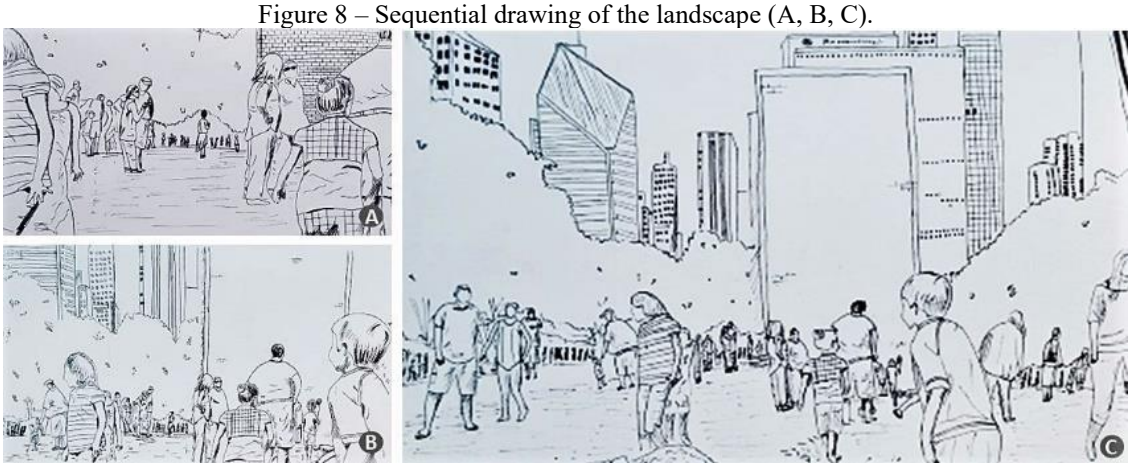
For CHING (2017) the serial vision can be used not only to convey the experience of being in a place but also to demonstrate the experience of movement, the representation of the place in a sequence of spaces. However, the results brought surprises in the sense of extrapolating the conventional serial vision representations, giving way also to the poetic and subjective (Figures 7 and 8).

Figure 7 – Sequential drawing of the landscape (A, B, C).



Source: Archives of the discipline Perspectives. Author Tayla Caroline Rodrigues Pinto (2020).

Figure 8 – Sequential drawing of the landscape (A, B, C).



Source: Archives of the discipline Perspectives. Author: Bruna Laís Cózaro. (2020).

Finally, the new format resulted in new possibilities to look at urban landscapes and envision alternatives to live, know and register the city. Alternatives expressed in results that dialogue with what Bajzek (2019) reveals about the act of designing the city. For Bajzek (2019), drawing the city goes beyond recording a scene. To draw the city is to become part of it, it is to engage with its material and immaterial dimensions, it is to recognize its realities and dialogue, it is to awaken to its daily life, it is to allow oneself to stop in time, to discover memories, details of the urban daily life, and to open one's eyes to the urban totality.

5 FINAL CONSIDERATIONS

Through the products presented in the *digital sketchbook* delivered by the students, it was possible to mark the absorption of knowledge and the proposed content. Despite the question posed, of a possible adaptation in the way of conducting a discipline of a notably practical nature remotely, it is noted that the exchange of knowledge, discussions, and debates was possible virtually. However, it was observed that the virtual teaching model brought a certain discomfort to the students and that over time it became tiring or distressing to the students. It became annoying to be on the other side, at the window of the computer or cell phone, inside the house, entering the intimate space. A reciprocal feeling between teachers and students mixed with the uncertainty that this circumstance carried. Despite the limitations and insecurities attributed to the moment, it was possible to understand that the obstacles were overcome and the objectives achieved.

It should be noted that visual records become more intact as a process when it is proposed to the academic to abdicate scenes and landscapes plastered and framed classically and conventionally, such as the "postcard" scenes. By launching themselves into the search for more intimate, personal, circumstantial frames, the unexpected and the unusual allowed the capture of the moment, of the fleeting scene in drawing. Result of the deconstruction of the vitiated and preconceived look about the

landscape and a new construction towards an interpretive and peculiar look, where the "kitsch", the vulgar, the minor and "unimportant" detail, the deviations, and the ruptures fit.

It was possible to debate the teaching and methodology mediated by digital platforms. Also understand that the importance of physical presence in the urban space, allowing physical contact and sensations caused by smells, sounds, and the intensity of lights will not be supplied by the intermediation of digital instruments. They can meet emerging demands or be complementary tools to teaching and proposed methodologies.

Finally, it was possible to understand that the proposed discipline was never intended to be configured as a course offered in the distance learning modality, although the methods employed have converged to do so. At that moment, a collaborative and collective methodology was being built, so that it would be possible to meet the circumstances of the pandemic and social isolation, without renouncing creativity and the exercise of a new look at the city, even between screens.

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CHAPTER
45

Factors associated with the mortality of patients hospitalized by COVID-19 in a tertiary hospital

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ABSTRACT
The pandemic of COVID-19 generated a significant impact on health and socioeconomically globally due to lack of treatment, high transmission, and morbidity and mortality. In this sense, analyzing the epidemiological scenarios of the disease generates means for health management planning, identification of more susceptible groups, and physiopathological understanding. The objective of this study was to identify factors associated with death in patients hospitalized for COVID-19 in a tertiary care hospital. A cross-sectional study was carried out based on secondary data seen at the hospital unit covered by the 8th Health Regional of Paraná (8thRS), in the year 2020. Data related to the socio-demographic, laboratory, and clinical characteristics of patients were collected, and the outcome analyzed was hospital death (yes/no). Pearson's chi-square test or Fisher's exact test was used to analyze the data. ("Predictors of burnout syndrome in intensive care nurses") As of December 31, 2020, 185 patients with RT-PCR confirmed diagnosis for COVID-19 were recorded, with 113 discharges (61.1%; 95%CI;54.1 - 68.1) and 72 deaths (39%; 95%CI; 31.9 - 48.2). In summary, we identified higher mortality in the male group, longer periods of hospitalization, and comorbidities present: hypertension, obesity, diabetes, and cardiovascular diseases.

Keywords: COVID-19, Death, Hospitalization.

1 INTRODUCTION

In 2019, in Wuhan, China, a new virus capable of infecting humans, the SARS-CoV 2 virus, was discovered in Portuguese. The disease caused by SARS-CoV 2 was termed COVID-19 and in March 2020 due to the rapid spread of the disease, it was determined by the World Health Organization (WHO) as a pandemic. According to the Ministry of Health, Brazil had its first case reported on February 26, 2020. A year later, on February 27, 2021, the country recorded 10,517,232 cases and 254,221 deaths from the virus. Due to the high transmissibility, lack of treatment, number of deaths, and overload in hospital care, health agencies are concerned about transmission and mortality (BRAGA

et al., 2020; BRAZIL, 2021).

The ease of dissemination and contagion, associated with the severity of complications in the respiratory system and systemic, are pointed out as elements of the pathogenicity of SARS-CoV2. Spread occurs mainly through inhalation of saliva droplets and respiratory secretions that can be suspended in the air or on objects when the infected person coughs, sneezes, or speaks. The incubation period of COVID-19 can range from 1 to 14 days and results from respiratory tract infection, characterized by a broad spectrum of clinical manifestations and varying degrees of severity. Most infected people are asymptomatic or have mild symptoms of the disease, resembling a common cold, and will not need to be hospitalized (BAPTISTA; FERNANDES, 2020; MARTELLETO *et al*., 2021; SOUZA *et al*., 2020).

When mild, respiratory symptoms present as dry cough, fever, sore throat, body ache, diarrhea, conjunctivitis, headache, loss of taste (dysgeusia) or smell (anosmia), rashes on the skin, or discoloration of the fingers or toes. However, when it progresses to a more severe condition, complications may develop, such as pulmonary involvement (visualized on imaging - radiography or computed tomography of the chest - by bilateral opacification of the air space), interstitial pneumonia, dyspnea, acute kidney injury, septic shock and need for mechanical ventilation. It can progress to more alarming conditions such as acute respiratory distress syndrome (ARDS), multiple organ failure, and death due to the cascade of cytokines by excessive activation of the immune system (FEITOZA *et al*., 2020).

However, not every case of COVID-19 patients will be hospitalized. According to the Brazilian Society of Pulmonology and Phthisiology, Computed Tomography recommends that hospitalization cases of COVID-19 patients should be reserved for cases of alarm symptoms or in specific clinical situations (BAPTISTA; FERNANDES, 2020).

Studies reveal that some factors are significant in determining the worsening and clinical outcomes of COVID-19. The comorbidities that are related to higher hospital admission and development of the disease form were patients with pre-existing comorbidities, such as systemic arterial hypertension (SAH), diabetes *mellitus* (DM), and coronary heart disease. There is also a correlation, in smaller numbers, with other diseases such as hepatitis B, chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), neoplasms, and immunodeficiencies. Smokers also had a greater predisposition to develop the severe form of the disease due to previous lung injury caused by the toxic substances of cigarettes (ALMEIDA *et al*., 2022).

Obesity is also considered a comorbidity with worse outcomes, being a predictor for the worsening of the disease. Deregulation of immunity, increased pro-inflammatory activity, decreased cardiorespiratory capacity, and expiratory volume is pointed out as one of the fiopathologies of obesity

that aggravate infection by the virus, increasing the risk of mortality (MOREIRA *et al.*, 2020).

In addition to these factors, the patient's age range was correlated with his clinical outcome. Studies show that age can be a predictive factor, being worse for older ages, while young people and children have a lower mortality rate due to the disease. Biophysical and immunological changes and a higher probability of previous comorbidities are some of the factors that justify this factor linked to higher virological morbidity and mortality (ALMEIDA *et al.* , 2022; FEITOZA *et al*., 2020).

Finally, the length of the patient's hospitalization is directly proportional to the risk of death. Patients with more severe conditions require longer hospitalization and, therefore, there may be a need for more invasive treatments, such as hospitalization in the Intensive Care Unit (ICU) and use of mechanical ventilation (invasive or not), resulting in the worsening of the evolution of the clinical picture. In addition to COVID-19 infection, longer hospital stays increase the likelihood of viral, bacterial, or fungal coinfections and superinfections, worsening the severity of the condition (FERNANDES *et al.*, 2021).

The severity of the disease and death described in the literature has shown great variability due to the differences in the periods analyzed, the sample size and the standardization of the data. The results of international and national studies converge regarding the worse prognosis in male patients, with increased age, longer hospitalization and ICU bed stay, and the presence of comorbidities.

The profile of death from COVID-19 in the 8th Regional of the Southwest of Paraná has not yet been reported and discussed extensively with the existing literature. Given the unique character of the pandemic, which has had a great impact on public health, it is important to describe the characteristics of the affected population and factors associated with the greater severity and lethality of this disease, contributing to the confrontation of current and/or future crises.

Thus, this research aims to identify the factors associated with the mortality of patients hospitalized for COVID-19 in a tertiary hospital.

2 MATERIAL AND METHODS

2.1 DESIGN

This is a quantitative and cross-sectional study, resulting from a larger research conducted by the Health Sciences Center of UNIOESTE, *Francisco* Beltrão campus. Secondary data were obtained from the research project 'Epidemiological and clinical characterization of the population exposed to COVID-19', obtained through the survey of medical records of suspected and confirmed cases of COVID-19, in the year 2020.

Data were collected through individual notification forms and electronic medical records of patients confirmed of COVID-19 by RT-PCR (*Reverse-Transcriptase Polymerase Chain Reaction*, or

reverse transcriptase reaction followed by polymerase chain reaction), and transcribed into a questionnaire focusing on the following surveys: sociodemographic characteristics (gender, age), presence of comorbidity (yes or no), for each category: cardiovascular disease (CVD), diabetes *mellitus* (DM), neoplasia, obesity, chronic neurological disease, chronic lung disease, chronic hematologic disease, chronic liver disease, human immunodeficiency virus (HIV) infection; use of intensive care (ICU: yes; no); ventilatory support (invasive; noninvasive; no support). The outcome analyzed will be hospital death or not.

2.2 SAMPLE

The sample was composed of individuals who participated in the cross-sectional study 'Epidemiological and clinical characterization of the population exposed to COVID-19', obtained through a survey of medical records of suspected and confirmed cases of COVID-19, attended at the hospital unit of the 8th Regional Health of Paraná (8th RS), in 2020. The 8th RS encompasses 27 municipalities, headquartered in the municipality of Francisco Beltrão - Paraná, with an estimated population of 357,174 inhabitants (IBGE, 2018). Those whose notifications and medical records of patients were not confirmed of COVID-19 by RT-PCR were excluded.

2.3 STATISTICAL ANALYSIS

Descriptive and inferential analyses were used to study factors associated with hospital death, using the SPSS program, version 23. For crude analysis, Pearson's chi-square test or Fisher's exact test was used for categorical variables. Comparisons of means were made by the U test<. Graphs were also used through network analysis, which showed associations between the variables according to the outcome (cure/death).

2.4 ETHICAL ASPECTS

The present study has as its methodology a cross-sectional analysis based on secondary data obtained by the survey of medical records, without any intervention of the patients and subjects in the research. The present study was approved by the Research Ethics Committee (CEP) of UNIOESTE, number 4,034,106, on May 18, 2020. In addition, it is noteworthy that measures have been taken to minimize the risk of exposure of the data of the patients involved, such as the use of digital cloud storage and controlled access to researchers.

3 RESULTS

During the study period, 185 patients with a diagnosis confirmed by RT-PCR for COVID-19 were hospitalized, of which 113 (61.1%; CI95%;54.1 – 68.1) were discharged and 72 (39%; 95%CI; 31.9 – 48.2) that evolved to death.

Of the total hospitalizations analyzed, 3 patients did not live in the 8th Regional Health of Paraná, 1 of the patients was visiting family members in the region and needed hospitalization, being their residence in Rio de Janeiro (RJ) and 1 patient of the 10th and 9th Regional Health of Paraná, for lack of hospital beds, 1 with residence in Cascavel (PR) and 1 in Santa Helena (PR). Of the 8th Regional Health of Paraná, the highest frequencies of hospitalized patients were in the municipalities of Francisco Beltrão (72), Dois Vizinhos (33), Barracão (10), Enéas Marques (9) and Salto do Lontra (7).

Table 1 presents the characteristics of patients hospitalized with COVID-19 in 2020 in a hospital unit in the area covered by the 8th Regional Health of Paraná.

Table 1 – Demographic and clinical characterization of patients hospitalized for COVID-19 in a hospital unit, according to outcomes (discharge/death).

	DENOUEMENT		
Variable	**Death N=72 (%)**	**Loud N=113 (%)**	**P value**
Sex			
Male	46 (64,8)	66 (58,4)	0,388
Female	25 (35,2)	47 (41,6)	
Place of Internment			
Clinical	10 (13,9)	32 (28,3)	**0,022***
UTI	62 (86,1)	81 (71,7)	
Obesity			
Yes	25 (39,1)	31 (47)	0,363
No	39 (60,9)	35 (53)	
Cardiovascular Diseases			
Yes	13 (18,3)	12 (10,6)	0,138
No	58 (81,7)	101 (89,4)	
Systemic arterial hypertension			
Yes	48 (67,6)	65 (57,5)	0,171
No	23 (32,4)	48 (42,5)	
Diabetes Mellitus			
Yes	22 (30,6)	26 (23)	0,254
No	50 (69,4)	87 (77)	
Fever			
Yes	25 (34,7)	36 (32,1)	0,717
No	47 (65,3)	76 (67,9)	
Cough			
Yes	35 (48,6)	66 (58,4)	0,192
No	37 (51,4)	47 (41,6)	
Headache			
Yes	09 (12,5)	19 (16,8)	0,425
No	63 (87,5)	94 (83,2)	
Dispneia			
Yes	52 (72,2)	83 (73,5)	0,854
No	20 (27,8)	30 (26,5)	
Sore throat			

Yes No	04 (5,6) 67 (94,4)	05 (4,5) 107 (95,5)	0,737
Myalgia Yes No	 15 (20,8) 57 (79,2)	 25 (22,3) 87 (77,7)	0,811
Diarrhoea Yes No	 10 (14,1) 61 (85,9)	 13 (11,5) 100 (88,5)	0,606
Vomiting Yes No	 05 (6,9) 67 (93,1)	 06 (5,3) 107 (94,7)	0,647
Asthenia Yes No	 15 (21,1) 56 (78,9)	 27 (23,9) 86 (76,1)	0,663
Inappetence Yes No	 09 (12,7) 62 (87,3)	 12 (10,6) 101 (89,4)	0,669
Hospitalization Up to 7 days 8 to 14 days 15 to 21 days Over 21 days	 18 (25) 24 (33,3) 20 (27,8) 10 (13,9)	 73 (64,6) 31 (27,4) 06 (5,3) 03 (2,7)	**<0,001***

*Chi-square test.

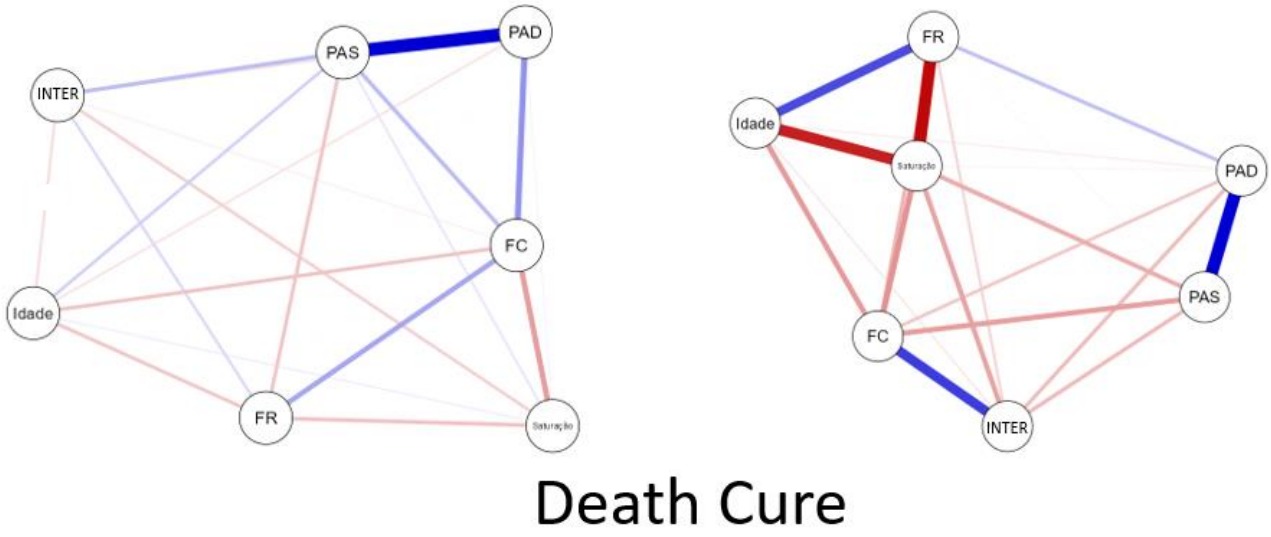
When performing the chi-square test, we identified an association between the outcome of death in the variables of hospitalization in the Intensive Care Unit (ICU) ($p = 0.022$) and length of stay longer than 7 days ($p < 0.001$). Hypertension and diabetes were the most frequent comorbidities among patients who died. Another associated factor was age ($p < 0.001$). These patients had slightly higher medians of respiratory rate, heart rate, and arterial oxygen saturation, but without statistical significance as shown in Table 2.

Table 2 – Characterization of the length of stay, age, and vital signs of patients hospitalized for COVID-19 in a hospital unit, according to death outcome, 2020.

			DEATH		
Variable	**n**	**Total (IQ50-Min-Max.) *****	**Yes (IQ50-Min-Max.)**	**No (IQ50-Min-Max.)**	**P value**
Length of Hospitalization	185	8 (1-68)	11,5 (2-46)	6 (1-68)	**<0,001****
Age (in years)	185	64 (0,0-96)	68,5 (27-91)	60 (00-96)	**<0,001****
Arterial oxygen saturation (SaO2)*	173	93 (35-125)	92 (35-99)	94 (70-125)	
Systolic blood pressure*	97	130 (70-201)	133 (70-201)	130 (90-186)	0,730
Diastolic blood pressure*	96	78 (40-123)	74 (40-107)	80 (50-123)	0,576
Respiratory rate*	112	21 (13-40)	22 (13-40)	20 (14-30)	0.592
Heart rate*	101	84 (31-150)	87 (52-128)	82 (31-150)	0,365

* Result of examinations on the admission of patients.
** Teste U de Mann-Whitney
IQ50 – Interquartile 50. Minimum and Maximum

Figure 1 – Network graph referring to the associations between the variables (vital signs, length of hospital stay, age) according to the clinical outcome of patients hospitalized for COVID-19 in a hospital unit, 2020.



HR: Respiratory rate
SBP: Systemic blood pressure
DBP: Diastolic blood pressure
INTER: Total length of hospital stay

Finally, we performed network analyses to understand the associations between the variables according to the outcome (cure/death). Evident differences can be seen in Figure 1. The central nodule related to death was the variable saturation, which was negative and strongly associated with age and respiratory rate. In the group of patients whose outcome was discharged, there was no central nodule and the only strong association found was between systolic and diastolic blood pressure; In this same group, it is possible to see that, although not significant, oxygen saturation was positive with the patient's age and indirectly negative when considering the respiratory rate.

4 DISCUSSION

It was announced by the World Health Organization (WHO) on January 30, 2020, that COVID-19 has been classified as a global pandemic, i.e. a public health emergency internationally. The high viral spread, lack of specific treatment, and high morbidity and mortality are some of the factors that have generated such concern and urgency of knowledge to cope with COVID-19. Thus, the purpose of this study was to analyze and identify the main factors associated with death in patients hospitalized for COVID-19 in the 8th Regional Health of Paraná (MARTELLETO *et al.*, 2021).

In the period analyzed, the lethality rate of the disease was 39%, corresponding to 72 cases. According to studies by Klosowski, Carraro, and Figueiredo (2022), the case fatality rate in the State of Paraná, during the year 2022, was 34%, with 14,352 cases and 4,870 deaths being reported in the 181 hospitals analyzed, the city with the lowest lethality Maringá (21%) and the highest in Apucarana (74%). In this context, the 8th RS has a higher case fatality rate in cases of hospitalization for COVID-

19 than the State of Paraná. Next, to propose a more structured discussion, the main results found in this research will be evaluated and discussed in comparison with the available scientific literature.

4.1 GENDER AND MORTALITY

There was a higher prevalence of deaths from COVID-19 in cases of hospitalization in males (64.8%) than in females (35.2%). This fact corroborates the data found in the literature, which demonstrates that men are more predisposed to mortality related to COVID-19 (BAPTISTA; FERNANDES, 2020).

One of the explanations for this fact is due to the greater predisposition to comorbidities in males, such as systemic arterial hypertension (SAH), diabetes *mellitus (*DM), and cardiovascular diseases (CVD). These are linked to higher morbidity and mortality of the virus (BAPTISTA; FERNANDES, 2020).

Another predisposing factor is due to male stigmas and social behaviors. The low demand for medical care, sedentary lifestyle, excessive alcohol consumption, and smoking, are some of the stigmatized male behaviors in society, worsening the prognosis if they get sick (BAMBRA *et al.*, 2020).

4.2 AGE AND MORTALITY

People over the age of 60 are considered a risk group due to extreme susceptibility to infection and worsening of the disease due to more deficient physiology and immune system. Lethality was higher in the elderly, with emphasis on those with preexisting diseases such as systemic arterial hypertension (SAH), cardiovascular diseases (CVD), and diabetes *mellitus (*DM) (MACIEL *et al.*, 2020).

The compromised immune mechanism causes the elderly to have worse prognoses in the face of infections. In addition, anatomical changes - such as degeneration in the muscles in the elderly - can cause changes in the respiratory tract, leading to atrophy in the repository anatomy, leading to a reduction in the clearance of the airways and pulmonary reserve. Given this, respiratory tract infections, as in the case of COVID-19, generate greater injuries and complications (COSTA *et al.*, 2020).

Another factor for the higher mortality rate is the lower energy intake in the elderly. Physiological variations with advancing age lead to a lower metabolic rate, generating risks regarding the evolution of malnutrition. In this context, they make them more vulnerable to infections and, consequently, increase the risk of greater complications in infections (BORGES *et al.* , 2021; OLIVE TREE; BRITO, 2021).

The elderly also had a longer period of hospitalization, and high rates of respiratory rate, heart rate and arterial oxygen saturation. However, in the present study, there was no statistical significance regarding the length of hospitalization, with the outcome of death. This data differs from the data pointed out by Walter *et al.* (2020), which found longer hospitalization time and higher death rates in the elderly (QUEIROZ *et al.,* 2020).

4.3 INTERNMENT REGIME

The results also demonstrate the association between hospitalization variables and clinical outcomes. Patients with a hospitalization period longer than 7 days had a worse prognosis ($p < 0.001$). In addition to the length of hospitalization, patients who were admitted to the Intensive Care Unit (ICU) had a higher mortality rate ($p = 0,022$).

Patients who require hospitalizations in ICU beds are due to the greater aggravation and worse prognosis of the disease. Usually, these patients require more aggressive measures such as ventilatory support (invasive and noninvasive), vasoactive drugs and pronation. In addition to the viral infection of COVID-19, the longer stay or in ICU increases the likelihood of coinfections and viral, bacterial or fungal superinfections, worsening the severity of the condition (FERNANDES *et al.,* 2021).

4.4 COMORBIDITIES

Obesity is considered a chronic non-communicable disease (NCD) and is correlated as a severity factor for COVID-19 infection. Obese patients have higher rates of hypoxemia, frequency and intensity of cough, dyspnea, admission to the Intensive Care Unit (ICU), severe complications, acute respiratory distress syndrome (ARS) and death. In the present investigation, obesity was identified as a factor associated with death, which converges with the study by Borges *et al.* (2021), which found a worse prognosis and morbidity and mortality of COVID-19 among obese people.

Some mechanisms are associated with the pathophysiology of obesity and explain the worsening of the hospitalized patient's condition. Initially, chronic inflammation occurs due to the increase of pro-inflammatory cytokines by adipocytes, generating a degree of immune impairment in the patient due to the decrease in innate and adaptive immunity. The worsening in ventilatory saturation and compensation in cases of virus infection in these patients is due to the injurious mechanism that occurs by the decrease in lung capacity, by the reduction of its compliance, expiratory volume and pulmonary function. Finally, the increase in circulatory demand in obese patients due to greater body vascularization demands a greater cardiovascular overload, thus increasing the vulnerability to cardiovascular and metabolic complications, such as atherosclerosis and microvascular lesions (MOREIRA *et al. ,* 2020; BORGES *et al. ,* 2021).

Feitoza *et al.* (2020) indicate that about 20% to 50% of those infected have some type of comorbidity and that can provide greater lethality of the disease. The main pre-existing comorbidities correlated with worse outcomes are systemic arterial hypertension (SAH), diabetes mellitus (DM) and coronary heart disease. One of the explanations for this association is due to the medications used in such comorbidities and that can aggravate the condition. For the treatment of SAH, DM and heart disease, medications that increase angiotensin-converting enzyme type 2 (ACE-2) are used, whose production occurs in cells of the lungs, kidneys, intestines and blood vessels. This enzyme has a high affinity for binding the virus to target cells, functioning as a functional receptor of COVID-19, which may aggravate the clinical picture of the patient infected by SARS-CoV-2 (SILVA JÚNIOR *et al*., 2021).

In the present study, there was a greater predisposition to worse outcomes in patients with preexisting comorbidities, especially obesity, systemic arterial hypertension (SAH), diabetes mellitus (DM), and coronary heart disease. This result is consistent with international data, in which these comorbidities were also associated with a worse prognosis. According to research conducted in January 2020 by Chen *et al.* (2020), referring to mortality from COVID-19 at *Jinyintan Hospital, Wuhan*, China, the most predominantly reported comorbidities associated with worse outcomes were hypertension (16.9%), followed by diabetes (8.2%), with other cardiovascular diseases also present.

4.5 ASSOCIATIONS BETWEEN VARIABLES

Finally, analyses were performed using network graphs to understand the associations between the variables according to the outcome (cure/death); Evident differences can be seen in Figure 1.

Regarding cure, Figure 1 shows that there was no central nodule, that is, no variable that centralizes the factors associated with cure. The only association that is more prominent in cured patients was between systolic and diastolic blood pressure. Although not significant in this same group, it is possible to see that oxygen saturation was positive with the patient's age and indirectly negative when considering the respiratory frequency.

Still referring to FIGURE 1, but in the outcome of death, the central nodule was saturation. This variable presents itself as a negative factor and is strongly associated with age and respiratory rate. This fact can be explained, according to Queiroz *et al.*, 2020, because when groups older than 60 years had higher death outcomes and, consequently, during the hospitalization period, presented complications from COVID-19, such as acute respiratory distress syndrome, co-infections, ventilatory support (invasive or not) and impaired immune response. All these aggravations reflect in the worsening of saturation and, consequently, as a compensatory response, in the respiratory rate.

5 FINAL CONSIDERATIONS

Due to the lack of an effective treatment against COVID-19, knowing the factors of higher risk of morbidity and mortality of the disease become crucial for the elaboration of care plans with groups of greater vulnerability in developing the severe form of the disease, aiming to reduce the rate of deaths from the coronavirus. In this study, it was found that the main variables for the outcome of death in patients hospitalized with COVID-19 were: older age groups, male patients, hospitalized for a hospitalization period longer than 7 days and if hospitalized in the Intensive Care Unit. In addition to these factors, patients who had some previous comorbidity or aggravation also had worse clinical outcomes, especially obesity, systemic arterial hypertension and diabetes *mellitus*.

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CHAPTER
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The dynamics of health care for children with cancer in the time of COVID-19

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ABSTRACT
Objectives: To map the scientific production related to the repercussion of COVID-19 on the health of oncological children and to identify the challenges related to this public in the current context of the pandemic. Methodology: this is an integrative review of the literature, consisting of a bibliographic survey and a review of relevant studies published on the CAPES journal portal from January 2020 to October 2021. Six methodological steps were followed and the research strategy with the acronym PICo was used to construct the guiding question. Of the material collected, only 17 works were eligible, according to the objective of the research. Results: In the analyzed works, the main findings were: the relationship between the clinical course of COVID-19 disease in pediatric cancer patients and the challenges related to this public in the current context of the pandemic. Conclusion: This study allows us to conclude that in general, the SARS-COV-2 infection did not have a significant impact on the clinical picture of children and adolescents with cancer, and the treatment presented challenges in times of pandemic.

Keywords: Child, Pediatric Cancer, COVID-19 pandemic.

1 INTRODUCTION

In the global context, one in six deaths has cancer as the main cause, responsible, 2018, for 9.6 million deaths. This disease has a higher frequency in the adult population, however, children and adolescents (0-19 years) have an average incidence of approximately 0.5% to 4.6% of all malignant tumors, occurring mainly in countries with low human development index (HDI) with deficient access to health care. [1.2]

According to the American Cancer Society, in 2019, leukemia (28%), central nervous system (26%), and lymphomas (8%) stood out as the main types of pediatric cancers included in the age group of 0 to 19 years. In Brazil, it is estimated that for each year of the 2020-2022 triennium, 8,460 new cases in the child and adolescent population, with 4,310 referring to males and 4,150 to females, with a higher incidence, respectively, in the Southeast and South regions. [3.4]

In December 2019, in China, the first outbreaks of viral pneumonia by a new strain (SARS-Cov-2) of the Coronaviridae family were traced, which spread rapidly to all continents due to its high

transmissibility. On March 11, 2020, the World Health Organization (WHO) elevated the SARS-Cov-2 infection status to the COVID-19 pandemic, a state of international public health emergency. [5]

The course of the pandemic has led to severe and strict government interventions to contain the rapid transmission of the new viral strain under the population. Measures such as the use of masks, *lockdown*, social distancing, an increase of beds, construction of emergency care for infected and other actions contributed to an impact on the social, economic, political, and cultural spheres of the country directly interfering in the daily lives of citizens. [6.7]

Given the current pandemic scenario, it is of fundamental importance to address this theme and care for cancer patients, with the focus of the study on the pediatric population, since about 2% of this group has the prevalence of the virus. It is known that some studies defend the possibility of a higher risk for SARS-CoV-2 infection and future complications, with the population affected by cancer, due to the clinical picture and their routines of comings and goings to the hospital, with greater exposure to the contagion of the disease. However, research aimed at the spread of the virus, early diagnosis, prognosis, and treatments concerning COVID-19 and its impact on the routine care of the pediatric oncology population, are still rare. [8]

In this perspective, with emphasis on the current global public health crisis due to COVID-19, it is relevant to approach the subject related to the theme of pediatric oncology, from the questioning about the possible existing productions about children with cancer in a pandemic period.

Given the above, the present study was aimed at the scientific production about the care of children with cancer during a period of the COVID-19 pandemic with the objectives of mapping the scientific production related to the repercussion of COVID-19 on the health of children with cancer and identifying the challenges related to this public in the current context of the pandemic.

2 METHODOLOGY

2.1 TYPE OF STUDY

The study is an integrative review of the literature, consisting of a bibliographic survey and a review of relevant studies published, to contribute assertively to the construction of new scientific studies. In addition to facilitating the implementation of effective interventions in care and identifying possible gaps in knowledge that need to be filled with further investigations. [9.10]

During the course, six methodological steps were followed, which are: (1) elaboration of the guiding question; (2) research or sampling in the literature; (3) data collection; (4) critical analysis of the included studies; (5) discussion of the results; (6) production of the review related to learning. [11th]

In this sense, the research strategy with the acronym PICo was used to construct the guiding question: how does the disease of COVID-19 affect the health of cancer children? Once the

composition of the fundamental elements is well constructed and organized, a greater degree of reliability about the evidence necessary for the resolution of the clinical research question is possible and avoids unnecessary searches. [12] Thus, P (child AND NOT adult) was defined;

o I (Pediatric Cancer); the Co (covid-19 pandemic).

2.2 STUDY LOCATION

The collection of literary materials, carried out from August to October 2021, was carried out in the following databases: Latin American and Caribbean Literature in Health Sciences (LILACS), Web of Science (WoS), Público/publisher MEDLINE (PubMed), SCOPUS and Cumulative Index to Nursing and Allied Health Literature (CINAHL).

2.3 INCLUSION AND EXCLUSION CRITERIA

The inclusion and exclusion criteria, being included: studies comprised in the time frame from 2020 to 2021, referring to the period officially declared a pandemic by the WHO, full texts and free access that have as main target: the child and adolescent public (0-19 years), the line of cancer care and the pandemic scenario. On the other hand, studies tangent to the target audience and with duplicity were excluded, considering only once for the analysis.

2.4 DATA COLLECTION

The descriptors defined and applied were selected from the register of the Descriptors in Health Sciences (DeCS), from the LILACS and PubMed databases, and the Medical Subject Headings (MeSH) of the Web of Science portal, SCOPUS, and from the CINAHL thesaurus of the CINAHL database.

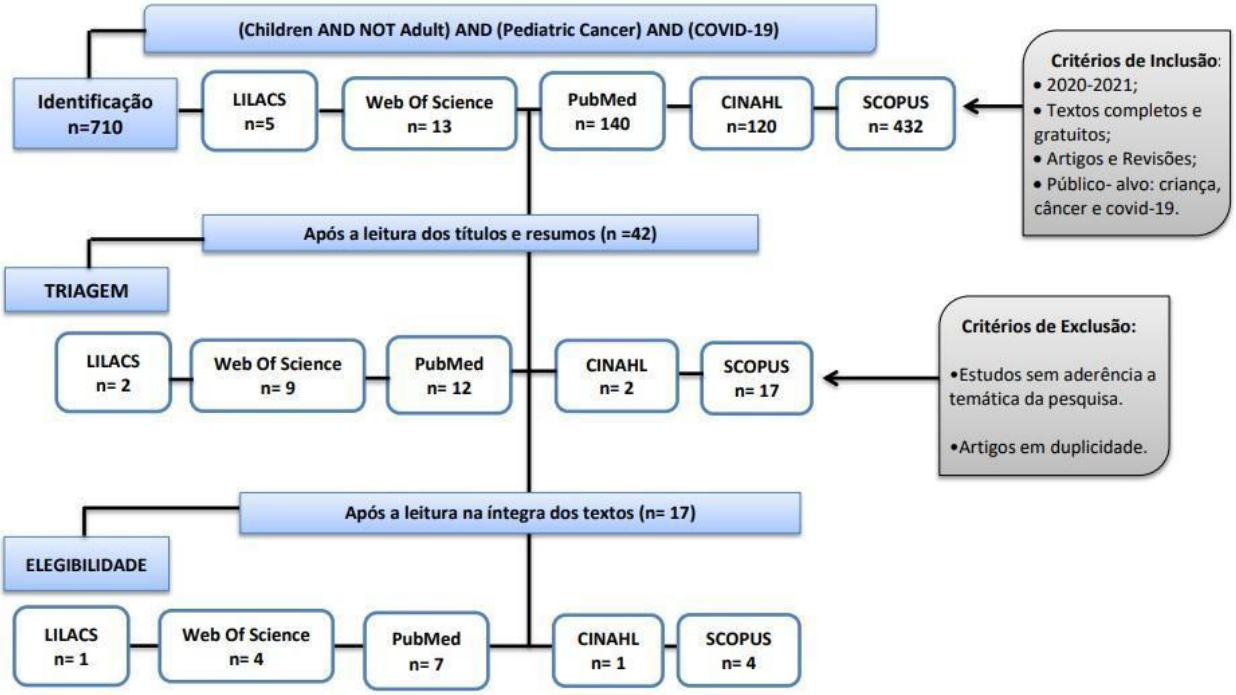
In addition, the choice of descriptors and their synonyms were constructed to capture as many available articles as possible, choosing to use the Boolean AND NOT among the terms referring to the participants, to increase the specification of the research according to the objective of the study, and AND between each term, allowing the combination of them. Thus, the following trifecta of keywords was used in the English language: ((("Children" AND NOT "Adult") AND ("Pediatric Cancer") AND ("Covid-19"))).

2.5 DATA ANALYSIS PROCEDURES

The collected literary materials were submitted to a screening process for better identification and eligibility of the articles according to the objective of the research, as described in Figure 1 based

on the PRISMA recommendation (Main Items for Reporting Systematic Reviews and Meta-analyses). 13th

Figure 1. Screening flowchart and eligibility of review articles. Rio de Janeiro, RJ, Brazil, 2021.



Source: Own Authorship

In this line, at first, 710 scientific productions were identified in the databases selected for the study. The first stage of the screening was characterized by the filtering of the articles after the analysis of the title, followed by the abstract, according to the inclusion and exclusion criteria. At the end of the first stage, 668 scientific productions were excluded, leaving only 42 for the next stage. From this quantity, the second filtering was performed through a more detailed and careful analysis of the texts in full, obtaining as the final result of the screening 17 articles that were within all the inclusion and exclusion criteria and were in agreement with the guiding question and objectives of the research.

Of the potential studies, an evaluation was performed using an instrument containing a database, title, author, year, journal, objective, and conclusion of the research. Finally, the consistency of the information and data found for the elaboration of the results and presentation of the review was analyzed.

2.6 ETHICAL ASPECTS

In addition, it is of fundamental importance to mention the absence of participants and scenario for the construction of IR, since it was a collection of literary materials in a database, for this reason, it was not necessary to forward a research protocol for evaluation by the Ethics and Research

Committee (CEP) by the Norms and Regulatory Guidelines for Research Involving Human Beings - Resolution CNS 510/2016.

3 RESULTS

Chart 2, below, comprises the final sample of 17 scientific productions, with a larger quantity in the PubMed database. Regarding the place of origin of the study that composed the sample, we have Europe (07), Asia (02), Africa (01), and America (06), being the United States of America (USA) responsible for three works, accompanied by Mexico, Cuba, and Brazil with only one work each. Regarding the language of publication, 90% correspond to English and 10% to Spanish.

Table 2 – Organization of the articles included in the review, according to base, title, authors, year, journal, objective, and conclusion, 2020-2021.

Code	BASE	TITLE/ AUTHORS	YEAR/ NEWSPAPER	TYPE OF STUDY/LEVEL OF EVIDENCE	OBJECTIVES	MAIN RESULTS
A 01	**LILACS**	*COVID-19 in pediatric cancer patients.* [8] Lopez EM *et al.*	2020/ Cuban Journal of Pediatrics.	Opinion Piece. Level of Evidence- 7	To characterize from a clinical-epidemiological point of view pediatric patients infectedwith SARS-CoV-2.	COVID-19 in the pediatric population of eastern Cuba, mainly in the province of Santiago de Cuba, is not a health problem in terms of morbidity and mortality, butit is a source of contagion for adults.
A 02	**Web of Science**	*Delayed diagnosis and treatment of children with cancerduring the COVID-19 pandemic.* 14 Dvori M, *etal.*	2021/ International Journalof Clinical Oncology	Quantitati ve article/ retrospective document ary analysis. Level of Evidence- 4	Alert experts and general pediatricians tothe needfor prudence in diagnosing and treating children with cancer promptly, despite the ongoing COVID-19 pandemic.	Late diagnosis of cancer is primarily related to fear of exposure to COVID-19. In addition to cases of co-infection with SARS-CoV-2 and the attribution of oncological symptoms to infection. In addition, patients already diagnosed with cancer, due to COVID-19 infection detected in the patient, family member, or bone marrow donor, contributes to the delay in treatments.

A 03	**Web of Science**	*Survival in pediatric patients with cancerduring the COVID-19 pandemic: scoping systematic review.* [15] Dorantes-acosta E, *et al.*	2020/ Medical Bulletin of the Children's Hospital of Mexico	Article of systematic explorator y review of the literature. Level of evidence- 1	Discover the available data on COVID-19 and mortality in pediatric cancer patients, and provide useful information for planning and developing strategies in this group.	Given the nature of thepreliminary reports, COVID-19 appears to be less severe in children than in adults and does not appearto be a cause of mortality in pediatric cancer patients.
A 04	**Web of Science**	*Caring for Children with Cancerin Africa during the COVID-19 Crisis: Implications and Opportuniti es.* [16] Slone, JS, Ozuah N, Wasswa P.	2020/ Pediatric Hematolo gy and Oncology	Article Expert commenta ry. Level of evidence- 7	To point out the main challenges faced in Africa during the pandemic for the treatment of children with oncology andblood disorders.	The emergence of positive long-term implications for the African health system, from the momentum createdin response to COVID-19.
A 05	**Web of Science**	*Survival and Complicatio ns in Pediatric Patients With Cancerand COVID-19: A Meta-Analysis.* [17] Dorantes-	2021/ Frontiers in Oncology-Pediatric Oncology	An explorator y systematic review ofthe literature: Meta-Analysis. Level of evidence- 1.	To determine survival and associated complications in pediatric cancer patientsduringthe pandemic.	In the literature analyzed, survival in the studied group of patients with COVID-19 was very high. Being a carrier of hematologic malignancy or other solid tumors and COVID-19 was not a risk factor in children with cancer for the outcomesanalyzed.

		Acosta E, *et al.*				
A 06	**PubMed**	*COVID-19 in pediatric oncology from French pediatric oncology and hematology centers: High risk ofsevere forms?* [18] André N, Rouger-gaudichon J, Brethon B, *et al.*	2020/ Pediatric Blood & Cancer.	Letter to the editor. There is no evidence.	Learn more about the impact of COVID-19 on pediatric cancer patients from the cases identified in France's leading pediatric oncology centers.	At first, COVID-19 in pediatric cancer patientsappears to be rare. However,the greater possibility of severe forms of the infection compared with immunocompetent childrencannot be ruled out
A 07	**PubMed**	*Flash survey on severe acute respiratory syndrome coronavirus -2 infectionsin pediatric patients on anticancer treatment*. [19] Hrusak O, Kalina T, Wolf J, *et al.*	2020/ *European Journal of Cancer*	The Flash search was used to obtain data on the incidence and severity ofCOVID-19. Level of evidence-4	Identify the incidence and severity of COVID-19 in children on anticancer treatment.	This quick research, while providing a very early picture of COVID-19, showsthat the disease can have a mild course even in childrenreceiving anticancer chemotherapy.
A 08	**PubMed**	*COVID-19 disease in New York City pediatric hematology and oncology patients.* [20]	2020/Pediatric Blood &	Letter to the editor. There is no evidence.	Describe the impact of COVID-19 on New York's pediatric population	The study data reinforce the impression that pediatric patients have a lower burdenof COVID-19 disease compared to adults. In addition to adding the delays and postponements in cancertreatment during the pandemic as one of the

		Gampel B, *et al.*	Cancer		hematology and oncology.	main challenges facing pediatric oncologists.
A 09	**PubMed**	*Impact of the First Wave of COVID-19 on Pediatric Oncology and Hematology : A Report from the French Society of Pediatric Oncology.* 21 Rouger-gaudichon J,*et al.*	2020/Cancers	This is a quantitative, retrospective study with clinical data analysis. Level of evidence- 3	To better describe the presentation and evolution of COVID-19 in patients followed in French pediatric oncology and hematology wards. Identify those who may be atthe highest riskof severe COVID and establish specific recommendatio ns.	Relatively few pediatric cancer patients have shown clinical signs of COVID-19or tested positive for thevirus. However, some highly immunocompromised patients are at risk of developing severe forms ofthe viral infection. In addition, cancertreatment was delayed in nearly half of the cases, indicating that COVID-19 impacted patient care, even though most cases were mild.
A 10	**PubMed**	*Severity of COVID-19 in children with cancer: Report from the United Kingdom Paediatric Coronavirus Cancer Monitoring Project.* [22] Millen GC,*et al.*	2021/ *British Journal of Cancer*	Observational study retrospective. Level of evidence- 4	To produce evidence of the incidence and outcomes ofSARS-CoV-2 in children with cancer seen inall hospitals treating this population across the UK.	Children with cancer with SARS-CoV-2 infection are not at increased risk of severe infection compared tothe general pediatric population.
		A collateral effect of the COVID-19 pandemic:		Letter to	To examine the delay in the diagnosis of patients arrivingat	The study suggests as apossible side effect of the COVID

A 11	**PubMed**	*Delayed diagnosis in pediatric solid tumors.* [23] ChiaravalliS, *et al.*	2020/ Pediatric Blood & Cancer	the editor. There is no evidence.	the Pediatric Oncology Unitof the Istituto Nazionale Tumori, Milan,a referral centerfor pediatric solid tumors.	pandemic thereduction in access to referral centers for pediatric cancer patients and their consequent worse chances of a timely diagnosis.
A 12	**PubMed**	*Clinical Characteristics and Outcome of Severe Acute Respiratory Syndrome Coronavirus 2 Infectionin Italian Pediatric Oncology Patients: A Study Fromthe Infectious Diseases Working Group of the Associazione Italiana di Oncologia e Ematologia Pediatrica.* 24 Need G, *etal.*	2020/ *Journal of the Pediatric Infectious Diseases Society*	Cohort study, prospective with clinical data analysis. Level of evidence- 4	To prospectively evaluate clinical features and outcomes in pediatric patients infectedwith SARS-CoV-2 during chemotherapy or after stem cell transplantation, during the pandemic in Italy.	SARS-CoV-2 infectionappears to have a milder clinical course in children than in adults with cancer. In addition, the data indicatethat it may not be necessary to modify or delay your cancer treatment program, especially for patients who remain asymptomatic orhave only mild symptoms of the viral disease.
A 13	**CINA HL**	*A Child with Acute Lymphoblastic Leukemia in Institutional Isolation during the COVID Pandemic:A*	2020/ *Indian Journal of*	Case Report. Level of evidence- 5.	Discuss the concerns andreflect on the problems of a 10-year-old boy with COVID	The report reinforces theneed for holistic care for patients and their families during anticancer treatment,especially regarding psychological issues andconcerns

		Multifaceted Responsibili ty. [25] Rathore P, *et al.*	*Palliative Care*		during the evaluation and treatment of leukemia.	that have intensified during the pandemic.
A 14	**SCOPUS**	*Prevalence and course of sars-cov-2 infection among immunocom promised children hospitalizedin the tertiary referral hospital in Poland.* [26] Kuczbourska K, Ksiazyk J.	2021/*Jour nal of Clinical Medicine*	Study Quantitati ve Retrospect ive. Level of evidence- 4	To evaluate the prevalence, clinical features,and comparisonof the course ofSARS-CoV-2 infection in children with and without immunodeficiency admitted tothe COVID-19 subunit of the tertiary referral hospital in Warsaw, Poland.	Concerning the comparison of the groups of children with and withoutimmunodeficiency the course of infection was similar. Both were mostly asymptomatic or had a mild stroke of COVID-19.
A 15	**SCOPUS**	*Impact of the COVID-19 pandemic on pediatric patients with cancerin low-income, middle-income, and high-income countries: Protocol fora multicentre, international, observation al cohort*	2021/*Briti sh Medical Journal*	Study observatio nal multicenter international cohort. Level of evidence- 4.	To determine all-cause mortality ratesof 30 days, 90 days, and 12 months in children with pediatric cancer during the COVID-19 pandemic in countrieswithlow,	This study limited its focus to nine of the most commonpediatric cancers globallyidentified by the WHO and therefore does not capture the effects of the pandemic on rarer cancers.

		study. [27] Peter N, Bandyopadhyay S, Lakhoo K.			medium, and high Human Development Indices.	
A 16	**SCOPUS**	*The global effect of the COVID-19 pandemic on pediatric cancer care:a cross-sectional study.* [28] Graetz D, *etal.*	2021/*The Lancet Child and Adolescen t Health*	A cross-sectional quantitative study. Level of evidence- 4	To assess the effect of the COVID-19 pandemic on the treatment of childhood cancer worldwide.	This study emphasizes theurgency of a robust and equitably distributed global response to support pediatric cancer care during this pandemic and future public health emergencies.
A 17	**SCOPUS**	*SARS-CoV-2 in children with cancerin Brazil: Results of a multicenter national registry.* [29] MCM course, *et al.*	2021/ Pediatric Blood & Cancer	Multicenter observational cohort study. Level of evidence- 4	Address the impact of COVID-19 on pediatric cancer patients in low- and middle-income countries.	In children with cancer and COVID-19, lower BMI was associated with a worse prognosis. Mortality in thisgroup of patients (12.3%) was significantly higher thanthat described in the general pediatric population (~1%).

As for the main findings evidenced in the code works: A01, A03, A05, A06, A07, A08, A09, A10, A12, A14, A15, and A17, there is mainly the relationship of the clinical course of COVID-19 disease in pediatric cancer patients. With emphasis on the signs and symptoms presented, the low impact on the infant mortality rate and the favorable evolution of the prognosis without sequelae. [8,15,17,18,19,20,21,22,24,26,27,29]

Study A01 describes fever and dry cough as the most frequent respiratory manifestations accompanied by other symptoms, less frequently, such as: runny nose, dyspnea and headache, in addition to, in some cases, the presence of bacterial pneumonia. [8] According to works A05 and A10, COVID-19 infection does not represent a higher risk in the pediatric population with cancer, and a mortality rate <1% is identified as the final result of the analysis of the articles, in which the cause of

death occurs by the progressive disease and not by contact with the new SARS-COV-2 viral strain. [17.22]

In addition, the low incidence of hospitalizations and the presence of a favorable prognosis without sequelae accompanied by health professionals are highlighted, according to A01. [8] Although mild or asymptomatic development by children and adolescents with cancer predominates in most studies, scientific studies A09, A10 and A14 point out the importance of careful clinical monitoring of these patients considered potential to develop a severe form of COVID-19. [21,22,26]

On the other hand, the studies whose codes are: A02, A04, A11, A13 and A16 focus on the challenges related to this public in the current context of the pandemic, with notes on late diagnosis, delay or postponement of treatments and the socioeconomic implications on health. [14,16,23,25,28]

The fear of exposure to COVID-19, evidenced in A02, A11 and A13 is the main reason for the late diagnosis of cancer in the pediatric population, since the hospital previously seen as a place of treatment becomes synonymous with a possible place of contagion. In addition, we highlight the cancellation of some laboratory and imaging tests presumed to be non-essential in the context of the pandemic, the replacement of face-to-face consultations by the excessive use of telemedicine, the suspension of consultations as a preventive measure to protect the team of health professionals and other patients. [14,23,25]

As a result, article code A02 highlights the delay or postponement of treatments linked to COVID-19 infection of caregivers and relatives of children and adolescents or with pediatric patients with cancer and the attribution of oncological symptoms to SARS-COV-2 infection. [14th]

In the scientific productions A04 and A16, corresponding respectively to the African continent and the USA, the precariousness of health services were identified, especially in middle- and low-income countries that already have an overload in the health system and with the context of the pandemic the already existing socioeconomic implications were accentuated, with emphasis on the lack of inputs and infrastructure to deal with COVID-19 positive patients, Even more so about the pediatric oncology public. [16, 28]

According to A16, some health centers such as pediatric hematology-oncology have reported complete closure during the pandemic. Others reported the scarcity of blood products, the unavailability of chemotherapeutic agents due to logistical difficulties at the border and interruptions in radiotherapy due to the absence of supplies, directly corroborating the abandonment of treatment and delay in the care plan of these patients. [28th]

It is also worth mentioning article A17, unique in the study sample for being a national reference, contemplating the complexity of the unified health system (SUS) during the pandemic, for

the access of children and adolescents with cancer to treatment centers, which are mainly concentrated in the metropolises, where the focus of COVID-19 infection was high. [29th]

In addition, SARS-COV-2 infection at the time of study presentation and the nutritional status of the pediatric patient were related as possible risk factors for a favorable prognosis or not. In which the data of the work evidenced higher mortality in the groups of children classified as seriously ill when compared to those who were asymptomatic or with mild/moderate symptoms of COVID-19. [29th]

In addition, the article also provides notes on the impact of nutritional status on the survival of children and adolescents with COVID-19, about a BMI lower or higher than what is considered appropriate for the age group being a potentially significant lethal risk factor in the clinical response and prognosis related to acute SARS-CoV-2 infection. [29th]

4 DISCUSSION

The analysis of the articles selected for the sample within the time frame, January 2020 to October 2021, resulted in 17 studies, all published in foreign journals and none in a specific nursing journal, nor did they present direct nursing interventions in the construction and execution of a care plan for the target audience of IR.

The study showed two broad categories of scientific production, one related to the clinical picture of pediatric patients with cancer and the other to the challenges faced mainly to the current treatment of this public during the pandemic.

In this context, it is of fundamental relevance to mention that the trifecta: child, cancer and COVID-19 is still little addressed and discussed, focusing the studies, mainly, on the changes in the clinical course of SARS-CoV-2 infection in children and adolescents with cancer, which characterizes a greater concern about the effects of COVID-19 contagion in this group and the path to be taken during treatment.

Therefore, a greater number of publications linked to the European continent is notorious, one of the precursors in the practice of rigorous government interventions to contain the rapid contagion by SARS-CoV-2, being a possible reason to be the main pioneers in the scientific productions of this theme.

In this perspective, the detailed reading of the works and the identification of the main findings, previously mentioned, lead to the suggestion that the scientific effort for the development of research on this theme, in the short term, refers to a need for the part of health professionals to develop guidelines and management protocols for the clinical monitoring and treatment of cancer in the current context of the pandemic. [15th]

Of these, it is important to highlight the absence of works highlighting the direct action of nursing and its main interventions in the care of these patients in the current scenario of COVID-19. A greater relevance is visible in the body of studies to(s): signs and symptoms presented, use of the main medications (hydroxychloroquine, ritonavir and lapinavir), number of hospitalizations and percentage of mortality during treatment.[8,22,24]

Given the reduced number of scientific productions on this theme, the few data highlighted in the literature corroborated the convergence of the isolated opinions of different authors about the milder clinical course in the age group studied, even if they are immunocompromised patients. However, some questions are still evident during the in-depth reading of the articles. For example, whether or not to postpone chemotherapy when the infection is detected, what parameters to follow for a proper recovery from COVID-19 in a pediatric cancer patient, and among other open questions. 15th

Regarding the category of challenges faced in this pandemic scenario, it is extremely relevant to mention that in pediatric cancer patients, care is not limited to the possibility of increased infection by SARS-Cov-2 or the risk of greater severity of the clinical outcome, but also to the challenges for the reorganization in the management and care of these patients, especially about their current treatments. [8.30]

Linked to this, the implications of socioeconomic precariousness are evidenced, as a fundamental factor of prominence in the overload of health systems in certain regions,31 especially in countries with low human development index (HDI), reflecting in the delays in consultations and/or modifications in treatment regimens, and decrease in pediatric onco-hematology teams. [32nd]

At the time of the present study, no article has been identified that addressed as a target of the research actions that are being adopted to mitigate the advance of COVID-19 in children undergoing cancer treatment.

In addition, the interaction of research groups and health professionals is evidenced to gather and make available recommendations that facilitate the implementation of oncology services in a pandemic scenario so that protection transcends the patient and accompanies their families and team in cancer care. [33.34]

5 STUDY LIMITATIONS

The present study has limitations regarding the fact that SARS-CoV-2 infection is recent, evidenced in the time frame of the research, contributing directly to comprehensive and methodologically robust studies on the subject.

6 CONTRIBUTIONS TO PRACTICE

From this study, it is expected to identify gaps in the literature that interfere in the care of this child and adolescent population in a context of the COVID-19 pandemic, to contribute to the discussion of the results obtained in care and teaching to expand the knowledge regarding the theme addressed. In addition to encouraging new studies, of medium and long-term follow-up, to elucidate with a greater degree of evidence the effects of SARS-CoV-2 infections in the pediatric oncology group and possible changes in the treatment of this group, especially in the face of the care of a nursing scientifically based on the care of patients with cancer.

7 FINAL CONSIDERATIONS

Given the vulnerability exposed by children and adolescents, affected by cancer, the involvement of this group immunosuppressed by SARS-CoV-2 infection becomes a concern, since the signs and symptoms related to COVID-19 can be camouflaged by the recurrent effects of cancer treatment.

Thus, this study allows us to conclude the relevance of the scientific productions selected to highlight the main unanswered questions regarding the dynamics of health care for the target audience in times of pandemic. In addition to pointing out the main challenges faced in the therapeutic routine of the underlying disease.

In addition, it is worth mentioning the fundamental position of research for health professionals, especially nursing, resulting in the updating of protocols and guidelines, in addition to the construction of critical thinking and development of skills and competencies in situations such as the one recently witnessed, and it is up to them to train to form new plans to provide the necessary changes regarding a better care plan.

AUTHORS' CONTRIBUTION

The authors: Karina de Avellar Silva and Luciana de Souza Castro, were responsible for the elaboration of all stages of construction of the article from the elaboration of the project, literature review, definition of the methodology, data collection and filtering, results, discussion, and final considerations.

The author Laura Johanson da Silva acted as advisor of the dissertation that gave rise to the article, responsible for the orientations and corrections of all the steps carried out until the approval of the final version to be published.

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CHAPTER
47

Analysis of the economic and commercial impacts suffered by family farmers during the COVID-19 pandemic

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ABSTRACT
The article in question addresses the economic and commercial impacts suffered by family farmers during the Covid-19 pandemic. This is a field study, exploratory and descriptive in nature and quantitative and qualitative in approach. The research includes individuals over 18 years old who self-declare as family farmers and reside in any area of the Brazilian territory. Data collection addressed issues related to the production and marketing of products, the economic situation of individuals, difficulties, limitations, changes, and adaptations covering the period of the pandemic. During this research period, the three main activities performed by family farmers were: vegetable production (72.3%), grain production (36.9%), and fruit growing (30.8%). The family farmers interviewed used more than one way to market their products, the two main ones being: selling in open fairs (performed by 55.4%) and selling directly to consumers or establishments (32.3%), besides using public policies such as PNAE (29.2%) and PAA (26.2). However, during the pandemic, many faced difficulties, such as reduced demand due to the closure of consumer establishments and lack of access to emergency aid. In addition, 76.9% of the farmers admitted to having their marketing affected and 60% had a reduction in their income. Despite this, new alternatives were developed to face these challenges, among them the extensionist actions that were fundamental in the creation of a new form of commercialization (virtual fair). These results highlight the need for specific policies and support measures for family farmers during crises such as the Covid-19 pandemic.

Keywords: Public policies, Perspectives, Small farmers.

1 INTRODUCTION

The end of the year 2019 was marked by the identification of a new respiratory disease classified as Covid-19, caused by the novel coronavirus (SARS-CoV-2). The Epidemiological Bulletin Volume 51 (2020) made available by the Ministry of Health in January 2020, portrays for the first time Covid-19 then called "Pneumonia of unknown etiology", which had its first record in the city of Wuhan, in the country of China. "With the rapid growth of cases outside China and large numbers of countries affected, on March 12, 2020, the World Health Organization announced that the global spread of COVID-19 characterized a pandemic scenario" (BITTENCOURT *et al.*, 2020, p. 1).

Due to this rapid advance of the disease, thousands of people have been affected directly and indirectly. Even those who have not been infected by the novel coronavirus have had their lives changed due to the restrictions and safety measures adopted throughout the global territory. Among these measures is social distancing, which has led to thousands of workers and students adopting

remote work/study. However, not all professionals were able to maintain their activities within these measures, including family farmers.

According to data from the 2017 Agricultural Census, shared by the IBGE, 77% of rural establishments in Brazil practice family farming, which generated a production value of 107 billion reais, equivalent to 23% of all Brazilian agricultural production. In addition to being a huge economic force, family farming is responsible for feeding thousands of people and maintaining the support of several small farmers, indigenous people, settlers of agrarian reform, riverside dwellers, and all those classified as family farmers.

Thus, the present study was designed to analyze and describe the economic and commercial impacts suffered by family farmers during the Covid 19 pandemic.

2 METHODOLOGY

This is a field study, exploratory and descriptive, and with a quantitative and qualitative approach. The research includes individuals over 18 years of age who declare themselves family farmers and reside in any area of the Brazilian territory. The concept of family farming used here is by Decree No. 9,064, of May 31, 2017.

Data collection took place between May 2021 and August 2021, through a questionnaire distributed online through the google forms platform and disseminated through social networks. Addressing issues related to the production and marketing of products, economic situation of individuals, difficulties, limitations, changes, and adaptations covering the period of the pandemic.

The quantitative data were analyzed through the Microsoft Excel software and the narratives were used to compose the analytical arguments. In total, 65 responses were collected from family farmers from 14 Brazilian states, namely: Pará (PA), Paraná (PR), São Paulo (SP), Santa Catarina (SC), Minas Gerais (MG), Ceará (CE), Bahia (BA), Rio Grande do Sul (RS), Espírito Santo (ES), Maranhão (MA), Mato Grosso do Sul (MS), Sergipe (SE), Rio de Janeiro (RJ) and Paraíba (PB).

3 RESULTS AND DISCUSSION

3.1 CHARACTERIZATION OF THE PARTICIPANTS

According to Chart 1, the percentage of males was similar to that of females (50.8% and 49.2%), the prevalent age group was from 18 to 30 years with 30.8%, there was a high level of education, where 70.7% of the individuals reported having complete or incomplete high school or higher education, about the locality of the individuals, most of them are concentrated in the southern region of Brazil, and more than half (60.3%) were located in the state of Paraná.

Also according to Chart 1, with the time exercising family farming by the individual or his family, the minimum reported was 2 years while the maximum was 112 years, the range from 11 to 20 years was the one that presented the highest percentage with 29.2% followed by those who exercise 5 years or less with 23.1%. In addition, 72.3% reported having no other job than family farming, and almost half (49.2%) dedicated more than 40 hours per week to family farming.

The majority (75.4%) of the farmers interviewed stated that they owned the property in which they work and 12.3% that they were part of an agrarian reform settlement. Another point that deserves to be highlighted is the participation of 75.4% of farmers in cooperatives or associations. The associations and cooperatives formed by farmers allow new ways of adding value, such as increasing bargaining power with customers and suppliers of inputs, access to new marketing channels, and sharing of machinery and equipment and many can provide technical assistance to their associates / cooperative members (BATALHA, BUAINAIN, FILHO, 2004; BIAVA, 2016).

Table 1. Characteristics of the farmers who composed the research according to gender, age, level of education, state, time practicing family farming, if they have another job, hours per week dedicated to family farming, if they are the owner of the land on which they work if they are part of an agrarian reform settlement, cooperatives, and associations.

Feature	Number of Individuals	Percentage (%)
Gender		
Female	33	49,2
Male	32	50,8
Total	65	100
Age		
18 to 30 years	20	30,8
31 to 40 years	13	20,0
41 to 50 years	12	18,5
51 to 60 years	15	23,1
Over 60 years	5	7,7
Total	65	100
Education Level;		
Complete Elementary School	3	4,6
Incomplete Elementary School	7	10,8
Complete High School	10	15,4
Incomplete High School	5	7,7
Complete Graduation	9	13,8
Incomplete Graduation	16	24,6
Postgraduate studies	11	16,9
I have no formal education	4	6,2
Total	65	100
State		
Parana	41	63,1
São Paulo	2	3,1
Santa Catarina	1	1,5

Ceara	2	3,1
Mato Grosso do Sul	1	1,5
Sergipe	1	1,5
Minas Gerais	3	4,6
Rio Grande do Sul	6	9,2
Bahia	2	3,1
Maranhao	1	1,5
Paraiba	1	1,5
Holy Spirit	2	3,1
Rio de Janeiro	1	1,5
Stop	1	1,5
Total	65	100
Time working on family farming		
5 years or less	15	23,1
From 6 years to 10 years	5	7,7
From 11 years to 20 years	19	29,2
From 21 years to 30 years	6	9,2
From 31 years to 40 years	7	10,8
From 41 years to 50 years	7	10,8
More than 50 years	6	9,2
Total	65	100
Another job		
No	47	72,3
Yes	18	27,7
Total	65	100
Hours/week dedicated to family farming		
Up to 15h per week	9	13,8
15 to 25 hours per week	9	13,8
25 to 40 hours per week	15	23,1
More than 40 hours per week	32	49,2
Total	65	100
Owner of the land on which he works		
Yes	49	75,4
No	16	24,6
Total	65	100
It is part of an agrarian reform settlement		
No	57	87,7
Yes	8	12,3
Total	65	100
Is part of a cooperative and/or association		
Yes	49	75,4
No	16	24,6
Total	65	100

Source: Authors' Database, 2021.

3.2 PRODUCTION CHARACTERIZATION

According to Chart 2, which depicts the aspects of production, 63.1% of the farmers worked with more than one agricultural activity. This diversity of products is advantageous to the producer because it allows the entry of various types of markets, stimulating trade, and maintaining income stability throughout the year, in addition to becoming a financial security against possible risks generated by price fluctuation, climatic factors, and the attack of diseases and pests (CLEMENTE, 2015; NETO *et al*., 2010).

Within this study, the three main activities performed by family farmers were vegetable production (72.3%), grain production (36.9%), and fruit growing (30.8%). As cited by Clemente (2015), the production of vegetables has been generating employment and income for family-based farmers mainly in the south and southeast of the country, grain production in Brazil is highly expressive, being favored by the climate, adoption of technology in agricultural management and the vast territorial extension of the country (BARONI; BENEDETI; SEIDEL, 2017).

According to Gazolla (2004), the family farmer is induced to cultivate what is best financed by banking institutions and what stands out is the production of grains such as soybeans and corn. Fruit growing has also been financed by Pronaf (National Program for the Strengthening of Family Agriculture), which brings "an important role in the social reproduction of farmers outside the dominant pattern of grain production." (GAZOLLA, 2004, p. 203).

Another characteristic that deserves to be highlighted is the fact that a little more than half of the individuals interviewed (55.4%) maintained an organic production, which makes it possible to reach groups of consumers who seek this food, which is often related to healthy eating and without the use of pesticides (NETO *et al*., 2010).

3.3 CHARACTERIZATION OF THE COMMERCIALIZATION AND INCOME OF FAMILY FARMERS

In family farming, producers have access to several distribution channels. Some choose to sell their products through supermarkets, restaurants, and institutional sales, such as government programs (CARVALHO; GROSSI, 2019).

Also according to Table 2, 47.7% of the family farmers interviewed used more than one way to market their products, the two main ones being: the sale in free markets (carried out by 55.4%) and the direct sale to the consumer or establishments (32.3%).

The free markets maintain an important role in family farming, as they allow the "reproduction of local values, the productive inclusion of farmers, the supply of small towns, far from the food

distribution routes and the heating of the urban economy, a result of the purchases of the fairgoers" (PEREIRA; BRITO; PEREIRA, 2017, p. 71).

In addition, fairs play a significant role in preserving the autonomy of producers, increasing their incomes, promoting the sustainable development of local agriculture, adding value to products, and reducing the bargaining power of local establishments such as supermarkets (CARVALHO E GROSSI, 2019).

Just like the free markets, the direct sale to the consumer and the establishments is an important point of commercialization used by family farmers, this modality of sale allows the reduction of costs related to the transaction, allowing the producers greater profitability (NASCIMENTO *et al*., 2016).

Another possibility of a trade is through public policies, such as the Food Acquisition Program (PAA) and the National School Feeding Program (PNAE), both aimed at rural producers of smaller economic size (PEDROSO; CORCIOLI; FOGUESATTO, 2020).

In the present research, 29.2% of the interviewees stated that they participated in the PNAE and 26.2% in the PAA.

The main objective of the PAA is to promote access to food and encourage family farming (HESPANHOL, 2013). For this, the program operates in 5 modalities, namely: Direct Purchase of Family Agriculture, Purchase with Simultaneous Donation, Support for the Formation of Stock by Family Agriculture, Incentive to the Production and Consumption of Milk (for the states of the Northeast and Minas Gerais) and Institutional Purchase (CAMARGO, BACCARIN, SILVA, 2013).

The PNAE, on the other hand, is a program that seeks to ensure and provide school meals for students of basic education, including those of early childhood education, elementary school, high school, and youth and adult education, enrolled in public and private schools (CAMPOS, 2011).

As established by Law No. 11,947, of June 16, 2009, it is determined that at least 30% of the financial resources transferred by the FNDE (National Fund for the Development of Education), under the National School Feeding Program (PNAE), must be destined to the acquisition of food directly from family agriculture (BRASIL, 2009).

Table 2. Aspects related to production: type of production, diversity of production, organic production, form(s) of marketing, and diversity of marketing.

Feature	Number of Individuals	Percentage (%)
Type of production*		
Vegetables (lettuce, kale, carrots, etc.)	47	72,3
Fruit growing (apple, peach, strawberry, grape, etc.)	20	30,8
Dairy Cattle	6	9,2
Beef Cattle	5	7,7
Grains (corn, beans, soybeans, rice, etc.)	24	36,9

Swine	5	7,7
Poultry	17	26,2
Fishing/Fish farming	4	6,2
Agro-industry (of vegetables, baked goods, smoked, etc.)	8	12,3
Agroforestry	2	3,1
Apiculture	4	6,2
Goat/Sheep	4	6,2
More than one activity		
Yes	41	63,1
No	24	36,9
Total	65	100
Organic Production		
Yes	36	55,4
No	29	44,6
Total	65	100
Marketing Form(s)*		
Free Markets (family farming, organic, ecological, etc.)	36	55,4
Food Acquisition Program (PAA)	17	26,2
National School Feeding Program (PNAE)	19	29,2
A direct sale to consumers or establishments (markets, restaurants, refrigerators, etc.)	21	32,3
Cereal	2	3,1
Cooperative	5	7,7
State Supply Centers (Ceasa)	3	4,6
Atravessador	1	1,5
A community that Sustains Agriculture (CSA)	1	1,5
It does not sell the products, used for its subsistence	2	3,1
Uses more than one form of marketing		
Yes	31	47,7
No	34	52,3
Total	65	100

*The interviewee may indicate more than one alternative.

Source: Authors' Database, 2021.

According to Chart 3, which lists the difficulties faced by farmers during the pandemic, 55.4% of the individuals reported not having had access to emergency aid, some reasons cited were non-request by farmers (88.9%) and non-approval of the request (11.1%).

Emergency aid was implemented by the Federal Government as an alternative measure to mitigate the economic impacts of the coronavirus pandemic (COVID-19) on the most vulnerable portion of the population (CARDOSO, 2020).

Among the beneficiaries of the emergency aid, informal workers are included, whether employed, self-employed, or unemployed, of any nature, including those with an inactive intermittent contract, provided that they are enrolled in the Single Registry for Social Programs of the Federal Government (CadÚnico), are also considered eligible individuals with monthly per capita family income of up to 1/2 (half) minimum wage, or whose total monthly family income does not exceed 3 (three) salaries minimum (BRAZIL, 2020). Thus excluding family farmers.

Regarding the change in the income of family farmers, 73.8% admitted to having their income changed during the pandemic, with 60% saying their incomes were reduced and 13.8% increased.

The interviewees who had a decrease in their income attributed as determinants for this the factors such as the closure of consumer establishments, such as restaurants and hotels, reduction in the supply and demand of their products (including by public policies such as the PAA and the PNAE), increase in the prices of inputs, the difficulty of access to new consumer markets, interruption of free markets and reduction of the circulation of consumers in those that did not have their interruption.

Some of these factors described by the producers as harmful to their income were also related to marketing, and 76.9% of the interviewees who said they had the marketing of their products affected pointed to the interruption of free markets (38.5%), the decrease in demand (23.1%) and the interruption or decrease in the demand for programs (PAA, PNAE) (21.5%) as the main triggers of this loss.

It is worth mentioning that the PNAE as previously mentioned is a channel that guarantees school feeding and the commercialization of the products of family farming, with this it is verified that the interruption of face-to-face classes due to the pandemic did not only affect students but also professionals who depend on the operation of schools, among them, family farmers who depend on the National School Feeding Program (PNAE).

Soon with the onset of the pandemic and the closure of schools, the government decreed that the PNAE maintain the food of elementary school students (from public schools) through the distribution of food kits (PEREIRA *et al*., 2020). However, as already pointed out, a large percentage of the products generated by family agriculture is distributed in nature, such as vegetables (in this study it represents 72.3% of production), which hinders transport and distribution needs to be faster due to the high perishability of these foods.

In addition, the purchase of the products began to be made through a remote public call, which made it difficult for farmers who do not have easy access to the internet to participate (DA SILVA *et al*., 2020).

According to the FNDE (2020), the distribution of kits is directed to students enrolled in the public basic education network and is not directly related to the Bolsa Família Program or other local

social programs. However, the legislation that regulates the National School Feeding Program (PNAE) does not prevent local management from using its resources to make a selection based on socioeconomic criteria.

Thus, some states did not distribute the food kits to all public school students, in some cases, the established criteria were restrictive, depriving many students who also need these foods (AMORIM; JUNIOR; BANDONI, 2020, s/p.). This fact, in addition to harming children and their families, impacted the economy of family farmers who had their demand reduced due to the restriction of kits to some families.

About the PAA, at the beginning of the pandemic, there was the postponement of purchases by the program, which negatively affected the guarantee of sales of farmers and the food and nutritional security of beneficiaries (BREITENBACH, 2021). In addition, Sousa and Jesus (2021) point out that PAA purchases have been significantly reduced in many cases since the beginning of the period of social isolation.

With the reduction of institutional programs and the restriction of free markets, markets became one of the main marketing channels during the pandemic since such establishments remained open because they were "essential services" (DE LIMA MEDEIROS; TRAMONTIN MASCARENHAS, 2021).

4 NEW ALTERNATIVES

Based on all these difficulties described, the farmers who had the commercialization of their products affected sought new alternatives to enable their sales, with the adoption of delivery and online sale being the most pointed out. These alternatives emerge as a way to respect social distancing, preventing consumers from leaving the house (DUTRA; ZANI, 2020).

In addition to the strategies mentioned above, virtual/online fairs have also emerged as a new marketing channel, such as the "Easy Genius Fair" created by the Association of Producers of Hortifrutigranjeiros de Ponta Grossa (ASPHPG) (DE LIMA MEDEIROS; TRAMONTIN MASCARENHAS, 2021) and "AGROUFAM em CASA" constituted by family farmers in the state of Amazonia (VASCONCELOS, 2020).

5 FUTURE PROSPECTS

Finally, given the debate presented, farmers rated the degree of change in routine during the pandemic (from 1 to 10), 27.7% of people classified the change in their routine as "8" and only 3.1% classified it as "1" and "2".

When asked with a view to prospects, 87.7% of farmers answered that after the pandemic they would have the conditions (financial, physical, and mental) to continue to exercise family farming, while 1.5% answered not and 10.8% did not know how to answer. Among the group that answered not having conditions, the arguments used were the physical limitation of the individuals, insecurity about the future, discouragement, and the price of inputs.

Table 3. Factors related to the pandemic according to access to emergency aid include factors that influenced the possible non-receipt, degree of change in routine caused by the pandemic, change in income, affected marketing and contributing factors, and the permanence in family farming after the pandemic.

Feature	Number of Individuals	Percentage (%)
Access to emergency aid		
Yes	29	44,6
No	36	55,4
Total	65	100
Non-receipt of aid		
I didn't request/I didn't need to	32	88,9
My request was not approved	4	11,1
Total	36	100
Degree of change in routine		
1	2	3,1
2	2	3,1
3	3	4,6
4	3	4,6
5	6	9,2
6	6	9,2
7	6	9,2
8	18	27,7
9	8	12,3
10	11	16,9
Total	65	100
Change in Income		
Yes, my income has increased	9	13,8
Yes, my income has decreased	39	60,0
My income has not changed	14	21,5
I can't tell	3	4,6
Total	65	100
Marketing affected		
Yes	50	76,9
No	11	16,9
He didn't know how to answer	4	6,2
Total	65	100
Factors that affected marketing*		
Yes, due to the interruption of the fairs	25	38,5

Yes, due to interruption or decrease in demand for programs of which I am part (PAA, PNAE)	14	21,5
Yes, due to the decrease in demand for the products I sell	15	23,1
Yes, there has been a decrease in products marketed due to health issues that I or a family member faced during the pandemic	3	4,6
Yes, another reason	8	12,3
The marketing of my products has not been affected during the pandemic	11	16,9
I don't know how to answer	4	6,2
After the pandemic, you will be able (financially, physically, and mentally) to continue to farm in family farming		
Yes	57	87,7
No	1	1,5
I don't know how to answer	7	10,8
Total	65	100

*The interviewee may indicate more than one alternative.

Source: Authors' Database, 2021.

6 FINAL CONSIDERATIONS

As seen, during the pandemic the restriction and closure of free markets, and the reduction and change of the PAA and PNAE government programs negatively implicated the commercialization of the products of family-based farmers. 76.9% of the farmers admitted to having their marketing affected and 60% had their income reduced.

These results underscore the need for specific policies and support measures for family farmers during crises such as the Covid-19 pandemic.

Despite the difficulties faced by family farmers during the COVID-19 pandemic, new alternatives have been developed to face these challenges, among them stand out the extension actions that were fundamental in the creation of a new form of commercialization (virtual fair), although it is necessary to keep in mind that the elderly class (9.2% of the individuals in the research) still has difficulties in interacting with this technology, What represents a challenge in the use of online selling, for this to be minimized it is necessary that cooperatives and associations maintain assistance related to this portion of farmers.

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CHAPTER
48

Impacts of COVID-19 on the mental health of health professionals: An integrative review

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ABSTRACT
Objective: To analyze the scientific evidence regarding the impacts of COVID-19 on the mental health of frontline healthcare workers. Methodology: integrative review study, which had as eligibility criteria: primary research, published between December / 2019 to October / 2020, without language restriction and that presented information on the subject. The research question was formulated following the assumptions of the acronym PICo, generating the question: What is the scientific evidence about the impacts on the mental health of health professionals who are on the front lines of the fight against COVID-19? The bibliographic survey took place in the following databases: MEDLINE via PubMed, CINAHL, EMBASE, SCOPUS, WOS, IBECS, LILACS, and BDENF via VHL. Results: 10 studies were analyzed, identifying the prevalence of studies published in the MEDLINE database, with the country of origin in China, cross-sectional studies, and having as participants doctors and nurses. The main impacts observed on the mental health of the professionals were: insomnia, depression, anxiety, fear, and stress, and these changes were more prevalent in females. Conclusion: the mental illness of health professionals during the pandemic reveals the need to strengthen strategies and actions that promote the mental health of these workers in the workplace, especially in periods such as these.

Keywords: Mental health, Health professionals, COVID-19.

1 INTRODUCTION

In December 2019, with the emergence of the new coronavirus, *Severe Acute Respiratory Syndrome Coronavirus (*SARS-CoV-2), the etiologic agent of Coronavirus Disease *2019 (COVID-19), health* systems around the world saw an increase in the number of infected people seeking health services, resulting in increased rates of hospitalizations and individuals needing intensive care in

hospital services (MIRANDA et al., 2020), consequently, enhancing the need for inputs, equipment, materials and the performance of health professionals in the fight against this disease.

These professionals, in addition to already living with an exhausting routine, with disturbances inherent to the profession and working conditions, often inadequate to act, now face the fear of becoming infected or transmitting the virus to the people closest to them, working with feelings of anguish and powerlessness (FERNANDES; RIBEIRO, 2020) given the scarce knowledge we still have about the potential impacts of COVID-19 on the health of the population.

Among all the professional categories active in the fight against the COVID-19 pandemic, health workers constitute the most vulnerable group, especially those who are on the front lines of care, as they are more exposed to high work demands and more specific demands. Factors that lead to intensification and multiplicity of tasks, in addition to continuous exposure to environments with high levels of stressors, compromise mental health and cause physical and emotional exhaustion (FERNANDES; RIBEIRO, 2020).

Studies conducted in Toronto, Hong Kong, and Singapore where health professionals experienced outbreaks caused by other types of coronavirus (MERS-CoV-Middle East respiratory syndrome), identified significant levels of distress, which was higher for nurses, since they had the feeling of loss of control of the situation, fear for their health and the spread of the virus (WANG et al., 2017).

The increasing number of confirmed and suspected cases, work overload, stress due to the lack of personal protective equipment, extensive media coverage, as well as the absence of specific protocols and medications can interfere with the mental health of health professionals (PAIANO et al., 2020).

These facts added to the experience as a health professional, in the process of training to deal with the emergence of disorders and mental illness in the population, through the execution of the work as a psychiatrist, emerges the interest in deepening the knowledge of the subject, which although it is about mental processes already common in mental health care, brings as a new variable the presence of a pathogenic being hitherto unknown, with a high capacity to cause disturbances throughout the health system, which permeate the physical illness and affects the mental health of individuals, especially those who are daily in the line of combat. Thus, surveying the scientific literature is appropriate to obtain the main evidence on the subject.

In addition, the present study may contribute, not only to elucidate evidence about the influence of COVID-19 in the scope of health work and mental health of health professionals, but also to help understand the needs that exist for the development of actions and strategies aimed at promoting the mental health of health workers in situations such as the current pandemic scenario, since the presence

of the new coronavirus has been potentiating the triggering factors of mental illness in the occupational environment of these professionals.

To this end, this research aimed to analyze the scientific evidence about the impacts of COVID-19 on the mental health of health professionals who are on the front lines of care for patients with COVID-19.

2 METHODOLOGY

It is an integrative review, developed through six stages of investigation: definition of the theme and elaboration of the research question; sampling, literature search, and delimitation for the inclusion of studies; data extraction; critical evaluation of the included studies; analysis and synthesis of results; and presentation of the review or synthesis of knowledge (MENDES; SCOTT; GALVÃO, 2008).

The research question was formulated from the acronym PICO (LOCKWOOD; PORRIT; MUNN et al., 2017), in which P (study population) refers to health professionals; I (the phenomenon of interest) for mental health; and CO (context) COVID-19 pandemic, resulting in the following question: What is the scientific evidence about the mental health impacts of health care workers on the front lines of fighting COVID-19?

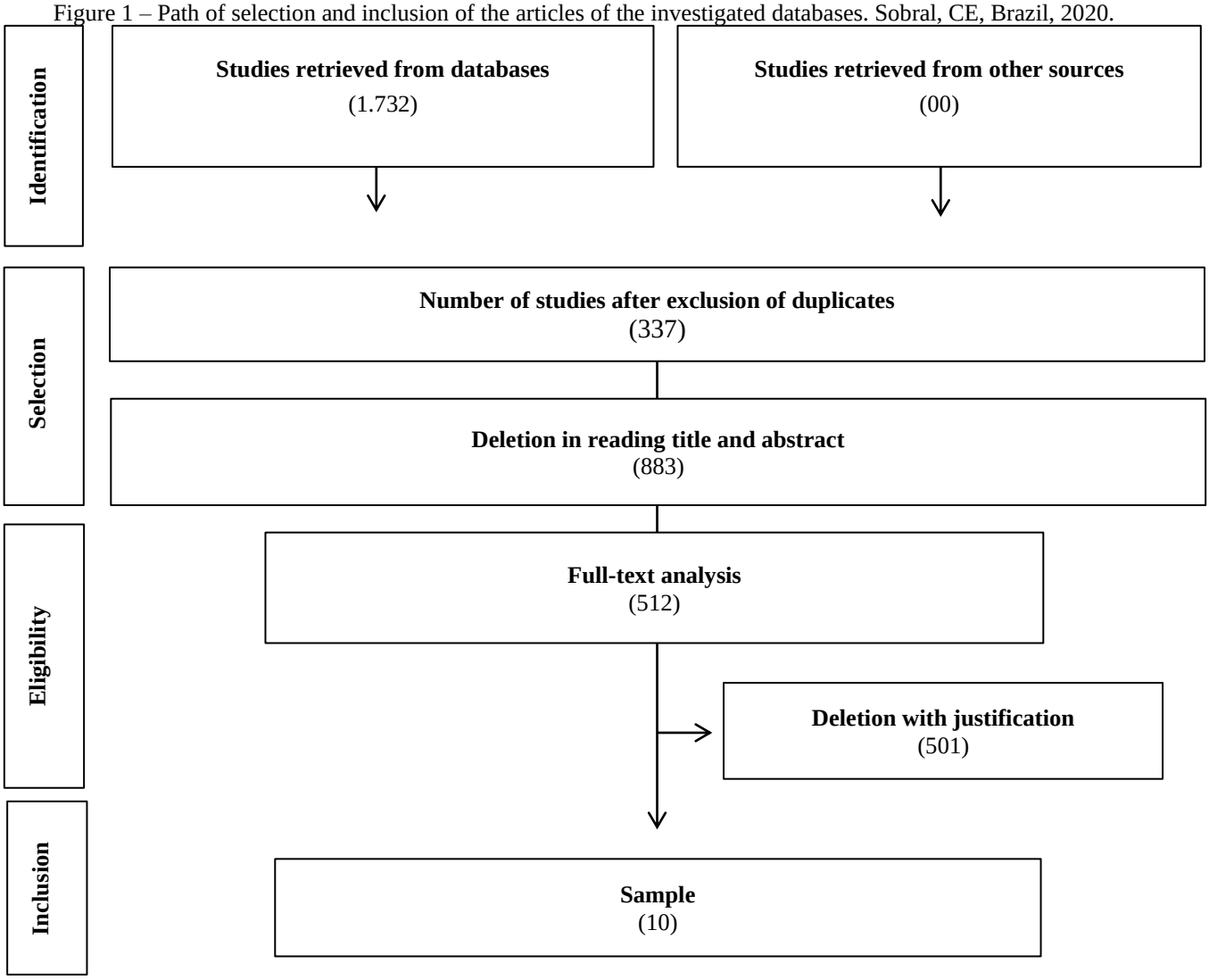
Data collection occurred from September to October 2020, in the electronic databases: *Medical Literature Analysis and Retrieval System Online* (MEDLINE via PubMed®), *Cumulative Index to Nursing and Allied Health Literature* (CINAHL), SCOPUS, *Biomedical Answers* (EMBASE), *Web of Science*™ and Latin American Health Sciences Literature (LILACS), Nursing Database (BDENF) and Spanish Bibliographic Index in Health Sciences (IBECS) via Virtual Health Library.

To survey the literature, after investigating the main terms in the Health Sciences Descriptors (DeCS), *Medical Subject Headings* (MeSH), and *Entry terms and list of headings of* CINAHL, the controlled descriptors were used: "Health personnel", "Mental health", "Coronavirus infection", "Doctors", "Physiotherapists", "Nurses and Nurses" and "Nursing Team"; and the uncontrolled (keywords): "Health Workers," "Health Professionals," "Health Workers," "Mental Health," "COVID-19," "Coronavirus Infection 2019-nCov." The combination of terms was performed with the help of the Boolean operators *AND* and *OR*.

Among the eligibility criteria, primary research was selected, published between December/2019 and October/2020 (a period that comprises the beginning and current pandemic scenario), without language restriction and that presented information on the subject. Duplicate articles, reviews, letters to the editor, expert opinions, and editorials were excluded. The selection of studies occurred after reading and rereading them.

The search in the databases totaled 1,732 productions, being selected only 11 articles answered directly the research question. The path for inclusion of these studies was represented through the flowchart *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA), as can be seen in Figure 1.

Figure 1 – Path of selection and inclusion of the articles of the investigated databases. Sobral, CE, Brazil, 2020.



To extract the main information, we used our instrument that helped in the identification of data such as author/year/database, objective/methodology, and results. The analysis was based on descriptive principles, and the results were presented in a demonstrative table, according to the variables of interest.

3 RESULTS AND DISCUSSION

Among the articles included in this review, it was observed that most of the publications prevailed in the MEDLINE database, with the country of origin of research in China, type of cross-

sectional study, and participants, doctors, and nurses. Regarding the impacts, it was identified that the main symptoms and signs of the alteration in the mental health of the professionals were: insomnia, depression, anxiety, fear, and stress and that these alterations are more prevalent in females, as described in Table 1.

Table 1 – Characteristics of the articles according to the author, year, database, methodology, sample, place of study, and main impacts on mental health. Sobral, Ceará, Brazil, 2020. (n=11).

Author/year/base	Methodology/sample/study site	Main impacts on mental health
Huang, Zhao, 2020 MEDLINE	• Transverse • 2,250 Health workers • China	Anxiety, depression, and poor sleep quality have been identified and are associated with a high level of time (≥3 hours/day) to provide care to people with COVID-19.
Mo et al., 2020 MEDLINE	• Transverse • 180 Nurses • China	The multiple regression analysis showed that an only child, working hours per week, and anxiety are the main factors that affect nurses' stress.
Jianbo, et al. 2020 MEDLINE	• Transverse • 1,257 Health workers • China	First-line healthcare workers involved in diagnosing, treating, and caring for patients with COVID-19 were at increased risk for depression, anxiety, insomnia, and distress.
Zhenyu Li et al., 2020 MEDLINE	• Descriptive • 526 nurses • China	The indirect traumatization scores of the general public were higher than those of frontline nurses. Behavioral, physiological, psychological, emotional, and cognitive changes were perceived.
Huang, et al., 2020 *Chin Ind Hyg Occup Dis* MEDLINE	• Transverse • 230 medical teams • China	The incidence of anxiety in the medical team was 23.04% and the SAS and PTSD-SS scores were 42.91 ± 10.89. The incidence of anxiety in nurses was higher than in physicians, as well as the SAS score. The incidence of stress disorder in the medical team was 27.39% and the PTSD-SS score in the female medical team was higher than in the male team. The use of PPE, breathing difficulties, rest time in isolation, physical and mental fatigue, nervousness, and anxiety were factors related to stress.
Du J et al., 2020 *Gen Hosp Psychiatry* MEDLINE	• Transverse • 134 Health workers • China	Among the survey participants: 12.7% and 20.1% of health professionals had at least 81 mild depressive and anxiety symptoms, respectively. More than half had moderate to severe stress. Depressive and anxiety symptoms were more common among women, who were less psychologically prepared. Poor sleep quality, lack of psychological preparation, and family support were also perceived.
Wang et al., 2020 *Occupational Medicine* MEDLINE	• Transverse • 123 (midfielders and nurses) • China	38% of participants with PSQI> 7 scores were identified as having sleep disorders. A logistic regression analysis showed that sleep disorders were independently associated with being an only child,

		exposure to COVID-19 patients, and depression.
Zhang et al., 2020 *Brain Behav Immun*. EMBASE	• Transverse • 304 health workers • Iran	A considerable portion of the health team has reached the cutoff levels of anxiety disorders, depression, and distress, requiring mental health attention.
Cai et al., 2020 *Asian Journal of Psychiatry* EMBASE	• Transverse • 1521 Health Workers • China	People without experience in emergency treatment performed worse in mental health, resilience, and support, and tended to suffer from psychological abnormalities in interpersonal sensitivity and photic anxiety.
Mohindra, 2020 *Asian Journal of Psychiatry* SCOPUS	• Qualitative • Health Workers • India	When interviewed, health professionals reported exposure to factors associated with care delivery: isolation of the patient, demand for greater care (biological and psychological) and stigma about the disease, fears and fears of professionals regarding the risk of contamination.

Source: prepared by the authors.

COVID-19 has been the cause of profound transformations in the healthcare landscape, especially in the mental health of health workers on the front lines. A study conducted in China, which sought to assess the mental health burden in the population during the pandemic with 7,236 participants, of whom 2,250 (31.1%) health professionals, identified a general prevalence of anxiety in 35.1%, depressive symptoms in 20.1% and sleep quality in 18.2% of the participants. Compared to other occupational groups, health professionals (23.6%) had the highest rate of poor sleep quality (p <0.001) (HUANG; ZHAON, 2020).

The incidence of anxiety among the medical team was 23.04% (53/230) and the anxiety score was (42.91 ± 10.89) points, which was also identified in research conducted by Huang *et al.* (2020). Among the professionals investigated, the incidence of severe anxiety, moderate anxiety, and mild anxiety was 2.17% (5/230), 4.78% (11/230), and 16.09% (37/230), respectively.

Wang's research *et al*. (2020), which sought to assess the effect of the COVID-19 outbreak on the sleep quality of health workers at a children's health center in Wuhan, showed that in total, 47 out of 123 (38%) participants with a score in the *Pittsburgh Sleep Quality Index* - PSQI> 7 were identified as having sleep disorders, being independently associated with being an only child (adjusted odds ratio (OR) and 95% confidence interval (CI) 3.40 (1.21-9.57), P <0.05), exposure to COVID-19 patients (adjusted OR and 95% CI 2.97 (1.08-8.18), P <0.05) and depression (adjusted OR and 95% CI 2.83 (1.10-7.27), P <0.05),

Doctors and nurses are identified as the most vulnerable professionals to suffering and mental illness in this pandemic period. These professionals deal all the time with death and difficult decisions that can affect their physical and mental well-being. In addition, physical and mental exhaustion, the pain of the loss of patients and colleagues, the difficulty of decision making, the fear of contamination

and transmission of the disease to close ones, are also factors that harm the mental health of professionals working in this current scenario (PRADO et al., 2020).

As it was possible to observe in the research of Hung *et al. (2020), the incidence of anxiety among nurses is higher than that of physicians [26.88% (43/160) to 14.29% (10/70),* Z = *-2.066*, P = 0.039)], and the anxiety score of nurses is higher than that of physicians [(44.84 ± 10.42) Ratio (38.50 ± 10.72) points, *t* = -4.207, P <0.001]. The incidence of stress disorder in the medical team was 27.39% (63/230), and the stress disorder score was (42.92 ± 17.88) points.

In this perspective, in a study by Jianbo *et al*. (2020), where among the participants 764 (60.8%) were nurses and 493 (39.2%) were doctors; 760 (60.5%) worked in hospitals in Wuhan, and 522 (41.5%) were first-line health workers. A considerable proportion of participants reported symptoms of depression (634 [50.4%]), anxiety (560 [44.6%]), insomnia (427 [34.0%]), and distress (899 [71.5%]). Frontline healthcare workers involved in the direct diagnosis, treatment, and care of COVID-19 patients were associated with a higher risk of depression symptoms (OR,1,52; CI of 95%, 1.11-2.09; P = 0.01), anxiety (OR, 1.57; CI 95%, 1.22-2.02; P <0.001), insomnia (OR, 2.97;95% CI, 1.92-4.60; P <0.001) and anguish (OR, 1.60; CI 95%, 1.25-2.04; P <0.001).

The fact that COVID-19 is transmissible from person to person, coupled with its high morbidity and potential fatality can intensify the perception of danger among people. The psychological response of health professionals to an epidemic of infectious diseases may include feelings of vulnerability, loss of control, concerns about the patient's health, the spread of the virus, and anxiety about changes in the work routine (PAIANO et al., 2020). Research in Canada has identified symptoms that characterize the damage to the mental health of health workers, such as the feeling of high risk of contamination, the effect of the disease on professional life, and depressed mood (PEREIRA et al., 2020).

The accentuation of occupational stress in the current period of the pandemic among health workers can also be associated with the nature of work, which requires direct care for patients affected by Covid-19, with a high risk of contamination. Also noteworthy in stressful situations is the fact that there is no set deadline for the end of the pandemic, the scarcity of PPE, and the pressure, on the part of institutions, to rationalize their use (LUZ et al., 2020).

This perspective, research revealed that factors such as children, hours of work per week, and anxiety were the main aspects that contributed to the stress of nurses (p = 0.000, 0.048, 0.000, respectively), also presenting scores of stress (39.91 ± 12.92) and anxiety (32.19 ± 7.56) of these nurses positively correlated with these factors (r = 0.676, p <0.05) (MO et al., 2020).

In this same context, aspects such as the distance from family members, feelings of fear, psychological stress, loneliness, sleep-related disorders, scarcity of PPE in the sectors, and the insufficiency of rapid tests for diagnosis and analysis of the health status of the team, fear of direct

contact with isolated patients and risks related to contamination by the virus along with uncertainty about the effectiveness of controlling the spread of the disease and the continuous monitoring of news about the progress of the disease are also factors that contribute significantly to increased stress and mental illness among frontline professionals (ZHANG et al., 2020; Mohindrab et al., 2020).

The COVID-19 pandemic has generated unprecedented psychological stress on people around the world, especially in the medical workforce. In the study by Lu *et al.* (2020), the occurrence of fear, anxiety, and depression was measured by the numerical rating scale (NRS), Hamilton Anxiety Scale (HAMA), and Hamilton Depression Scale (HAMD), respectively. A total of 2,299 participants, including 2,042 medical teams and 257 administrative staff. Compared to non-clinical staff, frontline medical staff with close contact with infected patients, including work in the breathing, emergency, infectious diseases, and ICU departments, had higher scores on the fear scale, HAMA, and HAMD, with 1.4 times higher odds of feeling fear and 2 times more likely to suffer from anxiety and depression. Medical professionals who worked, especially in the aforementioned departments, were more susceptible to psychological disorders.

When one looks at the COVID-19 scenario, one realizes that workers are doomed to increase emotional exhaustion and depersonalization, as well as low professional fulfillment as a result of physical and mental exhaustion. Situations experienced by shifts, often doubled, to meet the demands of the institution due to the pandemic, for fear of contamination, lack of materials and fear, insecurity about work and performance, as well as for experiencing the loss of lives en masse, constitute factors that can lead workers to professional dissatisfaction, exposing them to Burnout Syndrome (LUZ et al., 2020).

In the research of Cai *et al*. (2020), with 1521 health professionals in China, with a prevalence of psychological alterations of 14.1%, another factor discovered that was directly related to the psychological illness of health professionals was the absence of experience in emergency treatment in public health, revealing worse performance in mental health, resilience, and social support, tending to suffer from psychological changes in interpersonal sensitivity and anxiety. In contrast, even more, significant impacts were pointed out in the research of Zhenyu *et al*. (2020), where results showed that vicarious (secondary) trauma scores for frontline nurses, including scores for physiological and psychological responses, were significantly lower than those for non-frontline nurses ($P < 0.001$)).

When these impacts on mental health are observed taking into account the issue of gender, it is identified that the female sex is more prone to the development of these diseases. Du *et al.* (2020), in their study, counted 12.7% and 20.1% of health professionals who had at least 81 mild depressive and anxiety symptoms, respectively. More than half had moderate to severe stress. Being the depressive

and anxiety symptoms more frequent among women, less psychologically prepared. Poor sleep quality, lack of psychological preparation, and family support were also perceived.

This was confirmed in another study in China, in which the incidence of anxiety in women was higher than that of men [25.67% (48/187) vs. 11.63% (5/ 43), Z = -2.008, P = 0.045], and women's anxiety scores were higher than those of men [(43.78 ± 11.12) scores (39.14) ± 9.01) minutes, t = -2.548, P = 0.012]. The stress disorder score of the female medical team was higher than the male [(44.30 ± 18.42) points a (36.91 ± 13.95) points, t = -2.472, P = 0.014] (HUANG et al., 2020).

4 CONCLUSION

The present study showed that signs and symptoms such as stress, anxiety, depression, fear, anguish, and insomnia are the main impacts on the mental health of health professionals related to the period of the COVID-19 pandemic, with doctors and nursing staff being the most affected. Thus, further studies must be carried out, to unveil not only this relationship between mental illness with the presence of COVID-19 in the health work environment but the actions and strategies of prevention, detection, and direction for the treatment of these workers developed by health institutions, as well as to awaken the attention of public policies to the need for the elaboration of care plans for the mental health of workers in possible and future new pandemic scenarios.

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CHAPTER
49

The remote work of the high school teacher linked to the regional education center of Ponta Grossa during the pandemic of the novel Coronavirus

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ABSTRACT
This article consists of an analysis of the remote work of high school teachers, linked to the Regional Education Center of the city of Ponta Grossa, State of Paraná, Brazil, in the context of the coronavirus (COVID-19) pandemic, with a view to identifying the possible occurrence of existential damage as a result of the violation of the right to disconnection. Lo and behold, one of the first sanitary measures implemented by the authorities to contain the spread of the COVID-19 virus was the suspension of face-to-face school activities, and with the prolongation of such measures, in the face of the rampant increase in the number of cases of the disease, it was decided to establish a new model for the continuity of classes and compliance with the school calendar, making use of virtual resources that allowed the teaching of remote classes. This reality had significant effects on the work routine and on the private lives of these professionals who, suddenly, were compelled to adapt to this new format of work, carried out from within their homes, using their own resources. There were several transformations and difficulties resulting from this new way of working, notably in relation to time and intensification of work, shortening of rest periods, damage to social, family and professional relationships, as well as several other mishaps felt and reported by professionals, through this research, conducted through a questionnaire made available through a virtual tool. The data obtained with the research pointed to the existence of elements that can characterize the existential damage, as well as well-founded indications that the work in such conditions is capable of causing the worker existential damage, by violating the right to disconnection.

Keywords: Remote work, teaching work, right to disconnection, existential harm, pandemic.

1 INTRODUCTION

This research analyzes the effects of remote work, during the COVID-19 pandemic, for high school teachers, linked to the Regional Education Center of Ponta Grossa (PR)[1] and the violation of the right to disconnection as a possible generating fact of existential damage.

Behold, the work of high school teachers linked to the Regional Education Center of Ponta Grossa, State of Paraná, during the pandemic of the new coronavirus, has undergone changes from the emergence of this health crisis worldwide, because a new reality has emerged for many categories of workers, giving space to figures such as remote work, to enable the operation of some market segments, ensuring the offer of products and services during the pandemic.

[1] Ponta Grossa is a municipality in the state of Paraná in the Southern Region of Brazil. It is the fourth most populous municipality in the state, with 391,654 inhabitants, according to the IBGE estimate published in 2023.

Thus, many workers have been forced to adapt to new realities, new forms of work through virtual platforms, through the use of various technologies, in order to continue their work activity.

In this context, educational institutions have emerged among the first and most affected by the effects of the pandemic, given the large flow and crowding of people that necessarily cause, greatly facilitating the contagion by the new coronavirus. As a result, the suspension of in-person classes was one of the first measures adopted by the authorities in an attempt to curb the exacerbated transmission of the virus.

In the State of Paraná, for the fulfillment of the school calendar of the 2020 school year, the proposed solution was to adopt remote school activities, through virtual platforms for the availability of content and teaching of classes, such a model was made possible from the State Decree No. 4230 of March 16, 2020.

With this, the teachers of the state school system had to suddenly adapt to the new reality and, taking advantage of the available technological resources, teach classes and other activities to their classes, from the interior of their homes, thus giving continuity to the school calendar.

This sudden change, from face-to-face work to remote work, added to the current circumstances installed by the pandemic period, has imprinted profound changes in the daily exercise of teaching, as well as in the reordering of the organization of daily life, which may lead to the occurrence of existential damage, notably by the violation of the right to disconnection that assists all workers.

Still, a new configuration of the teaching work subjected this professional category to a completely new and unknown universe, as well as to concerns and various difficulties. Lo and behold, the work had to be carried out, despite the circumstances, the lack of qualification and adequate resources to do so.

The demands of the teaching work, in this scenario, also changed: behold, the students, in large part, found difficulties in learning remotely, resulting in an avalanche of calls and complaints directed to the teacher, on varied days and times, subjecting him to constant work and the sudden difficulty of disconnecting from his professional activities, even during the periods that should be destined to rest.

In this context, it often occurs that the worker is not able to disconnect from his work activity, despite being constantly in his own home environment, thus ceasing to dedicate himself to exclusively personal tasks and without any connection with his professional occupation, since work, if it does not consume all his time, subtracts from all his energy and disposition.

It should also be noted that, in the context of teaching, the preponderance of women is undeniable, who are also responsible for unpaid work in the domestic context, embodied in the duties of care for the family.

This disparity in the distribution of domestic tasks and family care requires women to activate themselves in long working hours, especially when productive work, in the case of this research, to teaching, is performed from the domestic sphere itself.

Excessively long working hours, or in strenuous conditions, are causes of psychophysiological and social disorders, subjecting the worker to a degrading condition and unavoidable frustration, to the extent that he is hampered by incessant labor, the possibility of exercising family, social, leisure activities or simply enjoying free time and unrelated to any work.

It is, therefore, a notorious violation of a right that assists every worker: the right to disconnection, according to which he can freely enjoy time outside the work environment, using it for his own benefit, whether to perform personal, family or any other activities disconnected from the universe of his work.

The intensity of the work routine often ends up subtracting from the individual all the energy he had to dedicate himself to any other activity aimed at leisure, so he tries to find it, not infrequently, from the same instruments that he also uses for work.

In that scenario, therefore, in addition to the substantial change in the way they perform their work, teachers were forced by circumstances to remain collected, not finding other means of socialization and fun that are not necessarily linked to the same technological tools that they use for the exercise of their work activity.

Hence why there is unavoidable confusion between the periods of rest and work, because, when using a mobile device or computer, for private purposes, socialization or fun, the worker is exposed to the same networks that enable the transmission and communication in the work environment, taking him easily, even if unconsciously, to perform the work.

It is noteworthy, therefore, that remote work facilitated the expenditure by the worker of a significant portion of his time available to perform tasks arising from his professional activity, consequently reducing the time destined to leisure and leisure.

Still, the anxiety and agitation resulting from the work developed in the scope of their own home, cause the individual not to adequately enjoy the breaks intended for rest or fun, behold, he remains linked to the work activity, even during free periods.

Thus, with the violation of the fundamental right to disconnection that assists every worker, ensuring that he enjoys periods of non-work, there is also a severe offense to human dignity, because the completeness of his existence lies in the balance between work and private, social and family life.

In this scenario, the possible submission of these workers to an extra patrimonial damage emerges, which consists in real damage to their existence, as a human being, due to the limitation of

their freedom to self-determine socially, since they are restricted from freely exercising their own subjectivity and identity.

In this context, the present work aimed to unveil, in the light of the law, disconnection and existential damage, the effects of remote work for education professionals during the validity of Decree No. 4230/2020 of the State of Paraná, and was carried out through bibliographic and documentary research, as well as through data collection through a questionnaire open to teachers of the state school system of Ponta Grossa and region.

From the data obtained and the analysis of the elements that characterize the existential damage, it was possible to identify indications that the work of such professionals, in such conditions, may give rise to the occurrence of the aforementioned off-balance sheet damage, due to the violation of the right to disconnection.

2 METHODOLOGICAL EXPLANATIONS

In view of the study objectives of the research, data collection was performed by providing a questionnaire, composed of 60 (sixty) questions distributed in six thematic axes: identification, family group, labor bond, means of remote work, working conditions in the domestic sphere and impacts of remote work for the high school teacher.

Considering the current scenario, where social distancing measures still remained, it was decided to make the questionnaire available in a virtual environment, so that the answers could be offered at a distance.

Thus, the questions were included in the *Google Forms*[2] tool and, from the *link*[3]created by the platform, widely disseminated through the researcher's network of contacts, in her social networks and private contacts.

The strategy adopted to capture the responses was the "snowball" technique, which starts from the recruitment of the sample group through a chain reference. (BALDIN; MUNHOZ, 2011, p. 333).

Thus, the questionnaire was sent to several specific contacts, which, in turn, promoted the dissemination of the material to other individuals in their personal network of contacts and who fit the object of the research.

In this technique, the dissemination of the questionnaire is continued until the saturation point is reached, when the answers obtained begin to repeat the same content already measured in previous answers, so that they no longer add new relevant information to the research.

[2] Google Forms: free tool that allows you to collect and organize information in small or large amounts, through the creation and availability of questionnaires.
[3]https://docs.google.com/forms/d/e/1FAIpQLSf420FybInDYRZMxYj_2XaGBaAyjmDlFg7WusMzb6PVal2MA/viewform?usp=sf_link

The questionnaire remained open for answers, for a period of 60 (sixty days), which ended on 05/31/2021. In addition, 44 (forty-four) responses to the questionnaire were obtained, which are listed in the appendix, with the exception that, in order to preserve the identity of the participating subjects, the questionnaires answered were numerically classified from number 1 (one) to 44 (forty-four).

For the organization and analysis of the collected data, content analysis was used, comprising several techniques that aim to describe the content obtained from the written communication process.

According to Mynaio (2002, p. 75-76), the content analysis is done in three phases: pre-analysis, exploration of the material and, finally, treatment of the results obtained and interpretation. In the first phase, the material obtained was organized, selecting, after reading, categories and excerpts relevant to the research objectives.

The second phase is the one that demands the most time, because it is the moment to employ what was defined in the previous phase. To this end, in addition to elucidating the profile of the respondents, the data analysis was organized into five categories: The profile of the educators; The work routine and remote work; The right to disconnection and the right not to work: excessive working hours, damage to personal projects and life project; The existential damage in the context of remote work of high school teachers in the State of Paraná; and, The reparability of existential damage.

Finally, the third phase consists of, in fact, discovering the content underlying what is explicit in the data, in order to identify, for example, ideologies, trends and other determinations specific to the phenomenon studied.

Thus, through this technique, the contents of all the answers obtained were described and interpreted, with the intention of verifying the possible occurrence of existential damage in the remote work relationships of high school teachers in Ponta Grossa and region.

3 THE PROFILE OF EDUCATORS

The first axis of the questionnaire comprised the following questions: name, school, municipality, gender, race, age and marital status. These questions served to draw a profile of the educators surveyed.

It is observed from the data collected that most of the respondents are from Ponta Grossa (PR), but there are answers from the cities of Imbituva, São João do Triunfo, Castro, Telêmaco Borba and Palmeira.

In addition, there is a significant preponderance of women among teachers, of whom 77.3% declared themselves female, while 22.7% were male. It is extracted, therefore, from such a scenario, that there is a notable preponderance of women in the exercise of the teaching profession, in the scope of high school in Paraná.

The feminization of teaching is an international phenomenon deriving, historically, from social constructions linked to the economic and patriarchal relations that characterized the practice of teaching. (VIANNA, 2013, p. 164).

In Brazil, the expressive presence of women in teaching originated in the nineteenth century, when improvised schools emerged and detached from the State. And it intensified after the Republic, with the growth of serial schools and the expansion of public schools, already in the mid-twentieth century.

This process must also be seen in the light of class and gender relations, since the magisterium consists of one of the "first fields of work for white women of the so-called middle classes, scholars and bearers of a femininity idealized for this class [...]". (VIANNA, p. 164).

The circumstances that permeate the massive entry of women into the field of teaching, therefore, are related to the social construction that they are better prepared for care functions, especially with children, an understanding based on biological, social, social, cultural and economic inequalities.

Therefore, under the social and cultural aspects, it must be recognized that the female magisterium was one of the first professions to win the approval of society, since it was linked to motherhood itself. It should also be noted that, at the time, it was practically the only option available to working women, since they had not yet been allowed to exercise other trades. (HAHNER, 2011, p. 468).

All these factors, together with the low salaries paid to teachers in schools accessible to the economically inferior classes, contributed to configure, in Brazil, the effective feminization and devaluation of teaching.

In any case, the preponderance of women in teaching, even today, is a very evident reality, a fact that was confirmed in the context of this research, where more than 77% of those surveyed are women.

Regarding race, 81.4% of the respondents declared themselves white, while 9.3% declared themselves brown and, finally, 7.0% were black. The racial profile of the respondents is consistent with the ethnic characteristics of the region, notably the process of colonization of the State of Paraná, influenced mainly by Spanish, Swiss, Italian, German, Polish, Ukrainian and Russian immigrants. (PARANÁ, 2021).

Still, another factor that influences the great discrepancy between the percentage of white and black/brown respondents is racial inequality, with regard to access to higher education, which still persists, despite the series of measures aimed at expanding and democratizing access to higher education, which began to be adopted in Brazil from the 2000s onwards. (IBGE, 2019, p. 8).

The age range of the respondents is comprised of 25 (twenty-five) to 57 (fifty-seven) years of age, while 60.5% of the respondents are married, 20.9% single, 14% are in a stable union and another 4.7% are divorced/separated.

Regarding the composition of the family group, 56.8% of the respondents declared that they have children under their care and, of these, 60% answered that such children depend on their guidance to perform school activities. In addition, 29.5% reported having elderly people under their care and another 22% stated that they have other dependents who are under their care.

These data reveal the difficulties of remote teaching work at home, behold, most respondents are married or in a stable union, as well as a significant portion of them have children, elderly or other dependents who depend on their care.

This scenario represents a great challenge for the respondents, as they had to reconcile remote work with family experience and care, sharing time, space and even equipment used for work among family group members.

In addition, the existence of children or other family members who, to some degree, depend on assistance and care, is a factor that significantly influences the organization of work itself and the productivity of the teacher, along the lines of remote teaching.

Also, regarding the employment relationship, according to the official website of the Secretary of Education of the State of Paraná (http://www.educacao.pr.gov.br/Pagina/Ingresso), teachers join the Paraná education network, by two different ways.

The first of these is as members of the Proper Staff of the Magisterium (QPM), as effective or statutory servants, and whose admission takes place through a public tender. These professionals are governed by their own statute, the Statute of Civil Employees of Paraná (Law No. 6,174/70).

Also, teachers are admitted by the special regime (PSS), for a fixed term, whose admission takes place through approval in a simplified selection process (PSS). Such professionals are considered hybrid bonds, since they are governed by Law No. 108/2005, however, they are also subject to some provisions of the Statute of Civil Employees of Paraná and are linked to the General Social Security Regime of the National Institute of Social Security (INSS).

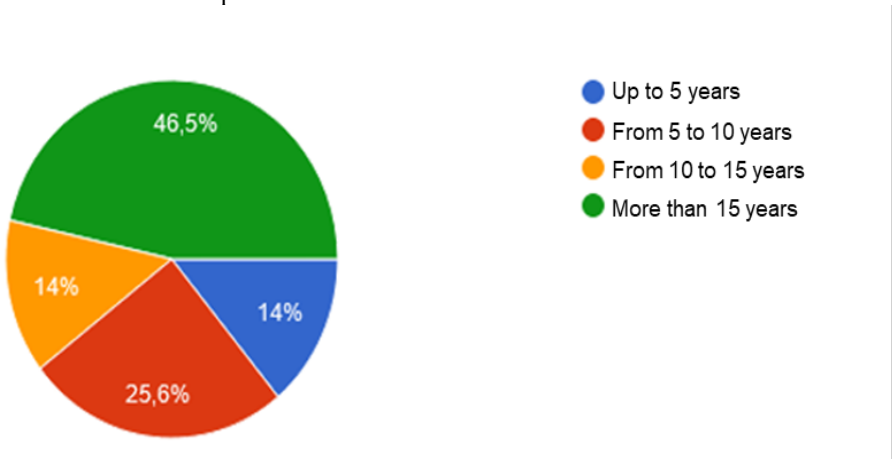
Regarding the employment relationship, answers were obtained from teachers who work as temporary workers, admitted through a simplified selection process, and also from public servants who make up the state teaching staff (QPM). Of the respondents, 21 are civil servants, while the others were admitted through a simplified selection process. In addition, 21 claimed to work on two standards

sad/or contracts, 14 of them on one standard/contract, and one of them claimed to accumulate 3 standards[4].

Regarding the working day, it is noticed that the answers vary between 15 and 60 hours per week, and some of the answers did not know how to specify the hours worked due to remote work. These results, as will be shown below, have implications for working time, with an increase in working hours and a decrease in rest periods for the respondents.

Regarding the time of exercise of the function of teacher (a), it is observed that there is a preponderance of those who have worked for more than 15 years and from 5 to 10 years:

Graph 1 – Time of exercise of the function



Source: Survey data, 2021.

It can be seen, therefore, that the minority of respondents have been teaching for more than 10 and less than 15 years, and that 14% of them have been practicing the profession for less than five years.

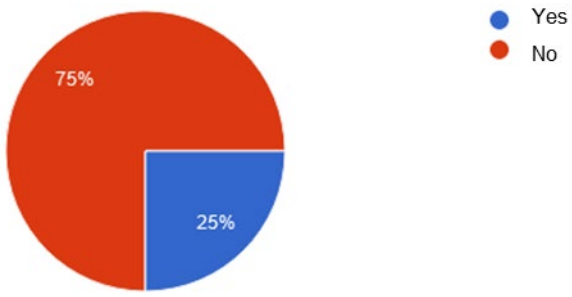
4 THE WORK ROUTINE AND REMOTE WORK

Specifically in relation to remote work, 97.7% of respondents reported having adhered to classes in a virtual environment, due to social distancing measures to control the novel coronavirus pandemic.

However, despite the massive adherence to remote teaching, a significant majority of respondents state that they have not received any qualification from the regional education center for work in this new format:

[4] It should be noted that it is not feasible to accumulate more than two public offices, by virtue of the provisions of paragraph *a of* item XVI, of article 37 of the Federal Constitution, which allows the cumulation of a maximum of two public positions of teacher. (BRAZIL, 1988)

Graph 2 – receiving training for remote work

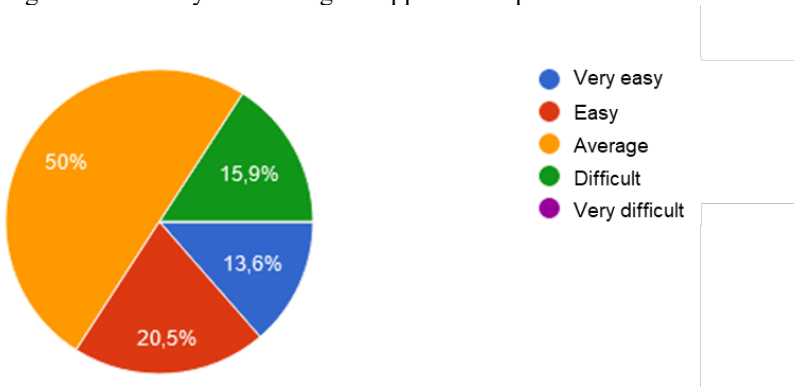


Source: survey data, 2021.

In addition, 71.4% of the respondents stated that they did not have their doubts resolved through the training course, as well as 57.9% answered that no contact was made available to resolve any subsequent doubts.

Regarding the degree of difficulty in handling applications and platforms for remote learning, the data show that most respondents encountered some difficulty:

Graph 3 – Degree of difficulty in handling the applications/platforms for the classes



Source: Survey data, 2021.

In addition, to the open question "In which modality do you feel most comfortable to work? If you want, justify", several respondents prefer in-person classes, however, many of them expressed concern about the pandemic scenario, and the possibility of contagion in the face-to-face environment.

There are also respondents who ponder the difficulty of mastering the technological resources for teaching classes and others who show hopelessness with the moment experienced, especially in relation to the risks of contagion and the lack of vaccination:

> Remote, since there is no vaccination for students and teachers at the moment is the pandemic situation is still alarming. (Questionnaire 5)
> Face-to-face because I have more experience, remote classes are still very new to me. I realize that there are many resources available, but I don't have the knowledge to use them. (Questionnaire 6)
> I honestly don't know; I feel more and more unmotivated every day... We have no return in online and face-to-face will be a new reality ..., But I never imagined myself in online classes (questionnaire 10).

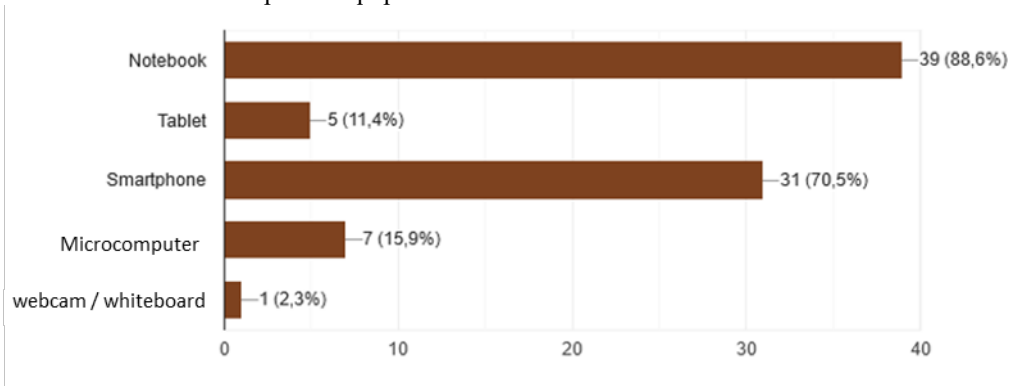
Regarding the physical conditions for remote work, most respondents used *a laptop* and *smartphone*, and 59.1% reported not having adequate physical space for work. Thus, the vast majority of respondents stated that the place chosen for work is part of the collective space of their residence.

Regarding the equipment and technological resources used by teachers to perform remote work, 68.2% reported having replaced the internet service and/or acquiring/replacing personal equipment to enable remote classes.

In addition, 65.9% of the respondents need to share the equipment used at work with other family members, a fact that, according to the data obtained, interferes with the organization of work.

Among the most used equipment in the work are the *Notebook* and the *Smartphone:*

Graph 4 – equipment used for remote classes



Source: Survey data, 2021.

About the platforms and applications used by teachers for remote work, Aula Paraná*, Google Classroom, Google Meet, Google Forms, Google Drive, Google Presentations, Youtube and WhatsApp* were mentioned. Such applications/platforms have varied functionalities and objectives, as can be seen from the table below:

Table 1 – Platforms and Applications most used for remote work. (To be continued)

Platform Application	**Definition**	**Source**
Paraná Class	It consists of a page on the Internet, which can be accessed by microcomputer or notebook (http://www.aulaparana.pr.gov.br/) and also an application intended for mobile devices with *ANDROID* and *IOS* operating system. Through this system, classes are transmitted, which can be accessed by students in the shifts and times proposed, through *login* and personal password.	http://www.aulaparana.pr.gov.br/
Google Classroom	It is a didactic content management system, aimed at the creation, distribution and evaluation of school work.	https://classroom.google.com//0/h

Google Forms	It allows the creation of forms for research and collection of information, or even the creation of questionnaires, and is used in teaching practice, mainly to apply activities and evaluations.	https://www.google.com/intl/pt-BR/forms/about/

Table 2 – Platforms and Applications most used for remote work.

Platform Application	**Definition**	**Source**
Google drive	It consists of a file storage and synchronization system, which, along with other features of the platform, allows the editing and sharing of the files, in addition to storage.	https://www.google.com/intl/pt-br/drive/about.html
Google Slides (*slides*)	Enables the creation and editing of presentations that can be broadcast in virtual meetings.	https://www.google.com/slides/about/
Youtube	It consists of a platform for sharing videos, which can be made available after recording, or even transmitted in real time, allowing the interaction of users.	https://www.youtube.com/
WhatsApp	Application that allows the sending and receiving of instant messages and video and voice calls between *smartphones*, also enabling the sending of media, such as images, videos and documents. As long as there is an *internet* connection, it allows instant communication between two people, or even in groups of people.	https://www.whatsapp.com/?lang=pt_br

Source: Paraná, 2021. Note: Data organized by the author

Also, of the answers obtained, about the work routine and work organization in the context of the pandemic, among the main complaints, the difficulty of handling technological resources and equipment, the low participation and lack of interest of the students, demands on days and times destined to rest, the accentuated fatigue and the demands imposed by the hierarchical superiors were highlighted:

> I don't master computer science and I had to learn the hard way. I was very nervous. (Questionnaire 01)
> The interaction of the students is 0 (questionnaire 03)
> From downloading the apps, to making the activity forms in Google forms. The most complicated was learning how to deal with Google Classroom tools, make the forms, correct activities, download spreadsheets, etc. And also learn to use the games as a pedagogical resource. (Questionnaire 05)
> The students do not deliver the activities and very few participate in the meetings (questionnaire 07)
> Understand how the platform worked; the lack of interest of students who did not participate; little guidance, among others (questionnaire 08);

The absence of any material support provided by the State of Paraná to professionals also made it difficult to work remotely. The vast majority did not have adequate physical space, equipment, or even an *internet* service suitable for work in such conditions.

With this, many of the teachers pointed out the need to use their own resources to acquire equipment or to hire services suitable for the work:

> Use of internet and own resources; equipment damaged due to the amount of hours connected and no memory due to the various apps we had to download; in addition to remote classes, many activities to prepare for students who needed printed material; disrespect of the Pedagogical Team that charged activities and passed information on weekends, including messages during the night; students sending activities and messages during the early hours and non-binding hours, including in the early hours of weekends; use of own resources to call or send messages charging students or to encourage them to continue; Short time of activities in quarantine, we take materials from the hand of students to correct, disrespecting the time of protection to prevent the spread of pathogens, among others. (Questionnaire 5)
> Internet, Lack of student participation Equipment. (Questionnaire 09)
> Sharing home space with other people. (Questionnaire 30)

Another difficulty felt consisted in the relationship with hierarchical superiors and in the lack of interaction and guidance, in addition to the constant changes in the way of working and in the functionalities of the technological resources made available for the work:

> Understand the functionality of the platform, because during the process it was changed several times by SEED. (Questionnaire 11)
> Every time I found an internal organization the secretariat imposed a new change. Increased vigilance, lack of listening and no space to propose other ways of dealing with work. For me the hardest part is the intensification of surveillance, control and the loss of autonomy. (Questionnaire 23)

It is denoted, therefore, from such a scenario, that the adoption of remote work represented a profound change in the work routine of high school teachers. In addition to the necessary adaptation of the physical space and the equipment and technological resources used for the exercise of the work, it was necessary a reorganization of the teaching work, in view of the new demands of the profession.

It should be noted, at the outset, that the vast majority of respondents did not receive qualification for remote work, nor did they have the opportunity to resolve any doubts that arose from this new work process.

Difficulties in handling the technological tools and equipment used in the work were also reported, specifically among teachers with a higher age group, a circumstance that, they report, brought them nervousness and anguish.

It can be seen from this scenario that the adoption of the remote teaching model resignified the very organization of the work of high school teachers linked to the state network of Paraná, to the extent that it led to a new configuration of the teaching activity, permeated by technological resources and distance interaction. Behold:

> These adaptations required efforts that cannot be overlooked. Most of these professionals did not receive any training for the development of these activities. However, it is perceived that the commitment of these teachers with their students has guided the search for ways to make the educational offer possible. This experience can mean an important professional growth and maturation, but it also generates tensions and anguish for teachers. (UFMG, 2021, p. 714-715).

The first major challenge faced by these professionals, in addition to the issue of material resources, was to produce and/or adapt content for remote education and teaching methods adaptable to the new technological apparatus.

This incessant demand for new professional skills is consistent with a more flexible model of work organization that, in turn, has as its characteristic the encouragement of workers to be collaborative in the work environment, in order to better accept and adapt to profound changes, (re) learn quickly and be proactive and creative, under pressure, and in the face of unpredictable events. (WILLIAMS; WOLFF, 2008, p. 10). Behold,

> [...] the demands (extemporaneous or not) of compliance with pedagogical activities in distance activities places education professionals in a very complex level of teaching practice, reorganizing standards, redefining standards and processes, with the risk of an extrapolation of the usual levels of stress due to the (new) situations to which they are having to submit. (AZEVÊDO, 2020, p. 12-13).

The current reality requires the teacher to appropriate new technologies for remote teaching. What it does through the continuous replication of its image in platforms and digital resources, without, however, being assured any copyright, nor are it provided with script requirements, connection resources and techniques for the elaboration and dissemination of the content, since they make use of private resources, coming from their own homes.

In practice, this new demand, therefore, means that "in short, the teacher needs to behave like a zealous professional, capable of matching the rigor, effectiveness and ability to be innovative" (CANÁRIO, 2006, p. 48), in order to enable the necessary reformulation of school practice required by the current moment.

However, the implementation of this new way of teaching forced by the emergence of the pandemic, and from policies imposed by governments - without the possibility of broad discussion with the school and teaching community - is not covered by previously planned and structured actions, given the very speed with which they were executed, given the demands of the moment.

The absence of adequate planning subjected the category of teachers to the challenge of implementing, by themselves, techniques, strategies and methodologies under which they had no previous mastery and knowledge. It can be seen, therefore, that despite this absence (or insufficiency) of support from the State, these professionals took up the challenge of enabling the continuity of

classes, in the remote modality, continuously exposing themselves to criticism and judgments and to the mercy of their own limitations.

About such a scenario, however, Azevedo warns:

> It is no longer about appropriating concepts, skills and competencies for a future that we do not know when it will come for us or for them. The virus has put any future on hold, exposing the errors of our present way of living, built and consolidated from a not too remote past. If our classes will pretend that these issues are distant from our lives and from our students, I modestly wonder what is the use of a school pedagogical process: only to guarantee certificates, transcripts and to confer more or less high degrees [...]? (AZEVÊDO, 2020, p. 56-57).

Thus, considering the prolongation of sanitary measures, aiming at the control of the pandemic and the continuity of classes in remote format, or, at least, in a hybrid model, it is essential that measures aimed at teacher training for the use of digital technologies and their media in teaching activity be headed by the State and its institutions, in charge of Public Education, as well as aiming to offer infrastructure for the production of classes with the desirable quality.

It is also necessary to ensure the preservation of the fundamental rights to the image, privacy and intimacy of such professionals, protecting their physical and mental health, so that they can perform their functions with dignity.

5 THE RIGHT TO DISCONNECTION AND THE RIGHT TO NON-WORK: EXCESSIVE WORKING HOURS, DAMAGE TO PERSONAL PROJECTS AND LIFE PROJECT

From the data obtained, it is also extracted that remote work for the teachers surveyed represented a significant increase in working time (working hours), as can be seen from the answers listed below:

> I have 20h, but there was a week that I worked 60h. It was a stressful period (questionnaire 1)
> Before:15 _ after: 30" (questionnaire 04)
> Many times, I got to work 60 hrs (questionnaire 07)
> Before: 8am during the pandemic, all day (questionnaire 08)
> Before 30hs weekly / after 50hours, more or less. (Questionnaire 14)
> 36 hrs/ more than 60 hrs (questionnaire 21)
> Before 8 hours a day, after the pandemic more than 12 hours a day (questionnaire 09)
> Before 50 after 80 (questionnaire 29)

The extension of the working day, in the context of remote work, was reported by most of the respondents, and some of them even pointed to the activation in extremely long hours, such as 50 and 60 hours per week.

In addition, another recurring complaint is that it is difficult to properly enjoy rest breaks and weekly rests and/or holidays:

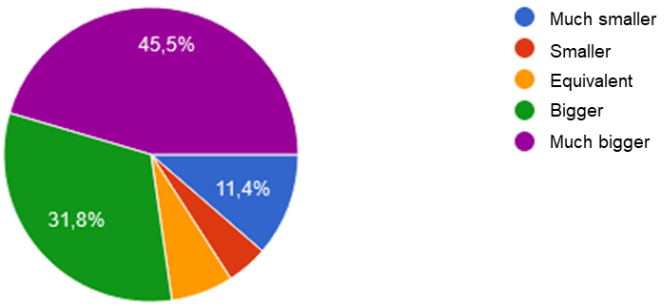
> The work doubled, I worked in hours of rest and moments that had no link with the State, to put everything in order and meet the demand for documents and activities that SEED imposed. (Questionnaire 05)
> Before they were the contract, post I cannot even measure because they were weekends, holidays ... (questionnaire 10)
> After the pandemic there is no longer a fixed schedule (including weekends and holidays) (questionnaire 11)
> Before it was only a day or two. Now the preparation is development of the activities is the whole week. (Questionnaire 19)

The new demands of remote teaching have also aroused the concern of professionals, who report the charge exerted by their superiors and the difficulty of completing all the tasks inherent to their function:

> Now it is indeterminate, the charge is many. (Questionnaire 15)
> A lot of time made available for remote activities, because everything was very new and I had to spend much more time to study and learn how to deal with the tools, as well as meet students by email, on the platform and plan classes. (Questionnaire 06)
> I work all day including weekends and holidays. (Questionnaire 38)
> Before it was easier now, I define myself as exhausted. (Questionnaire 03)

However, the data show that remote work greatly accentuated the working hours of the professionals surveyed, increasing the time of preparation of classes, also requiring work in periods of rest, as is extracted from the answers above. Specifically, regarding the preparation of classes, the vast majority of respondents answered that the time spent for this purpose is "much greater" or "greater":

Graph 5 – Time dismissed for preparation and administration of remote classes compared to the face-to-face model



Source: Survey data, 2021.

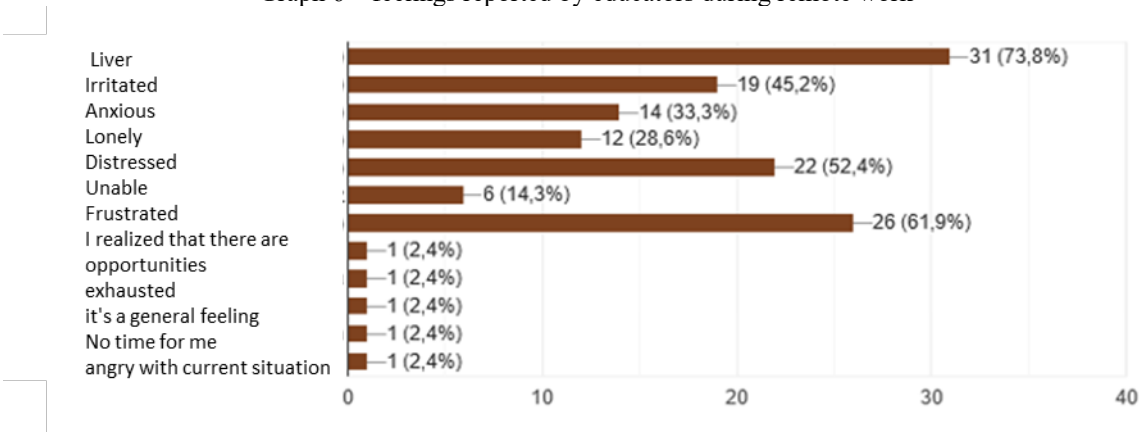
It is observed that many of the answers to the open questions point to the tightening of time and the consequent suppression of rest periods, and some respondents even stated that work now occupies all their free time or that the time worked is incalculable.

This scenario evidences the difficulty of adapting such professionals to the new work model, which substantially increased the time allocated to the tasks performed, either by the need to readapt materials and content for the classes, or even by not completely mastering the resources used during the work, a circumstance that requires a greater dedication to the work.

The last axis of questions is intended to assess the impacts of this type of work for high school teachers, and the answers obtained, so far, have demonstrated profound effects suffered by the respondents.

It should be noted, at the outset, that almost 67.4% of the teachers reported having faced difficulties to perform their work remotely. Still, regarding their personal perception, the vast majority of the responses showed that the respondents are, at some level, dissatisfied with the circumstances of remote work:

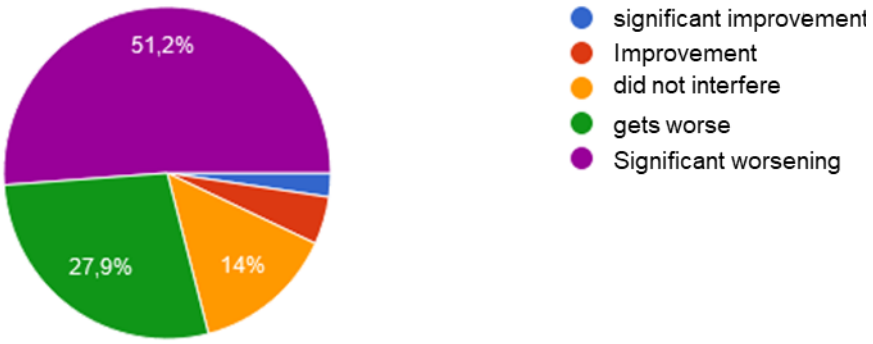
Graph 6 – feelings reported by educators during remote work



Source: survey data, 2021.

Fatigue and frustration are among the effects most felt by respondents, followed by feelings such as anguish, irritation and loneliness. In addition, remote work represented a significant worsening or worsening for almost 80% (eighty percent) of those surveyed, regarding the use of time for private activities:

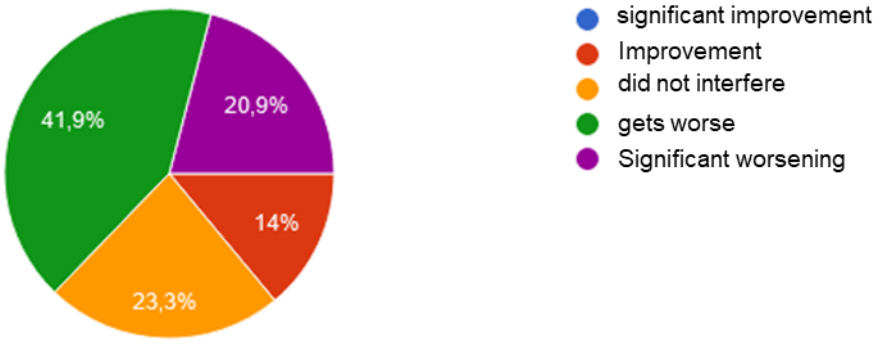
Graph 7 – Conditions of use of time for private activities in remote work in relation to the face-to-face model



Source: Survey data, 2021.

In addition, more than half of the respondents found a significant worsening/worsening in the quality of family relationships:

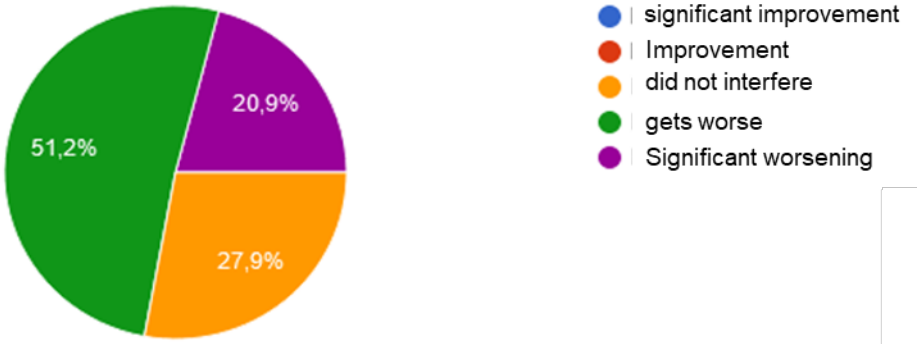
Graph 8 – Quality of family relationships during remote work in relation to the face-to-face model



Source: Survey data, 2021.

Still, to the same question, in relation to social relations, very similar answers were obtained:

Graph 9 – Quality of social relationships during remote work in relation to the face-to-face model



Source: Survey data, 2021.

The justifications presented in the open questions show that remote work consumed the time previously allocated to family and social life, bringing conflicts and imposing difficulties on the relationships of professionals:

> There was no time left for anything. By the end of the day, I was exhausted. (Questionnaire 1)
> No time and no willingness. (Questionnaire 3)
> It got worse because often the family wanted attention and care and I was on the laptop working, evenings, Saturdays, Sundays, outside of my normal hours. (Questionnaire 6)
> The work is practically integral. (Questionnaire 14)
> Stress, unfortunately discounts on the nearest person. (Questionnaire 15)
> There is no way to establish routine with the children, we are under one roof, but we do not look at each other we are all day with our eyes fixed on computer screens, with our heads dipped in work. (Questionnaire 40)

The data show that the damage to family and social relationships does not only result from the increase in working hours and decrease in rest periods, but also from the physical and mental

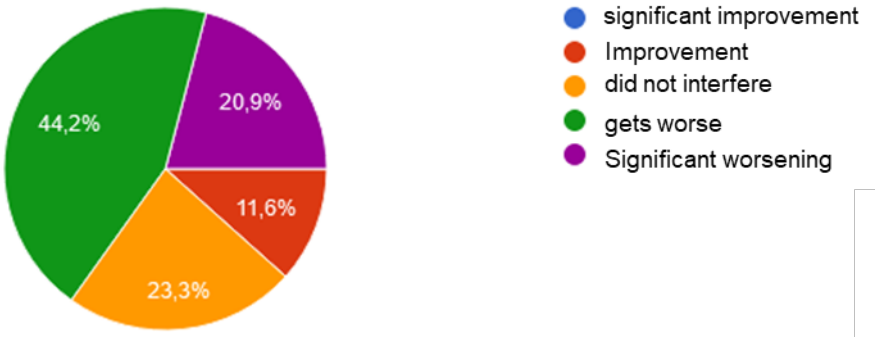
exhaustion of professionals who, even in periods of leisure, do not have the courage and willingness to enjoy moments of relaxation and leisure with family and friends.

In addition, the physical presence in the home environment was not enough to promote the approximation between the family, because the constant connection with work, through technological resources, impairs the interaction of the family group.

It can be seen, therefore, that the quality of family relationships was substantially affected by remote work, performed in the domestic environment and its demands. The same occurred in the context of social relationships, where more than 70% of the responses point to significant worsening/worsening.

In addition, more than 60% of respondents admitted that there was damage to their projects and personal activities as a result of remote work:

Graph 10 – Time allocated to projects and personal activities during remote work in relation to the face-to-face model

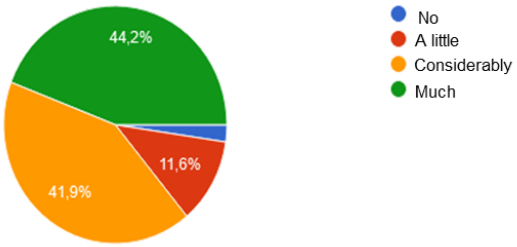


Source: Survey data, 2021.

It is observed, therefore, that the projects and personal activities of the teachers were also substantially impaired by the new form of work that they began to exercise, and most of the justifications presented allude to overwork and lack of free time.

The increase in the time allocated to work and also the demands of work in periods previously destined to rest, still represented great concerns of the respondents, as extracted from the graphs below:

Graph 11 – Frequency with which the teacher thinks about work on weekends/holidays off



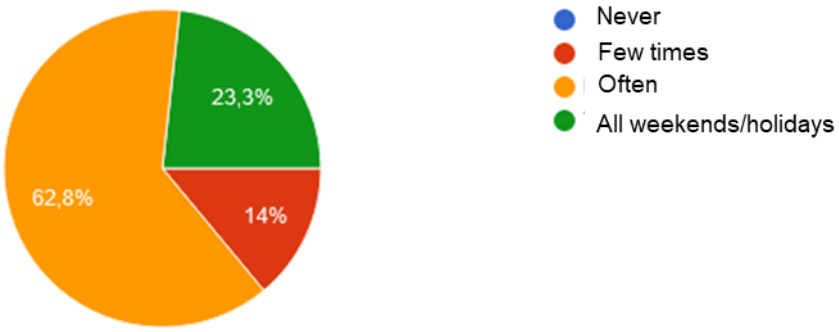
Source: Survey data, 2021.

The percentage of respondents who, even during rest periods, think about work is a significant 97.7%, while only 2.3% said they do not.

This scenario highlights the difficulty of such professionals to disconnect from work to freely enjoy their rest periods. This difficulty also stems from the fact that the same resources used in routine communication or leisure, such as mobile applications and electronic correspondence, are now used for work.

The private activities of the respondents were also, not infrequently, interrupted due to work demands, even when they enjoyed their rest periods:

Graph 12 – Frequency with which the teacher had his private activities interrupted due to remote work, on weekends/holidays

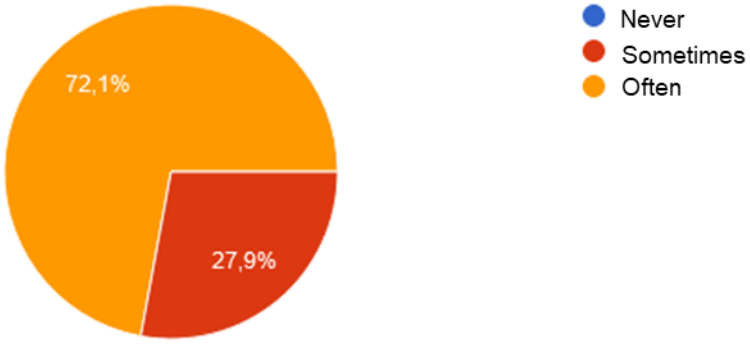


Source: Survey data, 2021.

It is observed that the demands of work occupied, at some level, the thoughts of more than 97% (ninety-seven percent) of those surveyed, even on weekends and holidays and that 23.3% of them worked on all weekends/holidays, while 62.8% worked on many of these occasions.

In addition, all respondents stated that they have already been questioned by the students in rest periods:

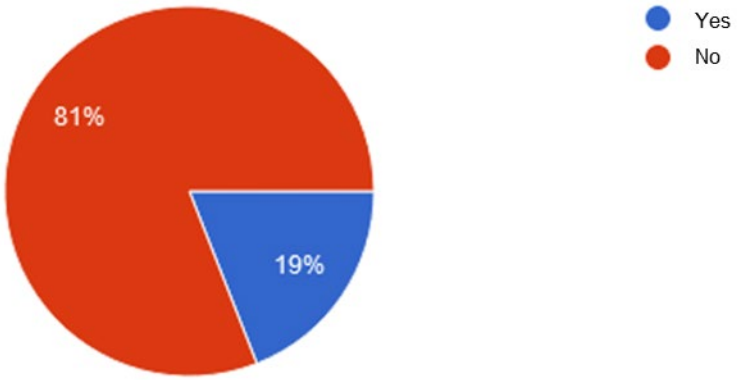
Graph 13 – Frequency with which the teacher has been sought by students outside of class hours, by any means of communication



Source: Survey data, 2021.

In addition, 81% of them have not been able to regularly take advantage of their rest breaks and days off:

Graph 14 – Adequate enjoyment of rest intervals and days off



Source: Survey data, 2021.

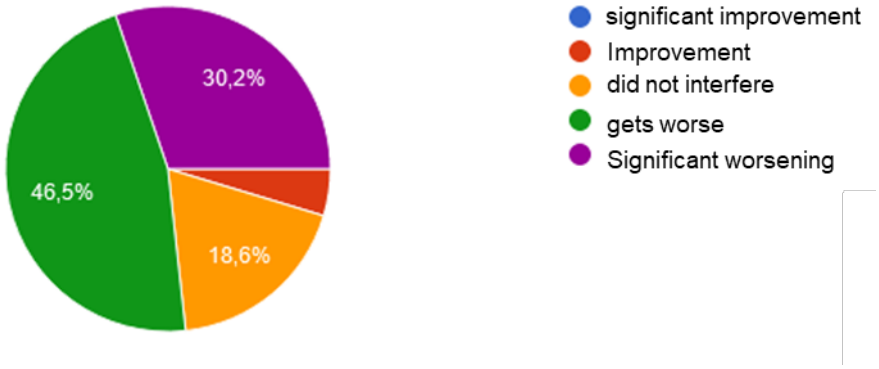
The answers obtained point to the difficulty of disconnecting from work, even at times intended for rest, since communication with students is constant and instantaneous. In addition, it is difficult to establish limits and schedules for work:

> I had no rest, when I was not a student was parents looking to solve doubts. (Questionnaire 1)
> In remote teaching it is difficult to establish schedules, the student or pedagogical team sends a message, you are on the cell phone, you see and immediately begin to respond. (Questionnaire 6)
> There was never any rest: attendance to parents and students was frequent.
> As the work has increased, we always have chores. (Questionnaire 11)
> Students and parents come to us outside of the hours set for them. They want immediate care. (Questionnaire 22)
> I have been using [rest breaks and days off] to organize classes because the time is insufficient for the demands that are imposing on us. (Questionnaire 23)

The effects of remote work were deeply felt by the respondents in their quality of life, and almost 80% of them point to significant worsening or worsening, under various arguments, including reporting damage to physical health.

Both the graph below and the answers transcribed below illustrate the effective damage to the health and quality of life of professionals:

Graph 15 – Quality of life during remote work in relation to the face-to-face model



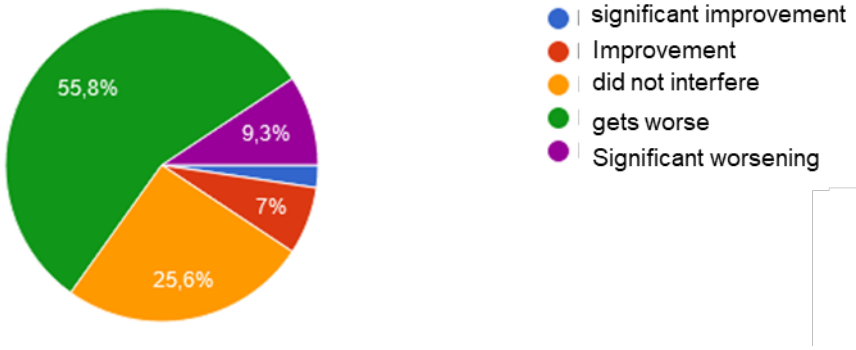
Source: Survey data, 2021.

The answers to the open question, in turn, show the difficulties felt by the professionals:

> I spent a lot of time in front of the laptop, sitting, which caused weight gain. (Questionnaire 06)
> I didn't have time for anything else. (Questionnaire 07)
> The stress caused me problems such as hair loss and dental problems, which I am undergoing treatment. (Questionnaire 11)
> I totally stopped exercising. (Questionnaire 17)
> Sedentary. (Questionnaire 18)

Still, it is noteworthy that most respondents were frustrated with the quality of their work, behold, more than 60% (sixty percent) of them, report significant worsening or worsening in this regard:

Graph 16 – Quality of the remote work of the teacher in relation to the face-to-face model



Source: Survey data, 2021.

The main complaint of the professionals, in this sense, is the lack of interest of the students, the difficulty of reaching them and teaching them remotely, as well as problems to perform practical classes.

Finally, the last open question, aimed at the free expression of respondents about remote work during the pandemic of the novel coronavirus, brought varied answers that reflect the perspective of these professionals in the face of the remote work they have performed.

Among them, it is worth mentioning:

> It was a huge challenge for teachers who had to reinvent themselves. The students were in the case of my discipline, physical education, the ones who were most harmed because they did not have the practical classes. However, I have put several practical classes on the platform, but I have had little feedback from students. (Questionnaire 06)
> Remote work without training, with many things to be accomplished without opting out was extremely detrimental to our work and to future professionals as it is being masked that they have learned... The numbers do not represent reality! (Questionnaire 10)
> We're in a pandemic, but the charge is superhuman. Incomparable with face-to-face work.... We get sick (us, students and parents of students). We need to stay alive; the rest recover as soon as this pandemic recedes. (Questionnaire 11)
> That I was not born, to be alone in front of the small screen, the face-to-face makes all the difference, eye to eye. (Questionnaire 15)
> Even if we teachers were supported with equipment to develop our work, our students would not all have equipment to accompany the classes, this goes far beyond physical resources, they often do not have at home family support without the participation of our student it is impossible to develop a satisfactory work. (Questionnaire 16)
> Nothing replaces face-to-face teaching, teacher-student contact, that connection we create in the classroom. (Questionnaire 18)

The data obtained from the research outlined the contours of the existential damage caused to this category of professionals, mainly due to the difficulty of disconnecting from work. The work is continuous, exhausting and too accentuated, while there is dissatisfaction with its quality.

In addition, there is undeniable damage to family and social relationships and delay or impracticability of personal projects, a circumstance that represents effective damage to the private life, achievements and personal desires of the respondents.

The continuous connection with the work environment, through cell phones, computers and other equipment impairs the adequate enjoyment of the time destined to rest, making the professional always remain connected to their work activities.

It is that, with the use of the various technologies available for the exercise of labor, which enable communication in real time, there is difficulty in separating periods of work and rest, behold, "the borders become more diffuse and the time of work invades the times of non-work, affecting individual and collective life." (DAL ROSSO, 2008, p. 35).

Still, the tightening of time is another very relevant element, it is perceived that the researched have worked without taking advantage of the intervals for rest and weekly rests, submitted, therefore, to the strenuous journey and deprived of their right to dedicate themselves to moments of leisure, or, simply, of leisure.

However, the time of non-work is essential for the maintenance of the physical and mental health of the work, because, "[...] It is true that work is a fundamental right, however, this right cannot exclude the right to rest, leisure, family and social life; that is, to not work." (CARDOSO, 2017, p. 72).

The discussions surrounding the duration of the work, however, are relevant from several angles:

> The issue has several implications, three of which are highlighted here: it affects the quality of life, as it interferes with the possibility of enjoying or not more free time; defines the amount of time during which people devote themselves to economic activities; establishes direct relationships between health conditions, the type and time of work performed. These reasons, far beyond historical curiosity, are sufficient to explain why studies of working time that are devoted to the analysis of duration have become so socially relevant. (DAL ROSSO, 2006).

It should be noted that these right aims, primarily, to restrict the time of dedication to work, in order to promote the harmonization of the social times that the worker enjoys, in order to ensure that he does not remain under constant pressure because of the continuous demands of his labor activity.

In this context, it should be elucidated that the right to disconnection is linked to the worker's ability to have free time, intended for the practice of private activities, whether for leisure, family and social life, or even to apply to projects and objectives of a personal nature, completely unrelated to their professional activity.

In this line, the remote performance of the teacher, while the social distancing measures adopted as a result of the pandemic of the novel coronavirus were in force, demanded from this category of workers substantial changes in the way they carry out their work activities.

In addition to the need to reinvent oneself as a professional and to reconfigure didactic material and the way of teaching itself, the work itself has changed a lot, starting with the environment. Now, if before the teacher exercised his activities in the classroom and, still, disposing of the physical space of the school environment for the preparation of materials, now, all the professional activity was abruptly shifted into the homes.

The same technological resources that provide real-time communication and the sharing of diverse materials and information, whether by written or audiovisual means, represent, simultaneously, a facilitator of the teaching activity, allied to the teacher in times of social distancing. On the other hand, a form of suppression of his time, even consuming the hours he enjoyed carefree and unrelated to his work.

The limits of work and private life are confused in the scope of remote work, behold, the personal and professional universes were brought together in the same home environment, where the individual enjoys his freedom and privacy.

On the evils of the use of technology in the home environment, Almeida exemplifies "[...] We're at home, in leisure time, and almost without realizing it, we stop what we're doing to fix reports, respond to emails, or troubleshoot work issues." (ALMEIDA, 2014, p. 46).

It is observed, therefore, that remote activity tends to provide a significant increase in the workload of teachers, either due to the rhythm employed by the worker or even due to the time actually spent with work activities at home, during remote teaching due to social distancing measures due to the pandemic.

Thus, in remote work, the line between rest and work is thin, since the activities are developed in the home environment. In addition, the so-called flexibility in the working day often encamps by printing greater intensity of work, or even lengthening of working hours.

Still, the connectivity of the teacher with his students, through the virtual environment, either by the platforms destined to the inclusion of tasks and contents, or by communication applications, was constant, so that the adequate enjoyment of the periods destined to the rest, many times, can be impaired.

This scenario, added to the loneliness and uncertainty of social distancing, is capable of imposing on the worker exaggerated weariness. Quickly, lead him to exhaustion, also hindering his quality of life and the possibility/willingness to enjoy particular moments, in the family or social, or simply, to devote free time to leisure or any other purpose unrelated to work.

Still, the discussion in fire gains more complex contours when associated with female labor, usually performed in double shifts and culminating in the extension of work periods and shortening of rest times, overloading and restricting the realization of women as human beings in all its dimensions.

This panorama stems from the sexual division of labor as a historical product of relationships built and deconstructed in daily life, successively, in which the work destined to women, predominantly in unpaid and care activities, evidences the unequal education between men and women.

It should also be considered that domestic work is essential for life in society, since it is it that provides its functioning and reproduction. It is a form of work that has existed since the beginning of time, even resisting egalitarian revolutions. (PERROT, 2007, p. 114 - 115).

It is also undeniable that domestic work remains linked to the female figure, while its relevance is linked to the value of the family itself and the administration of daily life. As Perrot (2007, p. 114) describes, such work is fundamental in women's lives "and a weight on their shoulders, because it is their responsibility. And a weight also in their identity [...]. The domestic character marks all women's work: the woman is always a housewife."

Thus, when attempting a professional career, women begin to accumulate external work, most of the time, in precarious functions, remunerated with reduced wages and with no prospect of career advancement, with the domestic work that is assigned to them, the result of the unequal distribution of domestic tasks between men and women.

This accumulation of care tasks, in the home environment, usually supported by women, with the exercise of an external professional practice, causes the performance in total working hours much higher than that undertaken by male workers, as a rule.

As has been shown, women's work, in its broad conception, has always existed, even though the trades performed by them have not always been of notorious recognition, however, paid labor represented an obstacle for them to continue to perform the functions considered natural:

Varied conditionings and needs have led women to assume various "productive functions", habitually embracing the existing possibilities, occupying gaps in the world of work or taking for themselves positions and placements previously vetoed or inaccessible. In this process, they were more easily incorporated into the labor market when they assumed occupations for which they were considered skilled or vocational (spinning, weaving, sewing, caring, serving) and faced greater difficulties when it was necessary to overcome the existing prejudices, especially in the more conservative sectors, considered as traditionally masculine. (KILLS; BORELLI, 2012, p. 127).

In the scope of teaching, it is observed that the female preponderance is "[...] linked to the establishment of characteristics of the female gender for the profession, in articulated processes, however, not necessarily automatic and simultaneous", which lead to the perception of the school as an extension of the private family space. (YANNOULAS, 2013, p. 44)

Nowadays, the feminization of teaching work is consolidated, and in the current circumstances that have forced teachers to transfer their work activity to the interior of their homes, gender inequalities and discrimination are latent, to the extent that one of the greatest mishaps faced by workers is in the use of time for domestic and unpaid work.

Historically, all those that involve domestic care, with children and elderly or sick family members are considered feminine functions. The accumulation of paid and unpaid working time _ in the domiciliary context causes women an overload in relation to men, thus accentuating gender inequality in the labor market:

From the research carried out it was possible to conclude that the work overload produced by the attribution of domestic work to women, reinforced by the social representations of gender, directly influences the conditions of insertion and permanence of women in the labor market (ability to participate in the labor market, to occupy better jobs), constituting the material basis of a set of inequalities in the labor market that resist disappearing. (SAINTS, 2019, p. 177).

This disparity in the distribution of domestic and family care tasks requires women to activate themselves in long working hours, causing them to occupy and assign their time to paid and/or homework, in proportions much higher than the periods spent by male workers.

The discussion about the occupation of time in work activities is relevant from several angles. Behold, Leite (2015, p. 444) observes that "the reasons for the limitation of the working day are biological, social, economic, religious and family. The exhausting days were, during the nineteenth century, one of the main causes of revolutionary workers' movements."

In this context, Süssekind (1996, p. 774) asserts that one of the reasons for the "limitation of working time" is "of a biological nature, since it aims to combat the psychophysiological problems arising from fatigue and excessive rationalization of the service." Thus, the imposition of reasonable limits on the duration of working hours is essential for the preservation of the health and quality of life of the worker.

Still, in research on the inequalities between men and women in the use of time, with regard to work and family responsibilities, Santos (2019, p. 165) assessed that there is, in fact, a work overload attributed to women and that this stems from their "[...] the need to reconcile the work that is done for the family and the work that is done for the market."

Therefore, considering the significant transformations arising from the insertion of women in the labor market, especially in teaching, it is also necessary to take into account, for the measurement of the effects of remote work in the scope of teaching activity, gender inequalities with regard to the sexual division of labor.[5]

Notably, remote teaching during the pandemic caused by the novel coronavirus prevented the full exercise of the right to disconnection by teachers, since, as demonstrated, there is evidence that such a type of work hinders the complete disconnection of the worker from his work activities, in addition to reducing the time allocated to rest.

Still, even during the periods destined to rest, the teacher finds it difficult to detach himself from work, since the demands resulting from it are sent to him in real time, on any day of the week or time, and it is often not possible to separate the moments destined to family and social life, or to rest, from those destined to work.

It is pointed out that, for women, remote work as a teacher becomes even more costly, since they are still mostly concerned with the care of children, the elderly, or other members of the family group that require attention, in addition to being responsible for domestic work within their homes.

[5]According to HIRATA, the concept of sexual division of labor "is, on the one hand, a sociographic meaning: the differential distribution of men and women in the labor market, in the trades and professions, and the variations in time and space of this distribution are studied; and it analyzes how it is associated with the unequal division of domestic labor between the sexes." (HIRATA; KERGOAT, 2007)

Therefore, the remote work required of teachers during the pandemic is a situation that has triggered several and profound changes in their way of working, and also in their professional life, by subtracting part of their privacy, individuality and free time, at their full disposal, disconnected from their work environment.

Thus, in the scenario of the present research, it is evident the violation of the right to disconnection embodied in the difficulty of the teacher to disconnect from his functions, even when he should enjoy his rest breaks or weekly days off, or, simply, his periods of non-work, completely free of any pressure, demand or charge arising from his work activity.

6 THE EXISTENTIAL DAMAGE IN THE CONTEXT OF REMOTE WORK OF HIGH SCHOOL TEACHERS IN THE STATE OF PARANÁ

From the data obtained from the answers to the questionnaires fired, it is extracted that several mishaps have haunted the activity of the high school teacher of Ponta Grossa and region, due to the abrupt change from the face-to-face regime to the distance model.

It is worth noting, at this point, the slowness of the vaccination process against COVID-19 aimed at the category of education professionals in the state of Paraná. Lo and behold, despite growing pressure for the full resumption of in-person classes, the distribution of vaccines intended for such workers began only on 5/10/2021. Immunization is staggered by age, starting in the range between 55 and 59 years, according to the data on the official website, www.saude.pr.gov.br/.

In addition to the feelings of fear, uncertainty and suffering unleashed on all citizens as a result of the pandemic that has dragged on for more than a year, the category of teachers still has to deal with the difficulties to perform their duties.

Now, one of the first and most relevant milestones that characterize the existential damage to which these professionals are subjected, is the accumulation of work, and, consequently, the lengthening of the working day, shortening of rest periods and the need to work, also, on weekends and holidays.

It is observed, from the answers obtained, that a very significant portion of the responding teachers have failed to adequately enjoy their rest breaks and also the days intended for rest, because they are daily connected to their work activities.

The connection with the work environment is continuous, after all, the technological resources used for leisure (cell phones and computers) and social networks for private communication, are the same employed in the scope of labor activity. From this scenario, it is extracted that there is difficulty for the professional to disconnect from work, even on days and times that are not intended for work. And such a situation triggers damage to all segments of the teacher's private life. Family and social

relationships are impaired, either by the lack of time spent on their behalf, or even by the lack of energy and willingness of the individual to simply devote himself to his circle of private contacts.

The projects, activities and particular customs were also, by many of the teachers, abandoned, as a consequence of the change in the way of exercising the work. Such resignations of these professionals can already be felt by some of the respondents who highlighted the damage to their physical and mental health.

It is also observed that several feelings were mentioned, such as: anguish, frustration, anxiety, loneliness, irritation, feeling of incapacity, among others, which are common to most professionals and which demonstrate their dissatisfaction with the current scenario.

Still, the varied pressures and demands for the work to be performed, despite the difficulties, lack of support from hierarchical superiors and adequate physical facilities and equipment, was a cause of great concern and even frustration with the quality of the service provided.

The fact is: the teachers who make up the researched public were exhausted with the work, in the way it had been performed, and found themselves hampered by the time and disposition that they previously freely dedicated to their private activities, a fact that has been detrimental to them on many levels, such as family, personal and social.

It is also observed from the answers obtained that the responding educators point out greater difficulties, due to accumulating, also, functions of care with children or other dependents, as well as that those respondents of more advanced age deduce greater difficulties to master the technological resources employed.

From these findings, it is extracted that the exercise of work, in these conditions, is capable of triggering, depending on the personal conditions, whether physical, mental or material, of each professional, the existential damage by violating the right to disconnection.

This is mainly due to the tightening of working time, which occupies practically all the time available to the professional, who, even when he is not dedicating himself to work, remains connected to the activity through communication applications and electronic equipment that he uses, simultaneously, for work and to communicate in the private sphere.

In addition, the obligation to reconfigure and reorganize their professional activity in a short period of time, without the necessary qualification and support from their superiors, is to be highlighted as a factor that potentiated the difficulties inherent to the exercise of the profession.

In this context, the existential damage emerged as a result of this new configuration of teaching work during the suspension of face-to-face classes and its replacement by the remote model, as a result of the COVID-19 pandemic, given the numerous difficulties that resulted from the resignification of teaching work in the current scenario.

7 THE REPARABILITY OF EXISTENTIAL DAMAGE WITHIN THE SCOPE OF THE JUDICIARY OF PARANAENSE

Although there are well-founded indications of the occurrence of existential damage by the violation of the right to disconnection, during the remote work of teachers of the state school system of the State of Paraná, the possibility of pecuniary reparation of such damage demands individualized analysis that could only take place in the midst of a judicial process, guaranteeing the litigating parties the right to the adversarial and the ample defense.

It happens that the dominant jurisprudence of the Regional Labor Court of the State of Paraná, as well as that of the Superior Labor Court, has established its understanding in the sense that the recognition of the indemnifiable existential damage requires effective demonstration that the working conditions, to which the worker was subjected, were capable of compromising his life project or of harming his social relations.

Thus, although there are elements that indicate the possible occurrence of existential damage, its finding before the Judiciary, for reparation purposes, is not automatically presumed by the mere finding of the precariousness of working conditions, but demands proof that, from such a scenario, the rupture of their social relations or the frustration of their life project came to the worker.

In practice, when postulating compensation for existential damage, it is incumbent on the worker to prove specifically that this damage, in fact, has come to him, in a way that results in offense in the personal, social or family sphere. Such proof, therefore, can only be ascertained in the concrete case.

In this sense, the Superior Labor Court (BRASIL, 2018) has also positioned itself in several judgments:

> [...] It should be noted, as appropriate, that the provision of overtime, by itself, does not constitute an unlawful act committed by the employer to give rise to the conviction in existential damages. Only the contumacious non-compliance with labor legislation, such as the excess of overtime work beyond the legal limit, which configures the exploitation of labor, therefore, an unlawful act, together with the proof of the damage to their personal development and social relations, represents an affront to the fundamental rights of the worker, which characterizes the effective existential damage. [...]

It happens that the production of such proof proves to be complex, notably because the existential damage presents subjective contours, difficult to measure, because it is linked to intrinsic feelings of the human being, which cannot be measured or verified objectively.

Regarding the characterization of existential damage, Boucinhas Filho and Alvarenga (2013, p. 33) state that "[...] Any unjust fact that frustrates this destiny, preventing its full realization and forcing the person to resign himself to his future, must be considered an existential harm." Such a

statement, however, must be weighed in the light of the body of evidence produced in the present case. The mere assumption that the alleged fact is unjust is not sufficient to support the claim for relief.

From what was measured with the present research, it cannot be denied that there are various indications of the occurrence of existential damage during the remote work of the teachers surveyed, as a result of the violation of the right to disconnection. These elements, however, do not allow us to conclude that there is, in fact, grounds for any claim for compensation of the injured parties.

It is observed, therefore, that the measurement of existential damage amenable to pecuniary reparation requires the submission of the controversy to the Judiciary which, within the scope of the judicial process and from the evidence produced by the parties, in the specific case, will resolve, by means of a reasoned decision, the occurrence or not of the damage and the (im) origin of the indemnification claim.

8 CONCLUSIONS

It is extracted, therefore, from the data obtained through the questionnaires applied, that there is evident dissatisfaction of the responding teachers with the working conditions during the period in which the social distancing measures were in force, due to the COVID-19 pandemic, especially with remote classes.

Among the main complaints verified are the lack of adherence and interest of the students and the damage to the quality of life and social and family relationships. It should also be noted that practically all the respondents showed that they had not received the appropriate qualification for work in such conditions.

The absence or deficiency of material conditions for work is also a factor that caused concern to these professionals, especially the lack of adequate equipment, since the educators used their own resources, often shared with other members of the family group.

Other mishaps also befell these professionals during remote work, such as the absence of a private environment for work, performed from inside the homes and, for most of them, from the collective spaces of the house. In addition, many of the professionals also had to dedicate themselves to the care of children or other dependents under their responsibility, in the same space and time in which they had to dedicate themselves to work.

These difficulties also reflected in the mood of the educators surveyed. Most of the answers pointed to the existence of varied difficulties in the current way of working, emphasizing that this format has caused them several feelings, such as: fatigue, irritation, loneliness, anxiety, among others.

In addition, all the answers obtained indicated that there was an increase in working time, compared to the hours worked in face-to-face teaching and the vast majority of them claim to have worked or thought about work on weekends, holidays, and during periods intended for rest.

In addition, most of the answers indicated that there was a significant worsening/worsening in the quality of their family and social relationships, and in their involvement with private projects and activities, which demonstrates that remote work had significant effects on the private lives of these workers.

Thus, the present research demonstrated that, at least in relation to those surveyed, the remote work of teachers from the state school system of Ponta Grossa and region attracted several difficulties and subjected professionals to various undesirable circumstances.

In this context, it can be stated that, for many educators, there is evident damage to the life project and to the quality of family and social relations, as well as embarrassments to the exercise of activities inherent to the private life of these professionals.

This is because, considering the concept and the elements that characterize the existential damage, it can be observed that there are strong indications that teachers have not been able to adequately enjoy their right to disconnection, since they remain connected to work, even during the periods that are intended for rest, either to prepare classes, respond to students, parents and coordinators.

In addition, the charge for productivity and the need for rapid adaptation is a cause of anguish and frustration. Subjecting the professional to continuous dissatisfaction with the work and with himself, mainly because they were not given the necessary and adequate qualification for this new reality.

The existential damage, in this scenario, emerges from the damage to the full exercise of the individuality of the professional, with regard to their family and social relations, and also to the ability to self-determine and to apply themselves to personal projects of any nature.

It is observed, therefore, that, from the data obtained, at least in relation to the professionals who responded to the survey, there is an effective prejudice to the right to disconnection. A situation that, depending on the circumstances, may cause them existential damage.

It cannot be forgotten, however, the indispensability of the remote work of the teacher, in the context of the pandemic of the new coronavirus, behold, given the nature of the service provided, the complete closure of educational institutions, in the current scenario, proves to be absolutely unfeasible.

In any case, remote learning has allowed school activities to continue, even amid the necessary social distancing measures. The working conditions reported by the educators, however, alert to the

need to implement policies capable of offering improvements to such professionals in the exercise of their functions.

It is observed that there was not enough support from public agencies both for the training of teachers, as for the proper material support, in the sense of offering materials, equipment and adequate resources for the exercise of the teaching activity, remotely.

In addition, the delay in the beginning of the vaccination of this category of professionals, hindered the resumption of face-to-face classes with the desirable safety, subjecting them to a scenario of insecurity and fear, given the high rates of contamination that still resist.

In this context, any configuration of existential damage, by violation of the right to disconnection, for reparation purposes, will depend on effective proof before the Judiciary. Analysis that would only be done individually and depending on the factual circumstances that permeate the private relationship that is established between the worker and his employer.

However, the data obtained certainly allow, at least, to ignite a reflection on the circumstances to which these professionals have been subjected, especially on the immaterial damages that work, in such conditions, may cause them.

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CHAPTER
50

Estimation of excess mortality during COVID-19 pandemic based on death registry quality analysis.

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ABSTRACT
Background: There was a debate whether an accurate measurement of deaths was exacerbated during COVID-19 pandemic 2020 in Brazil.
Purpose: This study aimed to analyze the magnitude and temporal course of excess mortality from the COVID-19 pandemic in 2020 with evaluation of mortality data quality in one state of Northeast region of Brazil.
Methods: Excess mortality estimation and evaluation of the quality of COVID-19 death records during 2020 pandemic was applied for the state of Paraiba. The assessment of deaths records quality included analysis of its coverage and completeness (redistribution of garbage codes (GCs) with redistribution of ill-defined causes).
Results: The total number of deaths due COVID-19 in Paraiba for 2020 increased by 37.4% after data quality correction analysis. The study proved statistically significant excess of deaths in the state for all-cause mortality and natural causes, with approximately 2-fold higher number for respiratory diseases. The quality data correction added significant fractions on top of initially observed deaths which makes the scope of exceeding deaths in Paraiba even larger.
Conclusions. There is strong evidence that the full impact of the 2020 pandemic in Paraiba has been much greater than what is indicated by reported deaths due to COVID-19 alone. It is noteworthy that the methodology applied to the state of Paraiba can be replicated for any Brazilian state.

Keywords: Covid-19, mortality, quality of death registry.

1 INTRODUCTION

Reliable and valid mortality data are essential for monitoring population health and developing target policies [1]. There was a debate whether an accurate measurement of deaths was exacerbated during COVID-19 pandemic [2].

Brazil experienced significant challenges during 2020 pandemic with registration of COVID-19 cases and associated deaths [3]. Among the possible causes of reporting bias were low testing capacity, delays in information delivery and errors in identifying causes of death. The quality of mortality data in Brazil has been gradually improving over time. Nonetheless, someissues remain, as regional differences in routine death registration [4-6]. Some problems relatedto mortality statistics quality in the country possibly have been aggravated during pandemic.

Estimating excess mortality due to the COVID-19 pandemic was globally recognized as an important tool for measuring the real toll of deaths [2,7,8]. It can draw attention to the magnitude of the crisis by providing a comprehensive comparison of additional deaths amongstthe countries and

allowing for further analysis of its causes. Empirical evidence demonstrates that COVID-19 pandemic is associated with the excess mortality due its direct (infectious disease) and indirect effects (shortage of health care resources, altered access to health care, patient's comorbidity status and others) However, there are some limitations in regional/location scope and evaluation of the quality of reported deaths. Many studies were attributed to all-cause excess mortality without cause specification [2, 9-11].

This study aimed to analyze the magnitude and temporal course of excess mortality from the COVID-19 pandemic in 2020 with evaluation of mortality data quality in one state of Northeastregion of Brazil.

2 METHODS

Data sources and study setting. Excess mortality estimation and evaluation of the quality of COVID-19 death records during 2020 pandemic was applied for the state of Paraiba, the third most densely populated federative unit in Northeast region of Brazil [12]. This state was the geographic focus part of the master's thesis of one of the authors of this work [13], which makes Paraíba a representation of what can be investigated for other Brazilian states.

The data was retrieved from the Mortality Information System (Sistema de Informação sobre Mortalidade -SIM)- a nationally consolidated official Brazilian mortality data source, which is the one among all, concisely presenting information from the death certificate including causes of deaths [14]. Weekly (1st-52nd epidemiological weeks) all -causes, natural causes and respiratory system diseases registered deaths in Paraiba for 2015-2020 were compiled [15]. The Mortality Information System protocol for recording deaths due COVID-19 was based on nationally adopted COVID-19 death definitions, certifications, and classification [16]. The data was adjusted by sex and age groups. An age breakdown of 0-59 years and 60+ years was applied.

The study followed 2 main methodological steps:

i) Assess of death registries quality and

ii) Estimation of excess mortality.

Death registries data quality analysis. To assess the data quality of deaths due COVID-19 the following approaches were determined: a) analysis of the coverage of deaths, b) analysis of deaths registration completeness by redistribution of garbage codes (GCs) and c) redistribution of ill-defined causes (IDC). The methodological approach and results of mortality data quality analysis for 2020 COVID-19 pandemic in Paraiba were published previously [17].

The coverage of all registered deaths was estimated using the General Growth Balance (GGB) method originally proposed by Brass [18]. Due to the errors inherent to any estimates and to facilitate

the interpretation of death coverage estimates, was applied the classification adapted by Paes [19], which established four categories: excellent (>90%); good (81%–90%); regular (71%–80%) and deficient (≤70%).

For redistribution of Garbage Codes (GCs) attributed to COVID-19 deaths was applied the conceptual approach outlined by Naghavi et al. (2010) [20]. The study followed four key steps:

i) Identification of GCS;

ii) Identification of target causes where the deaths assigned to a GCS should in principle be reassigned (based on pathophysiology);

iii) And calculation of the fraction of deaths assigned to a GCS that should be reallocated to target cause. In addition to identify specific GCS list and mapping it across major groups of causes was determined 4 levels typology: Level 1- codes with serious policy implications; Level 2- codes with substantial policy implications; Level 3-codes with important policy implications; Level 4- codes with limited implications. Each GC was revised in terms of pathophysiology connection to COVID- 19, and those that are likely belong to another ICD chapter or rubrics were excluded. It is important to highlight, that there is no specified GCS for COVID-19 since this disease is relatively new, with newly opened ICD-10 rubrics, and yet under observation/investigations in terms of pathogenesis, systems involved to pathology and specific reasons of deaths. The cgs for investigation were chosen based on evidence about primarily respiratory system damages due COVID-19 and its generalized sepsis complications [21]. All GCS previously extracted from major groups were redistributed accordingly to calculated fraction for COVID-19 considering their typology, sex and age-adjusted distribution.

Redistribution of ill-defined causes (IDC) was estimated by application of the Ledermann's method based on simple linear regression between the proportion of a specific cause of death and the proportion of ill-defined causes of death [22].

2.1 EXCESS MORTALITY ESTIMATION

Before estimation of expected deaths, each year of data for any mortality "shocks", such as other epidemics or natural disasters, which might not represent long-term mortality trends was observed and removed from the data. In a study were considered all-cause mortality, due to natural causes (after subtraction of external causes) and respiratory system diseases. The trend line of the deaths (weekly historical data 2015-2019) to calculate excess deaths in the period of interest was constructed. Two sets of data were used to excess deaths estimation and their comparison: observed deaths and expected deaths count. The observed deaths are referred to the deaths as registered by SIM

database. Expected deaths are the number of deaths after corrections based on the mortality quality study.

By calculating standard error (SE) and confidence interval (CI) was obtained baseline value, which was the weekly upper limit for expected deaths under normal conditions. Next, was obtained the number of excess deaths for each week by separately subtracting weekly baseline from observed/ expected number of deaths corresponding to the same week of 2020. Negative values, where the observed count fell below baseline, were set to zero. The total number of excess deaths for Paraiba was calculated by summing the excess deaths in each epidemiological week, from January 1, 2020, to December 31, 2020.

The Triple Exponential Smoothing (Holt-Winter Method) function was used to project deaths in 2020 based on historical time series 2015-2019. Two measures were used for analysis– absolute number of excess deaths, and relative measure, P-score. The absolute number of excess deaths is the difference between number of observed and number of projected deaths (baseline):

$$Excess\ deaths_{\ week\ (x)2020} = Observed\ Deaths_{\ week\ (x)2020} - Projected\ Deaths_{week(x)2020}$$

The absolute number of excess deaths provides the measure of scale. However, it's less comparable across the territories due to large differences in populations. If the result was a positive number, the week was marked as having experienced excess mortality. A measure that is more comparable across countries is the P-score, which calculates excess mortality as the percentage difference between the number of deaths in 2020 and the average number of deaths in the same period — week or month — over the years 2015–2019.

$$P-score = \frac{Deaths_{Period\ \#2020} - Average\ Deaths_{Period\ \#2015-2019}}{Average\ Deaths_{Period\#2015-2019}} * 100$$

The study has limitations: the data source considered for the study had presented certain limitations in 2020, such as: preliminary mortality data, registration of suspected cases along with confirmed, limited variables for analysis and disagreements in deaths counts. The proportions of ill-defined causes (ICD) and Garbage Codes were limited by target causes that possibly could be attributed to COVID-19, and not included all ICD and GCs. In this case, the number of misclassified deaths could be even higher. The statistical models for registered deaths correction and calculation of excess mortality could present some acceptable errors.

3 RESULTS

Table 1 summarizes the results of COVID-19 expected deaths estimation for Paraiba after investigation of mortality sources data quality (coverage by application of the General Growth Balance method and completeness by redistribution of ill-defined causes and Garbage Codes).

Table 1 - Total and sex-specific COVID-19 deaths considering observed and expected counts, Paraiba, 2020.

Deaths	**Males**	**Females**	**Total**
Observed	1929	1497	3426
Expected	2530	2177	4707
Difference	601	680	1281
(%)	31.1	45.4	37.4

Sources: Mortality Information System (SIM), 2020

The total number of deaths due COVID-19 in Paraiba for 2020 increased by 37.4% after data quality correction analysis. The percentage was higher for females comparing to males (45.4% vs 31.1%).

Table 2 shows the results of excess deaths (observed and expected) for Paraiba in 2020 with statistical outcomes based on application of historical series average and exponential smoothing function for all-cause deaths, natural causes and deaths due respiratory system diseases.

All-cause mortality. The analysis of all-cause mortality during 2020 pandemic identified 4461 of excess deaths (95%CI, 4174-4816). The percentage difference between deaths in 2020 and the average number of deaths over the years 2015–2019 was 16.5%, P <.0001. After quality data correction, an estimated number of excess deaths was 6702 (95% CI, 6467 – 7009), p- score 25%, P <.0001.

Table 2 - Excess of deaths due COVID-19 for 2020 based on historical 2015-2019 trend for all-cause mortality, natural causes, and respiratory diseases, Paraiba 2020.

	2015-2019 (Baseline)	**2020**	**Excess of deaths**		
	N (95% CI)	N	N (95% CI)	P-score (%)	p-value
Observed deaths					
All-causes	27055 [24732, 29378]	31517	4461 [4174, 4816]	16.5	<.0001
Natural -causes	24177 [23872, 24482]	28576	4399 [4094, 4704]	18.2	<.0001
Resp	3221 [3110, 3332]	6236	3015 [2904, 3126]	93.6	<.0001
Expected deaths[a]					
All-causes	27055 [24732, 29378]	33757	6702 [6467,7009]	24.7	<.0001
Natural-causes	24177 [23872, 24482]	30626	6449 [6144, 6754]	26.7	<.0001
Resp	3221 [3110, 3332]	6678	3457 [3346, 3568]	107.3	<.0001

[a]- deaths after quality data correction by application of General Growth Balance (GGB) method
Legend: Resp- respiratory system diseases, Source: SIM-Mortality Information System, 2020.

Considering the number of observed deaths due COVID-19 for Paraiba in 2020 (Table 1), the excess of deaths probably was in 75% directly impacted by virus (3426 vs 4532).

Natural causes mortality. Analysis of observed deaths due natural causes showed difference in 4399 (95% CI, 4094 -4704, p-score 18.2%, P <.0001). Estimation based on expected counts were higher (p-score 26.7%) than estimates based on observed counts with an increase of excess deaths of approximately 8.5%.

Mortality due to respiratory illness. The exploratory analysis of excess deaths due respiratory diseases in Paraiba during pandemic 2020 identified values that were two-fold higher than baseline for both observed and expected deaths. The difference with 5-year weekly average baseline showed excess of deaths in 93.6% and 107.3%. The statistically significant (P <.0001) excess of deaths in Paraiba due respiratory diseases proved direct influence of COVID-19 on excess mortality in 2020. Figure 1 showed graphic visualization of the magnitude of excess mortality due to all-causes, natural causes and respiratory diseases.

Sex and age-group distribution. Analysis of sex adjusted all-causes, natural causes and respiratory causes distribution showed the same mortality pattern for Paraiba in 2020 as was

seen in previous 5 years (2015-2019): prevalence of males compared with females. Statistically significant excess of deaths was observed both among males and females and was higher for deaths due respiratory diseases (Table 3).

For all-causes, p-score for males was 18.5% observed deaths and 24.1% expected deaths (2723 vs 3551, P<0.001). For females, the difference compared with baseline was 13.6% for observed deaths and 24.7% for expected deaths.

Table 3 - Sex-adjusted excess of observed and expected deaths due all-causes, natural causes and respiratory diseases, Paraiba, 2020

	2015-2019 (Baseline)	**2020**	**Excess of deaths**		
	N (95% CI)	N	N	P-score (%)	p-value
Observed deaths					
All-causes					
Males	14711 [12998, 16423]	17434	2723	18.5	<.0001
Females	12395 [10823, 13966]	14083	1688	13.6	<.0001
Natural causes					
Males	12503 [10924, 14081]	14880	2377	19.0	<.0001
Females	11943 [10401, 13486]	13696	1753	15.4	<.0001
Resp					
Males	1512 [963, 2061]	3360	1848	122.2	<.0001
Females	1691 [1110, 2271]	2876	1185	70.1	<.0001
Expected deaths[a]					

All-causes					
Males	14711 [12998, 16423]	18262	3551	24.1	<.0001
Females	12395 [10823, 13966]	15454	3059	24.7	<.0001
Natural causes					
Males	12503 [10924, 14081]	15587	3084	24.6	<.0001
Females	11943 [10401, 13486]	15024	3081	25.7	<.0001
Resp					
Males	1512 [963, 2061]	3519	2007	132.7	<.0001
Females	1691 [1110, 2271]	3158	1467	86.7	<.0001

[a]- deaths after quality data correction by application of General Growth Balance (GGB) method.
Legend: Resp- respiratory system diseases, Source: SIM-Mortality Information System, 2020.

Analysis of excess mortality for natural causes in terms of the magnitude showed the same tendency as for all-causes. The gap between males and females was less prominent comparing with all-causes, because of external causes subtraction. For males, the difference was in 1174 deaths (19% vs 25%, P<0.001). The highest proportion of exceed deaths was observed for respiratory diseases considering both males and females. For males was notified statistically significant (<0.0001) P-score 122.2% based on observed deaths, which increased in 10% for expected deaths.

Age-adjusted scope of deaths in 2020 as well as for weekly historical baseline showed significant prevalence of individuals 60-years-old and higher for all-causes, natural causes and respiratory diseases (Table 4). However, despite the prevalence of older age group (≥ 60-years- old) in total count of deaths for both baseline and 2020, the higher P-score was notified for group under 60-years-old.

Table 4 - Age-adjusted excess of observed and expected deaths due all-causes, natural causes and respiratory diseases, Paraiba 2020.

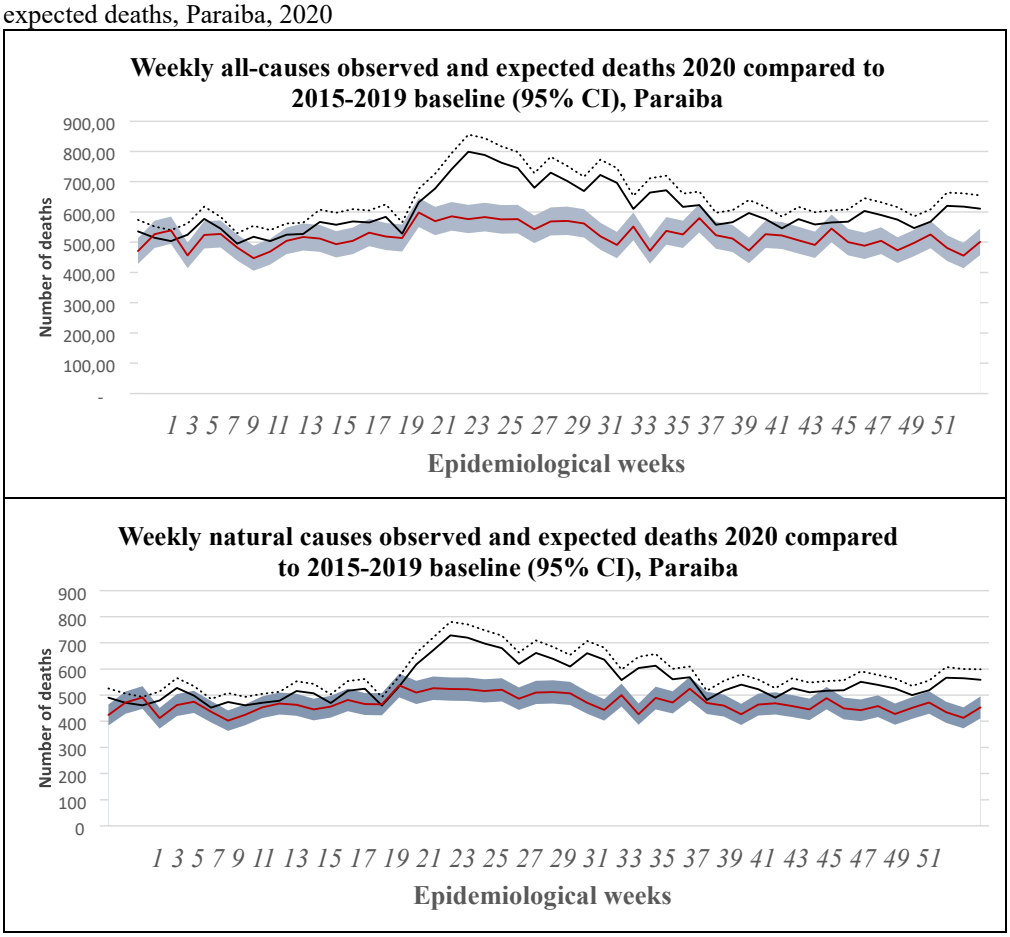
	2015-2019 (Baseline)	**2020**	**Excess of deaths**		
	N (95% CI)	N	N	P-score (%)	p-value
Observed deaths					
All-causes					
<60-years-old	8226 [6946, 9506]	9768	1545	18.7	<.0001
≥60-years-old	18827 [16890, 20764]	21749	2992	15.9	<.0001
Natural causes					
<60-years-old	6069 [4970, 7168]	7678	1609	26.5	<.0001
≥60-years-old	18311 [16401, 20221]	20898	2587	14.1	<.0001
Resp					
<60-years-old	483 [175, 790]	1404	921	190.6	<.0001
≥60-years-old	2717 [1982, 3454]	4832	2115	77.8	<.0001

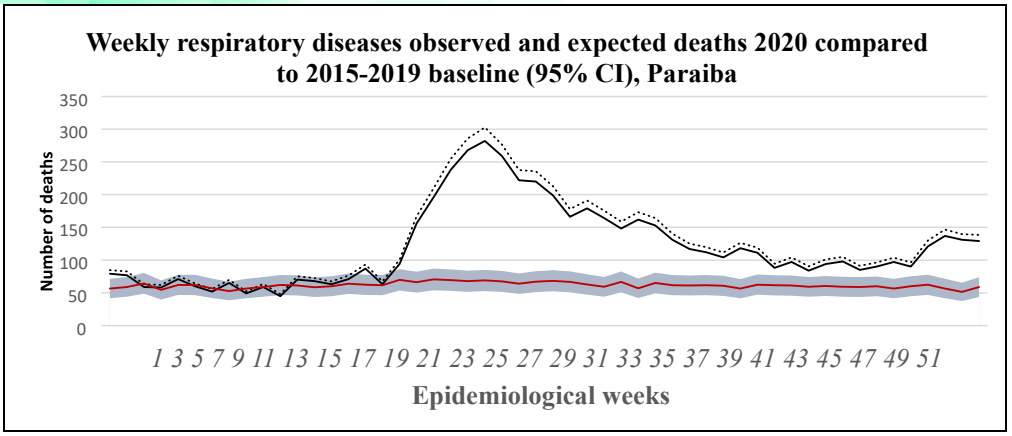
Expected deaths[a]					
All-causes					
<60-years-old	8226 [6946, 9506]	10479	2253	27.3	<.0001
≥60-years-old	18827 [16890, 20764]	23332	4505	23.9	<.0001
Natural causes					
<60-years-old	6069 [4970, 7168]	8240	2171	35.7	<.0001
≥60-years-old	18311 [16401, 20221]	22419	4108	22.4	<.0001
Resp					
<60-years-old	483 [175, 790]	1506	1023	211.8	<.0001
≥60-years-old	2717 [1982, 3454]	5184	2467	90.7	<.0001

[a]- deaths after quality data correction by application of General Growth Balance (GGB) method
Legend: Resp- respiratory system diseases, Source: SIM-Mortality Information System, 2020

For instance, looking at the historical baseline for respiratory diseases, the magnitude of excess deaths for <60-years-old group was at least 3 times higher than was seen in previous 5 years. The number of expected deaths increased for this particular group in 27.3%, 35.7% and 212% (all-causes, natural causes and respiratory diseases deaths, respectively).

Figure 1 - Excess deaths due all-causes, natural causes and respiratory system diseases compared to baseline considering observed and expected deaths, Paraiba, 2020





4 DISCUSSION AND FINAL CONSIDERATIONS

The incompleteness of COVID-19 deaths reporting, untested cases, time lags, overwhelmed health care capacities, among other issues, may create variations in death counts, so they do not represent real magnitude of mortality. Estimation of excess mortality proved to be a more accurate measure of direct and indirect impact of pandemic to population's mortality [8].

The full impact of the 2020 pandemic in Paraiba has been much greater than what is indicated by reported deaths due to COVID-19 alone. The study proved statistically significant excess of deaths in the state for all-cause mortality and natural causes, with approximately 2-fold higher number for respiratory diseases. The quality data correction added significant fractions on top of initially observed deaths which makes the scope of exceeding deaths in Paraiba even larger.

Even though confirmed COVID-19 deaths present a higher difference in excess deaths compared to historical baseline, about one-fourth of the excess deaths have been attributed to indirect impact of pandemic. It is likely that some of these deaths were COVID-19 cases that were miscoded or misdiagnosed. Many studies ultimately show that around one-third of the excess deaths that occurred at different times throughout the COVID-19 pandemic are not assigned to virus [23].

Analysis of age and sex-adjusted deaths in Paraiba during 2020 pandemic, proved statistically significant excess of deaths in all observed demographic characteristics: males and females, group under 60-years-old and 60-years-old and higher for all-cause mortality, natural causes and respiratory diseases. The historical trend of the male's prevalence among all deaths had a larger magnitude during 2020 pandemic.

Despite the significant prevalence of total number of deaths in group ≥60-years-old, the proportion of excess deaths was higher for group under 60-years-old. It proves that not only elderly people were affected by COVID-19 pandemic, but younger people also died and probably were underreported or misdiagnosed.

Northeast region of Brazil, including Paraiba, had shown recent improvements in a quality of vital events registration. However, the studies of the mortality information quality in region and

Paraiba are still severely limited [4,5]. This study has demonstrated that any analysis of mortality and excess mortality requires understanding of data quality issues. The analysis shown significant number of underreported deaths due COVID-19 after the General Growth Balance method application. One of the main contributions of this study is that for excess mortality estimation was considered mortality data quality issues which proved that deaths count released by Brazilian official mortality system do not fully represent the real burden of pandemic.

5 CONCLUSIONS

In conclusion, there is strong evidence that the full impact of the 2020 pandemic in Paraiba has been much greater than what is indicated by reported deaths due to COVID-19 alone. It is noteworthy that the methodology applied to the state of Paraiba can be replicated for any Brazilian state.

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CHAPTER
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Teaching work during the COVID-19 pandemic challenges and learning

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ABSTRACT
During the COVID-19 pandemic outbreak, several changes have become necessary in the world of work, especially regarding the modalities and spaces of its realization. Due to the need for social isolation to minimize the spread of the virus and the consequent contamination of the mass population, the implementation of remote work performed at home, mediated by digital technologies - the so-called home office - has been implemented in several professional areas. In this way, the public and external space, in which productive and salaried work takes place, migrated to the private space, in which unpaid work is performed and dedicated to the reproduction of the conditions of existence, domestic work. Two distinct environments, in which the sexual division of labor and the social relations of sex/gender develop, have been transformed into one. Specifically in the teaching work in Basic Education, despite its already proclaimed precariousness, devaluation, and feminization, the implementation of Emergency Remote Teaching (ERE) added to the overload of the teacher-mother-wife-housewife woman with the realization of a distance educational practice, mediated by unusual digital technologies in public schools, as well as the unforeseen intertwining of their public and domestic work spaces. Unveiling how this moment was experienced by the teachers, its impacts, challenges and difficulties, strategies of resistance and coping, in the face of multiple and simultaneous works, the unusual transformation of their public and private spaces into one, and the compulsory need to use Digital Information and Communication Technologies (DICT) in the educational process, is what this article addresses. It seeks to understand and rethink the training and teaching work in the face of unforeseen situations, the compulsory and unplanned use of digital technologies as tools for teaching-learning, and the sexual division of the domestic work of teachers. The theoretical-empirical research had a qualitative approach, whose subjects are teachers of Basic Education who work in Cycles I and II, of the Municipal Public Education Network of Belo Horizonte, who were interviewed in person using a semi-structured script. Subsequently, excerpts from the interviewees' speeches, which help to answer the research questions, were selected and analyzed in the light of the theories on Teacher Education and Work and Sexual Division of Labor.

Keywords: Teaching work, emergency remote teaching, home office, sexual division of labor.

1 INTRODUCTION

Conducted in a municipal school in the Metropolitan Region of Belo Horizonte, this research sought to unveil the adversities faced by Basic Education teachers during the Emergency Remote Teaching (ERE), implemented during the Covid-19 pandemic. Knowing how they experienced and dealt with the impacts caused by social isolation, imposed as one of the measures to contain the disease, during the most critical period of the pandemic caused by SARS-Cov 2, is what motivated this research. It is also of interest to investigate the obstacles found for the development of remote work and what strategies were used by these teachers to overcome the obstacles, especially those that arose because the teaching work migrated to the home environment and required them to reconcile domestic

tasks with teaching activities. All this added to the difficulties arising from the adoption of digital information and communication technologies, the TDIC's, for the development of teaching methodologies.

Despite all the difficulties faced by the entire population during the pandemic and with the compulsory implementation of the ERE for teachers, students (and their families) and for the entire school community, the impacts that affected more specifically the lives of women teachers of Cycles I and II of the Municipal Public Education Network of Belo Horizonte is the excerpt proposed in this article.

The choice of this public was because education in these segments is mostly in charge of precarious, poorly paid women, who need to accumulate multiple working hours in different schools and conciliation with domestic work. The objective is to understand how much and how this overload, combined with the difficulties related to the use of digital technologies in educational practice, was added to another challenge: to transform the domestic space into the classroom, working with children in the range of 6 to 11 years of age, especially students from the lower classes.

To carry out this investigation, four teachers of Basic Education were invited to participate in the study, answering the following questions: How did they experience the moment of the health crisis? What are the impacts on educational practice, health, family relationships and sociability of women teachers? How did you develop the teaching-learning process at a distance, mediated by digital technologies? How did the sexual division of domestic work come about in the context of the pandemic and the ERE? What difficulties did they have? What strategies did they use in the face of this unpredictable situation?

In summary, we sought to understand how these women experienced the transformation of the domestic environment into a professional space when the work performed in the classroom migrated to the home environment. And finally, how they dealt with the TDIC (Digital Information and Communication Technologies) and the other challenges in their practice and the impacts on their health and sociability.

When it comes to domestic work, there is an intrinsic relevance in the sexuation of the research subjects who approach work, and the necessary interlocution of the productive and reproductive work of the female teacher, especially in the *home office* modality during social isolation and ERE. The unusual situation caused by the pandemic and the consequent social distancing invites us to rethink teacher training, particularly concerning the acquisition of skills for the use of DIDs in educational practice. It also leads to a reflection on the unequal division of domestic work between men and women – even more evident during the ERE – and all the impacts that the teaching work developed in the home environment caused in the health, sociability and personal and professional life of Basic

Education teachers. It is hoped that the reflections raised will contribute to the rethinking of teacher practice and training in unpredictable scenarios, especially about basic education.

2 CONTEXTUALIZING THE PROBLEM

On December 31, 2019, the World Health Organization (WHO) was alerted to several cases of pneumonia in Wuhan City, Hubei Province, People's Republic of China. It was a new strain of coronavirus that had not been identified before in humans: SARS-Cov 2. From there, the epidemic spread around the world, becoming a pandemic with immeasurable reach and impacts around the world.

To stop the spread of the deadly virus, social isolation measures have been taken by governments in several countries. Among these measures was the implementation of remote work, performed in the home office system[1] for all activities compatible with remote work, and thus several changes became necessary in the world of work, especially concerning the modalities and spaces of its realization, as pointed out by Cambi *et al*. (2020):

> Labor relations have also changed surprisingly, the difficulty has paved the way for Brazilian creativity. Work meetings were not postponed, a new way to promote them was discovered, and commerce began to sell online, with the right to home delivery, never before have so many applications appeared, with functions of the most diverse, science is in a hurry towards progress. Yes, people are physically less free, but human inventiveness has never been more liberated. (p. 10).

In the area of teaching, Emergency Remote Teaching (ERE) was implemented. Thus, the work performed in the public and external space was migrated to the private space, in which domestic work is already performed, an unpaid activity dedicated to the reproduction of the conditions of existence. Thus, two distinct environments, in which the sexual division of labor develops, have been transformed into one.

According to Cavallini (2020), "The shift to remote work has allowed many companies to continue operating and ensure the health and safety of their employees." However, the work ended up invading the private lives of workers in *a home office,* which caused a significant increase in stress and the consequent impairment of mental health. (CAVALLINI, 2020).

In Brazil, from the spread of the virus and the disease that caused high rates of contamination and deaths, social isolation was an imposition, and *home office* work became necessary and mandatory in several segments of the economy. In addition to the anxiety and fear caused by the pandemic, the lack of knowledge of the disease, the lack of vaccines and the high numbers of deaths, the workers experienced, overnight, all their practices and routines changed in their form and place of

[1]Home office.

accomplishment. In theory, in addition to getting rid of the virus contamination, the work done at home, in the view of most people, would provide more hours of sleep, no mishaps with daily commutes and an opportunity to spend more time with family. In practice, however, what was experienced was the suffering caused by the lack of socialization, changes in routine and wear and tear resulting from work overload.

The Linkedin platform, the world's largest social network dedicated to the professional field, in a survey of people's behavior during the pandemic, found that 62% became more anxious and stressed about work than they were before the introduction of remote activities.

Janone (2021) shows in her study that 72% of young professionals believe the pandemic has impaired learning behavioral skills such as communication and emotional intelligence. This scenario has also increased the demand for the treatment of psychic disorders, according to research conducted by the Brazilian Association of Psychiatry – ABO (2021).

In another perspective, a large contingent of workers – particularly health professionals – could not stay at home because of the type of activities they perform. Another group also had to work in person, even at the peak of the pandemic, for reasons of maintaining income for survival. This is the case of many domestic workers and other professionals who make up a reality highly crossed not only by determinants of gender but also of social class and race.

It is worth noting that the United Nations Population Fund (UNFPA), the international development agency of the United Nations (UN), has drawn attention to the intensification of gender inequality during the pandemic. Responsible for addressing population issues, the agency produced the bulletin titled "Gender equality, combating gender-based violence (gender-based violence) and prevention, protection and response to the coronavirus (COVID-19)" in 2020, which warns of the disparity between the impacts of the Covid-19 pandemic on women's lives compared to those on men's lives. This document also raised issues such as ensuring access to sexual and reproductive health services and care, unpaid work, and domestic violence, among other sensitive issues.

The pandemic has shown that working *from home* has required much more commitment from women. According to Datafolha survey data[2], released in the report "Research points out that household chores make *home office* difficult for 64.5% of women", authored by Fernanda Mena and published in 2020, 57% of women who started working remotely said they had accumulated most of the domestic care. Among men, that percentage drops to 21 percent.

According to data for 2019, collected by the Brazilian Institute of Geography and Statistics (IBGE), women dedicate, on average, 18.5 hours per week to household chores and care for people

[2]Datafolha is a research institute of the Folha Group, a group of affiliated companies that also includes the newspaper Folha de S.Paulo.

such as children and the elderly. The average for men is almost half – only 10.3 hours a week are spent on these activities. Confirming this gender disparity in the *home office*, a survey by Workana (2022) shows that 31.3% of Latin American women take care of their children while working. Among Brazilian women, this percentage rises to almost 50%. Among Brazilian men, on the other hand, only 11.1% said they accumulated both tasks. Home office *work* thus exacerbates the multiple and simultaneous works performed by women (ROSA, 2022). Soon, what was already a fact verified in society becomes even more evident.

3 THE WORK TEACHER DURING THE PANDEMIC

As the teaching work in basic education, is already so precarious, devalued and feminized, the implementation of Emergency Remote Teaching (ERE) caused an overload of work for the woman who is a teacher-mother-wife-housewife. The realization of distance educational practice, mediated by unusual digital technologies in public schools, as well as the unforeseen intertwining of their public and domestic work spaces, generated a great strain for education professionals. After a long period of school closures and with no face-to-face activities, the implementation of ERE as a mitigating measure highlighted many gaps related to technological-digital skills. And, concerning the acquisition of these skills, Ribeiro (2013) states that, according to different studies, digital inequalities have a strong relationship with income criteria and social markers of difference, such as race, gender and age.

Also considering the different realities of students who, according to Oliveira (2022, p. 10),

> It is possible to declare that the emergency remote teaching format exposes the reality of students who encounter difficulties in the way of accessing classes, because not everyone has access to the internet and a mobile device, thus making it impossible for them to have the opportunity to follow the progress of classes online. (OLIVE TREE; OLIVEIRA, 2022, p. 10).

In turn, the teachers,

> (...) who have been having a "heavier workload", seek alternatives to bring these students the planned activities, and one of them is that schools have started to make printed materials available so that these students do not fall behind about the contents programmed by the school. (SILVA, BEZERRA AND ADRIÃO, 2020 *apud* OLIVEIRA; OLIVEIRA, 2022, p. 10).

The difficulty of accessing the internet was also one of the factors that hindered learning during emergency remote teaching and was a point of discussion among several researchers and scholars. This observed aspect, which came to be called "digital inequalities", was present mainly in public schools and was responsible for most of the obstacles faced by students, families and teachers during the ERE.

According to Ribeiro, Parreiras and Macedo (2020), cited by Oliveira and Oliveira (2022), digital inequalities have a strong correlation with income criteria:

> Unfortunately, the lack of access to technology is a reality mainly for public school students, since they include students and families without financial conditions to pay for the purchase of electronic equipment or access to the internet. According to this fact, the institutions sought ways so that these students were not harmed. Printed materials were made available in the schools and those responsible for each student were in charge of seeking and returning these materials with the resolutions of the activities (p.17).

About ERE, it is worth mentioning what Behar (2020) reminds us when she establishes the difference between Emergency Remote Teaching and Distance Education, which according to her cannot be understood as synonyms, because,

> The term "remote" means distant in space and refers to a geographical distance. Teaching is considered remote because teachers and students are barred by decree from attending educational institutions to prevent the spread of the virus. It is an emergency because overnight the pedagogical planning for the 2020 school year had to be shelved.

Cruz, Coelho and Ferreira (2021) also make consideration about the difficulties faced by most teachers and students, especially in the public school system, when they are forced, overnight, to transform their routines and planning:

> First, on the one hand, teachers immersed in a context of difficulties to work remotely, without training for planning and carrying out activities only with technological devices that require knowledge for handling. A significant portion does not have a quality broadband connection and adequate equipment that provides innovative and active participation in their pedagogical practice, a posture so requested of them in this context of social distancing. Allied to all these conjunctures, a situation that cannot be ignored: all are in their respective homes, with a new teaching routine in times of pandemic: knowledge and remote teaching established for the whole family, due to the measures adopted by the states and municipalities to maintain social distancing. (pp. 1010-1011).

On an emergency basis, the system having been implemented without prior planning generated several reactions in the school community, such as anxiety, fear and stress. It is a fact that the process forced the teaching work to reinvent itself since it required the teacher to change his way of teaching by imperatively resorting to Digital Information and Communication Technologies (TDIC). (GROSSI; MINODA; FONSECA, 2022).

It is noteworthy that remote teaching is not exactly distance education (EAD), because, although teachers and students relate through virtual learning environments (VLE), it cannot be said that there was a previous configuration for the curricular contents to be taught in such a way. Therefore, the ERE only uses the same technological resources used in distance learning, in an attempt to reproduce the routine of the classroom in face-to-face teaching. (GROSSI; MINODA; FONSECA, 2022).

The continuing education and the instruments provided by the education secretariats did not efficiently attend to teachers and education professionals so that they could perform with tranquility the pedagogical work in the emergency remote format.

The challenges made the faculty seek communication media considering them as teaching strategies and means of social interaction. Daily hours dedicated to living broadcasts are highlighted, aiming at the most qualified training for the exercise, the execution of emergency remote work. (TROITINHO et al., 2021).

In this scenario, the so-called *home office* brought an overload to education professionals, especially teachers, who were forced to reconcile domestic work and teaching, all in the same space, continuously and simultaneously (TROITINHO, et al., 2021). "The pandemic caused by covid-19 has taken these professionals by surprise. Few had the opportunity or knowledge to work with distance education in ancient times." (ANDRADE, 2020, p. 36). However, the use of technology has become indispensable in this new reality. (ANDRADE, 2020).

Therefore, the covid-19 pandemic brought limitations, but there was no other option to ensure the continuity of classes, since:

> The school is one of the social spaces in which there are greater exchanges and mobilities of subjects of different age groups, therefore, it represents a space of a greater probability of mass contamination – which indicates that it is one of the last spaces to be reopened in countries that have minimally controlled the rate of contamination of the new coronavirus. (ARRUDA, 2020, p. 263).

Brazil differs from other countries due to the little experience in the modality of distance learning in basic education, so it had to develop strategies so that the educational system continued to function during the period of social isolation, to allow, even minimally, the school conviviality, in a virtual way. (TROITINHO, et al., 2021). New functions were included in the daily lives of teachers, who had to assimilate and learn to deal with technologies quickly (ANDRADE, 2020). "Now their classes are synchronous and asynchronous, their work is now at home and the teacher had to adapt to receive their students virtually" (ANDRADE, 2020, p. 24).

In addition to the difficulties of access to the internet and other issues, the ERE has brought out pedagogical weaknesses, such as the lack of relevant professional training for the execution of virtual education. (TROITINHO et al., 2021).

For teachers, the distancing from the school required them to have more time to prepare classes, correct the assignments, and meet each student individually, virtually. (TROITINHO et al., 2021). The routine consisted of "recording videos, producing slides and material to be distributed to those students who do not have access to the internet and also do not have cell phones, computers or tablets." (ANDRADE, 2020, p.33).

This unexpected educational scenario for the entire school community required major and radical changes in the use of digital technologies since most did not know how to use technological resources deftly and when they use it, it is for other purposes. For the teachers, it was even more challenging, because they needed to be creative in the use of technological resources, which were previously used only in communication, and now be explored as effective pedagogical resources to maintain the teaching-learning process in an interesting way for the students. (TROITINHO et al., 2021).

On this, Silva and Camargo (2015) warn that it is complicated to integrate all technological resources overnight, schools would need a transition plan, so that this change could be carried out gradually. After all, inserting digital technologies in schools requires strategic planning, rethinking learning spaces, providing training to teachers and involving students and families. In this scenario, the role of all those involved in educational practices has changed, especially the teacher, who is the mediator of the teaching and learning process. (p. 590).

Some studies also demonstrate the excessive stress experienced by many teachers during the experience with the ERE, such as "(...) the experience of unpleasant and negative emotions, such as anger, anxiety, tension, frustration or depression, resulting from some aspect of his work as a teacher" (KYRIACOU, 2001, p. 28).

> Studies on teacher stress have pointed out some important stressors in the school context, many of which may be exacerbated in the current context of remote work in the pandemic: dealing with class and Anxiety, negative affect and stress of teachers in remote activity during the COVID-19 pandemic maintain discipline; apply the tasks; organize working groups; help children with behavioral problems; communicate concepts and prepare resources for lessons; face the lack of resources and equipment. Other important stressors are excessive responsibility for students; little state support and time pressures at school; the largest number of classes; high workload; the low motivation of the students; insufficient parental involvement; and joint pressure from parents, teachers and students (Silveira et al., 2014). Makarenko and Andrews (2017) also point out that teachers who work with online instruction are more subject to feelings of isolation and loneliness, producing greater stress. Another important clue to the possible negative impact of the sudden transition to remote pedagogical work during the pandemic can be found in research on digital work and precariousness (Antunes, 2010; Antunes and Praun, 2015; Berardi, 2009; Filgueiras and Antunes, 2020). (TROITINHO et al., 2021, p. 4-5).

It is valid to consider in this context the unquestionable sexual division of domestic, reproductive and affective work, because women, having conquered workspaces outside the home, ended up accumulating double shifts, since they are responsible for domestic tasks, including the education of their children. This means that in the field of teaching, the teachers who worked in the ERE accumulated even greater stress than the male teachers.

In addition to these accumulated functions, teachers needed to help their children who are also studying at home. Thus, it is possible to consider that remote work contributed to the psychological

suffering of teachers, especially teachers. For Troitinho (et. al, 2021), the reasons are several and range from loneliness and isolation to the difficulty in exchanging ideas and experiences with colleagues, factors arising from the *home office.*

Moll, Souza and Almeida (2022) acknowledge that teachers during the pandemic period judged their work "as a challenging task, above their regular capacities, which seems to have caused fear, but which they faced with love, dedication and empathy", as can be seen in the following report:

> Fear that paralyzes and causes anxiety "a work above our forces", with the functional effect of "determining behaviors related to the object", that is, when they feel fear and helplessness, do not seek resources in their group, which led us to justify the absence of references to solidarity; the intensification of relationships of coexistence and sharing of experience could have increased resilience; • Fear that energizes and sets out to face the challenges to account for their pedagogical work, even if with difficulties. (MOLL; SHAH; ALMEIDA, 2022, p. 189).

And in the face of this new picture, the authors warn that:

> [...] Without considering the difficulties expressed by teachers as their cries for help, establishing control processes will not help to develop the improvement of teaching work. [...] Welcoming through encouragement can lead you to cross the river, to cross the pandemic save your students Control, and ignorance of your feelings will lead you to ictus, to the [3]the collapse of your teaching action. The Departments of Education are in a moment of choice. (MOLL; SHAH; ALMEIDA, 2022, p. 190).

Targeted studies such as those conducted by the Study Group on Educational Policy and Teaching Work (Gestrado), of the Federal University of Minas Gerais, showed that the experience of teachers with the realization of remote classes advanced in the stages of Basic Education, despite the difficulty that a large part faced concerning the use of new digital technologies.

From another perspective, "this time of social isolation and remote teaching made it possible to discover how to innovate technological and pedagogical experiences, generating irreversible changes. The school and the way of teaching will never be the same", affirm Grossi, Minoda and Fonseca (2022, p. 599) who also bet that "(...) technological resources will no longer be a barrier that arouses fear or challenge, but a possibility to enhance learning and make it more exciting, stimulating and meaningful."

4 AND WHAT DO THE TEACHERS INTERVIEWED SAY?

The field research was conducted in the first semester of 2023 and data collection took place with the locus of the Municipal Public Education Network of Belo Horizonte – MG, whose research subjects were four teachers of Basic Education, working in Cycles I and II, who were interviewed in person, having as a research instrument a script of questions.

[3] Medication is used to treat congestive heart failure (heart failure).

As recommended by the Research Ethics Committee of CEFET-MG, the names of the interviewees were preserved, being replaced by fictitious names, namely: Ipê, Rosa, Orquídea and Margarida. The analysis of the interviewees' responses was divided into four categories: (i) impacts of the pandemic, social isolation and Emergency Remote Teaching on health, sociability and teaching practice; (ii) Transformation of private space into the classroom and the sexual division of domestic work; (iii) Use of digital technology; (iv) coping and resistance strategies.

Asked how they experienced the pandemic, social isolation and ERE, and how this moment and new way of working affected their health, their physical and mental health and their teaching work, the teachers were empathetic: "Health? It affected a lot. I had plantar fasciitis and shoulder pain" (Margarida, 2023).

Margarida's complaints show the result of an ante-ergonomic work position, always sitting in front of the computer, and without a suitable workstation. Without prior planning and with meager resources, the bedroom, dining room and even the kitchen became classrooms; Common benches, stools, and chairs were used throughout the class time.

Rosa also complains of health problems arising from the ERE:

> Posture was one thing that hurt the most during this process. That then, I started to have a hemorrhoid problem something that I never had, I went to a spine problem, more problems of dryness of vision ... I have a tendency, in front of the computer, to blink less when it's in front of the screen. All of this is a consequence of the pandemic because I've never had any of these health problems... "But because I sat for a lot of hours and I also started to work harder." (ROSE, 2023).

When it comes to sociability, complaints also occurred: "This issue of pandemic and remote classes has increased the workload too much, because the teacher already works too much, if he leaves, he has no social life, no family life. And without leaving home then? Folded work and no laser" (ROSA, 2023).

The use of digital technologies was also an immense challenge to overcome by them. Lack of ability for digital work, limited assistance from the city regarding equipment and data packages, and difficulty of students, among others, were the worst impacts evidenced. Ipê (2023) vents when he says:

> To this day I get beaten up with a computer. I had too much difficulty. I think, also, that anger you get at not having the support of the city. Throw that at you: turn around! I like the technology, but I'm still from the time of the paper, I like the contact with the child, the contact with the person. That messed up a lot. I got too caught up in the bill! I was shaking my head; I hired a guy who taught me. But it felt like I was locked into technology. I grieved, I cried, I suffered to teach.

When it comes to domestic work simultaneously with the teaching practice at home, the teachers also bring strong reports: "The issue of spaces, it was terrible ... I couldn't organize myself that way.

When you're working at home you end up not organizing, you have lunch out of hours, everything is a mess" (ROSA, 2023). "It was pretty complicated. So much so that at the time I ended up setting up an office in my room so I could work. Joining home with the school was not easy. My husband complained a lot about the lack of privacy" (Ipê, 2023). "Because the house has become a real office. While my daughter stayed in the living room I worked in the bedroom. And, there was stuff sprawled all over the house. So, I didn't know, I couldn't tell the difference between home and workplace. It's not easy" (Orchid, 2023). "It happens like this, while we prepare lunch, we help the child in his exercises and in the time of washing the clothes, while the machine works you prepare the class" (Margarida, 2023).

But it's not just complaints that teachers have experienced through the pandemic. There are also reports of "unexpected help" from the husband in domestic activities, in overcoming the difficulties with the use of digital technologies with the help of colleagues and the students themselves, of the rediscovery of an eternal student, even being a teacher, of the greater closeness with the family and of the love for teaching. "My husband helped me a lot, he saw my difficulty and my rush and took care of the house while I worked" (Ros, 2023)

> I was going to go crazy inside the house not knowing what to do. So, I got a very good person who I talked to her on the phone and she took me by the hands. And then it was teaching me, it was helping me. Today I know, thus, very good with digital technology in education (Orquídea, 2023)

> The big lesson is that we need people. And, it's no wonder I chose this profession. I need to be surrounded by people. The pandemic has shown that we need people and has also taught us that we need to recycle as professionals. Sometimes, we settle for various issues and end up not investing in their training and the secretariat should give this support. (Margaret, 2023)

Finally, as Rosa (2023) summarizes, "The pandemic has taught us to have resilience, to live with worry, stress, and fear of death. Being resilient to deal with the new and the need for unity and partnership."

5 FINAL CONSIDERATIONS

Because they are partial results of a master's research, the findings of the study, briefly reported in this article, do not exhaust all the possibilities of interpretation and reflection about the experience of the teachers interviewed regarding how they experienced the ERE during the social isolation of the pandemic.

However, although incipient, the study demonstrates the different nuances of the challenges suffered by them in this unusual moment.

The physical and mental health of the teachers was affected severely. Complaints of headaches, back, back problems, hemorrhoids and other diseases are part of the reports. Also, anxiety and depression, so common among teachers, were raised to maximum power.

The challenges and difficulties in the use of digital technologies in educational practice alert to the low quality in the initial and continuing training of teachers of basic education and to the lack of public policies and investments of the public power in schools and teacher qualification.

The use of one's own home as a classroom environment denotes how spaces and territories translate meanings and a sense of belonging. Without a prediction, consent, planning and choice the junction of these environments and only one brings anguish, lack of privacy, and evidence, even more, the problem of the social class experienced by the less paid teachers.

The compulsory imposition of domestic work on women has been exacerbated during the pandemic and social isolation. Although some companions have been supportive in the division of tasks, it is evident that the boundaries of this unequal division of care work between the sexes remain.

However, there were many learnings from this difficult time. The certainty of incompleteness, paraphrasing Paulo Freire (1996), was affirmed by several interviewees when they reported the need for constant learning, updating and investment in continuing education. The appreciation of life and solidarity between people to overcome themselves, from the most serious problems to the simplest things, such as giving a remote class, for example. The love for teaching that crosses any obstacle and overcomes all the challenges and the certainty of the correct choice for the teaching profession, is part of the life of these teachers who faced all the difficulties to give the best to their students, even at a distance, even when they needed help. This is priceless!

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CHAPTER
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Analysis of cases of deaths from covid-19 in the state of Paraná: A cross-sectional study

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ABSTRACT
Introduction: After the first cases of COVID-19 emerged, we realized that some groups of people were more affected than others. When we analyze the cases of the disease and deaths, the literature reports that there is a higher incidence of the disease in the adult population, but the lethality is higher in the elderly. Objective: To analyze the cases of deaths from COVID-19 in the State of Paraná. Method: This is a descriptive, cross-sectional, and retrospective study, with a quantitative approach, based on secondary data in the public domain, made available by the State Health Secretariat of the State of Paraná (SESA-PR), from March 2020 to March 2021. Results: The State of Paraná reported 16,571 cases of deaths from COVID-19, meaning that 2.1% of the cases, over 18 years of age, notified with the disease, had a negative outcome. The disease was more lethal in the elderly (74.6%) than in the adult population (25.3%). When we stratified the deaths of adults and elderly by sex, we observed that in both adults (61.8%) and the elderly (56.8%) the highest number of deaths was in men, compared to adult women (38.1%) and elderly women (43.1%). However, when we stratified the number of cases of deaths by age group and sex in the adult and elderly population, the number of deaths was higher in older men, in the age group between 41 and 59 years, about 80.9% of deaths. In the elderly population, the highest number of deaths also occurred in the male elderly, aged between 70 and 79 years, representing about 36.8% of the deaths. Final considerations: The results of the study suggest that age and gender are variables that may interfere in the establishment of risk groups for the disease and may also be related to different outcomes, especially death. Other results show that when we analyze the distribution of cases of the disease and deaths by age group, in Brazil and worldwide, there is evidence that there is a higher incidence of the disease in the adult population, however, the lethality is higher in the elderly population. Although COVID-19 is less lethal compared to other epidemics caused by the coronavirus, its power of transmissibility is much higher affecting mainly the elderly, men, and those with comorbidities, the findings in this study also show the increase in deaths in men when compared to what was observed in women, which are similar to some literature.

Keywords: Elderly, men, COVID-19, death records.

1 INTRODUCTION

At the end of the year 2019 in the city of Wuhan, in Hubei province, People's Republic of China the first cases of pneumonia of unknown origin were identified, after some investigations began to suspect a disease of zoonotic origin since the first confirmed cases were of regulars and workers of the wholesale seafood market of the region. [8,22] Scientifically the disease has been classified as an

infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), its transmission is potentially severe and of high distribution, the most common symptoms may include: cough, difficulty breathing, sore throats, fever, and other clinical manifestations. [8.9]

The disease is highly contagious, it can be transmitted in various ways, from person to person in confirmed cases, through respiratory droplets produced and excreted during coughing, sneezing, speech, and contaminated objects and surfaces such as cell phones, doorknobs, tables, and among others, in addition, another form of transmission is by asymptomatic or mildly symptomatic people. [5.19]

Faced with this high transmissibility, on January 30, 2020, the World Health Organization (WHO) declares an epidemic of COVID-19 in China, characterized as a Public Health Emergency of International Importance (PHEIC), but only on March 11, 2020, that the WHO changed the status of the disease to pandemic. [9.13]

In Brazil the first case of the disease was registered on February 26, 2020, it was an elderly resident in the city of São Paulo, with a history of travel to Italy, but the first case of death in the country was recorded on March 17, 2020, and it was an elderly person also living in São Paulo, with a history of diabetes and hypertension, but no record of travel abroad. [7.23] In the State of Paraná, the first case of COVID-19 was recorded on March 17, 2020, and the first death was reported after 10 days. [13th]

After the records of the first cases of COVID-19, several actions were implemented to contain and mitigate the advance of the disease, however, the measures were not enough to prevent deaths from COVID-19, in addition to the losses due to death the pandemic also brought certain concerns to the mental health of the population, causing psychological and social disturbances that affect the whole society, be it children, adolescents, adults and the elderly, at different levels of intensity. [2,9,16]

In this epidemiological context, as of October 18, 2020, 39,596,858 cases diagnosed with COVID-19 and 1,107,374 deaths have been recorded worldwide. In the same period, 5,200,300 confirmed cases of the disease and 163,214 deaths were recorded in Brazil, and 197,444 confirmed cases and 4,875 deaths were reported in the State of Paraná. [5]

Given the severity and rapid proliferation of the disease, it was noticed that some groups of people were more vulnerable to the disease to the detriment of others. The elderly, for example, are in the group most vulnerable to developing the various complications arising from the new coronavirus. The cases of deaths in the elderly have been increasing since its emergence. [7,22,29] In the countries that faced the initial epidemic, the overall mortality rate was approximately 3%, however, this may change with advancing age. In children and young people, the number of deaths does not reach 1%. In contrast,

in the elderly over 70 years the deaths reached 8%, and in the elderly over 80 years this number rose to almost 15%. [6.15]

There are reports in the literature that mortality may be higher when the disease is associated with risk factors such as severe lymphopenia, high levels of C-reactive protein that is correlated with the severity of hypoxemia, male gender, race/skin color, low socioeconomic status, diabetes mellitus (DM), arterial hypertension (SAH), cancer and older age (≥60 years), where older age groups tend to have a higher proportion of comorbidities than young people. However, these factors can be minimized, depending on the characteristics of the population and health services, so more studies are needed that may be useful to know the local realities and subsidize health actions based on these realities. [1,10,24]

When analyzing the distribution of cases of the disease and deaths by age group, in Brazil, and in the world, it is observed that there is a higher incidence of the disease in the adult population, however, the lethality is higher in the elderly population. [3] In a study conducted in Brazil, data indicated that as of June 3, 2020, 35,126 elderly people had died, corresponding to 71% of the total deaths from COVID-19 in the same period, associated with at least one risk factor. [26th]

In another study conducted on May 25, 2020, they reported that the highest proportion of cases and deaths in the elderly was observed in the states of Pará (22.36%) and Rio Grande do Sul (84.44%), and the lowest proportions, recorded in the states of Bahia (3.90%) and Amazonas (37.66%). [4]

Although COVID-19 is a globally known and studied disease, and scientific studies have made some progress on the coronavirus, there are still many gaps in the scientific world, that is, there are few studies that talk about the outcomes of the disease, especially about the epidemiological profile of cases and deaths, so these gaps need to be studied and unraveled. [28th]

It is known that COVID-19 has made many victims throughout the Brazilian state, however, we do not know for sure what the impact of the disease is on the people of Paraná, more specifically on the cases of deaths. In this sense, it is important to know the epidemiological profile of deaths, which is under construction, because every day new cases of death are reported, to make the population aware of the potential deleterious effect of the disease. To this end, the study aimed to analyze the cases of deaths from COVID-19 in the State of Paraná.

2 METHOD

This is a descriptive, cross-sectional, and retrospective study with a quantitative approach, carried out through documentary analysis of secondary and public domain databases, made available by the State Health Secretariat of the State of Paraná (SESA-PR), from March 2020 to March 2021.

As inclusion criteria, data referring to people over 18 years of age, grouped into two categories: adults (18 to 59 years old) and elderly people over 60 years old, living in the State of Paraná and diagnosed with COVID-19, were included in the study. Non-residents of the State of Paraná were excluded from the study and incomplete and/or incorrect data were discarded.

Data collection was performed by an investigator, considering the following variables gender, age group, city of residence, onset of symptoms, date of death, and number of deaths. The searches for the data were made by consulting the Coronavirus Epidemiological Report Bulletin (COVID-19) in CSV format, available at the link https://www.saude.pr.gov.br/Pagina/Coronavirus-COVID-19. In all, in this period, 781,625 confirmed cases of COVID-19 were reported in Paraná, these cases come from 401 cities in Paraná.

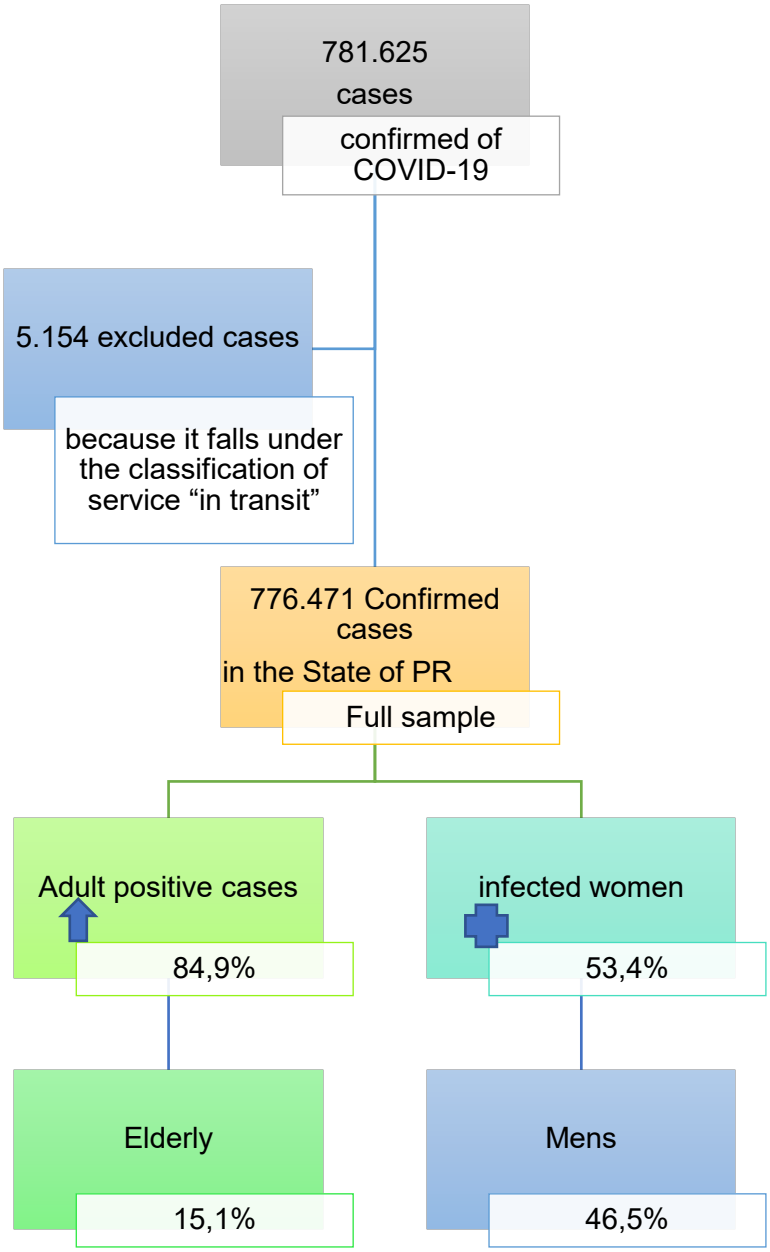
The data used in the research were tabulated in a spreadsheet in the Microsoft Office Excel® version 2019 program. These data were analyzed using frequency. From the tabulation, the program's filters were used to obtain the confirmed cases of COVID-19 in adults and the elderly.

3 RESULTS

The results obtained in this study were performed through the documental analysis of confirmed cases and deaths, using the data provided by SESA-PR in the period from March 2020 to March 2021.

The flowchart of confirmed cases is shown in Figure 1.

Figure 1 - Flowchart of study participants confirmed and discarded cases of COVID-19 in the State of Paraná, 2021.



Source: Coronavirus Epidemiological Report Bulletin – SESA - PR (2020 to 2021)

Regarding deaths, the data show that 2.1% of the population infected by COVID-19 had death as an outcome. Mortality was higher in the elderly (74.6%) than in the adult population (25.3%), as shown in Table 1.

Table 1 – Characterization of COVID-19 death cases in the State of Paraná, 2021

	n	%
Adults	4.197	25,3%
Elderly	12.374	74,6%
Total deaths	16.571	2,1%

Source: Coronavirus Epidemiological Report Bulletin – SESA - PR (2020 to 2021)

On the other hand, when we stratified the deaths of adults and the elderly by sex, we observed that both adults (61.8%) and the elderly (56.8%) had the highest number of deaths in men, compared to adults (38.1%) and elderly women (43.1%), as shown in Table 2.

Table 2 - Characterization of COVID-19 death cases by sex in the State of Paraná, 2021

	Men	%	Women	%
Total adult deaths (n = 4,197)	2.594	61,8%	1.603	38,1%
Total number of elderly deaths (n = 12,374)	7.029	56,8%	5.345	43,1%

Source: Coronavirus Epidemiological Report Bulletin – SESA - PR (2020 to 2021)

However, when we stratified the number of cases of deaths by age group and sex in the adult population, we observed that the trend of death is higher in men, in the age group between 41 and 59 years, with about 80.9% of deaths. However, when we performed this same analysis in the elderly population, we found that the highest number of deaths also occurred in the male elderly, especially in the age group of 70 to 79 years with 36.8% of the deaths, as shown in Table 3.

Table 3 – Cases of deaths by age group and sex in adults in the State of Paraná, 2021

Age group	Men (n = 2.594)	%	Women (n = 1.603)	%
18 a 29	107	4,1%	73	4,5%
30 a 40	387	14,9%	230	14,3%
41 a 59	2.100	80,9%	1.300	81,0%
60 a 69	2.430	34,5%	1.639	30,6%
70 a79	2.588	36,8%	1.875	35,0%
80 an 89	1.629	23,1%	1.395	25,0%
90+	382	5,4%	436	8,1%

Source: Coronavirus Epidemiological Report Bulletin – SESA - PR (2020 to 2021)

Finally, another data analysis in the study was the relationship between the time elapsed from the date of onset of symptoms to death. To analyze this variable, 2,202 cases were excluded from the sample because they contained *missing,* leaving 14,369 deaths. Through this analysis, we obtained an overall average of 21.91 days between the onset of symptoms and the date of death. When separated by age group, the time increased for the group of adults at 22.87 days and decreased for the group of elderly at 21.58 days.

4 DISCUSSIONS

The present study showed a significant number of people who were infected by COVID-19 throughout the State of Paraná and in many cases had a negative outcome, such as death. The results indicate that in the 12 months, 2.1% of the population with COVID-19 died, indicating that this average was lower compared to national data11, which was 54.4 deaths per 100,000 inhabitants, considering the beginning of the pandemic until the 34th Epidemiological Week. In the State of Rondônia, the

mortality rate was higher than the Brazilian average, 59.7 deaths per 100,000 inhabitants. [11] In another study released by the Ministry of Health20 on 09/12/2021 Brazil recorded the lowest moving average of deaths from COVID-19, on last epidemiological bulletin released, the drop was 18.78% compared to the last 14 days and 93% since the peak of the pandemic, recorded in April 2021. This drop occurred due to the advance of the Vaccination Campaign.

Another important result in our study indicates that the variables age and sex may be related to cases of mortality from COVID-19 since deaths occurred more in elderly males. Since the beginning of the pandemic, the elderly has been considered a risk group, both for contracting the disease and for worsening symptoms and consequently death. This outcome is corroborated by studies that report a higher incidence of the disease in adults, but with a higher mortality rate in the elderly, a hypothesis for the increase in the number of deaths may be associated with the presence of changes in the immune system that are typical of the age. [14] And the prevalence of chronic diseases, common in the elderly, can increase the severity of the disease. Therefore, determining the lethality and severity of COVID-19 can help public health services protect the most vulnerable groups. [18,25,27]

In our study, both in the adult population and in the elderly population, mortality was higher in men, suggesting that males are more vulnerable to negative outcomes. Studies indicate that the gender variable may be a factor associated with mortality rate, but genetic, behavioral, and lifestyle factors should also be considered. [4,14,30] When it comes to aspects related to gender, the scientific literature points to greater male vulnerability to COVID-19 due to organic responses to infection, with emphasis on hormonal and chromosomal function, the presence of previous comorbidities and the maintenance of unhealthy patterns, habits, and lifestyles. [14th]

Another result found is that in the adult population, most deaths occur in older men, aged between 41 and 59 years. This data is corroborated by studies that show that people over 50 infected by the coronavirus are 2 times more likely to progress to the most severe form of the disease. [27] Possibly, due to work where this population is more exposed to the virus, since it is not always possible to maintain social distancing, thus increasing the risks of infection and consequently a greater chance of death. Male morbidity and mortality from COVID-19 are higher than female morbidity and mortality in several countries around the world. This is because, historically, men do not usually take care of themselves in addition to having greater exposure to health risk factors, and the search for medical care is undertaken in a phase of greater severity of the disease. [11.33]

In the elderly population, the highest number of cases of death occurred in the elderly, in the age group of 70 to 79 years. According to the literature, the risk of death from COVID-19 tends to increase with advancing age, since most deaths occur mainly in the elderly, especially those with chronic diseases. [21.28]

On the other hand, some literature indicates that of people aged 80 years or more 14.8% of those infected died, compared with the elderly aged 70 to 79 years at 8.0% and those aged 60 to 69 years with 8.8%, presenting a rate of 3.82 times higher than the general average, this serves as a warning to the health authorities, to develop strategies to protect the health of the elderly. [4] Therefore, advanced age is seen as a risk factor for the disease, increasing the chances of developing severe acute respiratory syndrome (SARS). [21st]

Although there are not many studies that explain the true reason why men have the worst clinical outcomes, then women by the new coronavirus, a justification, pointed out by the literature, is related to hormonal issues, such as the presence of estrogen, a sex hormone present in cisgender women and trans men, it is believed that this hormone can stimulate the immune response and make these people more protected. [31] On the other hand, some studies suggest that COVID-19 contamination may have a predilection for sex; in previous SARS and MERS epidemics, men were also more likely to be infected than women. This may be related to the important role that a woman's X chromosomes and sex hormones play in the body's immune system. Another assumption is that men are laxer about complying with rules and many have not carried out the quarantine period correctly. [17th]

Regarding the time elapsed between the onset of symptoms and death as an outcome, the average found in days is higher than that recommended by the literature. This leads us to suppose that the treatment offered to the patient was able to postpone, but was not enough to avoid death. There are not many studies that show the time traveled from the onset of symptoms to death from COVID-19, however, in some literature, they bring a variation in the time intervals from the onset of symptoms to death, of approximately 14 days. [17.32]

This study has some limitations, such as the lack of some data that could provide more elements of analysis such as sociodemographic data (race, color, social class, marital status), clinical condition (comorbidities), and incomplete and incorrect data in the bulletins, which made some analyses difficult. However, despite the limitations, this study provided relevant facts about the profile of deaths, which can assist in prevention strategies and assist in the provision of evidence-based health services.

5 CONCLUSIONS

While the occurrence of COVID-19 infection was higher in adults, the disease was more lethal for the elderly. Making this population the most vulnerable group to negative consequences and serving as a warning for health professionals to develop strategies to protect the health of the elderly. In addition, mortality was higher in both adults and the elderly in males, drawing attention to the clinical condition of men.

Since the arrival of the pandemic, several challenges have been thrown at researchers, health professionals, and managers, about the search for strategies to prevent the health system from overloading and the number of deaths from increasing even more. Therefore, with the results obtained in this study, health professionals working in Basic Health Units (BHU) will be able to outline strategies to meet this demand of patients, focusing on specific guidelines or tactics to meet each need that risk groups may present and thus reduce hospitalization.

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CHAPTER
53

Data analysis of students who used the MAZK Intelligent Tutor System during the pandemic period

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ABSTRACT
In this article, we present an analysis of data from an Intelligent Tutor System (ITS) created by a group of Brazilian researchers. The STI was used by approximately 19,000 users from elementary to higher education in public schools. The research methodology used was quantitative and qualitative exploratory analysis. The data set for this study was obtained through the students' interactions with the STI during remote teaching. In the data analysis, information from the students' profiles (age, frequency of access, etc.) and interactions were used, for example, the exercises were solved with objective and descriptive questions to identify the student's abilities and challenges. A total of 2,514,219 responses were analyzed in the STI until 05/31/2021, with 1,533,946 answers to objective questions and 980,273 answers to discursive questions. In the results, it was possible to observe a tendency towards the mastery of mathematics and languages and an excellent performance in 69% of the total answers, which obtained maximum scores in the questions.

Keywords: MAZK Intelligent Tutor System, students, pandemic period.

1 INTRODUCTION

The technologies with Artificial Intelligence have caused changes in the most diverse areas, including education. These changes represent challenges, risks, and opportunities to ensure inclusion and equity, qualify teachers, improve educational practices, and ensure ethics in information management (PEDRÓ, 2019) (BARRIOS-TAO, 2018).

According to Vicari (2018), the main educational systems that use these technologies are Affective Intelligent Tutoring Systems (STIs), Learning Management Systems (LMSs), Intelligent Educational Robotics, and Massive Open Online Courses (MOOCs), regard Learning Analytics (LA). However, each of these applications makes use of AI techniques in different ways.

The use of STIs in classes provides benefits to students and teachers (Bittencourt, 2021). One of the main contributions to the use of STIs is to increase the speed with which students take ownership of the proposed activities. With intelligent tutors, students can solve the activities and get ahead without the need for intervention from the teacher to clarify doubts or evaluate the result. The tutors also suggest other content for each student according to the way they solved the previous ones. The study becomes more efficient, practical, and agile. It also has the benefit of geographical freedom for

both the student and the teacher who can from anywhere create and solve the activities. Students become more motivated and teachers gain time and can devote themselves to other tasks.

STI MAZZ is an intelligent tutor for teaching and learning various topics. The MAZK identified and stored the level of knowledge of the user, as well as the difficulty of the exercises that are adjusted according to the interaction of the student with the tutor. The software promotes learning adaptively and collaboratively and can be accessed on computers or from other devices such as mobile phones or tablets. In MAZK, the teacher can accompany students during the learning process synchronously through the virtual room feature. All interaction information within the MAZK is stored in the student, pedagogical and domain models (SILVA et al., 2019; MORO et al., 2019).

It is of paramount importance that the data on the learners are recorded in the STI MAZK, which presents the following structure to store the information: The learners who use the Intelligent Tutor perform activities, generating data. First, the learner performs a registration in the software, soon after viewing the home page of the Tutor, this page contains the main menu by areas, the experiences (Experiences of the apprentices called in the XP software), the successes and errors, the use of each apprentice and a ranking of all users. The learner uses the Intelligent Tutor a virtual room through a code made available by the teacher where he will interact with other colleagues and with a facial recognition reader that captures and records the emotional state of the learners. From the data generated, we can then individually understand the skills, competencies, and challenges of each learner and create strategies to improve the learning process of students.

The objective of this article is to present the results of the analysis of the data of the learners who interacted with an Intelligent Tutor System. The data set for this study was obtained through the students' interactions with the STI during remote teaching. In the data analysis, information from the students' profiles (age, frequency of access, etc.) and interactions were used, for example, the exercises were solved with objective and descriptive questions to identify the students' skills and challenges. The article is organized into sections on STIs, related works, methodology, results, and final considerations.

2 INTELLIGENT TUTOR SYSTEMS

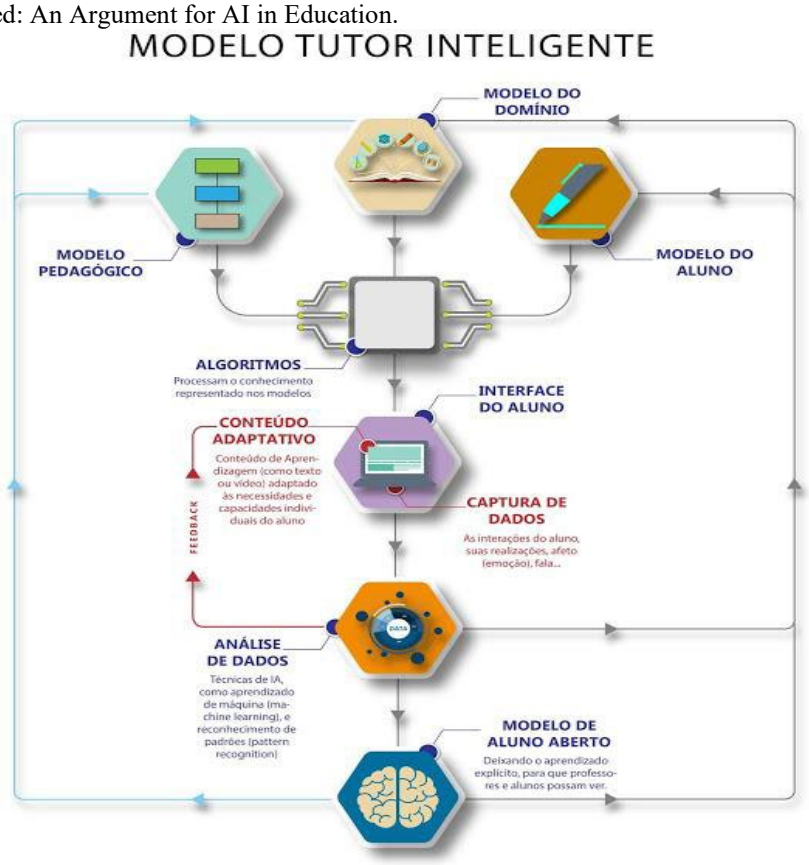
For the STI to be efficient it needs to be developed containing targeted modules to cover what will be taught (domain model), as the content will be taught (pedagogical model), and for whom (the knowledge that the student already possesses, student model). And this traditional basic architecture can be found in authors such as Murray (1999); Pozzebon (2008); Santos, Menezes, and Cury (2018).

The infographic (Figure 1) shows the initial information that will nourish the STI. The student model takes into account the student's level of knowledge; By participating through interactions with the STI, the system itself levels its knowledge. According to your accesses, the system will provide

opportunities for topics of interest. As Moro (2019) explains, in an STI this monitoring of access takes place through the verification of its log, where the student can access the virtual room, answer the proposed materials, and also participate in self-knowledge courses. An "X-ray" of the student's performance and level of understanding. As a support, the system offers activities in the areas that need to improve its performance.

Two types of information can be stored in the learner's model and are called static or dynamic information. Static information, according to Arcos et al (2000), are information such as the student's name, age, and gender, and is not changed by the system, and appears only explicitly in the interface. The dynamic information is that which determines the progress of the student in learning, verified by the system logs and that occurs by the interaction, as is the case of the observation of the level of knowledge and the preferences of content (JOVANOVIC, 2020).

Figure 1: Infographic developed by doctoral student Paula Toledo Palomino, from ICMC, from an image available in the book Intelligence Unleashed: An Argument for AI in Education.



To compose this work, we studied the modules of students in Intelligent Tutoring Systems, defined in the literature by Chrysafiadi and Virvou (2013), Pozzebon (2008), Gasparini (2013), among other authors: Overlap Model; Stereotype Model; Disturbance Model; Machine learning techniques; Cognitive Theories; Fuzzy Logic; Bayesian Networks; Based on ontologies and Hybrids.

Several related works show implementations in intelligent Tutor Systems such as a study by authors Okubo et al. (2017) who used a method to predict students' final grades by a Recurrent Neural Network (RNN); Zakzewska (2018) who presented an agent-based recommendation system; Peñafiel et al. (2018) used an application of data mining using computational techniques, such as text mining and sentiment analysis, to evaluate the open questions of online surveys conducted by university professors; Islam, Soddiqui, and Aljohani (2019) made an exploration of the various aspects of student interaction data using data mining techniques such as clustering and association to identify relevant patterns of behaviors; Uzir et al. (2020) presented a new learning analysis methodology that combines three complementary techniques – agglomerative hierarchical clustering, epistemic network analysis, and process mining. The methodology allows the identification and interpretation of self-regulated learning in terms of the use of learning strategies. Guo, Yan, and Li. (2020) presented an LA-based method, which has a structure designed and implemented to meet the problem of predicting students' attitudes toward certain blended learning classes; Jovanović et al. (2020) aimed to establish an explanatory model of student behavior by identifying patterns in online activity, offering new opportunities to identify patterns that can be easily interpreted by instructors.

3 METHODOLOGIES

The approach proposed in this work has three main entities that can be visualized: (A) data collection of an intelligent tutor system during remote classes, (B) tabulation and elaboration of graphs (c) and finally, writing about the results obtained.

The methodology used was an exploratory study to obtain information about the learners who used the STI MAZK. Investigative approaches were carried out and some interesting information about this technological resource was found. Data collection was performed in the STI MAZK database and Phyton® was used for the extraction and generation of graphs.

The STI used in this study was MAZK which has three types of users: student, teacher, and coordinator. The student/learner, when registering and initiating interactions with the system, is presented with various contents that, over time, are adapted by the tutor to their profile. In the data analysis, information from the students' profiles (age, frequency of access, etc.) and interactions were used, for example, the exercises were solved with objective and descriptive questions to identify the students' skills and challenges. A total of 2,514,219 user responses in the STI were analyzed as of 05/31/2021.

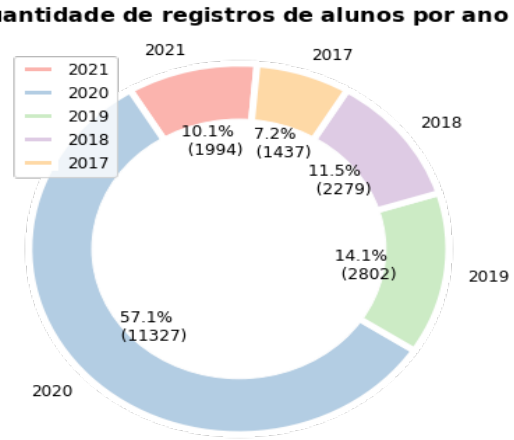
4 RESULTS

The following are the results of the data analysis of an Intelligent Tutor System (ITS) used in remote classes in Brazilian public schools.

4.1 ANALYSIS OF REGISTRATIONS AND LOGINS

According to data extracted from the MAZK intelligent tutor system, the platform currently has 19,839 registered students. Of this total, the frequency of registrations annually was analyzed, obtaining the year 2020 with the highest percentage of registrations, 57.1% as can be seen in Figure 2.

Figure 2: Number of student records per year. Source: Authors



This number can be justified by the high degree of use by schools during the covid-19 pandemic (Figure 3), allowing classes to continue, even remotely. In the year 2021 it can be noticed that there was a drop in registrations, it is believed that those who used some distance learning platform continued its use. A small number of classes adopted new platforms, also for the sake of training teachers and students.

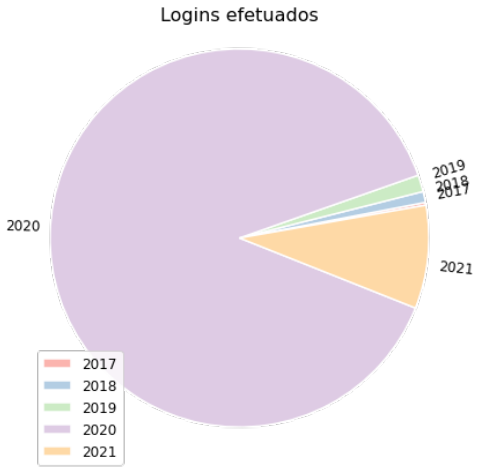
The average age of students on the platform is 18. The age that concentrates the largest number of registrations is 20 years with 2606 users, concentrating 13.13% of the total. The lowest age found was 6 years and 120 years was the highest. It is important to note that data registered by users were analyzed and may contain erroneously registered dates. Above 81 years of age 10 users are obtained and over 60 36 are obtained and these data were omitted from the following analysis for its best presentation. It can be noted that the frequency of users remains high in the range of 19 to 21 years, 3 of the 75 ages found, adding up to 29.69% of the total.

One can also observe balanced numbers without considerable peaks between the ages of 7 and 18 years. Each reserve a percentage between 3% and 5%, which together form 48.10% of the total students, about 9,523 students. These numbers are justified by the high degree of public schools having adhered to the use of STIs during the pandemic, making it possible for classes to be possible during

in-person distancing from classrooms. And XXXX as the cradle of the system also justifies the great peak between the ages of 18 to 21 years, the most frequent ages of entry into the academic environment, making good use of the platform in their classes since their first years of operation.

Figure 3: Logins made

Year	Frequency
2017	2205
2018	8366
2019	12846
2020	795391
2021	79163



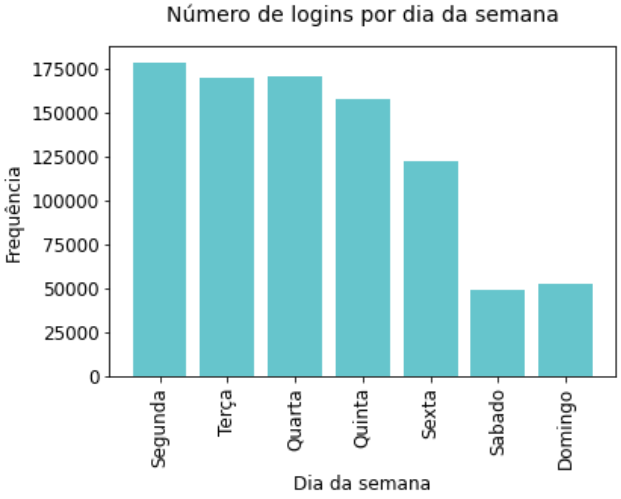
Source: Authors

We also analyzed data from students registered in 2020 to obtain a specific profile of the student who used the platform during the covid-19 pandemic. Compared to the previous overall, we see a large growth in users aged 7 to 15 years, even though the peak has continued between 20 and 21 years, previously justified.

Of the 19839 students registered, 2965 had only 1 login record on the platform, therefore, we have as students who effectively used the STI 16874 students. The average number of logins made is around 225 times per user, with the minimum number of accesses being 1 and 1135 being the maximum. Of the total logins already made, 897971 were from students. This number was analyzed by distributing it annually as well.

We also analyzed the day of the week preferred by the students to use the platform, and obtained the same visible result as in the general scope, being the Monday day of greater access by these users, as shown in Figure 4.

Figure 4: Number of logins per day of the week.



Source: Authors

4.2 STUDENT'S SKILLS AND CHALLENGES

The platform has an individual analysis of the student's skills and challenges that can be verified as soon as they log in to the platform. In this visualization are contemplated the tags that the same has already had contact within the platform and make an average of the amounts of hits and errors of the same displaying this in a graph, so you can have a follow-up of how your learning is going and pay attention to some discipline or material that should have more attention. This section will be discussed the analysis of skills and challenges in a general scope of students.

A total of 2,514,219 responses were recorded on the platform until 05/31/2021, with 1,533,946 answers to objective questions and 980,273 answers to discursive questions. The objective and descriptive questions were analyzed separately:

4.2.1 Objective questions

Of the total of 1,533,946 answers to objective questions recorded on the platform, 1,216,961 correct answers, and 316,985 incorrect answers were obtained, demonstrating a great use by the students since 79.33% of the answers to the objective questions were assertive.

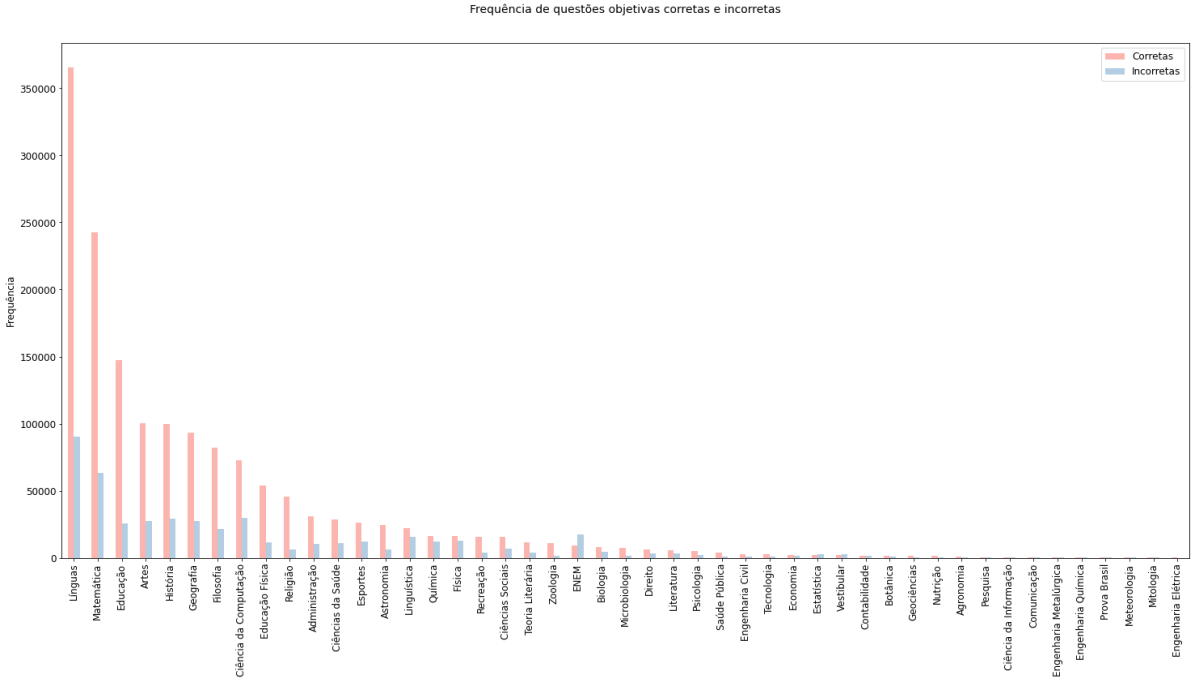
It is also possible to verify to which areas of knowledge these questions belong with the analysis of the tags registered in the material. The tags are markings used on the platform as a means of identifying the materials created by the teacher. Until the date of the analysis, there were 788 tags registered, and in times of pandemic, that is, from the year 2020 141 new tags were registered.

It is also important to note that tags can have subtags, that is, a tag can have child tags, as in the case of mathematics which has the child tags 'Differential and integral calculus' and 'Derivatives' for example. In the scope of this analysis, the child tags for their main tags were suppressed, that is,

the questions marked with the tags of 'Differential and integral calculus' and 'derivatives' were taken into account as their main 'mathematics'.

Knowing this, in the graph below you can see the numbers of correct and incorrect answers to objective questions according to the main areas listed by the tags, in this case, 47 areas.

Figure 5: Frequency of correct and incorrect objective questions.



Source: Authors

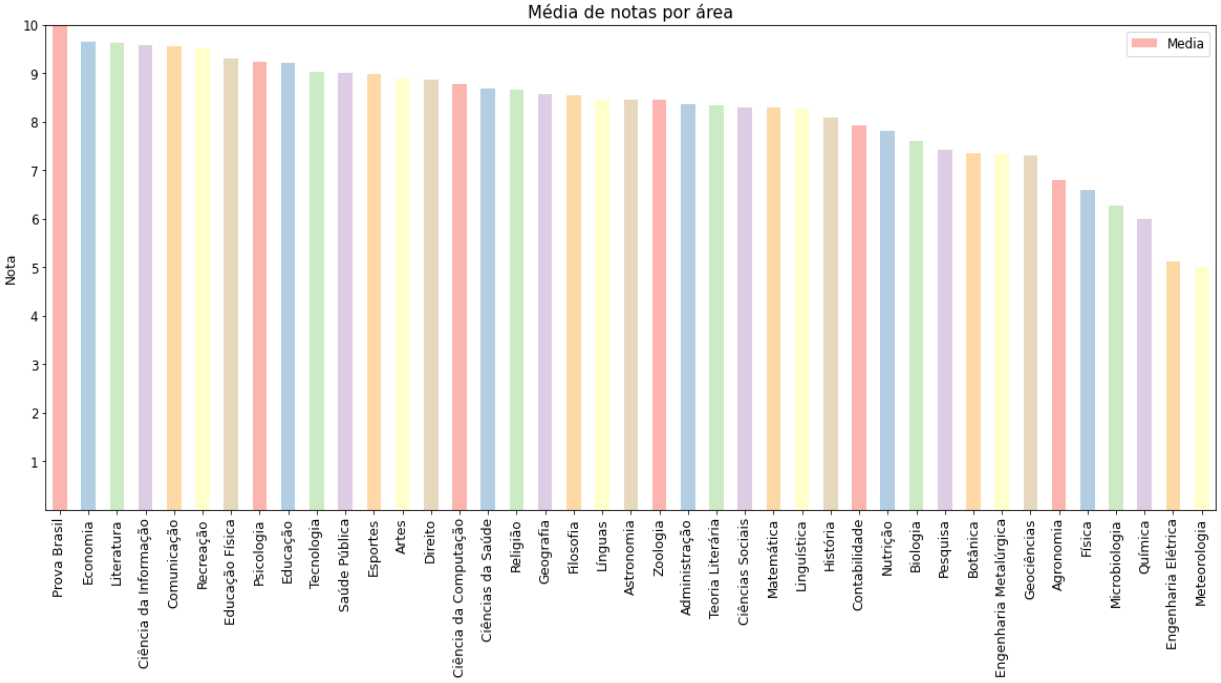
4.2.2. Descriptive Questions

As of 05/31/2021, a total of 980,273 responses to discursive questions have been recorded on the platform. Of this total, about 297 were removed due to invalid data, which makes it impossible to use them in a general context, thus leaving 979,976 records to be analyzed and inferences made.

Of the total, 324,921 responses from students obtained some descriptive feedback from teachers, 33% of the responses were recorded, and the rest were only with feedback from the grade. The grades in turn have two forms of attribution, one is the possibility of automatic grade generated by the STI and another is the one registered by the teacher. Of course, even if there is an automatic grade, the teacher can choose whether or not it is the definitive one for each student. The automatic grades are generated from the comparison between an expected response that was previously registered by the teacher and the response obtained from the student through the artificial intelligence of the system. About 83,386, 8.5% of the registered questions were configured to assign automatic grades by the platform using these expected answers, and of these, 14,324, only 17.17% were accepted by the teacher as a definitive grade for the student.

Taking into account the total number of students on the platform until the date of this analysis, 9,427 students had access to descriptive questions, of which 502 had a zero grade for not having answered any question and about 5% of the total questions still do not have an assigned grade. Of 94% of discursive questions answered by students, the frequency of grades was analyzed by measuring their performance as a whole on the platform. To facilitate the visualization, the decimal places were discarded and only full notes from 0 to 10 displayed in the chart below were considered. It is then seen an excellent performance in 69% of the total answers, which obtained the maximum score in the questions.

Figure 6: Average grades per area.



Source: Authors

It was also considered relevant to analyze and present the average grades by area to which they belong (Figure 6), being able to measure the performance of the students in a more specific way. It can be observed that as in the grades in general, the average per area also has a great result. In all areas, the average was above 5, with 15% of the areas between grades 5 to 7 and 85% above grade 7.

The areas with the lowest averages were Meteorology with 5, Electrical Engineering at 5.12, Chemistry with 5.98, Microbiology with 6.27, Physics at 6.58, and Agronomy at 6.80. As a curiosity, the 3 areas with the best performance were Prova Brasil with 10, Economics with 9.64, and Literature with 9.63.

5 FINAL CONSIDERATIONS

This article presents the analysis of data from an Intelligent Tutor System (ITS) with approximately 19 thousand users from elementary to higher education in public schools and found that the use of Intelligent Tutors in the school context has become an ally of teachers and learners, despite the challenges. As competitiveness increases and challenges increase, the inclusion of technology in and out of the classroom is essential to ensure that learners are prepared to meet the demands of today's professions and especially those that have not yet been created. "The professions of the future."

The current generation of students was born accustomed to the presence of new technologies, but that does not mean that it is easy to engage students and teachers in the processes of digital transformation, this being the biggest challenge faced. So, the school should not see technology as a negative aspect, one should see the positive side of how to work it in teaching to provide better results in learning. Many times, we look at the challenges, and the difficulties, but we cannot see the good side, of how it will be worth overcoming the challenges. And the MAZK Smart Tutor contributes as the numbers in this article show, because being intuitive and easily accessible, it motivates learners to perform more and more tasks within their base of activities, in addition to providing intelligent individualized assistance and promoting social presence.

In 2020, the percentage of registrations increased greatly due to the pandemic and remote classes. The average age of students is from 18 to 21 years, the most frequent ages of entry into the academic environment, making good use of the platform in their classes since their first years of operation. We also analyzed the students' preferred day of the week for STI use and obtained Monday, the day of greatest access by these users.

In the STI analysis, there is an individual analysis of the student's skills and challenges that can be verified as soon as he logs in to the platform. In the analysis, it was possible to verify that the vast majority of the answers were in the area of languages, mathematics, and education, and also that generally, the number of errors does not exceed the correct ones, except for the areas 'Enem' and 'Vestibular'. Another item that drew attention was the two ways of assigning grades in the exercises, one is the possibility of an automatic grade generated by the STI and the other is the one registered by the teacher. Of course, even if there is an automatic grade, the teacher can choose whether or not it is the definitive one for each student. About 83,386, 8.5% of the registered questions were configured to assign automatic grades by the platform using these expected answers, and of these, 14,324, only 17.17% were accepted by the teacher as a definitive grade for the student.

As for related works, it was observed that authors Okubo et al. (2017) used a method to predict students' final grades from the stored record data while in STI MAZK students had access to their performance, skills, and challenges based on the data stored in the system. Zakzewska (2018) assumes

that student groups have already been created and that they consist of learners of similar characteristics, differentiating from STI MAZK where the creation of groups is random. Peñafiel et al. (2018) used sentiment analysis that was not used in this study. Islam, Soddiqui, and Aljohani (2019) used similar data mining techniques such as clustering and association to identify relevant student patterns.

As a future work, analyze the data of the pedagogical module to identify the pedagogic strategies used in the STI and correlate with the learning outcome.

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CHAPTER
54

The evolution of hepatitis B and nutritional support: Case report

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ABSTRACT
Hepatitis B is an infectious disease caused by contact with a source that is positive for both the HBV surface antigen and the “e” antigen of the virus. Hepatitis B is a silent disease and therefore the diagnosis is usually late, favoring the chronicity of diseases that affect the liver. The objective of this article is to present a case study of hepatitis B and its complications, and the nutritional interventions performed during hospitalization. This is an experience report of monitoring the treatment of a patient affected by hepatitis B and other diseases in the mandatory hospital experience in the discipline of diet therapy II, of the bachelor's degree in nutrition, held at the Hospitalar Foundation of Acre. The progression of liver disease has an impact on nutritional status because it is related to a decrease in energy and protein intake, affected by food restrictions and low-palatable diets, which directly interfere with food consumption. After the patient's follow-up period, it was not possible to observe evolution in his health status, it was possible to identify the progression of the disease through imaging, biochemical and physical exams.

Keywords: Hepatitis B, Nutrition, Liver disease, Nutritional support.

1 INTRODUCTION

Hepatitis B is an infectious disease caused by contact with a positive source for the HBV surface antigen, and for the "e" antigen of the virus. Hepatitis B is a silent disease and therefore the diagnosis is usually late, favoring the chronicity of diseases that affect the liver. The symptomatology of hepatitis B is common to other chronic parenchymal liver diseases and usually manifests only in more advanced stages of the disease. The basic symptoms are: nausea, vomiting, fever, malaise, fatigue, loss of appetite, abdominal pain, jaundice. Worldwide, more than 240 million people have chronic liver disease at risk of progression to morbid complications such as cirrhosis and hepatocellular carcinoma [1].

The hepatitis B virus can trigger solid nodules that appear in the liver (hepatic nodules), most of them of benign origin such as hemangioma, focal nodular hyperplasia, and adenoma. Or Hepatocarcinoma is the main representative of malignant tumors, which has the ability to metastasize. HBV causes hepatocarcinoma by direct and indirect routes, with continuous inflammation and necro-regeneration activity, with the accumulation of potentially critical mutations in the hepatocyte genome, with subsequent malignant transformation and clonal expansion. HBV has been shown to be an oncogenic virus, with the integration of the viral genome to that of the host, which can lead to the activation of cellular genes [2].

Liver cirrhosis It is the final irreversible stage of chronic liver injury, where there is hepatocytic death, which qualifies as diffuse fibrosis, and replacement of liver tissue by regenerative nodules of abnormal structure. Several causes can generate the picture of liver cirrhosis, such as liver toxicosis by copper, chronic inflammatory hepatitis, hepatic hypoxia, medication, viral infections, leptospirosis, hepatic collangium complex [3].

Ascites is defined as excess fluid in the peritoneal cavity, the origin of the fluid varies between plasma, bile, blood, lymph, pancreatic juice, urine. Most ascites are caused by liver cirrhosis, with peripheral vasodilation and renal retention of water and sodium [4].

The decrease in the size of the liver and its distorted shape with the presence of hepatic nodules separated by fibrotic bands is caused by continuous destruction of hepatocytes and the exaggerated deposition of collagen. This condition causes disorganization of the intrahepatic circulation and induces portal hypertension, which is a significant complication factor of decompensated cirrhosis, being responsible for the appearance of ascites and bleeding from esophageal varices, two complications that indicate the presence of decompensated cirrhosis. Ascites is one of the most common complications of cirrhosis, as well as renal sodium retention, which are consequences of effective hypovolemia [4].

The progression of liver disease impacts on nutritional status because it is related to decreased energy and protein intake, affected by dietary restrictions and diets of low palatability, which directly interfere with food consumption. Malnutrition is one of the most frequent complications in patients with liver cirrhosis, occurring in 20% to 50% of patients, being associated with a worse prognosis of liver disease [5].

The objective of this article is to present a case study of hepatitis B and its complications, and the nutritional interventions performed during hospitalization.

2 METHODOLOGY

This is a report of an experience of monitoring the treatment of a patient affected by hepatitis B and other diseases in the mandatory hospital experience in the discipline of diet therapy II, of the bachelor's degree in nutrition, held at the Hospital Foundation of Acre, a large hospital, considered a teaching hospital. The said hospital is located in the green way, number 2224, industrial district neighborhood, in Rio Branco Acre.

The hospital experience took place in February 2023, during one week. The students assumed the role of observers of the care received by the patient in question, aiming at the construction of a clinical case at the end of the course.

3 CASE PRESENTATION

3.1 PATIENT IDENTIFICATION

Patient identified as F.D.N.F., 21 years old, male, natural and resident of the municipality of Porto Walter, the patient resides in the municipality with his wife of 18 years of age and a son of 2 years.

3.2 HISTORY OF THE CURRENT DISEASE

Patient reported that 6 years ago he was diagnosed with hepatitis B, undergoing treatment only for 6 months and interrupting due to living in the rural area of difficult access, finding difficulties of locomotion and lack of available medications for treatment. He denied the presence of DM, HAS, DRC.

The patient reported that the initial symptoms before admission were pain in the right hypochondrium, fever, nausea, vomiting. After approximately 15 days of the onset of symptoms, the patient and his family noticed an abdominal swelling. They sought medical attention and the patient was initially admitted to the rural hospital, later transferred to the hospital of Cruzeiro do Sul.

With the evolution of the pathologies, the patient was admitted to the hospital foundation of Acre on February 13, 2023, with a diagnosis of "abdominal pain in the right hypochondrium", and main complaint of abdominal pain. The patient had a regular, anicteric general condition, Normocolored, hydrated, afebrile and cyanotic.

3.3 EVOLUTION AND NUTRITIONAL MANAGEMENT

The day after his admission to the hospital, the patient was submitted to nutritional evaluation, and the NRS questionnaire, the hospital's standard, was applied. He was eutrophic with a BMI of 21.2, scoring 2 on the questionnaire, presenting no nutritional risk. On February 22, 2023, 9 days after hospitalization, the questionnaire was again applied, according to the nutritional bulletin, it was eutrophic according to BMI, however, it presented decreased muscle strength and semiology compatible with malnutrition. Biochemical tests indicated loss of muscle mass, with changes in albumin and creatinine levels. Changes in bilirubin and lipase tests, common in liver patients.

During hospitalization, the patient had daily nutritional follow-up. The calculation of total energy expenditure was performed by determining the basal metabolism rate, according to Harris Benedict, multiplying by the physical activity factor and injury factor. Nutritional requirements were estimated at 2,205kcal. The diet offered to the patient was characterized as: mild, hyperprotein, hypolipidic, supplemented. There was no need for major salt restrictions, given the normal excretion of sodium metabolism in laboratory tests.

The patient showed low acceptance of the diet offered, claiming gastric fullness, inappetence and episodes of emesis. The change in the patient's weight was noticeable, being estimated by the formula of James (1989), due to the picture of moderate ascites and peripheral edema. In this study, anthropometric measurements were also evaluated, which were altered: Adequacy of arm circumference (AC): 59% (<70% severe malnutrition); Triceps skinfold adequacy (TSF): 50% (<70% severe malnutrition).

4 DISCUSSION

The patient F.D.N.F, 21 years old, presents as a basic pathology Hepatitis B, a type of viral hepatitis that affects the liver, although there is no cure, the treatment of hepatitis B is essential to avoid the evolution of the disease, enabling a life with the inactive form of the virus.

When affected by the virus as a child, the patient began treatment, being carried out for a short time, given the difficulties of locomotion and lack of medicines in the city of the interior of Acre. The lack of treatment led to the evolution of the disease, progressing to a case of liver cirrhosis, being aggravated by the case of Ascites and later hepatic nodules and esophageal varices.

The last imaging tests performed by the patient in the period in question showed the possibility of liver and lung metastasis. The hepatitis B virus is described in the literature as an oncological virus, as it has the ability to parasitize the cells of its host, incorporate itself into its DNA and cause malignant cell mutations. By not adhering to the treatment of the disease, the patient facilitated viral replication, which may explain the findings in the imaging studies.

In addition, the patient presents in case of moderate to severe malnutrition, based on biochemical tests and anthropometric evaluation comparing with the evaluation described in the book of clinical nutrition in adults [6]. The picture of malnutrition is common in liver diseases, these patients have hypermetabolism and metabolic stress, in addition to malabsorption, which tends to lead to the picture, presents the worst prognosis in the evolution of the disease. In addition, the patient has low acceptance of the diet offered, refusing the food supplement and presenting some episodes of emesis when taking the medication.

Patients with cirrhosis manifest gastrointestinal symptoms such as gastroparesis and intestinal dysmotility frequently, causing nausea, vomiting and early satiety, limiting nutrient intake [7; 8]. Therefore, the fractionation and reduction of the volume of the meals offered is an effective option for a better intake of the necessary caloric intake.

In addition to the hypermetabolism caused by the pathologies, and the low albumin shown in the biochemical tests, the procedure performed to relieve the picture of moderate ascites (Parecentese), causes the individual to have greater excretion of proteins, requiring a greater intake, therefore, the

diet to be offered was hyperprotein and hypercaloric, aiming at the recovery and maintenance of the patient's weight. In addition, the difficulty of nutrient absorption and difficulty of fat digestion, requires a low-fat diet.

5 FINAL CONSIDERATIONS

After the follow-up period of the patient, it was not possible to observe evolution in his health status, it was possible to identify the progression of the disease through imaging, biochemical and physical examinations. To date, there was no forecast for the hospital discharge of the patient in question. The doctor responsible for the case reports that the patient will be referred for analysis by an oncologist specialist considering the diagnostic possibility of metastasis. If confirmed, the patient will receive palliative care.

The experience in the hospital experience contributed greatly to the learning and reconciliation of theory and practice. It was possible to closely follow the importance of the professional nutritionist in the clinic, and the importance of nutritional therapy for the evolution of an individual affected by serious diseases. In addition, the importance of interdisciplinarity and communication of health professionals in the management of bedridden patients was notorious.

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CHAPTER

55

Correlation between blood type and SARS-CoV-2 infection susceptibility: A literature review

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ABSTRACT
The pandemic caused by SARS-CoV-2 is one outbreak that affects human health worldwide. Since the first confirmed case, several people have been infected across the globe and many have unfortunately lost their lives due to complications caused by Covid-19. Several studies have been published on the subject since the disease emerged, and among these, studies correlating blood type and levels of infection by SARS-Cov-2. The purpose of this work is to collect works published on the subject, during the period of 2020 and 2021, and to investigate whether it is possible to prove the existence or non-existence of this correlation. Articles were searched in 3 databases, and reaching a final number of 44 analyzed articles. Concluding a greater susceptibility to infection in individuals of type A and group O being considered protective against infection.

Keywords: Covid-19, Blood type, SARS-CoV-2, ABO.

1 INTRODUCTION

1.1 THEORETICAL REFERENCE

The blood type is defined according to the nature of the antigen present on the surface of the erythrocyte cell membrane, which is a macromolecular structure that can be made up of proteins, glycoproteins or carbohydrates that perform various functions in the cell, such as structural, transport, anchoring, enzymatic, and regulation of the complement system (BONIFÁCIO and NOVARETTI, 2009; TORMEY and HENDRICKSON, 2019).

Currently, about 360 types of erythrocyte antigens are recognized, 322 of which are grouped into 36 blood groups (STORRY et al., 2019). The antigens that have the greatest clinical importance are those that are part of the ABO system, the first of which was described in 1900 by the Austrian pathogolist Karl Landsteiner, followed by the Rh factor (GIANGRANDE, 2000; THORNTON and GRIMSLEY, 2019) and connect to a precursor coupled to the erythrocyte membrane, the H antigen, fundamental for the characterization of the ABO system.

From a genetic point of view, the ABO locus is located on the long arm of chromosome 9 (9q34.1-q34), has 3 alleles: A, B and O. The A allele encodes a glycosyltransferase, an enzyme that adds a N molecule terminally -acetylgalactosamine to the H antigen, originating the A antigen on the erythrocyte membrane, and thus the A blood type. The B allele, on the other hand, by the action of the same enzyme, encodes the insertion of a D-galactose molecule at the end of the H antigen, forming the

B antigen and the respective B blood type. Individuals who express the presence of both alleles present the two sugars incorporated in the H antigen and consequently are recognized as having the AB blood type. While the O allele has the enzyme glycosyltransferase inactive, not encoding any antigen, so that individuals with this condition express only the H antigen on the erythrocyte membrane, thus being devoid of A and B antigens and recognized as having the O blood type (BETHESDA, 2005).

In the early 1990s, for the first time, the possibility was raised that these ABO group antigens were somehow related to some infections caused by microorganisms, since, according to research carried out by Borén et al., the presence of ABO group antigens Lewis blood (especially Le^b), in the cells of the gastrointestinal tract would act as receptors for the bacterium Helicobacter pylori, facilitating the entry of this germ into this tissue, enhancing the infection process (BORÉN et al., 1993).

In 2003, another study on the same subject was published, but correlating blood antigens to an infection caused by the Norwalk virus. In this bias, the author theorizes that this virus binds to the H antigen, which is an important part of blood antigens, especially in individuals with blood group O, increasing susceptibility to infection (LINDESMITH et al., 2003).

In 2005, the first correlation between blood antigens and the SARS-CoV virus, a respiratory virus derived from bats, was performed. After an increase in the number of infections by this virus in Hong Kong, the author takes into account the two works mentioned above and investigates whether these infections could be related to blood type. Research has shown that the number of infected blood type O was significantly lower when compared to other blood types among the patients studied (CHENG et al., 2005)

Three years later, the first work appears that theorizes the specific role of protein S (also known as “Spike”), a membrane protein characteristic of the coronavirus that is responsible for binding and its entry into the host cell, correlating with blood types during the viral infection process (GUILLON et al., 2008).

In December 2019, cases of pneumonia without proven causes began to appear in the Wuhan region, China (ZHU et al., 2020). In February 2020, a new strain of coronavirus was identified as the cause, henceforth called “SARS-Cov-2” or “novel coronavirus”.

SARS-CoV-2 is a positive-sense, single-stranded RNA virus (+ssRNA), belonging to the B lineage of the genus Beta-coronavirus of the Coronaviridae family (NAQVI et al., 2020). The virus uses membrane receptors to enter the host cell, more precisely the Angiotensin-Converting Enzyme 2 (ACE2 or ACE2) receptor (YAN et al., 2020), which is present in various tissues such as the trachea, kidneys, small intestine, pancreas, blood vessels and other tissues, however, the tropism of the virus is greater in the lungs (LIU, J. et al., 2021).

According to the studies developed by Hatmal et al. (2020), because it has a slightly more different and stable way of binding and entering host cells, SARS-Cov-2 is more infective and more virulent. The most common manifestations of infection by this virus are respiratory symptoms such as fever, dry cough, and even dyspnea. More severe cases even present sepsis, secondary infections and even multiple organ failure (HUANG et al., 2020).

In March 2020, the World Health Organization, considering the growing trend in the number of new cases of the disease and the number of deaths, raised the infection by this virus to a pandemic status, something that would profoundly change the lives of practically all the people of the world and causing millions to die (CHAMS et al., 2020).

With the emergence of Covid-19, a disease caused by the infection caused by SARS-Cov-2 and, due to the enormous impact it caused in the health area, in addition to the social and psychological disorders caused by the pandemic, it did not take long for researchers and industries to Pharmaceutical companies put the maximum effort into obtaining information about this virus and especially how to combat it (CIOTTI et al., 2022).

Due to its great structural similarity with the other types of coronavirus already studied, works such as Guillion's were soon cited and the possibility was raised that the correlation between blood types and infection could also occur in this new coronavirus.

On the other hand, since then, there has been much controversy surrounding this correlation, as several studies categorically claim susceptibility to infection considering blood type, whereas other authors make a counterpoint. Considering these arguments, the purpose of this work was to carry out a bibliographical review based on works published on this subject, during the period of 2020 and 2021, and to investigate whether it is possible to prove the existence or not of a correlation between blood type and the process of SARS-Cov-2 infection

2 JUSTIFICATION

With the emergence of the first cases of Covid-19 in China, a long race began to investigate and try to better understand the mechanisms of action of SARS-CoV-2. As a relationship between blood types and other coronaviruses has already been previously established by some works, the question whether this relationship would also extend to the new coronavirus immediately arose. In this context, the justification of the present work is to investigate what has already been published on the subject and to analyze whether there already exists, in fact, a concrete answer for the existence or not of this correlation, in addition to knowing how this could help in the fight against this virus causing such a negative impact on the world stage in recent years.

3 OBJECTIVE

3.1 MAIN GOAL

To carry out an investigation among the works already published if the blood type increases the susceptibility to the development of the Covid-19 disease, caused by SARS-CoV-2. Also, if confirmed, investigate at which point in the disease this correlation occurs.

3.2 SPECIFIC OBJECTIVES

- Search for works that talk about the correlation between Covid-19 and blood types in reliable databases.
- Perform filtering and organization of these articles.
- • Discuss what was found in these works and demonstrate whether this correlation is real, in addition to being significant.

4 METHODOLOGY

4.1 DATA SOURCES AND RESEARCH STRATEGY

A systematic search was carried out for articles published between January 2020 and December 2021 in the PubMed, Science Direct and LitCovid databases, using the following descriptors: “Covid-19”, “SARS-CoV-2”, “ABO” and “blood group”, separated only by a comma. There were no language or region restrictions.

4.2 STUDY SCREENING AND DATA EXTRACTION

The “EndNote X9” software was used to manage the process of sorting the articles found in the search, acting in the identification and removal of duplicates. In addition, all articles were manually reviewed in order to reduce the risk of additional duplicates.

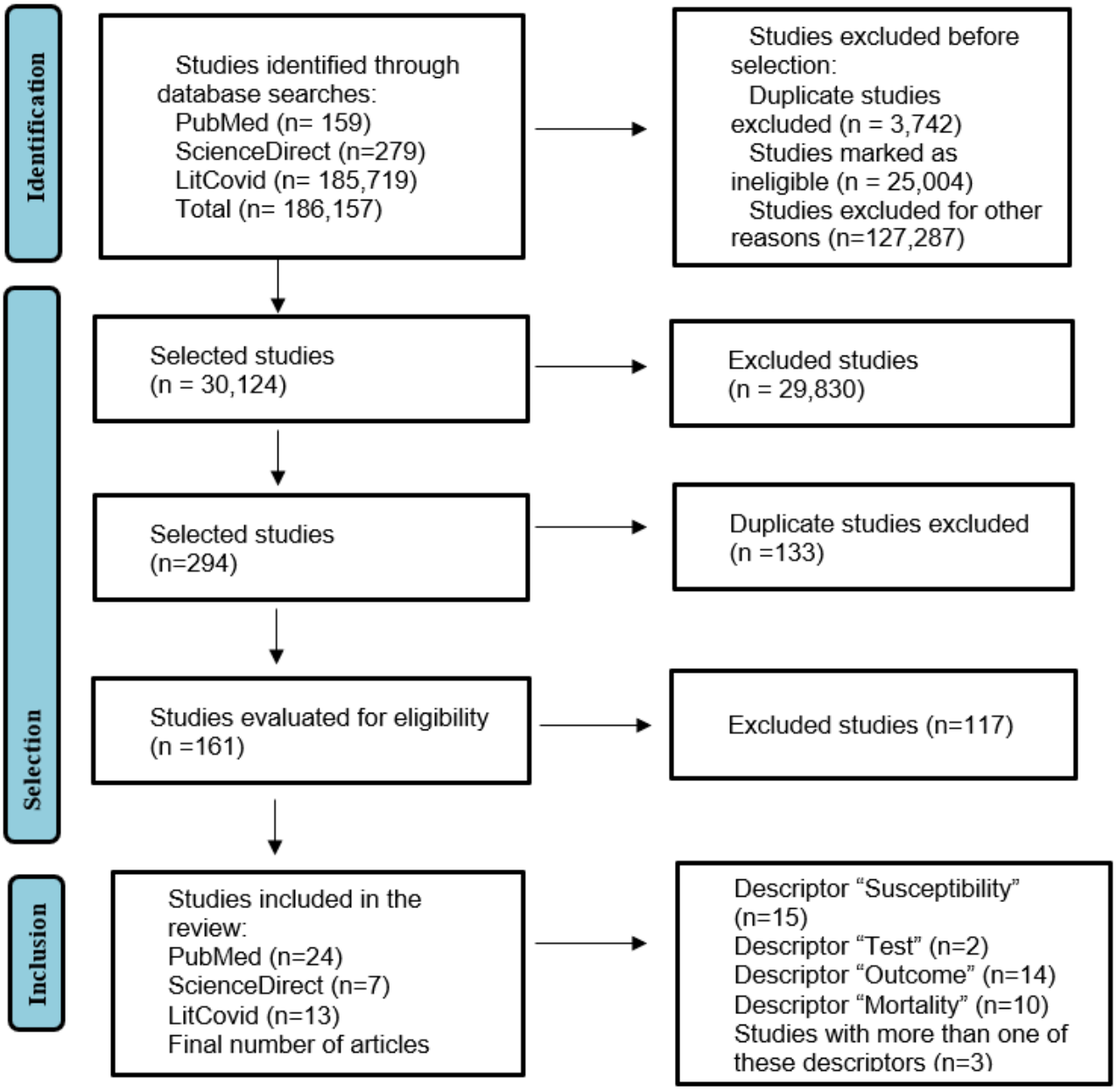
4.3 SELECTION CRITERIA (INCLUSION/EXCLUSION)

After eliminating duplicates, the exclusion criteria used were, in order: articles that did not fit the purpose of this work, articles that did not have at least one of the descriptors present in their titles and articles without a full text available for access.

5 DISCUSSION OF THE RESULTS

Upon initial research in the 3 cited databases, the total number of articles found was 186,157. After applying the inclusion and exclusion criteria shown in Figure 1, the final number of articles worked on in this review was established as 44.

Figure 1: Study selection flowchart adapted from Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISM) (PAGE et al., 2021)



O The first cut performed was the presence of duplicate articles within this initial number. The second cut took place in order to reduce the considerable number of articles retrieved from the databases using the chosen descriptors. In this way, we chose to redo the search in the "LitCovid" database, which brought a greater number of articles in the initial search, and to use only the descriptors "blood group" and "ABO". The justification is the fact that this database is specific to articles related to Covid-19, and after analysis, we could see that many of the articles filtered in the initial search only spoke about Covid-19 in general, and were not associated with the theme. With this cut, 25,004 articles were marked as ineligible.

The second and third cuts were made in order to exclude articles that were not related to the theme of this work. In this case, the vast majority consisted of articles that dealt only with the infection by the coronavirus, without correlating it with blood groups, therefore becoming ineligible.

Despite the third cut, analyzing the remaining 30,124 articles, it can be seen that some articles still only had Covid-19 or the SARS-CoV-2 virus as their subject, and did not talk about the association with blood type. For this reason, a fourth cut was applied, searching only the descriptors “blood group” and “ABO”, and reaching a number of 294 articles. To be sure of the veracity of the cut, all titles of all 29,673 excluded articles were checked manually and it was found that they did not talk about blood group or ABO group, therefore, they did not fit the theme. Of this number of 294 articles, a fifth cut was made to remove duplicates again, reaching a number of 161 articles evaluated for eligibility.

All these 161 articles fit the theme of this work, but because there is still a significant number of articles for analysis and because they do not fit the maximum number of references required for publication, a new cut methodology was applied. The idea for this section was to provide a general notion of the correlation between blood type and SARS-CoV-2 infection, that is, to demonstrate whether this correlation is significant at all stages, from susceptibility to infection, probability from positive tests, the development of the disease, to mortality. With that, 4 new descriptors were applied: “susceptibility”, “test”, “outcome” and “mortality”, reaching a final number of 44 articles included in this bibliographic review.

Among the selected articles, twenty-eight of them are classified as retrospective studies, six are bibliographic reviews, five letters to the editor, two case-control studies, one epidemiological, one cohort and one survey based on a questionnaire. It was possible to perceive a great variation in relation to the total number of patients analyzed in the works, with the smallest number of samples being 46, and the largest 4,968 patients.

Among the articles that mentioned an average age of the patients studied, a variation from 7.9 to 77 years can be observed. Male and female patients were also quantified in some of the studies, in addition to the percentage of patients who died during the surveys. The percentage of blood types, as well as the prevalence among them, was also collected and is shown in Table 1, which follows below.

Table 1: Characteristics of selected studies. NI: Not reported.

First author and year	Country	Kind of study	Total Sample	Age Average	Women (%)	Male (%)	Deaths (%)	Type A (%)	Type B (%)	Type AB (%)	Type O (%)	Prevalence
AL-ANSARI *et al.* (2021)	Saudi Arabia	Retrospective	90	58	28 (31.1)	62 (68.9)	20 (22.2)	20 (22.2)	24 (26.7)	5 (5.6)	41 (45.6)	O>B>A>AB

(ALMADHI *et al.*, 2021)	Bahrain	Retrospective	2334	NI	NI	NI	NI	513 (21.9)	644 (27.5)	117 (5.0)	1060 (45.4)	O>B>A>AB
(AL-YOUHA *et al.*, 2021)	kuwait	Retrospective	3.305	42	1.017 (30.8)	2.288 (69.2)	151 (4.6)	843 (25.5)	956 (28.9)	281 (8.5)	1225 (37.1)	O>B>A>AB
(ANSARI-LARI e SAADAT, 2021)	Iran	letter to the editor	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
(AYATOLLAHI *et al.*, 2021)	Iran	Retrospective	1.554	56.6	740 (47.6)	814 (52.4)	287 (18.5)	472 (30.4)	436 (28.1)	112 (7.3)	534 (34.4)	O>A>B>AB
(BARI *et al.*, 2021)	Pakistan	Retrospective	66	7.9	28 (42.4)	38 (57.6)	0	17 (25.8)	23 (34.9)	1 (4.3)	25 (37.9)	O>B>A>AB
(BEHBOUDI *et al.*, 2021)	Iran	Retrospective	148	55.4	68 (45.9)	80 (54.1)	51 (34.5)	38 (26)	52 (35.6)	16 (10.9)	40 (27.5)	B>O>A>AB
(BHATTACHARJEE *et al.*, 2020)	India	Literature review	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
(CHEGNI *et al.*, 2020)	Iran	Letter to the Editor	94	NI	21 (22.3)	73 (77.7)	94 (100)	34 (44.7)	17 (22.4)	4 (5.3)	21 (27.6)	A>O>B>AB
(COLUK *et al.*, 2021)	Türkiye	Retrospective	211	NI	NI	NI	NI	101 (47.9)	32 (15.2)	9 (4.2)	69 (32.7)	A>O>B>AB
(COVALI *et al.*, 2021)	Romania	Retrospective	46	27.8	46 (100)	0	NI	24 (52.2)	10 (21.7)	3 (6.5)	9 (19.6)	A>B>O>AB
(FAN *et al.*, 2020)	China	case-control	105	56.8	50 (47.6)	55 (52.4)	NI	45 (42.8)	28 (26.7)	9 (8.5)	23 (21.9)	A>B>O>AB
(FAROUG MOHAMED *et al.*, 2021)	Sudan	Retrospective	100	NI	44 (44)	56 (56)	NI	30 (30)	15 (15)	9 (9)	46 (46)	O>A>B>AB
(GÖKER et al., 2020)	Türkiye	Retrospective	186	42	86 (46.2)	100 (53.8)	NI	106 (57)	20 (10.8)	14 (7.5)	46 (24.8)	A>O>B>AB
(GOLINELLI, 2021)	Italy	letter to the editor	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
(HALIM *et al.*, 2021)	Bangladesh	Retrospective	771	NI	NI	NI	NI	288 (37.35)	134 (17.38)	204 (26.5)	145 (18.81)	A>AB>O>B
(ISHAQ *et al.*, 2021)	Pakistan	Retrospective	1.067	47.8	355 (33.2)	712 (66.7)	113 (10.5)	202 (18.9)	295 (27.6)	49 (4.5)	521 (48.8)	O>B>A>AB
(KABRAH, ABUZERR, *et al.*, 2021)	Saudi Arabia	Retrospective	285	44.5	145 (50.9)	140 (49.1)	4 (1.4)	81 (28.4)	43 (15.1)	11 (3.9)	150 (52.6)	O>A>B>AB

(KABRAH, KABRAH, *et al.*, 2021)	Saudi Arabia	Literature review	16 estudos	NI	NI	NI	NI	NI	NI	NI	NI	NI
(KERBAGE *et al.*, 2021)	Lebanon	case-control	404	64	154 (32.5)	320 (67.5)	NI	172 (42.6)	53 (13.1)	24 (6)	155 (38.3)	A>O>B>AB
(KIM *et al.*, 2021)	USA	Literature review	9 estudos	NI	NI	NI	NI	NI	NI	NI	NI	NI
(KOMAL *et al.*, 2021)	Pakistan	Questionnaire-based research	305	30	99 (32.4)	206 (67.5)	NI	77 (25.4)	101 (33.1)	51 (16.7)	76 (24.9)	B>A>O>AB
(KUMAR *et al.*, 2021)	USA	Retrospective	3.563	67	1.675 (47)	1.888 (53)	NI	1.301 (36.5)	377 (10.6)	133 (3.7)	1.752 (49.2)	O>A>B>AB
(LATZ *et al.*, 2020)	USA	Retrospective	1.289	56.6	872 (67.7)	417 (32.3)	89 (6.9)	440 (34.2)	201 (15.6)	61 (4.7)	587 (45.5)	O>A>B>AB
(LEHRER e RHEINSTEIN, 2021)	USA	Retrospective	720	58	351 (48.8)	369 (51.2)	76 (10.5)	323 (44.9)	66 (9.2)	23 (3.2)	308 (42.8)	A>O>B>AB
(LEVI *et al.*, 2020)	Brazil	letter to the editor	2.037	NI	NI	NI	NI	816 (40.1)	237 (11.6)	71 (3.5)	913 (44.8)	O>A>B>AB
(LIU, N. *et al.*, 2021)	China	Literature review	10 estudos	NI	NI	NI	NI	NI	NI	NI	NI	NI
(MAHMUD *et al.*, 2021)	Bangladesh	Retrospective	438	39.8	180 (41.1)	258 (58.9)	5 (1.3)	144 (32.8)	148 (33.7)	52 (11.9)	94 (21.5)	B>A>O>AB
(MATZHOLD *et al.*, 2021)	Austria	Retrospective	336	77	187 (55.3)	151 (44.7)	78 (23)	151 (44.9)	54 (16.1)	31 (9.2)	100 (29.8)	A>O>B>AB
(MAY *et al.*, 2021)	USA	Letter to the Editor	165	57	65 (39)	100 (61)	32 (19)	56 (34)	30 (18)	8 (5)	71 (43)	O>A>B>AB
(MUÑIZ-DIAZ *et al.*, 2021)	Spain	Cohort	854	45	516 (60.5)	338 (39.5)	NI	403 (47.1)	65 (7.6)	32 (3.7)	354 (41.4)	A>O>B>AB
(NALBANT *et al.*, 2021)	Türkiye	Retrospective	313	57.7	145 (46.3)	168 (53.7)	0	147 (47)	44 (14)	22 (7)	99 (32)	A>O>B>AB
(PADHI *et al.*, 2020)	India	Retrospective	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
(PAUL *et al.*, 2020)	USA	Retrospective	249	70	128 (51.4)	121 (48.6)	118 (47.3)	87 (35)	43 (17.2)	9 (3.7)	110 (44.2)	O>A>B>AB
(RANA *et al.*, 2021)	India	Epidemiological	2.586	NI	NI	NI	NI	774 (29.9)	1.081 (41.8)	183 (7)	548 (21.1)	B>A>O>AB

(RAHIM *et al.*, 2021)	pakistan	Retrospective	1.935	39.7	607 (31.4)	1.328 (68.6)	NI	523 (27)	694 (35.9)	490 (11.8)	228 (25.3)	B>A>O>AB
(SAINZ BUENO *et al.*, 2021)	Spain	Retrospective	1.287	NI	786 (30.3)	1.800 (69.7)	317 (12.2)	544 (42.3)	154 (12)	54 (4.2)	535 (41.6)	A>O>B>AB
(SERTBAS *et al.*, 2021)	Türkiye	Retrospective	3.551	57.5	1.651 (47.8)	1.854 (52.2)	798 (22.4)	1.673 (44.1)	548 (15.8)	279 (7.7)	1.051 (32.4)	A>O>B>AB
(SHIBEEB e KHAN, 2021)	Qatar	Literature review	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
(SZYMANSKI *et al.*, 2021)	USA	Retrospective	4.968	62.1	2.562 (51.6)	2.406 (48.4)	1.146 (23.1)	1.473 (29.6)	846 (17)	204 (4.1)	2.445 (49.2)	O>A>B>AB
(TAMAYO-VELASCO *et al.*, 2021)	Spain	Retrospective	108	71.5	40 (52.9)	33 (47.1)	17 (23.3)	59 (54.6)	10 (9.3)	4 (3.7)	35 (32.4)	A>O>B>AB
(SILVA-FILHO *et al.*, 2020)	Brazil	Literature review	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
(YAYLAC1 *et al.*, 2020)	Türkiye	Retrospective	397	47.1	221 (55.7)	176 (44.3)	29 (7.3)	201 (50.6)	55 (13.9)	21 (5.3)	119 (30.3)	A>O>B>AB
(ZHAO *et al.*, 2021)	China	Retrospective	2.173	NI	NI	NI	206 (9.4)	797 (36.7)	577 (26.5)	232 (10.7)	567 (26)	A>B>O>AB

With regard to the country where the studies were conducted, we have articles published in the Americas, Africa, Europe and Asia, seven of them in the United States of America, five in Turkey, four in Iran and Pakistan, three in India, Spain, China and Saudi Arabia, two in Brazil and Bangladesh, and one in Sudan, Romania, Qatar, Lebanon, Kuwait, Italy, Bahrain and Austria. The prevalence of blood types presented in each country was calculated and can be seen in Table 2.

Table 2: Distribution of blood groups by country.

Country	**A(%)**	**B(%)**	**AB(%)**	**O(%)**	**Prevalence**
Saudi Arabia	27%	17.9%	4.2%	51%	O>A>B>AB
Austria	44.9%	16.1%	9.2%	29.8%	A>O>B>AB
bahrain	21.9%	27.5%	5.0%	45.4%	O>B>A>AB
Bangladesh	35.8%	23.3%	20.3%	19.8%	A>B>AB>O
Brazil	40.1%	11.6%	3.5%	44.8%	O>A>B>AB
China	37%	26.5%	10.5%	25.9%	A>B>O>AB
Spain	69.4%	15.9%	6.2%	63.8%	A>O>B>AB

USA	33.6%	14.3%	4%	48.1%	O>A>B>AB
India	29.9%	41.8%	7%	21.1%	B>A>O>AB
Iran	30.2%	28.1%	7.3%	33.1%	O>A>B>AB
kuwait	25.5%	28.9%	8.5%	37.1%	O>B>A>AB
Lebanon	42.6%	13.1%	6%	38.3%	A>O>B>AB
Pakistan	24.2%	33%	17.5%	25.2%	B>O>A>AB
Romania	52.2%	21.7%	6.5%	19.6%	A>B>O>AB
Sudan	30%	15%	9%	46%	O>A>B>AB
Türkiye	47.8%	15%	7.4%	29.7%	A>O>B>AB

Of the 44 publications analyzed in this work, 29 claimed that there was some level of correlation between blood type and Covid-19 infection and 15 argued against this association. Thus, some facts were hypothesized; if there is such a connection, at what moment does it manifest itself? Is it possible for a person to be more susceptible or not to be infected by SARS-Cov-2? In the possibility of positive tests? During some point in the development of the infection? Or does it influence mortality, once the patient becomes infected? The responses presented in the studies included in this work are shown in Table 3.

Table 3: Correlation results between the studies included.

	Yes	**No**
Susceptibility	14	2
Test	1	1
Development	6	9
Mortality	8	3
Total	29	15

5.1 ABOUT SUSCEPTIBILITY

Most works on the correlation between blood type and Covid-19 infection will deal directly with the part before the patient is properly infected by the virus, that is, if an individual's blood type can make him more vulnerable or even act as a protection against SARS-CoV-2 infection at the cellular level.

Some of the articles argue that the blood type does not influence this phase of the infection process (BEHBOUDI et al., 2021; KABRAH, ABUZERR, et al., 2021), however, as mentioned in Table 3, most of them state that there is some kind of correlation.

The results found vary about which blood type acts in this part of susceptibility, but most of them bring that: Blood type A is more likely to have its cells infected by the virus and blood type O has greater mechanisms of protection against this entry.

To enter the host cell, SARS-CoV-2 uses its S transmembrane glycoprotein (or spike). This S protein contains two subunits, S1 and S2, with S2 generally binding to the ACE2 receptor for cellular entry.

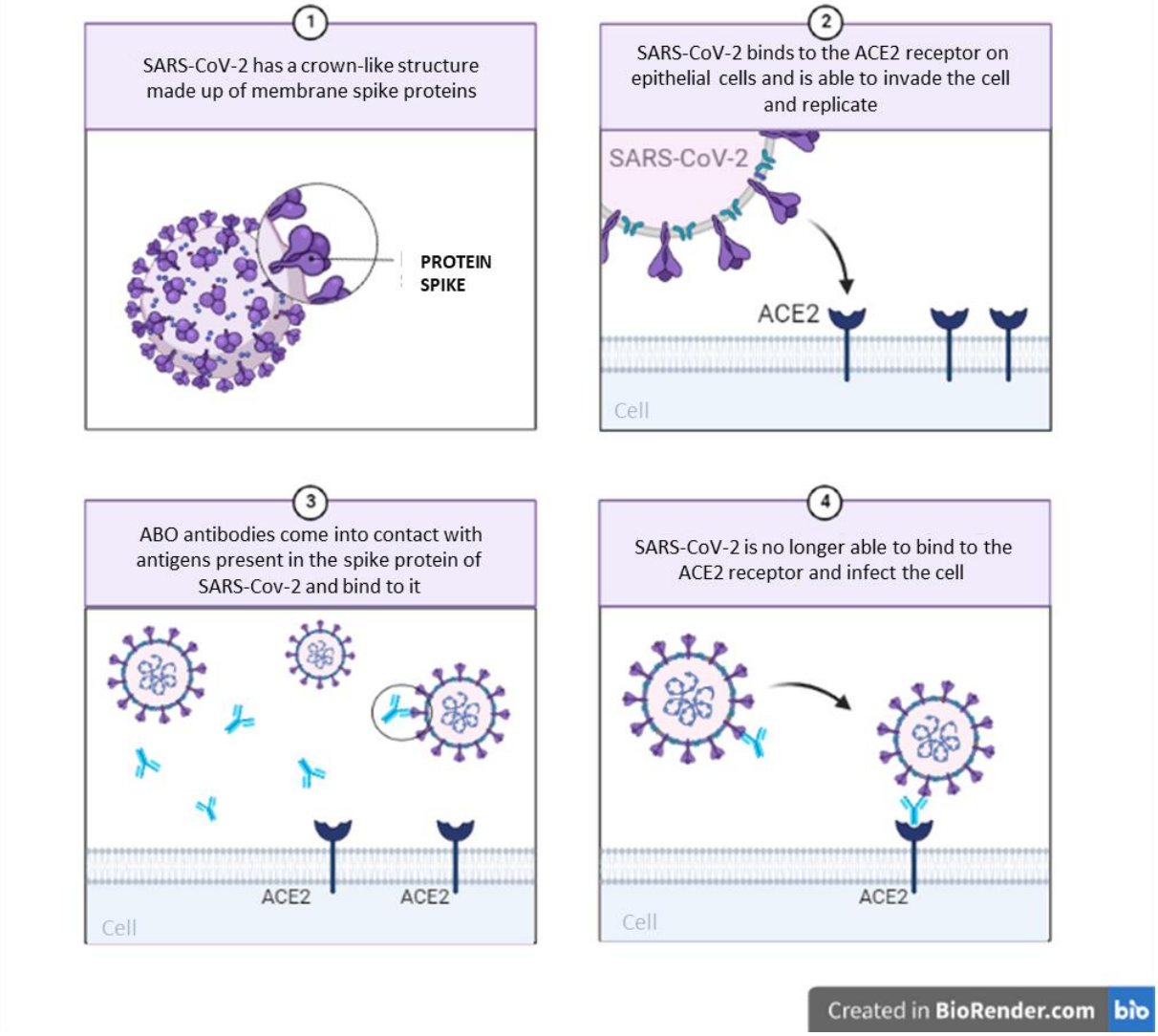
A study conducted by Brazilians from the Federal University of Bahia raises the hypothesis that the greater susceptibility found in type A can be explained by carbohydrate-carbohydrate interactions, however S1 binds to proteins containing sialic acid, such as CD147, which is also considered a SARS-CoV-2 entry receptor into the host cell. The hypothesis from this work is that the A antigen, mainly, stimulates the modulation of receptors containing sialic acid in the cell membrane through carbohydrate-carbohydrate interactions, which can maximize the binding of protein S in the cell membrane and consequently its entry in the host cell (SILVA-FILHO et al., 2020).

Furthermore, there is a significant structural similarity between protein S subunit 1 and a part of the A antigen of epithelial cells, which may also lead to this interaction and influence on susceptibility (WU et al., 2021).

The protective factor related to blood type O is raised by Yamamoto et al., remembering that ABO antigens are present not only in erythrocytes, but also in several other cells, such as the epithelial cells of the respiratory tract. So, when the virus invades that cell, it replicates and when it leaves the cell, it uses parts of the host cell's own membrane to create its membrane. In doing so, the virus may end up incorporating parts of the ABO antigens into its S protein, creating epitopes. When leaving this cell and trying to infect other cells of other hosts, these epitopes can be recognized by natural blood antibodies of this new individual.

Type O people have both Anti-A and Anti-B antibodies in their plasma, that is, following this line, they are the ones with the greatest capacity to recognize these epitopes in viruses that previously infected individuals of types A, B or AB and act accordingly. as neutralizers of these viruses, preventing their entry into the cell and consequent infection, at a certain level acting in a protective manner (YAMAMOTO et al., 2021). This information was compiled by the authors of this work, who proposed an illustrative scheme of this idea (Figure 2).

Figure 2: The protective power of blood antibodies against SARS-Cov-2 infection.



5.2 TEST

The correlation between blood types and SARS-CoV-2 infection has mixed results when it comes to test positivity. In the study carried out by Coluk and collaborators, 211 patients with flu symptoms were selected and then the PCR test was performed to detect SARS-CoV-2, in addition to the categorization of the blood group and Rh of the participants. After statistical analysis, no significant correlation was found between blood types and patients who tested positive (COLUK et al., 2021).

In the work conducted by Nalbant and collaborators, where a retrospective analysis of 313 patients who were tested was performed and a 4.1 times greater chance of positivity in the test was found in patients from group O when compared to other blood groups within this analyzed population (NALBANT et al., 2021).

5.3 DEVELOPMENT

Once someone is infected with SARS-CoV-2, can their blood type have any influence on disease progression? In an attempt to answer this question, some works have analyzed the presence or absence of aggravating factors in the clinical picture, such as the need for mechanical ventilation, use of vasopressors, what are the blood levels of infection and thromboembolism markers, need for intubation, need for ICU admission, among others (KUMAR et al., 2021).

The results found converge with each other. In a study conducted solely on infected children, it was found that type A was significantly associated with complications and consequent admission to the ICU and the need to use respirators.(BARI et al., 2021). Another study, this time done only with pregnant women positive for Covid-19, associated a lower risk of symptoms in patients with Rh+ and also found a greater association between blood group A and cases of hemorrhage and premature rupture of the placenta (SAINZ BUENO et al., 2021).

Most of the studies showed that type A can lead to a predisposition to increase the severity of the infection and type O can act in a protective way, but the results found are not statistically significant (GÖKER et al., 2020; KIM et al. al., 2021).

A study carried out in Bangladesh, conducted with patients admitted to the ICU, brings a more radical view: type A people had more clinical symptoms such as leukocytosis, increased serum ferritin levels and a greater need for oxygen supplementation when compared to patients of type A. other blood types (HALIM et al., 2021)

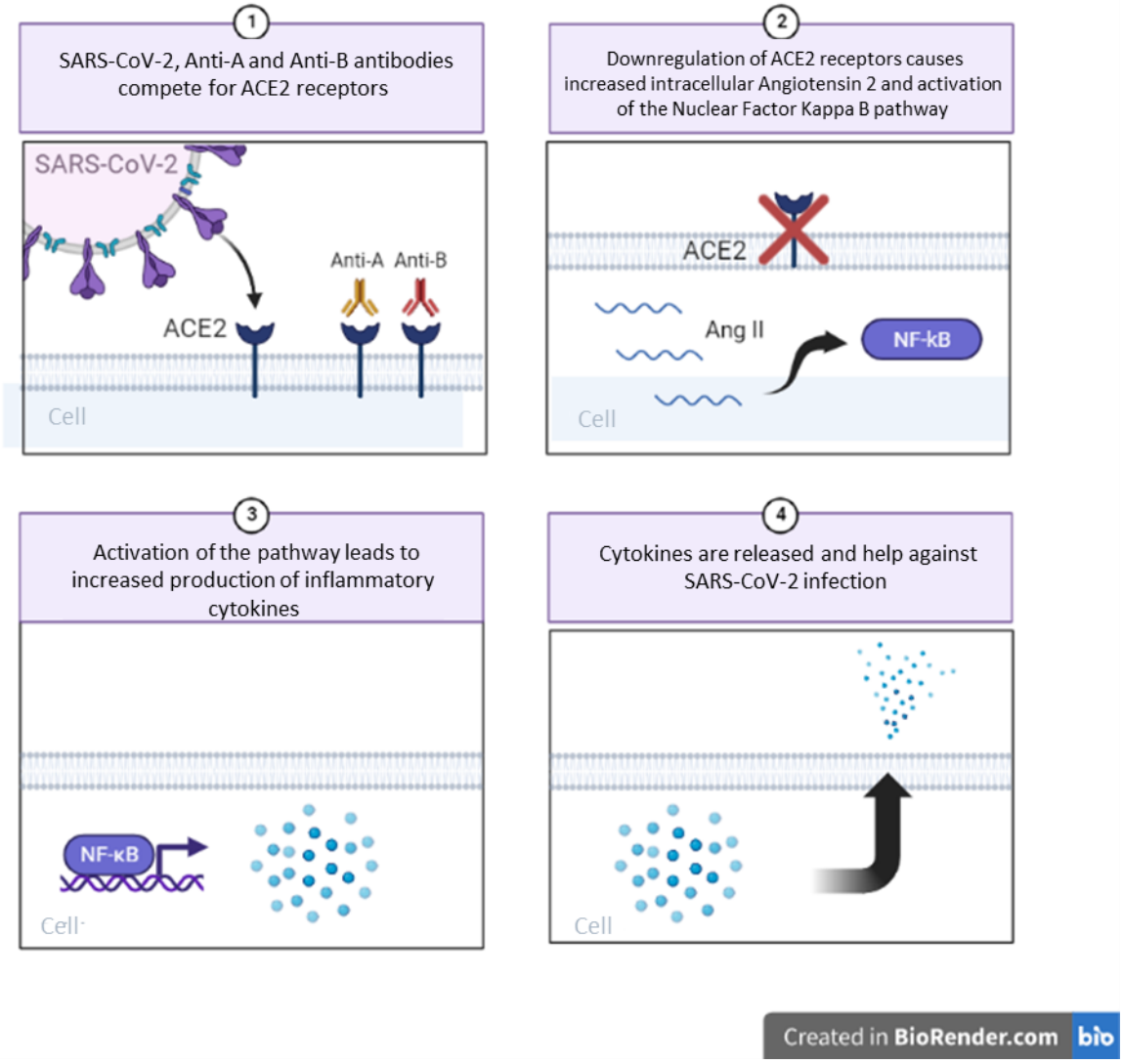
Another study from Bangladesh did not find significant differences in the progression of the disease in those infected, but detected that patients with blood type A had a late seroconversion when compared to patients with other blood groups, that is, patients with blood type A took longer to create antibodies against Covid-19, when infected by SARS-CoV-2 (MAHMUD et al., 2021).

Perhaps the work that brings a more concrete answer to this association is a study carried out in Spain, where they demonstrated a better prognosis in patients with blood type O. The explanation for this prognosis is that in addition to Anti-A and Anti-B antibodies present in the serum of these patients, they compete with the SARS-CoV-2 virus for the ACE-2 receptor. 2 and consequent entry into cells leads to a “downregulation” of ACE-2 receptors, as a form of cell defense.

This fact would cause an increase in intracellular angiotensin 2, which in abundance activates the Nuclear Factor Kappa B (NF-kB) pathway, triggering an increase in the production of several inflammatory cytokines, which act as an extra protection for patients with this type blood throughout the infection process, which may be responsible for an up to two times lower risk of need for mechanical ventilation (TAMAYO-VELASCO et al., 2021). For further clarification criteria, based on

the idea proposed by the authors mentioned above, a proposed interaction mechanism was proposed, according to figure 3

Figure 3: The protective power of downregulation of ACE2 receptors in type O individuals



5.4 MORTALITY

When it comes to the influence of blood type on the ability of SARS-CoV-2 infection, and the development of Covid-19 to lead the patient to death, the works that address this subject and that consider that this correlation does exist have brought biased results. The vast majority were studies that had a number of patients studied who died and their blood types were surveyed. Depending on which blood group was most frequently present among these patients, it was found that this group had a correlation with mortality from Covid-19.

It is important to point out that none of the works brings a theory or explanation about how this correlation occurs and how the blood type can lead to the death of those infected, in addition to being essential to remember that several factors can be responsible for a certain blood type being in greater

quantity in a certain population, such as ethnicity, geolocation, among others. As is the case of the work done by Padhi and collaborators, which argues for a greater susceptibility to death in patients with blood type B, investigated in a group of patients from India (PADHI et al., 2020). In a study carried out in New York City, United States, the most reported blood type among patients who died is type A (SZYMANSKI et al., 2021).

Even the articles that raise this correlation fail to bring statistically significant data, therefore, the works studied do not establish a correlation between blood types and the mortality of patients infected by Covid-19.

5.5 ROLE OF RACE AND GEOGRAPHIC REGION IN THIS CORRELATION

As can be seen in Table 2, the prevalence of a blood type changes from country to country, which can be explained by genetic inheritance. If a study is conducted on individuals of only one race, it may end up creating a skewed result.

This concern is raised by some studies included in this review, such as a study conducted in Pakistan, which found that people with blood type B are more susceptible to infection by SARS-CoV-2. However, Pakistan is part of one of the only regions in the world where there is a higher prevalence of people with blood type B (RAHIM et al., 2021).

Likewise, a study conducted with pregnant women in Romania shows that the largest number of infected women were type A, but the authors themselves already correlate this with the higher prevalence of this type among the Romanian population, and consider the result not significant. (COVALI et al., 2021).

Therefore, it is important to emphasize that there is a need to conduct research involving a population of patients that is multiracial, with the objective of considering possible racial disparities and differences in the prevalence of blood types when analyzing the correlation with SARS-CoV infection. -2 (PAUL et al., 2020).

As much as a correlation exists and can be proven, the progression of the disease will depend on several other factors that may be implicit, such as the patient's age, presence or absence of comorbidities, among others, which may play important roles.

One of the most recognizable consequences of aging is the decline of the immune system. Older people are not considered immunosuppressed, but the vast majority of them do not respond to antigens as quickly as younger people. In addition, the likelihood that these individuals are undergoing treatments with drugs that are immunosuppressive increases with age, making these patients more vulnerable to infections and the development of Covid-19 (MONTECINO-RODRIGUEZ et al., 2013).

The same goes for patients with certain diseases that inhibit the immune system, such as cancer, for example, as well as patients with some milder comorbidities, but which may still influence the onset of the disease, as is the case mainly of arterial hypertension, due to its relationship with the renin angiotensin aldosterone system and the ACE2 receptor, the main cell entry receptor used by SARS-CoV-2 and which is also the target of several drugs for hypertension, which can lead to an increase in the risk and development of infection in these patients (SAVOIA et al., 2021).

Circumstances like these mean that the clinical effects of the correlation between the ABO group and susceptibility, development and mortality by Covid-19 can be easily masked, which may explain the reason for so much controversy surrounding the existence or not of an association (YAMAMOTO et al., 2021).

6 CONCLUSION

The pandemic caused by SARS-CoV-2 is an outbreak that affects human health. Since the first confirmed case, several people have been infected across the globe and many have unfortunately lost their lives due to complications caused by Covid-19. Several studies have been published on the subject since the disease emerged, and among these, studies correlating blood type and levels of SARS-Cov-2 infection.

The data found in the works contemplated in this review suggest a greater susceptibility of type A to infection and a greater protective effect both in susceptibility and in the development of the disease in individuals of type O. However, these correlations are not significant for the development of the disease. They exist, but they are not enough to be decisive in the process of infection by Covid-19.

The studies discussed here have several factors that should be considered, such as the role of race and genetic inheritance in the reliability of the results found, the lack of studies with greater miscegenation of the participating patients, in addition to the results found without statistical significance.

The correlation between blood types and Covid-19 infection exists, but it does not prove to be clinically significant and needs more research on the subject to elucidate this association and what its exact mechanisms are.

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CHAPTER
56

COVID-19 pandemic: An increase in Brazilian deforestation

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ABSTRACT
The objective of this research was to verify the increase in Brazilian deforestation rates during the Covid-19 pandemic. The research used was the bibliographic and the data used were of secondary origin obtained on the website of the National Institute for Space Research and the System for Estimating Greenhouse Gas Emissions of the Climate Observatory. The results showed that the rate of deforestation in the Legal Amazon increased by 35% due to the decrease in inspection and the relaxation of environmental legislation supported by the Federal Government. It was expected that with the reduction in economic activity due to the social isolation necessary to combat the Covid-19 pandemic, there would be a reduction in deforestation, but illegal deforestation activities continued with more intensity. Public power must assume the main role in combating deforestation actions since the preservation of natural environments is essential for the survival of human beings.

Keywords: Deforestation, Pandemic, COVID-19 Amazon.

1 INTRODUCTION

The human being has harmed the productive capacity of natural resources, thus expanding the world's concern for the environment. Productively using the environment does not mean having to harm it, harmony between man and the environment in which he lives is possible. It is known that farmers, for their subsistence, use natural resources intensively, depleting the productive capacity of the soil.

The constant challenge is to make the population aware of the environmental issue, showing that natural resources cannot be explored indefinitely, as they are limited. Joint action by all sectors of society, across the planet, is necessary to reduce the impacts already caused and ensure the conservation of areas not yet explored.

However, the deforestation of environmental areas such as the Amazon rainforest continues to occur, as these areas have a complex and rich biodiversity, thus attracting different types of productive and largely destructive interests. According to Fearnside (2005), biodiversity is not the only victim of deforestation. Other ecosystem services are also affected, such as soil erosion, loss of nutrients and the regulatory functions of the watershed, and the emission of greenhouse gases, these emissions being very harmful to the ecosystem.

According to the Ministry of the Environment (MMA, 2012), deforestation is a direct consequence of the absence of policies based on sustainability. In Brazil, policies are still needed to regularize the land situation, disseminate a new model of exploitation of agriculture and the timber and mining industry, and improve the structure and technology of inspection, licensing and forest management bodies.

Despite the lack of efficiency in the application of laws that protect the environment, Brazil created in the 1960s the Brazilian Forestry Code in the 1980s the Federal Constitution. In addition, some bodies were created to supervise and regulate activities in environmental areas, such as the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA).

The Brazilian Amazon began to be exploited in a more accentuated and harmful way in the 1970s, in which population migrations intensified. According to Alencar et al (2004), in the late 1990s and early 2000s, the Amazon underwent a second phase of occupation, in which tax incentives played a reduced role, but the profitability of extractive and agricultural activities boosted expansion. and the transformation of the border of Brazil.

According to the National Institute for Space Research (INPE), deforestation in the Amazon Forest had a process decrease in its rates in the period between 2004 and 2012, from 27,772 km² in 2004 to 4,571 km² in 2012. Assunção et al (2012) state that there are two explanations for the reduction in deforestation, one of them is that the agricultural product gets a price drop and thus they do not look for new lands to produce; and new policies to combat deforestation.

Also according to INPE, in 2013 the deforestation rate increased again to 5,891 km². In 2014, there was a reduction to 4,848 km² deforested. In the following years, 2015 and 2016, the increase in deforestation continued, with a decrease in 2017. Between 2018 and 2019, deforestation rates increased from 7,536 km² to 9,762 km², thus showing that the Brazilian deforestation rate has steadily increased.

The numbers show that the trend is for deforestation to also increase in 2020, as deforestation alerts in the Amazon grew 63.75% in April when compared to the same month of 2019, according to INPE. This increase occurs amid the Covid-19 pandemic, a period that requires social isolation, thus making inspections regarding illegal activities carried out in the Amazon region more difficult.

Based on the above, the objective of this research is to verify the increase in Brazilian deforestation rates during the covid-19 pandemic through the data available at INPE, to identify possible justifications for the negative impact of the pandemic on deforestation.

2 ENVIRONMENTAL POLICY AND BRAZILIAN DEFORESTATION

Capitalism brought social domination over nature, as this is considered an obstacle to be overcome in the pursuit of civilization progress. The capitalist system recreated human nature and its

needs since human beings used nature for their subsistence before, and after the unbridled adoption of capitalist thinking, they exploit nature's resources more intensely to sell them and thereby obtain profit, which is the main objective of this system, without worrying about the use of natural resources and their degradation.

For Smith (1776) the forces of the economy lead to a harmonious result in economic and social terms. But over the years this is not what has happened, this harmony does not exist, since the capitalist system privileges economic strength, in which the most crucial thing is profit, no matter what needs to be done to achieve it. In this way, one aspect grows, in the economic case, to the detriment of others such as social, environmental and cultural. It is important to emphasize that the environmental aspect was not much talked about at the time in question, since natural resources were not used in such an intense and predatory way as they are today. The problem is that human behavior in recent times has constantly degraded natural resources and this has brought harmful consequences to society as a whole, such as global warming and the scarcity of essential resources such as water.

The debate on environmental policy is very incipient in Brazil, unlike what happens in other countries, which are already more advanced when it comes to this subject. In Brazil, policies were more focused on the objective of economic growth, increasing the country's wealth, without any concern for natural resources and their sustainability. Economic policies were the main objective of the rulers, however, from the United Nations Conference on the Environment, in 1972, most countries became concerned with environmental protection, including Brazil. There was, however, no coordinated action by the government or by an entity responsible for environmental management, thus making it difficult to promote ideas about environmental conservatism.

After 1972, environmental ideas became more talked about, thus consolidating the theme worldwide, as part of the population was already concerned about the future of humanity, due to the excessive exploitation of natural resources. According to Lustosa and Young (2002), the Brazilian environmental policy elaborated after the Stockholm Conference was based on pollution control and the creation of nature conservation units. It wasn't ideal, since the use of natural resources covers several situations, but it was already the beginning of a concern to protect natural environments.

Brazilian environmental policy began in the first government of Getúlio Vargas intending to order the use of natural resources. In 1934, the Forestry, Waters, Mines, Hunting and Fishing Code was created and the first Brazilian Conference on Nature Protection was created, in addition to the creation, in 1937, of the Itatiaia National Park and legislation to protect historical and artistic heritage. national. According to Salheb et al. (2009) the first moment of Brazilian environmental policy was marked by two basic concerns: the rationalization of the use and exploitation of natural resources and the definition of permanent preservation areas, thus establishing some limits to private property.

In 1958, the first Brazilian environmental agency was created, the Brazilian Foundation for Nature Conservation. In the 1970s, the Special Secretariat for the Environment was created, bringing up the discussion on pollution and deforestation, at the same time that the government encouraged the colonization of the Amazon and civil construction in the main Brazilian cities. In 1981, the National Environmental Policy was formulated, introducing environmental protection areas and ecological stations in the country. The "Our Nature" Program, in 1988, created the Brazilian Institute for the Environment and Renewable Natural Resources. During this period, a specific ministry was also created to deal with the issue, thus recognizing the concern of public authorities in conserving natural resources. And in 1992, Brazil was chosen as the host of the United Nations Conference on Environment and Development, thus contributing to a greater debate about environmental policies (ALMEIDA, 2002).

The “Eco-92” meeting marked the discussion on sustainable development, held in Brazil, with the participation of representatives from almost all countries to discuss the need to internalize environmental problems in decision-making processes, both in the political and economic spheres. (SIRVINSKAS, 2009). Until then, discussions had been held about the economic development of countries, which consisted of increasing the wealth of a country combined with better living conditions for the population, such as access to health, education, housing, sanitation, and culture, among others. What was not in question was the use of natural resources that are essential for the economic growth of a country, but how to continue growing and not degrade the environment? It would be possible? The new definition of development brings the idea of sustainable development, which consists of not only growing economically and the well-being of the population, but the conscious use of natural resources and the stimulus to think of new ways of producing, in which degraded little or no use of natural resources.

For Veiga (2000), the notion that comes closest to the discussions on sustainable development are the ideas of Amartya Sen, in 1996 and 1997, with the notion of development as freedom, in which freedom could never be restricted and understood as per capita income, and should cover cultural, social, environmental issues, among others.

Still at Eco-92, Agenda 21 was elaborated. According to the Ministry of the Environment (2013), Agenda 21 was a planning instrument for building sustainable societies, in different geographical bases, which reconciles methods of environmental protection, justice social and economic efficiency, linked to combating desertification and resistance to the effects of droughts in the arid, semi-arid and dry sub-humid zones of the planet.

It is important to modify the current relationship between human beings and nature, which is exploratory, as barriers are created for the future by using natural resources excessively, producing

scarcity, polluting the environment, deforesting, extinguishing species, and heating the planet, among others. According to Freitas (2007) in approximately three hundred years man has already destroyed 50% of the world's natural green area. Brazil is responsible for a significant portion of the devastation, as it has already destroyed 40% of its total forests.

Faced with this situation, the population needs to change its actions so that nature is preserved and with it the resources we need to survive. According to Fonseca (2007), the main activities responsible for the deforestation of Brazilian forests are agricultural and extractive, in addition to poor management of urban waste.

Brazilian deforestation is the result of legal and illegal productive activities. There is an urgent need for public policies aimed at the environment, especially in locations where activities are very intense and frequent. In addition to enforcing current legislation and reducing the expansion of activities that harm the environment.

For Fearnside (2005) the main strategies to slow down deforestation are repression, through licenses, inspections and fines; political reform on taxes, credits and subsidies, to reduce tax subsidies for ranches raising cattle and other crops in areas of deforestation.

The remarkable decrease in deforestation rates in Brazil provides important lessons about the importance of creating public policies, strengthening monitoring systems, and intervening in the production chain to make the work of those who insist on practicing illicit activities more difficult (NEPSTAD, 2014).).

Environmentally educating the population is one of the most viable and far-reaching solutions, however, it is necessary to invest in the dissemination of this knowledge not only for producers who work using natural resources but for society as a whole. It is important to show them that there is a way to continue working, supporting themselves, and protecting natural environments.

3 RESULTS AND DISCUSSION

The research used was bibliographical, according to Fonseca (2002) any scientific work begins with bibliographical research, which allows the researcher to know what has already been studied on the subject. The data used are of secondary origin obtained on the website of the National Institute for Space Research (INPE) and the System of Estimates of Emission of Greenhouse Effect Gases (SEEG) of the Climate Observatory.

The relationship between Brazil and deforestation is not recent, studies indicate that at the time of Portuguese colonization, action was already taking place for the exploitation of natural resources abundant in Brazilian soil. In the 1970s there were high rates of deforestation and in 1995 it reached a high peak not seen in Brazilian history until then. According to Folmer and Kooten (2006), the causes

of deforestation are the combination of several factors, such as agricultural expansion, timber trade, population growth, and road construction.

The consolidated rate of deforestation for the years 2018 and 2019 of the nine states belonging to the Brazilian Legal Amazon (ALB) is shown in Table 1. This rate is calculated by the Monitoring Project for Deforestation in the Legal Amazon by Satellite (PRODES). Data show that the rate of deforestation in the Legal Amazon increased by around 35%, mainly due to the substantial increase in deforestation rates in Acre (53.60%), Pará (52.04%), and Roraima (202.56%). These results achieved by the territory of the Legal Amazon have occurred due to the decrease in the inspection of these areas and the relaxation of environmental legislation supported by the Federal Government.

Table 1: Deforestation Rates for the years 2018 and 2019

State	2018 (km²)	2019 (km²)	Variation (%)
Acre	444	682	53,60
Amazonas	1.045	1.434	37,22
Amapá	24	32	33,33
Maranhão	253	237	-6,32
Mato Grosso	1.490	1.702	14,23
Pará	2.744	4.172	52,04
Rondônia	1.316	1.257	-4,48
Roraima	195	590	202,56
Tocantins	25	23	-8,00
Amazônia Legal	**7.536**	**10.129**	**34,41**

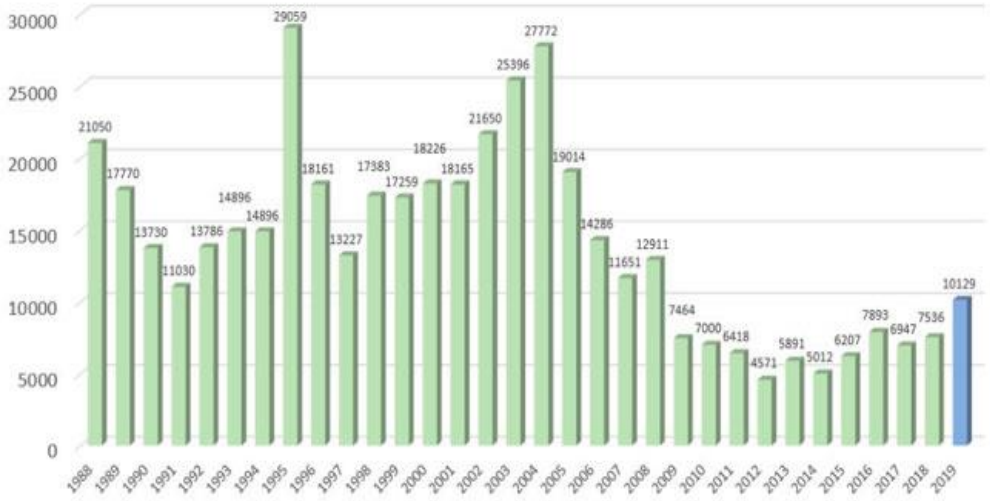
Source: National Institute for Space Research (2020)

In the analysis of annual deforestation rates in the Legal Amazon over the last 20 years, significant changes in Brazilian deforestation can be seen, as shown in Figure 1. The worst Brazilian results occurred in 1995 (29,059 km²) and 2004 (27,772 km²). After 2004, Brazilian deforestation rates began a strong reduction, reaching the lowest rate in 2012 (4,571 km²).

According to Arraes et al (2012) in 1995 the deforestation rate reached its highest level and as a consequence, there is also degradation that contributes to the loss of biodiversity, reduction of water cycling, and global warming, mainly through fires, by emitting gases that contribute to accelerating the greenhouse effect process.

In 2004, to combat deforestation and other environmental crimes, the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon was launched. This plan prioritized the viability of a new development model in the Amazon region, based on social inclusion with respect for cultural diversity, in addition to enabling various economic activities through the sustainable use of natural resources (BRASIL, 2004).

Figure 1: Consolidated annual deforestation rates in the Brazilian Legal Amazon in km2



Source: National Institute for Space Research (2020)

Segundo o **Instituto Nacional de Pesquisas Espaciais** (INPE, 2020) o increase in cases of Covid-19 in Brazil coincides with the increase in records of destruction of the Amazon rainforest. In the first four months of 2020, the increase in deforestation was 55% compared to the same period in 2019. However, it was expected that with the reduction in economic activity, there would be a reduction in deforestation.

Brazil is bucking the world trend of low emissions in 2020, due to the increase in deforestation during the Covid-19 pandemic. Greenhouse gas emissions should rise between 10% and 20% in Brazil in 2020 compared to 2018. The expectation is that the recession caused by the pandemic will reduce greenhouse gas emissions by 6%. In 2018, Brazil emitted 1.9 billion gross tons of CO2. The expectation is that emissions in 2020 will be between 2.1 billion and 2.3 billion gross tons, depending on the progress of deforestation in the Amazon (CLIMATE OBSERVATORY, 2020).

Also according to the Climate Observatory (2020), Brazil will hardly meet the goals of the National Policy on Climate Change for the year 2020. The goal would be to reduce the rate of deforestation in the Amazon by 80%, but with data from the first months of 2020, high deforestation rates and few actions by regulatory bodies are identified, thus showing the country's low commitment to environmental issues.

Illegal deforestation activities continue even more intensely during the social isolation necessary to combat the pandemic. According to the deforestation alert system of the National Institute for Space Research (INPE, 2020), in January 2020 there was a 52% increase in the area under deforestation alerts compared to the same month of 2019, and in February was 25% higher than the same month in 2019.

For the Climate Observatory (2020), the strong increase in deforestation in the Amazon in 2020 tends to offset the expected drop in emissions in the energy sector and industrial activity. Another factor for the increase in emissions in Brazil is the reduction in meat consumption, since in April cattle slaughter fell by 20%, and livestock alone accounts for 20% of emissions in Brazil, as the reduction in slaughter means more cattle on pasture and, therefore, more emissions.

It is necessary and urgent that the government assumes the main role in combating deforestation actions since the preservation of natural environments is essential for the survival of human beings. In 2020, the Federal Government created the Amazon Council and the National Environmental Force, both intending to protect Brazilian diversity. However, when analyzing deforestation rates, there is no evidence that effective actions are being put into practice in the last months of 2020.

The acceleration of deforestation and emissions stems directly from the actions of the current Brazilian government to dismantle control plans, on the one hand, and encourage environmental crime, on the other (OBSERVATORIO DO CLIMA, 2020). Some analysts claim that creating new bodies and sending the army to protect the Amazon is not enough, since the bodies that have been operating in this area for several years do not have the necessary support from the public power, thus making it difficult to inspect and educate the population's environment.

Regardless of the government, it is crucial to encourage environmental education, from primary school to graduate school, making the population understand the importance of the diversity and richness that the Brazilian Amazon. Thus stimulating the feeling of belonging and protection of the local community with the natural environment.

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CHAPTER

57

The effectiveness of microneedling in the treatment of post-COVID-19 hair disorders

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ABSTRACT
Patients who were contaminated by SARS-CoV-2 developed an infectious picture of non-cicatricial alopecia of the type's alopecia areata - AA, androgenetic alopecia - AGA and increased cases of telogen effluvium - ET, and for alopecia areata and androgenetic alopecia was observed worsening of these diseases in cases of patients already being carriers of this pathology. This article is characterized as an integrative, descriptive and qualitative review. The work was composed of specialized bibliography, consisting mainly of articles and scientific journals published in English and Portuguese, consulted the Medline databases (Medical Literature Analysis and Retrieval System Online); Google Scholar and Virtual Library – CEUMA, using the descriptors "COVID-19" and "hair disorder", "COVID-19" and "alopecia", "microneedling" and "treatment" and "alopecia". Microneedling accelerates the inflammatory process, providing skin revascularization, tissue regeneration and hair follicle stimuli. It is a safe method with a low risk of side effects, showing effective results in androgenetic alopecia-AGA. alopecia areata-AA and telogen effluvium-ET.

Keywords: Hair therapy, alopecia, SARS-CoV-2.

1 INTRODUCTION

Hair and the overvaluation of personal image are directly linked. Hair loss is directly related to lack of confidence, impacting self-esteem and mental health. The treatment of this disorder is fundamental for the recovery of health and quality of life of people who are affected by this type of pathology (CRISTINO *et al*., 2022). However, advances in science in the search for better techniques, which are able to control progression and/or reverse cases, have been advancing (TALEI *et al*., 2021).

According to Basilio *et al*. (2022), microneedling therapy has been used to treat hair disorders, regenerate follicles and seek balance of the capillary cycle. Treatment with microneedling proved to be quite advantageous at this time of increased cases of capillary disorder caused by the SARS-CoV-2 virus, when compared to other therapies (OCAMPO-GARZA *et al*., 2022).

SARS-CoV-2 virus infection is directly associated with exacerbation of the hair disorder, hair loss, and other diseases such as prostate cancer, benign prostatic hyperplasia, and polycystic ovary syndrome (WAMBIER *et al*., 2022). Several cases of dermatological diseases such as erythematous rash, generalized urticarial, chickenpox-like vesicles, acroischemia, chilblain-like eruptions and petechiae eruptions mimicking dengue were also evidenced (CAPALBO *et al*., 2021; BRANDÃO, 2022).

Researchers are unsure of the harmful effects related to the duration and extent of the disease. However, hair loss is one of the disorders that has been drawing the attention of scientists (NATÁRIO *et al*., 2022).

It was observed that patients who were contaminated by SARS-CoV-2 developed an infectious picture of non-cicatricial alopecia of the type's alopecia areata - AA, androgenetic alopecia - AGA and increased cases of telogen effluvium - ET, and for alopecia areata and androgenetic alopecia worsening of these diseases was observed in cases of patients already being carriers of this pathology (OGBUEFI *et al*., 2022).

SARS-CoV-2 is the virus that causes the COVID-19 pandemic, its spread and mutation occur in an accelerated way, that is, each new host that settles can undergo variations, and may be more pathological or more infectious. The most contagious mutant viruses become dominant in the population, giving rise to new viral strains (SANTOS *et al*., 2021).

According to Capalbo *et al*. (2021), the failure in the tolerance mechanism activates the self-reactive cells – T and cause damage to the hair follicles, thereby activating and/or reactivating autoimmune diseases such as alopecia areata – AA. In addition to this factor, the environmental trigger was considered, which affects mental health and accentuates psychological stress, which seems to be another possible risk factor for this pathogenesis. The SARS-CoV-2 virus can act on different autoimmune pathways, stimulating an inflammatory environment that allows nonspecific activation of

the immune system or by a cross-reaction between its antigens and the host antigens. Studies are being deepened, investigated and one of them is on the transmembrane serine protease enzyme 2, better known as (TMPRSS2). Although this enzyme does not belong to SARS-CoV-2, it was found that it has a fundamental role in host infection and, for this reason, may be a potential pathway to combat and spread SARS-CoV-2 and its harmful effects (SANTOS *et al.,* 2021; GRESS *et al*., 2022).

The researched literature already shows a strong trend in relation to hair loss and COVID-19 infection. Therefore, this work aims to demonstrate the effectiveness of microneedling techniques in the treatment of hair disorders. This treatment option is showing highly promising results in the face of exacerbation of capillary disorders caused by SARS-CoV-2 viral infection.

2 MATERIALS AND METHODS

The elaboration of this article was based on an integrative, descriptive and qualitative review. In addition, the work was composed of specialized bibliography, consisting mainly of articles and scientific journals published in English and Portuguese. The following post-COVID-19 hair loss research databases were used: Medline (*Medical Literature Analysis and Retrieval System Online*); Google Scholar (Google Scholar) and Virtual Library – CEUMA. The descriptors used were "covid-19" and "hair disorder", "COVID-19" and "alopecia", "*microneedling" and "treatment" and "alopecia".*

Data collection took place between February and March 2023, adopting the following inclusion criteria: articles published in the last five years and related to the proposed theme. On the other hand, as an exclusion method, the respective foundations were adopted: articles published on dates lower than 2019, articles that were repeated in the databases and articles whose objectives did not contemplate this research.

In total, 35 potential articles were analyzed for analysis, which belong to the *Medline* google scholar database and CEUMA Virtual Library. Thus, and considering the inclusion and exclusion criteria mentioned above, 26 studies were selected to compose this research.

3 RESULTS AND DISCUSSION

After conducting the searches, where the selected articles were read and interpreted, this article presents the main capillary disorders caused by the SARS-CoV-2 virus and also the treatment through microneedling techniques. It was observed, in this sense, that several articles indicated the need for further scientific investigations to prove the treatment.

In studies by Nguyen *et al*. (2022), when 41 articles were chosen for evaluation, considered the association between infection caused by the SARS-CoV-2 virus and the various types of alopecia. In

this first analysis, 1826 patients were selected, all of whom were affected by the virus and developed or had relapse of alopecia. As shown in **Table 1**.

Table 1 - Association between SARS-CoV-2 and types of alopecia.

Types of alopecia associated with SARS-CoV-2 contamination		
Types of alopecia	%	Quantity
Alopecia AGA	31%	561
Alopecia TE	20%	362
Alopecia AA	7,80%	143
Other types Alopecia	0,20%	4
Not classified	41,40%	756
Total	100%	1826

Source: Nguyen *et al*. (2022)

For Vieira *et al*. (2022), changes in the life cycle of the anagen to telogen phase in patients infected with the SARS-CoV-2 virus are caused by the release of specific neuropeptides, neurotransmitters, and hormones in the brain axis of the hair follicle. Carneiro *et al*. (2023), state that the increased release of cytokine can cause the alteration of the cycle or damage to the cells of the capillary matrix. Saki *et al*. (2022), on the other hand, emphasize that there is also a reduction in anticoagulant proteins, which can cause microthrombi and, consequently, there is a reduction in the amount of blood to the hair follicle. The consumption of drugs, especially blood thinners during the treatment of COVID-19, may also have its contribution.

In addition, **Table** 2 shows the period that arose and the duration of hair loss after the individual was infected by the SARS-CoV-2 virus. An increase in the prevalence of cases during the pandemic period has been observed. During this observation, of the 80 patients evaluated, 43 of them, that is, 53.75% presented hair loss disorders.

Table 2 - Time after the onset of COVID-19 infection until the development of hair loss and the duration of hair loss

Period	Onset of hair loss after SARS-CoV-2 contamination		Duration of hair loss	
	Number of Patients	%	Number of Patients	%
1 week	3	6,98	0	
15 days	11	25,88	0	
1 month	13	30,23	2	4,65
2 months	4	9,3	7	16,28
3 months	10	23,25	8	18,60
4 months	0	0	8	18,60
5 months	0	0	1	2,33
6 months	0	0	5	11,63
another 6 months	2	4,65	7	16,28

They didn't know how to answer	0	0	5	11,63
TOTAL	43	100%	43	100%

Source: Perelli *et al.* (2022)

According to **Table 2**, most patients developed the hair disorders between 15 days and 3 months after being infected by the virus. For cases before the pandemic, the emergence of this pathology was observed between a period of 60 to 90 days after a stressful agent that triggers this condition. Regarding the duration of hair loss of the 43 patients, only 38 were able to inform, the others did not respond. The table also shows that recovery, in its majority, occurred in up to 6 months, cases over 6 months escape from traditional cases and can be considered acute telogen (PERELLI *et al.*, 2022). Emphasizing the fact of the early disease, in another study conducted the average onset of the disease was 57.1 days, taking into account a sample of 214 patients with telogen effluvium type disorder (ARAUJO *et al.*, 2022).

However, for Saki *et al.* (2022), the increase in the prevalence of telogen effluvium was 400%, considering the period since the beginning of the pandemic. Telogen effluvium is a self-limited pathology, is divided into acute, which lasts for 6 months or less and is chronic (presented in an intermittent diffuse form), lasting more than 6 months. For patients infected by the SARS-CoV-2 virus, it has already been observed that recovery can occur around 3 months, however, recovery may be hampered due to the strong stress they are subjected to (CRISTINO *et al.*, 2022).

Perelli *et al.* (2022), not only evaluated the increase in hair loss, but also other symptoms that occurred on the scalp and hair shaft after infection. The main symptoms are described in **Table 3**.

Table 3 - Main hair disorders reported by the interviewee

Main hair disorders reported by the interviewee			
Symptoms	Individuals who had symptoms	Individuals who did not have symptoms	Percentage (%)
Thinning of the wires	24	19	55,8
Itching of the scalp	13	30	29,5
Sensitivity in the scalp	11	32	25,5
Weakening at the root	11	32	25,5

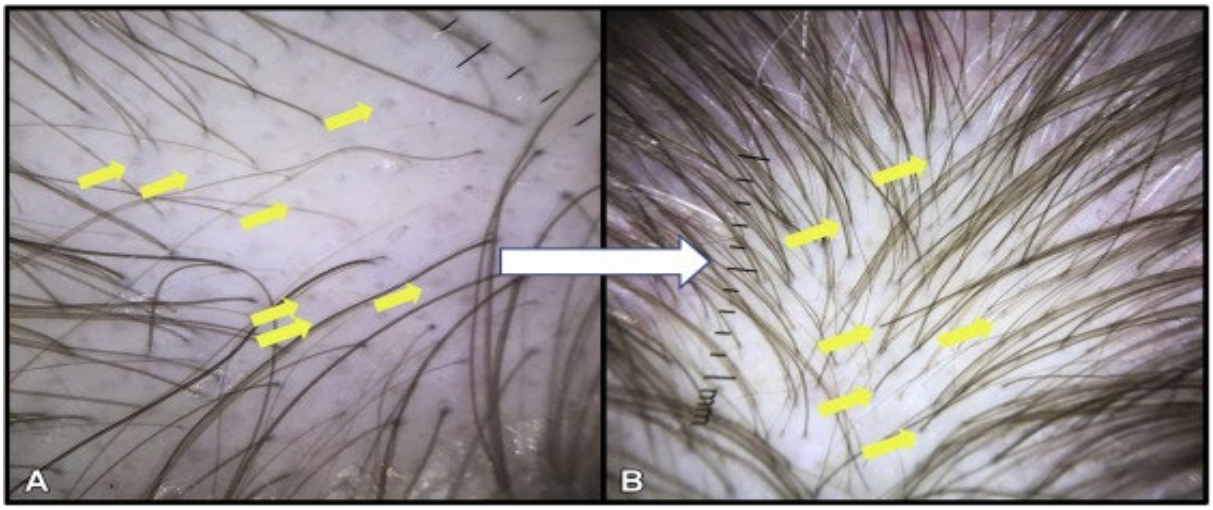
Source: Perelli *et al.* (2022)

The data shown in **Table 3** by Perelli *et al.* (2022), indicate the symptoms presented in the patients interviewed, in this sense it is important to highlight that the reports indicate that the scalp is more visible, the hair falls in several lengths and the density is reduced, that is, the fall is more diffuse. Being that these symptoms are very related to alopecia type telogen effluvium – ET. What's more, for

cases of alopecia areata – AA, the fall is more concentrated and usually oval in shape. Patients also reported scalp pain and/or tenderness.

Severe systemic infections can have interference in the functions of keratinocytes, leading even to the breakage of the hair shaft due to the contractions and expansions to which they are subjected, causing damage to the anagen matrix of the hair, this anomaly is known as Pohl-Pinkus's brand or bayonet hair. The hair breaks in the weakest part as a result of thinning or narrowing of the hair shaft (SAKI *et al*., 2022).

Figure 1- post-COVID-19 Acute Telogen Effluvium – Female.



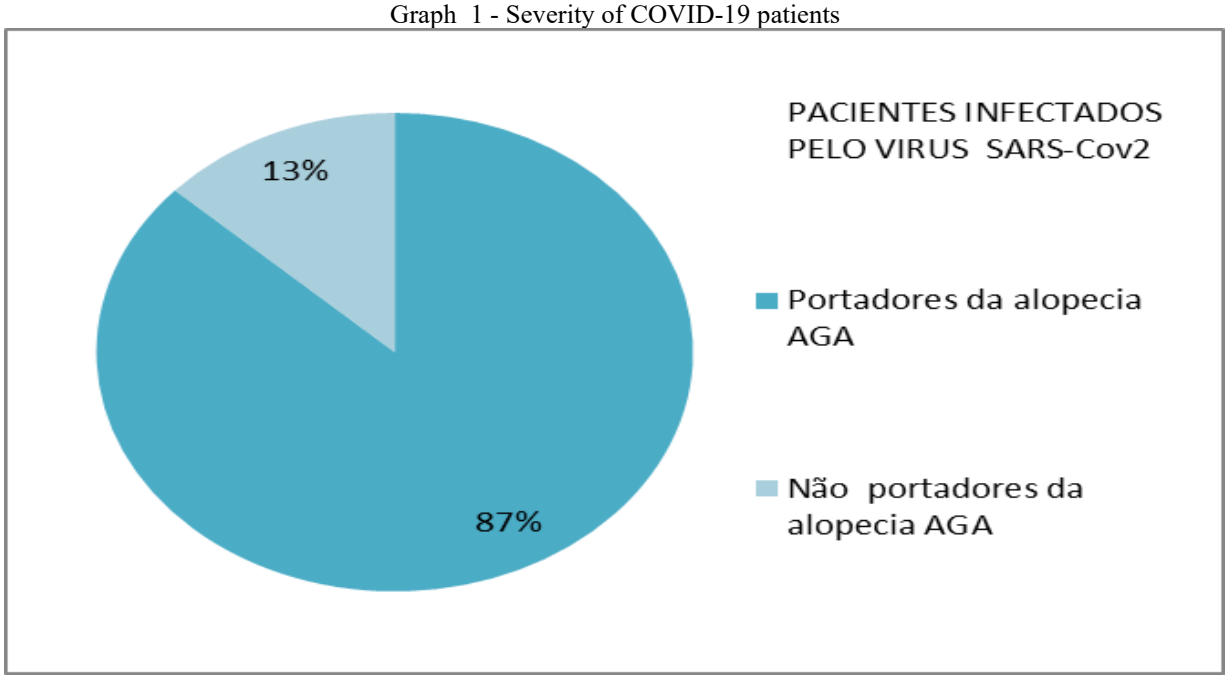
Source: Abrantes *et al*. (2021)

Photo **A shows empty follicles and changes in the stems, as indicated in the yellow arrows and** in photo B, **after 4 months, the resolution of empty follicles and the presence of short hair strands, indicated in the yellow arrows (ABRANTES** et al*., 2021).*

Seyfi *et al*. (2022) compared the influenza pandemic in 1918 to COVID-19 in 2019. The study revealed that telogen effluvium - ET manifested itself in both pandemics, in influenza it was calamitous and the fall was on average 2 months and 15 days long, while in the case of COVID-19 it is estimated that it may be smaller. The study demonstrates that the cutaneous manifestations, that is, the occlusion of the microvasculature may have been caused by the greater release of cytokines (tumor necrosis factor, interleukin 1b, interleukin 6 and interferon types 1 and 2).

Wambier *et al*. (2020) report cases of high rates of androgenetic alopecia (AGA) in patients hospitalized with COVID-19 due to severe symptoms. Androgen sensitivity is a likely determinant of disease severity. In this sense, the evolution of the severity of the disease in patients with androgenetic alopecia is observed, as indicated in **Graph 1**.

Graph 1 - Severity of COVID-19 patients



Fonte: Ohyama. M; Matsudo, K. e Fujita, T. (2022)

According to the analysis of the graph above, among the patients who had androgenetic alopecia – AGA, 87% presented more severe picture when infected by the SARS-CoV-2 virus, while 13% did not have androgenetic alopecia – AGA. The research took into account a total of 98 patients, one of the justifications may have been the increase in serine protease 2 (TMPRSS2) or angiotensin-converting enzyme 2 (ACE-2), justified by the binding of dihydrotestosterone (DHT) to the drogen receptor, arising from the cleavage of the spike protein of the SARS-CoV-2 virus (OHYAMA; MATSUDO; FUJITA, 2022**).**

As reported by Natario *et al*. (2022), it is important to monitor this pathology associated with COVID-19, the way it presents itself and its evolution, because the earlier the diagnosis is detected, the easier it is to establish treatment procedures and stop the progression of the pathology, in addition to minimizing or eliminating possible sequelae.

There are several types of treatment for alopecia, but the choice of treatment should be made judiciously, taking into account each patient, the type of alopecia and the degree of evolution in order to choose the most appropriate therapy. It can be exemplified, in this sense, telogen effluvium pictures, which are most often self-limited and resolve without the need for some alternative therapy. In cases of chronic telogen effluvium, alopecia areata or other hair disorders, the analysis has to be thorough in order to choose the correct treatment and perform safely (PERELLI *et al*., 2022).

Freitas, Vasconcelos and Oliveira Filho (2021) report that conventional therapies are presenting a low satisfaction rate, because their action is to prevent the spread of the pathology. These therapies have low efficacy in the areas already affected and do not act on regeneration, possibly due to the characteristics of the treatment and the need for prolonged use, in addition to causing several side

effects, such as the use of minoxidil and finasteride, which can cause hyperalgesia, sexual dysfunctions, breast and prostate cancer. Given this, there is a demand for new therapeutic treatments that can be more effective and meet expectations.

Treatments have emerged as an alternative to conventional methods, such as microneedling, laser therapy and platelet-rich plasma (PRP) and others. Ha *et al*. (2021) emphasize conventional treatments and the heredity of androgenetic alopecia, reinforce that they are limited treatments and added more examples of side effects such as Hypertrichosis, which is excessive hair growth. In addition, it was pointed out possible birth defects if administered in women of childbearing age, decreased libido and the possibility of prolonged impotence. The researchers noted that due to the limitations, many patients end up dropping out of treatment and 40 percent of these patients end up going bald. This is due to side effects and/or the need for continuity of conventional treatments.

The treatment with the microneedling technique emerges as a promising minimally invasive alternative to treat hair loss, as it has already shown its effectiveness and has its relatively low cost. Hair transplantation can be considered as a permanent treatment, however, due to its high cost, it ends up being unfeasible for most individuals affected by alopecia, low-level laser therapy is one of the treatments used, however, it has not proven its effectiveness when compared to other treatments (GUPTA *et al*., 2022).

There is no standardized protocol to perform the microneedling technique, there are varied techniques, such as the form of application over the same place, intervals between sessions, duration of each session and the use or not of drug after or during the procedure. However, many articles share the same thinking with reference to esterization of the site, obtaining a hyperemia or punctual bleeding, that is, obtaining holes (and approximately 250 holes per square centimeter). No method during testing proved to be more effective than another. The length of the microneedles and the number of passes seem to have a satisfactory effect on hair growth (GUPTA *et al*., 2022; SANTOS *et al*., 2020; OAK; GOMEZ, 2022).

The first device of microneedles - roller was invented by Liebl and Fernandes, had approximately 200 microneedles, but in order to improve the form of application and with the aid of technology, the device was perfected. First came the microneedling pen and then they added a motor, which facilitates both the permeation of assets and the reduction of the sensation of pain. The advantages and limitations of roller and pen microneedling are described in **Table 4** (GUPTA *et al*., 2022).

Table 4 - Advantages and limitations of microneedling with Dermaroller and microneedling with pen

Dermaroller		Microneedling pen	
Limitations	Advantages	Limitations	Advantages
Puncture depth is according to the size of the roller needles – it can reach only one depth; Penetrate the skin at different angles, more painful, recovery time is longer; Treatment with less precision; It is a mechanical action	Product of easy access for purchase, being able to be applied in each at home and clinics	Purchase of more restricted product and requires professional assistance (Available only in professional environments and medical clinics)	Reaches the most difficult surfaces to reach the skin; Personalized treatment; The size of the needle can be adjusted reaching various depths for better penetration; Areas of difficult access, it is easier to treat; Penetrate the skin vertically causing less damage; Treatment with more precision and accuracy because it is an automated device

Cast iron: Gupta *et al*. (2022)

In one study, the microneedling technique was applied using the needle with a length of 1.5 mm on the areas affected by the pathogenesis, in addition to the asterisks technique (longitudinal, vertical and diagonal directions, eight times in each direction), or until erythema or bleeding was presented. The average duration was between 20 and 25 minutes. In this treatment minoxidil was not used and the scalp was not washed for a period of 24 hours (STARACE *et al*., 2020). As Figure **2**:

Figure 2 - Scalp after microneedling session

Data Source Provider: Starace *et al* (2020)

Starace *et al*. (2020) report that the study was done in the period of 6 months, when they evaluated the efficacy and tolerability, performed traction test, clinical iconography and trichoscopy, in each session the scalp was measured through digital images with varying magnifications 20x, 40x and 70x. The goal was to have all the information about the area under treatment.

Kang's point or "V" point was used as the primary reference. The "V" point is calculated by the intersection of the sagittal midline and the coronal line that connects both ends of the patient's tragus. At the end of the treatment in analysis, dermoscopy of the scalp revealed the typical aspect of AGA with the presence of diametric variability, peripillary signs and empty follicles in all patients. On the other hand, patients with TS presented short hair in regrowth at trichoscopy and positive traction test with telogen hair roots.

Starace *et al*. (2020) argue that in research carried out, that microneedling treatment has shown effective results in androgenetic non-cicatricial alopecias, telogen effluvium and Areata. For the case of AGA at the vertex in males and the frontal area in females, they are the ones that presented the highest percentage of improvement. The procedure induces a stop in hair loss as well as the density and thickening of the diameter of the capillary shaft. During the study period (6 months), no serious adverse side effects were reported. Through the analysis by clinical iconography and trichoscopy, the patients presented positive results, with stop of hair loss or decrease.

Zhou *et al*. (2020) argue that combination therapies for hair loss treatment have greater efficacy than monotherapy. In a sample when using microneedling together with minoxidil, the result presented was more effective when compared to other combinations. Microneedling through its microneedles causes micropunctures in the skin, causing non-inflammatory wounds, inducing neovascularization and the production of growth factors, thereby favoring the capillary restoration of the affected areas (OCAMPO-GARZA *et al*., 2020). In addition, the author of the study adds that **microneedling** is proposed to increase hair growth; in particular, when needling-induced damage leads to the release of growth factors (TGF-alpha, TGF-beta, and platelet-derived growth factor [PDGF]) by platelets and neutrophils. Subsequently, fibroblasts provide collagen and elastin production in the papillary dermis.

The treatment with microneedling proved to be very advantageous at this time of increase in cases of alopecia, is more accessible and presents relatively fast results when compared to other therapies. It is a safe procedure, minimally invasive, does not interfere with the patient's routine. Microneedling involves thermal and/or physical injuries causing disruption in the skin barrier and can be combined with other therapies, in addition, it can be adopted in patients who do not respond to other therapies or patients who for some reason cannot use systemic treatment. Microneedling has already been shown to be effective even for more invasive or more time-consuming therapeutic regimens, and has no side effects (OCAMPO-GARZA *et al*., 2022).

4 CONCLUSIONS

The sensitivity of patients, especially women, cannot be ignored when it comes to hair loss, as it directly affects quality of life and personal self-esteem. It is known, therefore, that hair and appreciation of personal image are directly linked to this disorder. Therefore, the sooner you start treatment, the faster you can achieve satisfactory results.

Microneedling has plausibly shown its effectiveness in the treatment of hair disorders. Such a procedure accelerates the inflammatory process, providing skin revascularization, tissue regeneration and stimuli of the hair follicles. It is a safe method with a low risk of side effects, showing effective results in androgenetic alopecia-AGA. alopecia areata-AA and telogen effluvium-ET. In addition, microneedling therapy is associated with *the drug-delivery* technique.

Microneedling treatment has shown advantages, alone or combined with other therapies, it is a quick, easy and inexpensive procedure. Excellent strategy to promote hair growth post COVID-19.

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CHAPTER
58

Analysis of space and housing based on the new considerations derived from the COVID-19 pandemic. An approach to housing in Mazatlan, Sin. Mexico

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ABSTRACT
This document examines the minimum housing characteristics that must be reconsidered to address emerging needs from the health crisis derived from the COVID-19 virus pandemic. Since the needs of society are constantly evolving, it is important to re-evaluate the minimum requirements for adequate housing. As people's lifestyles and family structures change, so do their housing expectations. In the present investigation, some of the issues that make the revaluation of the house necessary are enunciated.

Keywords: Housing, COVID-19.

1 INTRODUCTION

Housing is a basic need that has been present at all stages of human evolution. The need for shelter and shelter has driven the development of various housing systems. The habitability and functionality of these systems are crucial to providing adequate accommodation. In recent times, there has been an increased focus on developing sustainable housing options to reduce the negative impact of housing on the environment.

During the health crisis caused by COVID-19, housing returns to take the character of refuge, unique and safe in the face of the events generated, housing acquires a new leading role within the activities of the human being, in this way it becomes the center of development of activities such as coexistence, leisure, work, shopping, etc., for all the inhabitants of the house.

Recent changes in daily activities have highlighted the importance of assessing the functionality of living spaces. With the added emphasis on remote work and virtual communication, it is necessary to ask whether the minimum housing requirements are sufficient for modern life. In this regard, the efficiency and flexibility of living spaces are now being examined more than ever. As we navigate this new normal, sustainable housing options must be not only functional and livable but also adaptable to meet the changing needs of individuals and families.

The minimum characteristics of the house must be rethought to solve the new needs that arise. With the ever-changing needs of our society, it is necessary to reassess the minimum requirements for

adequate housing. One of the solutions could be to address the issue of overexploitation of common areas such as living rooms, studies, etc. By establishing and using functional areas, we not only solve the problem of overcrowding but also improve the overall living experience of the occupants. This is especially important in times like the COVID-19 pandemic, where spending long periods at home was established as the norm.

2 THE CONCEPT OF HOUSING

The Royal Spanish Academy defines housing as a Protected place or construction conditioned for people to live. Heidegger for his part expresses a broad concept of "inhabiting" exposed, encompasses the totality of our earthly permanence as "mortals of the earth" that we are. In this way, thought can go beyond simply building and, with it, inhabiting acquires a higher and transcendent dimension. (2015) (Heidegger, 2015)

For Marx, housing arises as a response to the growth of production levels and highlights the concept of "Social Engineering". This theory establishes the contribution of buildings capable of housing the working workforce, necessary to move the industrial production apparatus. It is important to understand that housing is not only a place to live, but it is also a tool for economic production and society as a whole.

The design and construction of housing must take into account not only functionality and habitability but also the contribution to the overall socio-economic structure, as discussed in the work "Contribution to the housing problem" by Frederick Engels. (Engels, 1987)

In recent years it is considered necessary to reformulate the concept of housing, establishing how it is being transformed and acquiring a new meaning, both at the cognitive level and in terms of significance, derived from the new requirements marked by the COVID-19 pandemic. Housing is not only a physical space to live but has taken on an important role as a place of work, education and entertainment. In addition, the importance of accessibility and connectivity within housing has become crucial to enable remote work and learning. Addressing this transformation in housing is critical to ensure it remains a safe and comfortable haven for the people who inhabit it.

The COVID-19 pandemic has disrupted society, altering social dynamics and interactions with the world around us. To adapt to these changes, resilience is critical. Measures must be taken to ensure the safety and well-being of individuals and families. This includes innovative housing options that prioritize functionality, sustainability and adaptability to changing circumstances.

The perception of housing and daily activities within households are changing and generating modifications within people's lifestyles. It is necessary to redesign the house and the perception of this in the face of these new requirements.

3 THE MINIMUM HOUSING

For several decades there has been a constant debate that marks the urgency of establishing and where appropriate reconsidering the minimum space per person required, this space must have at least the minimum measures necessary for the inhabitants to carry out their daily activities corresponding to hygiene, safety, health, accessibility, safe and stable supplies and comfort, comfortably and comfortably. In this regard, regulations must be put in place to ensure that housing is livable and safe for all, regardless of their economic and social circumstances. Public policies that promote the construction of sustainable and affordable housing, as well as the implementation of protection systems for the most vulnerable households, should be considered. This will allow housing to remain a safe and comfortable haven for people, today and forever.

In this sense, the minimum dimensions of the house acquire a new meaning, since in many cases, especially within large cities, the institution of minimum spaces, constituted as bedrooms, consumed much of the day of the resident. The COVID-19 pandemic has shown how important adequate and safe housing is, beyond its function as simple shelter. It is therefore imperative that attention be paid to factors such as ventilation, natural lighting, workspace and access to technology in the conceptualization and construction of homes of the future. Housing should be considered as a flexible space that can adapt to the changing needs of people, without compromising their well-being and quality of life.

When the pandemic appeared, it was established that these spaces were not enough, since the house must now serve for a greater number of functions, which were not contemplated within its original design. New rituals are established within homes such as disinfection upon entering the home, hygiene and change of clothes. Another indicator of resilience has been household internet access. Classes, teleworking and online health control have measured the ability of families to adapt to change, generating stress and anxiety in many cases, also affecting health.

Ensuring adequate housing for all people involves more than providing shelter. Minimum conditions of habitability must be met, including access to basic services such as water, electricity and drainage, as well as durable and affordable materials. In addition, housing accessibility should be considered, paying attention to compliance with building codes and standards. In addition to these factors, it is essential to ensure that the house is not in poor condition and does not require major repairs to be habitable.

Location is also a crucial aspect to consider when designing sustainable housing options. A dwelling should not be located near toxic waste or other hazardous materials that may negatively impact the health of its inhabitants. The housing establishment should also take into account potential hazards, such as flood-prone areas, to reduce the risk of damage and displacement. In addition,

dwellings should not be located along high-traffic areas, such as railways or highways, that may disturb the peace and security of the inhabitants, within an ideal state these should be the minimum requirements with which a living space must meet.

In Board 1 the minimum spaces for housing are established, contemplated in several regions of Latin America, as recorded in the regulations and building codes of the different countries.

Board 1 Characteristic of minimum housing for different countries

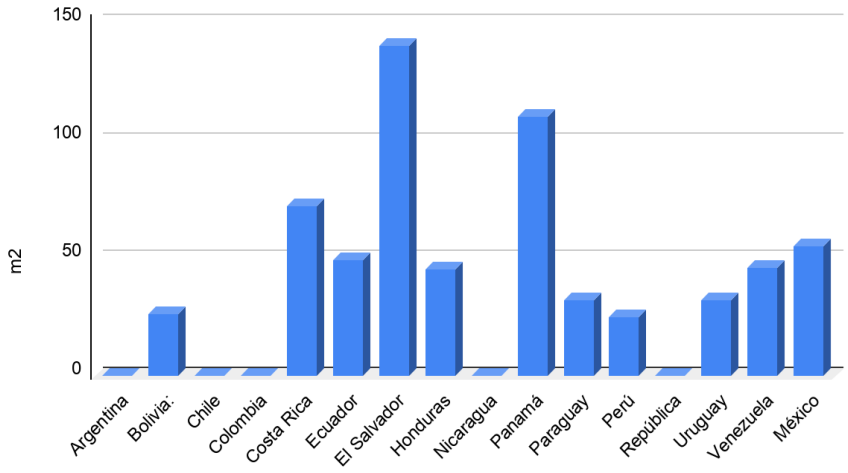
Country	Building Code	Minimum Sizing
Argentina	Argentine Building Code	The minimum number of spaces within a social housing (living room, dining room, kitchen and bedroom) and is determined by the inhabitants of the house
Bolivia:	Bolivian Construction Regulations	Single-family homes with a minimum of 26 m² and 36 to 54 m² for progressive social housing.
Chile	Ministry of Housing and Urban Planning	The regulation dictates requirements per enclosure based on the minimum furniture necessary for habitability depending on the type of space (bedrooms, living-dining room, kitchen, bathroom, loggia, circulations) and complementary furniture (closets, stairs and doors).
Colombia	These are determined from a human rights perspective	The technical assistance guide for quality in social interest housing is based on decree 1468 of 2019 which stipulates the different aspects by premises within the homes and depending on the climates in which it is located (cold, temperate, hot dry and warm humid climates).
Costa Rica	The regulation of subdivisions and urbanizations of the National Institute of Housing and Urbanism (INVU)	Article 94 defines the minimum area and front of lots of residential complexes and their provisions and according to the levels, being the minimum of one level in 72 m² with a front of 6 m.
Ecuador	The Minimum Guidelines for Registration and Validation of Housing Typologies of the Ministry of Urban Development and Housing	Minimum requirements that dwellings in a minimum area of 49 m² must have.
El Salvador	Regulatory framework for the Single Window in the minimum requirements of urban planning and construction	The minimum size of the lots is based on their slope, being the smallest (corresponding to a slope of up to 15%) of 140 m².
Honduras	La Gaceta, the official newspaper of the Republic of Honduras	The normative parameters give a minimum lot area for individual housing of 45 m² corresponding to a front 3.5 m.
Nicaragua	The Nicaraguan Mandatory Technical Standard NTON 11 013-04	The housing area will correspond to what determines the land occupation factor
Panama	Executive Decree No. 54 of 18/07/2009 of the Ministry of Housing	The minimum area is determined per lot, corresponding to 110 m² for single-family housing, with a minimum front of 7.5 m
Paraguay	Ordinance No. 241/05 of the Municipal Board of Asunción	Homes within 32 m² must have basic environments of a bedroom, kitchen, dining room, living room, and bathroom.
Peru	Housing Standard A.020 in Article 8	At least one roofed area of 25 m² with expandability and 40 m²
Dominican Republic	Provisional recommendations for minimum spaces in urban housing M-016 of the Secretary of State for Public Works and Communications	The ranges of values vary according to the number of people living in the house, the activities and the furniture in each type of space.
Uruguay	Article 18 of Chapter III of Law 13.728	The living area of a dwelling is greater than 32 m². This minimum will apply to dwellings that have one bedroom. For each additional bedroom, the minimum will be increased by 12 m².

Venezuela	In the Report of Design and construction guidelines for Housing and new developments of the Venezuelan Chamber of Construction	Master bedroom 10 m², secondary bedroom 8 m², laundry kitchen 10 m² and dining room 18 m².
Mexico	National Housing Commission	The minimum habitable for a house is 55 m²

Ensuring a home is livable and functional involves more than simply meeting basic building standards. Even when spaces have been standardized according to different regulations, they may still not be sufficient to meet the minimum requirements for hygiene, safety, health, accessibility, reliable supply and comfort. As such, it is vital to consider additional factors and prioritize the needs of the individuals and families who will reside in the household. By doing so, we can create sustainable and comfortable housing solutions that truly meet the needs of different communities.

Even when the spaces are standardized in the different regulations, they often fail to be sufficient to meet the minimum requirements of hygiene, safety, health, accessibility, and comfort, in Figure 1 The square meters of minimum housing for different countries are graphically shown.

Figure 1. Minimum housing in square meters



As the COVID-19 pandemic continues to affect the way people live and work, it has become increasingly important to develop housing that is tailored to the unique needs of individuals and families. Some of the measures proposed to generate greater comfort during the pandemic include the creation of soundproof cubicles or offices for videoconferencing, the use of paints resistant to disinfection techniques and the implementation of thermal and acoustic insulation elements. In addition, improving energy efficiency can reduce the negative impact of housing on the environment while ensuring that housing is affordable and sustainable for future generations. These measures are established in response to the requirements established by the pandemic.

By incorporating these measures into the design and construction of new housing, we can create housing solutions that promote health, well-being in the different regions where housing is located.

4 SOCIAL HOUSING IN MAZATLAN, ARCHITECTURAL MORPHOLOGY

To perform an analysis of housing in Mazatlan it is necessary to consider the wide range of options, there are multiple classifications where each of the types of housing can be classified, the main classifications according to INEGI are those listed below: precarious housing, traditional housing, improved housing, social interest housing and medium interest and residential housing. With this diversity of housing, it becomes evident the need to have well-structured housing policies focused on the quality of life of the inhabitants, taking into account factors such as location, accessibility, services and security in the area. By doing so, adequate housing for all can be ensured.

When generating functional and comfortable spaces, several key factors must be taken into account, such as the size and orientation of the house, as well as the materials used in the construction, which play an important role in determining the habitability and sustainability of the house. In addition, it is essential to incorporate elements that promote greater comfort within the living space, such as natural ventilation, adequate lighting and insulation. By prioritizing these factors in the design and construction process, we can create homes that truly meet the needs of the occupants.

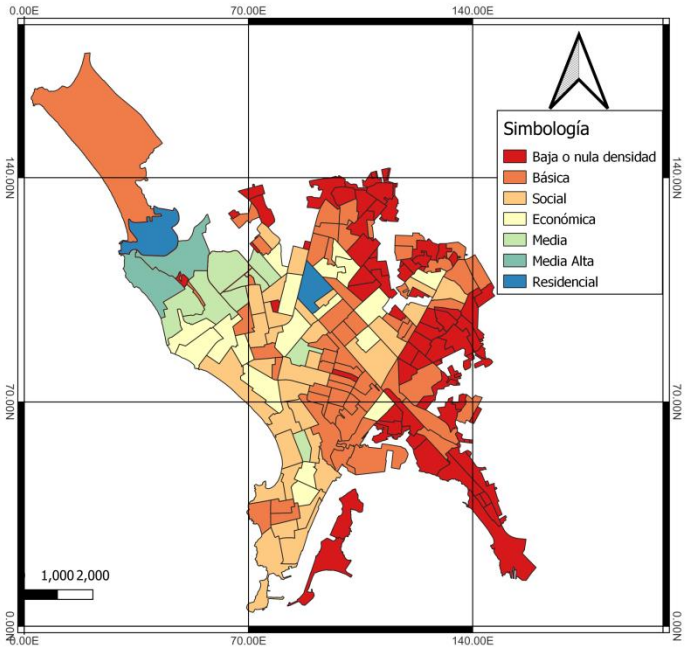
INFONAVIT defines social housing as affordable housing that is intended for low-income people and workers who must have at least 3.9 monthly salaries. The importance of social housing is that it provides an affordable housing alternative to vulnerable groups who would otherwise have difficulty obtaining adequate housing. In addition, these homes play a crucial role in reducing Mexico's housing deficit and strengthening the social fabric of communities. The housing to which the workers will be entitled, is minimum housing, which has the minimum spaces required and whose value does not exceed 118 VSM (times the minimum wage), therefore depending on each region, the size of the house may vary, since it depends mainly on the surplus value of the region as well as the cost of operation during its operation. Based on the previous definition, the housing to be studied will not exceed 118 VSM and its operating cost does not exceed 20% of 3.9 VSM.

In this type of social housing, it is ensured that the minimum requirements of habitability are met, in addition to having the necessary public order services, such as drinking water, electricity, drainage and garbage collection service; You may count items like air conditioning.

According to the different classifications of housing in Mazatlan, it is important to highlight the prevalence of basic, social and economic housing in the area, as can be seen in Figure 2, according to the analysis carried out this type of structure represents 86.7% of the total housing in Mazatlan. Since this type of building corresponds to structures with limited spaces, it is necessary to carry out an analysis

that involves functionality in the face of the requirements imposed by the pandemic derived from COVID-19, this topic is addressed in detail within the following section.

Figure 2. Distribution by type of housing in Mazatlan.



The geo-referenced map of Figure 1 graphically shows the distribution of each type of housing in Mazatlan, the map shows the types of buildings that occur more periodically, in this sense the basic, social and economic housing, are the type of building that is built most frequently. Continuing with this observation, it is important to note that to have a better impact on housing design at the regional level, in basic social and economic housing, specific designs and regulations must be available that allow significant changes within this type of property, since positive changes within these types of buildings, They can have important impacts at the regional level, given the frequency with which these types of structures occur.

Innovation in housing design is an opportunity to transform and improve housing patterns. The implementation of health security measures in the design of new homes, as well as the rehabilitation of existing ones, will contribute to greater resilience and a better quality of life for the inhabitants.

5 PRACTICED SPACE. HOUSING AND HEALTH

Throughout the history of humanity, man has experienced health crises on several occasions that have forced him to generate changes in the way of thinking and acting, these changes have been developed as countermeasures to the effects that generate damage, the current pandemic is not the practical exception. Given the new requirements of living spaces, buildings must be modified to solve

the pressing circumstances. In this sense we can emphasize that before the needs that arise it is necessary to redesign the living space. Living spaces must be transformed to solve the pressing circumstances, as a response to the needs of the user.

An example of how public space and housing were modified in the face of health crises is the one detailed by Alejandro Hernández Gálvez (Gálvez, 2020) where he describes how architecture responded to the pandemic in this case caused by Cholera. At that time, architects developed homes that featured patios and higher ceilings to improve ventilation and natural light in. Hygiene measures such as separate bathrooms and sinks were also implemented in each room.

Within the reference, the crisis is described as: (Gálvez, 2020)

"What left an indelible impression on my spirit was the terrible invasion of cholera in that year. The silent and deserted streets in which the hasty footsteps of someone who ran for help resounded at a distance; the yellow, black and white banners that served as a warning of the disease, of doctors, priests and houses of charity; the crowded apothecaries; the temples with the doors wide open with a thousand lights on the altars, the people kneeling with their arms crossed and shedding tears."

During the cholera pandemic in Mexico, access to adequate and safe housing became even more crucial to prevent the spread of the disease. In addition to the infection control measures mentioned above, people needed to have a safe place to shelter and prevent the spread of the virus.

During the cholera pandemic in Mexico, extreme measures were taken to prevent further infections. According to an account by Prieto, in the reference "Cholera in real time. A rereading of The Rosary Cholera Epidemic of 1894-95" describes that some foods, including stuffed chili peppers, were banned and houses were fumigated with vinegar and chloride to prevent the spread of the disease. Within the same reference it is described that at that time a Municipal Board of Health was established that took action to protect the community efficiently and effectively. (Prieto, 2020)

The cholera pandemic in Mexico in 1833 was a great step to implement sanitary measures and improve the living conditions of the population. Velasco in reference "The cholera epidemic of 1833 and mortality in Mexico City" highlights the importance of the introduction of drainage, sewage and drinking water, the construction of pipes and sanitary facilities. These measures made it possible to improve the quality of life of the inhabitants and prevent future epidemics. (Velasco, 1992)

Among the lessons learned in the cholera pandemic of 1833, the importance of collaboration between administrations, scientists, public health experts, architects, urban planners, sociologists, sectoral panels, neighborhood communities and associations is insisted on the importance of collaboration between administrations, scientists, public health experts, architects, urban planners, sociologists, to prevent the spread of infectious diseases. As Velasco highlights in his 1992 reference,

measures taken to improve sanitary conditions, such as the introduction of drainage, sewage and drinking water, were crucial to controlling the spread of cholera. The cholera pandemic of 1833 represents an important lesson for sustainable development and investment in health infrastructure, as these advances are necessary to ensure the long-term safety and well-being of communities in health emergencies. (Velasco, 1992)

During the current pandemic, housing has taken on a singular significance as a home and shelter. Faced with the need to spend more time at home, society has undergone a transformation in the way spaces are used and the importance given to them. In addition, COVID-19 has highlighted the need for adequate, sustainable and healthy housing that promotes people's quality of life. In this sense, it is necessary to rethink architecture and cities to adapt to the new needs of society in this context of pandemic and the future.

Without a doubt, you prioritized the generation of new changes and ways of thinking within urban design and architecture. The challenge is to generate these changes efficiently and effectively to solve as soon as possible the challenges that arise from different perspectives. In this sense, it is important to highlight the need to promote, on the one hand, the implementation of sustainable technologies and the use of ecological materials in the construction of housing and, on the other hand, to guarantee the health, comfort and well-being of the inhabitants of the house, to solve efficiently and effectively the challenges that arise.

The objective since the beginning of time is to create buildings that protect the occupants from inclement weather and predators, the new challenge is to create sustainable, affordable buildings that are also safe in the face of public health crises. Generating in the same way not only safe housing, but also safe and healthy cities.

Architecture has always been influenced not only by art, but also by science. In the era of Braque's cubism and Mondrian's neoplasticism, it is established that positive science also had an impact on architecture's orientation towards sanitation, antisepsis, heliotherapy, as well as other aspects of medicine.(Sato, 2020)

Today, the importance of health and safety in architecture and urban planning is more evident than ever. These civilizational advances have led to the need to revise the principles of urbanism and architecture to ensure the welfare of society. It has been claimed that modern urbanism began in the nineteenth century thanks to the intervention of doctors and their hygiene measures. (Sato, 2020)

Another example of the adaptation of architecture to health requirements, is exemplified in the records made in 1857 by the Doctor Juan Bruner on the poor conditions of popular housing in Chile establishing that the health of a people depends on the place where it lives, topography, material life and customs, which would constitute a challenge for architecture. Bruner not only documented the

unsanitary conditions of the dwellings, but also proposed architectural solutions to improve the quality of life of the inhabitants. This historical example highlights the importance of collaboration between science, architecture and medicine in sustainable housing development. Architectural and building professionals need to consider these principles to develop housing that protects public health and ensures long-term safety and well-being.(Bassa M. & Fuster S., 2013)

This scientific approach has become even more relevant in the current situation of the COVID-19 pandemic and the need to develop sustainable, healthy and safe housing that promotes people's quality of life. In this sense, sustainable architecture is not only a matter of aesthetics, but also of science and health. The current pandemic has highlighted the need to consider public health in urban planning and architectural design to ensure a safe and healthy future for all.

6 CHANGE IN CITIES

The coronavirus has already generated radical changes the way of acting and seeing the city the changes have been transcendent and irreversible, the pandemic has managed to show the vulnerability we have in crises, health requirements must be met and give new solutions to the dimension of the problem. Urban dimensionality takes on a new significance.

The city demands from its inhabitants the reduction of transfers, a greater distance between people, and in general more prudent alternatives, where contact and closeness with people other than the family nucleus is avoided in the best way.

Now social networks replace the need for socialization and contact with the environment, a paradigm shift is established that leads to a change in thinking and the way of seeing and living the city and the environment. Overcoming a contingency that is already historic depends to a large extent on this adaptation. Social networks, the internet, the telephone, take a capital importance in the maintenance of news and progress, in the exercise of solidarity and mutual help.

Social interaction, and with the city now becoming virtual, the urban space acquires a new dimension within the environment and is replaced by poor substitutions, generated within a shelter inside the house.

Within the following section, a more in-depth analysis of what the replacement of face-to-face social interaction by virtual social interaction represents.

7 REPLACING SOCIAL INTERACTION

As it is already well known and also disseminated by several media, confinement is one of the main weapons to prevent the spread of the Coronavirus, however the effects triggered by this confinement are still being studied. One of the main problems triggered by the shelter is the

replacement of social interaction, now through electronic means. No doubt the answer is still uncertain, however entrepreneurs related to communication networks by electronic means, take this opportunity as a business opportunity with a performance undoubtedly quite lucrative.

Entrepreneurs like Marc Zuckerberg affirm that "Connecting people around the world is the most important thing", but is a connection achieved?, in this sense other entrepreneurs who have been venturing into the market of technology, applications and social networks. However, it is not until confinement that most of the population has been forced to have social interrelationships by electronic means. And this is happening all over the world. Activities such as studying, shopping, drinking, exercising, meditating, working, going to the museum or a concert, sharing with your friends, family or neighbors, are daily activities that it was impossible to imagine the realization of these by virtual means, and yet they no longer happen in schools, museums, amphitheaters, shopping malls, discos, gyms or chapels, but have been teleported to the virtual world, where we will be safe from being infected.

During this pandemic the use of the internet increased historically, however this represents a very dangerous gap, since on the one hand some people can have access to education by digital means, and we forget about people who for some reason do not have or have access to the internet, This can harm their training.

For people with internet access, platforms such as Zoom, Microsoft and Google are trying to cope with the growing demand from users who now do homeoffice, telecommuting or remote work while providing their software for free, but hoping for a paid subscription, in exchange for unlimited calls. Companies like Microsoft's Team, have increased the number of their calls by up to 700%. The question is: if these means can replace traditional systems?

Virtual overexploitation makes internet systems unsustainable and begin to fail, virtual overpopulation is also present with the delivery applications of food, food and hygiene products, traditional means of consumption are being replaced by online shopping platforms of Walmart, Sears, Mercado libre, Linio and Amazon, are some of the main means of buying and selling in Mexico, these media have reached new records of daily downloads and demand during the health crisis. Systems such as Rappi and Uber have also benefited from the current contingency and are also profiting from this situation, since they have raised the cost of fares.

The electronic link media at the moment are being revalued, and are also classified, within an unwritten classification where media such as Zoom, Microsoft and Google are attended as formal means of communication while there are others such as FaceTime, Skype, or WhatsApp video call that are used as more informal communication systems. Spending time "together" by video call, perhaps can substitute for being truly together?

What happens with the busiest meetings in a not-so-formal environment, applications such as Skypéro or Coronapéro have taken virtual socialization to another level, with the art of partying staying at home, or at least it is how it is intended to advertise. These applications are designed for people who, as happens at real-life parties, between people who know each other well and a couple of strangers make a video call by Skype, Zoom or Messenger. In Spain, Portugal and Italy the HouseParty App has become the most downloaded application for iOS and the fifth in Android. This application offers the same service as others but with a plus of mini-games to share with users in real-time. For a mood of Quarantine and chill, Google Chrome proposes an extension called Netflix Party that allows Netflix users to watch movies in groups and comment on them in real-time.

The human being as a social being needs to live and develop in a group, generating a coexistence with other people, in systems such as Youtube from home everyone shares their knowledge of baking, watercolors, languages, fitness, meditation, mindfulness in an attempt to maintain mental health quarantine is leaving strong teachings, which will undoubtedly go down in history for the aftermath and the lessons derived from it, But undoubtedly it will also go down in history as the moment of the taking of prominence of social networks and the social transformation generated from this.

8 THE SICK IMAGINARY

The imaginary stands out as the ability to represent certain objects in thought and with relative independence of reality, the significance of an element that is common in a group of people can generate a transcendence and importance for decision-making and behaviors within the collective.

In this sense, Castoriadis constructs a theory about the function of imagination in shaping society. It is proposed to make a distinction between the radical imaginary and the conceived imaginary we can affirm that there is a mutual relationship between the historical-social and the meanings. The imaginaries establish a particular way of being of things, first, original and irreducible, in this sense we can raise the idea that nothing exists outside the established concepts of significance; while the social imaginary may have the ability to think of society as a system that constructs itself. In this way society can institute the world as its world and it is in this idea of self-construction of society that the possibility of self-transformation emerges.

Within the conceptualization, constitution and significance, social imaginaries can generate a set of values, appreciations, tastes, ideals and behaviors in the consciousness of the people who make up a certain culture. In this case, imaginaries can be maintained in constant interaction with the individual conception of reality, which stands out as the effect of a complex network of relationships

between discourses and social practices. The constitution of the whole unfolds considering the individual valuations

Another conceptualization that expresses the imagination very closely is the one highlighted by the author Ruth Sautu:(Sautu, 2010)

"*... The social imaginary is composed of a set of global and totalizing representations of a society, where values, beliefs, ideas, symbols and appreciations are integrated to shape the cultural and the symbolic. The imaginaries are established as social meanings that establish order, establish a limit of what can be imagined, thought, desired and acted in a particular historical moment. Through them, a collectivity designates its identity by elaborating a social representation of itself."*

If we ground these concepts to what is currently happening with the pandemic, it may seem paradoxical that we may find ourselves facing the construction of an imagination, which is capable of wrapping and creating a concept about the temporality in which we live.

This imagination may or may not be overvalued concerning reality and yet it affects us directly, in each of our daily activities, the news, the number of deaths, the number of patients, are figures that alarm and create an image of fear within the collective.

But on the other hand authors such as Pablo Lazo describe the effects of the pandemic as follows: (Lazo, 2020)

"*... In the last week Venice's empty canals have given room for ducks, herons and fish to turn. The quality of the water has improved substantially since the irruption of the water transport service has stopped pouring more than 300 liters of dissela daily into the canals. During January and February, air quality in China's major cities improved substantially. Deaths related to diseases linked to air pollution fell by more than 30%. The images show the surprising dissipation of polluting gases in no more than 30 days. In northern Italy, the reduction of nitrogen dioxide emissions (which does not directly generate CO2 emissions), has been 40% during the last three weeks. In Mexico City, according to the Ministry of Mobility, vehicular traffic has decreased 61% in just 7 days.*

While it is true that the constitution of the imaginary can become negative, it is also true that for some environmentalists they can create their imagination to some extent, without any of these being more or less true.

9 HOUSING IN MAZATLAN

The perception of housing in the face of COVID-19 in Mazatlan can be described in three stages. The first occurred during the beginning of the pandemic, where fear and uncertainty led most people to seek refuge in their homes, the pandemic surprised the majority of the population without

prevention measures and with housing that did not meet the basic requirements for a healthy and safe life.

The second stage was characterized by the need to adapt housing to be able to work and study from home, generating a demand for larger spaces and with adequate conditions, in this way the authorities and developers began to take measures to improve the quality of housing and guarantee social distancing.

In the third stage, in the face of the prolongation of the pandemic, the importance of having sustainable and healthy housing has become essential, since this not only guarantees individual but also collective well-being, at this stage citizens are adopting a greater awareness about the importance of safe and sustainable housing, and expect the authorities and developers to continue improving the living conditions of the population throughout the country.

During the research carried out in the city of Mazatlan to know the perspective of people about their housing after the pandemic, several relevant opinions were obtained. One of the main priorities mentioned was the need for sufficient spaces for work and study at home. In addition, the importance of having access to green areas and outdoor spaces to improve quality of life and mental health was emphasized. The need for double-glazed windows to ensure adequate ventilation and reduce outside noise levels was also emphasized.

After conducting interviews with 35 people in different parts of the city of Mazatlan, some interesting answers were obtained regarding the perception of housing during the pandemic. Some opinions agreed on the importance of having private outdoor spaces, such as patios and balconies, to be able to enjoy the outdoors without exposing yourself to crowds. Others stressed the importance of good ventilation and the need for air conditioning to mitigate high temperatures during the summer. In general, the opinions pointed to the relevance of having a comfortable, functional and safe home during these times of uncertainty, some of the answers are stated below:

The pandemic has affected my concept of housing in several ways. Before the pandemic, my home was primarily a place to rest after a long day at work and a space to spend time with my family over the weekend. However, I now feel that it has become a much more important space for my emotional well-being and physical health. I've paid more attention to the air quality and lighting in my home, plus the need to have adequate space to work from home in case of future emergencies.

The pandemic has changed my concept of housing in a significant way. Before, my focus was on aesthetics and comfort, however, the pandemic made me realize the importance of having a safe and healthy space. I now value natural ventilation, proper lighting and access to outdoor spaces much more. In addition, the need to have a place to work and study from home has led to greater attention on the functionality and adaptability of interior spaces.

The COVID-19 pandemic has had a huge impact on my concept of housing. Before the pandemic, my home was simply a place where I lived and spent time with my family, but now it has taken on a new dimension. I realize that the quality, safety and sustainability of my home are fundamental factors for my well-being and that of my family. In addition, the pandemic has highlighted the importance of having adequate space for work and study at home, as well as innovative urban design approaches to ensure the health and well-being of communities.

The pandemic has significantly affected the concept I had about my home. Before the pandemic, I used to see my home primarily as a place to sleep and spend free time. However, after being quarantined in my home for several months, I have come to appreciate much more the comforts of my home and its ability to meet my basic needs. In addition, I have become aware of the importance of having a healthy and safe living space to preserve the health and well-being of my family and me.

The pandemic had a major impact on my perception of my housing. Previously, I saw it primarily as a place to sleep and rest, but after spending so much time at home due to social distancing measures, I realized it's so much more than that. My home became my office, my gym, and my haven. I started paying more attention to air quality and lighting to make sure my home was not only comfortable but also healthy.

10 CONCLUSIONS

As conclusions of this work, it can be established that the COVID-19 pandemic has had a profound impact on the perception and valuation of housing. In this sense, the quality, safety and functionality of housing have emerged as fundamental factors for the well-being and health of people. Likewise, the need for adequate spaces for work and study at home has become evident, as well as innovative urban designs that encourage not only social interaction and access to green areas, but also respond to health needs and requirements.

It can be noted that the pandemic has negatively affected many of the sectors surveyed in Mazatlan since most of the people interviewed mention the discomforts of confinement. Establishing that, the house presents deficiencies in terms of space and levels of comfort for the development of online activities.

In the same way, there is an insufficiency in terms of computer equipment and internet, as well as an increase in energy expenditure and terms of space, people raise the need for an increase in personal space.

In short, the pandemic has posed new challenges and opportunities to rethink the way we understand and inhabit our homes, which invites us to reflect on the importance of building more sustainable and healthy homes.

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CHAPTER
59

Association of demographic and meteorological variables with COVID-19 occurrences and deaths

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ABSTRACT
The health crisis caused by COVID-19 is considered the most severe pandemic in the last 100 years. Because it is a serious public health problem, there are many studies aimed at understanding the evolution of cases and possible associations of meteorological and demographic factors with the contamination by the virus. Given this scenario, the objective of this study is to portray, based on literature, the associations between meteorological and demographic variables with COVID-19 contamination and spread, taking into account the global panorama. Regarding demographic variables, it was found that the age group and sex of the population are associated with the spread of COVID-19. Regarding meteorological variables, scientific studies point to an association between temperature, relative humidity and air quality in advancing the spread of the COVID-19 virus. It is noteworthy that among the studies evaluated, divergences were observed in the type and level of association between demographic and meteorological variables with the spread of viruses. These results demonstrate the particularity for each region and there is a need for more specific and in-depth studies in each region.

Keywords: Pandemic, Coronavirus, Relation, Climate, Population.

1 INTRODUCTION

During the history of society, several crises in health and other sectors have been caused by pathogens. The recent health crisis caused by COVID-19 is considered the most severe pandemic in the last 100 years. The novel coronavirus (SARS-CoV-2), responsible for the COVID-19 pandemic, was first reported on December 31, 2019 by the World Health Organization. Originating in China, the etiological agent reached most countries of the world in a short period, causing a major global health crisis (WHO, 2020).

SARS-CoV-2 is a spherical virus enveloped with positive RNA and single strands (CAMPOS and SANTOS, 2020), with approximately 30,000 nucleotides (SIDDEL, 2020). It belongs to the *coronaviridae* family, being responsible for two major epidemics in the last 20 years and the recent COVID-19 pandemic (YANG et al., 2020). The first epidemic was caused by SARS-CoV (Severe Acute Respiratory Syndrome), originating in 2002-2003 in Guangdong province, China, with more than 770 deaths (CHAN-YEUNG and XU, 2003) and the second by MERS-CoV (Middle East Respiratory Syndrome), in the Middle East in 2012-2013, emerging in Saudi Arabia in 2012 and reaching 30% lethality (WHO, 2019).

In Brazil, the first officially recorded case of SARS-Cov-2 contamination was on February 26, 2020, in the city of São Paulo (BRASIL, 2020). Since then, the number of those infected has grown exponentially. Due to the proportions of the pandemic crisis, nations around the world, including Brazil, have adopted quarantine and social isolation as a way to contain the virus.

Because it is a serious public health problem, there is much scientific research aimed at understanding the evolution of cases and possible associations of meteorological and demographic factors with contamination by the virus. Previous studies conducted with SARS-CoV have shown that the transmission of the pathogen can be influenced by meteorological factors, such as: temperature and relative humidity of the air, wind speed, solar radiation and precipitation (CASANOVA et al., 2010; AHMADI et al., 2020, AULER et al., 2020; BASHIR et al., 2020; OLIVEIROS et al., 2020; SILVER et al., 2020; IQ et al., 2020; SOBRAL et al., 2020; WANG et al., 2020b).

In addition to these factors, demographic characteristics may also play a determining role in the rate of transmission of the virus in the population. According to Şahin (2020), there are indications of a direct relationship between the characteristics of the population and the number of cases, indicating the need to consider factors such as demographic density and age group of the population for the study of the evolution and behavior of the spread of COVID-19 in different regions. Given this scenario, the objective of this study is to portray, based on literature, the associations between meteorological and demographic variables with the occurrence of COVID-19 cases and deaths, taking into account the global panorama.

2 ASSOCIATION BETWEEN DISSEMINATION AND DEMOGRAPHIC FACTORS

When investigating the possible associations between demographic factors and virus contamination, Ahmadi et al. (2020) observed that one of the factors of greatest association with cases of SARS-CoV-2 contamination refers to population density. However, other factors such as gender and age group may also be associated with contaminations and deaths.

In this sense, soon after the outbreak of the COVID-19 pandemic in China, it was realized that there was an imbalance in the number of cases and deaths between men and women (ZHAO et al., 2020). In order to investigate this relationship, authors Gebhard et al. (2020) conducted a study in some European countries. In this study, it was verified that men had a higher rate of contamination in relation to women and it was also noted that the factor "age" had an influence on the result, due to the increase in the number of contaminated people over 60 years of age (GEBHARD et al., 2020).

The difference in contamination between the sexes may be associated with the different response of the male and female organism after infection of the virus. For men, diabetic or healthy, it is found that there is a higher level of ACE2 (angiotensin-converting enzyme receptor) circulating in the body (PATEL, 2013), which makes them more susceptible to contamination, since this is the gateway used by SARS-CoV-2. In view of this, there is also an increase in the level of ACE2 in the elderly, which is an indication of the elderly being more susceptible to contamination of this disease (GEBHARD et al., 2020).

Thus, in addition to man being more susceptible to contamination, the responses of the virus in the body are more severe for this genus. Since, men, proportionally, have fewer immune system cells when compared to women and, as a consequence, have worse immune responses (XIA et al., 2009; BOISSIER et al., 2003). It is noteworthy that sex hormones (testosterone, estradiol and progesterone) are factors that are part of the determination of this difference verified in the immune system (KOVATS et al., 2010).

Another aspect to be observed, in addition to the physiological between sex and age groups, is social behavior (practice of sports, consumption of alcoholic beverages and tobacco, etc.). Given that this produces consequences on biological factors. Worldwide, men represent the largest number of smokers and consumers of alcoholic beverages, which generates health problems, which can directly or indirectly influence the body's response to SARS-CoV-2. In addition, men have less medical follow-up and are less strict to hygiene habits, such as washing hands frequently (GLOBAL HEALTH, 2020).

3 ASSOCIATION BETWEEN DISSEMINATION AND METEOROLOGICAL FACTORS

By definition, meteorology is the study of atmospheric phenomena, manifested in a relatively short period and in specific locations. The set of meteorological characteristics is responsible for the formation of the climate (INMET, 2021a). In meteorology, the main characteristics studied are temperature and relative humidity, precipitation, winds, clouds and pressure. The study of these characteristics is carried out by supercomputers that accurately demonstrate the real situation at the time and specific region of interest. In Brazil, this work is mostly carried out by the National Institute

of Meteorology (INMET), but other institutions, such as universities and the support network for farmers, also do so.

Since the outbreak of the new coronavirus, researchers have presented studies in order to understand the dynamics of the new pathogen, considering the climatic and meteorological characteristics. Among the many studies, there are different methodologies applied in different regions of the world.

The study by Bashir et al. (2020), conducted in the United States of America, used the correlation coefficients of Kendall and Spearman to evaluate the association between contamination and deaths with the variables of temperature and relative humidity, wind speed, air quality and precipitation. Faced with this situation, the authors observed that the average and minimum temperature, in addition to air quality showed positive associations with new cases and total cases, and negative associations between air quality and mortality from coronavirus.

Already in a study developed by Briz-Redón and Serrano-Aroca (2020), aiming to evaluate the numbers of COVID-19 cases in Spain, it was observed that temperature (maximum, minimum and average) and non-meteorological factors such as population densities, population by age groups, number of travelers and number of companies as explanatory variables to model the natural logarithm of relative risk through spatio-temporal modeling techniques, considering the number of cases following the Poisson distribution. From this analysis, no evidence of a reduction in the number of SARS-CoV-2 cases with changes in air temperatures was identified.

On the other hand, in China, Shi and Zhu (2020) verified a negative association between air temperature and the number of cases, being verified through linear and nonlinear models. In addition to this study, the research of Xie et al. (2020), conducted in China, sought to understand the association between air temperature and the number of cases using a generalized additive model (GAM model). In this study it was not possible to conclude that the number of cases decreases as the air temperature increases, but they observed a reduction of approximately 4% in the number of cases in places with higher temperatures.

In Brazil, Auler et al. (2020) used multivariate procedures (principal component analysis and canonical correlation) to assess the association of rainfall, temperature, and relative humidity with the number of COVID-19 cases. This study found that temperature and relative humidity showed positive correlations with the number of COVID-19 cases. That is, according to the results of the study, warmer and wetter places tend to have a higher number of COVID-19 cases, when compared to places with milder air temperatures and lower relative humidity.

Prata et al. (2020) sought to understand the dynamics between weather conditions in subtropical cities in Brazil. For this purpose, the GAM model was used to evaluate the association of

the number of cases of the novel coronavirus with air temperature and population density. The results showed that there is a negative linear relationship between air temperature and COVID-19 cases, for air temperature values up to 25.8°C. When air temperature exceeds this threshold there is no evidence that the established relationship between air temperature and COVID-19 cases holds.

Considering only the city of São Paulo in the initial period of contamination by the new coronavirus, Rodrigues et al. (2020) evaluated possible associations between case and deaths with temperature and relative humidity, atmospheric pressure and wind speed. Through the Spearman correlation coefficient, it can be observed that the increase in air temperature during the study period was related to a reduction in the spread of the virus. On the other hand, on days when the relative humidity values were lower and the wind speed values were higher, there was an increase in SARS-CoV-2 contamination. Finally, on days of higher atmospheric pressure values, there was an increase in the spread of the virus when associated with other factors, such as wind speed, because there will be an increase in the concentration of pollution in the air, which may influence the behavior of the virus.

In studies conducted in Turkey, through the Spearman correlation coefficient, Şahin (2020) found that there is an association between the number of COVID-19 cases and meteorological factors, such as temperature and relative humidity of the air and wind speed. In Africa, the study conducted by Diouf et al. (2020) using temperature and relative humidity of the air and solar radiation, through the Pearson correlation coefficient showed that lower air temperatures and lower levels of relative humidity of the air, increase the transmission of COVID-19.

The authors Lolli et al. (2020), in a study conducted in Italy, sought to relate wind speed and atmospheric pressure with the transmission of SARS-CoV-2 using the correlation coefficient of Spearman and Kendall. The study was carried out in Milan, Florence and the province of Trento, and there was evidence of associations between the meteorological variables evaluated and the number of those infected by the virus.

In Latin America, Bolano-Ortiz et al. (2020) evaluated possible associations between cases and deaths with various meteorological variables in Argentina's capital, Buenos Aires. In this study, the Spearman correlation coefficient was used to measure the correlation between the variables: number of COVID-19 cases, mean, maximum and minimum air temperature, relative humidity, amount of rainfall and wind speed. The authors pointed out a negative association between COVID-19 cases and all meteorological variables in the study, except relative humidity.

Finally, in a systematic study covering 61 studies conducted in several countries, the authors Hoevemeyer et al. (2020) found that most of the studies evaluated indicate an association of new daily cases of coronavirus with the meteorological variables temperature, relative humidity and air quality.

As for the variables precipitation and wind speed, the authors found that most of the studies analyzed did not determine an association of these variables with new cases of COVID-19.

On the other hand, when evaluating the association of the number of daily deaths caused by COVID-19 with meteorological variables, the authors Hoevemeyer et al. (2020) found that temperature and relative humidity of the air and precipitation were the variables that showed the most association between the studies evaluated, and that wind speed and air quality showed no association in most studies.

Briefly, it can be seen in Table 1, the main results of research relating meteorological factors to SARS-CoV-2 contamination carried out in different countries.

Table 1: Studies on the association between meteorological factors and SARS-CoV-2 contamination in different regions of the world.

Country	Reference	Variables studied	Association between variables and number of cases
Africa	Diouf et al. (2020)	Temperature, Relative humidity, Solar radiation	There was an association between temperature and relative humidity in relation to contamination.
Argentina	Bolano-Ortiz et al. (2020)	Temperature, Relative humidity, Rainfall, Wind speed.	There was an association between all variables in relation to contamination.
Brazil	Auler et al. (2020)	Temperature, Relative humidity, Rainfall	There was an association between temperature and relative humidity in relation to contamination.
	Prata et al. (2020)	Temperature	There was an association between temperature and contamination.
	Rodrigues et al. (2020)	Temperature, Relative humidity, Pressure, Wind speed	There was an association between all variables in relation to contamination.
China	Shi et al. (2020)	Temperature	There was an association between temperature and contamination.
	Xie and Zhu (2020)	Temperature	There was an association between temperature and contamination.
Spain	Briz-Redón and Serrano-Aroca (2020)	Temperature	It did not present any association.
USA	Bashir et al. (2020)	Temperature, Wind speed, Rainfall, Relative humidity	There was an association between mean and minimum temperature with new cases and accumulated cases
Italy	Lolli et al. (2020)	Pressure, Wind speed	There was an association between pressure and wind speed in relation to contamination.
Turkey	Falcon (2020)	Temperature, Relative humidity, Wind speed	There was an association between temperature, wind speed and relative humidity in relation to contamination.

Source: Prepared by the authors, 2023.

From a review of scientific studies aimed at evaluating the association between COVID-19 cases and deaths in various locations around the world with demographic and meteorological characteristics, many studies can be observed pointing out some type of association, evidencing the importance of climate and population characteristics in the spread of the virus. However, due to the

observational character, the results should be interpreted with caution, not being an indicator of COVID-19 risk predictions based solely on meteorological or demographic characteristics.

4 CONCLUSIONS

Among the different studies presented, there is a discrepancy in the results of the association of meteorological and demographic variables in the characteristics of the spread of the COVID-19 pandemic. The divergences observed in the literature can be justified by the particularity of each locality. Thus, it verifies the need for more in-depth studies that are necessary for a better understanding of the behavior of the novel coronavirus in different microclimates and regions in the global scenario.

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CHAPTER
60

Incidence of "notified" cases of domestic violence against children and adolescents during the covid-19 pandemic in the demographic region of southwestern Paraná

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ABSTRACT
The objective of this study is to map the evidence found in the Database of the National Information System for Childhood and Adolescence (SIPIA) of the Tutelary Council of the mesoregion of Southwest Paraná in 42 cities that make up the geography of Domestic Violence against Children and Adolescents (VDCA). This breakdown is by region and pre-pandemic, pandemic, and post-pandemic period and demonstrates the impacts of the COVID-19 pandemic on VDCA. About the methodology adopted, this is documentary research of the quantitative-qualitative type. The results brought a "surprise" and proved to be quite frightening with the number of municipalities that do not feed in SIPIA the notifications of cases of VDCA, zeroing out all the years surveyed. There are 15 municipalities: Clevelândia, Honório Serpa, Coronel Domingos Soares, Renascença, Salgado Filho, São João, Salto do Lontra, Saudade do Iguaçu, Santo Antônio do Sudoeste, Realeza, Santa Izabel do Oeste, Cruzeiro do Iguaçu, Barracão, Verê and Francisco Beltrão. Still in this analysis about the "disregard" with the information, we have Pato Branco, Vitorino, Ampére, Pranchita and Marmeleiro with only one notification. Mariópolis and Manfrinópolis with two notifications and Coronel Vivida, Itapejara d'Oeste, Sulina, Enéas Marques and São Jorge d'Oeste with only three notifications in 6 years of research. The data explored by the SIPIA system referred to 6 years of notifications (2018-2023). In the case of the pandemic period, 2020 and 2021, only 40 cases were reported in the mesoregion of Southwest Paraná compared to the previous year (2019) in which 162 cases of VDCA were reported. Among the typologies of cases, we have in 1st place Physical Violence, with 21 notified cases. In 2nd, Sexual Violence with 17 cases. In 3rd, Psychological Violence with 9 cases. In the Sexual Exploitation typology, there are no notifications to be commented on. The data reported from the pandemic period (2020-2021) made it possible to outline. There is a "perverse ranking", in which the hidden figure of the researched data and the fact of the underreporting of cases of VDCA prevent the construction of knowledge about the theme studied. The construction of knowledge takes place in a historical process that cannot do without criticism, debate, and the confrontation of data. The absence of this debate due to the lack of information on the incidence of cases weakens criticism and scientific thinking and limits intervention in the fight against VDCA. Taking into account factors such as fear of contamination, imposed social isolation, limitations on distancing from home, and financial difficulties arising from the pandemic – factors that could aggravate VDCA – these underreporting generate perplexity. At the same time, these factors may have caused obstacles to the reporting of VDCA and to the search for assistance and the consequent decrease in notifications. Therefore, the limitations of this study are the high number of underreporting in the data provided by the municipalities of the Mesoregion of Southwest Paraná regarding the VDCA through SIPIA.

Keywords: VDCA, COVID-19, impacts.

1 INTRODUCTION

1.1 IMPACTS OF COVID-19 ON INTRA-FAMILY RELATIONSHIPS WITH CHILDREN AND ADOLESCENTS: FOR STARTERS

The article entitled here is linked to the Laboratory of Information and Communication Technologies in Health (LATICS-CNPq) in partnership with the Federal University of Campina Grande (UFCG-Cajazeiras-PB) and the Federal University of the Southern Border (UFFS-Laranjeiras do Sul-Realeza-PR), research line Caregiving-Educational Technologies: interlocutions in health, training and education. Thematic axis: Education and Child and Adolescent Psychic Health.

In the COVID-19 pandemic we face several transformations in our lives. Social isolation, especially about children and adolescents, has forced family life to "narrow". When it comes to the theme of Domestic Violence against Children and Adolescents (VDCA) it seems to us as something relevant to think about. Imagine the children and adolescents who suffer VDCA living in isolation all day with their abuser.

Worldwide there are propensities and predictions that Violence InTrafamiliar against children and teens grew during the pandemic state. The prolonged family life required by the world health authorities favored, by the fact that it has decreased the support network to take care of children and adolescents, such as daycare centers, schools, clubs, also the coexistence with other relatives, etc., on the other hand, increased the responsibility of parents (BRASIL, 2020 and SILVA; OLIVEIRA, 2020).

The school provides or should provide a role of advocate for children and adolescents,denying their rights. However, according to the United Nations Educational, Scientific and Cultural Organization (UNESCO), about 1.5 billion children and adolescents worldwide have been out of school due to the closure of educational institutions as an initiative to contain COVID-19 cases. Thus, children and adolescents no longer have considerable space for the manifestation and revelation of the violence suffered.

Many risk factors for VDCA were present in the daily lives of families during quarantine: unemployment, economic difficulties, living with children and adolescents for long periods, emotional ability and uncertainties of the moment lived. Focusing the discussion on the mental health status of family members during this time can lead to attempts to escape from problems, through violence, as a mechanism to compensate for the stress generated by these feelings and emotions, in more vulnerable family members, such as children and adolescents (MENEZES & AMORIM, 2020).

Thus, we are left with the key question: What is the incidence of "notified" cases of Domestic Violence against Children and Adolescents (VDCA) during the COVID-19 pandemic in the demographic mesoregion of Southwest Paraná?

The objective is to make a mapping of the incidence in the database of the National Information System for Childhood and Adolescence SIPIA[1] of the Tutelary Council of the mesoregion of Southwest Paraná. 42 cities make up the geography of the VDCA in this cut, by region and pre-pandemic, pandemic and post-pandemic period.

SIPIA has the function of: standardizing information at the Brazilian level; facilitate the recording of information; streamlining/automating the decision-making process; record the history of a child or adolescent; and, to enable the exchange of information.

In addition, SIPIA declares that it is the sole responsibility of the Guardianship Councils to record the information in the system and that it cannot be delegated to other employees.

Incidence refers to the number of cases reported in a given period. (LÓPEZ, 1995). The prevalence refers to the number of cases that the adult population recognizes as having suffered in childhood and adolescence (LÓPEZ, op cit).

The data researched here refer to the INCIDENCE of the VDCA phenomenon in its various modalities by the SIPIA system of the Tutelary Council of the mesoregion of the Southwest of Paraná of 42 cities.

The VDCA, who are the ones denounced, is just the tip of the iceberg. Most of the complaints committed are not notified. We have to warn that this is a hidden figure, termed as the "plot of silence" that mystifies statistics.

2 KEY CONCEPTS ABOUT VDCA AND INCIDENCE AND PREVALENCE

We adopted as a theoretical framework for conceptualizing the concepts about the VDCA and also about the incidence and prevalence of the term from the works of Azevedo & Guerra (1998) of the Laboratory of Child Studies of the University of São Paulo, Institute of Psychology, Department of Psychology of Developmental and Personality Learning, considering the relevance of years of studies and struggle for the rights of children and adolescents. Being classic and nuclear works in the studies on VDCA.

According to the authors, VDCA is an intra-class violence, which permeates all social classes, as violence of an interpersonal nature. It consists of a transgression of the disciplinary power of the adult, converting the difference of adult in comparison to child/adolescent, into an intergenerational inequality of power; It consists in a denial of the value of freedom: demanding that the child/adolescent be accomplices of the adult, in a pact of silence and in a process that imprisons the will and desire of the child or adolescent, subjecting them to the power of the adult, coercing them to satisfy their interests, expectations and passions.

[1] https://sipiact.treina.mdh.gov.br

As for the typologies of VDCA We have physical, sexual, psychological, negligent and fatal violence.

So, physical violence corresponds to the use of physical force in the disciplinary process of a child or adolescent by the parents, or those who play such a role in the family environment. The literature is controversial, but we consider physical violence as any disciplinary act that affects the body of a child or adolescent. (AZEVEDO & GUERRA, 2001).

When it comes to of sexual violence, is configured as any sexual act or game, straight or homosexual relationship, between one or more adults to a child or adolescent, to sexually stimulate this child or adolescent or use them to obtain sexual stimulation on the child or another person. It is noteworthy that in an occurrence of this type, the child or adolescent is always a victim and cannot be transformed into a defendant.

The intention of the process of sexual violence is always the pleasure (direct or indirect) of the adult, and the mechanism that enables the participation of the child and adolescent is the coercion exercised by the adult, a coercion that has roots in the adult-centric pattern of adult-child-adolescent relationships in force in our society.

Psychological violence, also designated as "psychological torture", occurs when the adult constantly depreciates the child, blocks his efforts at self-acceptance, causing him great mental suffering. Threats of abandonment can also make a child fearful and anxious, representing forms of psychological distress.

As for neglect, it is an omission in terms of providing for the physical and emotional needs of a child or adolescent. It is configured when parents or guardians fail in terms of feeding, dressing their children properly, provide adequate education and supervision and when such failure is not the result of living conditions beyond their control.

And finally, the fatal violence practiced in the family against children and adolescents, whose consequence ends up being their death.

We also talk about the incidence and prevalence of VDCA cases. An incidence deals with the number of cases reported in a given period. (LÓPEZ, 1995). The prevalence refers to the number of cases that the adult population recognizes having suffered in childhood and adolescence (LÓPEZ, op cit).

The data here researched, refer to the INCIDENCE of the VDCA phenomenon in its various modalities by the SIPIA system of the Tutelary Council of the mesoregion of the Southwest of Paraná of 42 cities.

The VDCA, which are the ones denounced is only at the point of the iceberg, most of the complaints committed are not notified. We have to warn that this is a hidden cipher, termed as the "plot of silence" that mystifies statistics.

3 METHODOLOGIES

It is documentary research that uses primary sources, that is, data and information that have not yet been treated scientifically or analytically. (GIL, 2007).

A mapping of the incidence was performed in the database of the National Information System for Children and Adolescents SIPIA[2] of the Tutelary Council of the mesoregion of Southwest Paraná in 42 cities that make up the geography of the VDCA in this breakdown by region in the period of the COVID-19 pandemic.

The analysis of the information was transformed into tables with the number of incidences of the registered cases, therefore a quantitative-qualitative analysis, in the period pre-pandemic, pandemic and post-pandemic, making a total of 6 years, focusing on the pandemic period.

4 RESULTS AND DISCUSSIONS

From the collected data mapped by the database of the National Information System for Childhood and Adolescence SIPIA of [3] the Tutelary Council of the mesoregion of Southwest Paraná, the information was verified through inferences for further analysis.

Despite laws and advances in child and adolescent care, the numbers on VDCA in the pre-pandemic period were already worrying. DATASUS (2017) - Data from the Department of Informatics of the Unified Health System show in 2017 a total of 126,230 cases of violence against children and adolescents up to 19 years old.

In 2019, the Human Rights Dial (Dial 100), a telephone tool made available by the Brazilian government that receives, analyzes and forwards complaints of human rights violations, revealed that 86,837 (55%) of intra-family violence against children and adolescents, with 38% linked to negligence, 23% to psychological violence, 21% to physical violence, 11% to sexual violence, 3% to child exploitation/labor and 3% associated with other violent injuries.

Returning to the theme of the study - Incidence of "notified" cases of Domestic Violence against Children and Adolescents during the COVID-19 pandemic in the demographic messoregion of Southwest Paraná, we have in the following table the incidence of notifications of the 42 municipalities that geographically compose this region.

[2] https://sipiact.treina.mdh.gov.br
[3] https://sipiact.treina.mdh.gov.br

Table 1: SIPIA notifications of VDCA cases in the Pre-pandemic, Pandemic and Post-pandemic periods in the demographic mesoregion of Southwest Paraná (42 municipalities)[4].

VIOLÊNCIA DOMÉSTICA CONTRA CRIANÇAS E ADOLESCENTES (ANTES - DURANTE - APÓS / PANDEMIA COVD-19)							
ANO	2018	2019	2020	2021	2022	2023	
	antes	antes	durante	durante	após	após	
CIDADES							TOTAL CASOS REGISTRADOS
1- Palmas	0	70	0	0	0	0	70
2- Clevêlandia	0	0	0	0	0	0	0
3- Honório Serpa	0	0	0	0	0	0	0
4- Coronel D.S	0	0	0	0	0	0	0
5- Mangueirinha	0	14	1	0	0	0	15
6- Pato Branco	0	0	1	0	0	0	1
7- Chopinzinho	0	0	0	0	6	0	6
8- Coronel Vivida	0	0	3	0	0	0	3
9- Itapejara d'Oest	0	0	3	0	0	0	3
10- Mariópolis	0	0	0	0	2	0	2
11- Bom sucesso d.s	0	3	3	1	0	0	7
12- São João	0	0	0	0	0	0	0
13- Saudade do Ig.	0	0	0	0	0	0	0
14- Sulina	0	0	1	0	2	0	3
15- Vitorino	0	0	0	0	1	0	1
16-Capanema	0	10	2	0	0	0	12
17-Bela Vista da C.	0	1	4	5	0	0	10
18- Ampére	0	0	1	0	0	0	1
19- Pérola d'Oeste	0	4	2	0	0	0	6
20- Planalto	0	12	0	0	1	0	13
21- Pranchita	0	1	0	0	0	0	1
22- Realeza	0	0	0	0	0	0	0
23- Santa Izabel do Oeste	0	0	0	0	0	0	0
24- Francisco B.	0	0	0	0	0	0	0
25- Dois Vizinhos	0	6	3	0	0	0	9
26- Bom Jesus do Sul	0	3	3	0	0	0	6
27-Cruzeiro do I.	0	19	0	0	0	0	19
28-Boa Esperança do Iguaçu	0	0	0	0	0	0	0
29- Enêas Marques	0	0	0	3	0	0	3
30- Flor da Serra do S.	0	0	0	0	0	0	0
31- Barracão	0	0	0	0	0	0	0
32- Manfrinópolis	0	1	1	0	0	0	2
33- Marmeleiro	0	0	0	0	1	0	1
34- Nova Esperança do Sudoeste	0	0	0	0	0	0	0
35- Nova Prata do Iguaçu	0	14	0	0	0	0	14
36- Pinhal de São Bento	0	0	1	0	0	0	1
37- Renascença	0	3	0	0	0	0	0
38- Salgado filho	0	0	0	0	0	0	0
39- Salto da Lontra	0	0	0	0	0	0	0
40- Santo Antônio do Sudoeste	0	0	0	0	0	0	0
41- São Jorge d'Oeste	0	0	1	1	1	0	3
42-Verê	0	1	0	0	0	0	0
	0	162	30	10	14	0	216 casos registrados

Source: Database of the National Information System for Childhood and Adolescence (SIPIA) – Accessed: May 20, 2023[5].

Table 1 is quite frightening about the number of municipalities that do not feed the SIPIA with notifications of VDCA cases, zeroing out all the years surveyed.

[4] The municipalities are not in alphabetical order, but rather by microregion, thus divided into colors. The 5 municipalities of the **geographical microregion** of **Palmas - sub-governance Planalto:** 01. Palms, 2. Clevelândia, 03. Honório Serpa, 04. Colonel Domingos Soares and 05. Mangrove. The 10 municipalities of the **geographical microregion** of **Pato Branco:** 01. White Duck, 02. Chopin, 03. Colonel Vivida, 04. Itapejara d'Oeste, 05. Mariopolis, 06. Good Success of the South, 07. St. John, 08. Saudade do Iguaçu, 09. Sulina and 10. Victorine. The 8 municipalities of the **geographical microregion** of **Capanema:** 01. Capanema, 02. Beautiful View of Caroba, 03. Ampere, 04. Pearl of the West, 05. Plateau, 06. Pranchita, 07. Royalty and 08. Saint Izabel of the West. The 19 municipalities of the **geographic microregion** of **Francisco Beltrão:** 01. Francisco Beltrão, 02. Two Neighbors, 03. Bom Jesus do Sul, 04. Iguazu Cruise, 05. Good Hope of Iguazu, 06. Aeneas Marques, 07. Flower of Serra do Sul, 08. Shed, 09. Manfrinopolis, 10. Quince, 11. New Hope of the Southwest, 12. New Silver of Iguaçu, 13. St. Benedict's Pine Forest, 14. Renaissance, 15. Salgado Filho, 16. Otter Jump, 17. St. Anthony of the Southwest, 18. São Jorge d'Oeste and 19. See.

[5] It can be inferred that in 2023 unreported cases may still be being processed, as we are in May 2023. The data can then be examined in late 2023.

At the beginning of the writing of the study, we talked about[6] INCIDENCE and PREVALENCE[7] of VDCA cases, it is noted that we adopted only the INCIDENCE as an indicator of the phenomenon regarding the functioning of the SIPIA. When considering INCIDENCE, only reported cases are considered, which is at the "tip of the iceberg", as most are not reported. We ask: Why all this neglect of vulnerable childcare services when we deal with VDCA?

O SIPIA, as we have already said, has the function of standardizing information at the Brazilian level; facilitating the recording of information; streamlining/automating the decision-making process; recording the history of a child or adolescent; and, enabling the exchange of information.

It is the SIPIA that declares the number of notifications and it is the sole responsibility of the Guardianship Councils to make this record of the information in the system and that cannot be delegated to other employees.

Why are there no cases of VDCA flagged in the system? It is no longer easy to "lie" with the data with PREVALENCE and when we have INCIDENCE as the first form of data collection, the information is inaccurate. Could we speak of neglect of these services, with the function of making these notifications public? The problem of notifications should be widely discussed by society in general so that we can create support networks for children in situations of VDCA. "Secrecy" cannot be invoked as an obstacle to notifications of VDCA cases.

In the SIPIA data we have of the 42 municipalities, 15 municipalities did not publish the information in 6 years surveyed. They are: Clevelândia, Honório Serpa, Coronel Domingos Soares, Renascença, Salgado Filho, São João, Salto do Lontra, Saudade do Iguaçu, Santo Antônio do Sudoeste, Realeza, Santa Izabel do Oeste, Cruzeiro do Iguaçu, Barracão, Verê and Francisco Beltrão. Still in this analysis about the "disregard" with the information, we have Pato Branco, Vitorino, Ampére, Pranchita and Marmeleiro with only one notification. Mariópolis and Manfrinópolis with two notifications and Coronel Vivida, Itapejara d'Oeste, Sulina, Enéas Marques and São Jorge d'Oeste with only three notifications. Remembering that we are not yet dealing specifically with the COVID-19 pandemic period.

Thus, even before we analyze the numbers of VDCA cases and their typologies during COVID-19, we will cover some points as predisposing factors to try to explain such a neglect of municipalities in not releasing the data. These factors are linked to the very issue of childhood, the issue of the family and the issue of violence. (AZEVEDO & GUERRA, 1995).

We start with **childhood issues.** Brazilian childhood is a smaller segment of the population, valued in discourse but devalued in practice. It is one of the factors that discreetly authorizes adults to

[6] Incidence refers to the number of cases reported in a given period.
[7] It refers to the number of cases that the adult population recognizes as having suffered in childhood and adolescence.

violate their rights. Therefore, the deconstruction of this factor brings us back to Vygotsky's Socio-Historical Psychology.

The overcoming of reductionist positions in the adult-centric relationship in the view of such a theory must consider that the VDCA phenomenon are not natural, they are historical constructions produced by individuals in concrete situations of existence. Vygotsky (apud COLE & SCRIBNER, 1984) was the first author to attempt to correlate concrete psychological questions with Marx's idea of the historical-social and material changes that produce transformations in human nature. Thus, phenomena must be studied as processes in motion. It is necessary to understand childhood as a social construction that cannot be dissociated from other social variables.

When if we return to the history of children, it is perceived that the conceptions of child/childhood bring important components for the understanding of the labeling of devaluation. Since Classical Antiquity, children have been associated with the weak of society: slaves, blacks, servants, people and women. "Not only are children or were regarded as children: slaves in antiquity, colonized blacks, servants, people and women have been called children and have often been treated as children." (SNYDERS, 1984, p. 25)

From a religious point of view, children were seen as innocent, pure, angelic, sweet and fragile beings, but also depraved, annoying, "pestinhas", immature, "pets" and willful. (Ariès, 1978).

From the epistemological point of view, children were designated as: without reason, without judgment that they needed adults not to fall into error and, finally, from the scientific point of view they were considered imperfect, incomplete, came to be and whose perfection and intellectual and moral completeness would only be achieved in maturity, that is, moldable with a controlled will.

In this sense, we need to compensate these ideas with a culture that values childhood and adolescence while **be psychological** with specific needs arising from the inherent condition of development of the human being, knowing the process of child development and respecting their needs and limitations and also valuing them as **be political,** as a subject of rights and duties.

A culture where children and adolescents feel loved and accepted and not merely tolerated or abused, with the general complacency, indifference and connivance of adult society.

When it comes to the **Family issue**, it is known that the bourgeois model with the emergence of private space, it gave families the free will and power of "care" for childhood and adolescence, including the "right" of life and death in the "education" of this segment of society, being a favoring model of the VDCA.

The intra-family relationship pattern is abusive, either by the personal conditions of family members or by stressful factors and/or precipitating the socioeconomic and cultural conditions of an adult-centric society.

Concerning **the Violence Issue**, needless to insist on structural factors as a historically constructed constitution.

Returning to Table 1, we continue the analysis of the information by SIPIA. Remembering that our research problem is: What is the incidence of "notified" cases of Domestic Violence against Children and Adolescents (VDCA) during the COVID-19 pandemic in the demographic mesoregion of Southwest Paraná?

About the more general aspects with the period studied, 2018 and 2019 (pre-pandemic), 2020 and 2021 (pandemic) and 2022 and 2023 (post-pandemic) we have a total in the 42 cities, no notifications in 2018, 162 in 2019, 30 in 2020, 10 in 2021, 14 in 2022 and none in 2023. So in the pre-pandemic period we have 162 notifications, in the pandemic 40 notifications and 14 in the post-pandemic.

The city that recorded the most cases in the pandemic was Bela Vista da Caroba, with 9 notifications, followed by Bom Sucesso do Sul, with 4 cases, Coronel Vivida, Itapejara d'Oeste, Dois Vizinhos, Bom Jesus do Sul and Enéas Marques with 3 notifications. With 2 notifications, we have Capanema, Pérola d'Oeste and São Jorge d'Oeste. With only 1 notification appears Mangueirinha, Pato Branco, Sulina, Ampére, Manfrinópolis and Pinhal de São Bento.

And, finally, we see that Palmas, Clevelândia, Honório Serpa, Coronel Domingos Soares, Chopinzinho, Mariópolis, São João, Saudade do Iguaçu, Vitorino, Planalto, Pranchita, Realeza, Santa Izabel do Oeste, Francisco Beltrão, Cruzeiro do Iguaçu, Boa Esperança do Iguaçu, Flor da Serra do Sul, Barracão, Marmeleiro, Nova Esperança do Sudoeste, Nova Prata do Iguaçu, Renascença, Salgado Filho, Salto do Lontra, Santo Antônio do Sudoeste and Verê there is no notification. There are 26 cities out of a total of 42 studied that do not show any case.

Regarding notifications in their general aspects, however, we have 162 cases in 2019 (pre-pandemic), 30 in 2021 and 10 in 2022 (pandemic) and only 14 in 2023 (post-pandemic).

Still referring to chart 1 it is "interesting" to realize, now in the 6 years analyzed, that the largest number of notifications are in the city of Palmas. There are 70 cases recorded in 2019, before the pandemic, although there are no reports in 2018, 2019, 2020 (pandemic period), 2022 and 2023. Remembering that the study period is 6 years (2018, 2019, 2020, 2021, 2022 and 2023).

The same is true with the city of Cruzeiro do Iguaçu, although with a lower number of cases concerning the municipality of Palmas, with 19 notifications, but also these data are in the year 2019 and no notifications in 2018, 2021, 2022 and 2023.

Mangueirinha, appears in 3rd place with the record of 15 cases, of which 14 is from 2019 and only 1 in 2020 (pandemic). In 4th place we have the city of Nova Prata do Iguaçu, with 14 cases, but in the same proportion of Palmas and Cruzeiro do Iguaçu, all 14 notifications are from 2019. Already

in Planalto we have 13 cases, 12 in 2019 and 1 in 2023, demonstrating that in 2020 and 2021 (pandemic) no complaint is registered.

In the municipality of Capanema, we have 12 cases in the periods studied, and 10 cases in 2019 and 2 cases in 2021 (pandemic). In Bela Vista da Caroba, we found a different scenario, there were 10 cases reported, 1 in 2019 (pre-pandemic) and 4 in 2020 and 5 in 2021 (pandemic). So did Two Neighbors that in a total of 9 cases, 6 in 2019 and 3 during the pandemic. Bom Sucesso do Sul also verified that of the 7 reported cases, 3 are from 2019 (pre-pandemic) and 3 from 2020 and 1 from 2021 (pandemic).

With 6 reported cases appearsm Chopinzinho, Pérola d'Oeste and Bom Jesus do Sul, with the difference that in Chopinzinho the 6 cases were in the post-pandemic period, Pérola d'Oeste sees 4 cases in 2019 and 2 in 2021 (pandemic) and Bom Jesus do Sul, 3 in 2019 and 3 in 2021 (pandemic).

The other notifications with 3, 2 and 1 cases have already been mentioned in the above text.

Thus, our analyses focus on the pandemic period, 2020 and 2021, totaling 40 cases reported in the mesoregion of the southwest of Paraná.

The following will be presented the NOTIFIED cases of VDCA by SIPIA in the pre-pandemic, pandemic and post-pandemic period regarding their TYPOLOGY.

Table 2: NOTIFIED cases of VDCA by SIPIA in the Pre-pandemic, Pandemic and Post-pandemic period regarding their TYPOLOGY.

	ANTES		DURANTE		APÓS	
	2018	2019	2020	2021	2022	2023
MODALIDADES DE VDCA						
VIOLÊNCIA FÍSICA	0	32	13	9	7	0
VIOLÊNCIA PSICOLÓGICA	0	42	8	1	1	0
VIOLÊNCIA SEXUAL - ABUSO	0	86	17	0	6	0
VIOLÊNCIA SEXUAL EXPLORAÇÃO COMERCIAL	0	2	0	0	0	0
TOTAL POR ANO	0	162	30	10	14	0

Source: Database of the National Information System for Childhood and Adolescence (SIPIA) – Accessed: May 20, 2023.

How much to the VDCA typologies we have in table 2 in 2019, 32 notifications of Physical Violence (pre-pandemic), 21 cases between 2020 and 2021 (pandemic) and 7 in 2022 (post-pandemic).

When it comes to Psychological Violence, there are 42 cases in 2019, 8 in 2020, 1 in 2021 and 1 in 2022.

As for Sexual Violence, there are 86 cases in 2019, 17 in 2020 and 6 in 2022.

As for commercial exploitation, there are 2 cases in 2019.

Table 2 does not show the typologies of Negligence and Fatal Violence.

It is observed, in general, that even having low INCIDENCE notifications per year, it is evident that in the pre-pandemic period, 2019, the number of cases is almost 6 times higher (162) than in the pandemic (40) and post-pandemic period (14).

The data reported from the cut of the pandemic period (2020-2021) it is possible to draw an outline, which can corroborate in this study. Physical Violence against Children and Adolescents appears in 1st place with 21 reported cases. At the level of analysis of this form of corporal discipline and / or domestic punishment as an aspect to repress the child and / or adolescent are characterized by obedience at any price and the "good" of the child, which in fact, are methods that aim to manipulate, frighten, take away affection, distrust, humiliate, applying violence that can reach torture. It is necessary to listen to what a child wants to tell us to be able to understand him, accompany him and love him. There must be a dialectical process between the adult and child (GUERRA, 2001).

Thus, it is clear that the prevention of Domestic Physical Violence has to assume the commitment to combat corporal punishment as a form of discipline.

About the 2nd type of VDCA, table 2 shows 17 cases, ranking 2nd in notifications in the pandemic. Unfortunately, the association between sexuality and violence is based on power, or rather, on the inequality of power and domination of the adult over the child and/or adolescent. Because it is a terrible concrete reality, that there is an intra-family manipulation that silence is the aggravating factor of the idea of the perfect family, many children and adolescents want to tell the adults they trust and when they do the blame falls on the child and the adolescent himself.

There is still the question of seeing this form of violence as naturalizing, but it is a reality produced over time. No one is born an aggressor; the person becomes an aggressor and is socially reproduced. Another factor to consider is sexist culture. Machismo and its socialization in the family environment are unequal, especially as one of the factors responsible for the greater vulnerability of girls and adolescents in incestuous episodes of sexual violence, while aggressiveness in small males, the conquering stallions, is stimulated from an early age.

The third typology of VDCA is Psychological Violence, with 9 cases in the pandemic period. Threats, excessive control, offenses, malicious and excessive criticism, comparisons and humiliations are forms of Psychological Violence. Behaviors that make the victim feel incapable, neglected and diminished. Situations that can last for years, since often the child or adolescent does not know what is happening.

These forms of Psychological Violence against Children and Adolescents carry psychological damage. As consequences we have: stress, anxiety, depression and lack.

And finally, in the analysis of Table 3, we have sexual exploitation. In this typology there are no notifications to be commented on.

5 FINAL CONSIDERATIONS

> "We all grew up convinced that the big is worth more than the small."
> (JANUSZ KORCZAK, the right of the child to respect).

In these final considerations, we were surprised not to be notified, through SIPIA, in 26 cities out of a total of 42 studied, no case of VDCA from 2018 to 2022. It can be said that there is a "preserved ranking" in this statistic on a scale from "worst" (no case) to "least bad" (cases of low notification).

When we mention "preserved ranking", we bring the idea of the dimension of the hidden cipher of the researched data, and also by the fact that by not being notified the cases of VDCA there impedes the construction of knowledge about the theme studied. The construction of knowledge takes place in a historical process that cannot do without criticism, debate, and the confrontation of data. The absence of this debate due to the lack of information on the incidence of cases carries the weakening of criticism and scientific thought and limits us to intervene in the fight against VDCA.

On the other hand, the fear of contamination, imposed social isolation, limitations in distancing from home, added to the financial difficulties resulting from the pandemic, may have been obstacles to reporting violence and seeking assistance and the consequent decrease in notifications. (FEDERAL DISTRICT HEALTH DEPARTMENT, 2020).

We can then analyze as limitations of this study the low number of municipalities in the Mesoregion of Southwest Paraná that provided data on VDCA notifications by SIPIA. It is possible to conclude that the reduction in the number of VDCA notifications does not reduce the feeling of perplexity in the face of such facts.

It is necessary to oppose the VDCA, to defend and practice a peaceful solution of intra-family conflicts to socialize the new generations in the area of non-violence.

How long will children and teenagers have to pay by intra-family abuses due to the disarticulation of institutions in not notifying cases of VDCA?

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CHAPTER
61

COVID-19 pandemic - Social isolation, socio-emotional repercussions and mental health effects

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ABSTRACT
It is known that the COVID-19 pandemic has affected several sectors, several individuals, in a potentiating way, including the elderly, who have been the focus of worrying news, victims of this virus, because they are part of the risk zone, because of their comorbidities involved. In this work, the main object of study is to investigate the impact of social isolation among Brazilians during the COVID-19 pandemic period. To this end, we discuss the repercussions on socio-emotional feelings and the lifting of the effects of the COVID-19 pandemic on mental health. The study was qualitative, based on an exploratory qualitative theoretical perspective. Initially, we had the literature review, bringing authors on the theme presented here. The results showed that social isolation during the COVID-19 pandemic has aggravated problems that affect people's mental health, such as anxiety, depression, insecurity, insomnia. It is concluded, therefore, that the subjects deserve attention, even after the end of isolation, since the damages are real.

Keywords: COVID-19 pandemic, Social isolation, Socio-emotional feelings, Mental health.

1 INTRODUCTION

In return to the end of the year 2019 and beginning of 2020, we witnessed the impact of the health crisis that shook the world and generated such complexities for most of the members of planet Earth. We have experienced the COVID-19 pandemic, one of the greatest phenomena of worldwide occurrence in recent years, which has affected psychological, economic and social aspects worldwide. Faced with the absence of effective treatments and at first, of a vaccine that would prevent contagion, there was the inevitable *lockdown* and social isolation, as the main measures to contain the disease and efforts to prevent the increase in the number of infections. In the year 2021, we were advancing in attempts to combat the virus of high transmission rate and lethality of COVID-19 that, even in 2022, has been mutating.

In this scenario, many Brazilians had their routines suddenly changed and the fear of illness remained, even in the face of protection and hygiene measures, especially among risk groups. One of the main risk groups affected by the disease were the elderly, as many also have other diseases and comorbidities, such as diabetes and hypertension.

To this end, it was evidenced that in the months of 2020 the pandemic caused by COVID-19 severely transformed a good part of Brazilian citizens and the severity of the disease added to the protective and social isolation measures implemented to control the spread of the virus, had several consequences such as the death of many people in the world and especially in Brazil. These problems ended up affecting the population, both in their living conditions and mental health. Issues related to the symptoms of the COVID-19 disease to the entire political, economic and social context resulting from the coronavirus, have caused consequences for the mental health of countless individuals. For the Brazilian population, the pandemic period could cause worsening of anxiety and stress states due to the effect of atypical situations of the period and excess of negative and/or reliable information. In this way, we seek to understand and investigate the increase in anxious cases in Brazil in the context of the COVID-19 pandemic.

Thus, this research had the proposal of responding to the general objective of investigating the impact of social isolation among Brazilians during the COVID-19 pandemic period, the repercussion on socio-emotional feelings and the survey of the effects of the COVID-19 pandemic on mental health. In accordance with this proposal, it was essential to verify the concept of social isolation, to understand what scientific studies present about the relationship between the COVID-19 pandemic and social isolation and people's lives, as well as to verify the main socio-emotional factors resulting from social isolation during the period of the COVID-19 pandemic and affects mental health.

The methodology, the central north of the research as well as the key to answer the objective about the impact of social isolation during the COVID-19 pandemic among Brazilians and the socio-emotional repercussion in the pandemic scenario, consists of a descriptive bibliographic research of qualitative nature. Topics on the COVID-19 disease, the concept of social isolation and the main socio-emotional factors that emerged during the COVID-19 pandemic will be discussed. Given the above scenario, the following question was named as a problem situation: What are the socio-emotional factors impacting social isolation among Brazilians during the period of the COVID-19 pandemic? The question present in the study is justified, because it is understood that having many studies analyzed that epidemics generally strongly impact the mental health of individuals, it is considered that the number of people affected psychologically is greater than the number of people infected by the disease, which can reach one third of the population (CEPEDES, 2020; ORNELL et al., 2020). Lima (2020) exposes that the COVID-19 pandemic generates impacts not only social and economic, but also at the level of mental health. Based on the statement of these authors, the hypothesis is that the pandemic may be a triggering factor of shock to people's mental health and we continue the search for answers.

2 THE COVID-19 PANDEMIC AND THE REPERCUSSIONS ON THE LIVES OF MOST BRAZILIANS

2.1 THE COVID-19 PANDEMIC CONTEXT IN BRAZIL AND SOCIAL ISOLATION

The COVID-19 pandemic is a worldwide phenomenon that impacts economic and social aspects worldwide. Faced with the absence of effective treatments and a vaccine to prevent contagion, social isolation was the main measure to contain the disease, as an attempt to avoid the increase in the number of infections. In this scenario, many Brazilians, including the elderly, had their routines suddenly changed and the fear of illness remained even in the face of protection and hygiene measures, especially among risk groups, such as the elderly. In this sense, since the beginning of the COVID-19 pandemic in 2020, elderly people have been identified as belonging to a risk group and the recommendation in most countries was that they maintain as much isolation as possible, in addition to the use of masks and hygiene measures indicated for all.

Many seniors have been isolated for more than a year, without seeing or hugging their loved ones. Those who lived in shelters were unable to meet with their families. Many have come to live in a world without hugs, celebrations and online shopping, sometimes having to deal with social networks that they do not dominate. The difficulties are even more aggravated for those who do not have stable financial conditions.

With the COVID-19 pandemic, seniors have gained prominence, largely by exhibiting changes stemming from senescence or senility that make them more susceptible to infectious diseases like COVID-19, with social distancing actions and strategies specifically for them. Even though it is a reality, in relation to population aging, unfortunately there is little visibility and appreciation for the elderly public that continuously receives from much of society a prejudiced, stigmatized and stereotyped view. And with the actions to protect the elderly against COVID-19, the prejudices of society have been reinforced. If this happened to the elderly population in general, what about the homeless elderly, already so marginalized and stigmatized by their situation of vulnerability (ROMERO & SILVA, 2021).

For the general population, during the COVID-19 pandemic, Brazil experienced the new normal, with work in *home office* format, virtual classes such as Distance Learning (EAD), and even the shows were transformed into *online lives*, transmitted by digital and social media under the prevention and hygiene protocols issued by the World Health Organization (WHO), intending as little social contact as possible in the face of the virus that threatens global health. In companies it was no different and workers adapted to the new format of remote work.

Since January 2020, the WHO has held daily press conferences to present to the world population the situation of the new virus and clarify the first doubts. But it was in February that

communication began to intensify, shortly after the first notification of Sars-CoV-2 in China. According to information from Brito (2020), in Brazil, Carnival occurred without interruptions and without worries, registering a record audience of people in the main carnival cities such as Rio de Janeiro. At the end of the carnival, specifically on Ash Wednesday, on February 26, 2020, Brazil detected the first case of contracting the coronavirus, in a 61-year-old white man who had returned from a trip from Italy to the city of São Paulo, "being the first confirmed death, of a 57-year-old woman who was hospitalized in the municipal hospital in the capital of São Paulo on March 12," points out Verdélio (2020).

With the confirmation of the first deaths on March 18, 2020, the Chamber of Deputies passed a legislative decree to recognize the state of public calamity in the country. The social and economic problems faced as a result of the Covid-19 virus are different from all the health crises faced in recent years, in which dozens of protective measures were sanctioned, applied to reduce their impacts, and in Brazil, Law No. 13,979/2020 was enacted, with measures to address the public health emergency, with regulation of its operationalization in the Ministry of Health Ordinance No. 356/2020 and penalties for non-compliance of these measures in the Interministerial Ordinance MJSP (Ministry of Justice of the State of São Paulo / Ministry of Health (MS) n° 005/2020, aiming to protect Brazil from the unknown disease. From this perspective, it is possible to understand that social isolation was the best measure of containment of the coronavirus, because at the time there were no vaccines, being of paramount importance the use of masks in public places and large crowds, where the risk of contagion is greater. According to law No. 13,979 of February 6, 2020, then-President Jair Bolsonaro, sanctioned the following law that:

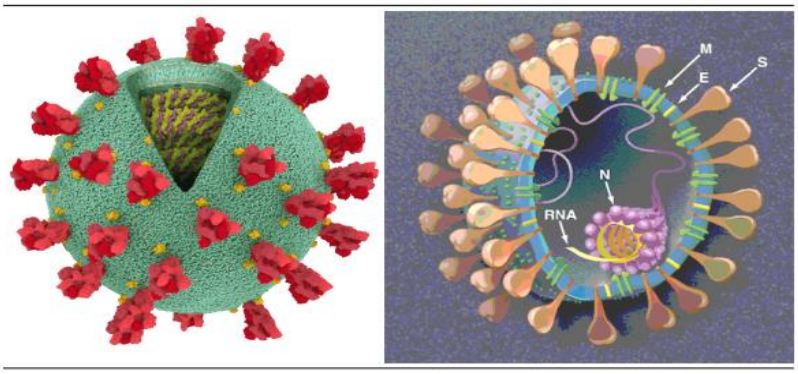
> Art. 1 This Law provides for the measures that may be adopted to address the public health emergency of international importance arising from the coronavirus responsible for the 2019 outbreak.
> § 1 - The measures established in this Law aim at the protection of the community.
> § 2 Act of the Minister of State for Health shall provide for the duration of the public health emergency referred to in this Law. (See Decree No. 10,538 of 2020)
> § 3 - The period referred to in § 2 of this article may not be longer than that declared by the World Health Organization.
> Art. 2 For the purposes of the provisions of this Law, it is considered:
> I - Isolation: separation of sick or contaminated persons, or of affected baggage, means of transport, goods or postal parcels, from others, in order to avoid contamination or the spread of the coronavirus;
> II - Quarantine: restriction of activities or separation of persons suspected of contamination from persons who are not sick, or of baggage, containers, animals, means of transport or goods suspected of contamination, in order to avoid the possible contamination or spread of the coronavirus.
> Art. 3 To address the public health emergency of international importance referred to in this Law, the authorities may adopt, within the scope of their competences, among others, the following measures:
> I - Isolation;
> II - Quarantine;
> I II-A – mandatory use of personal protective masks;
> IV - Exceptional and temporary restriction, by roads, ports or airports

Scholars of the sciences, doctors, sanitarians, researchers and health professionals in general, have focused on reading, listening, investigating the most diverse communications about COVID-19. It is believed that the virus has a zoonotic origin, since the first confirmed cases had links mainly to the Wholesale Seafood Market of Huanan, where the commercialization of live animals was also carried out (MARTINS et al., 2020). Covid-19 infection is a disease caused by the SARS-COV-2 virus, having originated in Wuhan, China, in December 2019. The clinical picture of patients diagnosed with COVID-19 ranges from asymptomatic infections to severe respiratory infections, as well as causing several sequelae that are still being evaluated and studied. Regarding the treatment of such patients, the WHO mentions that some may require hospital care and others treatment for severe respiratory failure (MARTINS et al., 2020).

The agent responsible for the COVID-19 pandemic is a virus that belongs to the *Coronaviridae* family, called SARS-Cov-2, being a ribonucleic acid virus, in which the genetic material is represented by only one molecule of RNA+. Its genome is composed of approximately 30,000 nucleotides and each of them is formed by a ribose, a phosphoric acid and a nitrogenous base. We identified 29 viral proteins and the most relevant are the spike glycoprotein, recognized as protein S, and the N protein, of the nucleocapsid vira. Through the spike glycoprotein the virus is allowed to enter its host cell, which eventually binds to the cell receptor and fuses the membrane. It is through the nucleocapsid protein that the process of viral replication is developed (UZUNIAN, 2020).

The virus is classified as RNA+ due to its ability to be read directly by cellular structures. Still, it is considered as a messenger RIN, which when traversed by cellular ribosomes inducing the reproduction of viral proteins. Another characteristic and highlight is the presence of the enzyme replicase, which accompanies the virus or is produced by the infected cell, causing the production of RNA- to occur from the RNA+ that is typical of the virus. Thus, the transient RNA- molecule ends up serving as a model for the production of RNA+ molecules and each of them will descend from the virus that infected the cell, and its descendants will parasitize the cell and be produced inside it (UZUNIAN, 2020).

Figure 1 – Structure of the SARS-Cov-2 virus



Source: Uzunian (2020, p.1).

The synthesis of new molecules, as illustrated in Figure 1, is done inside the vesicular structures of the cell, in the endosomes. The production of viral proteins occurs with the participation of ribosomes that are attached to the rough endoplasmic reticulum in the presence of the Golgi complex. The binding of the virus with its target cell occurs with the aid of the S protein, which interacts directly with the cellular receptors (UZUNIAN, 2020).

The S protein, when it comes into contact with the protein cell receptor, represented by the enzyme angiotensin 2, which is present mainly in the lung cells. Through such a link, the virus ends up invading the cell (UZUNIAN, 2020). This protein comes into contact with the protein cell receptor, the angiotensin-converting enzyme 2 (ACE2), present mainly in lung cells. By binding both proteins, the virus can invade the cell. (UZUNIAN, 2020). Subsequently, the fusion of the proteins illustrated above, the next process is the fusion of the lipid membrane of the virus with the cellular plasma membrane, where the virus eventually conquers the cellular interior. After performing the introduction of the genetic material of the virus into its host cell, the cell vesicle is formed causing the virus to be retained and multiplied. Therefore, the RNA+ molecules that are generated by the endosomes are released and the synthesis of viral proteins happens (UZUNIAN, 2020). It is observed that the RNA- molecule is produced from the RNA+ molecule, being descendants of the genetic material of the virus that eventually invaded the cellular space. When the viral proteins have already been produced, the process of assembling the virions begins by including the RNA+ molecules in the protein capsids. As the virions approach the cell plasma membrane, which is in this totally worn stage, they are surrounded by a lipid bilayer, which was originated by the plasma membrane of the host cell, which at the end of the process opens releasing a large amount of the virus to the outside (UZUNIAN, 2020).

Thus, the severe acute respiratory syndrome caused by SARS-CoV-2 spread rapidly to all countries, causing numerous deaths, when the WHO declared a public health emergency of international concern.

Since the beginning of the pandemic in 2020, the number of infected individuals has increased greatly as the days have passed, mainly due to the high degree of transmission of the disease. Coupled with this, the absence of a vaccine and specific treatments in the early months of the pandemic led to the development of detection methods that presented greater sensitivity and specificity for the adoption of measures to mitigate the impact of the pandemic. Among the various aspects, social, economic, political, cultural and above all psychological, 2020 was an extraordinarily difficult year. Amid the alarming situation of population illness, due to the advent of the COVID-19 pandemic, social isolation was decreed as a way to slow the rates of contamination of the virus. Several measures of control and prevention of the disease were taken by the local health authorities in different administrative spheres (federal government, state and municipal governments).

These measures differed from one region to another of the country, however the most widespread measure by the authorities was the practice of social distancing, generally understood by the population and the media, as social isolation (FARIAS, 2020). In order to contain the spread of the virus, which quickly caused a strain on the health systems of numerous countries, the practice of isolation was widely adopted through voluntary social distancing of citizens to stay at home, or in the form of government lockdown mandates so that people would stay in their homes and only go out for essential services.

Social isolation is the act of separating people who are sick, or with signs of respiratory illnesses consistent with COVID-19, of non-patients. During the pandemic, people were told to stay only in their homes, living only with the people in their family who already lived there, without leaving. The measure of social isolation is also carried out in hospitals when the respiratory condition is more severe. It must be prescribed by a doctor or agent of epidemiological surveillance and has a maximum duration of 14 days, where after such a period, the health situation of the person is reviewed and is discharged or not for the case (SANAR, 2020). In this sense, social isolation is a medical recommendation for those people who have had contact with someone infected who has tested positive for COVID-19 or for those who are waiting for the result of tests that confirm or deny contamination by the new coronavirus. There are two types of isolations: the vertical adopted for those who belong to the risk group such as the elderly, and the horizontal adopted for people who can stay at home, such as workers in home office according to the measure of social distancing). Wilder-Smith & Freedman (2020) point out that community containment of the coronavirus has brought everyday terms into people's lives such as quarantine, social isolation and social distancing. These terms have been heard in the past during other ills, but historically they are considered significant for the balance of epidemics and for the control of non-pharmacological public health measures in the period of viral diseases that are concentrated under the absence of vaccines and medicines.

In addition, Wilder-Smith & Freedman (2020), assert that social distancing during the pandemic refers to the process of reducing the conviviality of a group, and/or a community, even if it is not sick, keeping away from people who may be affected by the infection not yet diagnosed and not separated. The same authors point out that the measures adopted, such as the closure of schools and work environments, are necessary social distancing procedures to avoid crowds and therefore reduce the transmission of the coronavirus. Social distancing measures are restrictions imposed privately on settings with community transmission.

However, Nicola et al. (2020) points out that not only in the area of health, but in other areas, it is necessary to reflect on the inevitable social, educational and economic impacts that the effectiveness of social isolation measures can really affect. During the review studies, on the shocks of social isolation, from the socioeconomic perspective, Nicola et al. (2020) show that social distancing, self-isolation and travel limitations already demonstrate results such as unemployment in various economic categories, routine overwork, worker overload and, the confinement of people, who are living massively with family members and children who are without face-to-face school, it already exposes daily cases of domestic violence in the physical, emotional and sexual spheres.

However, according to Wilder-Smith & Freedman (2020), social isolation is a method of separating sick people from people not infected by the coronavirus for the purpose of reducing the threat of transmission of COVID-19, however, the efficiency of social isolation, according to the authors cited, requires that the discovery of infectious cases be prior and that the viral spread of the asymptomatic be low. Smith & Freedman (2020) in their studies claim that, the incubation period of COVID-19 because it is longer in comparison with the incubation period of other viral diseases and the spread of the disease by asymptomatic beings is high, limits the efficiency of the isolation of cases of the disease as the only basic measure being necessary the implementation of other forms of control.

Wilder-Smith & Freedman (2020) point out that another measure of social distancing and restriction of virus contamination is quarantine, which restricts the activities or separation of people from a community, a state or city, who have presumably been exposed to a contagious disease but who are not sick, because they have not been infected or because they are in the incubation period. Quarantine can be applied at an individual level, such as: for a person returning from international travel or for close contacts of a suspected or confirmed case of coronavirus; or at the collective level, such as quarantine a ship, a neighborhood, or a city, and usually involves restriction to the domicile or other designated location. It can be voluntary or mandatory (MINISTRY OF HEALTH, 2020).

Wilder-Smith & Freedman (2020) reinforce that the most restrictive measure of social control is lockdown, used by state force when necessary. This means that if isolation and distancing measures are not respected, authorities intervene in the community to break up gatherings, close non-essential

service establishments and stop any activity that disrespects prevention measures. Therefore, it is the most restrictive action in which the freedom to come and go of people in a certain neighborhood/city or region is impeded due to the emergency. Only people authorized by the police and/or sanitary authorities may circulate, with isolation from the streets and checkpoints. *Lockdown* aims to take people out of circulation so that viral spread is minimised as much as possible and is used when there is an imminent risk of the health system not handling the number of sick people in that place.

The pandemic period prompted the creation of laws for emergency taking. Law 13.979/2020 was created to define the measures that the federal government would take to address the emergency. The purpose of the law is precisely to protect the whole society, that is, to offer means for the population to go through the pandemic so that the problems are alleviated. Law 13.979/2020 acted in a relevant way in the fight against the COVID-19 pandemic because it established measures to control the entry of infected people into the country, in addition to avoiding the large circulation of Brazilians themselves indoors, informing about the importance of the use of masks and alcohol gel. Federal Law No. 13,979, of February 6, 2020, provides for measures to address the public health emergency of international importance arising from the coronavirus responsible for the 2019 outbreak. Constitutional Amendment No. 106, of May 7, 2020 - Establishes an extraordinary fiscal, financial and contracting regime to deal with the national public calamity resulting from the pandemic. We also had Federal Law No. 14,020, of July 6, 2020 - Establishes the Emergency Program for the Maintenance of Employment and Income; provides for complementary measures to address the state of public calamity recognized by Legislative Decree No. 6 of March 20, 2020, and the public health emergency of international importance arising from the coronavirus (covid-19), which is addressed by Law No. 13,979 of February 6, 2020; amends Laws No. 8,213, of July 24, 1991, 10,101, of December 19, 2000, 12,546, of December 14, 2011, 10,865, of April 30, 2004, and 8,177, of March 1, 1991, and gives other measures. However, Federal Law 14,035, of August 11, 2020 - Amends Law No. 13,979, of February 6, 2020, to provide for procedures for the acquisition of goods, services and inputs intended to address the public health emergency of international importance arising from the coronavirus.

Federal Law No. 14,065, of September 30, 2020 - Authorizes advance payments in bids and contracts made within the scope of public administration; adjusts the limits of waiver of bidding; expands the use of the Differentiated Regime of Public Contracting (RDC) during the state of public calamity recognized by Legislative Decree No. 6 of March 20, 2020; and amends Law No. 13,979, of February 6, 2020. However, Federal Law No. 14,124, of March 10, 2021 - provides for exceptional measures relating to the acquisition of vaccines and supplies and the contracting of goods and services for logistics, information and communication technology, social and advertising communication and

training for vaccination against COVID-19 and the National Plan for the Operationalization of Vaccination against COVID-19.

As highlighted in previous works (MORAES, 2020), there was no single social distancing policy in the country, with significant variation in the degree of rigor and format of the measures adopted by states and municipalities. This occurred in a context in which the federal government did not adopt standardized criteria for social distancing, which led states and several municipalities to adopt policies autonomously. Without the direct coordination of the federal government, state governments and municipalities followed recommendations from the Ministry of Health (MoH), groups of scientists, international organizations or simply emulated the behavior of other governments.

The scenario pointed out that a modern coronavirus that propelled an infectious disease (COVID-19) and with a high contagious rate spread throughout the world (Vasconcelos et. al. 2020 apud Guo et al. 2020). The pathogenesis of the SARS-cov-2 virus of the coronavirus family has reached rapid transmission to many people reaching the category of pandemic, in which public health agencies have expanded the massive dissemination of clarifications and recommendations regarding health care, in the face of the unknown outbreak. However, the COVID-19 pandemic has posed a challenge to the world's population as a period marked by separation, and social distancing is the best measure to avoid the disease.

Santos and Nascimento (2014) describe that, the new disease and the rapid spread of the virus, advocated reflections and measures among health experts in order to retain the circulation of COVID-19 and the failure of health services by proposing the establishment of preventive measures, such as hand hygiene with soap and water, alcohol gel, mask-wearing, quarantine or the popular social isolation. Meanwhile Vasconcelos et. al., 2020 apud Smithe and Freedman, (2020), state that quarantine is represented as being a phase of control of movement of people possibly unprotected to a stipulated infectious agent. Although quarantine may seem to be synonymous with social isolation, Vasconcelos et al., 2020 apud Coomes et al. (2020) highlight that, are measures of restriction of movement of differentiated people in which quarantine is a way to mitigate the flow of people who may have had contact with the disease; Social isolation aims to separate people already infected with the coronavirus from asymptomatic people. These are apparently synonymous terms in order to inform the population in a generic way about the importance of distancing and the effort related to the reduction of contacts and physical approximation, aiming at containing the speed of contagion of the disease.

3 BRAZILIANS, THE IMPACT OF SOCIAL ISOLATION AND THE SOCIO-EMOTIONAL IMPLICATIONS

We will address in this part of the research the impact of social isolation and the repercussion on the socio-emotional feelings of the majority of the Brazilian public, taking into account the social context resulting from the COVID-19 pandemic and the survey of the effects on mental health. To this end, it was evidenced that in the months of 2020 the pandemic caused by COVID-19 severely transformed a good part of Brazilian citizens and the severity of the disease added to the protective and social isolation measures implemented to control the spread of the virus, had several consequences such as the death of many people in the world and especially in Brazil. These problems ended up affecting the population, both in their living conditions and mental health. Issues related to the symptoms of the COVID-19 disease to the entire political, economic and social context resulting from the coronavirus, have caused consequences for the mental health of countless individuals. For the Brazilian population, the pandemic period could cause worsening of anxiety and stress states due to the effect of atypical situations of the period and excess of negative and/or reliable information. In this way, we seek to understand and investigate the increase in anxious cases in Brazil in the context of the COVID-19 pandemic.

After the arrival of COVID-19 in Brazil, several measures of control and prevention of the disease were taken by the local health authorities in different administrative spheres (federal government, state and municipal governments). These measures differed from one region to another of the country, however the most widespread measure by the authorities was the practice of social distancing, generally understood by the population and the media, as social isolation (FARIAS, 2020).

In order to contain the spread of the virus, which quickly caused an overload in the health systems of numerous countries, the practice of distancing was widely adopted, through voluntary social isolation of citizens and by government mandates of confinement. In this sense, the guidance was that people only go out for essential survival services. However, in the face of alarm about social isolation, it can be mentioned that the reality of the pandemic ended up implying behavioral changes that affected part of society, where the expressive psychosocial impact, especially to the elderly public, evidenced the importance of mental health care, planning and alerting society to other possible situations of anguish.

At the end of 2019 and beginning of 2020, COVID-19 radically affected and transformed much of the world's society where, the severity of the disease and the protective measures taken to control the spread of the virus had several consequences caused by the loss of family and friends, unemployment, precariousness of the structure of medical care, measures of social isolation, bankruptcy of several companies, distance learning programs, hunger and other situations that have

caused great negative impact on many national sectors, such as health, education, social, economy, accessibility. The enigmatic situation involved by the pandemic, ended up affecting the population both in their living and health conditions and there was not only the issue related to the symptoms of the disease, but also to the political, economic and social context resulting from the disease, which caused consequences for the mental health of countless individuals. Among many emotional shocks, Barros (2020) points out that the main factors related to the negative psychological effects are the duration of quarantine, fear of infection, frustration, annoyance, financial losses and misinformation brought by the advent of the pandemic. The conjuncture of COVID19, brought a new way of living life based on solitude, uncertainty, confusion in the information established through the absence of reliable sources of communication, viral exposure, the immunobiological inexistence at first and a remedy for the domain of the disease, revealing the emotional instability, the psychic exhaustion of people exposing the great shock of the mental health of the Brazilian population, that long before the pandemic context was already publicized and known among most Brazilians, for the physical and mental symptoms linked to stress and depression suffered by the battle of everyday life.

The period before the COVID-19 pandemicus years before 2019, already revealed some of the symptoms related to stress and depression, these symptoms, experienced by the man who currently lives in large urban centers and who present in their daily lives a natural reaction of signaling and alarm of the body as, the fight or flight response to work challenges, family problems, bills payable, long commutes with the presence of congested traffic, few hours of rest followed by poor diet, facts that result in stressful situations of exhaustion of the nervous system. Added to this constant routine of stressful life and the natural reaction of being connected to daily activities, almost in an automatic way, can cause serious consequences not only for health in general, but also for mental health. It can be carefully observed that, the Society goes through constant transformations, however it is still possible to verify that individuals, at some point in life, have mild depressive episodes, and these natural reactions are associated with bad and unpleasant events that happen in the daily routine. With this perception, it is possible to understand that mild depression is a natural component of human life and an adaptation factor, having a sense of recovery and learning, because these situations end up encouraging the search for improvement and improvement (SERSON, 2016). However, at the same time, several physical and mental symptoms, experienced by some people, are linked to stress and depression disorders, such as insomnia, lack or excess of appetite, nervousness, forgetfulness, guilt, shortness of breath, dizziness, infections, negative thoughts, among many others that are quite recurrent in globalized society.

In this context, mild anxiety reactions, such as stress and fear, serve to propel individuals to fight, persist, learn and evolve, promoting survival. The problem exists when these feelings are

excessive and end up harming mental and physical health, causing the individual to withdraw instead of using them to their advantage. Several times it is necessary to seek qualified help to treat the physical and mental symptoms, which will be mitigated through professional mental health care and medication. In addition, it is essential that the individual works to return to his normal life and without negative dependencies on drugs and therapies (SERSON, 2016).

Currently, in society, it is possible to verify several disorders of the mind that are quite recurrent, such as depression, anxiety, phobias, and compulsions, a result of the transformations that have occurred in recent decades, which have made society more accelerated, consumerist, globalized, materialistic and insensitive to the difficulties and ills of others. As Cury (2013, p.04) points out,

> Without realizing it, modern society – consumerist, fast and stressful – has altered something that should be inviolable, the rhythm of construction of thoughts, generating very serious consequences for emotional health, the pleasure of living, the development of intelligence, creativity and the sustainability of social relations. We got sick collectively.

These psychic diseases cause changes in behavior, emotional state, compromise well-being, physical and mental health, generating repercussions in the fulfillment of daily tasks, impairing performance at work and in studies, causing physical symptoms and mainly, affecting the social relationship of the individual with others. As the WHO points out, more than 700 million people worldwide are affected by mental health problems, the most common being depression, which, according to the organization's estimates, should be the disease with the highest incidence by 2030.

Thus, it is possible to verify that this is a public health issue, due to the large size and impact caused by mental illnesses in the majority of society, because in addition to the consequences for the individual himself in the most diverse aspects of life, these disorders result in high economic cost for the Brazilian government, in which the indices indicate that mental and behavioral diseases, as depression and anxiety, already represent the third cause of absence from work and request for sickness benefit, as pointed out by the National Institute of Social Security (INSS).

Another major concern is that most people who suffer from any of these diseases do not seek professional help or end up taking too long to do so, aggravating the disease and preventing its improvement. Sometimes this occurs due to lack of information or even the refusal of the individual to accept that he is affected by a disease. As Serson (2016, p. 15) points out,

> Both depression and anxiety can be or become chronic problems, a trend that we can reverse to some degree. This is not achieved only with medicines and psychotherapy. More than awareness, it takes the will and action to change, knowing that it is important to change. If well oriented, the patient can understand and thus try to modify certain things; or, conversely, knowing that you cannot change and process this fact within yourself, seeking to adapt and accept yourself.

Thus, the Brazilian Institute of Geography and Statistics (IBGE) (2016) warns about the high rate of mental illness, which every day becomes more noticeable that many people suffer from anxiety and stress, resulting from daily charges, pressure at work and studies, globalization of communication and standards imposed by society, as already mentioned, causing negative consequences to individuals and their families and friends, who suffer and accompany the daily challenges to overcome the disorder. In recent decades, Brazil has faced a process of accelerated urbanization, as well as large-scale scientific and technological advances. These aspects have directly influenced today's society, which has become competitive, with high rates of violence, poor employment and income conditions, lack of housing, inefficient transportation and a health system that does not meet the needs of the population. All this influenced the growth of cases of mental illnesses, which contribute to 18% of diseases in the country, impacting on functional capacity and quality of life (GRAEFF et al., 2012).

It is exposed that anxiety is one of the most recurrent diseases of the mind, which can be characterized as anguish and excessive worry, persistent and difficult to control, being accompanied by physical and psychological symptoms, which cause suffering and reduced performance in daily activities. It is a frequent disorder that is not properly diagnosed in many individuals. Some of the physical symptoms of this disease are: tachycardia, sweating, insomnia, tiredness, muscle aches and difficulty relaxing, which can even cause hypertension and heart problems. According to Magalhães and Camargo (2013, p. 53),

> Pathological anxiety is, along with depression, the most common type of mental distress worldwide. On average, one in six people develops some problematic way of feeling and manifesting anxiety at some point in their life. This maladjustment can present itself in six different ways, according to the manuals of psychiatry adopted worldwide. That is, there are six different mental disorders in the anxiety group: panic disorder, specific phobias of situations, places, animals and objects, social phobia, generalized anxiety, post-traumatic stress disorder and obsessive-compulsive disorder, better known by the syllable OCD.

Each of these anxiety disorders has different symptoms and characteristics, but they all manifest themselves in the physical, emotional and behavioral spheres. Physical symptoms can be more severe, as in panic attacks, or milder, such as excessive sweating that is quite common in everyday life. In the mental context, symptoms appear through exaggerated and constant worries, difficulty relaxing, racing and negative thoughts. Behavior is also strongly influenced and anxious people avoid situations that make them nervous or uncomfortable. The picture Below is some of the ways in which anxiety can present itself.

Cury (2013) still describes vital anxiety as one in which the individual has full conviction of his thoughts, ideas and wills, being responsible for the healthy control of his life, when this control is lost, the individual begins to suffer from a pathological anxiety.

It is verified that often those who suffer from anxiety have other mental illnesses and emotional problems, about 60% of people who suffer from anxiety have concomitant depression, it is estimated that the aggravation of anxiety symptoms can result in more serious diseases, because they negatively affect the quality of life of the individual and end up influencing the occurrence of feelings of stress and depression. There is still no scientific proof that one disorder causes another or what the relationship between its causes and symptoms is, but its interaction occurs in several cases (MAGALHÃES AND CAMARGO, 2013). Sometimes individuals do not present evident mental and emotional symptoms, the problem presents itself through physical symptoms called psychosomatic disorders, such as headache, shortness of breath, tachycardia, muscle pain, among others. These patients are usually referred by other doctors for treatment of mental illnesses, as their symptoms are not the result of physical problems or illnesses.

Chart 1 - Anxiety disorders and their forms of presentation

Disorder of anxiety separation	The individual with separation anxiety disorder is apprehensive or anxious when the separation of attachment figures to a point where it is inappropriate for the developmental level. There is persistent fear or anxiety about the occurrence of damage to attachment figures and about events that could lead to loss or separation from such figures and reluctance to move away from them, as well as nightmares and physical symptoms of suffering. Although symptoms often develop in childhood, they can also be expressed during adulthood.
Selective mutism	Selective mutism is characterized by consistent failure to speak in social situations in which there is an expectation to speak (e.g., at school) even if the individual speaks in other situations. Failure to speak up has significant consequences in contexts of academic or professional achievement or interferes with other aspects of normal social communication.
Specific phobia	Individuals with specific phobia are apprehensive, anxious, or shy away from circumscribed objects or situations. A specific cognitive ideation is not characterized in this disorder as it is in other anxiety disorders. Fear, anxiety, or avoidance is almost always immediately induced by the phobic situation, to a point where it is persistently out of proportion to the actual risk that presents itself. There are several types of specific phobia: to animals, natural environments, blood-injection-injuries, situational and others.
Disorder from social anxiety	In social anxiety disorder (social phobia), the individual is fearful, anxious or avoidant of social interactions and situations that involve the possibility of being evaluated. This includes social situations such as meeting with people who are not familiar, situations in which the individual can be observed eating or drinking, and performance situations in front of other people. The associated cognitive ideation is that of being evaluated negatively by others, being embarrassed, being humiliated or rejected, or offending others.
Disorder from panic	In panic disorder, the individual experiences recurrent unexpected panic attacks and is persistently apprehensive or worried about the possibility of experiencing new panic attacks (e.g., avoidance of exercise or unfamiliar locations). Panic attacks are abrupt attacks of intense fear or intense discomfort that peak within minutes, accompanied by physical and/or cognitive symptoms. Panic attacks with limited symptoms include fewer than four symptoms. Attacks can be *expected*, such as in response to a normally feared object or situation, or *unexpected*, meaning that the attack does not occur for an apparent reason. They function as a marker and prognostic factor for diagnosis severity, course, and comorbidity with a range of disorders, including, but not limited to, anxiety disorders (e.g., substance use disorders, depressive and psychotic disorders). Panic attacks can therefore be used as a descriptive specifier for any anxiety disorder, often being avoided or requiring the presence of a companion.

Disorder of generalized anxiety	The main features of generalized anxiety disorder are persistent and excessive anxiety and worry about various domains, including work and school performance, which the individual finds difficult to control. In addition, physical symptoms are experienced, including restlessness or a feeling of "nerves to the flower of the skin"; fatigability; difficulty concentrating or "having whites"; irritability; muscle tension; and sleep disturbance.
Disorder substance/medication-induced anxiety	Substance/medication-induced anxiety disorder involves anxiety due to substance intoxication or withdrawal or to a drug treatment.
Agoraphobia	Individuals with agoraphobia are apprehensive and anxious about two or more of the following: using public transportation; being in open spaces; being indoors; standing in line or being in the middle of a crowd; or being out of the house alone in other situations. The individual fears these situations due to thoughts that it may be difficult to escape or that there may be no help available, chaos, panic-type symptoms, or other disabling or embarrassing symptoms. These situations almost always induce fear or anxiety and are often avoided or require the presence of a companion
Anxiety disorder due to another medical condition	In anxiety disorder due to another medical condition, anxiety symptoms are a physiological consequence of another medical condition.

Source: Rolim (2020)

Therefore, anxiety is considered a natural response of humanity to situations in which there is threat and fear, being an influencing factor of social evolution. Nowadays it is part of the natural process related to the struggles and challenges of life, causing individuals to react to certain situations and be prepared for future events. In contrast, these natural symptoms when related to conflicting social and biological factors, can result in mental diseases and disorders, the result of excess and risk factors to which society is exposed in this globalized world (MAGALHÃES & CAMARGO, 2013).

Despite portraying the natural and pathological emotional states experienced by the individual in their life journey, we contemplate that for the Brazilian population, the pandemic period may have caused worsening of the states of anxiety and stress as a consequence of the atypical situations of the period and excess of negative information.

In the last months of 2022, one of these factors of worsening mental health was the occurrence of the pandemic caused by COVID-19, which impacted social relations, the economy and politics, forcing the world population to reorganize and develop new measures for the control of the disease. These measures, while seeking to contain the spread of the virus, caused several economic and social problems, impacting the lives of the majority of the population and consequently worsening the emergence of emotional disorders.

Currently, authors such as Aquino et al. (2020), seek to develop research in relation to the psychic effects of the measure of social isolation seeking to understand what are the socio-emotional factors of psychological suffering. Amid the findings, it is emphasized that the biggest causes of mental suffering are the duration of the period of social isolation, the fear of being infected or of infecting other people, frustration, idleness, lack of supplies, unemployment, poverty and inadequate information about the disease (ZANON et al, 2020). Through comparative studies developed, it is observed that most of these factors are related to the symptoms of depression, stress, anxiety and

negative affects after the period of social isolation (ZANON et al, 2020). In addition, other adverse factors that were built in the midst of the period of social isolation are highlighted, such as financial losses. Financial losses were one of the major factors for the development of mental disorders in families with a low socioeconomic level. This factor stems from the impact that the loss of income represents for such families (ZANON et al., 2020).

As can be seen in other pandemics over the centuries, it is observed that the increase in symptoms of mental illness in individuals who have experienced a pandemic period and who have faced periods of social isolation may be related to fear and risk perception, the absence of vaccines and medicines to combat the disease effectively and, above all, the lack of reliable information (ZANON et al, 2020). Still dealing specifically with the case of the COVID-19 pandemic, it is observed that the news has constituted itself as a triggering factor of fear. Health status and history of chronic illness had a significant association for the presence of symptoms of stress, anxiety and depression (ZANON et al, 2020). Given this, it is understood that this pandemic will not only leave physical sequelae, but also in the mental health of the population. Therefore, it is difficult to find someone who did not feel distressed, fearful and depressed with all the situations suffered, be it the thousands of deaths, the financial difficulties, the hunger, the social isolation and the various restrictions for fraternizations and human interaction to which everyone was accustomed.

Research conducted during the pandemic shows that individuals who already have mental disorders are more likely to demonstrate higher levels of stress and distress during social isolation to contain COVID-19, as such a context is a driver for negative feelings and emotions. On the other hand, individuals who do not have previous mental disorders have a lower tendency to develop mental illnesses such as anxiety and depression. Thus, the observation of the incidence of stress, anxiety and depression during the pandemic among people with previous disorders and people who do not have such conditions is important to define appropriate prognoses and treatments for each group (BARROS, 2020).

When the individual is faced with this reality, it is necessary to propose strategies that return well-being to the passing situations and the proper professional accompaniment for the most severe cases. As Barros (2020, p. 02) points out,

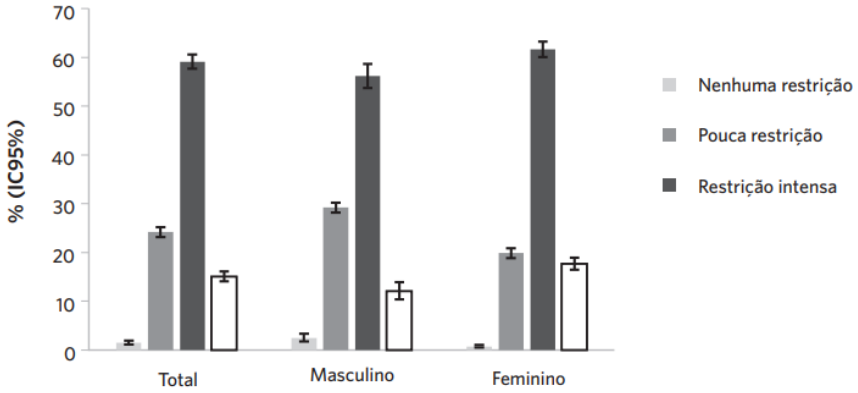
> Given contexts such as the present, it is understandable that practical and scientific efforts are focused on the biological aspects of the disease in question. However, the pandemic context and the recommended control measures affect the population in many dimensions of living and health conditions, among them, significantly, the mental health component.

The panorama exposed above shows that the sudden changes in habits and routines that occurred during the COVID-19 pandemic period, such as social isolation, telework, school closures and reduced social interactions, which happened suddenly, were factors of great influence for the

increase in anxiety symptoms, and also other feelings such as fear and insecurity, Related to the diverse information disseminated about the disease, as well as the large number of sick and dead, caused a significant increase in cases of anxiety, depression and stress. It is perceived that the pandemic period caused a great impact on world society, both in the field of physical health and mental health, in which a large part of the population began to present symptoms of stress, depression and anxiety. Given the COVID-19 pandemic moment, it is necessary that there is also concern for the mental health of the population, which needs support and support in specialized care, where many people end up presenting symptoms of mental disorders and do not have the proper professional monitoring.

In a survey developed by Malta et al., (2020), on adherence to social distancing, 45,161 individuals were evaluated, where 45.7% of the studied population was between 18 and 39 years old; 34.0%, between 40 and 59 years; and 20.3%, 60 years of age or older. Regarding education, 72.4% of the participants had completed high school; 11.1%, incomplete elementary school; and 16.5%, complete higher education or more, it can be contemplated that, in relation to the intensity of social distancing during the study period, only 1.5% (95%CI 1.20 – 1.98) led a normal life, without any social restrictions; and 15.1% (95%CI 14.1 – 16.1) stayed strictly at home (MALTA et al., 2020), as shown in graph 1 below:

Graph 1 – Intensity of social distancing during the Covid-19 pandemic according to sex

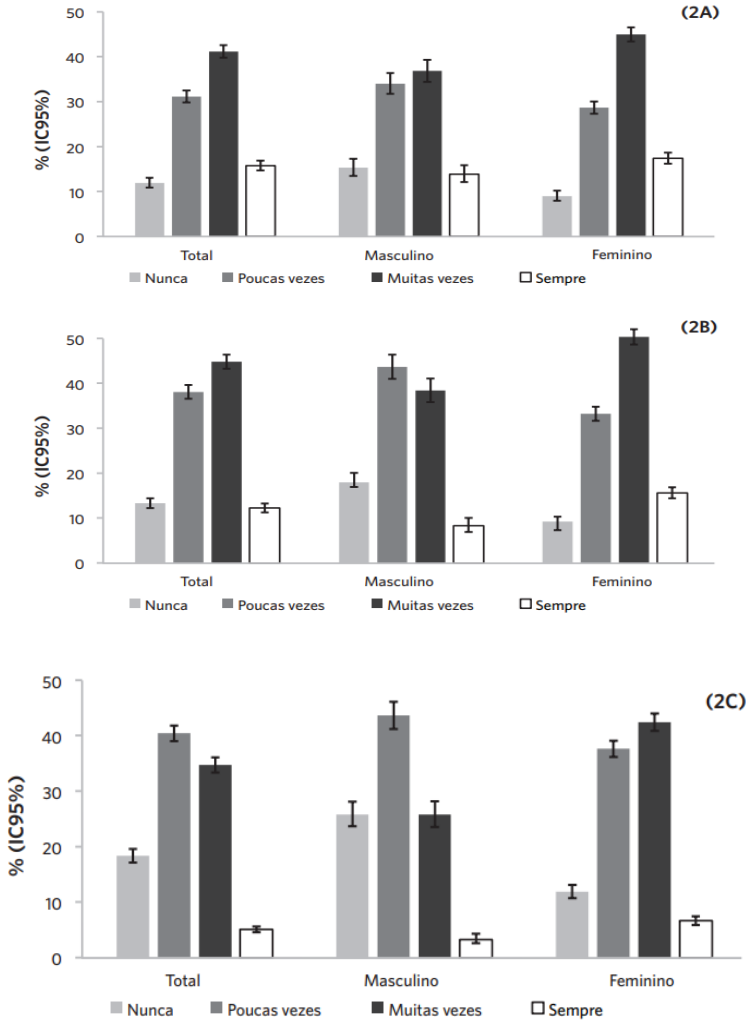


Source: Malta et al. (2020, p. 180).

Through graph 1 it is observed that a large part of the Brazilian population adhered to social distancing, leaving only to go to the supermarket and pharmacy or stayed strictly at home. In contrast, social distancing contributed to a negative impact on the mental health and lifestyles of Brazilians, with increased feelings of anxiety, isolation, sadness or depression according to the information in graph 2 (MALTA et al., 2020).

Regarding mood, the study presented as data that 41.2% (graph 2A), 41.3% (graph 2B) and 35.2% (graph 2C) of Brazilians felt isolated, anxious, and sad or depressed many times during this pandemic period (MALTA et al., 2020).

Graph 2 – How often you felt isolated (2A), anxious (2B), and sad or depressed (2C) during the Covid-19 pandemic according to sex



Source: Malta et al. (2020, p.181).

It should be noted that social isolation measures signal occurrences of psychological implications, such as anxiety, sadness and depression. The fear of being infected by a potentially fatal virus such as the coronavirus, coupled with concerns about financial losses, can affect the psychological well-being of many people by weakening mental health. Thus, in addition to the measures to cope with and contain the pandemic, it is necessary to guarantee the population an appropriate assistance in mental health, with actions that minimize mental suffering throughout this period of crisis. In addition, it is important to propose strategies to promote mental health and

psychosocial care in the short, medium and long term, in an attempt to reduce or prevent psychiatric and psychological problems (MALTA et al., 2020).

4 FINAL CONSIDERATIONS

This research, which had the proposal of responding to the general objective of investigating the impact of social isolation among Brazilians during the COVID-19 pandemic period, as well as the repercussion on socio-emotional feelings and the survey of the effects of the COVID-19 pandemic on mental health, showed that measures to mitigate the spread of the virus such as social isolation, It aggravates problems that affect the socio-emotional feelings and mental health of some people, such as anxiety, depression, insecurity, insomnia. Therefore, it is of paramount importance that measures are taken and aimed at the restoration of mental health.

In addition, it is understood that social isolation was the possible measure at the time to avoid contagion, since it was a little-known virus, but it is understood that the panic about it around the national population, as well as the lack of medical care, lack of physical activity and leisure, were also contributing factors to the emergence and/or worsening of diseases and weaknesses of mental health.

This study showed that although social isolation was an emergency solution so that the virus did not manifest itself further, the psychic damage is real. Therefore, it cannot be denied that some people in the Brazilian population need a more careful look, since the virus has led to fear for many. Another point that deserves to be highlighted is that even before the pandemic, many people already suffered from mental health in society, needing support, attention and care. The descriptions made on the theme of the impact of social isolation also showed that the social and economic context during the COVID-19 pandemic influenced the exponential growth of cases of mental disorders such as anxiety.

This study showed that the sudden changes in habits and routines that occurred during the COVID-19 pandemic period, such as social isolation, telework, school closures and reduced social interactions, which happened suddenly, were factors of great influence for the shock in socio-emotional feelings as well as for the increase in anxiety symptoms.

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CHAPTER
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Social Inequality and the Pandemic: An Analysis of the Photographs Shared by @covidphotobrazil and @everydaybrasil Profiles

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ABSTRACT
The objective of this research is to discuss the central role of digital photography as a media that provokes reflections, discussions, debates, and possibly empathy. It is intended to analyze the social function of photographic research during the Covid-19 pandemic in Brazil through the Instagram platform and discuss the relationship between social inequality and pandemic. For the selection of the images, we chose the profiles @covidphotobrazil and @everydaybrasil, which catalog and share images about the pandemic, made by different authors and in different regions. The analysis was made in the light of discussions on the dimensions of iconology and iconography by Panofsky (2012) and adapted to photography by Kossoy (1999). We analyzed12 photographs, and from them we discussed political and social contexts of social inequality in Brazil, about the worsening of unemployment, hunger, inflation, and the political crisis in the context. We also discussed hunger, education, public transport, housing, employment and basic sanitation. As a result, we consider that the photographs are invitations to reflect on the reality of the north of the country in coping with the pandemic. The role of social science that investigates the data and information that contextualize images in contemporary history is considered extremely important. The analyses made are subjective and different looks on these same can perceive things that have gone unnoticed. The collective debate of the images that mark the Covid-19 pandemic is necessary precisely for this reason. We regret that the uses of the platform do not make explicit or bring the debate in the comments linked to the images we analyzed. This is partly due to the proposal of the platform and its audience, and partly due to the visual illiteracy of our society. Still, the comments on the images register a collective cry for social justice and express the Brazilian's faith in the divine force to solve the public health crisis aggravated by the political and economic crises.

Keywords: Covid-19, Digital Photography, Brazil Social inequality.

1 INTRODUCTION

Understanding the relationship between photography, memory, citizenship and respect for the lives of peripheral populations requires a visual literature and social debates on these historical problems of social inequality and their documentation. Thus, we believe that it is essential to analyze the readings of these images, that they are widely shared and that there is an understanding of their symbolisms.

The pandemic has been a time of greatest suffering for those who are homeless, unemployed, in informal and underpaid activities. Research shows that the pandemic reinforces the inequalities of the most vulnerable, deaths are more numerous in the peripheries with poor infrastructure and without basic services.

In this context, the present study proposes to analyze some photographic images made during the Covid-19 pandemic in Brazil, based on concepts of iconography and iconology proposed by Panofsky (2012) in 1932 and later adapted to the photographic language by Kossoy (1999). The work leads us to the discussion about the possibilities of the digital in the production and circulation of images and its impact on the creation of memory on the representation of the victims of the new coronavirus and on the transformative power of photography in recording and altering history.

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2 GOALS

2.1 GENERAL OBJECTIVE

To understand the central role of digital photography as a media that provokes reflections, discussions and debates. To this end, we chose as the object of analysis images that portray social inequality during the Covid-19 crisis released by the profile @covidphotobrazil and @everydaybrasil

2.2 SPECIFIC OBJECTIVES

a) to debate the importance of photography in the social debate regarding the Covid-19 pandemic in Brazil;

b) understand the role of social inequality in the worsening of the pandemic scenario in the country;

c) identify how Instagram profiles @covidphotobrazil and @everydaybrasil contribute to the debate on social inequality and its role in the difficulty of coping with the pandemic in Brazil.

3 METHODOLOGY

This is a bibliographic research and a case study. The study articulates qualitative methods of direct observation, through the description and qualitative evaluation of the photographic images posted in the @covidphotobrazil and @everydaybrasil profiles, and some comments from spectators linked to them. The selection of images was based on the theme of social inequality and occurs randomly and subjectively.

For the analysis of the published photographs, we start from the discussions of the iconological and iconographic dimensions, proposed and described by Panofsky (2012), in 1932, later adapted by Kossoy (1999), who added specificities of the photographic language. It is believed that these methods

can contribute to the photographic analysis and understanding of the representation of Covid-19 memory in Brazil.

The iconographic analysis refers to the plastic reading of the image, created from a point of view of the author of the image and eternalized by the instant in which the shutter was activated. The photographic moment documented in photography allows us to recover precious data for the reconstitution of memory and history.

Iconological analysis seeks information and contexts through documents or the account of the author of the image in order to "unveil the historical and social fabric of the image, as well as evaluate its cultural and ideological dimension" (UNFRIED, 2014, p.05).

In this sense, it is necessary a theoretical basis that articulates the problem of social inequality in Brazil and its role in the worsening of the Covid-19 pandemic.To deepen the iconological interpretation of the images, according to Kossoy (1999), we can look for the speech of the photographers whose images are chosen, either through interviews in newspapers or by direct contact through social networks.

4 FINDINGS

The final results of this research include 12 analyses of photographs produced in the context of social inequality during the Covid-19 pandemic, shared on pages @covidphotobrazil and @everydaybrazil.

To understand how the photographic language is able to signify, Santaella (2012) emphasizes the importance of taking into account how it is produced, emphasizing its producer and the means available for this.

Thus, the first step for this analysis is to seek to know who is the photographer who produced it, for which vehicles it works, its origin, its profile on the platform and the information about the image that it may have shared

The second step in understanding the image is to analyze how the language in question is able to represent something that is outside of it, that is, its object or referent, commonly called content. (SANTAELLA, 2012, p.74).

Among the ways of reading a photograph are: the perception of feelings that photography produces in us and the identification of what was photographed. Exploring the details of the photo refers us and allows us to know the reality that it was constituted "to contemplate the atmosphere that it offers to the look, because the immanent signification of the subjects and themes photographed is inseparable from the singular arrangement that the photographer chose to present" (SANTAELLA, 2012, p.30).

We add to this the study of the interaction characteristics of the Instagram platform that add icons and comments that influence the construction of image meaning such as number of likes, tags, hastags and comment analysis.

> Only then can we move on to the question of interpretation. What kinds of interpretive effects is that language able to produce in the receiver? The meanings of a language depend on this trinomial: its characteristics internal, their references and the interpretations it entails (SANTAELLA, 2012, p.74).

Erwin Panofsky proposes in his studies that iconography is the classification, description, identification and interpretation of meanings of images, that is, it deals with the theme or subject.

Iconology as opposed to iconography refers to the interpretation of symbolic values and seeks to discover their meaning. According to Panofsky (1991) iconology is an interpretive method that comes more from synthesis than from analysis, the latter being an essential requirement for iconographic interpretation.

In short, the difference between iconography and iconology lies in the way the works are read; Iconography starts from the concept of analysis, decomposition of a whole into parts, already the iconology of interpretation.

For the understanding of works of art, Panofsky proposes in his work the so-called "Iconographic Method" which is divided into three levels of meaning. The first of these concerns the level "Pre-Iconographic" or "Pre-Iconographic Description", where it is sought to effect the recognition of the work and a description that seeks the primary and natural meaning of the image.

The second level is called "Iconography in the strict sense", a phase that attests to works based on text and documents, that is, the iconographic analysis, properly said that aims to discover the secondary or conventional meaning of the work of art.

In the third level proposed "Iconological Level", initially designated "Iconography in a deeper sense" seeks to discover the inherent meaning or content of the work of art. At this stage it is possible to understand the ultimate meaning of the work and the context in which it was created, in it the values and symbolic values of the work are unveiled.

Boris Kossoy adapted the iconography and iconology from Panofsky's methodology. The Brazilian researcher maintained the definitions already proposed by Panofsky and introduced specific elements of photography, so that it was possible to use them in photographic analyses.

For him, in the iconographic analysis of the photographs, the process that originated the photograph is reconstituted, so that the elements that contributed to the documentary materialization and also the identification of the details that make up the content of the photograph are determined. In addition to the retrieval of the information of the photographic image, to thus obtain an identification of the iconic details that make up the content.

In his adaptation Segundo Passoy (2001), the stage of "Iconological Interpretation" would be the moment for us to remember that photography is a representation from the real. It presents two basic paths for iconological decipherment: the first path proposes to rescue the history of the subject and the second concerns the dismantling of the conditions of production, that is, the process that resulted in the representation under study. According to him, "It is sought by iconological interpretation, to decipher the inner reality of the photographic representation." (KOSSOY, 2001, p. 60).

Boris Kossoy points out that the reading of photographic images despite the levels, is a subjective process that depends on the ideology, sensitivity, attention, personal tastes and knowledge of the reader.

4.1 PROFILE REVIEWS @ COVIDPHOTOBRAZIL

Source: Instagram/covidphotobrazil, 2021 https://www.instagram.com/p/CM2kCQgldZ8/

The photographs chosen here were produced by Bahian photojournalist Felipe Iruatã during the health crisis caused by Covid-19 in Salvador on the second day of curfew in March 2021. The first photograph was taken outside a public transport bus. From a medium plane angle, it shows some passengers crowded in a bus, what draws attention is when realizing that it was being photographed one of the passengers makes negative sign with his hand and most of the other passengers who appear in the photograph look at the camera, evidencing a relationship of consent with the photographer. Their looks show fatigue and dissatisfaction with the lack of basic distancing.

The second photograph was taken inside a public transport also in Salvador, with the image taken from a top-down frame, or plongée angle. In it we can see the inside of the bus crowded with several people, one next to the other without the possibility of complying with the physical distancing indicated by the Ministry of Health.

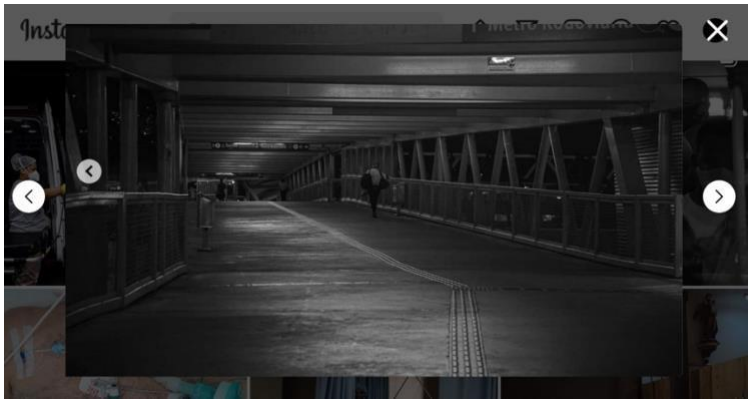
In Brazil, during the pandemic, remote work was a reality for only a small portion of the population. Most of the workers, in order not to lose their jobs, had to leave home and expose themselves to the virus in public transport, as the image indicates. According to a study by the Brazilian

Institute of Economics (Ibre) of the Getúlio Vargas Foundation (Ibre/FGV), the distance modality was adopted by only about 10% of the country's workers even at the height of the pandemic and social isolation. The survey found that telecommuting during the pandemic was a privilege concentrated in the wealthiest and most urbanized regions of the country. "The poor infrastructure of households in other regions, both from the point of view of equipment and internet access, has greatly limited the home office in the North and Northeast."

The images made in black and white are part of an album with 5 other photographs and were liked by 731 users[1]. The post is tied to the caption: "Second day of curfew at 6pm in Salvador.

While the bus stations are full, the city sits empty. Same contradiction and same social abyss." So we can see in the third image chosen made by the same photojournalist, taken from an open plan showing an almost deserted street, where we can see only a few people in the last plane.

The album was shared by @covidphotobrazil, features the Instagram tag of its author @felipe.iruata and the post received comments among them are: "While the government does not release a descending aid so that the worker can protect himself at this time, scenes like this will be common."



Source: Instagram/covidphotobrazil, 2021. https:// www.instagram.com/p/COIjglsnpNt/

The image and its respective caption were produced by freelance photojournalist André Coelho during the health crisis caused by Covid-19 in April 2021 in Rio de Janeiro. In April, the state of Rio

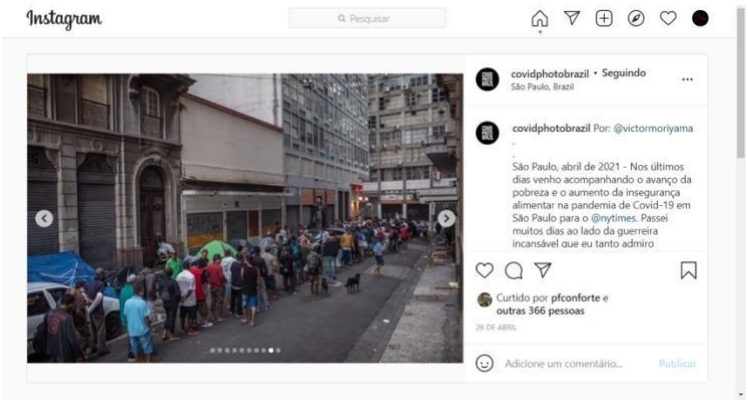
[1] Review made on August 22, 2022.

de Janeiro surpassed 700,000 confirmed cases of Covid, and set a record for the moving average of deaths with 270 deaths per day, according to the State Department of Health.

The photograph taken from an open frame made in the street, used to portray people and at the same time contextualize situations and environments. The image depicts in its foreground a man who has just received a lunch box probably with food, with the mask on his chin, he appears to cry while talking to one of the volunteers of the NGO Covid Without Hunger. In the background, we see a line of people waiting to also receive lunchboxes.

The photograph was shared by Instagram @covidphotobrazil and bears the marking of the profile of the photojournalist @a_coelho. The post was liked by more than 786 people and accompanies the caption "Rio de Janeiro, April 2021 - Volunteers from NGOs such as @covidsemfome and @acaodacidadania donate food to homeless people in Rio de Janeiro. Hundreds of people who live on the streets of Rio, or who have ended up on them because of the pandemic, receive at least one plate of food a day in the city center, much less than a year ago due to the drop in the number of donations.

Among the hashtags are: #fome #ong #pandemia. The image is part of an album with 9 other photographs. He received several comments, among them are: "My God, hunger and pain were already absolutely present in this region before the pandemic... Now, it's heartbreaking."



Source: Instagram/covidphotobrazil, 2021. https://www.instagram.com/p/COIBmoTHNN3/

The image was produced in April 2021 by photojournalist Victor Moriyama during the Covid-19 pandemic in the city of São Paulo. Victor is a regular contributor to The New York Times, covering the Amazon and Latin America and is currently working on a long-term project investigating social inequality in Brazil and the impacts of capitalism on social relations.

In the photograph taken in the open plan, we see a line seen from behind with people, most of them homeless, waiting for the distribution of food baskets. The National Survey on Food Insecurity in the Context of the Covid-19 Pandemic in Brazil, conducted by the Brazilian Research Network on

Food and Nutrition Sovereignty and Security (Rede Penssan), indicates that in the last months from 2021 to 2022, 9 million Brazilians went hungry and more than half of the households in the country faced some degree of food insecurity. According to the researchers, the number found of 19 million Brazilians who went hungry in the novel coronavirus pandemic is double what was recorded in 2009, with the return to the level observed in 2004.

The photograph was shared by Instagram @covidphotobrazil and bears the marking of the profile of its author @victormoriyama. The photo was liked by more than 366 users: "São Paulo, April 2021 - In recent days I have been following the advance of poverty and the increase in food insecurity in the Covid-19 pandemic in São Paulo for the @nytimes. I spent many days alongside the tireless warrior I admire so much @sophiabisilliat and her association @treinonalaje who does a fundamental job of distributing food and food baskets in the four corners of the city and downtown."

The publication is part of an album with other photographs and is linked to the hashtags: #covidbrasil #fome #pandemia #brazil. The album received comments such as: "Gotta tag the idiot who said to make sense through the Internet for him to learn that Brazil is not only the universe of privileges that he lives".

Source: Instagram/covidphotobrazil, 2021 https:// www.instagram.com/p/CQWCfnInA8v/

The images were produced in São Paulo by photojournalist Tommaso Protti during the health crisis caused by Covid-19 in 2021, The Italian photojournalist and documentary filmmaker who currently resides in São Paulo has been working as a freelance photographer, dedicating himself to documenting contemporary issues in Latin America.

In the first photograph we have the portrait of a woman, sitting on the couch of her house with her hands resting on her thighs with a countenance that seems to be a mixture of tiredness and worry,

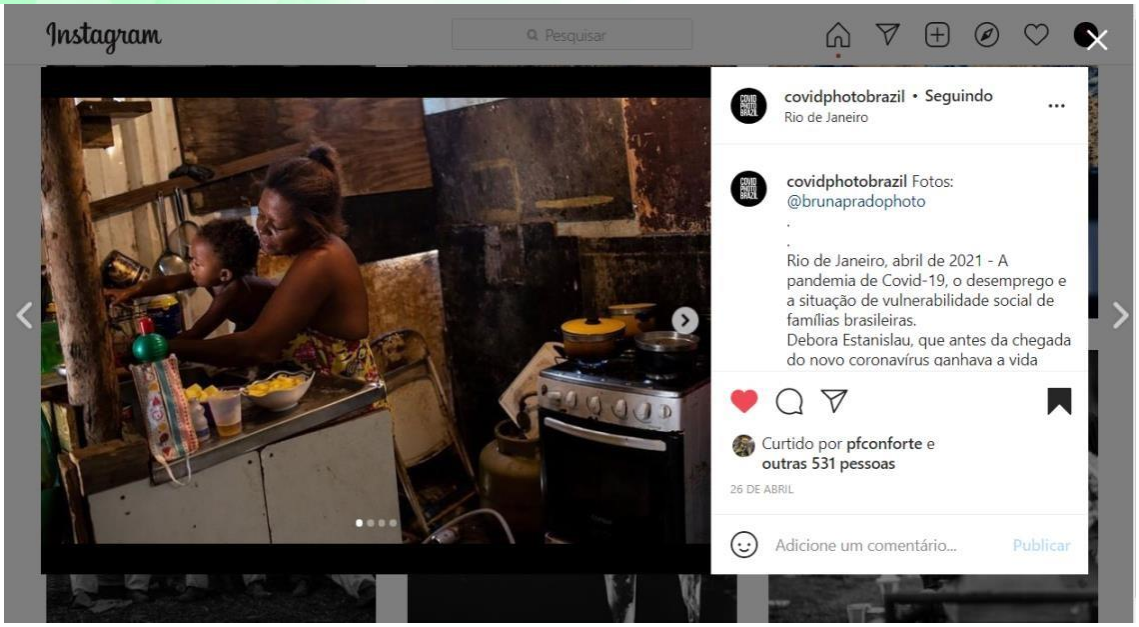
perhaps sadness. Made from a frame of medium plane, draws our attention to the wall behind the sofa in the background, on it is written "Jesus looked at me in fact never stopped looking". The image was made from a fontal angle, which refers to a posed photo.

Linked to the image, the information that the photograph shared by the @covidphotobrazil brings the Instagram marking of its actor @tomprotti. The post was liked by 741 users, with the caption: "São Paulo, June 2021 – Yesterday, the official death toll from Covid-19 in Brazil reached 500,000, the second highest in the world, behind only the United States." Photography makes part of an album with seven other photos for a series of reports documenting the social effects of the pandemic, investigating how it has increased poverty and inequalities in the country. published by UOL Notícias. Among the hastags are: #fome #covidbrasil .

Among the comments of album: " Congratulations @tomprotti and all. Heartbreaking images of an invisible 'political' war against the people."; "A beautiful work, but a sad and bleak scenario, may God bless all of us Brazilians!!!".

Source: Instagram/covidphotobrazil, 2021

The image, also produced in São Paulo in July 2021 by photojournalist Tommaso Protti, closes the album composed of 8 photos. The photograph, taken from an open frame, in its foreground shows people in street situation, one of them sleeps on a mattress, wrapped in a blanket and to the side in the center of the image, we can see two men talking, one of them wraps the other with his arm on his shoulder. In the background we see some blankets and also a tent.



Source: Instagram/covidphotobrazil, 2021 https://www.instagram.com/p/COJRc5vHCLY

The image and its caption were produced by photojournalist Bruna Padro during the covid-19 pandemic in April 2021 in the city of Rio de Janeiro. The photojournalist is a founding partner of Estúdio Prado, a producer of corporate, advertising, editorial, promotional and sports photographic images. Coordinates the EP Galeria project (from Estúdio Prado), with photography training.

In the photograph, made from a medium frame, we have in the foreground, the portrait of Debora Stanislaus with her son on her lap, in the kitchen of her house and in front of a dishwasher sink. In the background comes a stove with some pots and in the background the wall of the shack made plywood board.

The photograph was shared by Instagram @covidphotobrazil and carries the marking of the profile of the photojournalist @brunapradophoto. The post was liked by 533 people and accompanies the caption: "Rio de Janeiro, April 2021 - The Covid-19 pandemic, unemployment and the situation of social vulnerability of Brazilian families. Debora Estanislau, who before the arrival of the novel coronavirus was making a living as a maid, is unemployed and lives with four of her children in the Cidade de Deus favela in Rio de Janeiro, Brazil.

Among the hastags: #desigualdadesocial #photography #everydaysocialjustice #everydaybrasil. The image is part of an album with 4 other photos that depict the day of Deborah and her four children. The album received reviews and they are: "Unjust country!!!!! So rich and so poor."

4.2 PROFILE ANALYSIS @EVERYDAYBRASIL

Source: Instagram/@everydaybrasil, 2021. https://www.instagram.com/p/CTw3Zy0FaCU/

The image and its caption were produced by photojournalist Marcia Foletto in September 2021 in the city of Rio de Janeiro. Marcia Foletto has worked for 24 years at the newspaper O Globo and is seen as one of Brazil's leading independent photojournalists.

The photo was taken from a plongée frame in the middle plane and depicts a woman sitting on her bed with her hands and hair covering her face, in front of her appears a plate with only crackers like water and salt. The photo was posed and the woman identified as "C" reports that during the covid-19 pandemic she lost her job and came to live on the streets.

The photograph shared by the @everydaybrasil features the Instagram tag of its author @marciafoletto, was liked by more than 380 users and accompanies the caption: "C. lost her job in the pandemic. She had to give up the house where she lived and leave her daughters with her ex-husband. He came to live on the street and today is in a small apartment paid for by a friend, in the West Zone of Rio de Janeiro. With no work and what little he earns from emergency aid, he had only one packet of biscuits to spend the week. Afraid of jeopardizing the child custody process, C. told her story, but declined to be identified." The photo received commentary, among them: "The sad situation of many Brazilians in this bewildered moment."

Source: instagram/everydaybrasil, 2022 https://www.instagram.com/p/CZb4jllOkYI/

The photographs chosen here were produced by photographer Brenda Alcantara, graduated in Social Communication - Radio Tv and Internet. The photographer has a work focused mainly on Human Rights. The images are part of an album with 8 other photographs and were taken in the Caluete Quilombola Community in Garanhuns, Pernambuco in February 2022 during the pandemic caused by Covid-19

The first photo, taken from a medium shot, shows the figure of María Elena da Silva, as she opens her old refrigerator where we can see few foods. In the second image we have the family closet as the center of the photograph, and in it we can see only two bags of corn flour which, according to Maria, would be the food served throughout the month.

Families like Maria Elena's who were already living in a situation of vulnerability began to live in much more complicated situations, according to the research Inequality of Labor Impacts in the Pandemic, coordinated by the director of the Getúlio Vargas Social Foundation (FGV Social), Marcelo Neri. Over the course of the pandemic, the income drop among the richest 10% stood at -7.16%, and represents less than 1/3 of the income drop of the poorest half of the population, which tells us a lot about which people have been most affected by the pandemic.

In September 2020, because of the higher amount of emergency aid, the number of people below the poverty line fell to 4.63%, or 9.8 million Brazilians. Already in the first quarter of 2021, when emergency aid was suspended, but returning the Bolsa Família, it reached 16.1% of the population, or 34.3 million poor people.

The album was shared on Instagram @everydaybrasil and features the tagging of its author @brendaalcantarafoto. The post is tied to the caption "The nightmare of sleeping without dinner returns to the Brazil. Hunger returns to the political debate while 57 million citizens are malnourished due to the crisis, the pandemic and the cut in social programs.

María Elena da Silva, 44, along with her family of 11 members, went to bed hungry. The post received more than 330 likes, as well as comments such as "Another of the numerous examples of absence of this government."

Source: instagram/everydaybrasil, 2022 https://www.instagram.com/p/CHp6P5TFH9U/

The situation is also repeated in the family of Julliane, a solo mother of 3, who has lost all her income over the course of the Covid-19 pandemic. The strong increase in social inequality was mainly due to the increase in unemployment and, according to the survey "Inequality of Labor Impacts in the Pandemic who lost the most were the residents of the Northeast Region with -11.4% of income loss In the South region the impact reached -8.86%, of the population and, in relation to gender aspect, women who had double hours of child care at home, as well as Julliane.

Presented a loss of -10.35% against -8.4% of men.

The photograph was also produced by photographer Brenda Alcantara in 2020 in Brasília Teimosa, Recife – Pernambuco. The posed image was taken from a medium plane and shows Julliane and her family, her three children are all wearing masks and one of the children, a girl is in her arms while the other two boys are next to their mother, in the surroundings we can see what appears to be a village of houses with clothes on the clothesline.

The photo was liked by more than 700 users and accompanies the caption "What are the effects of the Coronavirus where everything has always been missing?"

5 FINAL CONSIDERATIONS

This research aimed to discuss the central role of digital photography as a media that provokes reflections and focuses on the importance of photography in the social debate regarding the Covid-19 pandemic in Brazil.

The methodology used was the bibliographic and case study, the analyses were made from the discussions of the iconological and iconographic dimensions, proposed by Panofsky in 1932, then adapted in 1999 by Kossoy who added specificities for the analysis of the photographs.

There were 12 analyses, including 8 of the Instagram @covidphotobrazil profile and 4 of the @everydabrasil profile. The images clearly portray the pandemic and the way it has opened up social

inequality in Brazil at various levels and different scopes such as: hunger, education, public transport, housing, employment and basic sanitation. Covid-19 has wreaked serious havoc in Brazil, causing an increase in poverty levels and helping the country return to the United Nations hunger map

During the process of analyzing the albums it was possible to notice that many comments were limited to clapping the photographer for the record of the historical moment or tears for it, making the debate around these images inferior to what it should be. This situation may be due to the lack of knowledge of people in general about reading images and messages involved. Thus, the need to expand people's knowledge about what exists in each image is highlighted, helping to "see" things not seen before, because they are something subjective in dependence, in part, on their worldview.

It is necessary to emphasize the importance of talking to others about the images, as it always helps us to "see" things that we have not seen before. Precisely because it is something subjective that depends on a number of factors as proposed by Kossoy.

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CHAPTER
63

Acute renal failure in patients with COVID-19: A literature review

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RESUMO
Introduction: Acute kidney injury (AKI) is a serious complication of the disease caused by the new SARS-CoV-2 and derives from numerous factors such as direct damage to the renal structures by the virus, the use of nephrotoxic drugs and the cytokine storm in response to the etiologic agent. Objective: In view of the relevance of AKI in the clinical outcome, the present study aimed to list the main aspects of the development of this complication in patients with COVID-19. Methods: A literature review was performed using the Virtual Health Library and Pubmed databases, adopting the descriptors "acute kidney injury" and "coronavirus 19". Results: 635 articles related to the topic were found, of which, after applying the inclusion and exclusion criteria, 23 studies were selected to integrate this review. The articles included were classified as retrospective cohorts and their samples were composed of individuals from Europe, Asia and the Americas. Discussion: Proteinuria, hematuria, leukocyturia and AKI were common clinical findings of renal impairment. AKI is a modifiable and multifactorial risk factor, uncommon in mild and moderate cases and common in severe cases. Age greater than 65 years, presence of comorbidities and laboratory tests with relevant alterations are important risk factors involved in AKI. Patients with stage 3 AKI required renal replacement therapy and were associated with an increased risk of developing chronic kidney disease. Conclusion: In patients with COVID-19 admitted to the ICU, a careful analysis of the clinical history and strict monitoring of laboratory tests are necessary to prevent the development of AKI.

Palavras-Chave: COVID-19, Risk factors, Kidney damage.

1 INTRODUÇÃO

The coronavirus disease 2019 (COVID-19) pandemic began in 2020 and has represented, in recent years, a leading role in several studies to better understand the pathophysiological repercussions on the human body1. This pathology manifests clinically in an asymptomatic or symptomatic form, with mild or severe respiratory involvement, febrile syndrome, shock, electrolyte disturbances and acute renal failure (ARF) as a result of multiple organ failure2.

Acute kidney injury (AKI), recognized as a morbidity and mortality factor in hospitalized

severe COVID-19 patients, presents pathogenesis related to multiple factors, such as the direct cytopathic effect on podocytes and tubules and accessory damage as a result of the use of nephrotoxic drug therapy3. Moreover, the systemic inflammatory response generates a storm of cytokines that activate the complement system and cause endothelial dysfunction4.

Common clinical presentations as a result of renal impairment revolve around hematuria and proteinuria. Studies have shown that more than 40% of patients hospitalized patients manifested the aforementioned symptoms5. Moreover, the microscopic evaluation of the urine of these patients pointed to the presence of acute tubular lesion with granulous and cloudy brown casts, in addition to leukocyturia6.

AKI, as a result of COVID-19, is a disorder associated with a worse clinical outcome in patients with severe SARS-CoV-27. In this context, the present study aimed to analyze the factors involved in the development of acute kidney disease in patients with severe COVID-19 disease.

2 METHODS

This is a literature review in the Public Medline (PUBMED) and Virtual Health Library (VHL) databases, from 2020 to 2022. The following descriptors were used: "acute kidney injury" and "coronavirus 19", in addition to the Boolean operators AND and OR.

The inclusion criteria were original articles published in English, Portuguese and Spanish, full articles and available in full. The exclusion criteria were articles that do not dialogue with the proposed theme, works written in languages other than those mentioned above, literature and/or systematic reviews, case reports and letter to the editor.

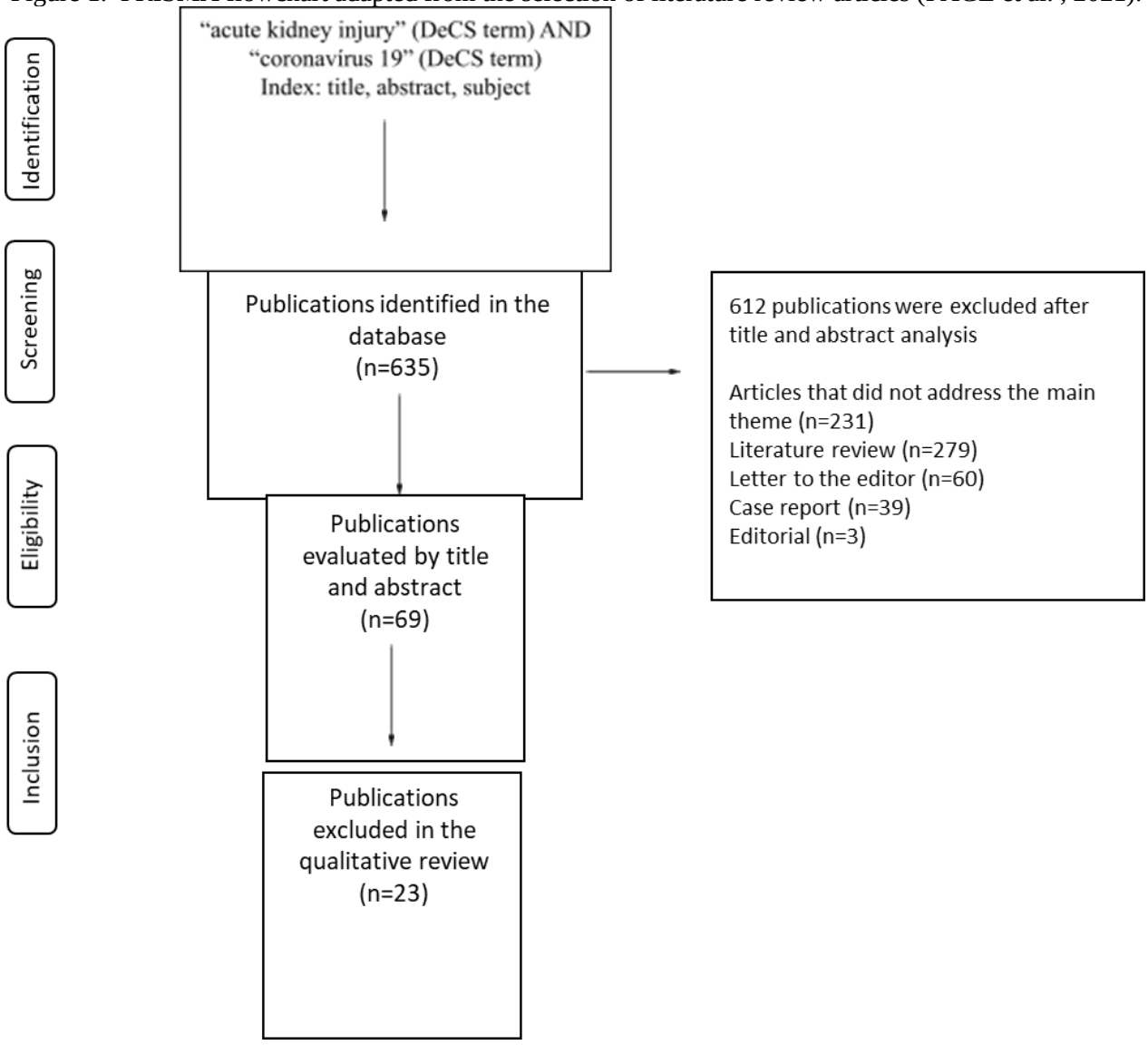
The selection of articles was performed by two independent evaluators and, in case of disagreements, a third examiner was called for the final consensus. The results were arranged in a spreadsheet, including year of publication, authors, databases and journals.

3 RESULTS

The search in the databases identified 635 publications. After the analysis of the title and abstract, only 69 articles had the full text evaluated and the other 566 were excluded. In the end, 23 articles were included and 46 did not meet the eligibility criteria because they did not dialogue with the objective of this review.

Figure 1 presents the flowchart with the inclusion and exclusion criteria specified for the selection of studies according to the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) model (PAGE *et al.,* 2021).

Figure 1. PRISMA flowchart adapted from the selection of literature review articles (PAGE et al. , 2021).



All included articles were classified according to the type of study, as retrospective cohorts, published between 2020 (21.73%) and 2021 (78.27%). The study samples included individuals from countries on three continents: Europe, Asia and America. China (5), the United Kingdom (3), the United States (2), Turkey (2) and Brazil (2) were the countries that most repeated themselves in the cohorts included in the qualitative synthesis. No studies on AKI in COVID-19 patients in countries in Africa and Oceania have been identified. Information on the location of the studies and the main results evidenced in the publications are shown in Table 1.

Most studies have shown the number of individuals with COVID-19 who have progressed to AKI. Thus, the highest incidence of AKI in patients infected with SARS-CoV-2 was 71.22%, identified in a Brazilian cohort whose mean age was 60 years1. In parallel, the lowest incidence (1.2%) was reported in a publication that evaluated AKI in children diagnosed with COVID-19 in a Chinese hospital19.

Table 1. Characteristics of the articles included i tarcila.fernanda1910@gmail.comn the qualitative synthesis of the literature review.

Author and Year Sample Country		Sample	Main Results
Jewell et al., 2021 Kingdom	United	1248 adult patients with COVID-19 were enrolled at King's College Hospital in London.	The presence of chronic kidney disease (CKD) prior to admission increased the risk of developing AKI in hospitalized patients with COVID-19. Hypertension and diabetes were more frequent among patients with AKI than those without AKI. The use of hospital diuretics was associated with a risk of AKI. Black ethnicity was an independent predictor of AKI2.
Chen et al., 2021	China	823 COVID-19 patients who were treated in Wuhan hospitals.	Hypophosphatemia was an independent risk factor for the development of AKI in hospitalized patients with COVID-19. Patients with AKI were also more likely to die than patients without AKI5.
Naser et al., 2021	Bahrain	353 patients admitted to Bahrain Defence Force (BDF) hospital from April 2020 to October 2020.	Diabetes, hypertension, CKD and cardiovascular disease were higher in patients with AKI. Individuals who developed AKI had elevated inflammatory, cardiac or hypercoagulable serum markers and lymphopenia9.
Li et al., 2021	China	223 patients, 52 patients from Wuhan University' s Zhaongnan Hospital, 70 from Leishenshan Hospital, and 101 patients from Jiangjunshan Hospital.	COVID-19 patients with AKI had a higher rate of pre-existing hypertension and cytokine storm compared to patients without AKI. More than half of the patients who received invasive mechanical ventilation developed AKI. Of the COVID-19 patients with ARF, 57.1% were susceptible to bacterial infection10.
Alfano et al., 2021	Italy	307 patients admitted to the University Hospital of Modena with SARS-CoV-2 infection	CKD, evaluation of non-renal sequential organ failure (SOFA), male gender, age over 65 years and glomerular filtration rate (GFR) lower than 45 ml/min were statistically significant risk factors for AKI11.
Chopra et al., 2021	India	105 patients admitted no department of pediatrics from a tertiary care university hospital in New Delhi.	The presence of sepsis, vasopressor support, hemodynamic instability, shock in the time of presentation, need for mechanical ventilation, and nephrotic syndrome were relevant risk factors for the development of AKI in children infected with SARS-CoV-212.
Charoennga m, et al., 2021	United States	1424 COVID-19 patients who were hospitalized at Boston Medical Center (BMC).	Black patients with COVID-19 were approximately 2.2 times more likely to develop in-hospital AKI and had higher levels of inflammatory markers compared to white patients with AKI13.

Caceres *and al., 202,*	United States	52 patients admitted to Henry Ford Hospital in Detroit, Michigan, with a clinical diagnosis of COVID-19.	A higher viral load of SARS-CoV-2 in urinary sediments of patients with COVID-19 correlated with increased incidence of AKI and mortality14.
Almeida et al., 2021	Brazil	COVID-19 at the Hospital of the Federal University of São Paulo with COVID-19.	Hematological and inflammatory markers, hypertension, mechanical ventilation, and therapy with vasopressors have been associated with AKI in patients with severe COVID-19. Combined treatment with hydroxychloroquine and azithromycin was associated with renal dysfunction in these patients1.
Mohaved et al., 2021	Iran	854 adult patients admitted with COVID-19 at Baharloo Hospital in Tehran were included.	The incidence of AKI in patients with COVID-19 was higher in patients receiving antibiotics against co-infections, in male patients, and in the elderly. The effects were greater in deaths and ICU admission, and AKI was associated with prolonged hospitalization15.
Xu et al., 2021	Sweden	316 seniors with COVID-19 and 875 without COVID-19 were included, all of whom were admitted to two geriatric clinics in two hospitals in Stockholm.	The odds of developing AKI in elderly patients with COVID-19 were higher in those with reduced baseline kidney function and in patients with initial C-reactive protein (CRP) greater than 10 mg/L3.
Lowe et al., 2021	United Kingdom	81 adult patients were admitted to the ICU of the University Teaching Hospital in Southampton diagnosed with COVID-19.	The risk factors for the development of AKI were advanced age, diabetes mellitus and immunosuppression. AKI was associated with increased disease severity on admission, mechanical ventilation, elevated D-dimer and severe lymphopenia16.
This et al., 2021	Singapore	707 COVID-19 patients admitted to the National Center of Infectious Disease.	Advanced age, congestive heart failure, initial use of iACE (angiotensin-converting enzyme inhibitors) or ARB (angiotensin-converting enzyme blockers) or ARB (angiotensin-converting enzyme blockers) angiotensin), initial statin use, exposure to aminoglycoside and vancomycin, use of NSAIDs (nonsteroidal anti-inflammatory drugs) in the hospital, exposure to contrast testing, and hypoxia were associated with an increased risk of developing AKI in SARS- CoV-217 infected patients.
Diebold et al., 2021	Switz erland	188 patients adults Hospitalized No University Hospital of Basel, tested positive for COVID-19.	AKI in patients with COVID-19 occurs more in those in need of care and the severity of the condition correlates with the severity of the disease. Risk factors such as age, history of CKD, CRP levels and creatine kinase were identified as independent predictors of AKI6.

Costa et al., 2021	Brazil	114 patients diagnosed with COVID-19 in the ICU of a private hospital in the city of Rio de Janeiro.	As independent predictors of the occurrence of AKI in patients with COVID-19, age and hypertension were identified7.
Pine et al., 2021	Spain	237 patients who were admitted to the ICUs of the Hospital Clínic of Barcelona with a diagnosis of COVID-19 and AKI.	The prevalence of moderate/severe AKI in patients with COVID-19 admitted to the ICU is high and has a strong correlation with mortality and length of hospital stay18.
Wang et al., 2021	China	882 patients over 65 years of age hospitalized by COVID-19 were recruited at Tongji Hospital.	It has been established that the incidence of AKI in patients with COVID-19 increases with age, due to the decline in renal function with aging, and with the increase in the number of preexisting comorbidities20.
Hamilton et al., 2020	United Kingdom	1032 adult patients were admitted to the Manchester University Foundation Trust Hospitals with clinical and/or virological diagnosis of COVID-19.	Independent risk factors related to the development of AKI in patients with COVID-19 were being male or black, having higher serum sodium and baseline CRP, as well as a previous diagnosis of kidney disease4.
Li et al., 2020	China	107 patients Elderly hospitalized with COVID-19 were included.	AKI can be seen as an indicator of poor prognosis, revealing more severe and multi-organ dysfunction. Independent predictors of incident AKI in patients hospitalized for SARS-CoV-2 infection who developed AKI in the ICU were septic shock, invasive mechanical ventilation and the need for vasopressors21.
Trabulus *And to the., 2020*	Turkey	336 COVID-19 patients admitted to the tertiary university hospital in Istanbul.	AKI was more common in patients with estimated glomerular filtration rate (eGFR) baseline less than 60 mL/min/1.73 m2. At admission, eGFR appears to be a prognostic marker for mortality in patients with COVID-1922.
Oussalah and al., 2020	France	149 patients with a confirmed diagnosis of COVID-19 and ACE inhibitor/ARB use data admitted to the University Hospital of Nancy.	The results corroborate the hypothesis of a deleterious effect of long-term therapy with iACE or ARB among patients with severe COVID-19 in relation to the risk of developing AKI23.
Ozsurekci et al. , 2020	Turkey	11 pediatric patients confirmed to have COVID- 19 with any degree of kidney injury.	Favipiravir may be an appropriate antiviral in the treatment of pediatric patients infected by SARS-CoV-2 with GFR without the need for dose adjustment24.

4 DISCUSSIONS

Initial reports regarding the current COVID-19 pandemic suggested a limited respiratory condition with little involvement of several organs, however it was evident, with the progression of the disease, the involvement of extra-respiratory organs4. Proteinuria, hematuria, leukocyturia and AKI have been described as common clinical presentations of renal involvement6.

AKI in patients with COVID-19 is an important complication of the disease2, being listed as a modifiable risk factor for mortality in patients with COVID-19, especially in environments with limited resources12. In mild to moderate cases, AKI is not common and is determined by subclinical renal abnormalities, in contrast, it is common in critically ill patients with COVID-19, affecting approximately 20% to 40% of ICU patients1.

The etiological mechanism of AKI in patients with COVID-19 is multifactorial, including direct virus injury, cytokine storm syndrome, antiviral drugs and vasoconstrictors5. Other factors include the use of nephrotoxic agents, such as NSAIDs12, as well as hemodynamic and hypercoagulability changes9. One study demonstrated evidence based on immunodetection of the expression of two SARS-CoV-2 proteins, nucleocapsid and spike in kidney cells from COVID-1914 biopsy samples. The virus also directly infects tubular epithelial cells and podocytes, causing significant structural damage16.

Cytokine storm and complement activation may play key roles in the pathogenesis of AKI in children with COVID-19, and subsequent dehydration with hypoperfusion of the kidneys increases the risk of developing AKI19. Secondary bacterial infections are also responsible for the cytokine storm, especially in individuals with decayed or compromised long-term immunity10. For the treatment of these opportunistic bacterial infections it is necessary to intervene with antibiotics, exposing the patient to nephrotoxic drugs such as vancomycin and amikacin12 that can lead to renal lesions, such as acute tubular necrosis and acute interstitial nephritis, direct cytotoxicity of the proximal tubule. Therefore, appropriate dosing of antibiotics should be administered to COVID-19 patients and monitored frequently to prevent AKI15.

In a cohort study in the United Kingdom, the average age of patients with AKI and COVID-19 was 69 years, 58% were male and 59.1% white and 27.4% black2. Age over 65 years is a strong predictor for AKI11. In children, the median age was 6 years, with the majority (47.6%) in the group of 5 to 13 years12. Age 80 to 90 years was associated with higher odds of AKI in patients with COVID-193. The study by Costa et al. 7 corroborated with age and gender profile, being mostly male (58.5%) and with a mean age of 66.5 years, also addresses that the mean body mass index (BMI) of the patients evaluated was 28 kg/m2.

Although the aforementioned cohort study in the United Kingdom points to a higher prevalence of AKI in COVID-19 in whites, the study by Charoenngam et al. 13 demonstrated that black individuals are more likely than whites to develop AKI. These differences can be explained by genetic particularities, socioeconomic status, access to care, diet, cultures, and other factors, as well as the interaction between them. Levels of inflammatory markers were higher in black patients, suggesting racial differences in the inflammatory burden of COVID-1913.

The main risk factors involved in AKI in patients with COVID-19 include long-term therapy with iACE and ARB23, use of statins before hospitalization, use of nephrotoxic drugs during hospitalization17, presence of comorbidities, glomerular filtration rate on admission22, as well as increased mean initial CRP value3. Critically ill patients with COVID-19 may be at increased risk of AKI due to hypoperfusion of the kidneys as a result of circulatory shock secondary to hypovolemia, sepsis, or cardiogenic shock due to underlying cardiovascular disease or new cardiac event17.

In addition, the laboratory tests that make up risk factors for AKI include thrombocytopenia, hypoalbuminemia, hypophosphatemia, in contrast to higher levels of lactate dehydrogenase (LDH), procalcitonin, CRP, urea and prothrombin time on admission5, as well as D-dimer, troponin I, ProBNP and ferritin. Thus, laboratory tests for serum albumin, hypercoagulability and markers of cardiac injury may be indicative of the development of AKI9. Children with AKI had leukocytosis and thrombocytopenia12, and also had anemia and thrombocytopenia19.

Regarding comorbidities, hypertension was the most common, followed by diabetes mellitus22. In addition, cardiovascular disease, chronic obstructive pulmonary disease (COPD), cerebrovascular disease21, previous diagnosis of kidney disease4, immunosuppression by any reason, including HIV, myelosuppression by hematological neoplasms and immunosuppressive therapy16. In the elderly, there is also a record of dementia3. Comorbidity in children is related to pneumonia, tuberculosis and hematological disorders/malignancy12. The presence of two or more comorbidities substantially increased the risk of developing AKI in patients with COVID-199.

Among patients with COVID-19 AKI, stage 3 received renal replacement therapy (RRT). All surviving patients with stages 1 and 2 and 3 with RRT had complete recovery of baseline renal function16. Normally, in the stage 1 and 2 group of AKI there were no deaths7. Patients with AKI were more likely to be admitted to intensive care, ventilated, more likely to die4, as well as more likely to use vasopressors and had high levels of urea nitrogen in the blood and uric acid21. Sepsis, septic shock, acute respiratory distress syndrome (ARDS), myocardial injury and liver injury were commonly observed complications in patients with AKI20. AKI has been associated with an increased risk of chronic kidney disease (CKD) in individuals with previously normal renal function and acute venous thromboembolism2.

In the cohort study by Piñeiro et al. 18 The treatment protocol for COVID-19 includes antiviral therapy with lopinavir/ritonavir, hydroxychloroquine, and azithromycin. If patients presented clinical deterioration, biological therapy was recommended, which most often included tocilizumab, anakinra, and/or corticosteroids. Corticosteroid use was associated with a 13% reduction in the need for RRT. Favipiravir may be an appropriate therapeutic option in pediatric patients with SARS-CoV-2 with reduced GFR without the need for dose adjustment24.

5 CONCLUSION

Acute kidney injury (AKI) is a common finding of renal involvement related to SARS-CoV-2 infection, being more frequent in severe cases and an important predictor of clinical outcome, especially in patients with stage 3 AKI. Because it has a multifactorial pathogenic mechanism, it is extremely important to pay attention to the treatment used during the hospitalization period, adjusting the dose and carefully monitoring the patient submitted to nephrotoxic drugs, and it is essential to monitor the levels of substances that predict AKI in the blood.

A careful analysis of the patient's clinical history is necessary, considering that the risk factors include several comorbidities and findings in laboratory tests. The advanced age (≥ 65 years) should be seen as a relevant variable for the development and outcome of the case. At the moment, ethnicity should not be listed as a predictor, since there are divergences in the existing literature, evidencing the need for further research on the subject. It is essential to emphasize that patients who survived 3rd stage AKI during the treatment of COVID-19 should have medical follow-up within 6 months of the outcome of the case, which is due to the high risk of developing chronic kidney disease.

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CHAPTER
64

COVID-19 and its main oral manifestations

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1 INTRODUCTION

In December 2019, the global spread of a new virus known as SARS-CoV-2, which is responsible for the disease called COVID-19, occurred, triggering an unprecedented crisis around the world. On March 11, 2020, the World Health Organization (WHO) declared the situation a pandemic. As of June 16, 2020, there have been more than 7.9 million confirmed cases and 434,796 deaths in more than 200 countries. Brazil was the second most affected country, with more than 900,000 confirmed cases and 43,332 deaths.

As a measure to contain the rapid spread of COVID-19, isolation and social distancing measures have been implemented around the world. This resulted in the temporary closure of dental clinics, both public and private, and the suspension of elective dental care. In addition, the dental school clinics were closed due to the interruption of face-to-face activities and clinical teaching.

Considering the current knowledge about the biological behavior of COVID-19, it is important to note that many viral infections can cause oral manifestations. Therefore, it is valid to know the oral manifestations that may be a direct consequence of SARS-CoV-2 infection.

There are several oral manifestations related to COVID-19, which can occur due to the side effects of the medications used in the treatment of the disease, as well as conditions arising from mechanical ventilation therapy and hospitalization in intensive care units (ICU). These manifestations include changes in the characteristics of the mucous membranes, changes in the production and quality of saliva, stomatitis, ulcers, sensory changes, pigmentation, among others. The advanced age and severity of COVID-19 can aggravate these injuries. Other factors, such as lack or reduction of oral hygiene, stress, systemic diseases (such as diabetes mellitus and immunosuppression), trauma from intubation, vascular impairment, and hyperinflammatory response secondary to COVID-19, may also contribute to the development of these lesions.

2 ORAL MANIFESTATIONS ASSOCIATED WITH COVID-19

2.1 CHANGES IN TASTE

Dysgeusia is a persistent distortion of taste, whether transient or permanent. Dysgeusia is also often associated with ageusia, which is the complete lack of taste, and hypogeusia, which is a decreased sensitivity to taste. The oral symptoms of COVID-19 are characterized by disturbances in taste and smell, without the simultaneous presence of nasal congestion. SARS-CoV-2 has been found to bind to the epithelial cells of the tongue via the converting enzyme receptor, which is widely expressed in these cells. Based on this finding, dysgeusia is considered the first direct oral manifestation of the infection.

2.2 HYPOSALIVATION

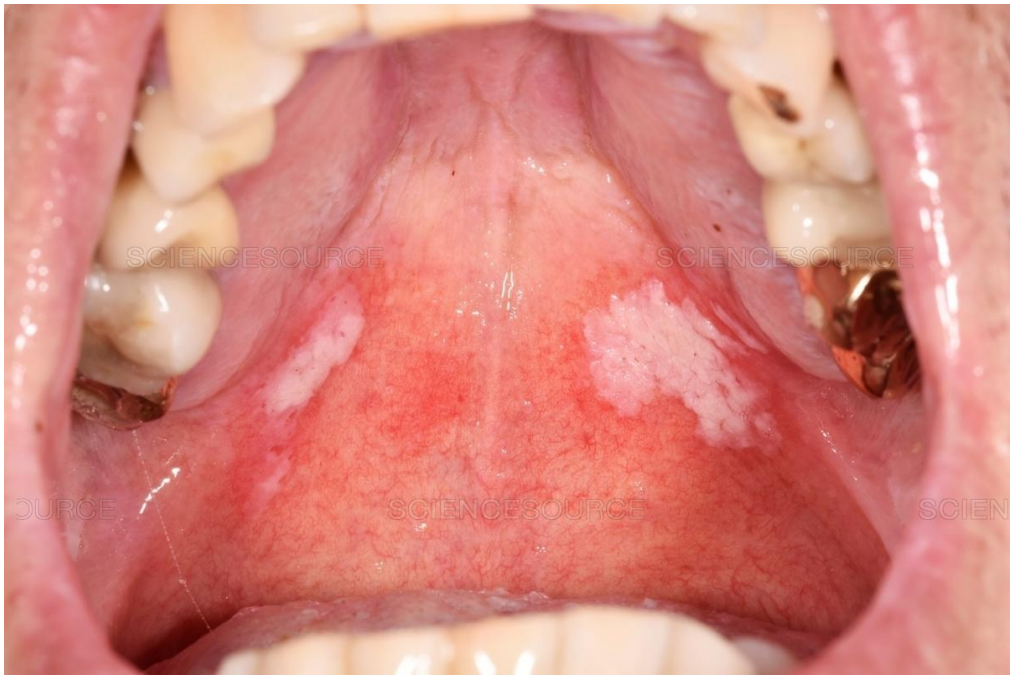
Additionally, decreased saliva production (hyposalivation) or changes in saliva composition can lead to dysgeusia and even ageusia. A recent study demonstrated that more than 50% of COVID-19 patients had symptoms of dry mouth (xerostomia) and dysgeusia, and there was a significant correlation between these two symptoms. However, more research is needed to determine if taste dysfunction is a direct consequence of SARS-CoV-2 infection or if the virus causes hyposalivation, resulting in dysgeusia. Either way, one symptom aggravates the other. Reducing saliva production also increases the risk of caries injuries and aggravating the process of tooth decay. In addition, the decrease in saliva implies a lower amount of immunoglobulins, which can pose a great risk for the development of periodontal diseases

2.3 OPPORTUNISTIC INFECTIONS

It is essential to highlight that the acute condition caused by COVID-19 can increase susceptibility to opportunistic infections, such as herpes simplex and candidiasis, which may present similar clinical characteristics. Since there is no standard treatment for COVID-19, different medications are given to patients, and it is important to consider that other endemic infectious diseases may arise as a consequence of COVID-19.

Studies indicate that prolonged use of antibiotics may aggravate oral manifestations and warn of the risk of potentially fatal opportunistic oral infections resulting from the indiscriminate prescription of broad-spectrum antibiotics. Mucus skin complications in the oral cavity can arise due to several factors, such as prolonged positioning of mechanical ventilation devices in intensive care units (ICU), previous antibiotic treatments that can lead to immune dysregulation, and, in general, injuries are indicative of side effects related to deteriorating systemic health or the use of medications in the treatment of COVID-19.

Source: Internet - Opportunistic Infection: Herpes Simplex



Source: Internet - Opportunistic Infection: Oral Candidiasis

2.4 MUCOSAL LESIONS

Several isolated case reports or case series have documented oral manifestations of COVID-19. However, questions arise as to whether these lesions are a direct consequence of SARS-CoV-2 infection or whether they are secondary manifestations of the disease. These manifestations include oral ulcers, petechiae, and reddish macules, mainly on the tongue and palate.

The discussion about the origin is inconclusive, since it may be the virus as to the pharmacological treatment employed. According to recent studies, the most frequent oral lesions were aphthous ulcerations (65%), vesicular-bullous lesions (11%), macules (16%), petechiae (6%) and plaques (6%), most of which were symptomatic, located on the tongue (53%), palate (30%), lip (23%) and gums (5%). Other oral changes reported were ageusia/dysgeusia (21%), burning in the mouth (20%) and xerostomia/hyposalivation (7%).

Source: Internet - Mucosal Lesions: Canker sores

Source: Internet - Mucosal Lesions: Petechiae

3 CONCLUSION

It cannot be stated with certainty that the oral manifestations are directly related to the SARS-CoV-2 virus or if they are side effects of the treatment of the disease. While it is common for COVID-19 patients to experience oral signs and symptoms, such as traumatic ulcers, changes in taste, opportunistic infections, and reduced salivary flow, these manifestations are not mandatory. Understanding the mechanism of action of COVID-19 requires more scientific research to determine the origin of these lesions and oral manifestations, as well as find ways to minimize them. It is important to make dentists aware of the proper management of the patient in this context.

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CHAPTER
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Quality of life of stroke patients during the COVID-19 pandemic

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ABSTRACT
Introduction: Stroke sequelae can reduce the activity and participation of these individuals, leading to reduced quality of life (QoL). The COVID-19 pandemic changed the organization of society to contain the contamination, leading to the suspension or changes in the format of outpatient care, which may have negatively influenced the QOL and health care of people with stroke. Objective: To analyze the physical, psychological, social relations and environment aspects of the QoL of individuals with stroke during the pandemic and related factors. Methods: This is a cross-sectional study, using an online form and the WHOQOL-Bref questionnaire. Results: Eleven individuals participated in the study, aged between 18 and 80 years, mostly male. Regarding QoL, the psychological domain presented the best score and the physical domain the worst. Likewise, the personal relationships facet the best score and the work ability facet the worst score. Conclusion: During the pandemic, the QoL of people with stroke was impaired. The factors that most interfered were physical condition, work capacity, dependence on medications or treatments, and sexual activity. It is worth mentioning the importance of Physiotherapy in QOL, as it promotes reintegration into the community and maximum capacity of patients.

Keywords: Stroke, Quality of Life, COVID-19.

1 INTRODUCTION

Cerebrovascular Accident (CVA) is a cerebrovascular disease that presents as a dysfunction of focal and/or global clinical signs that compromises the central part of the nervous system, which develops rapidly and its symptoms persist for 24 hours or more [1]. It is caused by an interruption or reduction of the blood supply of a part of the brain, and can be classified as ischemic or hemorrhagic [2].

About 30% of individuals who have suffered stroke become dependent on performing tasks of daily living (e.g., professional, social, personal, recreational, and sexual) [2, 3]. In this context, physiotherapy makes it possible to restore and maintain functions related to mobility and prevents

functional, motor and cognitive decline, improving quality and performance in activities of daily living (ADLs) [4]. Thus, the physiotherapeutic treatment for patients after stroke is essential, because it helps to reach their maximum capacity, and reintegrate these people into the community, in order to promote improvement in the perception of their QoL [5].

According to the Quality of Life Group of the World Health Organization (WHO) [6], QoL is defined as an individual's perception of their position in life, in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns.

At the beginning of the year 2020 the pandemic was declared by the novel coronavirus (COVID-19), and one of the main ways to prevent contamination was social isolation. Governments have included measures to close schools, colleges and universities, restaurants, shops and all so-called "non-essential" services to prevent crowding and the spread of the virus [7, 8]. Consequently, some outpatient care has been suspended, there have been organizational changes implemented in response to the pandemic, affecting stroke care, leaving them in the background [9]. Thus, in a literature review, Chaves [10] pointed out that during the period of the COVID-19 pandemic, people who suffered stroke had fewer consultations and fewer treatment/rehabilitation sessions, which is a worrying factor, since it could result in the worsening of the clinical picture and significant impact on their activities, participation and QoL.

The pandemic may have generated a series of personal impacts, such as stress, anxiety, depression, social isolation, worsening of chronic diseases, and these factors have great interference in QoL [11]. In addition, in this period there was a large drop in leisure activities, a factor that is directly related to QoL and well-being [12].

Thus, social isolation, added to the decreases in admission rates, consultations and treatments, can have repercussions in delayed rehabilitation and thus, greater probability of long-term disability, with damages that may be irreversible for the QoL and social integration of these individuals [11]. Therefore, the main objective of the present study was to analyze the physical, psychological, social relationships and environment aspects of QoL of individuals with stroke during the COVID-19 pandemic and related factors, such as stroke time, age and schooling.

2 METHODS

This is a cross-sectional study, through the analysis of responses of stroke patients from a form created with the Google® Forms platform, collected between October 2021 and February 2022. The research was approved by the Ethics and Research Committee of the Universidade Estadual do Norte do Paraná (CAAE 46608021.5.0000.8123).

2.1 POPULATION

Participated in the study 11 individuals, recruited to answer the form through dissemination on social networks, such as Instagram, Facebook and Whatsapp, and through post and messages requesting the invitation.

The study included individuals who suffered a stroke at any time of life, with a minimum age of 18 years, who have the means to answer the questionnaire online, such as a computer, tablet or mobile phone with internet access. Forms answered in duplicate were excluded from the research, that is, the same person performing more than once, in this case only the first evaluation was considered. Individuals who failed to finalize the questions on the form were automatically excluded, since the answers were not saved.

2.2 FORM

The form was conducted through the Google® platform, first containing the Term of Free and Informed Consent (ICF), after that, questions related to personal data, physical therapy care during the pandemic, performance of activities other than physiotherapy, difficulties encountered and the WHOQOL-Bref questionnaire to investigate the QoL of patients during this period.

The WHOQOL-Bref questionnaire consists of an instrument with the objective of assessing QoL and consists of an abbreviated version of the WHOQOL-100, to be an instrument of rapid application and with satisfactory psychometric characteristics, created by the WHO Quality of Life Group [13]. It has 26 questions, two of which deal with the general aspects of QoL and the other 24 are divided into 4 domains: physical, psychological, social relationships and environment; and each of them represents one of the 24 facets of the WHOQOL-100 questionnaire [14]. The transformed total score can vary from 0 to 100, with zero being the worst level and 100 being the best possible QoL level [13,15].

2.3 DATA ANALYSIS

Data analysis was performed using a descriptive quantitative analysis, through absolute values and percentages. The scores of the WHOQOL-Bref, a questionnaire used to assess QoL, were tabulated and analyzed in the WHOQOL-Bref / Microsoft Excel program, developed by Pedroso et al. [16].

3 FINDINGS

The total number of participants eligible for the study who answered the form was 11, there was no loss in the course of the research. Of these, the majority (54.5%, n=6) were male, and all were

aged between 18 and 80 years. Most of them (45.5%, n=5) lived in the city of Ourinhos-SP. Regarding occupation, only one participant (9.1%, n=1) reported that he worked.

The characterization of the individuals who were victims of stroke and participated in the study is described in Table I.

Table I- *Characterization of the study participants*

Variables	Values, n (%)
Sex	
Female	5 (45,5%)
Male	6 (54,5%)
Age	
18 to 40 years	2 (18,2%)
40 to 60 years	4 (36,4%)
60 to 80 years	5 (45,5%)
City	
Ourinhos-SP - Brazil	5 (45,5%)
Fartura-SP - Brazil	1 (9,1%)
Jacarezinho-PR - Brazil	1 (9,1%)
Bandeirantes-PR - Brazil	1 (9,1%)
Santo Antônio da Platina-PR	1 (9,1%)
Arapoti-PR - Brazil	1 (9,1%)
Matinhos-PR - Brazil	1 (9,1%)
Schooling	
Incomplete elementary school	4 (36,4%)
Completed elementary school	2 (18,2%)
Incomplete high school	1 (9,1%)
Completed high school	2 (18,2%)
Incomplete higher education	1 (9,1%)
Complete higher education	1 (9,1%)
Works	
Yes	1 (9,1%)
No	10 (90,9%)
Monthly income	
Up to a minimum wage	2 (18,2%)
From one to two minimum wages	4 (36,4%)
Above 5 minimum wages	2 (18,2%)
Has no income	2 (18,2%)
Don't know	1 (9,1%)
Marital status	
Married	7 (63,6%)
Desquitado/Divorced	1 (9,1%)
Single	2 (18,2%)
Widower	1 (9,1%)
Time since stroke	
More than 6 months	7 (63,6%)
From 3 to 6 months	3 (27,3%)
From 7 days to 3 months	1 (9,1%)

Source: Own authorship

Table II illustrates the characterization of the disease caused by the COVID-19 virus and the performance of physical therapy during the pandemic.

Table II- *Characterization of COVID-19 disease and physiotherapeutic treatment in study participants*

Variables	Values, n (%)
Diagnosis of COVID-19	
Yes	4 (36,4%)
No	7 (63,6%)
Hospitalized for COVID-19	
Yes	0 (0%)
No	11 (100%)
Interned for another reason	
Yes	8 (72,7%)
No	3 (27,3%)
Underwent physical therapy during the pandemic	
Yes	7 (63,6%)
No	4 (36,4%)

Source: Own authorship

Regarding QoL, it is possible to observe that the psychological domain presented the highest score, while the physical domain has the lowest, as shown in Figure I. Figure II shows the evaluation achieved in each of the facets of the WHOQOL-Bref questionnaire, with the highest scores obtained in relation to personal relationships, spirituality/religion/personal beliefs and home environment. And the lowest scores obtained were in relation to work ability, dependence on medications or treatments, and sexual activity.

Figure I- *Scores of the WHOQOL-Bref domains of quality of life of the participants*

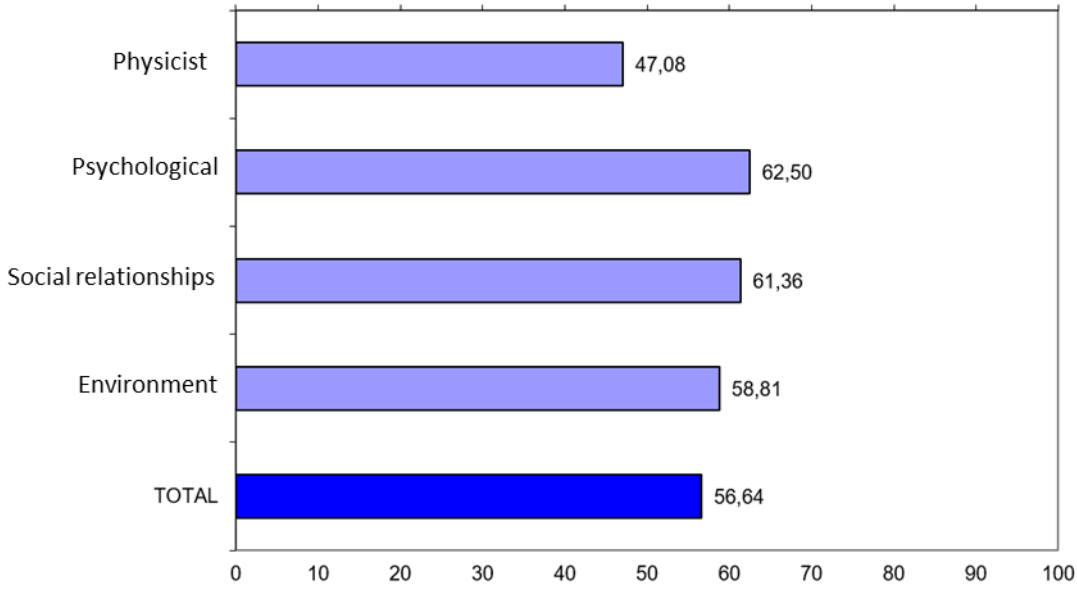
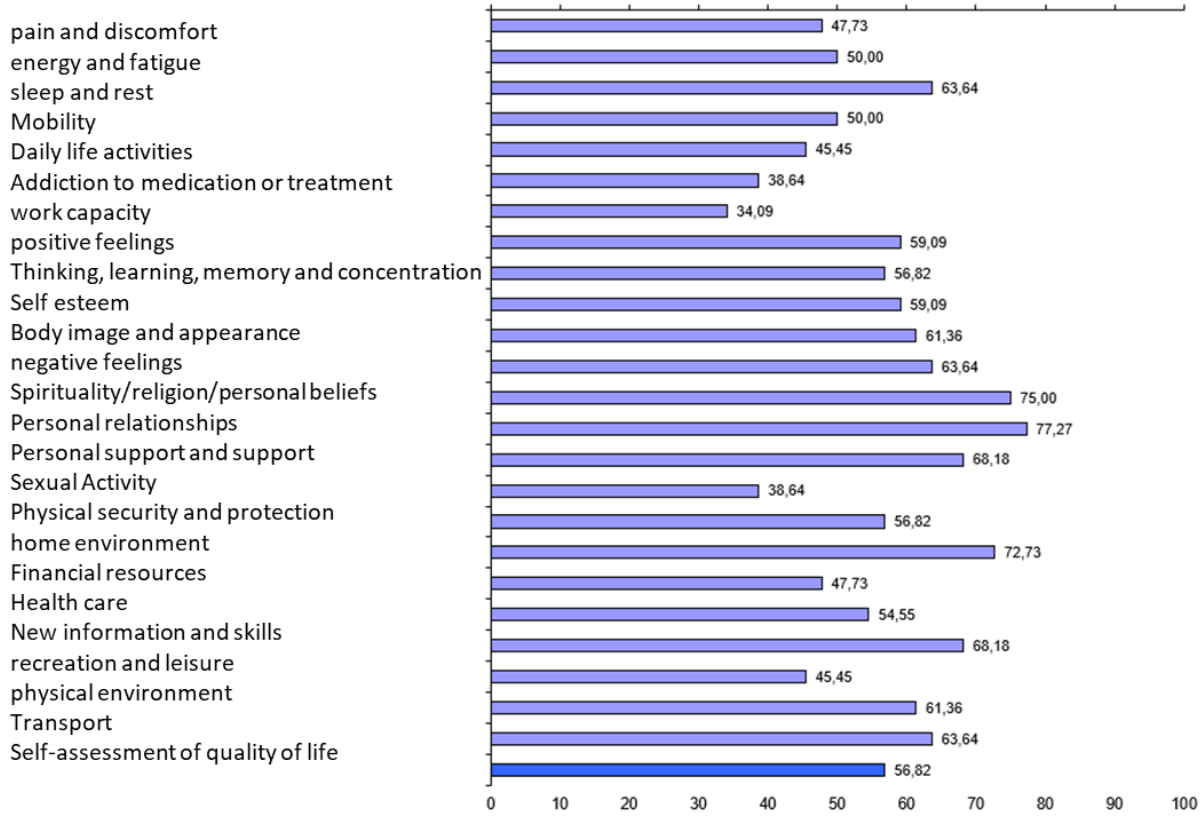


Figure II- *Scores of the facets of the WHOQOL-Bref questionnaire of quality of life of the participants*



4 DISCUSSION

QoL can be defined as the individual's conception of their position in life, considering their culture, values, goals and expectations [12]. With this it is possible to observe the heterogeneity of the factors that impact the QoL of people with stroke. Regarding the multidimensionality of these factors, the WHO recommends the use of the International Classification of Functioning, Disability and Health (ICF), when presenting a look directed to the functionality of the individual, instead of the disease, allowing a biopsychosocial view of the patient [17]. This is similar with the facets and domains observed by the WHOQOL-Bref, since it analyzes the physical, psychological, social relationships and environment domains, and the facets of mobility, activities of daily living, work capacity, self-esteem, health care, transportation, sexual activity, among others.

Regarding the psychological domain of the WHOQOL-Bref, post-stroke depression is the most frequent psychiatric sequelae in this population, being associated with increased mortality, worse physical and language functioning, prolonged hospitalization and decreased QoL [18,19,20]. Still, most of the articles selected in the 2019 review by Reis and Faro [21] addressed the occurrence of post-stroke depression, and as a form of prevention the search for information, obtaining positive social support and psychological monitoring. The impacts of stroke on QoL are multifaceted and may also affect survivors with mild sequelae who have achieved total independence in ADLs. The study by Oni et al. [22] found that post-stroke depression was associated with a reduction in scores for all

WHOQOL-Bref domains. These results differ from ours, since the psychological aspect obtained a higher score.

Regarding the physical domain, the present study was in agreement with that observed by Kauhanen et al. [23], which despite using the SF-36 questionnaire to assess QoL, resulted in physical functioning as one of the most frequently affected in this population, probably because of neurological impairment. In addition, the same result was found in the study by Scalzo et al. [24], who attributed the low score in the domain of physical aspects possibly to the presence of hemiplegia, which was not observed in our study. In the study by Takashi et al. [25], which used the WHOQOL-Bref, it was noted that the patient's perception of his own disability was negatively correlated with physical and psychological QoL, corroborating the present study in relation to the physical domain.

Regarding the facet of work capacity, according to Goh et al. [26], the ability to return to work or social activities after stroke positively influences QoL, which may explain the finding in the present study. Work is not only a form of financial and routine development, it plays an essential role in social relationships and personal involvement, enriching feelings of personal and professional fulfillment. It contains a purpose, meaning and usefulness for the individual, occupying a central position in the life of the adult [27,28]. In addition to the condition of the stroke, the pandemic also influenced the return to work, as there were closures of schools, colleges and universities, restaurants, shops and all non-essential services, causing families not to have the possibility to continue their work in the way they were accustomed, or even being doomed to unemployment [7, 8, 27].

Another facet analyzed was dependence on medication or treatments. Sebastião et al. [29], discuss in their study, conducted with the elderly population, that the use of medications can indicate the presence of diseases, which leads to a lower perception of health, interfering in the perception of QoL, and this can be applied to the present study, since most of the sample consists of elderly people. As for diseases, systemic arterial hypertension has a high incidence in this population, followed by Diabetes Mellitus, facilitating the occurrence of stroke and often requiring medication and treatment [30, 31].

The study by Braga et al. [32] reports that there are several studies in which functional capacity is an impact factor on the QoL of the elderly, resulting in a greater influence of the physical domain, however, this domain did not contribute in a statistically significant way and presented a good average and level of satisfaction. The ability to perform ADLs are basic points to prolong independence and functional capacity. The maintenance and preservation of functional capacity may have important implications on QoL, being directly related to the development of daily activities and pleasurable activities, intervening in the level of satisfaction [33].

Regarding sexual activity, the study by Monteiro et al. [34] found that stroke patients present sexual dysfunctions and decreased sexuality as sequelae, associated with decreased QoL. In addition, age has interference in sexuality, since the older the age, the lower the sexual desire, and there is impairment in erectile and ejaculatory functions [35]. Still, most of these individuals are afraid to have an active sex life after stroke, either due to sexual dysfunctions or physical and emotional problems [36, 37]. In the study by Pereira et al. [38], participants who did not have an active sex life reported reasons such as loss of interest, absence of partner, fear, indisposition and even the fact of being refused by their spouses. In addition, it was verified that the physical domain was the most compromised, which corroborates with the research of Pereira et al. [38], which suggest that a better physical capacity contributes to the individual to have a more active sexual life, and conclude that the practice of sexual activity is associated with motor and cognitive functional independence, in addition to the physical capacity of the individual [38].

In relation to the related factors, duration of stroke, age and education, the chronicity of stroke is a factor that should be considered when analyzing QoL, since the greatest recovery occurs in the first weeks after the injury for most of those affected, that is, still in the acute phase [39]. Age can also influence the QoL of these patients, according to Sultan and Elkind the prognosis and short-term mortality are better in younger patients. This is due to the fact that most of the risk factors for stroke are alterable by changes in lifestyle and medical therapy, thus not aggravating or providing sequelae after stroke or recurrence [40]. Another important aspect to be highlighted is the educational situation. Jingwen et al. [41] state that higher education is related to greater self-care capacity, which positively interferes in the performance of social roles, consequently in QoL.

The physiotherapeutic treatment has a great influence on QoL, because it promotes reintegration into the community and the maximum capacity of patients [5]. Although most of the participants in our study had undergone physical therapy during the pandemic, 36.4% of them did not, probably due to the suspension of care during the pandemic, a measure adopted to prevent the spread of the virus [7]. Thus, the time of physical therapy performed during the pandemic is a variable that was not asked in a form, however, when questioning whether the physical therapy care was satisfactory, most answered no, possibly because of the closure of the clinics. In addition, the fear of exposure to the virus may have influenced the performance of physical therapy treatment in this period, since contamination is a risk factor for stroke, and may lead to recurrence [42].

The present research brings essential knowledge for the post-pandemic physical therapy practice, given the need to investigate QoL and related factors in this period in patients who had stroke, helping professionals and academics to implement more effective strategies, according to the needs of each patient, in the care of this population, for example, directing them to physical capacity and return

to work, since they had a great influence on the QoL of this population, and occupation plays an essential role in social relations and personal involvement. In addition, it is necessary to look at the dependence on medications or treatments and sexual activity, since they were also facets impaired in QoL. Finally, it is worth mentioning the importance of physical therapy in the improvement of these domains, since the physiotherapeutic treatment has a great influence on QoL [5].

As limitations of the study, it is worth highlighting, in addition to the sample size, the lack of specificity of the questions addressed in the form regarding the performance of physiotherapeutic treatment during the pandemic, and the fact that potential participants received the link to the form and did not answer, which left the sample small.

It is recommended that future studies do this investigation with a larger number of participants, controlling for the heterogeneity of personal, sociodemographic, cultural and economic-educational factors. In addition, it is recommended the analysis of functionality, with a global view of neurological patients, as recommended by the WHO with the use of the ICF, since it allows a global view of the individual, ranging from the affected body structure to personal and environmental factors, in addition, functional capacity becomes a health item and not just a consequence of the disease [43]. Still, there is a need to analyze the relationship of the time of physical therapy treatment due to the pandemic, and how much this impacted QoL, focusing on the functional factors of individuals.

5 CONCLUSIONS

It is possible to conclude that during the pandemic, the QoL of the study participants, people diagnosed with stroke, was impaired. According to the findings in the WHOQOL-Bref, physical condition, work capacity, dependence on medications or treatments, and sexual activity were the factors that most interfered in the QoL of this population. Finally, it is worth mentioning the importance of physical therapy treatment in QoL, as it helps to restore and maintain the functions of the individual, promoting reintegration into the community and the maximum capacity of patients and improving the quality and performance in ADLs.

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CHAPTER

66

Relationships between quality of services and satisfaction, loyalty and "word of mouth" communication: Perception of students at a Higher Education Institution (HEI) during the pandemic

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ABSTRACT
The objective of this study was to evaluate the relationships between service quality, satisfaction, perceived value, loyalty and "word of mouth" in an HEI, pointing to the adoption of new practices in the HEI in question, as post-pandemic competitive alternatives. This is a descriptive and exploratory research, with a qualitative approach. The sample consisted of 100 students from different courses of a private HEI in the state of Minas Gerais, submitted to measurements and analysis of their characteristics and opinions. The results indicated a relative positivity in relation to the HEI, and the women, undergraduates, between 21-23 years of age showed greater satisfaction in relation to the higher education institution. Of all respondents, regarding the quality of services (53%) remained neutral; perceived value in terms of students' needs (50%) in agreement; perceived value to the HEI's performance (46%) neutral; overall satisfaction (45%) equally neutral; satisfaction with the services offered (48%) neutral; option for another HEI, 39% said they would hardly choose another one; pride in the HEI in which they study (48%), "word of mouth" communication (52%); positive comments on social networks (50%). The findings showed that most students remained neutral on most questions, results attributed to the time of the pandemic, when the research was carried out.

Keywords: Satisfaction, Quality, Loyalty, Value, Pandemic.

1 INTRODUCTION

Studies show that the benefits of establishing long-term relationships between students and Higher Education Institutions (HEIs) (ROWLEY, 2003; TAPP et al., 2004; ALVES; RAPOSO, 2009; ALVES, 2011; CAVALHEIRO et al., 2014) brings competitive advantages, to the extent that students loyal to their institutions disclose their satisfaction to others, as well as to those potential, allowing the image of the HEI to be positive.

Mass higher education, the expansion of the knowledge society, the frantic, unprecedented development of information technology, the commodification of higher education, as well as the turbulence of globalization have brought revolutionary changes to the mission and purpose of universities around the world (LEKO-ŠIMIĆ; ČARAPIĆ, 2021), notably during and post-pandemic (FARAGE, 2021).

The cycle of student-teacher-HEI relations has been disrupted by the COVID-19 pandemic, which has impacted the entire world, in all sectors, especially in health and education. During the pandemic, schools at all levels have had to create alternatives to teaching on an emergency basis. I then emerged the remote teaching, and the HEIs, had to adapt, in an attempt to minimize the didactic-

pedagogical damages, as well as the risks to health, at the same time, ensuring a quality higher education (GUSSO et al., 2020).

Urgent measures had to be taken, since educational institutions represent centers of social coexistence, naturally, generate agglomerations and providing the spread of the virus in society by this route, that is, by the educational environment (AQUINO et al., 2020). In turn, the Ministry of Education (MEC) issued Ordinance No. 343, of March 17, 2020, maintaining social isolation, but authorizing the replacement of face-to-face classes by digital means, thus emerging the Emergency Remote Teaching (ERE), while the pandemic lasted (MEC, 2020).

Among so many challenges to be faced, perhaps one was the most pressing, the use of technologies by faculty, students, and staff of HEIs. Challenge, because many teachers were not familiar with technological means, saved, conventional and commonplace, and as for the students, many did not have access to the internet and technological equipment and instruments, which was a dilemma, considering the need to develop remote activities in environments outside the institution.

According to Al Samaraee (2020), in a study on medical education in the pandemic, reported that at the beginning of classes, most students complained about not accessing the school platform and/or the activities shared in Google classrooms (Google *Classroom*). Most of these students said they used laptops, cell phones and conventional computers to follow the classes, but the great difficulty was the sharing of this equipment with other family members, which significantly hindered their access to the platforms. In this sense, the perception that one has is about the quality of the services provided at the time of the pandemic, in contrast to the difficulties of students and of teachers to access the platforms – classes by remote routes.

Other variables should also be considered by the HEIs, in addition to satisfaction, perception of value, communication "word of mouth", loyalty, which were used in this research. However, it is also necessary to consider factors such as flexibility and adaptation, interaction and engagement, support and support, resources and infrastructure, transparency in communication, adoption of hybrid education, investment in new technological resources.

As for flexibility and adaptation, many HEIs, as already mentioned, needed to adapt quickly, even emergency so that they could offer the minimum necessary in remote classes, both for teachers and students and other modalities of distance learning. In this sense, the quality of services can be perceived by students from the ease of access to platforms, availability of digital resources, efficient technical support, and clarity in communication. All of these factors are closely related. However, in practice these factors are still far from acceptable.

When it comes to blended learning, many still don't understand what it means. In some cases of private HEIs, they are already adapting to this teaching modality, that is, combining face-to-face

classes with remote classes, seeking to bring and guarantee students better quality and flexibility in the teaching-learning process. Many try to invest in improving their technological apparatus, facilitating access to materials and activities, adequate technical support and effective interaction between students and teachers. These are challenges that have yet to be faced.

As for public HEIs, the scenario is even more complex, since they depend on public investments, parliamentary amendments, common sense, and good political sources. Most public HEIs are relegated to the second and third plane. You don't invest in education as you should. Successive governments take more and more percentages that should be directed to education and divert to other areas.

Corroborating with our understanding, Cavalcanti and Guerra (2021, p. 74), state that, "in Brazil, in addition to the health crisis caused by the new coronavirus, it was seen that our country lacks a project of nation, and, what is more worrying, is that it was evident that government planning, in all spheres of public power, leaves something to be desired, when it exists."

Also according to the same authors,

> In relation to Education, several factors contributed to the worsening of the situation, in relation to the federal HEIs, because it was found that, even having an institutional planning tool, in force for more than 15 years (Institutional Development Plan (PDI)), the existence of a contingency plan that was capable of dealing with the crisis caused by the pandemic was not detected, neither in the Federal Universities, nor in the Ministry of Education (MEC), which, so far, does not even have a Crisis Management Office caused by Covid-19, which can guide public universities, through standardized procedures and routines (CAVALCANTI and GUERRA, 2021, p. 74).

The fragmentation of Brazilian education is a fact. Previous governments, notably the last government, were against federal universities, harshly criticizing the educational process, including intervening in the management of virtually all of them. As a result, it has drastically reduced the financial resources of these institutions, with more force in the pandemic period.

Students and teachers have been and still are overwhelmed and in many cases looking for ways to offer and receive quality education, even minimally. Given this, the p0erception of students in a general scenario, naturally is not the best, in relation to the quality of teaching and its satisfaction, and consequently word of mouth communication is impaired.

In addition, it is worth mentioning that in the educational area, it is of paramount importance to take into account the quality of the services provided by the HEIs, given the number of offers and competitiveness existing in the current market, especially those of the private sector. In addition, the pace and dynamics of global changes in many aspects of life are changing dramatically and is noticeable also in the area of higher education. The perceived quality of services in an unsatisfactory

way can demotivate and lead to school dropout (or dropout), especially of undergraduate courses (GOUVÊA et al., 2016).

However, it was noticed that, with the pandemic (COVID-19), it accentuated even more the demotivation, the dissatisfaction, especially of the students, and, consequently, the quality of the services had a sharp drop giving space to discussions, especially about the quality of higher education.

Research in the education sector has been carried out for some time. However, regarding the quality of services, it seems, they have been more frequent, between expectation and perception of students/consumers about various aspects (such as services, satisfaction, perceived value, loyalty, and communication "word of mouth"), assuming a character of great competitive importance. Several differentials have been used as a strategy by the institutions in the competitive scenario, currently existing among the HEIs, but what has stood out the most, in practice and in the literature, is the quality of the services offered, which consequently influences the loyalty and satisfaction of students/consumers.

Higher education institutions, as well as business organizations from other sectors, that understand how customers evaluate quality, the dimensions of quality of services that are most relevant to the HEI, paying attention to customer perception, and what are the repercussions of quality on loyalty, satisfaction, perceived value and word of mouth tend to be more competitive in the market (VIEIRA et al., 2009), tend to achieve more positive results.

In view of the above, the objective of this article was to evaluate the relationships between quality of services, satisfaction, perceived value, loyalty, and word-of-mouth communication in an HEI, under a post-pandemic perspective.

2 METHODS

This is a descriptive, exploratory study with description of the methods and characteristics of the individuals using descriptive statistics, measures of position, central tendency, and dispersion. For the qualitative characterization variables, absolute and relative frequencies were used, while the mean and standard deviation were used to describe the quantitative characterization variables. To evaluate the correlation and association between the characteristics, Pearson's chi-square test was calculated.

The Chi-square test (denoted by x^2), a statistic devised by Karl Pearson in 1899. It is a non-parametric test, that is, it does not depend on population parameters, such as mean and variance. The test is used to check whether there is an association between the row variable and variable column in a contingency table constructed from sample data. The null hypothesis is that the variables are not associated. The alternative hypothesis is that the variables are associated. If the p-value of Pearson's

Chi-Square Test (last column) is lower than the significance level of 0.05 (P-value < 0.05), we conclude that the characteristic studied has an association.

For analysis and comparison of variables, the nonparametric Kruskal-Wallis test was used. It is a non-parametric test, that is, it does not depend on population parameters, such as mean and variance. For analysis and comparison of variables, the nonparametric Kruskal-Wallis test was used, with the objective of comparing whether all samples are equal.

The research instrument was a structured questionnaire, with an estimated response time of five minutes with 15 closed questions, five of which were sociodemographic to characterize the individuals. This questionnaire was applied via *Online Survey*, indicated to surveys that express opinions, customs or characteristics of a certain target audience, in this case, students of HEIs.

The survey was conducted between July 2020 and January 2021, during the pandemic, to assess the relationships between quality of services, satisfaction, perceived value, loyalty and "word of mouth" in an HEI, pointing to the adoption of new practices in the HEI in question, as competitive alternatives post-pandemic.

3 RESULTS AND DISCUSSION

3.1 DESCRIPTIVE ANALYSIS AND CHARACTERIZATION OF INDIVIDUALS

Table 1 presents the characterization of the individuals. From it it can be verified that most of the individuals are female (56.6%). Regarding the degree of education, we can see that most of them have completed undergraduate (57%) and postgraduate (12%). And, in general, the course time (48%). As for age, they are young people between 21 and 23 years old.

Table 1. Characterization of Individuals

		Frequency	**%**
Degree of Education	Graduation	57	57,0%
	Postgraduate studies	12	12,0%
	Masters	2	2,0%
	Ongoing	28	28,0%
	Doctorate	0	0,0%
	Post-Doc.	1	1,0%
Sex	Female	56	56,6%
	Male	43	43,4%
Age	18-20	21	21,0%
	21-23	30	30,0%
	24-27	20	20,0%

	28-33	16	16,0%
	+34	13	13,0%
Income	1-2	58	58,0%
	3-5	33	33,0%
	6-10	8	8,0%
	11	1	1,0%
Course Time	Ongoing	48	48,0%
	1 year	14	14,0%
	2 years	7	7,0%
	3 years	9	9,0%
	4 in	10	10,0%
	5 years +	12	12,0%

Source: Research, 2022.

3.2 ANALYSIS OF THE OPINION OF THE STUDENTS INTERVIEWED

Table 2 shows the opinion of the interviewees regarding the variables. It was found that the students were more in agreement with the Quality variables: quality of services (QS) (51%), "word of mouth" (BB) (52%) and perceived value (PV): HEI is concerned with the needs of students (50%). On the other hand, less concordant in relation to the variables of Satisfaction (SAT): service (19%), performance of the HEI (22%) and loyalty (LEAL): hardly considers another HEI to take another course (23%).

Table 2. Individuals' Opinions on Topics

		Frequency	**%**
QS	Disagree	7	7,0%
	Neuter	42	42,0%
	Agree	51	51,0%
QRP	Disagree	11	11,0%
	Neuter	53	53,0%
	Agree	36	36,0%
VP	Disagree	13	13,0%
	Neuter	37	37,0%
	Agree	50	50,0%
VPD	Disagree	22	22,0%
	Neuter	46	46,0%

	Agree	32	32,0%
SATD	Disagree	16	16,0%
	Neuter	45	45,0%
	Agree	39	39,0%
SS	Disagree	19	19,0%
	Neuter	48	48,0%
	Agree	33	33,0%
LOYAL*	Disagree	23	23,0%
	Neuter	38	38,0%
	Agree	39	39,0%
LOYAL**	Disagree	17	17,0%
	Neuter	35	35,0%
	Agree	48	48,0%
BB	Disagree	12	12,0%
	Neuter	36	36,0%
	Agree	52	52,0%
CPRS	Disagree	15	15,0%
	Neuter	35	35,0%
	Agree	50	50,0%

(QS) Quality of services; (QRP) Quality Problem Solving IES; (VP) Perceived Value IES worries students need; (VPD) Perceived Value IES Performance; (SATG) General Satisfaction IES; (SS) Service Satisfaction; Loyalty (LEAL*) Hardly considers another HEI to take another Course; (LEAL**) Loyalty: You are proud of the HEI where you took your course; (BB) Word of Mouth: Would indicate HEI; (CPRS) Positive Comments on Social Networks.
Source: Research, 2022.

Table 3 presents the descriptive scores of the students' assessments. It was found that the higher the mean evaluation, the greater their agreement. At this point, the interpretation is reiterated that students have greater agreement with the items Quality: quality of services (2.44), "word of mouth" (2.40) and Perceived Value: HEI is concerned with the needs of students (2.37).

Table 3. Descriptive Reviews

	Average	Median	Lower CL Average	Upper CL Average	Standard deviation	My	Max
QS	2,44	3,00	2,32	2,56	0,62	1,00	3,00
QRP	2,25	2,00	2,12	2,38	0,64	1,00	3,00
VP	2,37	2,50	2,23	2,51	0,71	1,00	3,00
VP	2,10	2,00	1,95	2,25	0,73	1,00	3,00
SATG	2,23	2,00	2,09	2,37	0,71	1,00	3,00
SS	2,14	2,00	2,00	2,28	0,71	1,00	3,00
LOYAL*	2,16	2,00	2,01	2,31	0,77	1,00	3,00
LOYAL**	2,31	2,00	2,16	2,46	0,75	1,00	3,00
BB	2,40	3,00	2,26	2,54	0,70	1,00	3,00
CPRS	2,35	2,50	2,21	2,49	0,73	1,00	3,00

(QS) Quality of services; (QRP) Quality Problem Solving IES; (VP) Perceived Value IES worries students need; (VPD) Perceived Value IES Performance; (SATG) General Satisfaction IES; (SS) Service Satisfaction; Loyalty (LEAL*) Hardly considers another HEI to take another Course; (LEAL**) Loyalty: You are proud of the HEI where you took your course; (BB) Word of Mouth: Would indicate HEI; (CPRS) Positive Comments on Social Networks.
Source: Research, 2022.

Table 4 shows the comparison of the measures according to the characteristics of the students interviewed. Statistically significant results were observed at the level of 5% in the comparison of gender, education, age, income, and time of course. The following significant results stand out: 1) women tend to have higher satisfactions for "Loyalty: Hardly considers another", as well as "Word of Mouth", compared to men. Findings: 2) students with the course in progress have greater tendencies of positive evaluations for the items of "Quality: IES Problem Solving", "Perceived Value: IES Performance", consequently they are the ones with the highest evaluations for "Positive Comments on Social Networks"; 3) with regard to age, it was observed that this is a factor of extreme significance for the evaluation. In practically all evaluations, statistically significant differences were observed (P-Value < 0.05); 4) In general, students with income between 1 and 5 minimum wages (MW) tend to present positive evaluations for the items "Quality: Quality of services" and "Quality: Resolution of HEI Problem". On the other hand, students with higher income above 6 MW have better ratings for "Loyalty: Hardly considers another HEI"; 5) Course time is also a factor that impacts student assessment. The longer the course time (+ 5 years) the higher the positive evaluations for the items: "Quality: Quality of services, Perceived Value: IES Performance, Satisfaction: General IES, Service Satisfaction, Loyalty: Hardly consider another HEI, Loyalty: You are proud of the HEI and Positive Comments on Social Networks."

Table 4. Bivariate Analysis (a) Notes Opinions Individuals

		QS	QRP	VP	VPD	SATG	SS	LOYAL	LOYAL	BB	
Sex	FM	2,4	2,2	2,3	2,0	2,1	2,1	2,0	2,2	2,2	2,3
	M	2,6	2,3	2,4	2,2	2,4	2,2	2,4	2,4	2,7	2,4
	P-Value	**0,210**	**0,328**	**0,451**	**0,102**	**0,165**	**0,687**	**0,002**	**0,205**	**0,002**	**0,704**
Training	Ongoing	2,5	2,5	2,4	2,4	2,3	2,3	2,3	2,4	2,3	2,6
	Graduation	2,5	2,3	2,2	2,0	2,2	1,9	2,1	1,8	2,7	2,0
	Postgraduate studies	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
	Masters	2,3	1,8	2,4	1,6	2,2	2,0	1,9	2,4	2,5	2,0
	Post-Doc.	2,0	2,0	2,0	2,0	2,0	3,0	2,0	2,0	2,0	2,0
	P-Value	**0,193**	**0,000**	**0,631**	**0,001**	**0,790**	**0,247**	**0,086**	**0,127**	**0,271**	**0,002**
Age	18-20	2,0	1,8	2,2	1,9	1,9	2,1	1,9	2,3	2,0	1,9
	21-23	2,4	2,3	2,0	2,0	2,0	1,6	2,0	1,7	2,5	1,9
	24-27	2,4	2,9	3,0	2,4	2,1	2,8	2,2	2,6	2,5	2,9
	28-33	3,0	2,2	2,7	2,0	3,0	2,0	2,4	3,0	2,9	3,0
	+34	2,5	2,0	2,3	2,5	2,5	2,5	2,5	2,5	2,0	2,5
	P-Value	**0,000**	**0,000**	**0,000**	**0,105**	**0,000**	**0,000**	**0,104**	**0,000**	**0,000**	**0,000**
Income	1-2	2,3	2,1	2,3	2,0	2,1	2,0	2,0	2,2	2,2	2,2
	3-5	2,5	2,4	2,6	2,0	2,4	2,3	2,2	2,6	2,7	2,5
	6-10	3,0	2,8	2,1	2,9	2,6	2,1	3,0	1,8	2,5	2,6
	11	3,0	2,0	2,0	3,0	2,0	2,0	3,0	1,0	2,0	2,0
	P-Value	**0,009**	**0,004**	**0,052**	**0,007**	**0,064**	**0,286**	**0,002**	**0,008**	**0,066**	**0,245**
Course Time	Ongoing	2,2	2,2	2,1	1,9	1,9	2,0	2,0	2,0	2,3	1,9
	1 year	2,5	2,4	2,7	2,5	2,5	2,5	2,5	2,7	2,5	2,5
	2 years	2,3	2,3	2,1	2,0	2,1	1,4	2,0	1,7	2,9	2,0
	3 years	2,3	3,0	3,0	2,0	1,9	2,4	1,3	2,3	2,3	3,0
	4 in	3,0	2,0	2,8	2,0	3,0	2,0	2,4	3,0	3,0	3,0
	5 years +	3,0	2,1	2,5	2,7	3,0	2,6	3,0	3,0	2,1	3,0
	P-Value	**0,000**	**0,002**	**0,000**	**0,009**	**0,000**	**0,003**	**0,000**	**0,000**	**0,004**	**0,000**

a. P-Value Kruskal Wallis Test
Source: Research, 2022.

Tables 5, 6, 7 and 8 present the evaluation of the association of the items with the characteristics of the students. It is noticed that there is a statistically significant association at the level of 5% between the level of education of the students with the evaluations of "Quality: Resolution Problem IES, Perceived Value: IES Performance, Satisfaction: General IES, Loyalty: Hardly considers another HEI to take another Course, Positive Comments on Social Networks.

Table 5. Analysis Correlation Degree of Education and Opinions Individuals

		Degree of Education						
		Graduation	Postgraduate studies	Masters	Ongoing	Doctorate	Post-Doc.	
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	P-Value
Quality: Quality of services	Disagree	3 (5,3%)	0 (0,0%)	0 (0,0%)	4 (14,3%)	0 (0,0%)	0 (0,0%)	0,2720
	Neuter	20 (35,1%)	6 (50,0%)	2 (100,0%)	13 (46,4%)	0 (0,0%)	1 (100,0%)	
	Agree	34 (59,6%)	6 (50,0%)	0 (0,0%)	11 (39,3%)	0 (0,0%)	0 (0,0%)	
Quality: IES Problem Solving	Disagree	2 (3,5%)	0 (0,0%)	0 (0,0%)	9 (32,1%)	0 (0,0%)	0 (0,0%)	0,0000
	Neuter	24 (42,1%)	9 (75,0%)	2 (100,0%)	17 (60,7%)	0 (0,0%)	1 (100,0%)	
	Agree	31 (54,4%)	3 (25,0%)	0 (0,0%)	2 (7,1%)	0 (0,0%)	0 (0,0%)	
Perceived Value: IES worries need	Disagree	4 (7,0%)	3 (25,0%)	0 (0,0%)	6 (21,4%)	0 (0,0%)	0 (0,0%)	0,1390
	Neuter	24 (42,1%)	4 (33,3%)	2 (100,0%)	6 (21,4%)	0 (0,0%)	1 (100,0%)	
	Agree	29 (50,9%)	5 (41,7%)	0 (0,0%)	16 (57,1%)	0 (0,0%)	0 (0,0%)	
Perceived Value: IES Performance	Disagree	6 (10,5%)	6 (50,0%)	0 (0,0%)	10 (35,7%)	0 (0,0%)	0 (0,0%)	0,0000
	Neuter	25 (43,9%)	0 (0,0%)	2 (100,0%)	18 (64,3%)	0 (0,0%)	1 (100,0%)	
	Agree	26 (45,6%)	6 (50,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	
Satisfaction: General IES	Disagree	12 (21,1%)	0 (0,0%)	0 (0,0%)	4 (14,3%)	0 (0,0%)	0 (0,0%)	0,0280
	Neuter	17 (29,8%)	10 (83,3%)	2 (100,0%)	15 (53,6%)	0 (0,0%)	1 (100,0%)	
	Agree	28 (49,1%)	2 (16,7%)	0 (0,0%)	9 (32,1%)	0 (0,0%)	0 (0,0%)	
Service Satisfaction	Disagree	4 (7,0%)	5 (41,7%)	0 (0,0%)	10 (35,7%)	0 (0,0%)	0 (0,0%)	0,0090
	Neuter	34 (59,6%)	3 (25,0%)	2 (100,0%)	9 (32,1%)	0 (0,0%)	0 (0,0%)	
	Agree	19 (33,3%)	4 (33,3%)	0 (0,0%)	9 (32,1%)	0 (0,0%)	1 (100,0%)	
Loyalty: Hardly consider another HEI p do another Course	Disagree	16 (28,1%)	3 (25,0%)	0 (0,0%)	4 (14,3%)	0 (0,0%)	0 (0,0%)	0,0000
	Neuter	7 (12,3%)	5 (41,7%)	2 (100,0%)	23 (82,1%)	0 (0,0%)	1 (100,0%)	
	Agree	34 (59,6%)	4 (33,3%)	0 (0,0%)	1 (3,6%)	0 (0,0%)	0 (0,0%)	
Loyalty: You are proud of the HEI where you took the course	Disagree	8 (14,0%)	4 (33,3%)	0 (0,0%)	5 (17,9%)	0 (0,0%)	0 (0,0%)	0,1440
	Neuter	18 (31,6%)	6 (50,0%)	2 (100,0%)	8 (28,6%)	0 (0,0%)	1 (100,0%)	
	Agree	31 (54,4%)	2 (16,7%)	0 (0,0%)	15 (53,6%)	0 (0,0%)	0 (0,0%)	
Word of mouth: Indicataria IES	Disagree	8 (14,0%)	0 (0,0%)	0 (0,0%)	4 (14,3%)	0 (0,0%)	0 (0,0%)	0,2120
	Neuter	23 (40,4%)	4 (33,3%)	2 (100,0%)	6 (21,4%)	0 (0,0%)	1 (100,0%)	
	Agree	26 (45,6%)	8 (66,7%)	0 (0,0%)	18 (64,3%)	0 (0,0%)	0 (0,0%)	

Positive Comments on Social Networks	Disagree	5 (8,8%)	2 (16,7%)	0 (0,0%)	8 (28,6%)	0 (0,0%)	0 (0,0%)	0,0020
	Neuter	13 (22,8%)	8 (66,7%)	2 (100,0%)	11 (39,3%)	0 (0,0%)	1 (100,0%)	
	Agree	39 (68,4%)	2 (16,7%)	0 (0,0%)	9 (32,1%)	0 (0,0%)	0 (0,0%)	

a. P-Value Pearson's chi-square test.
Source: Research, 2022.

There is a statistically significant association at the level of 5% between the sex of the students with the evaluations of Satisfaction: General HEI, Loyalty: Hardly consider another HEI to take another Course and Word of Mouth: Would indicate HEI.

Table 6. Analysis, Correlation, Sex and Student Opinions

		Sex		
		Female	Male	
		n (%)	n (%)	P-Value
Quality: Quality of services	Disagree	7 (12,5%)	0 (0,0%)	0,055
	Neuter	22 (39,3%)	19 (44,2%)	
	Agree	27 (48,2%)	24 (55,8%)	
Quality: IES Problem Solving	Disagree	9 (16,1%)	2 (4,7%)	0,1989
	Neuter	28 (50,0%)	25 (58,1%)	
	Agree	19 (33,9%)	16 (37,2%)	
Perceived Value: IES worries students need	Disagree	10 (17,9%)	3 (7,0%)	0,2665
	Neuter	19 (33,9%)	18 (41,9%)	
	Agree	27 (48,2%)	22 (51,2%)	
Perceived Value: IES Performance	Disagree	13 (23,2%)	9 (20,9%)	0,0730
	Neuter	30 (53,6%)	15 (34,9%)	
	Agree	13 (23,2%)	19 (44,2%)	
Satisfaction: General IES	Disagree	15 (26,8%)	1 (2,3%)	0,002*
	Neuter	19 (33,9%)	25 (58,1%)	
	Agree	22 (39,3%)	17 (39,5%)	
Service Satisfaction	Disagree	11 (19,6%)	8 (18,6%)	0,8919
	Neuter	28 (50,0%)	20 (46,5%)	
	Agree	17 (30,4%)	15 (34,9%)	
Loyalty: Hardly consider another HEI p do another Course	Disagree	18 (32,1%)	4 (9,3%)	0,008*
	Neuter	22 (39,3%)	16 (37,2%)	

	Agree	16 (28,6%)	23 (53,5%)	
Loyalty: You are proud of the HEI where you took your course	Disagree	11 (19,6%)	6 (14,0%)	0,4328
	Neuter	21 (37,5%)	13 (30,2%)	
	Agree	24 (42,9%)	24 (55,8%)	
"Word of mouth": would indicate IES	Disagree	12 (21,4%)	0 (0,0%)	0,002*
	Neuter	21 (37,5%)	14 (32,6%)	
	Agree	23 (41,1%)	29 (67,4%)	
Positive Comments on Social Networks	Disagree	10 (17,9%)	5 (11,6%)	0,6666
	Neuter	18 (32,1%)	16 (37,2%)	
	Agree	28 (50,0%)	22 (51,2%)	

a. P-Value Pearson's chi-square test.
Source: Research, 2022.

There is a statistically significant association at the level of 5% between the age of the individuals with all assessments.

Table 7. Analysis Correlation Age and Opinions Individuals

		Age					
		18-20	21-23	24-27	28-33	+34	
		n (%)	n (%)	n (%)	n (%)	n (%)	P-Value
Quality: Quality of services	Disagree	7 (33,3%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	6 (28,6%)	18 (60,0%)	12 (60,0%)	0 (0,0%)	6 (46,2%)	
	Agree	8 (38,1%)	12 (40,0%)	8 (40,0%)	16 (100,0%)	7 (53,8%)	
Quality: IES Problem Solving	Disagree	11 (52,4%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	4 (19,0%)	21 (70,0%)	2 (10,0%)	13 (81,3%)	13 (100,0%)	
	Agree	6 (28,6%)	9 (30,0%)	18 (90,0%)	3 (18,8%)	0 (0,0%)	
Perceived Value: IES worries need	Disagree	8 (38,1%)	5 (16,7%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	1 (4,8%)	21 (70,0%)	1 (5,0%)	5 (31,3%)	9 (69,2%)	
	Agree	12 (57,1%)	4 (13,3%)	19 (95,0%)	11 (68,8%)	4 (30,8%)	
Perceived Value: IES Performance	Disagree	8 (38,1%)	14 (46,7%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	7 (33,3%)	3 (10,0%)	13 (65,0%)	16 (100,0%)	7 (53,8%)	
	Agree	6 (28,6%)	13 (43,3%)	7 (35,0%)	0 (0,0%)	6 (46,2%)	
Satisfaction:	Disagree	8 (38,1%)	4 (13,3%)	4 (20,0%)	0 (0,0%)	0 (0,0%)	,000*

General IES	Neuter	7 (33,3%)	22 (73,3%)	10 (50,0%)	0 (0,0%)	6 (46,2%)	
	Agree	6 (28,6%)	4 (13,3%)	6 (30,0%)	16 (100,0%)	7 (53,8%)	
Service Satisfaction	Disagree	5 (23,8%)	14 (46,7%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	9 (42,9%)	13 (43,3%)	4 (20,0%)	16 (100,0%)	6 (46,2%)	
	Agree	7 (33,3%)	3 (10,0%)	16 (80,0%)	0 (0,0%)	7 (53,8%)	
Loyalty: Hardly considers another HEI	Disagree	8 (38,1%)	7 (23,3%)	8 (40,0%)	0 (0,0%)	0 (0,0%)	,002*
	Neuter	7 (33,3%)	15 (50,0%)	1 (5,0%)	9 (56,3%)	6 (46,2%)	
	Agree	6 (28,6%)	8 (26,7%)	11 (55,0%)	7 (43,8%)	7 (53,8%)	
Loyalty: You are proud of IES	Disagree	5 (23,8%)	12 (40,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	4 (19,0%)	16 (53,3%)	9 (45,0%)	0 (0,0%)	6 (46,2%)	
	Agree	12 (57,1%)	2 (6,7%)	11 (55,0%)	16 (100,0%)	7 (53,8%)	
Word of mouth: Indicataria IES	Disagree	8 (38,1%)	4 (13,3%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	4 (19,0%)	6 (20,0%)	11 (55,0%)	2 (12,5%)	13 (100,0%)	
	Agree	9 (42,9%)	20 (66,7%)	9 (45,0%)	14 (87,5%)	0 (0,0%)	
Positive Comments on Social Networks	Disagree	8 (38,1%)	7 (23,3%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	7 (33,3%)	19 (63,3%)	3 (15,0%)	0 (0,0%)	6 (46,2%)	
	Agree	6 (28,6%)	4 (13,3%)	17 (85,0%)	16 (100,0%)	7 (53,8%)	

a. P-Value Pearson's chi-square test.
Source: Research, 2022.

There is a statistically significant association at the level of 5% between students' income and the evaluations of Quality: Quality of services, Quality: IES Problem Solving, Perceived Value: IES worries students need, Perceived Value: IES Performance, Loyalty: Hardly considers another HEI p do another Course, Loyalty: You are proud of the HEI where you took your course and Word of Mouth: I would indicate HEI.

Table 8. Analysis Correlation Income and Opinions Individuals

		Income				
		1-2	3-5	6-10	11	
		n (%)	n (%)	n (%)	n (%)	P-Value
Quality: Quality of services	Disagree	7 (12,1%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0,024*
	Neuter	27 (46,6%)	15 (45,5%)	0 (0,0%)	0 (0,0%)	
	Agree	24 (41,4%)	18 (54,5%)	8 (100,0%)	1 (100,0%)	
Quality: IES Problem Solving	Disagree	6 (10,3%)	5 (15,2%)	0 (0,0%)	0 (0,0%)	0,001*
	Neuter	41 (70,7%)	9 (27,3%)	2 (25,0%)	1 (100,0%)	
	Agree	11 (19,0%)	19 (57,6%)	6 (75,0%)	0 (0,0%)	
Perceived Value: IES worries students need	Disagree	10 (17,2%)	3 (9,1%)	0 (0,0%)	0 (0,0%)	0,010*
	Neuter	22 (37,9%)	7 (21,2%)	7 (87,5%)	1 (100,0%)	
	Agree	26 (44,8%)	23 (69,7%)	1 (12,5%)	0 (0,0%)	
Perceived Value: IES Performance	Disagree	15 (25,9%)	7 (21,2%)	0 (0,0%)	0 (0,0%)	0,012*
	Neuter	26 (44,8%)	19 (57,6%)	1 (12,5%)	0 (0,0%)	
	Agree	17 (29,3%)	7 (21,2%)	7 (87,5%)	1 (100,0%)	
Satisfaction: General IES	Disagree	15 (25,9%)	1 (3,0%)	0 (0,0%)	0 (0,0%)	0,059
	Neuter	24 (41,4%)	17 (51,5%)	3 (37,5%)	1 (100,0%)	
	Agree	19 (32,8%)	15 (45,5%)	5 (62,5%)	0 (0,0%)	
Service Satisfaction	Disagree	15 (25,9%)	4 (12,1%)	0 (0,0%)	0 (0,0%)	0,101
	Neuter	26 (44,8%)	14 (42,4%)	7 (87,5%)	1 (100,0%)	
	Agree	17 (29,3%)	15 (45,5%)	1 (12,5%)	0 (0,0%)	
Loyalty: Hardly consider another HEI p do another Course	Disagree	14 (24,1%)	9 (27,3%)	0 (0,0%)	0 (0,0%)	0,001*
	Neuter	30 (51,7%)	8 (24,2%)	0 (0,0%)	0 (0,0%)	
	Agree	14 (24,1%)	16 (48,5%)	8 (100,0%)	1 (100,0%)	
Loyalty: You are proud of the HEI where you took your course	Disagree	11 (19,0%)	0 (0,0%)	5 (62,5%)	1 (100,0%)	0,000*
	Neuter	23 (39,7%)	12 (36,4%)	0 (0,0%)	0 (0,0%)	
	Agree	24 (41,4%)	21 (63,6%)	3 (37,5%)	0 (0,0%)	

Word of mouth: Indicataria IES	Disagree	12 (20,7%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0,046*
	Neuter	20 (34,5%)	11 (33,3%)	4 (50,0%)	1 (100,0%)	
	Agree	26 (44,8%)	22 (66,7%)	4 (50,0%)	0 (0,0%)	
Positive Comments on Social Networks	Disagree	13 (22,4%)	2 (6,1%)	0 (0,0%)	0 (0,0%)	0,2380
	Neuter	19 (32,8%)	12 (36,4%)	3 (37,5%)	1 (100,0%)	
	Agree	26 (44,8%)	19 (57,6%)	5 (62,5%)	0 (0,0%)	

Source: Research, 2022.

There is a statistically significant association at the level of 5% between the Course Time of the individuals with all assessments.

Table 9. Analysis Correlation Course Time and Opinions Individuals

		Course Time						
		Ongoing	1 year	2 years	3 years	4 in	5 years +	
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
Quality: Quality of services	Disagree	7 (14,6%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	24 (50,0%)	7 (50,0%)	5 (71,4%)	6 (66,7%)	0 (0,0%)	0 (0,0%)	
	Agree	17 (35,4%)	7 (50,0%)	2 (28,6%)	3 (33,3%)	10 (100,0%)	12 (100,0%)	
Quality: IES Problma Resolution	Disagree	9 (18,8%)	2 (14,3%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	22 (45,8%)	5 (35,7%)	5 (71,4%)	0 (0,0%)	10 (100,0%)	11 (91,7%)	
	Agree	17 (35,4%)	7 (50,0%)	2 (28,6%)	9 (100,0%)	0 (0,0%)	1 (8,3%)	
Perceived Value: IES worries students need	Disagree	13 (27,1%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	19 (39,6%)	4 (28,6%)	6 (85,7%)	0 (0,0%)	2 (20,0%)	6 (50,0%)	
	Agree	16 (33,3%)	10 (71,4%)	1 (14,3%)	9 (100,0%)	8 (80,0%)	6 (50,0%)	
Perceived Value: IES Performance	Disagree	19 (39,6%)	0 (0,0%)	3 (42,9%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	15 (31,3%)	7 (50,0%)	1 (14,3%)	9 (100,0%)	10 (100,0%)	4 (33,3%)	
	Agree	14 (29,2%)	7 (50,0%)	3 (42,9%)	0 (0,0%)	0 (0,0%)	8 (66,7%)	
Satisfaction:	Disagree	12 (25,0%)	0 (0,0%)	0 (0,0%)	4 (44,4%)	0 (0,0%)	0 (0,0%)	,000*

General IES	Neuter	30 (62,5%)	7 (50,0%)	6 (85,7%)	2 (22,2%)	0 (0,0%)	0 (0,0%)	
	Agree	6 (12,5%)	7 (50,0%)	1 (14,3%)	3 (33,3%)	10 (100,0%)	12 (100,0%)	
Service Satisfaction	Disagree	14 (29,2%)	0 (0,0%)	5 (71,4%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	20 (41,7%)	7 (50,0%)	1 (14,3%)	5 (55,6%)	10 (100,0%)	5 (41,7%)	
	Agree	14 (29,2%)	7 (50,0%)	1 (14,3%)	4 (44,4%)	0 (0,0%)	7 (58,3%)	
Loyalty: Hardly consider another HEI p do another Course	Disagree	16 (33,3%)	0 (0,0%)	1 (14,3%)	6 (66,7%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	17 (35,4%)	7 (50,0%)	5 (71,4%)	3 (33,3%)	6 (60,0%)	0 (0,0%)	
	Agree	15 (31,3%)	7 (50,0%)	1 (14,3%)	0 (0,0%)	4 (40,0%)	12 (100,0%)	
Loyalty: You are proud of the HEI where you took your course	Disagree	14 (29,2%)	0 (0,0%)	3 (42,9%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	22 (45,8%)	4 (28,6%)	3 (42,9%)	6 (66,7%)	0 (0,0%)	0 (0,0%)	
	Agree	12 (25,0%)	10 (71,4%)	1 (14,3%)	3 (33,3%)	10 (100,0%)	12 (100,0%)	
Word of mouth: Indicataria IES	Disagree	12 (25,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	11 (22,9%)	7 (50,0%)	1 (14,3%)	6 (66,7%)	0 (0,0%)	11 (91,7%)	
	Agree	25 (52,1%)	7 (50,0%)	6 (85,7%)	3 (33,3%)	10 (100,0%)	1 (8,3%)	
Positive Comments on Social Networks	Disagree	14 (29,2%)	0 (0,0%)	1 (14,3%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	,000*
	Neuter	23 (47,9%)	7 (50,0%)	5 (71,4%)	0 (0,0%)	0 (0,0%)	0 (0,0%)	
	Agree	11 (22,9%)	7 (50,0%)	1 (14,3%)	9 (100,0)	10 (100,0%)	12 (100,0%)	

a. P-Value Pearson's chi-square test.

According to Alves and Raposo (2009), HEIs could benefit greatly in establishing lasting relationships with their students. The authors understand that a long-term relationship with students could provide the institution with a certain competitive advantage, mainly at a positive level of word-of-mouth with current and future students, as well as through a positive collaboration with the institution, especially after graduation, contributing to the placement of new graduates. However, to establish long-term relationships with students it is necessary, first, to obtain their satisfaction and understand the factors that influence them, since the absence of satisfaction by students can have harmful consequences for both HEIs and students. This can cause poor performance, cause students to drop out or transfer, and negatively influence word-of-mouth communication, harming the future of HEIs. Therefore, it is the responsibility of institutions to understand the process of formation of student

satisfaction and to find reliable ways of measuring satisfaction. Only in this way can institutions know their reality, comparing it with that of other institutions and analyzing its evolution over time.

For Cavalheiro et al. (2014), satisfaction, loyalty, and communication "good to mouth", are tools of great competitive strategic advantages to higher education institutions. However, addressing the challenges in higher education associated with the pandemic should perhaps be based on disaster management principles: mitigation, preparedness, response, and recovery (Al SAMARAEE, 2020).

When it comes to higher education in times of pandemic, COVID-19 has resulted in school closures at all levels of education, leaving millions of students and teachers out of classrooms. Therefore, education has undergone a significant change, with the increase, to a large extent, of *e-learning*, through which teaching has come to be carried out in the remote modality on digital platforms (SANTOS et al., 2021).

This study aimed to measure satisfaction, loyalty, and communication "word of mouth", targeting students of an HEI, held during the pandemic. Several authors understand that for higher education to be and have quality, it is necessary that the institution knows its students, levels of satisfaction and loyalty.

In this sense, the results showed a relative positivity in relation to the HEI, and the women, undergraduates, between 21-23 years of age showed greater satisfaction in relation to the institution of higher education. Of all the interviewees, regarding the quality of services (53%) remained neutral; perceived value regarding students' needs (50%); perceived value to HEI performance (46%) were neutral; overall satisfaction (45%) equally neutral; satisfaction with the services offered (48%) neutral; option for another HEI, 39% said they would hardly choose another; pride in the HEI in which they study (48%), communication "word of mouth" (52%); positive comments on social networks (50%). The findings showed that the students remained neutral in most of the questions, results attributed to the time of the pandemic, when the research was conducted.

The neutrality of the students is perhaps due to insecurity, even embarrassment in answering the questions, because they study at the institution and want to graduate and get a decent job. At the same time, in daily practice we perceive great difficulties on the part of students and challenges to be faced by teachers in this current conjuncture of the country.

4 CONCLUSION

Although the pandemic (COVID-19) has interfered in higher education, as in other levels of education, still, the perception is that this may be an opportunity for the HEI to reflect on the new directions of services, in its entirety, that can be offered. The remote classes, until then offered, must contain innovative themes, motivating, both for students and teachers. Another point that can be

explored is the student-teacher-HEI relationship. After all, competitiveness is increasingly fierce. The technologies used, the means of posting content on platforms, the modalities of classes (remote, distance) are irreversible. Therefore, it is of fundamental importance adaptations to maintain the satisfaction of students in course and conquer the potentials.

It should be noted this research was limited to just one private sector HEI, and a reduced number of students, due to the social isolation imposed by the pandemic. It is noteworthy that the variables studied here do not exhaust the theme. Thus, it is appropriate to continue this research, which can be expanded and/or modified, proposing new studies in sequence to the current findings, suggesting the inclusion of the perception of post-pandemic students, from other institutions, which would be interesting and possibly give a contribution, to private HEIs.

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Digital technologies in water education in the pespective of nursing graduates in pandemic COVID-19

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ABSTRACT
The pandemic of covid-19 required that all sectors of society had to transform themselves, including the school as an integral part of this social environment was one of the most affected spheres in this new scenario. The study aims to search the scientific literature for data on the use of digital technologies in hybrid teaching from the perspective of undergraduate nursing students in the covid-19 pandemic. This is an integrative literature review. The databases used were LILACS, BDENF via VHL. Medline via PubMed and SciELO portal. Inclusion criteria were: original articles available in full that addressed the theme. Opinion articles, duplicates, abstracts, dissertations, theses, letters to the editor, and review studies were excluded. Ten studies were selected to compose the sample. It was evident that nursing students, through hybrid teaching and through digital technologies, were satisfied with the methodologies implemented, adapting favorably to the social context in which they were included. It was noticed that hybrid teaching during the Covid-19 pandemic is a viable methodology in the teaching-learning process of nursing students, since the student becomes autonomous and responsible in an important part for his own learning, in addition to expanding the digital inclusion of all those involved.

Keywords: Distance Learning, Nursing, Covid-19, Information Technology.

1 INTRODUCTION

The covid-19 pandemic required that all sectors of society had to transform, including the school as an integral part of this social environment, it was one of the spheres hardest hit in this new scenario. Everything we knew as education professionals, whether in the process of training or carrying out teaching work, needed to be reviewed, analyzed and rediscussed (VIEIRA et al., 2020).

Still in the first months of 2020 after the spread of the virus and with the first cases being recorded on Brazilian soil, one of the government measures to contain the disease was to close spaces that gathered large numbers of people. Schools across the country had their face-to-face activities interrupted and students of all levels of education had to paralyze their student process in an attempt to curb the process of infection and transmission of the new virus (SANTOS; OLIVEIRA, 2021).

Long before the pandemic, in 1998, Libâneo already pointed to the importance of using new information and communication technologies in the context of the classroom, since society experiences constant technological, political, economic, social and cultural transformations. In a globalized, transnational world, our students need to be prepared for a critical reading of the transformations taking place on a world scale. In a world of intense scientific and technological transformations, they need a solid general formation, capable of helping them in their ability to think scientifically, to scientifically pose human problems (LIBÂNEO, 1998). The lessons that the pandemic has brought to education

professionals who are forced to work entirely online due to the temporary closure of schools, to avoid the health risk represented by crowds, are pointed out by education theorists (DEMERVAL, 2020).

In this historical period in which technology is in an increasingly accelerated growth we find the need to follow this movement and use this technology also in favor of teaching and enjoy its benefits so that it enables a better form of learning. In this current moment, when everything is very accelerated and time seems much scarcer, the use of this technological tool can be of great value both for those who dedicate themselves only to studies, as well as especially to those who want to study, but develop other roles that hinder this task (JUNIOR; MONTEIRO, 2020).

For Neto (2018), technology has joined traditional teaching to change the way subjects are exposed and, in this way, reach this new generation, and the changes that have been happening with the advancement and growing use of technology, an important factor in the emergence also, in the need to innovate active teaching methodologies, Because only traditional education does not serve this generation surrounded by technological innovations, so it is necessary to take advantage of these technologies so that the student feels attracted to seek knowledge.

Blended learning has been one of the alternatives for this innovation to happen. It is a teaching modality that merges online teaching with traditional teaching, bringing the advantages of these two spaces. Its use provides students with access to content in different environments, the sharing of ideas with groups, autonomy and problem solving, becoming active agents in the construction of knowledge (BACICH; GRANDSON; TREVISANI, 2015).

Thinking about teaching, especially higher education, is essential since, we live in a period where students are connected and the "teaching" and "giving" class, requires teachers to rethink education, its methodologies and the use of digital technologies and how to use these resources in favor of learning, in favor of the constitution of new knowledge, creating a model that delights, motivates connected students (LIMA, 2020).

Within this new context brought from the pandemic, technologies are configured as important tools capable of enabling the continuity of the teaching and learning process, however, it is not enough just to theorize, it is necessary to program a conscious construction of this technological aspect. It is necessary to reflect on how they will be effected in practice, think about the challenges that will be encountered and seek solutions that aim to facilitate the day to day of both the educator and the student (CO; AMORIM; FINARDI, 2020).

The study aims to search the scientific literature for data on the use of digital technologies in hybrid education from the perspective of nursing undergraduates in the covid-19 pandemic.

2 METHODS

This methodology consists of an integrative literature review. This type of research is defined as a search for relevant studies on a given theme, which makes it possible to discuss and evidence facts, identifying gaps that can influence the performance of new research, enabling a critical evaluation and synthesis of data in its final product (MOWBRAY; WILKINSON; TSE, 2015).

The integrative review follows the following steps: identification of the theme and formulation of the guiding question of the research; establishment of exclusion criteria and inclusion of studies to compose the sample; data collection; critical analysis of the selected studies; interpretation of results; presentation of the synthesis of information and review of data (MENDES; SCOTT; GALVÃO, 2008).

Thus, the use of the PICo strategy was determined, which represents an acromion, where (P) refers to the population (nursing undergraduates), (I) intervention (Use of digital technologies) and (Co) context (covid-19 pandemic). These elements guided the elaboration of the following guiding question: "What digital technologies were used during the covid-19 pandemic in hybrid education from the perspective of nursing students?".

The period of this investigation covers the interval between August 2021 and December 2022. In the following databases: Latin American and Caribbean Literature in Health Sciences (LILACS), Nursing Database (BDENF) via Virtual Health Library (VHL), Online System for Search and Analysis of Medical Literature (MEDLINE) via PubMed and the portal of the Online Scientific Electronic Library (SCIELO), using the Boolean operators AND AND OR. In Portuguese, English and Spanish. With the following descriptors: "Distance Learning", "Nursing", "Covid-19 Pandemic" and "Information Technologies".

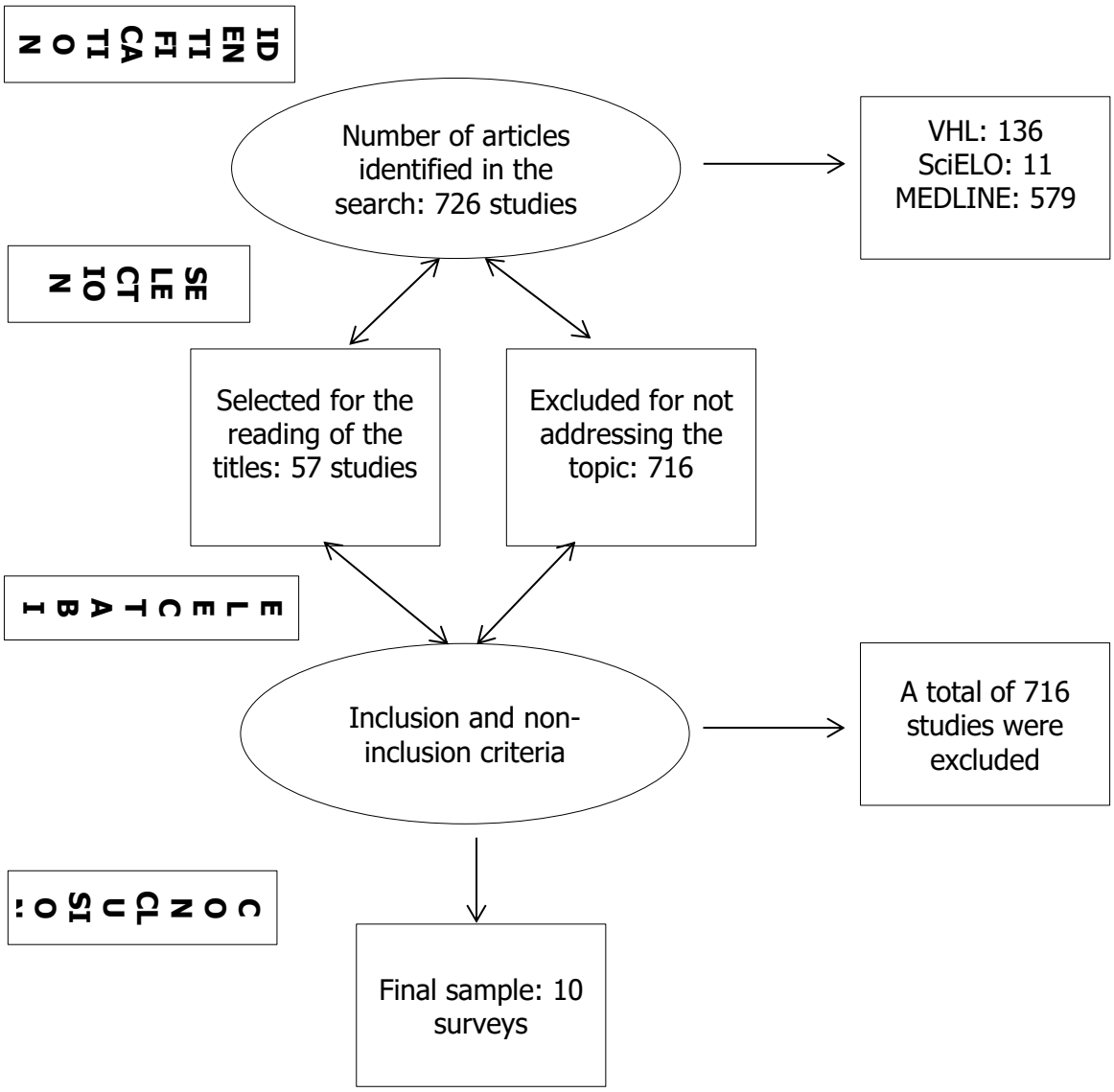
The following inclusion criteria were established: original articles available in full that addressed the theme. Opinion articles, duplicates, abstracts, dissertations, theses, letters to the editor and review studies were excluded.

The descriptors used were organized according to the following Boolean operators: [(Distance Learning) AND (Nursing) AND (Covid-19) AND (Information Technologies)]; [(Nursing) AND (Covid-19) AND (Information Technologies)]; [(((Distance Learning) AND (Nursing)) AND (Covid-19)) AND (Information Technology))] and [(Nursing)) AND (Covid-19)) AND (Information Technology)], selected according to the descriptors (DeCS/MeSH) specifying for each database.

After the initial screening, a result of 726 studies was obtained as a sum of all databases, of which 136 came from the VHL and 579 from Pubmed and 11 from the SciELO portal. After applying the eligibility criteria, 716 studies were excluded, 359 were review studies. After reading the titles, 300 did not refer to the theme. 57 studies were selected to read the abstracts, after this stage 47 were excluded and 10 were selected to compose the sample of this study, after the complete reading.

In the analysis process, the data related to the authors, title, methods, results and conclusions were established. To elaborate the flowchart for the selection of studies, an adaptation of the *Preferred Reporting Items For Systematic And Meta-Analyses* (PRISMA) was performed.

Figure 1. Study selection flowchart adapted from the *Preferred Reporting Items For Systematic And Meta-Analyses* (PRISMA).



Source: Own authorship (2023).

Table 1. Search strategy in the databases from the DeCS/MeSH.

DATABASES	
PubMed/MEDLINE	(((Distance Learning) AND (Nursing)) AND (Covid-19)) AND (Information Technology) (Nursing)) AND (Covid-19)) AND (Information Technology)
LILACS/BDENF	(Distance Learning) AND (Nursing) AND (Covid-19) AND (Information Technology) (Nursing) AND (Covid-19) AND (Information Technology)
SciELO	(Distance Learning) AND (Covid-19) AND (Nursing) (Nursing) AND (Covid-19) AND (Information Technology)

Source: Own authorship (2023).

3 FINDINGS

The sample consisted of 10 studies, which were organized according to title, author, type of study, objectives and results, and conclusion, as shown in Chart 2.

Table *2* - Articles used in the construction of the research

AUTHOR/YEAR	TITLE	METHODOLOGY	GOAL	MAIN FINDINGS
FRONZA, D.S et al. (2020)	Teaching possibilities in the context of the Pandemic.	Qualitative study, through analysis of reports	Make an analysis of the results of some activities developed in this teaching context.	Due to the suspension of face-to-face classes, strategies were designed and implemented in order to guarantee access to education for all. The adaptations were a challenge to managers, educators and undergraduates, who often faced great difficulties in learning.
NECKLACES, M. S. S. (2020)	Advantages and disadvantages of blended learning in the post-pandemic: discursive and enunciative event	Field study focusing on educational discourses	To understand the modalization of blended learning in the context of the Covid-19 pandemic.	We analyze the enunciative excerpts identified in the advantages and disadvantages of blended learning in the pandemic; we understand that teachers and students have had to reinvent home office activities in a practice of online classes.
Christoffers, C. (2022).	Practical Implications of Online Learning with Nurses during COVID-19	Descriptive study	This study explores how teaching practices have been impacted by coronavirus disease 2019 (COVID-19) in a fully online nursing program.	The results of the study suggest that the COVID-19 pandemic was challenging for faculty, but they still considered it an opportunity for personal and professional growth.
JEON, E. et al. (2021)	Emergency remote learning in nursing education during the COVID-19 pandemic	Descriptive study	This study aims to understand the status of Emergency Remote Learning.	The results of the study show that during the two semesters, university nursing professors have adapted well to this unprecedented teaching crisis.

ALMHDAWI, Khader A. et al. (2021)	Healthcare students' mental and physical well-being during the COVID-19 lockdown and distance learning.	Cross-sectional study with a self-administered questionnaire.	This study aimed to investigate the situation of university students in the health area and its predictors during COVID-19.	This study showed that health students had a relatively high level during the COVID-19 pandemic
BESTER, P. et al. (2021)	When online learning becomes compulsory: Student nurses' adoption of information communication technology in a private nursing education institution	This is a descriptive, qualitative and exploratory study.	Explore the barriers and facilitators to the adoption of ICT by a diverse group of nursing students in a private nursing education institution	The integration of ICT in nursing programs is important. The facilitators and barriers to ICT are described. Expose students to different technologies, especially using smartphones to search for information (academic/non-academic).
MCNABB, S. JN et al. (2021)	Delivering modern global health learning requires new obligations and approaches.	Descriptive study	We describe a set of multicommunication methods, e-Learning principles, ICT strategies and approaches for educators to streamline content delivery from traditional F2F classroom didactics to the modern era	We offer a vision, a set of guiding principles, and five strategies for delivering successful curricula in the modern era, so that global health training can be made available to a wider audience more efficiently and effectively.
AYHAN, D; SEKI ÖZ, H. (2021).	Effect of assertiveness training on the nursing students' assertiveness and self-esteem levels: Application of hybrid education in COVID-19 pandemic	Experimental study with control group	To assess whether assertiveness training offered through a hybrid education model had any effect on assertiveness and self-esteem	Technology-based hybrid assertiveness training has been shown to be effective in increasing undergraduates' assertiveness.
YOO, H. Jin; LEE, H. (2022).	Critical role of information and communication technology in nursing during the COVID-19 pandemic: A qualitative study	Qualitative descriptive study	Examine the need for information and communication technology (ICT)-based nursing care	The use of information technologies during the training of these undergraduates has become effective.
EVANS, D. JR (2022).	Has pedagogy, technology, and Covid-19 killed the face-to-face lecture?	Qualitative descriptive study	Examine the influence of digital technologies on face-to-face practice	It was found a forgetfulness of the methodologies implemented in face-to-face environments by digital teaching technologies

Source: Prepared by the authors (2023).

4 DISCUSSION

In the studies of Chistoffers (2022), they show that nursing undergraduates, through hybrid teaching, depend on their responsibilities, as this methodology presents greater flexibility and freedom

to access the content available on the virtual platform. This guarantees nursing students autonomy through a more proactive and critical posture, committed to their education and the type of professional they aspire to be.

The use of digital technologies in blended learning during the covid-19 pandemic has shown some benefits. For Jeon et al (2021), this type of teaching provides the opportunity to build one's own schedule and student planning, establishing preferences and schedules that best suit their needs, to ensure a better use of the content taught.

The use of blended learning is an incentive for nursing students during the covid-19 pandemic. In the research of Almhdawi et al (2021) demonstrates that hybrid teaching encourages nursing students to be protagonists of their own education, no longer being passive recipients of fractional subjects. Thus, this is another of the numerous innovative advantages of this model because they can access classes from any place or time, assimilating the content, solving the exercises individually, taking their doubts with the guidance of the teacher and applying what they learned in the classroom, as well as participating in events previously unavailable due to distances.

The use of technologies associated with hybrid education has been characterized as an important factor in the formation of undergraduate students. In the studies of Bester et al (2021) it is reported that activities such as virtual debates, simulations among others, are part of a permanent evaluation process and corroborate that knowledge is not static, however, it is the result of an individualized construction and divided with the group. For Mcnabb et al (2021) the assimilation of content is more propagated, since we have the help of many research tools, and the content is in our hands. Therefore, each one can be interested in a certain aspect to the detriment of another, deepening what is in their interest. The classes, in this approach, become more participatory, and not as expository, as in traditional teaching.

In order for this change to be effective, Ayhan and Seki (2021), affirm that the training of nursing students becomes a basic premise, to accept that the world has evolved and to welcome new technologies as facilitators of the educational process. Therefore, it needs to rebuild its pedagogical practice, be creative, a motivator in the classroom, aiming that future professionals can have their quality training assured.

Amid the adaptation required in times of pandemic, many actions had to be taken. According to Fronza et al (2020), The applications developed within the universities, by the professors themselves, associated with the Nursing curriculum and supported by intercollaboration with students, are better suited to educational practices by structuring a more favorable and attractive environment, enhancing and facilitating engagement in these actions, favoring satisfaction with teaching by undergraduates.

By using digital technologies in the teaching-learning process around nursing, professors are innovating in the relationship between teaching and learning, as they adapt to the need for current educational models. In this perspective, the undergraduates follow this renewal, using virtual environments, making interactivity favorable and favoring the learning process (YAOO; LEE, 2022).

In this sense, Colares (2020) report that the inclusion of digital technologies in undergraduate nursing courses reserves to the student the leading role in learning, in addition to increasing the level of digital inclusion of those involved, making the process more dynamic and motivating. Demonstrating that the visibility of use in situations that make direct contact with the teacher unfeasible, such as performing activities in the home environment, developing actions in the community and periods of remote classes.

Thus, the help of technology was a crucial factor in the students' learning during graduation. For Evans (2022), technologies can be effective to be seen as innovative tools in teaching in Nursing, presenting themselves as tools capable of arousing interest and motivation in learning, given that digital technologies are used in a proportion between 45% and 85% more than consultations to books and magazines.

So, Para Colares (2020) nursing undergraduates in their perspectives associate the use of digital technologies with a better assimilation of content and ease of learning, which culminates in the training of better professionals, even going through the limitations of the covid-19 pandemic.

The referred research presented some limitations, the main one being the little association of the number of studies with the objective of the research, which is evidenced in the methodological part of the research.

5 CONCLUSION

It was perceived that hybrid teaching during the Covid-19 pandemic is a viable methodology in the teaching-learning process of nursing students, since the student becomes autonomous and responsible in important part for their own learning, in addition to expanding the digital inclusion of all those involved. In addition, this teaching methodology provides the breaking of barriers about the education of undergraduate nursing students and contributes to reduce geographical distances. From the perspective of the undergraduate, hybrid education also contributes to meet their didactic deficiencies and deficits in educational materials.

In addition, it is necessary to develop new research that highlights the perspective of undergraduates being submitted to hybrid teaching and digital technologies in the covid-19 pandemic. This research serves as a basis and incentive for the construction of new studies on this theme.

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CHAPTER

68

Management of prescribed pharmacotherapeutic care: A strategy to minimize the impact of drug shortages in times of scarcity in the COVID-19 pandemic

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ABSTRACT
The lack of medication shortages is considered a public health problem and represents an obstacle to ensuring access to pharmacotherapeutic treatment for patients. For episodes of shortages to be minimized and for the hospitalized patient to receive treatment, management strategies should be developed. The present study aims to describe the management of an indicator that monitors the care of the pharmacotherapeutic treatment prescribed to patients admitted to a hospital. This is an observational, descriptive, cross-sectional, and retrospective study on the management of pharmacy care indicators of the pharmacotherapeutic treatment prescribed to patients hospitalized in a public hospital in Fortaleza/Ceará. The indicator was implemented in May/2020 with consolidation and systematic management of its data from June/2020. A total of 334,114 prescriptions were met, and 32,658 were missing. The acceptance rate of pharmaceutical interventions related to supply in June/2020: was 54.3% and in May/2022: 100% (average: 90% ±11%). During the indicator: 0% rupture of class Z drugs (immediate impact and no substitute); 2% of class Y drugs (immediate impact and with substitute) and 98% of the drugs were class X (no immediate impact and more than one substitute). Daily monitoring is performed according to the XYZ curve, evaluating coverage time and purchases in progress. The management of an indicator to evaluate the attendance of the prescribed pharmacotherapeutic treatment with real-time decision-making, aligning logistics and clinic, made it possible to minimize the shortage of medicines in the COVID-19 pandemic and the current shortage of market input.

Keywords: Management Indicators, Health Information Management, Hospital Administration, Pharmacological Treatment, Hospital Pharmacy Service.

1 INTRODUCTION

The COVID-19 pandemic, which began to spread globally in early 2020, has brought several challenges to the healthcare industry. In addition to the direct impact of infection by the virus, one of

the most urgent concerns was the shortage of essential medicines for the treatment of the disease and its aggravations. From the perspective of demand, such a problem occurs when it exceeds supply at any point in the supply chain, which may ultimately create a *stock-out* at the point of dispensation to the patient if it cannot be resolved promptly (MARTINS, 2021).

Among the main factors that contributed to the shortage, we can mention: increased demand for drugs used to treat the most severe patients, leading to a collapse in the pharmaceutical supply chain; interruption of production and distribution, mainly due to social isolation measures and *lockdown*, generating the interruption of several activities with reduction of the workforce and delays in the production and delivery of medicines; accumulation of pharmaceutical specialties, due to fear and uncertainty, people and institutions acquired huge quantities of medicines, depleting the stocks available to those who needed it (BARBIERI; MACHILINE, 2009).

All this directly affected public health, as this lack led to an increase in morbidity and mortality, especially in the most vulnerable groups of the population. In addition, it provided an overload of the SUS, increasing the length of hospitalization and reducing the effectiveness of the service.

To minimize this shortage, hospital institutions have sought collaborative efforts to strengthen the supply chain. In this context, the Pharmacy service stands out, which had to create strategies aimed at optimizing drug therapy, promoting adherence to treatment, and preventing drug-related problems (MRPs).

The pharmacy service plays an essential role within the hospital environment, being responsible for several functions that ensure the correct and safe use of medicines. One of its main attributions is the management of medicines, which involves the acquisition to receipt, passing storage, and distribution of pharmaceutical products within the hospital. This correct management is essential to ensure availability, avoiding problems such as lack or excess of inventory.

The dispensing of medicines is another function of the hospital pharmacy. Pharmacists are responsible for providing the prescribed drugs to inpatients, following medical prescriptions. In addition, they can also provide medications to the hospital's outpatient clinics and outpatient care programs. Another relevant activity is pharmacotherapeutic monitoring, in which pharmacists analyze prescriptions, identify possible drug interactions to ensure patient safety, and optimize therapeutic outcomes (PINHEIRO et al., 2022).

In addition to activities directly related to medicines, the hospital pharmacy also plays an educational and training role. Pharmacists provide up-to-date information about medications, guide healthcare professionals on their proper use, and offer training on medication delivery techniques. This contributes to the training of the team and the dissemination of good practices in the hospital environment (CABRAL et al., 2022).

The present study aims to describe the management of an indicator that monitors the care of the pharmacotherapeutic treatment prescribed to patients admitted to a hospital.

2 METHOD

This is an observational, descriptive, cross-sectional, and retrospective study on the management of pharmacy care indicators of the pharmacotherapeutic treatment prescribed for patients hospitalized at the Leonardo da Vinci State Hospital in Fortaleza/Ceará. The study period was from June/2020 to May/2022. It will be described the implementation of the indicator, the systematic management, and the evaluation of the results of the period recorded in the Management Drive of the Pharmaceutical Care Center (NUASF) of the referred hospital.

In addition to compliance of the prescribed drugs, the supply was evaluated according to the criticality classification:

X (low criticality): faults do not cause stoppages; easy replacement; easy to obtain according to consumption;

Y (low criticality): faults cause stoppages; easy replacement; low consumption;

Y (high criticality): faults cause stoppages; difficult to replace or few substitutes;

Z (high criticality): faults cause stoppages; cannot be replaced.

The acceptance rate of pharmaceutical recommendations related to the replacement of missing drugs was also evaluated.

3 RESULTS AND DISCUSSION

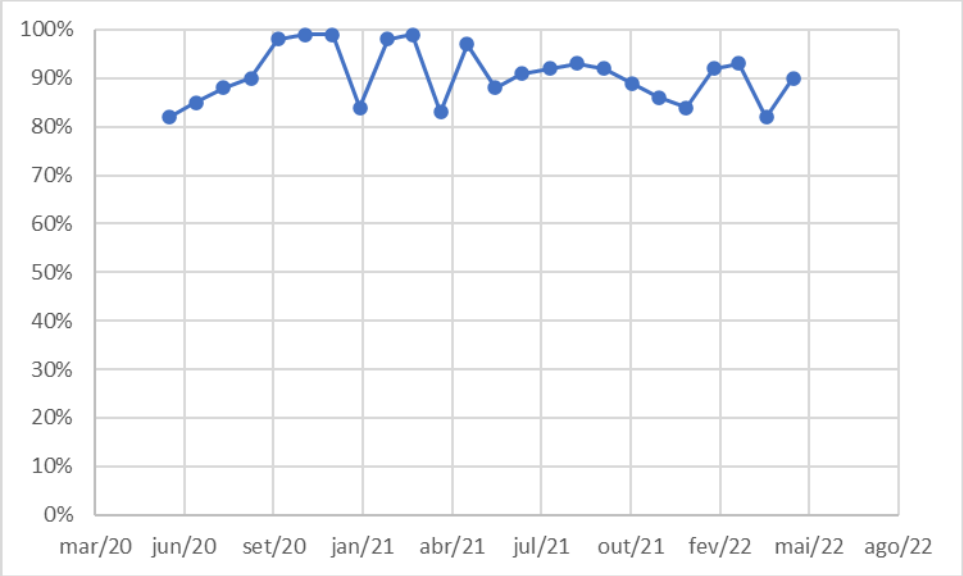
The Hospital Pharmacy Service within a hospital has characteristics of support through logistical and care activities when performing the clinical management of the use of medicines. In times of the COVID-19 pandemic, these activities must be well implemented and integrated. Mainly, concerning the supply and protocol options with substitutes that offer patients the same clinical outcome, sustainable and with less cost impact, knowing the market restrictions and the adjustments in drug prices. In addition, the profile of critically ill patients requires pharmacists to be integrated into the multidisciplinary team.

The indicator was implemented in May/2020 with consolidation and systematic management of its data from June/2020. The management of the indicator relates the number of prescriptions met by the NUASF without lack of any medication with the number of prescriptions met. The number of prescriptions that were not completely met is signaled and the XYZ criticality of the drugs that were in a situation of shortage is evaluated.

The strategies to minimize these ruptures were adopted through the interventions of the Prescription Analysis Center and Clinical Pharmacy, meetings to define conduct with the hospital management, and daily huddles with pharmacists. That is, in the management are developed actions in real-time to ensure the appropriate treatment for hospitalized patients.

A total of 334,114 prescriptions were met, and 32,658 were missing. In June/2020 the compliance rate of the service was 82% and in May/2022 90% (average: 91% ±5%) (Graph 1).

Figure 1. The compliance rate of prescription drug care. May/2020 to June/2022. Fortaleza/Ceará.



The acceptance rate of pharmaceutical interventions related to supply in June/2020: was 54.3% and in May/2022: 100% (average: 90% ±11%).

During the indicator: 0% rupture of class Z drugs (immediate impact and no substitute); 2% of class Y drugs (immediate impact and surrogate) and 98% of drugs were class X (no immediate impact and more than one substitute). Daily monitoring is performed according to the XYZ curve, evaluating coverage time and purchases in progress.

4 CONCLUSION

The management of an indicator to evaluate the attendance of the prescribed pharmacotherapeutic treatment with real-time decision-making, aligning logistics and clinic, made it possible to minimize the shortage of medicines in the COVID-19 pandemic and the current shortage of market input. In addition to the correlation with the criticality of the medications, it helped in the decision-making of the protocols with the available options and their effectiveness and the analysis of the indicator by the team reinforced the adherence to the conducts.

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CHAPTER
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Communication strategy in coping with COVID-19: Experience report

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ABSTRACT
Communication is an essential instrument for the effectiveness of health practices, enabling the dissemination of information, experiences and the development of improvement and innovation strategies. This study aimed to report the experience of creating a communication management committee, as a strategy to maintain dialogue with family members in coping with COVID-19. This was a descriptive study of experience report, contemplating the description of the phases of the process of implementation of the strategy developed at the General Hospital Dr. Waldemar Alcântara (HGWA), managed by the Institute of Health and Hospital Management (ISGH) in Fortaleza, Ceará. The results obtained with the strategy were positive, both for the family members as well as for the patient. It is concluded that in addition to communication, it was possible to strengthen the transition of care, through the multidisciplinary record in the medical record and allow greater integration with the sectors, sensitization of professionals, and approximation of family members.

Keywords: COVID-19, Health communication, Health services management.

1 INTRODUCTION

In the face of the COVID-19 pandemic, there was a need to strengthen management capacity as a condition for better health system outcomes. Build a systemic strategy that would allow preparing health services, at all levels, so that they would be able to obtain agile responses, reorganize their work

processes, adapt their physical structure, establish effective communication mechanisms, and ensure commitment and trust, with active leaders (CALDAS; REIS, 2022).

Amid the uncertainty, learning to deal with crises and anticipate them was paramount. The outbreak of COVID-19 has established itself in China, traveling through several countries and regions of the world, in a short time reaching Brazil. The increase in demand in emergencies, exhaustion of hospitalization capacity, reduced number of health professionals, and process disorganization caused health institutions to reshape their management format (CALDAS; REIS, 2022).

Therefore, it has become indispensable the involvement of quality management to support top management in identifying the points of criticality and investment in a proactive and systematized posture (AMARAL et al., 2020). Given this, a secondary hospital in the city of Fortaleza together with a social health organization formulated a document called institutional contingency plan: coping with COVID-19, which was minimally outlined to meet quickly, effectively, and safely the new challenges of coping with this scenario.

Through the contingency plan, the crisis committee was established, where the most relevant and urgent information was discussed for immediate decision-making by senior management. The quality and safety teams, such as the patient management and safety centers, could contribute greatly in this context, both in the implementation of the recommended measures and in the strengthening of other dimensions of the quality of care, such as the centrality of the patient (STAINES et al., 2020).

With the suspension of visits and companions during hospitalization, he highlighted the importance of a strategy to maintain communication and sharing of information about the clinical picture of patients.

According to the Ministry of Health (MS), in its emergency action plan, it cited health communication as one of the fundamental axes in coping with the pandemic, to strengthen the integrality of care (BRASIL, 2020).

The purpose of this work is to report the experience of creating a Communication Management Committee, as a strategy to maintain dialogue with family members in the fight against COVID-19. This initiative aimed to develop accessible and effective communication channels for professionals, managers, and users; support in updating critical information; clarification of the patient's health status to family members, and improvement of communication through feedback and suggestions.

2 METHODOLOGY

This research consists of an experience report about the realization of a Communication Management Committee in the fight against COVID-19, at the Dr. Waldemar Alcântara General

Hospital (HGWA), managed by the Institute of Health and Hospital Management (ISGH) in Fortaleza, Ceará, from March to May 2021.

We sought to point out the path taken from planning to the execution of activities and the benefits of this strategy in the care of patients and families.

3 COMMUNICATION STRATEGY IN THE INSTITUTION

To face the pandemic that imposes continuous and urgent adaptations in a scenario of uncertainties, it is essential to have the involvement of employees directly or indirectly related to each process. The recognition and identification of how each person can contribute to the resolution of the issues that emerge become essential to leverage and sustain improvement actions (AMARAL et al., 2020).

Faced with the increase in unsustainable cases and as a way to limit the exponential transmission of the virus, health services, visits, and follow-ups of hospitalized patients were suspended. Between February and May 2021, the actions of implementation of the strategy of the communication committee began.

The creation of the communication committee enabled the construction of strategies in the face of the need for health barriers, strengthening the integrality of care and the intersectionality of actions to respond to public health emergencies (SANTOS et al., 2021).

In this challenging path, senior management and the multi-professional team played a fundamental and decisive role in providing meetings and articulations to implement the strategy. The multidisciplinary team in partnership with communication and the patient safety center were the protagonists of the communication committee, however, the entire process until its realization involved several collaborators to ensure effectiveness in the dissemination of information.

The increased demand for health care has led to the redirection of pediatric beds and units to the adult profile. In this context, the pediatrics was closed and the pediatricians of the wards relocated to compose the communication committee.

To ensure effective communication with family members and everyone's knowledge about the clinical status of each patient, the implantation process went through the following stages:

Step 1 **- Definition of the professionals involved in communication** – defined that pediatricians would be responsible for disseminating the news about the state of patients with covid-19, isolated, to their families. As a result of the low demand for hospitalized children, they were transferred to a children's referral unit, which led to a change in the profile of the institution for exclusive care of the adult public.

Step 2 - Disclosure of the definitions and actions to be carried out for the leaders **- the latest updates, decision-making of the** top management and the definitions to be implemented were presented at the committee meeting, with the presence of the managers and coordinators of all services, who acted as multipliers to the care team. The data from the medical report issued to the family were collected from the electronic medical record (examinations, updating of the clinical picture). The physician who provided direct care to the patient, as well as the multidisciplinary team, recorded the daily evolution for consultation with the pediatrician and passed it on to the family.

Step 3 - **Method used for communication -** the family was contacted utilizing an institutional cell phone. Elected two family members to receive the information. If the number of the first one did not meet, a second attempt was made to another registered member. Right from the start, they informed us that no amount should be charged for the service, a moment of alert so that the family members did not fall into scams practiced by opportunists.

Step 4 - **Definition of the place for the calls -** the pediatricians were allocated to the outpatient offices that were inactive for care. Quiet environment, with computers available that enabled the collection and transfer of information.

Step 5 **- Recording of the communication in the electronic medical record -** the name of the family member who received the information from the patient was mentioned in the evolution, for the knowledge of the care team.

4 *FEEDBACK* ON COMMUNICATION STRATEGIES

The results obtained with the binding protocol were positive, both for the family members as well as for the patient. Each conversation was charged with hope and respect for those eagerly awaiting on the other end of the line. The time doctors spent on the phone with families depended on the condition of each patient, the most severe ones required more time. Those who were more stable were allowed to send a message, a desire for improvement, and comfort that could help in the treatment and evolution of the patient.

For more severe cases, family members were asked for some more private information, such as the name the patient liked to be called. There was also the opportunity for the loved one to write a more effective and private message, read by the professionals of the Intensive Care Unit. The result was gestures, emotional responses, and unexpected reactions of the patient, until then never noticed. This act contributed in some cases to improvement, even if subtle, of the patient's clinical state.

For pediatricians, this mission was a difficult experience, especially in spreading bad news. Since this information carries enormous emotional valence and has the potential to change people's lives and prospects (RIBEIRO et al., 2021). At the end of the day, the professionals felt exhausted, but

with a feeling of gratitude, because they knew that it was the only means of contact between patient and family.

The sensitive way of communicating was the reason for several compliments registered by the Ombudsman to the Communication sector. The contact, made daily, was a source of comfort, of passing on information and that often also served as a listening for those on the other side of the line.

In late July, HGWA pediatricians received a symbolic plaque in honor of their work during COVID-19 care. The occasion also marked the return of the hospital's two pediatric clinics.

5 REPERCUSSION IN THE MEDIA

During the period when the medical professionals of pediatrics were in the function of communicating with the relatives of patients hospitalized for COVID-19 there was, through the Communication Office, the dissemination of these actions and reports in the national press. Among the many news, one of them published on the portal of the movement 'Reasons to Believe', with the title *'In a humanized way, EC doctors welcome relatives of patients with Covid-19'.* In it, the story of some professionals of the General Hospital Dr. Waldemar Alcântara (HGWA) was told.

> "Every call is very important and intense. We are happy when they are calls for improvement and suffer when we need to give tougher news. We want to show that we are with them, that we are always by their side," an excerpt from the testimony of a pediatrician doctor.

The reports and articles published in the media could exemplify the daily lives of these professionals. Among the various demonstrations, after the period of increase in cases, in the HGWA, the professionals of pediatrics were honored with a symbolic plaque for the work carried out at the peak of the pandemic. The sensitive way of communicating was the reason for several compliments to the Pediatrics professionals registered by the Ombudsman to the Communication sector, linked to the Center for Management and Patient Safety (NUGESP).

6 CONCLUSION

Communication is an essential tool in the practice of health workers. Using the strategy of the communication committee was a positive experience both for the family members, who were welcomed and involved in this process and for the professionals who were able to transmit the information and be useful in this moment of pain and uncertainty.

It also allowed the care practice, to strengthen the transition of care, through the recording in the medical records of procedures, examinations, clinical conditions, and intercurrences of the patients, which served as a basis for the pediatricians in the transfer of information to the family members.

Given the above, it is believed that with the committee it was possible a greater integration with the sectors and sensitization of the professionals, who were able to participate and contribute to the history of several patients, through a song sung, a letter read, a way to bring the family members closer even if distant from their loved ones.

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CHAPTER
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Pandemics and tourism in Acapulco during the first two decades of the XXI century

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ABSTRACT
In Acapulco tourism is the most important economic activity, it is a beach destination and main actor in the contemporary tourist history of Mexico. From its tourist beginnings it caused admiration to own (national tourism) and strangers (international tourism) for its climate and golden beaches, known as the Pearl of the Pacific; annually receives around nine million visitors, however, during the Covid-19 pandemic Acapulco "closed" its beaches to tourism and this produced a decrease in the arrival of visitors, of this fact there was no precedent, although this pandemic (by Covid-19) was not the first that occurred so far this century, the previous ones, Severe Acute Respiratory Syndrome (SARS) and A(H1N1), did not have great repercussions on tourism. The objective of this article was to carry out an analysis of the tourism results of Acapulco during the pandemics that have occurred in the first two decades of the XXI century [A(H1N1) and Covid-19]. To this end, the descriptive statistical method of the variables referring to the arrival of tourists, hotel occupancy and economic spillover during the holiday seasons that were affected during the period of duration of the pandemics before becoming endemic was used. It is concluded that there is no parallel between the pandemics of influenza A (H1N1) and Covid-19, although an analysis of the behavior of specific topics can be made.

Keywords: Acapulco, Endemic, Tourism indicators, Pandemic, Tourism.

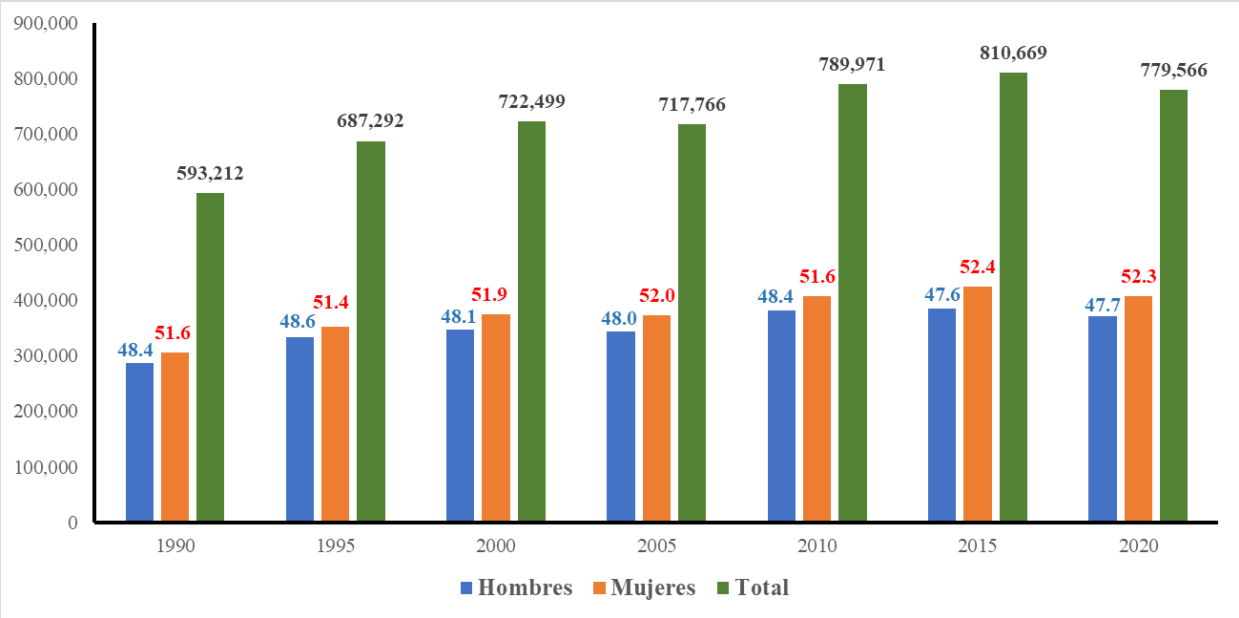
1 INTRODUCTION

Acapulco de Juárez is one of the 85 municipalities that make up the State of Guerrero, located in the south-southeast region of the Mexican Republic. It has a territorial extension (surface) of 1 727.3 km2 representing 2.7 percent of the state surface, is made up of 227 localities, 57 municipal delegations and 67 police stations (Municipal Development Plan of Acapulco 2021-2024); It is bordered to the west by the Pacific Ocean and the municipality of Coyuca de Benítez (municipality with which Acapulco forms one of the 74 existing metropolitan areas in Mexico), to the east by the municipalities of Juan R. Escudero and San Marcos; to the south by the municipality of San Marcos and the Pacific Ocean, and to the north by the municipalities of Coyuca de Benítez, Chilpancingo de los Bravo and Juan R. Escudero.

The municipality of Acapulco de Juárez (to be called simply Acapulco) has a population of 779,566 inhabitants (INEGI, 2020a), of which 52.3 percent (407,772) are women and 47.7 percent (371,794) are men. The male-to-female ratio (known as the masculinity index) is 91.2, that is, for every 100 women there are 91 men. The average number of live births is 2.1. With a population density of

451.3 (inhab./km2). 9.7 percent of the total population in the municipality is considered Afro-Mexican or Afro-descendant and 3.5 percent comes from an indigenous household.

Figure 1. Evolution of the population in Acapulco 1990-2020



Source: Ministry of the Interior/INAFED (2022).

In Acapulco is located 23.8 percent (223 924) of the total private homes inhabited in the State of Guerrero, the average occupants in inhabited homes amounts to 3.47 people. Of the total number of private homes inhabited in Acapulco, 88.9 percent have basic public services (electricity, piped water from the public network and drainage), services that are differentiated in homes, since 66.7 percent have piped water, 94.7 percent have drainage, 98.4 percent with electricity and 22.9 percent collect water through cistern or cistern.

According to the website Data Mexico (2022), and with data from the 2019 Economic Census, the economic sectors that concentrated the largest number of economic units in Acapulco were: 1) Retail trade (14,383 units), 2) Temporary accommodation and food and beverage preparation services (5,922 units), 3) Other services except government activities (4,077 units) and 4) Wholesale trade (703 units).

Table 1. Evolution of the Economically Active and Inactive Population 1990-2020

Concept/years	**1990**	**2000**	**2010**	**2020**
Economically Active Population	**187,016**	**257,599**	**339,195**	**384,977**
Employed Population	181,989	253,502	323,763	377,351
Non-employed population	5,027	4,097	15,432	7,626
Economically inactive population	**216,358**	**255,291**	**262,931**	**234,717**

Source: from 1990 to 2010 Ministry of the Interior/INAFED (2022) and 2020 of INEGI (2020b).

In Acapulco, tourism is the main economic activity on which a large number of direct and indirect jobs depend; contributes 60 percent to the Tourism Gross Domestic Product (GDP) in the State of Guerrero (Municipal Development Plan, 2012-2015). According to its economic specialization (temporary accommodation services, food and beverage preparation), during the third quarter of 2018 in terms of the Economically Active Population (EAP), trade activities and services related to tourism stand out in the tertiary sector, amounting to 83 percent of the EAP. (Municipal Development Plan, 2018-2021)

With regard to social development in Mexico, four indicators are used, which are associated with economic well-being and social deprivation; which are: 1) poverty, 2) social backwardness (social lag index), 3) marginalization (marginalization index) and 4) human development (human development index). These indicators are obtained from variables that generate different dimensions that allow analyzing the praxis of social policy.

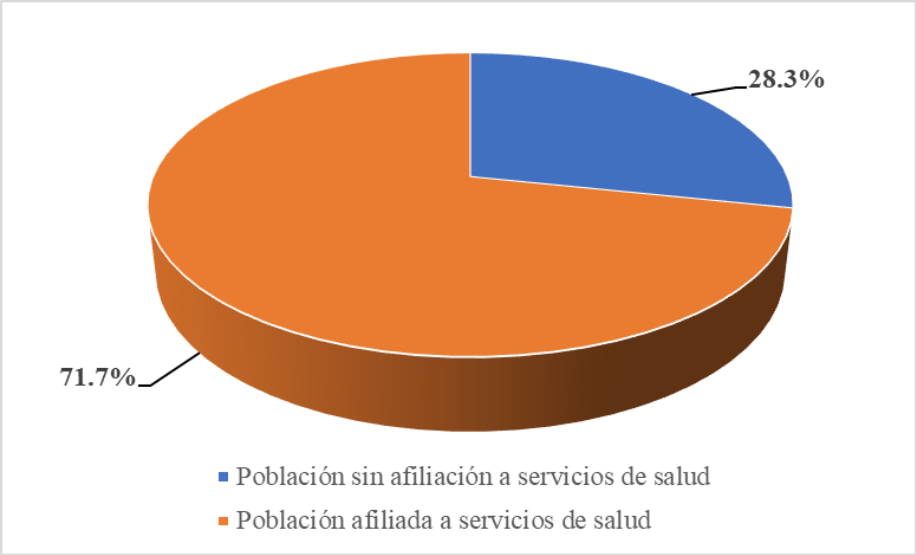
Table 2. Social Development Indicators for Acapulco

Years	Poverty	Marginalization	Social Backwardness	Human Development
2010	49.1	34.185	-0.68617	0.756
2015	56.6	47.875	-0.70923	0.753
2020	52.1	56.437	-0.58099	0.754

Source: Coneval (2022a), Coneval (2022b), Conapo (2022) and UNDP-Mexico (2022).

Social policy has permeated a large part of the population in Acapulco, the direct supports that have been delivered in this federal administration (2018-2024) and state (2021-2027) have reduced, in little, poverty (see table 2) and income inequality measured by the Gini Index (GI), since the IG decreased between 2015 (0.3856) and 2020 (0.3825), With a low social lag (when the value of this indicator is positive, the lag is high), with a high human development (between 0.7 and 0.799 high), however, there are still great social deprivations in the population. One of these social deprivations is access to health systems.

Figure 2. Affiliation to health services in Acapulco 2020



Source: INEGI (2022b)

The health system in Mexico has suffered great losses, the representatives of neoliberalism have tried to privatize health services, leaving aside public investment in infrastructure, coupled with the above there are many restrictions to enter the public universities of the different states that make up the Mexican Republic in the area of health and for specializations are even more.

> Mexico went from having 2.23 doctors per 100,000 inhabitants in 2014 to only 1.95 doctors in 2019. The OECD recommends a rate of 3.2 doctors per thousand inhabitants. On the other hand, the number of nurses per thousand inhabitants has increased, going from having a rate of 2.69 per 1,000 inhabitants. to another of 2.85. But it is the second country, after Turkey, with the lowest rate in the OECD. Mexico is also below the OECD average of nine nurses per 1,000 inhabitants and below the rates of countries such as Brazil, where the ratio is between six and seven nurses per 1,000 people. (Torres, 2022)

Some highly specialized private health services offered in the Acapulco region are subrogated and others, due to their high price, are beyond the reach of people's budget, since 75.2 percent of the employed population has incomes below two minimum wages (the general minimum wage per day in 2020 amounted to $ 123.22, which is equivalent to 6.5 dollars for an eight-hour workday, this equivalence is according to the exchange rate to solve obligations as of January 2, 2020). This implies that some health services are out of reach of the bulk of the population.

This meant that during the Covid-19 pandemic throughout Mexico (and in Acapulco) it faced a deficit in medical personnel and nurses; outdated and incomplete infrastructure with a large number of people suffering from different diseases; "70 percent are overweight, a third suffer from obesity, in addition, this disease is associated with diabetes and cardiovascular diseases, also with bone and muscle disorders, and some types of cancer" (Government of Mexico, 2023).

On the last day of March 2020, the Agreement establishing *extraordinary actions to address the health emergency generated by SARS-CoV2 was published in the official gazette of the Federal Government*; in which "the immediate interruption, from March 30 to April 30, 2020, of non-essential activities is ordered, in order to attenuate the spread and transmission of the SARS-CoV2 virus" (DOF, 2020). One of these non-essential economic activities was tourism.

Table 3. Information about Covid-19

Concept	National	Acapulco
Covid-19 cases		
Confirmed	7 614 771	46 051
Negative	11 584 758	63 930
Suspects	826 346	1 352
Deaths	334 107	2 946
Recovered	6 861 981	39 979
Assets	9 441	109
Sex		
Women	53.64%	52.57
Men	46.36%	47.43
Type of patient		
Hospitalized	9.58	12.77
Outpatient	90.42	87.23
Main comorbidities		
Hypertension	11.90%	14.68%
Obesity	9.59%	11.61%
Diabetes	8.74%	9.48%
Smoking	5.42%	3.08%

Source: https://datos.covid-19.conacyt.mx/#DOView (24 May 2023)

2 OBJECTIVE

Analyze the behavior of Acapulco's tourism results in the holiday periods that were affected during the A(H1N1) and Covid-19 pandemics that have occurred in the first two decades of the XXI century.

3 METHODOLOGY

It is an analytical, cross-sectional (holiday periods) and documentary study which examines, from the descriptive statistical method, the behavior of the variables that refer to the arrival of tourists, hotel occupancy and economic spillover during the holiday seasons that were affected during the period of duration of the pandemics before becoming endemic. For this, information disclosed by the Ministry of Tourism of the Municipality of Acapulco during the holiday periods of Easter, summer and end of the year is used; Analysis of percentage variations or percentage growth rates is carried out as the case may be. The transversality is presented during the holiday periods, in addition, two cuts are made to a time series (2006-2022): the first period goes from 2006-2011 covering the pandemic of A (H1N1) and the second 2015-2022 that covers the pandemic by Covid-19.

4 RESULTS AND DISCUSSION

4.1 TOURISM DURING THE A(H1N1) PANDEMIC IN ACAPULCO

According to Viruez and Vera (2013), "the 2009 pandemic associated with the Influenza A(H1N1) virus originated from a genomic mutation of the swine influenza virus, the first outbreaks were reported in Mexico and the United States" (p. 59). "The monitoring of the epidemic caused by the A(H1N1) virus began, in Mexico, on April 23, 2009" (Pérez and París, 2009, p. 4), "but it was not until June 11, 2009 when the World Health Organization (WHO) declared influenza a global pandemic" (Saunders-Hastings & Krewski, 2016, p. 11). "It was on August 10, 2010 when the WHO officially declared the end of the influenza pandemic" (Velasco-Castañón, 2010, p. 248). From this moment the A(H1N1) virus would become a seasonal influenza strain, which to date continues to be monitored.

During the pandemic, tourism activities in Mexico were affected, the greatest impact occurred after the outbreak of influenza A(H1N1); When the influenza alert was extended to other countries, the influx of tourists to Mexican territory was reduced, it should be noted that countries such as Argentina, Peru, Ecuador, canceled flights from their country to Mexico. The problem caused by this pandemic was the cancellation of hotel and transportation reservations of 90 percent in most destinations (Center for Public Finance Studies, 2009); since activities related to tourism are considered high risk of contagion (restaurants, hotels, transport and recreation).

According to ECLAC/PAHO-WHO (2010), "estimates of the losses caused by the pandemic during 2009 amount to 127.36 billion pesos, or the equivalent of 9.11 billion dollars; represents 1 per cent of the previous year's gross domestic product" (p.4).

During the influenza A(H1N1) pandemic, Acapulco had days with hotel occupancy rates of 11 percent, due to this reduction in tourist arrivals it was reflected in the spending they did not make in the Easter and summer holidays of 2009. It should be remembered that the Easter holiday space covers what is known for Christians as the major week and Easter, for 2009 the time interval was from April 4 to 19, *ex ante* "had already been detected, in March, in Mexico and the United States cases of atypical pneumonia" (Reynoso, 2010, p. 37). The gestation of the pandemic was during the Easter holiday season of 2009.

Table 4. Tourism indicators of the holiday seasons 2008-2011

Semana Santa				Verano			Fin de Año		
Años	Ocupación hotelera (porcentaje)	Afluencia turística (número de turistas)	Derrama económica (millones de pesos)	Ocupación hotelera (porcentaje)	Afluencia turística (número de turistas)	Derrama económica (millones de pesos)	Ocupación hotelera (porcentaje)	Afluencia turística (número de turistas)	Derrama económica (millones de pesos)
2008	80.3	534,448	1,523.2	67.0	617,682	2,223.7	73.4	488,033	1,815.5
2009	71.6	453,255	1,291.8	63.4	600,365	2,161.3	73.4	493,809	1,837.0
2010	70.0	451,659	1,287.2	62.4	589,638	2,023.6	74.5	502,573	1,869.6
2011	68.2	438,202	1,248.9	60.0	576,982	2,025.2	72.2	468,252	1,779.4

Source: Secretariat of Tourism of Acapulco. Statistical Yearbooks, several years.

The percentage variation of hotel occupancy during the Easter holiday period of 2009 with respect to 2010 had a decline of 1.6, while the tourist influx and the economic spillover during that same period had a percentage decrease (for both) of 0.4 percent. While for the summer period the percentage variation of hotel occupancy had a withdrawal of 1.0, the tourist influx, like the previous period, presented a decrease of 1.8 percent, the same happened with the economic spill, since it had a decrease of 6.4 percent.

These negative effects of the influenza A(H1N1) pandemic did not have an impact on the holiday period at the end of the year, as shown in Table 3, the indicators analyzed present favorable figures (with 1.1 in percentage variation of hotel occupancy and favorable growth rates of 1.8 percent for the tourist influx and in the economic spillover).

Another form of analysis is from the characteristics of the data, which are described through their measures of central tendency, position, dispersion, association and graphical analysis of the variables under study. Doing statistical analysis of the time series from 2006-2011 we have the values presented in the following table.

Table 5. Statistical results of the variables analyzed in the period 2006-2011

Statistical	Hotel occupancy (percentage)	Tourist influx (number of tourists)	Economic Spillover (MDP)
Stocking	50.2	7,848,701.8	23,690.5
Typical error	1.8	536,712.1	1,628.3
Median	50.7	8,099,317.5	24,744.1
Standard deviation	4.3	1,314,670.9	3,988.6
Curtosis	-1.4	-2.1	-0.6
Asymmetry coefficient	-0.5	-0.4	-0.8
Rank	10.9	3,057,015.0	9,979.4
Coefficient of variation	8.64	16.75	16.84
Minimal	43.7	6,029,452.0	17,363.3
Maximum	54.6	9,086,467.0	27,342.7

Source: authors.

The standard (standard) error of the mean weights the movements of the sample mean (mean obtained from the data) around the population mean, and is obtained by dividing the standard deviation of the population by the square root of the sample size:

$$Se_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

From the typical error, the confidence interval is constructed around the mean with a confidence level of 95%:

$$Límite\ inferior = \bar{x} - 1.96\ (valor\ en\ tablas\ de\ la\ distribución\ normal\ estándar) * Se_{\bar{x}}$$

$$Límite\ superior = \bar{x} + 1.96\ (valor\ en\ tablas\ de\ la\ distribución\ normal\ estándar) * Se_{\bar{x}}$$

Table 6. Confidence intervals around the mean

Limits/Variables	Hotel occupancy (percent)	Tourist influx (number of tourists)	Economic Spillover (MDP)
Lower limit	46.7	6,796,746	20,498.9
Upper limit	53.7	8,900,658	26,882.0

Source: own elaboration based on the data in Table 4.

The asymmetry coefficient (As) measures the degree of symmetry of the distribution with respect to the mean and its value should tend to zero. When As > 0, the curve is positive, implying that the values tend to cluster on the left side with respect to the mean. If As < 0, the curve is negative and implies that the values tend to meet on the right side with respect to the mean.

$$A_s = \frac{n}{(n-1)(n-2)} \sum_{i=1}^{n} \left(\frac{X_i - \bar{x}}{s}\right)^3$$

When the measures of central tendency (mean, median and mode) coincide, the curve is symmetric (there are the same number of elements to the left and right of the mean), and the distribution has the shape of Gauss's bell (normal distribution).

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

Kurtosis (K) measures the pointing level of the probability distribution, if K = 3 is mesocurtic; if K < 3 is platicurtic and if K > 3 is leptocurtic.

$$K = \left[\frac{n(n+1)}{(n-1)(n-2)(n-3)} \sum_{i=1}^{n} \left[\frac{X_i - \bar{x}}{s}\right]^4\right] - \frac{3(n-1)^2}{(n-2)(n-3)}$$

The coefficient of variation (CV) relates the standard deviation as a percentage of the arithmetic mean of a data set; The values are positive. When CV > 85 percent, the higher level of heterogeneity of the data, and if CV < 85 percent, greater homogeneity in the data; This implies that the arithmetic mean will be representative of the data set.

$$C_V = \frac{\sigma}{\bar{x}} * 100$$

Table 7. Asymmetry, kurtosis and coefficient of variation

Measurements/Variables	Hotel occupancy (percentage)	Tourist influx (numbers of tourists)	Economic Spillover (MDP)
Coefficient of asymmetry	(-0.5) Asymmetrically negative	(-0.4) Asymmetrically negative	(-0.8) Asymmetrically negative
Kurtosis	(-1.4) Platicúrtica	(-2.1) Platicúrtica	(-0.6) Platicúrtica
Coefficient of variation	(8.64) Homogeneous data	(16.75) Homogeneous data	(16.84) Homogeneous data

Source: own elaboration based on the data in Table 4.

If the asymmetry coefficient (As = 0), the distribution is symmetric, that is, the values are equally distributed on both sides of the mean. If As > 0, the distribution is skewed to the right ("tail" to the right), it means that the mean is greater than the median. If As < 0, the distribution is skewed to the left ("tail" to the left), it means that the mean is less than the median.

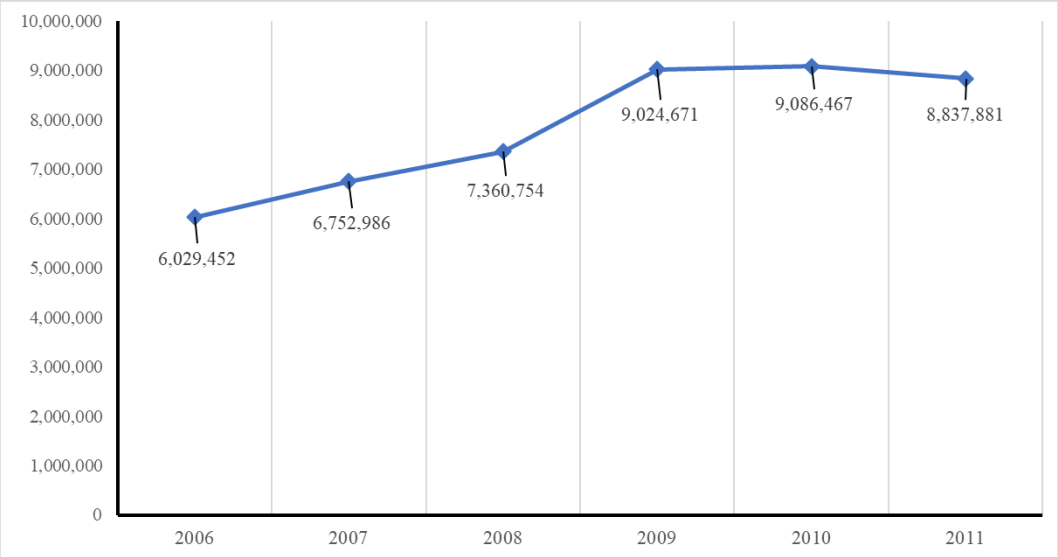
Kurtosis (K) provides information about the presence of extreme values, measures the shape and concentration of data around the mean in relation to a normal distribution. It is calculated relative to the normal distribution that has a K = 3 (0). When K > 3 indicates a distribution with heavier tails and is known as leptocurtic kurtosis. When K < 3 indicates lighter tails and less frequent extreme values, it is known as platicurtic kurtosis.

When the measures of central tendency (mean, median and mode) coincide, the curve is symmetric (there are the same number of elements to the left and right of the mean), and the distribution has the shape of Gauss's bell (normal distribution).

When data is said to be homogeneous, it means that they share similar characteristics. Homogeneity refers to the consistency or similarity in the attributes or properties of the data and it is easier to identify patterns, trends or relationships between them The homogeneity of the data is desirable in many analyses, as it allows comparisons to be made and more accurate conclusions to be drawn.

Another way to identify the behavior of the data is through the graphical method, considered as an informal procedure. Charts identify events that affect the data. For Hernández (2015), a graph allows us to observe: 1) frequency, 2) trend, 3) extreme values, 4) dispersion, 5) structural changes, 6) slope changes and 7) seasonality.

Figure 3. Tourist influx in Acapulco 2008-2011



Source: authors.

A positive trend in tourist influx is identified in the period from 2006 to 2011, with a minimum value of 6,029,452 visitors and a maximum of 9,086,467, without structural change or change of slope. In addition to the above, during the period of the influenza A(H1N1) pandemic there was a percentage growth of 0.4 percent, since it went from 9,024,671 visitors in 2009 to 9,088,467 in 2010. In real time, the pandemic lasted 425 days (from June 11, 2009 to August 10, 2010).

4.2 TOURISM DURING THE COVID-19 PANDEMIC IN ACAPULCO

The SARS-CoV-2 virus is the cause of the Covid-19 disease, it first appeared in Wuhan (Hubei province China) on the last day of December 2019 when the health authorities reported the presence of several cases of pneumonia, later it was announced that the cause was the presence of a new coronavirus. The Covid-19 disease spread at great speed throughout the world and was declared by the WHO as a global pandemic as of March 11, 2020, ending the health emergency on May 5, 2023, becoming an endemic. It took 1,150 days in real time.

In Mexico, as of March 30, 2020, preventive actions were applied throughout the country that were reflected in a digital platform generated *expressly* to disseminate different topics related to the Covid-19 pandemic. Preventive actions revolved around the suspension of non-essential activities, the application of hygiene and healthy distance measures, restrictions on meetings in closed spaces, home protection, especially for the elderly, pregnant women and people with autoimmune diseases. In addition, a Covid-19 health complication calculator based on risk factors was generated; in order to estimate the probability of pregnancy of the disease in the face of possible contagion.

Before these preventive actions, different agreements derived from the pandemic had already been published, highlighting the Agreement 02/03/ 20 where the suspension of classes during the

period from March 23 to April 17, 2020 was announced, postponing the return to classes gradually (according to the color of the epidemiological traffic light that was created to know the regional behavior of the pandemic) and with the application of filters Restrooms: 1) at home, 2) at the entrance of the school and 3) inside the classroom.

The follow-up given to the behavior of the Covid-19 pandemic (in Mexico) was extensive and punctual in the States and Municipalities of the Mexican Republic; three entities (Conacyt, Inegi and Coneval) generated individual digital platforms where confirmed, negative, suspected, death, recovered and active cases were traced. The purpose of the creation of the digital platforms was the dissemination of real information to the population about the behavior and trend of the pandemic.

Just as the return to school was gradual and complying with hygiene protocol, it was also for many non-essential economic activities, including tourism; "cataloging it as an instrument of propagation of the virus and of the contagions by the displacements that are made" (Zepeda, Medina and Flores, 2020, p. 70).

The pandemic brought severe consequences to tourism, "BBVA estimated during the first months of 2020 a decline of 83.7 percent, the Anahuac Center for Tourism Research and Competitiveness (CICOTUR) predicted a fall in tourism GDP between 3 or 5 of the 8.7 percent obtained in 2018" (ECLAC, 2020, p. 50).

In this pandemic, unprecedented events were presented, for example, in Acapulco recreational activities on the beach were prohibited during the month of April 2020 (from 02 to 29), with the commitment to reactivate for the last day of the same month and year; however, infections did not decrease, for this reason, the reactivation was rescheduled until the first days of July 2020 when the epidemiological traffic light changed to orange, as a consequence, in Acapulco two holiday periods were directly affected: 1) Easter and 2) summer; and the year-end period was partially affected. It should be noted that the ban did not imply the closure of the inns, some operated with 30 percent hotel occupancy, complying with hygiene protocols. In addition, the low tourist influx can be explained by second homes.

Table 8. Tourism indicators of the holiday seasons 2018-2022

Años	Semana Santa			Verano			Fin de año		
	Ocupación hotelera (porcentaje)	Afluencia turística (número de turistas)	Derrama económica (millones de pesos)	Ocupación hotelera (porcentaje)	Afluencia turística (número de turistas)	Derrama económica (millones de pesos)	Ocupación hotelera (porcentaje)	Afluencia turística (número de turistas)	Derrama económica (millones de pesos)
2018	74.1	487,573	1,477.3	67.0	694,114	3,110.2	79.2	591,503	2,602.6
2019	75.0	493,525	1,495.4	65.0	786,873	3,210.4	83.4	628,460	2,765.2
2020	4.4	30,000	90.0	18.3	274,789	1,154.1	36.9	229,785	942.0
2021	39.7	140,605	442.9	36.0	547,385	2,299.0	64.4	439,237	1,844.8
2022	63.7	376,008	3,115.5	59.3	597,385	5,346.4	73.0	826,976	6,405.3

Source: Secretariat of Tourism of Acapulco. Statistical Yearbooks, several years.

Large collapses are observed in the variables that are analyzed during the three holiday periods in 2020, for example, in hotel occupancy it had a negative percentage variation of 70.6, a percentage decrease of 93.9 and 94 for the tourist influx and in the economic spillover, respectively; having a slight recovery from the Easter holiday period 2021. It should be emphasized that on World Tourism Day 2020 (September 27) Acapulco was awarded the Global Safety Seal granted by the World Travel & Tourism Council (WTTC) together with the WHO and the Centers for Disease Prevention (CDC). The Global Safety Seal was awarded for complying with hygiene protocols, in addition, the Covid-19 Clean Point and Responsible Tourist programs were implemented.

> In Acapulco mass events were suspended: the pyrotechnics show, the sale, distribution and use of Cantoya balloons, musical events on beaches and in public areas were prohibited. The sanitary shielding was strengthened in hotels, bars, restaurants, public transport, in beach accesses filters were installed, in the information modules the information on the importance of the use of face masks and antibacterial gel was replicated, periphoning was carried out in the beach area, information campaigns were created in the mass media, Awareness courses were given to tourism service providers, public areas were sanitized, sweeping and manual cleaning campaigns were carried out. (Cruz, Dimas and Ortega, 2021, p. 422)

The following table presents the results for the descriptive analysis of the 2015-2022 time series, of the tourism variables analyzed; it should be noted that this period includes the period of the beginning of the Covid-19 pandemic.

Table 9. Statistical results of the variables analyzed in the period 2015-2022

Statistical	**Hotel occupancy (percentage)**	**Tourist influx (number of tourists)**	**Economic Spillover (MDP)**
Stocking	44.3	8,574,769	34,283.8
Typical error	2.6	546,513	4,334.6
Median	46.9	8,985,058	31,458.2
Standard deviation	7.4	1,545,773	12,260.1
Curtosis	0.0	-0.9	5.4
Asymmetry coefficient	-1.2	-0.8	2.1
Coefficient of variation	16.6	18.0	35.8
Rank	20.4	4,036,019	41,199.7
Minimal	31.3	6,192,520	21,456.5
Maximum	51.7	10,228,539	62,656.2

Source: authors.

First, confidence intervals are presented at 95 percent of the three tourist variables.

Table 10. Confidence intervals around the mean

Limits/Variables	**Hotel occupancy (percent)**	**Tourist influx (number of tourists)**	**Economic Spillover (MDP)**
Lower limit	39.2	7,503,603	25,788.0
Upper limit	49.4	9,645,935	42,779.6

Source: own elaboration based on the data in Table 8.

The following summary table presents the results of the symmetry of the data, the presence of extreme values and their homogeneity.

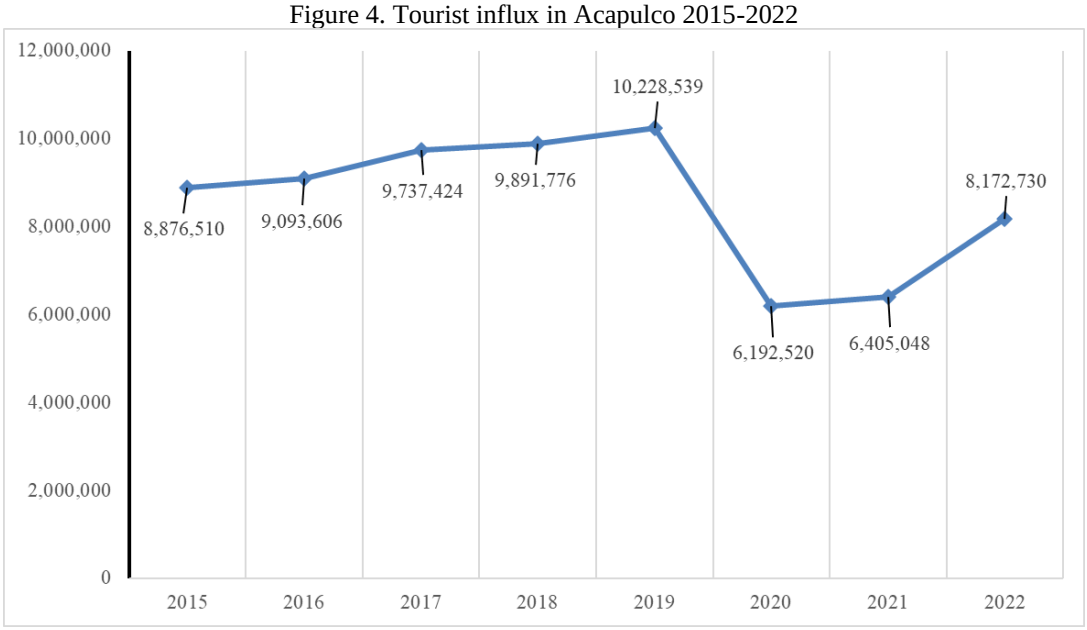
Table 11. Asymmetry, kurtosis and coefficient of variation

Measurements/Variables	Hotel occupancy (percentage)	Tourist influx (numbers of tourists)	Economic Spillover (MDP)
Coefficient of asymmetry	(-1.2) Asymmetrically negative	(-0.8) Asymmetrically negative	(2.1) Asymmetrically positive
Kurtosis	(0.0) Mesocúrtica	(-0.9) Platicúrtica	(5.4) Leptocúrtica
Coefficient of variation	(16.6) Homogeneous data	(18.0) Homogeneous data	(35.8) Homogeneous data

Source: own elaboration based on the data in Table 8.

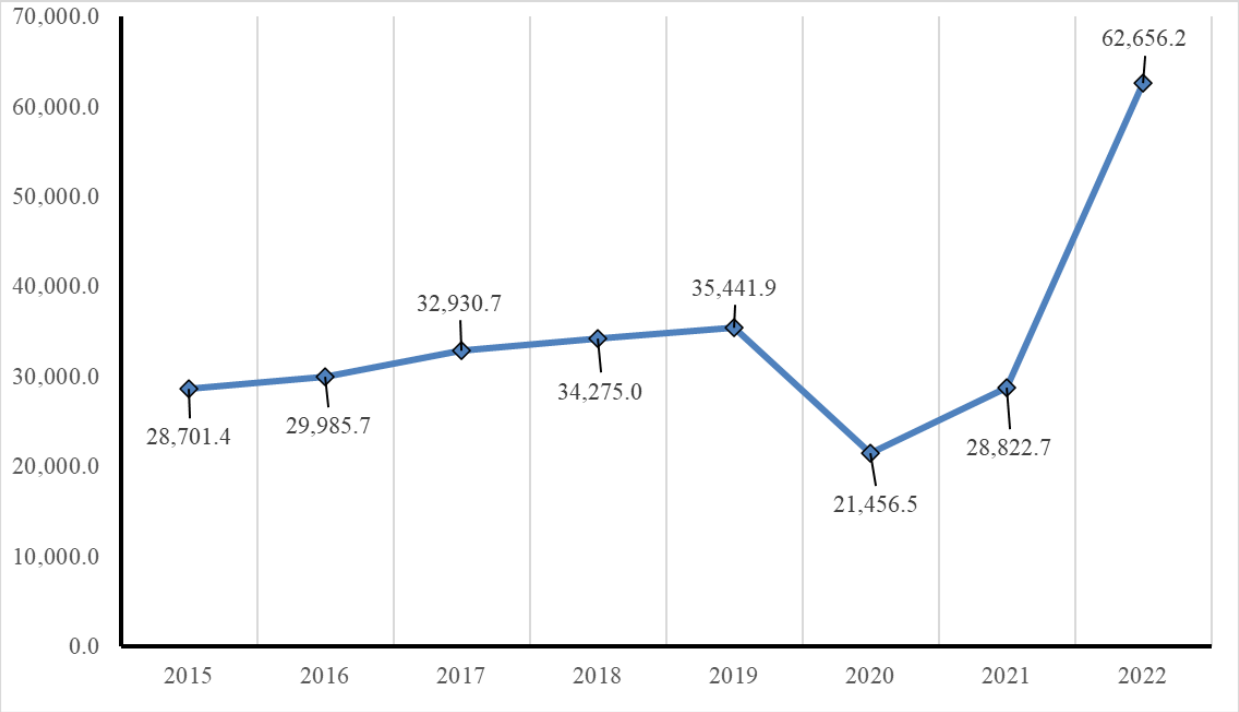
The following figure shows the behavior of the tourist influx 2015-2022, as can be seen during the pandemic there was a percentage decrease of 39.5 percent in the arrival of tourists; and as of 2021 and 2022 I present percentage growth rates of 3.4 and 27.6 percent, respectively; This fact is visualized in the holiday period of the end of the year of 2022, where the economic spillover has a significant increase; whose percentage growth rate of the time series of the economic spillover was 117.4 percent with respect to the previous year, that is, it went from 28,822.7 to 62,656.2 million pesos (MDP).

Figure 4. Tourist influx in Acapulco 2015-2022



Source: authors.

Figure 5. Economic Spill (MDP) in Acapulco 2015-2022



Source: authors.

5 CONCLUSIONS

Acapulco only prohibits, for a short period of time, the enjoyment of beaches when extreme hydrometeorological natural phenomena occur and the sea in the background, but in pandemics draconian measures were implemented for their use, ranging from the temporary "closure" of beaches, to social distancing measures in hotels, shopping centers, restaurants, among other businesses; This had a direct impact on the tourism sector.

There is no parallel between the influenza A(H1N1) and Covid-19 pandemics, although different elements can be analyzed : 1) number of deaths, 2) suspension of activities, 3) infections, 4) vaccines, 5) availability of information, 6) economic crises and 7) duration of the pandemic.

In Mexico, during the Covid-19 pandemic, various digital platforms were generated, that is, technological tools were made available to the population in which prevention issues, the risks of contagion and its complications according to their conditions were disseminated, for records and vaccination points. The purpose was to communicate the information in a real way and not to replicate the bad information that some media disseminated.

To date, it is not possible to know the economic and social effects of the Covid-19 pandemic in Acapulco. The oxygenation that was intended to give the economy of Acapulco in the holiday season of the end of the year of 2020 was at too high a social cost, since, according to official figures, infections doubled, as did deaths.

Acapulco has entered a process of tourism relaunch, this is demonstrated in the public investments that are currently being made in infrastructure, the diversification of attractions and ecotourism activities that are being offered, in order to reposition itself as the first place of traditional beach tourist destinations in the travel market.

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CHAPTER
72

The COVID-19 as mediation to the survival of the collective: The demerit of necessity and individual freedom through the perspective of work geography

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ABSTRACT
This article deals with the importance of the role of work as a founding condition of the social being and its repercussions in the actions that determine the conditions of collective needs that metabolize the man-environment relationship. The reality that the transformations imposed by the Covid-19 pandemic made emerge in the scope of space and global territorial perspective, the feelings of tenacity that individuals have come to external, as behavior in the social environment, abdicating the freedoms and individual needs, imposed by the market, through the neoliberal logic and reproduction of capital.

Keywords: Work, Pandemic, Individual needs, Defense of life, Collective right.

1 INTRODUCTION

First, we would like to clarify that the brief trial carried out was developed in the year 2020, at the time that we could not yet count in a practical way on the vaccines since they were in processes of studies and research, which followed the protocols of verification and investigation of the methodological affections of the scientific field, through the necessary phases of the same, until the moment of certification of the vaccine, and subsequent process of purchase and distribution.

The brief essay that I make is an unfolding of the study and research that I now develop as a student of the Graduate Program in Geography at the Federal University of Pará, where I have been developing studies on the focus of the Geography of Work, reason that made me develop some analysis and study within the category work, as well as the context of the centrality of work today.

Through the pandemic caused by Covid 19, which has planetary territorial dimensions, we seek to reflect some concepts that we debated in the study on the precariousness of work and its reflections on the processes of informalization, which are linked to the concepts of freedom and needs mediating the process of production and reproduction of capital. A reality that the pandemic made externalize and in a certain way, moved with the world of needs externalized by capital, as well as the subjectivity of mediating individuals to individual and collective issues.

2 THE CHANGES OF BEING THROUGH THE FACE OF THE VIRUS

To understand one of the faces of the pandemic situation exerted by the Corona virus (SAS-COV-02), and even by the disease generated, in this case Covid-19, through the territorial dynamics and in the very condition of production of space in Brazil, from reflections given in the scope of the metabolic relationship of man through nature, that is, of the relations given from the relationship man-society-nature.

Where principles linked to the traits, but general, of this duality, will be verified through the interpretative context, within the framework of the material historical perspective. That is the purpose of this brief essay of the article now proposed.

The pandemic framework not only signaled, but revealed that really, our consciences are shaped historically and materially, in the actions and behaviors of man in society, that is, as a social being. The pandemic has blown away casualistic views of man's freedoms and needs in society.

Mainly by leaving in a translucent way, for the action of man, the primacy of the laws of nature and their objective features, which promote and point out the dynamics and behaviors of man in society, about the issues "in itself", which promote the forms of organization and experiences of priority about life "for itself", that is, by calling into question the questions of the needs of egoistic-freedoms versus collective-freedoms.

In this sense the freedoms based on the world of needs, allows us to understand that the laws and / or demonstrations of nature, need to be understood so that they can meet the external conditions of nature, and even the external relations of humans, as a condition and natural human belonging, as well points out LENINE, in his work Materialism and Empiriocriticism, for it asserts that liberty is the intellection of necessity. The development of any individual consciousness and the collective knowledge of all humanity show us at every moment, the unknown "thing in itself" becoming a known "thing for itself" (1975).

In this meandering it is understandable when we come to realize that the freedom of individual wills in the current framework, made possible to all, decisions consistent with reality and its concreteness, that is, freedom consists, in the coherence of the domain of ourselves and on the external nature, having as a basic condition, the knowledge of natural needs.

> Engels considers the knowledge and will of man on the one hand, and the necessary laws of nature on the other, and, refraining from any definition, finds simply that the necessary laws of nature constitute the primordial element, human will and knowledge being the secondary element. (Lenin, p.168.1975).

In this sense, there is a need to understand men, as if they are part of nature and, when interacting in physical space, constitute social organizations, civilizations, cities, politics, etc. that is, giving rise or producing a specificity as human beings, and therefore producing human nature. Nature that we

could say, to be different, from the first nature, the physical nature in which he (man) would have emerged, but also, different like the things produced by him, by transforming the first.

> At the beginning of historical times, each human group built its living space with the techniques it invented to take from its piece of nature the elements indispensable to its survival. Organizing production, organizing social life and organizing space, to the extent of their forces, needs and desires. (SAINTS, p. 17. 2008).

Seek to understand reality, our experience and our knowledge by and through adaptations and compression of space-time in an objective way, as well as, reflecting them, with more intensity and depth, we will reveal human needs in their fullness, where we can understand all the real needs, to life as well as the contradictions externalized in space. As SANTOS well reveals, when he points out his investigative perspective, through the systems of actions and systems of objects. (2008).

In this sense it is necessary to understand reality as totality and movement, where the capacity of thought and consciousness are products of human celebration, and that man himself is a product of nature, or even of the whole of it, that is, what matters is matter in motion, consciousness given and learned, from the needs known and externalized in society by nature itself.

The sense of reflecting issues of nature, propitious to resume and obtain understandings, about the concept and historical sense of actions and relations man-nature, where man went little by little, adding artifacts to nature and / or removing and appropriating what it provided. From a basic constitution and philosophical affection, as primary conditioners of human transformation, where, the work and metabolic relations of man, propitiated, the founding condition of the verifications of humanity and society, in the "grunt" of modern man and his spatial formation. Reality verified by Santos, when pointing out that the determining distinguishing factor is work; What makes man a *su géneris form of life* is the capacity to produce. (2008. p. 95).

As much as we are aware that the subversions erected by the corrosion of the human character, given in the sense of how the human virtues by and through the work were given throughout the process of development and improvement of the conditions of the work of man, therefore, this should follow the path of creation and realization of its needs through nature, as Marx, well understands, if used what she, offered it and creating instruments that became true extensions, of its corporeal condition, first as instruments that now developed, as an extension of its body and then the earth itself, as its telluric characteristics.

> At the beginning of man's history, his instruments of work were separate; today they are increasingly indivisible, such as a railroad, a highway, etc. The historical path of the instruments of work goes more and more from divisibility to invisibility, and from the isolated data to the system. This is what happens with electricity, water, telephone, etc. (SANTOS. p. 73. 2008).

Having as debate the theoretical perspectives on the productive differentiations that occur in the world, as well as the primary human conditions where the needs of plunder by exploitation were not met, the more economic perceptions brought by the *guilds*[1] and the nascent political economy. Certain of referential terms, which determined, the regulatory framework represented by the state and liberal ideas, which brought together important contributions to the discussion of work, both as an economic category linked to the production of values, as participation of the human being in a certain historicity, at the same time determinant and determined by institutional textures that foster and characterize the way of being of each period.

In this sense, the advent of actions and their capacity for creation and development, where techniques had to be linked and legitimized, so that all the capacity for observation, as well as their practices, could propitiate, not only the emergence, but their development, where science could propose a safer walk. So that all needs, during the conditions of quantitative and qualitative growth, were changed, for the good of the human collectivity, that is, for society and the strengthening of the condition of human needs, in its totality, that is, for the common good.

> In very remote ages, the instruments of work were an extension of man, but as time passes, they become an extension of the earth, prostheses or additions to nature itself. (SAINTS, p. 72. 2008).

Thus, the work environment is that with which the worker has the most direct contact, because his relationship with the object is mediated by him. The medium, therefore, is a kind of prolongation of the human organs. At this point, Marx (2011) takes up a statement that appears numerous times in the *Grundrisse*. On earth as the original arsenal of the means of labor, in addition to providing the aforementioned means of life, ready for consumption and constituting a universal object of labor. Marx also notes that the use of the instrument is practically defining of human activity.

This is not something of hallucination or unfounded conjecture, for science, technology and inventions are human products, that is, of human nature, and all creation motivated by human action, around the process of creation and annihilation, of construction and deconstruction, of transformation (creation and rupture). But we all know that this is something, which has been completely distorted, because we are talking about how, the struggles and the forms of work, and their conditions of production have been exercised throughout history in the perspective of time and space. Everything is configured and materialized, by the processes of surplus and appropriation of this, by members, of the

[1] Guilds: These tensions resulted, to a large extent, from Marx's critical dialogue with the great cultural scientific complexes of his time: German philosophy, English political economy, French materialism, which made it possible to point out as antecedent agents of capitalism the relations that production and labor that was now imprinted at the moment of overcoming production via handicrafts, for the techniques given in manufacturing, which provided commercial development, through guild systems, see Marx – Book I Capital - 2017.

groups and the processes of organization that gradually were being taken over by members who no longer needed to develop stages and processes of work, a reality that is well understandable in the works of Marx (1988), Engels (1979) and Lukacs (1981).

To understand the role of the category work as the foundation of the actions and acts of the determinations of human doing, and its rebuttals from the pre-ideation, given and made possible in a concrete way, in the sense that the acts of ideas are made by human action in a concrete and material way, where their needs, made possible throughout their evolutionary and historical process, means of objectification to produce and develop the conditions not merely of survival and reproduction, on the contrary, with work the determinations and resonance of the social being are expanded, which passes to create objects and instruments, which would resignify, its action and mediate its consciousness, and all relations in an externalized way, that is, the objects created concretely and materially, by historical processes, they would transform themselves, and others, through all metabolic processes.

Such determinations of thinking and acting, dimensioned its condition of being generic, in the ontological scope, where such actions definitively enable evolutionary leaps in the order of its practice and in its future aspirations, which would delimit its ordering in the praxis of this new being, as well as, through the social organizations given and constituted, from its transformations.

In this sense to understand the metabolic questions, given and uttered, by the human making of men, through their objectives, their causes, determination of their action and their organization in society that implied in their act of producing, through their theological properties.

It is worth pointing out the perceptions of Lukacs (1981), regarding work, seen as the founding category of the social being. In the context of Lukacsian ontology, this means that, on the one hand, the genesis of the category of work corresponds to the genesis of a new sphere of being, of a new substantiality, radically distinct from the only natural being. And, on the other hand, that work provides the proforma, that is, it points to the generic model of human-social praxis.

Therefore, the genesis of work and the founding process of the complex explicitation and resignification of the human essence, of the human devenir of men. Establishing for this, the beginning of the self-constitution of humanity as a gender, for the Hungarian philosopher, this is the founding moment of generity itself. In this exact sense, the genesis of the category of work is the genesis of the social being.

In the current pandemic framework we cannot deny the objective reality nor the objective laws of nature, a negation that fatally blinds, and attacks life, where individual wills, imprinted through the false needs of the market and which according to Engels, attacks the philosophy of reality.

We must understand that the capacity of needs that elevate human freedom, through their actions of truth, liberates them, and metabolizes nature "for itself" and promoting the achievements proclaimed through the real mottos of "Freedom and Equality" through the proclaimed human rights.

In this way, all these foolish figurations fall to the ground, despite inner freedom, in which capital and the very condition of contradiction of space by the form of its production and reproduction. In this sense we must resume dialogues and elaborations, of authors like Engels; when it asserts its perceptions despite freedom, then, it is the dominion of ourselves and outer nature, based on the consciousness of natural needs; as such it is necessarily a product of historical evolution. (p. 96. 1979).

The human being is a creative historical and social being, who has developed the ability to know nature and apply it in his daily life aiming at his freedom. However, capitalist ideology has succeeded in transforming this human desire for freedom into a desire to, in addition to necessity, possess new commodities and completely alienated egoistic desires.

> Freedom can only consist in the social man, the associated producers, rationally regulating his metabolism with nature, bringing it under his communal control, instead of being dominated by it as if it were a blind force; that they do so with the least use of force and under the conditions most dignified and suited to their human nature. (MARX, 1988, p.255)

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The externalized human nature does not have and does not elaborate its end in the death of singular individuals, as well as the firm, Peixoto, because, while the individual and singular existence is finite, the collective character of its experiences and discoveries in the scope of a short existence remain as patrimony of the whole of humanity, reconfiguring the intertwining of the many existences and histories (40.p. 2007).

The historical perspective projects man beyond the duration of his particular existence, and makes possible an evolution and an infinite variation in his way of being, mainly by his ability to understand the dynamics of construction, continuity, coexistence and annihilation, verified through the landscape and geographical objects.

At first glance and in a simple way I hope that this brief theoretical reflection can point new looks to future years through definitive and unappealable truths, immutable truths and conceptions based on the knowledge of things, to their discovered roots, in the study of childishness and the spiritual incipience of the pandemic moment of our times.

3 PANDEMIC: FREEDOM VERSUS NECESSITY

There is a need to reflect on some issues that are of relevance in terms of what is lived, perceived and conceived through human actions, as well as analyzing social behavior in the face of the covid-19 pandemic, it is urgent. It is known that in all natural catastrophes, be they earthquakes, floods, hurricanes, volcanic eruptions, etc., individual freedom is also shaken, wounded to death and the only

way to survive in a locality that suffers a natural catastrophe is solidarity, collective behavior and the determining protagonism of the state.

Faced with the destruction of the entire infrastructure of a given locality, there is no more room for economic liberalism or individual interests, it requires a collective effort of society and the massive investment of the public power in the reconstruction and reestablishment of life.

All this has already been experienced in many societies around the world through territorial dynamics. A reality that Santos addresses when he exercises the intentions and achievements of the historical making of men, in the territorial dynamics and the social constitution of space.

> The Territory is the place where all actions, all passions, all powers, all strengths, all weaknesses flow, that is, where man's history is fully realized from the manifestations of his existence. Geography becomes that discipline made more capable of showing the dramas of the world, of the nation, of the place (SANTOS, 1999, p.7).

The Covid-19 Pandemic is a natural catastrophe that has hit the entire planet, therefore, it is not a localized hecatomb, but a worldwide tragedy, it, covid-19 is taking lives on all continents and as science in the biennium 2020-2021, had not yet completed and / or produced enough medicines and / or vaccines in the vaccine market to guarantee mass vaccination, To propose the control of the pandemic by immunization, sanitary measures were established as a condition of protection.

Reality that, immediately produced certain sanitary rules to contain it, these measures, which to date have been extremely effective, mess with social behavior, something similar to the measures taken in other natural disasters, measures emanated by the public power and incorporated by society, that is, economic liberalism and individual freedom are sacrificed in the name of the need for survival of the collectivity, Order is determined by science and what matters is life.

In this sense, we intend to briefly address the problem of the sanitary measures proposed by science and social behavior in the face of this pandemic that somehow impacts on the perception of the concept of freedom and experiences, in the collective scope.

The covid-19 pandemic is the greatest catastrophe of our time in the twenty-first century, this world tragedy has already killed more than a million human beings and so far continues to kill, we do not know yet when this death will cease.

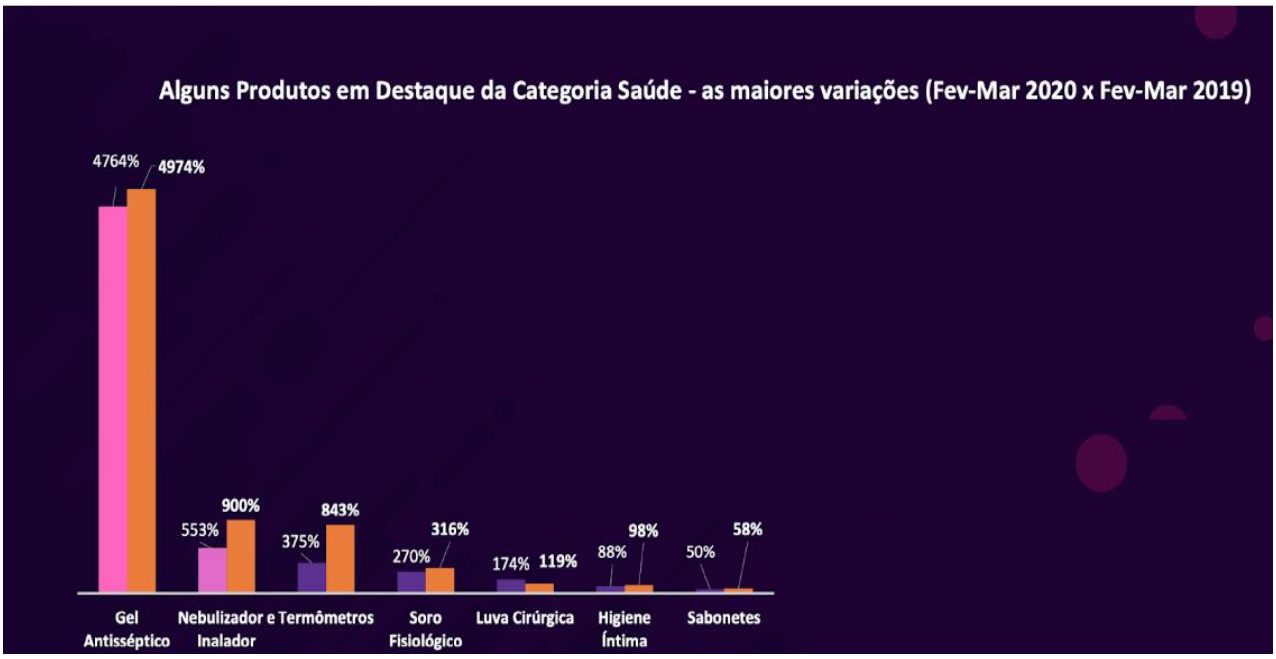
World science has joined in a movement never seen on the planet to combat this plague, which has directly countered in socio-spatial production, so far, tried to formulate remedies to combat the covid-19 virus, such as: anti-inflammatories, antivirals, antibodies, etc.

But all these drugs had little or no effect, so in the face of this resounding failure, science has staked all hopes on the production of vaccines, because only vaccines can contain or control the virus, according to science and its mediations, until the present moment.

The most efficient formulation that science has produced for the immediate fight against COVID-19 and that effectively works and being able to contain this catastrophe, so that the tragedy was not more drastic, was: social isolation, social distancing, the use of sanitary measures and products, the division of labor into essential and non-essential. These measures, besides being effective, are in their clearest depth, the sacrifice of "freedom for the sake of necessity".

Economic data from all over the world reveal that most people exchanged products that satisfied their interests for products that guaranteed their health and collective health, exchanged beauty products, makeup, perfumes, etc., began to prioritize sanitary products. Situation that can be visualized through the graph below.

Main Health Products, According to the Variation in Sales



Source: ecbr – ecommerce

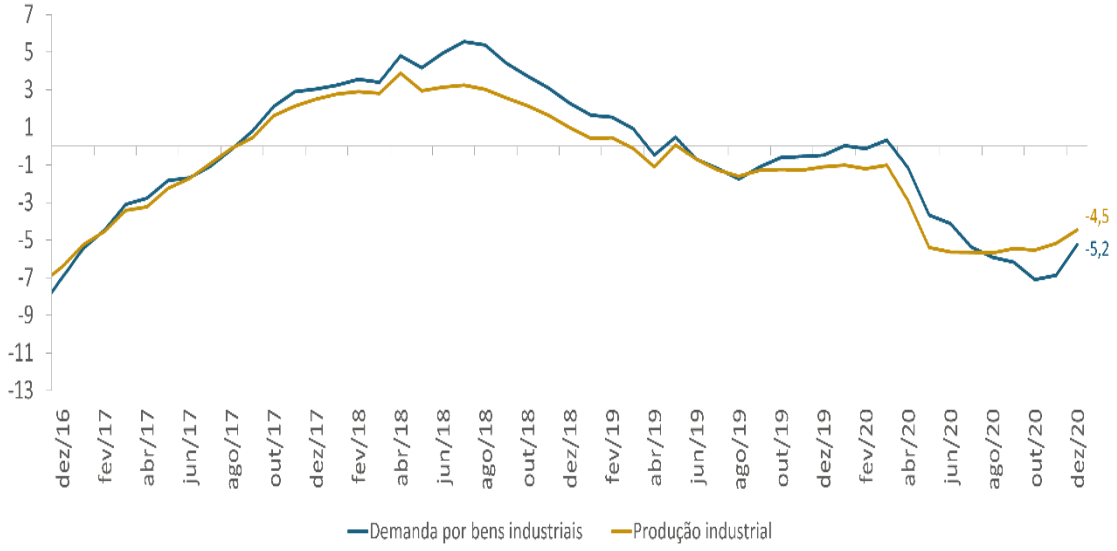
Also very impactful are the economic data of the closure of bars, restaurants and the fall in the sale of individual vehicles, at the same time as the sales of food and beverages in supermarkets, as well as the increase in internet sales of food and essential products, including electronic products and increased internet consumption, through e-commerce.

Reality that reflects, the "new" and "old" forms of adaptation of the processes of reproduction of capital, more than point out the expressions of exteriorization of the relations of individuals, as well as the subjectivity that has been shaping itself in the scope of space and territorial dynamics.

The graph below reflects the relations of ebbs and flows of production and circulation of industrial products in the market, a situation that reflects the priority externalized by the pandemic action, since, the meaning of life is given as the main parameter, to mediate the priorities and interests

in the market, where the egoistic wills demanded by the freedoms of capital at the individual level, in some way it is resignified, through the reality of the greatest social tragedy in the history of this time. To this end, we point out the falls in consumption of industrialized products in the year 2020.

Demanda por bens industriais *versus* produção industrial
(Taxas de variação acumuladas em doze meses, em %)



Fonte: Ipea e IBGE.
Elaboração: Grupo de Conjuntura da Dimac/Ipea.

From this catastrophe that today affects the world, it is evident that science has succeeded with a set of recommendations of sanitary measures and social isolation, that is, to guide to the sacrifice of "freedom in the name of necessity", it was this sacrifice that saved millions of lives throughout the world.

It is also clear that sacrificing freedom in the name of necessity in the world of "liberalism" is not a very easy task, therefore the exercise of full "freedom" has debauched, disrespected, neglected and not complied with such scientific recommendations, the inevitable consequences of this behavior have already generated more than a million deaths and we still do not know how many deaths will be.

> When knowledge becomes a powerful instrument of human progress, it will become the concern of men and women in all domains of life. By drawing his energies from the immeasurable resources of free peoples, he will not only irrevocably overcome hunger, disease and obscurantism, but in the very process of his victorious advancement he will recreate the intellectual and psychic structure of man (BARAN, 1984, p. 258)

Most of the world's governments realized and assumed the scientific guidelines for dealing with the pandemic, they also realized that the orthodox orientations of liberal economics were not adequate to face the catastrophe; And in the face of this harsh reality, they have taken emergency economic

measures, such as: investments in health, financial aid to the millions of vulnerable and facilitating credits for small and medium-sized businesses. This finding also corroborates that the role of the state changes and assumes that the need is more urgent than economic liberalism.

4 FINAL CONSIDERATIONS

The conclusion that one has of this tragic moment is that the role of the units of the federation, as well as the social behavior of individuals in general, determined the choice for life and realized that necessity determines freedom. Mainly by the various advances of science, technology and information, as products of human doing, and of the socially constituted space, as well as the facilities verified through the diffusion of knowledge on a global scale.

Despite the altruistic and empathetic actions that legitimize the interests of the collective relations of freedoms, we still find several political figures, people of ignominious public notoriety or ideological groups that navigate under the path of protecting life. Such a reality is, therefore, contrary to the rationality and clarification of the socially produced space. These externalize hatred, ignorance, alienation, etc. believe in the *"sleeping Alice"*, metaphysical lives and the surreal; completely contrary to life and common sense. They only believe in nonsense, intending to confuse society, as they believe the Earth is flat and disdain the effectiveness of vaccines to contain the pandemic.

I end this brief essay with the following question. Will this behavior last after the pandemic? The uncertain future will tell!

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CHAPTER
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Besieged cities: Representations of the fear of death and illnesses in the pandemic of COVID-19 and in the cartoons of the end of the nineteenth century in Brazil

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ABSTRACT
The epidemics plagued Brazil in several periods of history, such as the end of the 19th century and had a large effect on Revista Ilustrada, coordinated by the Italian-Brazilian cartoonist Ângelo Agostini. The fear of illnesses and death accompanies us throughout history and generates practices and representations associated with the historical context of the time. Today, the pandemic of the covid-19 reaps thousands of lives in Brazil and in the world, and the way we appropriate the tragic reality leads us to produce representations that slip, in many cases, to scientific denialism and contribute to the fact that many lives are still lost by discourses and practices emptied of scientific foundation. Besieged, cities face the microscopic enemy with social distancing and basic hygiene health measures, while vaccination cannot immunize the majority of the Brazilian population. Love and empathy become lenient summing up in the void left by the absence of sufficient vaccines or specific remedy against coronavirus to date, march 20, 2021. Previously closed windows are opened to provide the sight of the other. We will highlight in this article the relationship between feelings and their representative expressions related to the fear of death and illnesses in written and iconographic languages and seek to articulate them to the historical facts that served as a stage for its construction. Analyzing the practices and representations associated with public health and developing a comparative study between the epidemics of the late nineteenth century and the pandemic of the covid-19 becomes relevant to find realistic solutions that lead us safely to freedom, health and the enjoyment of community life.

Keywords: Covid-19, Cartoons, Representations.

1 INTRODUCTION

The fabric of history reminds us of the beacons that have always guided his writing: time and space. Without the context in which historical facts occur, their significance is lost in the tangle of the infinite possibilities of the transition between past and present, without adding its effective contribution to the understanding of the world in which we live. It is always necessary to situate the practices and representations in the historical time and in the geographical space in which they were erected. Chartier points out to us the need to consider the appropriations we make of reality and how they establish links between the practices and the representations we build from them when we elaborate our discourses. On the definition of Cultural History he states:

> On the one hand, it is necessary to think of it as the analysis of the work of representation, that is, of the classifications and exclusions that constitute, in their radical difference, the social and conceptual configurations proper to a time or a space. (CHARTIER, 2002, p. 27)

The discursive elaboration is always permeated with symbolisms. Our fears, desires, dreams, desires, life expectations are expressed in various languages that interact with everyday life and are covered with access codes that connect with each other. Subjectivity creates interpretations of its own

that reveal the mirrors with which we reflect ourselves and the world around us. We will highlight in this article the relationship between feelings and their representative expressions related to the fear of death and diseases in the written and iconographic languages and we will try to articulate them to the historical facts that served as a stage for their construction.

Considering the beacons of the European medieval Jacques Le Goff presents the city:

> The city of the Middle Ages is an enclosed space. The wall defines it. (...) A place of greed, the city aspires to security. (...) But the sick, like lepers who can no longer work, cause fear, and these shelter structures soon become structures of imprisonment, of exclusion. (LE GOFF, 1988, p. 71)

The walls were erected in medieval Europe in search of protection. A period marked by wars, especially by barbarian invasions, they seemed to constitute refuges from the menacing danger that reached Western Europe. However, they did not extend this protection to all the inhabitants even equally. Social exclusion demarcates its borders and they reflect the inequalities that also affect the spheres between disease and health, between life and death. The citadels were erected with moats, walls and thick walls to ensure that the population inside would be more protected from the external dangers that threatened them. But diseases generated the fear of the unknown that could lead to death and promoted the social exclusion of the sick. The disease within the citadel could mean the death of many people within and outside the walls.

In 2020, we saw borders closed in the face of another threat: the pandemic of the novel coronavirus, also called Covid-19, which spread around the world, taking as its starting point mainland China at the end of the year 2019. The Great Wall of China was ineffective in containing the enemy. The speed with which the virus spread continues to haunt the world's population and leads us to seek alternative forms of social interaction, especially in cities, where thousands of people live in spaces compacted by social demand. If on the one hand the search for security in gated communities demarcates the occupation of urban space in the twenty-first century, this security becomes fragile in the face of the invisible, microscopic enemy, which spares neither rich nor poor and invades public and private areas claiming thousands of lives.

In the face of the still little-known danger, the World Health Organization and health professionals are calling for social distancing as a way to stem the inexorable advance of the pandemic. This has been the most advocated measure to contain the disease associated with prophylactic measures such as basic hygiene, such as hand washing, and the use of masks. Masks previously used formally in the means of research and care in the area of health, or symbolically associated with carnival celebrations or even the need for anonymity for security agents or marginals, now take to the streets in cities as an imposition of state and municipal public authorities and health professionals in Brazil who fight to combat the virus and its tragic consequences for the population. State and municipal

governments have taken several restrictive measures for population circulation aimed at reducing the spread of the disease that reaches alarming rates in 2021 during the second pandemic wave in Brazil. Also called "lockdown", the closure of commerce, usually except for essential services such as pharmacies, supermarkets and banks, is now imposed by state and local governments in some municipalities for some periods during the pandemic, which also included the mandatory use of masks in public spaces among other restrictive measures such as the rotation of vehicles and the prohibition of access to public spaces such as bars, beaches, parks and restaurants, while the scientific denialism of the federal government, which should coordinate the actions to combat the pandemic in Brazil, leads to the advance of the evil that continues to claim thousands of lives around the world.

On March 10, 2021, in Brazil, we added 270,917 deaths from Covid-19 and, in 24 hours, 2,349 deaths from the disease, with a total of 11,205,972 confirmed cases since the beginning of the pandemic in the country, information released by the Consortium of Press Vehicles through the National Journal of Rede Globo television. These numbers are only indicative of the high mortality of respiratory infection, being only underreported indications, since the reduced availability of tests for Covid-19 led to their application only in critically ill patients, health and safety professionals at the beginning of the pandemic, and there is no way to assess the real severity of the problem. The majority of the population continues without access to diagnosis and, often, without access to care in the health service, which in several Brazilian states has already collapsed, unable to offer beds, especially ICU beds with respirators, indispensable to save lives in the event of worsening of the disease and, in some municipalities, without enough oxygen to meet the social demand, as happened in Manaus and in the interior of Pernambuco. Many sick people convalesce or die in their own homes.

Although most of those infected manage to recover, we cannot overlook the frightening number of infected and deaths from Covid-19 already achieved in Brazil, which reached the record of 2,798 in the number of deaths in 24 hours and a total of 282,400 deaths from the beginning of the pandemic until March 16, 2021.Brazil surpassed the United States of America and became the epicenter of the pandemic, especially after the discovery of a new variant of the virus in Manaus, considered more contagious than most of the genetic mutations of the virus so far identified, resembling the strains of the United Kingdom, South Africa and India.

It is essential to observe how the disease has transformed the lives of thousands of people. Images of almost deserted cities such as Paris, Madrid, Rome, Vatican City, New York and many other great capitals seem to come from the imaginary or from simple digital manipulation on a computer, when in normal times there are clusters of people circulating with the most diverse objectives. The city has resignified itself.

> On the other hand, contrary to what has been said about the "fragmentary" of the city, I think that what is taken as fragmentary, in a certain discursive formation that disposes meanings about the city, is, in reality, to look, interpretation of the world, of the city in movement: the meaning, we repeat, is also the window from which one looks. And then we have both the virtual and the real. (ORLANDI, 2004, p. 29)

The movement of the gaze recreates new perceptions of the besieged and immobilized city; The reduced movement of pedestrians and vehicles is associated with the frenetic network of invisible circulation of the city that operates in the virtual-real plane, mediated by the internet, by smartphones, by the computer, in an impressive agility in the exchange of experiences. The city's senses are in transit. Remote possibilities increasingly occupy the time and space of the real fragments of life in cities terrorized by the pandemic.

Loneliness, with forced seclusion in domestic spaces, increased depression and generated the need to address this problem with the digital approach. Technology overcomes distances and brings together individuals and groups, making solidarity emerge as a new link and one of the pillars on which the population relies in search of support.

> It seems to me that today, in the face of the rise of misery that the public authorities cannot contain, there is a reinvigoration of solidarity. (Duby, 1998, p. 36)

Solidarity appears as a constitutive element of a new social practice and is associated with collective survival in times of the Covid-19 pandemic. Death seems to us too close to put us in front of the dilemma: to face it, seeking alternative solutions such as affirmative community actions of relief and support for the sick isolated in their homes, or for the unemployed and components of the social category constituted by the self-employed who lost the only source of income they had with the state and municipal decrees of social isolation - either in the form of food aid or protective equipment individual such as masks and cleaning supplies to ensure the containment of the terrifying speed with which the virus spreads, especially in the so-called risk groups that encompass the age group of those who are with or above 60 years of age, those who have comorbidities such as severe hypertensive, diabetic, immunosuppressed, heart disease and people with previous respiratory diseases, or to settle down to the good fortune of not being infected and letting death take its course without doing anything to try to stop it, without caring about the lives of others. Today, local public authorities associate themselves with the civil population organized in NGOs formed by groups of volunteers, the business community, communities and specific local associations in order to promote social welfare.

> These collective subjects are the ones who perpetuate the historical memory of emancipatory civilizing processes, who build indignation in the face of the reactualization of old problems and the reconfiguration of human miseries and who dream of the possibility of contributing to the production of a more just and happy society. (SCHERER-WARREN, 1999, p.11)

The awakening of today's society to the need to preserve life has us contemplated with exciting scenes of reinvented social conviviality. Health professionals are often applauded and applauded in entire cities from the interior of buildings, from the balconies of apartments, as well as they and they applaud the recovery of the sick who overcome death and return to daily family life, carrying in their luggage gratitude for the victory won and recognition for the effort of health professionals in obtaining healing. In the corridors of hospitals, wards are formed by these and these professionals of life who celebrate the medical discharges of convalescent patients who pass by receiving applause and congratulations as if they had resurfaced to a new life. The hospitalized patients are prevented from a greater conviviality with family and friends and count on God and the dedication of the teams responsible for their treatment. Thus, an affective link is created that goes beyond professional limits: it is no longer just a number that has fled death; It is a unique life that preserves itself and that develops a greater belonging to the world that surrounds it. Love and empathy become leniency in the void left by the absence of sufficient vaccines or specific coronavirus medicine to date, on June 13, 2021.

The fear of death is replaced by the substantiality of life, by the valorization of priorities such as affectivity and coexistence in borderline risk situations. Previously closed windows are opened to provide a view of the other. Music then appears as a catalyst vehicle for emotions that overcome the physical barriers established by social distancing and bring happiness from one balcony to another in Italy and other countries, breaking the devastating silence and bringing a breath of life, like a breath that resurfaces the social potential of the human being. The Lives replace large events, avoiding the crowds favorable to contagion and enter our homes to bring a new breath with music and constructive messages of health protocols, narratives of experiences and deaths that live side by side in the womb of society.

The epidemics ravaged Brazil in several periods such as the late nineteenth century and had wide repercussions in the Revista Ilustrada, coordinated by the Italian-Brazilian cartoonist Ângelo Agostini, which circulated in Brazil from 1876 to 1898. The fear of illness and death accompanies us throughout history and generates practices and representations associated with the historical context of the time (Fig 1).

Figure 1. AGOSTINE, Angelo. Illustrated Magazine, 1881, p. 1 – "Come, darling epidemic! I have prepared the city for you as best you can so that you may have a splendid harvest of lives.".

Today, the Covid-19 pandemic claims thousands of lives in Brazil and in the world, and the way we appropriate the tragic reality leads us to produce representations that slip, in many cases, to scientific denialism and contribute to the fact that many lives are still lost by discourses and practices emptied of scientific foundation.

In a report by Pedro Henrique Gomes, "when answering on Monday (20) to a journalist's question about the number of deaths from coronavirus in the country, President Jair Bolsonaro stated that he is not a "gravedigger"" (GOMES, 2020). Referencing in the same report the response given by President Jair Bolsonaro on March 29, 2020 to a journalist in front of the Alvorada Palace in Brasilia who commented on the death toll in the country from the Covid-19 pandemic: on 03/29 after returning from a trip to Brasilia Bolsonaro repeated the argument that "this is a reality, The virus is there. We're going to have to face it, but face it as a man. Not as a tomboy. Let's face the virus with reality. It's life. We're all going to die one day."

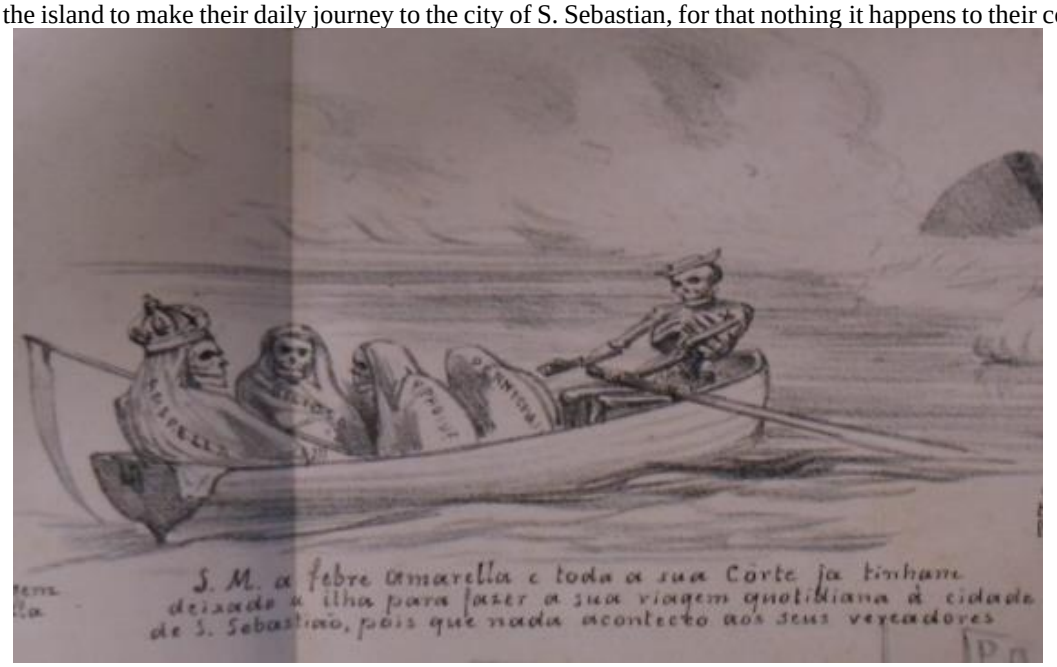
In the Illustrated Magazine of 1878, Ângelo Agostini presents in Fig.2 the representation of the epidemics that threatened the city of Rio de Janeiro, at the time the capital of the country, as three skeletons armed with their sickles to reap the lives of poor mortals: Yellow Fever, crowned in the

center, reigning over Typhoid Fever and Pernicious Fever also crowned. Today, the crown is on the coronavirus that prevails over Yellow Fever, Dengue, Chikungunya and Zica.

Figure 2. AGOSTINI, Angelo. Illustrated Magazine, 1878, no. 101, p. 4. "Ella is accompanied by her cousin-sisters and ruling with all her might. Terrible reign of death."

In Fig. 3, in addition to the aforementioned skeletons representative of Yellow Fever, Pernicious Fever and Typhoid Fever, there is also a canoe guided by a skeleton that serves as a boatman that goes towards the city of São Sebastião do Rio de Janeiro, the Bilious Fever that caused panic among the population.

Figure 3. AGOSTINI, Angelo. Illustrated Magazine, 1881, no. 238, p. 4. "S. M. the yellow fever and all his Court had already left the island to make their daily journey to the city of S. Sebastian, for that nothing it happens to their councillors."



In Fig 4, a woman full of pustule with a sickle appears threatening the city of Rio de Janeiro represented by another well-dressed woman, white and with a crown on her head who asks for help at the feet of the representatives of the Hygiene Board. An appeal launched to the representatives of the Junta responsible for combating epidemics as a last resort of a population terrorized by smallpox. It is worth remembering that in 1878 we were living in the form of monarchical government and the city of Rio de Janeiro was the capital of the country, so in her representation as a female figure she appears crowned. It is interesting to note that, despite the immense black population residing in the city, she still appears as a white woman, although the Revista Ilustrada defended abolition and the Republic. The stigmas of racism and prejudice also derived from slavery were present. Only those who had access to literacy would read and understand the caricatures, cartoons and texts published in the periodicals and this raised the old system of social exclusion more incident on blacks and browns. In addition to slavery, the poverty, misery and lack of schooling that affected the great mass of the Brazilian population in those times led to social exclusion.

Figure 4. AGOSTINI, Angelo. Illustrated Magazine, 1878, no. 131, p. 5. "The Government and the Board of Hygiene seek to save the city from the cruel epidemic."

Social theories appear most strongly in the nineteenth century, the time of Social Darwinism and an effervescent scientific discussion, seeking answers sometimes linked to prejudices, discourses and discriminatory practices.

> In general, until the second half of the nineteenth century, miasms would enjoy wide acceptance of all the ideas that would attribute the origin of epidemics – tertian fevers, yellow fever, cholera, etc. Such strange elements would usually be defined as imperceptible substances dissolved in the atmosphere, originated from the decomposition of corpses, organic elements, or even by emanations of patients. (ALMEIDA, 2018, p. 121-122)

> Medical explanations for the appearance and spread of yellow fever epidemics at the Court at two different times—in the 1850s, when the disease first appeared, and in the early 1870s, when it returned after relatively prolonged absence during the 1860s—demonstrate the continuing interdependence between medical thought and political and racial ideologies. [...] In other words, in dealing with the problem of yellow fever at a particular historical moment, the public health authorities of the governments of the Second Reign invented some of the essential foundations of the so-called "whitening ideal" – that is, the configuration of a racial ideology based on the expectation of eliminating the African heritage present in Brazilian society. Such elimination would occur through the arrival of immigrants, the encouragement of miscegenation in a demographic context altered by the massive arrival of white Europeans, by inertia and also by the operation of ill-confessed specific public health policies. (CHALHOUB, 1996, p.63)

It is a well-known fact that the denunciation made in the nineteenth-century cartoon by Ângelo Agostini in Fig 5, in which figures appear representing the rich with their properties squandering water and others representing the poor, who depended on fountains that did not meet the demand of the low-income population to supply themselves (Fig. 6) points to a current problem: How to meet hygiene protocols without water, which becomes a key element to prevent the spread of viruses such as corona? The absence of public policies that guarantee the equity of rights leads to social disparities that are

aggravated by the demographic increase and the rooting of the stigmas that we inherit, such as racism and social exclusion.

Figure 5. AGOSTINI, Angelo. Illustrated Magazine. 1878, no. 101, p. 4. "There is a great lack of water, and yet it is waited for by the rich who have it to spare at the expense of the poor who have none."

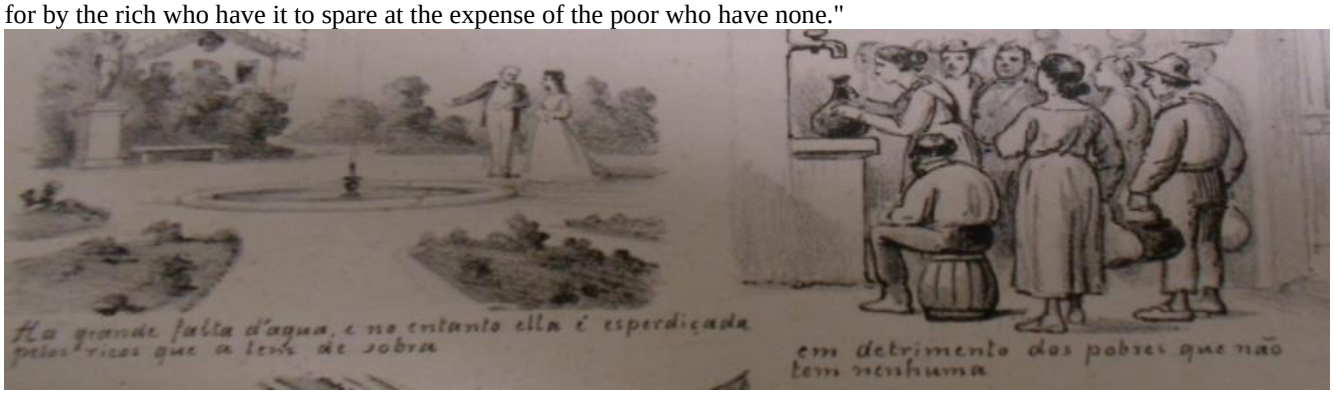
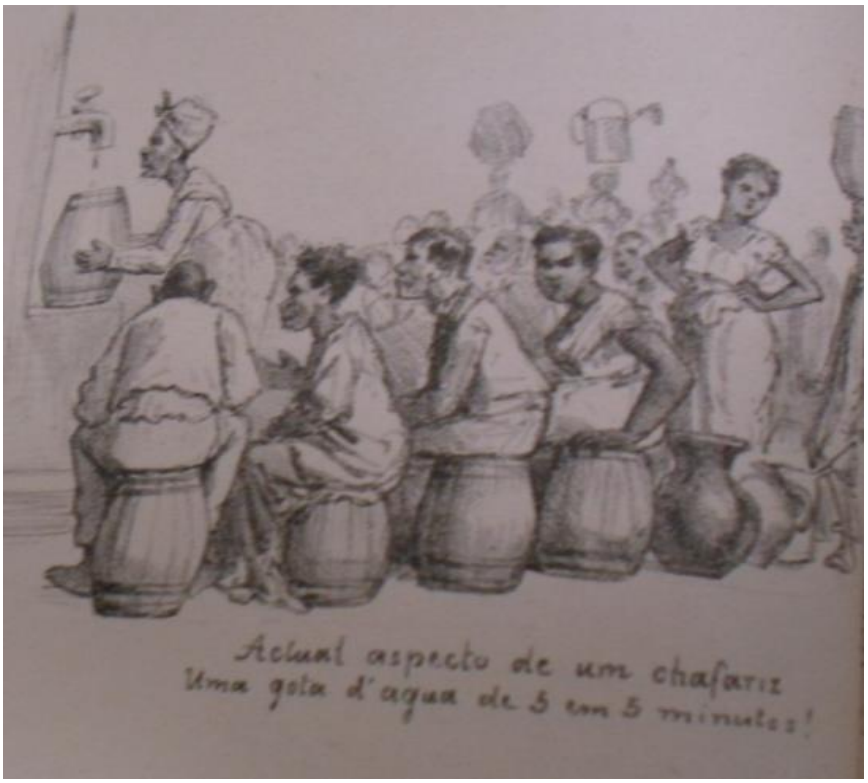


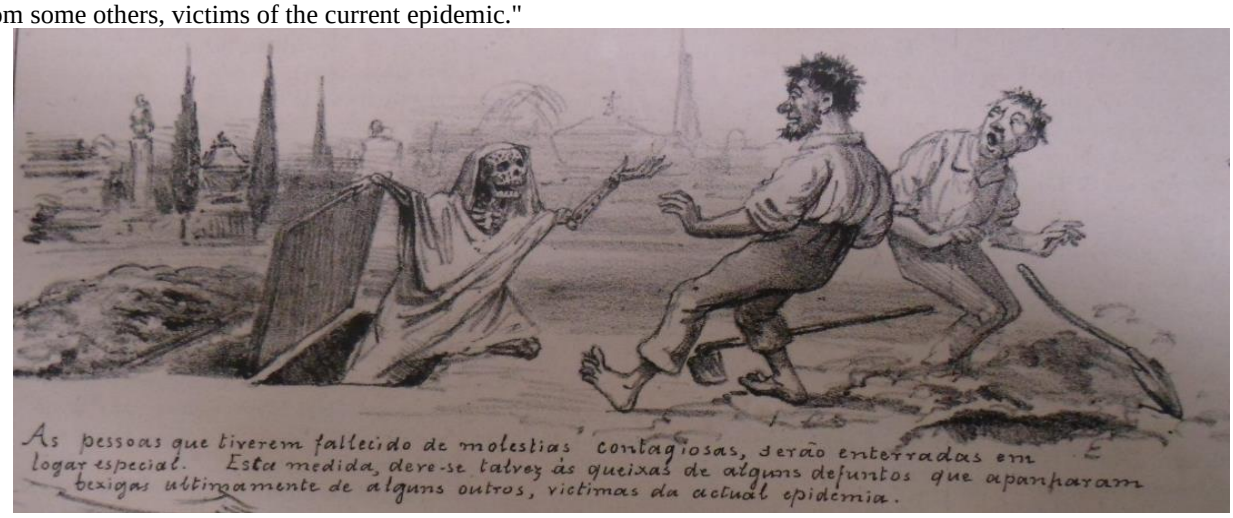
Figure 6. AGOSTINI, Angelo. Illustrated Magazine, 1878, no. 101, p. 4. " Current aspect of a fountain. A drop of water every 5 minutes."



On the other hand, the lack of affirmative action by the federal government to control the pandemic, following the health protocols already established by the scientific area, leads us to see chaos settling even in the first wave of the coronavirus pandemic, as occurred in Manaus, with regard to the high amount of bodies to be buried in the already crowded cemeteries. Pits were opened on a large scale very close to each other, while rows of refrigerated trucks formed with the bodies of pandemic victims awaiting burial. In Fig. 7, one sees the image of a deceased complaining that he

contracted bladders with other neighbors buried next to him, given the proximity of the graves in the cemetery.

Figure 7. AGOSTINI, Angelo. Illustrated Magazine, 1878, p. 4. "People who have died of contagious diseases will be buried in a special log. This measure is perhaps due to the complaints of some deceased who have lately picked up bladders from some others, victims of the current epidemic."



On March 18, 2020, in Bergamo, Italy, we saw a convoy of army trucks pulling out hundreds of bodies to be buried outside the city. In Rio de Janeiro, in 1878, as presented in his social satire the Revista Ilustrada (Fig. 8), the innovation thought to deal with the high amount of bodies to be buried victims of epidemics was to propose the creation of a crematorium in the vicinity of the city and transport them by train, called a mortuary car, to the burial site. This leads us to recover the old hygienist discussion of the nineteenth century of building secular cemeteries, without the control of the brotherhoods, to avoid the spread of diseases with the practice of intramural burials in churches and their churchyards. To transport the bodies to the cremation site in Rio de Janeiro, it was thought to use mortuary trains adapting the city to the modern standards they cherished then. The railroads symbolized the modernization of Brazil in the nineteenth, a product of the Industrial Revolution. Due to the demand caused by Covid-19 in the twenty-first century, refrigerated trucks, a product of the current modernization, waited crowded with corpses for burials in the crowded cemeteries.

Figure 8. AGOSTINI, Angelo. Illustrated Magazine, 1878, no. 134, p. 4. "Ahi will be roasted. The people who, after long soffrimentos on earth during their lifetime, want nothing more with Ella after death. And so they will be reduced to ashes, which is much more Tasteful, comfortable and elegant."

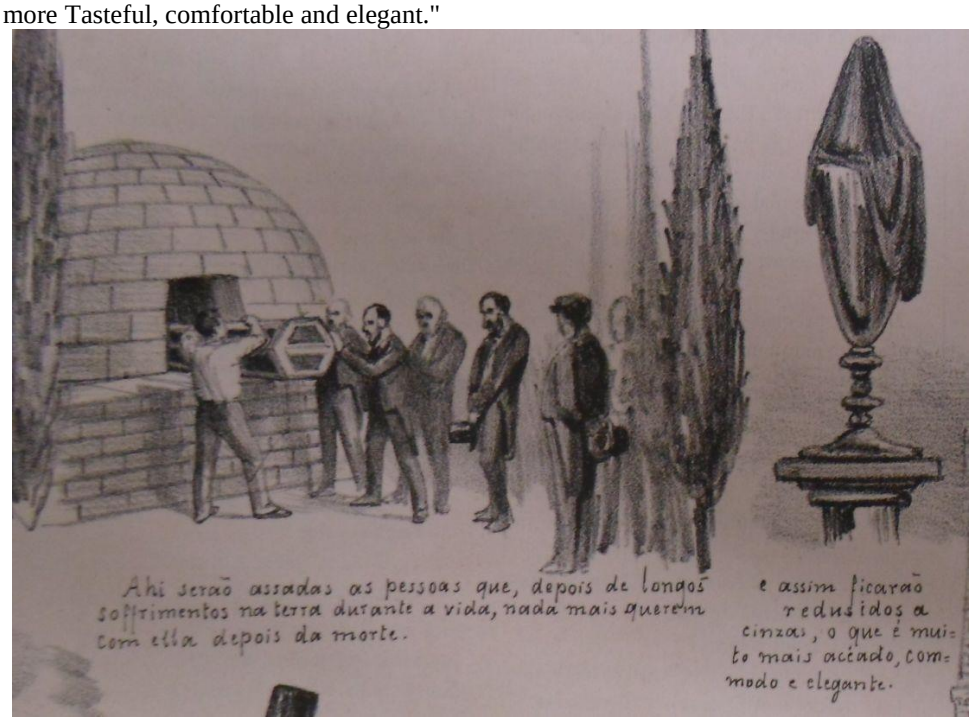
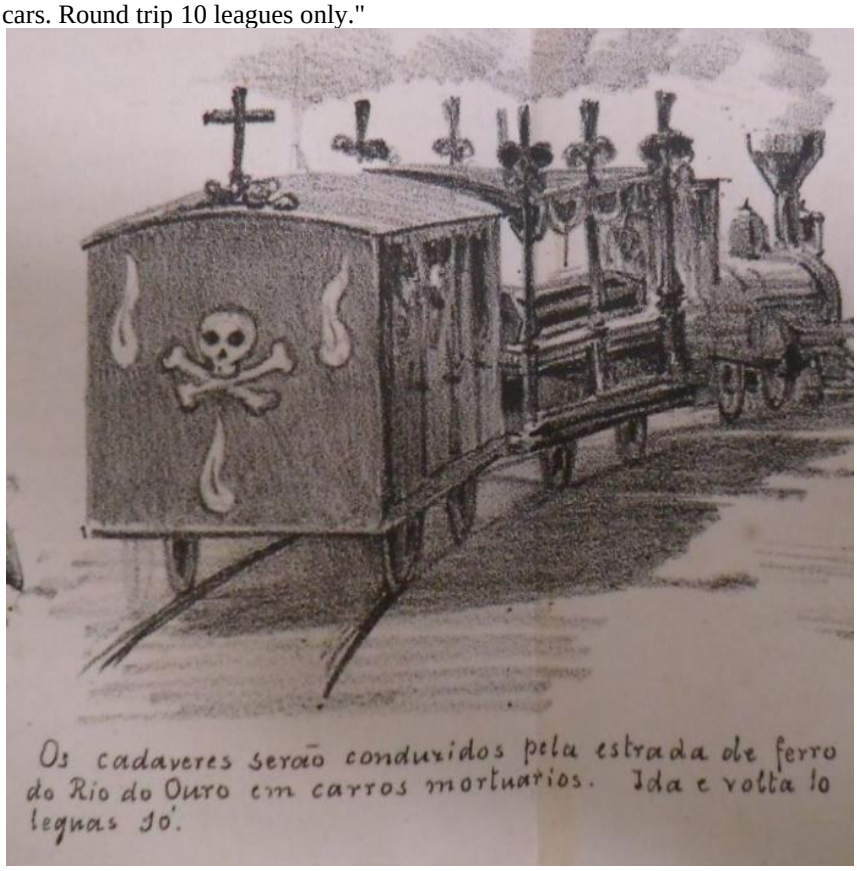


Figure 9. AGOSTINI, Angelo. Illustrated Magazine, 1878, no. 134, p. 4. "The corpses will be driven by the Rio do Ouro railroad in mortuary cars. Round trip 10 leagues only."



This comparative study between the representations of fear of diseases and death in Covid-19 and in the cartoons of Angelo Agostini at the end of the nineteenth century allows us to evaluate by fragments daily experiences in times of pandemic and epidemics that inexorably claimed thousands of lives and left their physical and psychological sequelae in the Brazilian population.

We have learned to deal with our fears and to face illness and death itself with a greater spirit of solidarity, but we still face the barriers imposed by ignorance and disregard for the health of the population that still affect some rulers and part of the population that insists on not listening to science and the need for responsibility and respect in social coexistence. Many lives could have been preserved with respect to health protocols. The demand for public policies that support the less favored layers of the population with water supply, indispensable to the fight against diseases, electricity supply, product of the second Industrial Revolution in the nineteenth century, education and health, which should be priorities in any government, become urgent concerns so that we can tread the path of social welfare together and together, thus ensuring the construction of a society guided by respect for human rights and collective accessibility to happiness.

Today, June 19, 2021, we have reached a terrifying level of 500,022 deaths (GLOBO, 2021) since the beginning of the pandemic in Brazil in 2020. We have already lost more than half a million lives in Brazil. Vaccination is being expanded and new vaccines appear in the Brazilian scenario to give us new breath to continue in the fight for survival and for the experience of better days.

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