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EYES ON HEALTH SCIENCES

V.01



Isabele de Souza Carvalho
(Organizadora)

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Dear readers,

We would like, initially, to remind you that this work deserves praise and reverence, and such compliments are intended for the authors who have disposed their knowledge in favor of the health area. Furthermore, the questions and studies proposed and presented here concern health, one of the most important matters for the development of a common good and longevity. When we think about life, we think about living the best life possible, and this is only possible thanks to scientific and technological advances of several generations. From the initial vaccines to the development of the vaccine that helped fight COVID-19, we have gone through several decades of progress, all of which were made in a collective way by several peoples. Thus, thinking of contributing to the connection and dissemination of studies for various cultures, this work was thought and planned by people from different countries and done internationally. Therefore, seeking to cover a small part for the sake of future development. Finally, we hope that if you feel instigated to participate in other works, you will contact us and enjoy the reading.

Sincerely,

The publisher.

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Chapter 1

Bedside nursing care for patients on hemodialysis

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ABSTRACT
The aim of this study is analyzed as related to kidney problems, with an emphasis on kidney function and nursing care for patients on hemodialysis at the edge. With regard to, a bibliographic and documentary analysis was used through national and international scientific articles, dissertations and theses indexed in databases such as Biblioteca Virtual de Saúde and PUBMED, in the last 10 years. This study was carried out in three aspects for the understanding of the investigated proposal: the Kidneys and a Renal Insufficiency; hemodialysis as a treatment modality for renal dysfunction and nursing care with hemodialysis at the bedside. Through professional results for the development of specific care for these patients. Studiesm that the experience as a facilitating element for hemodialysis is care for patients at the bedside. Therefore, the presence of the nursing team is crucial in the implementation and execution of care in order to avoid and observe possible complications at the time of hemodialysis.

Keywords: Nursing Care, Hemodialysis Solutions, Nephrology nursing, Kidney.

1 INTRODUCTION

Patients who have kidney disease are affected by several physical as well as psychological manifestations that require specialized interventions as well as personalized care. The accumulation of blood toxins occurs when the kidneys no longer perform their function effectively. In case of kidney failure, the individual needs invasive interventions to progress treatment and improve quality of life. One of these interventions is hemodialysis, whose goal is to filter the patient's blood through a machine. The blood is received through a catheter or arteriovenous fistula, and the existing toxins are removed. In this process, a semi-permeable membrane or solution is used, and this filtered blood is returned to the patient's vascular system. The procedure takes three to five hours and can only be performed in specialized clinics or hospitals. The patients that need hemodialysis require complex interventions, and are, therefore, a challenge for the Single Health System (SUS), due to the consultations, procedures, exams, or surgeries. Bedside hemodialysis is commonly performed in Intensive Care Units (ICU) for the maintenance and treatment of hospitalized chronic renal patients, but can also be performed in clinical wards. Thus, it is important to emphasize the aspects associated with this type of bedside care, with emphasis on nursing care and team qualification.

According to Ponce et al. (2019), hemodialysis care requires technical and scientific knowledge from the multiprofessional team, and integrated and cohesive actions are required for successful care. Regarding the nursing team, it is a category of professionals who offer continuous and direct assistance to

hemodialysis patients, including preparation, fistula puncture, catheter management, monitoring, machine management, and circuit structuring. Moreover, emotional and humanized care to the assisted patients is also required. For the nurses, specifically, the attributions consist of coordination, administration and supervision of the team. Thus, it is observed the complexity of the functions and the relevance for the assistance to hemodialysis patients at the bedside to be effectively performed.

Hemodialysis is a procedure performed by trained professionals and requires knowledge, skill and attitude, especially in the face of adverse events that may occur with the patient. At the bedside, it is essential to have trained and qualified professionals, since the difficulty in effectively performing the necessary care in hemodialysis can trigger vulnerabilities regarding nursing care and complications during the procedure. From the above, the research problem of this study is: "What are the nursing care involved in the assistance to the patient in hemodialysis treatment at the bedside?" In this sense, it is observed that because nursing corresponds to the area with the largest numerical volume of professionals in health, the direct contact offered by this category is evident, and in the treatment to the dialysis patient, it becomes essential to highlight the care involved, as well as provide a more solid training to these professionals in joint action to chronic renal patients on dialysis treatment - with emphasis at the bedside.

Given the above, the purpose of this study is to analyze the evidence related to kidney problems, with emphasis on renal failure and nursing care for hemodialysis patients at the bedside.

2 METHODOLOGY

This was a bibliographic study, specifically a narrative literature review. It consists of a broad analysis of the literature, not establishing strict methods for its execution (Vosgerau & Romanowski, 2014). However, it is an extremely important method for updating a specific theme, highlighting evidence and discussions from the data reported (Rother, 2007).

According to Minayo (2011, p. 16), understanding the methodology of a research is based on the "[...] path of thought and the practice exercised in approaching reality." According to Ludke and André (1986), "document analysis seeks to identify factual information in documents from questions and hypotheses of interest." As clarified by Boccato (2006, p. 266):

> The bibliographical research seeks the resolution of a problem (hypothesis) through published theoretical references, analyzing and discussing the various scientific contributions. This type of research will bring subsidies to the knowledge about what was researched, how and under which focus and/or perspectives the subject presented in the scientific literature was treated. Therefore, it is of utmost importance that the researcher carries out a systematic planning of the research process, from the thematic definition, through the logical construction of the work, to the decision of its communication and disclosure form.

In this aspect, we reaffirm what was mentioned above, and we used as systematization, the search in the following databases: VHL (Virtual Health Library) and PubMed PUBMED library (*National Library of Medicine*). Thus, it was considered the controlled descriptors present in the *Medical Subject Headings*

(MeSH) and Descriptors in Health Sciences (DeCS) - and non-controlled (keywords) by crossing the following descriptors and the Boolean operators "and" and "or": "Nursing Care" or "Nursing in Nephrology" and "Hemodialysis Solutions" and their respective translations into English. Studies published in the last ten years, in Portuguese and English, with full-text availability, including articles, theses, dissertations and other scientific studies were searched. Exclusion criteria: studies that did not have the full text available were later critically and reflexively analyzed by the researchers.

3 RESULTS AND DISCUSSION

This study was anchored on three strands for the understanding of the investigated proposal: the kidneys and renal failure; hemodialysis as a treatment modality for renal failure, and nursing care with hemodialysis patients at the bedside.

> Nursing professionals play a key role in hemodialysis treatment. It is extremely important to promote care, in all aspects, for these patients who need this procedure to be performed (Pires et al., 2017, p. 2239).

The kidneys are organs located below the ribs, in the abdominal cavity. These structures make up the urinary system, responsible for producing urine, one of the main products of organic excretion. Among the functions of the kidneys are: blood filtration; pH regulation; maintenance of balance; ionic concentration, electrolytes and solutes; excretion of toxic products to the body; secretion of hormones (erythropoietin - regulates the production of white blood cells, and renin - regulation of blood pressure through the renin, angiotensin, aldosterone system (Guyton & Hall, 2011).

Renal failure is a condition in which there is loss of kidney capacity to perform its basic functions. This condition may be acute or chronic. Acute renal failure (ARF) is the rapid loss of kidney function, whereas in chronic renal failure (CRF), this loss occurs slowly and is irreversible. In ARF, there may be some kind of kidney damage from, for example, shock, sepsis, burns, dehydration, excessive diuretics, heart failure, or renal obstruction. Some medications are also toxic to the kidneys and can lead to AKI, such as antibiotics, anti-inflammatory drugs, and some chemotherapy drugs. As for recovery, it varies depending on factors such as age, kidney function prior to the injury, and other comorbidities. Some people recover function, others may remain with function below normality, and there are those who depend on hemodialysis throughout their lives. Kidney disease can be avoided through some care, such as: balanced diet, especially avoiding excess salt and red meat; physical activity; control of blood pressure and diabetes and not smoking (Pires et al., 2017).

Chronic renal failure is the slow and irreversible loss of kidney function. Terminal chronic renal failure, on the other hand, occurs when kidney loss is greater than 85%, triggering an increase of toxins in the body, requiring treatment to replace the kidneys' function. In general, patients with kidney failure do not experience symptoms unless it is more advanced. However, the following can be observed: fatigue,

difficulty concentrating, altered appetite, difficulty sleeping, swelling, dry and irritated skin, and polyuria, especially at night (Pires et al., 2017). Among the treatments for chronic renal failure, one can mention the conservative one, based on guidelines, medications, and diet; renal transplantation; and the types of dialysis: peritoneal and hemodialysis, which will be discussed in this study.

Chronic kidney disease is characterized by irreversible kidney loss or reduced function for a period greater than or equal to three months, identified by urinary, blood, and laboratory changes (Evangelista et al., 2019; Freitas et al., 2018). Early diagnosis of the disease enables intervention with conservative treatments, such as dietary restrictions and medications (Barbosa et al., 2019). Other strategies refer to kidney transplantation and dialysis processes that encompass Continuous Ambulatory Peritoneal Dialysis (CAPD), Automated Peritoneal Dialysis (APD), Intermittent Peritoneal Dialysis (IPD) and Hemodialysis (HD), the latter being the most widely used therapeutic form (Malekshahi et al., 2018). In this study, the emphasis will be on patients undergoing hemodialysis, especially at the bedside. In this sense, it is highlighted that patients undergoing hemodialysis treatment need nursing care ranging from humanized, informative assistance, with clarification of doubts, to direct interventions at the time of hemodialysis and prevention of complications (Malekshahi et al., 2018).

It should be considered that hemodialysis constitutes a treatment that corroborates the perspective of life of these patients, since nephropathies are considered irreversible processes, and therefore, it is a widely used and essential modality in the treatment of these subjects. Some studies suggest that hemodialysis can culminate in changes in the quality of life of the patient, due to discomfort, fatigue, sleepiness, restriction of physical activities and affected self-esteem (Ottaviani et al., 2016).

> Hemodialysis is an important alternative for the maintenance of life of the renal patient, but, by the patients, it is seen as a debilitating experience and sometimes described as a situation of dependence and loss of autonomy, because it generates some difficulties for work and others, even greater, for travel. The hemodialysis machine, therefore, is an indispensable piece of equipment for life. Patients who depend on the procedure develop strategies of relationship with the process and a not always harmonious relationship with the machine.(Santos et al., 2018, p. 855).

Nursing care to hemodialysis patients at the bedside is based on the training of professionals for the development of specific assistance to these patients. Studies show that experience is a facilitating element for the effectiveness of care for hemodialysis patients at the bedside (Ponce et al., 2019).

> Bedside hemodialysis is a complex therapy that can generate serious adverse events to the patient. Therefore, it is necessary to review the quality management of processes and risks involving this therapy, formulating effective barriers to incidents, reviewing protocols and routines constantly. (Costa et al., 2021, p. 9).

Among the nursing care, one can mention the management of the machine and the circuit, equipment records, request of medications, record in the medical records, checking of hemodialysis materials. The nurse is specifically responsible for conducting health education, both with the team, students, patient and family members (Ponce et al., 2019). "However, the demand for specialized skills of other professionals is

considered a challenge of the work in hemodialysis, since they are not always available and/or are not exclusive to the sector." (Ponce et al., 2019). However, the performance of the nursing team in hemodialysis at the bedside faces some challenges, such as lack of support from the multiprofessional team, which leads to a high workload for nursing. Studies suggest that the presence of the professional nurse generates in the patients a feeling of welcome, physical and emotional safety, besides the qualification, esteem, and concern that are demonstrated by the professionals. It is observed that nursing care also includes aspects inherent to emotional support and humanization (Shahdadi & Rahnama, 2018).

> It is up to nurses to organize and plan their routine in order to reconcile their practical and administrative activities for the quality and safety of the hemodialysis service and patient care. The junction, instead of fragmentation, is the way to guarantee the integrality of care and for that, the professionals should seek/solicit - supported by the legislation - the necessary resources for the creation and/or implementation of tools and instruments that optimize their time and potentiate the assistance in hemodialysis (Marinho et al., 2021, p. 358-359).

Among some precautions, we can mention: inspection of the catheter and the insertion site; signs of inflammation or vascular trauma in the arteriovenous fistula, checking the infusion rate at the time of hemodialysis (Spigolon et al., 2018). At the bedside, it is important to pay attention to vital signs every thirty minutes, observation of access routes, patient safety with a view to infection control, psychological support, pain assessment, and medication administration according to medical prescription (Freitas & Mendonça, 2016). The presence of the nursing team is crucial in the implementation and execution of care in order to avoid and observe possible complications at the time of hemodialysis (Nísio et al., 2017). It is noteworthy that the nurse should assume the coordination at the time of hemodialysis, verifying the needs of each patient, and intervene through the qualification of the team, continuing education and guidance to the patient and family (Pires et al., 2017).

4 CONCLUSION

Through this study, it is observed that patients with renal failure requiring hemodialysis require special care to ensure their health and quality of life. Thus, it is necessary to emphasize the need to ensure the quality of care in the follow-up care in order to provide successful care, especially at the bedside, given the complexity of adverse events.

Furthermore, the nursing team, as well as nurses, must be professionals who are prepared to provide adequate care, enabling the guarantee of success in the processes involving hemodialysis. The possibility of suggesting modifications within the scope of the reality proposed by the theme, refers to the reflection about the team's performance, rethinking the work process and providing greater training for professionals in relation to patients with renal failure, since the academic training and, subsequently, perpetuating throughout the professional performance through proposals for continuing education for the improvement of the care offered, possibilities and improvements in daily routines at the bedside. It is suggested that further studies are conducted on the theme, in order to deepen the investigation related to

nursing care of hemodialysis patients at the bedside, especially with regard to the difficulties and potentialities of this assistance. Research with this emphasis may corroborate with an effective care as to hemodialysis and improve the care in relation to this issue since the formation during the nursing graduation and in the professional daily life.

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Chapter 2

Analysis of the number of syphilis hospitalizations in elderly women in Brazil between 2010 and 2019 by age group

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ABSTRACT
Introduction: The incidence of syphilis has increased among elderly women. As this is a public to which sexual health is less promoted, and which has lower adherence to routine gynecological evaluations, a public health problem arises. Objectives: To describe the trend in syphilis hospitalization rates in elderly women in Brazil between 2010 and 2019. Methodology: This is a descriptive ecological study, which used data taken from the Health Information System (TABNET), in the SUS Hospital Morbidity tab by Place of Residence, covering the whole of Brazil. Results: In all, 389 hospitalizations for syphilis were recorded. The 60 to 69 age group accounted for most records, with 215 notifications. In contrast, the group that grew the most in this period was the 70 to 79 year olds, with an increase of 1033.3%. Furthermore, 2019 was the year with the most records, with 91 notifications. Finally, in 2011, there were 9 hospitalizations, representing the lowest number of cases. Discussion: In this research, the possible causes of the increase in the number of syphilis cases in elderly women over 60 years old are discussed. Among the reasons are: aging of the population with consequent increase in the years of sexual activity of the elderly, lack of information about condom use, physiological changes in the body of the elderly, lack of knowledge about sexually transmitted infections, as well as lack of public policies to encourage prevention, screening and diagnosis of syphilis in the elderly. This makes women over 60 become a population at risk and vulnerable to syphilis infection. Conclusion: The results reinforce the need to promote awareness and information strategies for this population and to sensitize health professionals to an investigative look for suspicion and early diagnosis of syphilis in elderly women, thus avoiding more severe outcomes of the disease.

Keywords: Syphilis, Hospitalizations, Elderly.

1 INTRODUCTION

The aging of the Brazilian population was triggered by the increase in life expectancy associated with lower fertility rates, such that by 2025 Brazil will be the 6th country with the largest number of elderly people. In this scenario, many advances have led to the rediscovery of sex life in the elderly population,

such as the advent of medications for erectile dysfunction and hormone replacement therapy; being a population that, until recently, was not very sexually active, there are no incisive campaigns about contraception and protection against sexually transmitted infections (STIs), among which is syphilis (CARVALHO, 2021). Added to this is the fact that the elderly population, especially older women, commonly fail to maintain their routine gynecological evaluation. It is estimated that, in many cases, when a gynecological problem is diagnosed, it has already presented symptoms for about 8 months and the preventive evaluation has not been performed for about 4.5 years (SCHONBERG et al. , 2008). Several factors contribute to this regular absence to the gynecologist (NOBILE, 2002), such as: reduced physical mobility, with restrictions for gynecological examination and ignorance of alternative possibilities for its evaluation; embarrassment in undressing or even in exposing their sexual needs or difficulties associated with physiological changes of aging that, in general, are not socially respected or impose a greater burden to the elderly woman to undergo gynecological examination; ignorance of the real needs of prevention and early diagnosis of gynecological diseases, which when properly diagnosed and treated, allow improvement in quality of life and longevity.

In this context, the problem of syphilis becomes an important agenda. This disease is a curable chronic infection, transmitted by the *Treponema pallidum* bacterium mainly through unprotected sexual intercourse, whose occurrence is related to socioeconomic factors, such as poverty, HIV coinfection, drug use, and difficult access to health care, for example. When untreated, syphilis can evolve to primary (genital lesions and local lymphadenopathy), secondary (headache, fever, and generalized maculopapular lesions), latent, and tertiary (cardiac, neurological, visceral, and bone lesions) stages. Since 2010, when it became a compulsorily notifiable disease, the incidence of syphilis has consistently increased (which would justify the initial increase in detected cases, but the growth has been constant, not having yet occurred a plateau state of the number of cases), including in the elderly population (NATÁRIO et al., 2021). It is worth adding that syphilis cases are rare in its primary or secondary presentation in old age. However, tertiary syphilis may be the product of contamination in adulthood, at a time when treatment was not as effective. This fact is important to be investigated in patients whose dementia picture has its etiology investigated, since it may chronify and have neural involvement (neurosyphilis).

2 OBJECTIVES

To describe the trend in syphilis hospitalization rates in elderly women in Brazil between 2010 and 2019; to compare these rates between each age group, proposing interpretations for the results and possible interventions.

3 METHODS

This is a descriptive ecological study, which used data taken from the Health Information System (TABNET), in the SUS Hospital Morbidity tab by Place of Residence, covering all of Brazil. During the

search in the platform, in the row section, "Year processing" was selected, in the column section, "Age group 1" and, in the content variable, "Hospitalizations", considering the interval from January 2010 to December 2019. The category chosen in the ICD-10 Morbidity List was "Other syphilis" and in the "Sex" category, female was selected. For data analysis, the percentage difference between the hospitalization rates in 2010 and 2019, for each age group, was calculated and discriminated in which of them there was a greater increase. The Microsoft Excel program was used to prepare the graphs and spreadsheets used to show the results found.

4 RESULTS

There were 389 hospitalizations for syphilis in women over 60 years in Brazil between January 2010 and December 2019, of which 215 (55.27%) were in the age group between 60 and 69 years, 122 (31.36%) between 70 and 79 years, and 52 (13.37%) had more than 80 years. The highest number of reported cases, throughout the studied period, was observed in the year 2019 (n=91), representing 23.4% of the total, and the lowest in the year 2011 (n=9), corresponding to 2.3% of the total, as presented in Table 1.

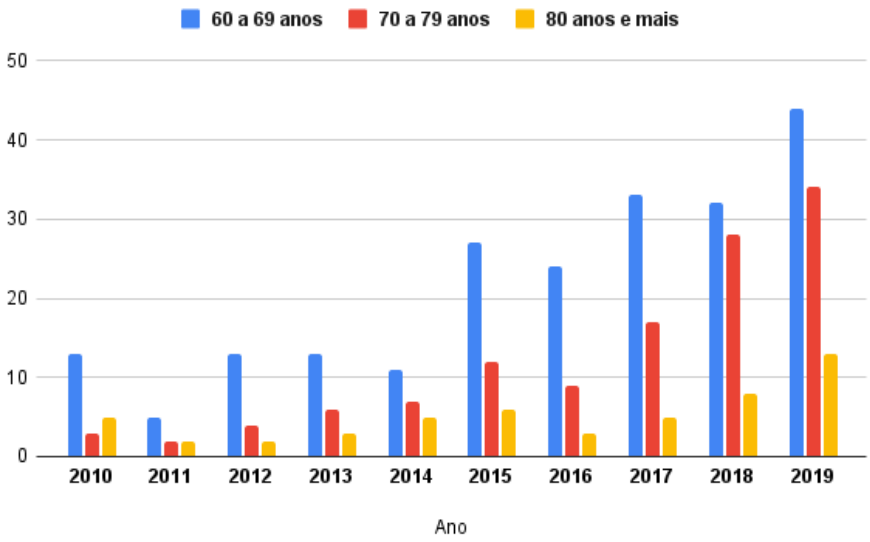
With regard to the growth rate during the observed period, in the year 2019 the amount of hospitalization notifications for syphilis in the elderly population was 91, which represents an increase of 70 hospitalizations compared to the 21 notifications made in 2010, corresponding to a percentage increase of 333.33%.

Table 1 - Syphilis hospitalizations in elderly women between 2010 and 2019 in Brazil.

Ano	60 a 69 anos	70 a 79 anos	80 anos e mais	Total
2010	13	3	5	**21**
2011	5	2	2	**9**
2012	13	4	2	**19**
2013	13	6	3	**22**
2014	11	7	5	**23**
2015	27	12	6	**45**
2016	24	9	3	**36**
2017	33	17	5	**55**
2018	32	28	8	**68**
2019	44	34	13	**91**
Total	**215**	**122**	**52**	**389**

Source: Adapted from DATASUS (2022).

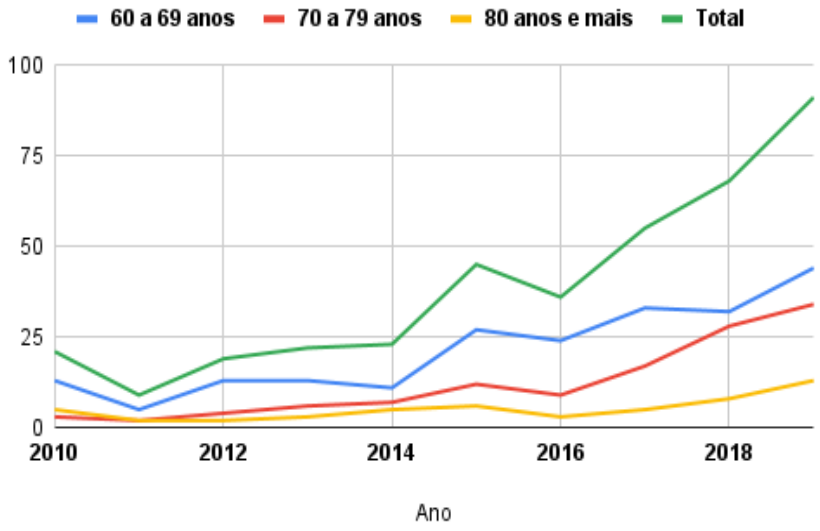
Graph 1 - Notifications of syphilis hospitalizations by age group between 2010 and 2019



Caption: Blue: 60 to 69 years old, Red: 70 to 79 years old, Yellow: 80+ years olds
Source: Prepared by the authors (2022).

With regard to the age groups, Chart 1 shows that the greatest increase occurred in the elderly women aged 70 to 79 years, going from 3 to 34 hospitalizations in 2010 and 2019, respectively, which represents an increase of 1033.33% in the aforementioned period. On the other hand, in the 60 to 69 age group, there was a 238% increase in the number of hospitalizations. In the elderly women aged 80 years or more, there was the smallest increase, which was 160%.

Graph 2 - growth curve of syphilis hospitalizations cases by age group between 2010 and 2019.



Caption: blue: 60 to 69 years old, red: 70 to 79 years old, yellow: 80+ years old, green: total
Source: prepared by the authors (2022).

5 DISCUSSION

Data from the Brazilian Institute of Geography and Statistics showed that there was an increase in the longevity of Brazilians and the life expectancy of the elderly by 8.3 years from 1940 to 2019 (CRELIER, 2020). In 1940, an individual, upon reaching age 65, would expect to live an average of 10.6 years longer, as well as the population aged 65 and over corresponded to 2.4% of the total national population. In 2019, it was found that, compared to the data referring to 1940, at 65 years of age a person expects to live an average of 18.9 more years, as well as there was an increase in 7.1 points of the percentage of the population in this age group, corresponding to 9.5% of the total Brazilian population (CRELIER, 2020), which justifies a greater participation of the elderly in all spheres of life, including sexual.

Although society sees sexual activity as restricted to a certain group of people, usually the young, studies show that the increase in age does not exclude the sexual desire of the elderly population, inferring also that most of this population remains sexually active. This phenomenon is also due to the advance of medicine and the development of treatments and drugs that soften the deleterious effects of age on the sexual vigor and appetite of men and women, who now have stimulants of the most diverse kinds at their disposal.

Faced with the phenomenon of population aging that we are currently witnessing, the number of sexually active elderly tends to increase, but unfortunately this portion of the population tends to decrease the use of condoms, mainly due to lack of knowledge about the use, by judging that the condom hinders the erection at the time of sexual intercourse, in addition to the myth that preventive barrier methods would only be to prevent a possible pregnancy. (SILVA et al., 2014).

From the data collected, it can be seen that there was a significant increase in cases of hospitalizations for syphilis in women over 60 years of age between January 2010 and December 2019. Considering the entire interval from 60 to 80 years and more, it is clear that acquired syphilis is not an STI that should be regarded as insignificant in the elderly patient, because old age is assumed to be an asexual phase of life, therefore, with no need for disease screening, guidance, and prevention in this health sector.

The results obtained with the Health Information System (TABNET), show a total of 389 hospitalizations for syphilis in elderly women in the Brazilian regions for the period analyzed (table 1). There was a significant percentage increase of 333% between the years 2010 and 2019, with 21 hospitalizations in 2010 and 91 in the year 2019, considering the total number of hospitalizations.

For Neves et al (2015, p. 129), "stereotypical thinking, ignorance and prejudice negatively influence both the clinical examination of the patient and the detection of diagnoses of fundamental need". Therefore, not recognizing women over 60 as a population vulnerable to STIs is one of the problems involved in the demonstrated increase in infection and hospitalizations for syphilis in elderly Brazilian women.

In addition, older women have lower levels of estrogen in perimenopause, causing less lubrication and thinning of the vaginal mucosa, predisposing to microabrasions of the wall during sexual intercourse and facilitating the transmission of STIs such as syphilis (DORNELAS NETO, J. et al. 2015). The elderly

also have physiological changes, such as decreased cellular and humoral immunity, less activation of T cells, and decreased antibody production, which may increase the susceptibility of tissues to the action of microorganisms, facilitating infections.

Often, the lack of information to the elderly contributes to them practicing unsafe sexual relations, since they do not see themselves represented as the target population of advertisements, campaigns, public policies to encourage prevention, screening and diagnosis of syphilis, a fact that ends up facilitating this alienation that the elderly are not part of the generation of safe methods (DORNELAS NETO, J. et al. 2015) and makes this group vulnerable and at risk. (SILVA, et al. 2014).

Thus, the perception of the significant increase in the number of hospitalizations for syphilis in elderly women in Brazil points to the need for public policies, protocols and manuals aimed exclusively at preventing syphilis in this specific age group. Moreover, it is necessary to sensitize health professionals to an investigative look at the suspicion and early diagnosis of syphilis in elderly women, avoiding hospitalization outcomes, sequelae, and greater severity of the disease. Since the care of women's health should be global, not excluding the scope of sexuality in the elderly woman.

6 CONCLUSION

It is concluded that there was an increase in the number of hospitalizations for syphilis in all age groups, especially in the elderly women between 70 and 79 years. Such results are consistent with the increase in life expectancy that has occurred in recent years and with the change in the social paradigm of perceiving the elderly, especially the elderly woman, as a population group without sexuality. Therefore, because this is a population that until recently was seen as less sexually active, there are few campaigns, as well as low adherence to methods of preservation, which makes the elderly vulnerable to syphilis. Thus, the results reinforce the need to promote awareness and information strategies for this population regarding prevention and knowledge of signs and symptoms for suspected syphilis diagnosis, especially among the elderly women aged between 70 and 79 years, since it was the interval with the most expressive percentage growth in the analyzed period.

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Chapter 3

The use of antidepressants in health students area

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ABSTRACT
Depression is the most common of affective disorders (defined as mood disorders, not imbalances of thought or cognition); can vary from very mild change, bordering on normality, to more severe depression, accompanied by hallucinations and delusions. According to the latest surveys by the World Health Organization, on the incidence of depressive disorder, more than 300 million people live with depression, an increase of more than 18% between 2005 and 2015. The present study aimed to analyze the use of antidepressants in health students of a teaching institution located in the city of Montes Claros, MG. In this way, this research is a descriptive study, with quantitative, exploratory field analysis, in order to identify which courses use antidepressants and which antidepressant drugs are most used by health students. As a result, it can be seen that the drug of the SSRI class, fluoxetine, was the medicine most used by students and that the female was the most affected. The most affected age group was between 18 years and 24 years. The data indicate that the disease still has high prevalence among students, and what preventive measures should be taken.

Keywords: Depression, Antidepressants, Students.

1 INTRODUCTION

Lifestyle has caused a considerable increase in the incidence of disorders such as depression. This disease has already become a public health and economic problem with higher prevalence and growth in the world population (OLIVEIRA *et al*., 2016).

According to Rang *et al* (2012) this disorder is the most common of the affective disorders (defined as mood disorders, not imbalances of thought or cognition); it can range from very mild alteration, bordering on normality, to the most severe (psychotic) depression, accompanied by hallucinations and delusions.

The bouts of depression usually begin at a younger age group and is usually prevalent in the female gender, but it can affect all types of people, from children to the elderly. The most important risk factors are family history of depression, loss of close people, the female gender due to women having menopause, post menopause and postpartum, chronic diseases, professions that generate stress (FERNANDES, 2014; NERI, 2020).

This disease is an intense mood disorder, becoming the fourth most common reason for social disability in the world. Its etiology is still not very well understood, but there is evidence that the symptoms cause changes in the individual's behavior. One in every 20 people is affected by depression at a certain stage of life. Of every 50 cases, one would require hospitalization, and 15% of these would commit suicide. It is classified as a public health problem because of the social damage it causes, such as loss of initiative, drop in productivity (in studies and at work), cognitive changes, mood, psychomotor and vegetative changes, and general disinterest**. Over the** years, several psychometric instruments have been created with the objective of assessing the symptomatology of depression due to the worrying factor that by 2020 it will be the second largest disabling cause in the world (CAMARGO; SOUSA; OLIVEIRA, 2014).

There are two distinct types of depression, namely recurrent depressive disorder and bipolar affective disorder. The recurrent affective disorder is characterized by comprising repeated depressive phenomena. Throughout this phenomenon, the individual experiences a fragile mood, absence of interest and pleasure, accompanied by a reduction in general actions for a few weeks. People who have depression also experience symptoms such as feelings of guilt, low self-esteem, anxiety, lack of concentration, difficulties related to sleep and appetite, and even those that are incomprehensible. Bipolar affective disorder, on the other hand, is defined as changes in mood, which include episodes of high mood and depression alternating with stages of remission, and are related to mental and physical symptoms and specific performances (FERREIRA; GONÇALVES; MENDES, 2014).

In students, depression can be associated with stressful factors, such as fear of failure in their goals, family demands, and obligations in the job market, which leads the student to the possibility of psychosocial stress, damaging his/her health. These factors, when combined with individual propensities, may lead the student to present psychopathological conditions such as depression, anxiety, and suicide. Thus, students throughout their training are exposed to several stressors, such as dedication to studies, new responsibilities related to personal charges, external factors, their insertion in the labor market and their success as professionals, and it is not uncommon for them to develop mental disorders (SOUZA; TAVARES; PINTO, 2017).

Depressive symptoms vary and are similar in all age groups: depressed mood, nervous breakdowns, emotional instability, insomnia, psychomotor agitation or retardation, significant weight loss or gain, lack of energy or fatigue, feelings of guilt, difficulties in the ability to think or concentrate on their daily activities, suicidal ideas and thoughts of death, and several other negative thoughts. These symptoms can

present themselves for a minimum period of two weeks and harm the individual in social aspects or other important areas in their daily lives (COUTO; REIS; OLIVEIRA, 2016).

Antidepressant drugs are classified according to their pharmacological characteristics or chemical structures. Tricyclic Antidepressants (ATCs) such as amitryptiline, doxepin, imipramine, and protriptyline, which prevent the reuptake of monoamines, especially norepinephrine and serotonin, and to a lesser extent dopamine, are granted for the control of depression. Selective Serotonin Reuptake Inhibitors (SSRIs), the representatives are fluoxetine, paroxetine, citalopram, sertraline, and fluvoxamine, which block the transport of serotonin back into the cell. The Monoamine Oxidase Inhibitors (MAOI) are not yet fully clarified because they have been little studied, what is known is that it is inhibited the activity of the MAO enzyme, represented by tranylcypromine, isocarboxazid and phenelzine (BARBOSA; SILVA, 2012).

From this perspective, the objective of this work was to evaluate the use of antidepressants among health care students and which course most uses this class of drugs in a given higher education institution in Montes Claros-MG.

2 MATERIALS AND METHODS

This is a descriptive, cross-sectional study, with quantitative, exploratory, and field analysis in which students who use antidepressant medication in an educational institution located in Montes Claros-MG were evaluated.

For sample calculation, a sample of 1000 students enrolled in healthcare courses was used. With the help of the statistical program calculator, a minimum probabilistic sample of 200 students was calculated, assuming a confidence interval of 95% and a margin of error of 5%. From the number obtained, the distribution was made proportionally by course, being: 50 pharmacy students; 50 nursing students; 50 Nutrition students, and 50 Psychology students.

Data were collected only from students who agreed to participate in the research after signing the Informed Consent Form (ICF), using a questionnaire composed of 10 closed questions, with the objective of evaluating the opinion of antidepressant users regarding guidance on the use of the medication, their knowledge about the antidepressant medication, how long they have been using it, whether it was purchased with a prescription, and whether they know the purpose of using antidepressants. The information was recorded by the subjects (self-completion), but they had the opportunity to clarify questions with the interviewer. There was no obligation to fill out the form, with the option of returning it blank.

From the data obtained with the application of the questionnaires, a quantitative analysis was made, evaluating the use of antidepressants among the students, as well as their characteristics such as age, gender, most used medication, most used course, among others.

The collected data were gathered, stored in a spreadsheet in Excel 2013 software. Later, the data were transported to be statistically analyzed in the Statistical Package for the Social Science (SPSS, version 24.0). Descriptive statistics were performed with presentation of the results in absolute values and

percentages. The use of antidepressants was used as independent variable compared with the dependent variables of age group, gender, and course using the Chi-square test. A 5% error level was adopted, so that a p value below 0.05 was considered statistically significant.

As there was the participation of human beings, the work was submitted to the research ethics committee of the Associação Educativa do Brasil - SOEBRAS - and was approved with Opinion number: 3.243.899.

3 RESULTS AND DISCUSSION

The frequency of participants using antidepressant medication was 31 students, making a total of 15.5% of the 200 research participants. Of the 31 participants who used antidepressants, 8 were from the nursing course, 10 from the pharmacy course, 7 from nutrition and 6 from psychology. The identification data of the participants are presented in (Table 1). It is estimated that the use of antidepressant medication by young people reaches 8.3%, and according to the results of this study, it was identified that this percentage may be higher in students, which is in line with the literature on the subject, which indicates a higher prevalence of depression among young college students (RIBEIRO et al., 2014). In the academic universe, many students use these drugs, since graduation requires dedication and responsibility of the academic and, therefore, some students have sleepless nights, inadequate diet, besides having to reconcile the routine of studies with work and family (NERI, 2020).

Table 1: Frequency and percentage of characteristics of students using or not using antidepressants and p-value according to chi-square test.

		Use of antidepressants		
		Does not take medication	Takes medication	P value
Age Group	18 to 24 years old	121 (89,6%)	14 (10,4%)	
	25 to 29 years old	20 (71,4%)	8 (28,6%)	0,005
	30 to 34 years old	11 (100%)	0 (0%)	
	35 to 39 years old	11 (73,3%)	4 (26,7%)	
	40 to 44 years old	3 (60%)	2 (40%)	
	45 to 49 years old	1 (33,3%)	2 (66,7%)	
	50 to 54 years old	1 (50%)	1 (50%)	
	55 to 60 years old	1 (100%)	0 (0%)	
	Total	169 (84,5%)	31 (15,5%)	
Genre	Female	133 (83,6%)	26 (16,4%)	0,512
	Male	36 (87,8%)	5 (12,2%)	
	Total	169 (84,5%)	31 (15,5%)	
Course	Nursing	42 (84%)	8 (16%)	0,721
	Pharmacy	40 (80%)	10 (20%)	
	Nutrition	43 (86%)	7 (14%)	
	Psychology	44 (88%)	6 (12%)	
	Total	169 (84,5%)	31 (15,5%)	

Source: Own authorship (2019)

Most study participants (77.4%) did not receive guidance from the pharmacist during the dispensation of the medication regarding side effects, drug interactions, correct time of use, according to (Table 2); the guidance was performed predominantly by the physician (93.3%). According to Santos et al. (2017) the pharmacist has an important role in Pharmaceutical Care, in that he/she is the only professional in the health team who has technical-scientific training based on the articulation of knowledge of biological and exact areas, in addition, the role of the pharmacist in promoting the rational use of medicines and therapeutic education is very important. Thus, the treatment becomes more effective and, with the necessary guidance, it enables the user to know how to deal with possible side effects and drug interactions, thus contributing to treatment adherence. Regarding the knowledge of the effects of the medication, it was found that 76.7% of the participants know the time for the onset of action of antidepressants. In addition, 96.7 of the participants know the purpose of using antidepressants (Table 2).

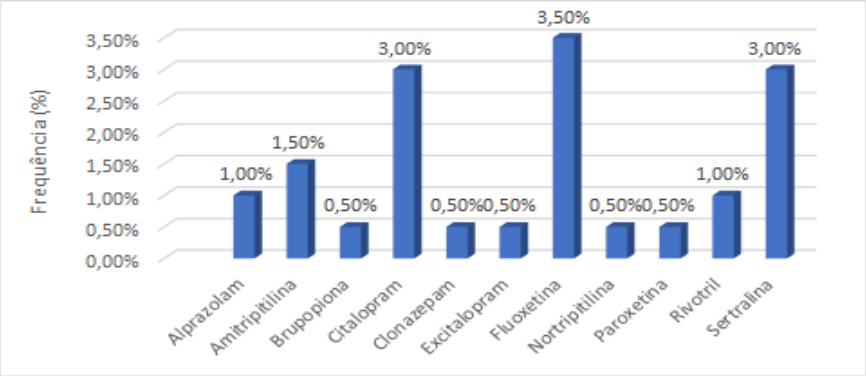
Table 2: Distribution of study participants who use antidepressants, according to their opinion about their knowledge of treatment with these drugs.

		Frequency	Percent P value
Pharmaceutical orientation	Yes	7	22,6
	No	24	77,4 0,187
	Total	31	100,0
Medical Prescription	Yes	28	93,3
	No	3	6,7 0,001
	Total	31	100,0
Purpose of Use	Yes	29	96,7
	No	2	3,3 0,649
	Total	31	100,0
Effect Time	Yes	23	76,7
	No	8	23,3 0,334
	Total	31	100,0

Source: Own authorship (2019).

As for the drugs used, it was observed that fluoxetine appears in first place being used by 3.5% of antidepressant users, followed by citalopram and sertraline with 3% (Figure 1), both from the same class of SSRI antidepressants. According to Scolaro et al. (2010) fluoxetine is the most commonly prescribed antidepressant drug. SSRIs have a half-life of approximately one day, except for fluoxetine, which has a half-life of four days. Its active metabolite, norfluoxetine, has a half-life of seven to fifteen days, resulting in a longer action than other SSRIs. Because they selectively inhibit serotonin reuptake, these antidepressants cause fewer anticholinergic side effects and are less dangerous at excessive doses when compared to tricyclic antidepressants. In an evaluation of the consumption of antidepressants among patients at a Health Care Unit in Caruaru-PE, an increase during the year 2019 of prescriptions containing antidepressants was observed and, it was based on the same drug, fluoxetine associated with amitriptyline (LIMA, OLIVEIRA, DA ROCHA GOMES FILHO, 2020).

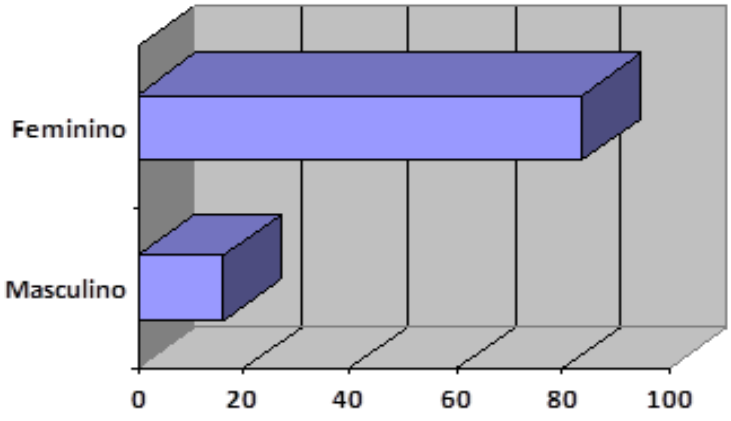
Figure 1: Absolute and relative number of each medication referred by participants.



Source: Own authorship (2019).

It is noteworthy that most of the students in the sample who use antidepressants (Figure 2) are female students. According to Schenkel et al. (2016), it is known that depression, a condition that may require the use of antidepressants, is more prevalent in this gender, both in academia and in the general population, and this is consistent with the literature found. The predominance of antidepressant consumption by women may be related to the fact that they are more sensitive to social, economic, and family problems, and to the higher prevalence of psychiatric disorders among this gender. In this study it was also found that the age group that most uses antidepressants is 18 to 24 years old. For Cassimiro et al. (2012) young academics suffer constant pressures in the period of preparation for exams. Fear, insecurity, family, social, and even personal demands are frequent at this time. The certainty of professional choice, for example, may receive direct or indirect influences and interventions from family and society. Thus, the pressure of choice may increase the levels of anxiety and stress in this student, since the professional desire of these young people may not be the same as the family's, nor the most socially accepted. Not to mention the possibility that this student may not yet have the maturity to make a professional choice.

Figure 2: Percentage of academics taking antidepressants segmented by gender



Source: Own authorship (2019).

4 CONCLUSION

Of the health students interviewed, being Pharmacy, Nursing, Psychology and Nutrition courses, 15.5% had already used antidepressant medication, being fluoxetine the most prescribed medication. The female gender was the gender that most used this class of drugs and age range was 18 to 24 years. In the population of this study, the pharmacist did not participate in the orientation of the patient in the phase that precedes the administration of the medication, this role being left exclusively to the physician. There is a large percentage of users who still have doubts about the use of antidepressants, especially the lack of knowledge about the time of onset to observe the antidepressant effect, the ability of the drug to cause tolerance and/or dependence, and the possible drug interactions. It is important to emphasize that the sample of this study is composed of health students who should be prepared to guide patients using antidepressants. The reason for such lack of knowledge is not clear.

Therefore, it is of utmost importance to make students aware of the consumption of antidepressants. Furthermore, it is necessary to reinforce procedures of orientation and prior diagnosis for depression during training, so that individual and collective preventive actions are taken among students, with the help of professors, health professionals, and if possible, with the presence of the family.

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Chapter 4

Peripheral arterial obstructive disease

10.56238/eyohsc1-004

Eduardo Vinicius Moreira Savelli

ABSTRACT

I found the experience we had at the Miguel Couto hospital very useful; we could closely follow how the daily routine of a doctor in a reference hospital works; we witnessed the difficulties patients have to follow the proper treatment, due to lack of resources and many times even cultural and/or educational. We saw how important preventive medicine and close monitoring is, so that we can reduce the serious consequences arising from vascular diseases.

1 INTRODUCTION

The case refers to a patient who was admitted to the hospital emergency department with a lot of pain in the legs, lack of sensation, edema and necrosis in the toes. A patient with few resources and limited information about diabetes, he did not know he was diabetic and as a consequence, the disease was never treated, he has been a smoker (3 packs of cigarettes a day) for more than 30 years. He was admitted to the hospital with covid, resulting in a worsening of his condition. Due to the intercurrences of the disease and the patient's general condition, he suffered amputation of the supra-patellar left lower limb and later it was necessary to perform the same procedure on the right lower limb.

2 CASE PRESENTATION

a. Patient identification: J.E.C.A., 58 years old, born in Rio de Janeiro, resident in Vidigal Hill, black, street vendor, currently retired.

b. Clinical History. On today's date, 09/01/21, the patient had his first appointment at the outpatient clinic; he had been hospitalized on 05/28/21, diagnosed with PAD - peripheral arterial obstructive disease with dry gangrene in the left hallux; a left supra-patellar amputation was performed, with discharge scheduled for 06/11/21; while still hospitalized, he underwent a right supra-patellar amputation due to complications from diabetes.

He takes Metformin 500 mg. Smoker until today, reports smoking 3 packs a day, used Gabapentin 100 mg, patient still refers to neuropathic pain. Presence of interstitial fluid in the left lower limb, the stitches were removed, they were inflamed, edematous, and a bandage was made.

c. Exams: Patient did not present any exams

d. Diagnostic hypotheses: Peripheral arterial obstructive disease

e. Conduct: Suprapatellar lower limb amputation, prescription of medications, and regular follow-up at the outpatient clinic

f. Case Outcome. Patient was advised to continue medication, quit smoking, and eat a restricted glucose and carbohydrate diet, and was advised to check back in two months for follow-up.

3 DESCRIPTION OF THE HEALTH-DISEASE PROCESS

The patient has low income, lives in the Vidigal community, has little education, has difficulty moving around, smokes three packs of cigarettes, and does not do any kind of monitoring to stop smoking, worsening her disease. In addition, the patient has difficulty accepting a diet with restricted sugars and carbohydrates, which compromises the control of diabetes.

4 DISCUSSION OF THE CASE

Overview

The main cause of peripheral arterial obstructive disease (PAD) is atherosclerotic disease leading to peripheral arterial obstruction, which may appear asymptomatic or present with various signs and symptoms that indicate limb ischemia. It is a serious high-risk disease. Mortality related to cardiovascular problems. Among patients with this disease, it is about 4% to 6% per year.[1] It is characterized by the deposition of fat, calcium, and other elements in the walls of the arteries, reducing their caliber and causing the tissues they supply to fail.[2] About 10% to 25% of people over 55 have PAD, this proportion increases with age, and about 70% to 80% of patients affected by the disease are asymptomatic. Only a few require surgical treatment or amputation.[3]

Pathophysiology

Various pathological processes lead to clogging of the arteries, resulting in symptoms of insufficient blood supply to the arteries due to reduced blood flow. The accumulation of lipids and fibrous materials narrows the vascular lumen, which can lead to thrombosis and/or rupture of the atherosclerotic plaques, leading to vascular occlusion. Several factors contribute to atherosclerosis, including endothelial dysfunction, dyslipidemia, inflammatory and immunological factors, and smoking. The symptoms associated with aortic or atherosclerotic stenosis of the lower extremities depend on the location and severity of the disease. In any arterial segment, plaque tends to occur near the mid-segment. PAD is a chronic disease that is related to the physical, psychological and social suffering of the elderly and their families, as it is a major disability that also affects the psychosocial and emotional aspects, impairing quality of life.[4]

Risk Factors

Atherosclerotic disease follows an anatomical pattern that also affects the natural history and progression of the disease. Patients with diabetes or end-stage renal disease usually have more distal disease. Atherosclerosis is the leading cause of peripheral obstructive arterial disease in the lower limbs. Obstructive atherosclerosis may exist in other arteries, especially coronary arteries.[5] Markers related to inflammation and smoking dominate PAD, while total cholesterol and body weight are less important. The risk factors most frequently assessed in publications are hypertension, diabetes, smoking, history of cardiovascular disease, and age.[6] PAD is associated with the presence of diabetes, total obesity, stroke, and ischemic heart disease (IHD).

PAD occurs more frequently in the presence of hypertension, heart failure, renal failure on dialysis, and smoking for more than 20 pack-years. In diabetic men, the risk is 6.6 times higher than in non-diabetic patients. This risk increases with age, duration of disease, and the presence of diabetic neuropathy.[7]

Prognosis

For limb loss or survival, patients with early onset atherosclerosis, diabetes or end-stage renal disease, and patients who continue to smoke are significantly worse. Patients with peripheral vascular disease may have severe ischemia, which is characterized by a high risk of pain at rest, ulcers or gangrene, cardiovascular disease, and limb loss.[8] In PAD, the vascular changes cause decreased ankle-brachial pressure index (ABI), which is measured by a portable vascular Doppler and sphygmomanometer (it is considered the gold standard for non-invasive diagnosis)[9]

If the index measured at rest is lower than 0.9,[10] the individual is considered to have peripheral arterial disease. It is considered an important indicator of morbidity and mortality from cardiovascular diseases. Considering this definition, about half of the patients with PAD are asymptomatic, so it is extremely important to have a good medical history and physical examination to reach a correct diagnosis.

Clinical Picture

Patients with PAD have a wide range of symptoms and effects related to daily functioning. Limb ulcers, intermittent claudication, and pain at rest are warning signs and should be checked and monitored by the vascular physician to prevent the development of the disease, which can lead to limb loss or even death.

Because it is a chronically progressive disease, the resources required for treatment are high. For example, in the US population, the estimated annual cost per patient with PAD is US 5,955.[1]

Diagnosis

The clinical diagnosis of peripheral arterial disease, is based on the search and interpretation of symptoms and signs that may arise at the site of arterial changes or by ischemia in the area of injured arterial

perfusion. The diagnostic strategy for PAD, should include a thorough physical examination, investigation of suggestive clinical signs such as absence of peripheral pulse, arterial fibrillation and skin changes in the affected limb, and confirmation of the severity of the vascular obstruction.[11] Complementary tests, such as computed tomography angiography (CT), are performed by intravenous injection of large amounts of iodinated contrast and radiation. The images are sufficient and of good quality, especially in the aortic iliac artery and popliteal femoral region, providing a wide field of view for the study of leg arteries.[12]

Magnetic resonance angiography (MRI) is a noninvasive test that enhances the imaging of arterial stenosis and produces high quality images in the aorto-iliac area. It does not make use of iodine-containing contrast agents, but its use in patients with kidney disease has limitations because it uses gadolinium (a chemical element).[12] In addition to arteriography, which is performed a direct puncture to detect the number of arteries in any opacified segment.[8] This is an invasive study that can be used for preoperative planning.

Treatment

Treatment of symptomatic lower limb PAD is based on careful evaluation of risk factors, medical comorbidities, medication adherence, and follow-up patient care.

Patients with pain or ischemic ulcers may require early intervention to promote limb salvage. Through active medical management, lesion regression

non-calcified atherosclerotic disease is possible. Regarding the use of medications, many patients take hypolipemic agents, in addition to the use of antihypertensives, antiplatelet agents, statins, converting enzyme inhibitors, and beta-blockers.

Provide guidance on weight control, smoking, alcoholism, and sedentary lifestyle to increase the efficiency of treatment of peripheral arterial obstructive disease.[13]

In addition, intravascular revascularization (balloon artery and stent angioplasty) may be an effective method for patients with high stenosis of the proximal arterial segment of the extremities. Surgical revascularization is suitable for patients with severe iliac aortic artery disease with a low risk of ischemia.

All patients with PAD of any severity need to reduce the risk factors for atherosclerosis to normal levels and take antiplatelet therapy.[4]

5 SELF-REFLECTION

a) How has this event/attention changed my life?

We realized the importance of being objective and clear in our service and always being ethical in our actions

b) What have I learned from this course this semester?

We could see the patients up close with the supervision of our teacher, and I think it was very important for us to experience this practice together with the theoretical content of the discipline.

c) What did I stop doing because I had this experience?

We saw the importance of having a regulated life, without exaggeration, with a balanced diet and healthy practices on a daily basis, in fact, make a difference to avoid such serious diseases that affect a considerable portion of the population

d) What learnings will you acquire beyond this event?

We must always be studying, medicine has a long learning curve and many details must be observed to increase our successes and to give the best to the patients

e) What are the strengths and weaknesses of these learnings?

Strong point, without a doubt, was the experience we had and weak point, I think we could have more weeks in each rotation

f) What could you have done better?

I guess I could have volunteered to change the patient's dressing, then regretted not asking.

g) What importance did this attendance/event have in my formation at a personal and professional level?

I found it an interesting and challenging area, there is the possibility to work in the clinical part and in surgical procedures

h) What relationship did this event/attendance have with who I am today as a professional/person?

The importance of helping others, the happiness of the patients after the service is really rewarding and rewarding

i) What relation can I draw from this event/attendance regarding cognitive aspects, technical skills, clinical reasoning, attitudes, values, communication and ethical posture?

We saw the importance of practice in the conduct of procedures, and we also realized how exhausting the daily routine is for doctors who work with the public.

I think that building clinical reasoning really makes a difference in a doctor's career, because knowing what the patient is feeling, screening for the disease, and finding out the cause and trying to treat it in the best way possible, is of utmost importance.

It was clear that we must always be ethical, maintain an attitude consistent with our profession, and try to communicate in the best possible way with our patient, so that he or she can follow the treatment correctly.

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Chapter 5

Profile of children of adolescent mothers in a Northeastern Brazilian State

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ABSTRACT
Introduction: Teenage pregnancy is a public health problem and the understanding of this phenomenon requires its understanding from a biopsychosocial perspective. Objective: to describe the profile of births of children born to adolescent mothers in the state of Alagoas, from 2011 to 2020. Method: This is an ecological, time series, descriptive, cross-sectional study with a quantitative approach. Data collection was carried out in August 2022 and was carried out through the Information System on Live Births. Result: 126,234 births of children born to mothers aged between 10 and 19 years were reported to SINASC, 93 of which were 9% children of mothers aged between 15 and 19 years old and 6.1% between 10 and 14 years old. As for the profile of births, there is a predominance of males, brown, full-term, with Apgar at the 1st and 5th minute equal to or greater than 8, weight between 2,500g and 3,999g and without congenital anomaly. Conclusion: It was possible to observe that the percentage of births of teenage mothers between 15 and 19 years old, despite the reduction over the years, still remains high in Alagoas, requiring further studies in the area.

Keywords: Teenage pregnancy, Teenage mothers, Nursing.

1 INTRODUCTION

Adolescent pregnancy is a public health problem and understanding this phenomenon requires understanding it from a biopsychosocial perspective, given the possibility of repercussions on physical, sexual, mental, and spiritual health, as well as on social and economic relations (NASCIMENTO; TEIXEIRA; dos ANJOS et al. 2021).

According to data from the Ministry of Health's Library Thematic Bulletin (2022) on the prevention of teenage pregnancy, in Brazil 66% of teenage pregnancies are unintended, 75% of teenage mothers drop out of school, and 15.3% of fetal and neonatal deaths per 1,000 live births are of young mothers, setting it as one of the highest infant mortality rates.

Regarding the distribution of adolescent mothers among Brazilian regions, the Northeast concentrates the highest percentages with about 32% of total births, followed by the Southeast (32%), North (14%), South (11%) and Midwest (8%) (SBP, 2019).

In general, teenage pregnancy can be related to several problems such as socioeconomic conditions, social organization, structural problems in health services, absence of a support network, cultural characteristics, deficiency of educational and health policies, among others (SANTOS; VADOR; CUNHA et al.2020).

It is a fact that, over the years, the history of women's sexual and reproductive health has been seen as a taboo and its remodeling has been strongly influenced by the feminist movement. However, it is notorious that providing guidance on sexual and reproductive health, especially focusing on adolescence, still generates discomforts, discussions, and repressions, having direct repercussions on the phenomenon of teenage pregnancy and teenage motherhood (SILVA; CASTRO,2018).

Nevertheless, the prevention of teenage pregnancy through health education, as well as the welcoming and qualified listening in health services have proven to be one of the ways to overcome this problem and in this perspective, the importance of nurses in promoting interdisciplinary actions of sexual education stands out (SANTOS; VADOR; CUNHA et al.2020).

In this sense, assuming that teenage pregnancy is above all a social phenomenon, it is important to identify the factors commonly associated with this event in order to support and strengthen public policies of prevention and also to provide the recognition of these factors in the health services in order to promote an effective and targeted care.

Given the above, this chapter aims to describe the profile of births to children born to adolescent mothers in the state of Alagoas from 2011 to 2020.

2 METHOD

Ecological time-series study, carried out with data from the Information System on Live Births (SINASC), of the Department of Informatics of the Unified Health System (DATASUS) of the Ministry of Health of Brazil, on births that occurred from 2011 to 2020 in the state of Alagoas, where the mothers were aged 10 to 19 years.

Data collection occurred in August 2022 and the variables studied were divided into maternal and gestational variables and those related to the newborn. The maternal and gestational variables were: age, education, marital status, number of prenatal visits, type of pregnancy, and type of delivery. The variables

related to newborns were: sex, color/race, gestational age, Apgar score in the 1st and 5th minutes, birth weight, and presence of congenital anomaly.

After data collection, they were tabulated in a Microsoft Excel spreadsheet and analyzed through descriptive statistics, by means of absolute and relative numbers; subsequently, the data were presented through tables and graphs. To better understand the phenomenon of teenage pregnancy, the analyses were stratified by maternal age, i.e., women aged 10 to 14 years and 15 to 19 years.

It is worth mentioning that besides the descriptive analysis, the calculation of the standardized birth rate by year of birth and general average was performed. For this the following formula was used:

Number of births to children of mothers aged 10 to 19 years old residing in the state of Alagoas	x 1.000
Population of women aged 10 to 19 years old residing in the state of Alagoas	

This study followed the ethical recommendations and because it is a study with secondary data extracted from information systems of universal coverage and public access, it did not require submission to the National Research Ethics Committee (CONEP), according to Resolution No. 510, April 7, 2016.

3 RESULT

In the period from 2011 to 2020, 126,234 births of children born to mothers aged 10 to 19 years were reported in SINASC, with the highest number of births recorded in the year 2011 and the lowest in the year 2020 (Table 1).

Of the total births, 93.9% were children of mothers between the ages of 15 and 19. In contrast, 6.1% were children of mothers between the ages of 10 and 14. In Table 1 it is possible to observe a decrease in the number of births to children of adolescent mothers.

Table 1: Absolute and relative number of births to children of adolescent mothers in the state of Alagoas, in the period from 2011 to 2020, according to maternal age group. Alagoas, Brazil, 2022.

YEAR	10 to 14 years old	15 to 19 years old	10 to 19 years old
	n (%)	n (%)	n (%)
2020	546 (7,0)	9.309 (7,9)	9.855 (7,8)
2019	606 (7,8)	10.030 (8,5)	10.636 (8,4)
2018	662 (8,5)	11.278 (9,5)	11.940 (9,5)
2017	724 (9,3)	11.625 (9,8)	12.349 (9,8)
2016	739 (9,5)	11.657 (9,8)	12.396 (9,8)
2015	827 (10,7)	12.918 (10,9)	13.745 (10,9)
2014	860 (11,1)	12.807 (10,8)	13.667 (10,8)
2013	942 (12,1)	13.204 (11,1)	14.146 (11,2)
2012	955 (12,3)	12.792 (10,8)	13.747 (10,9)
2011	897 (11,6)	12.856 (10,9)	13.753 (10,9)
Total	7.758 (100,0%)	118.476 (100,0)	126.234 (100,0)

Source: Information System on Live Births (SINASC).

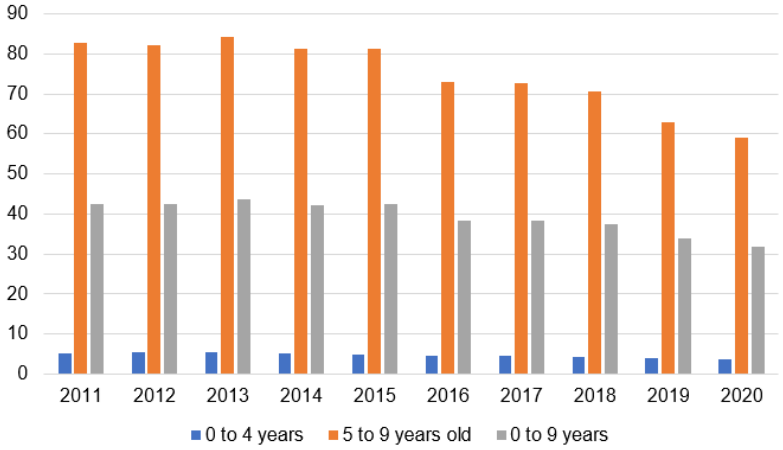
In chart 1, we can see the birth rate of children born to adolescent mothers, by general group age stratification, i.e., 10 to 19 years old.

Birth rates were lower in the group of mothers aged 10 to 14 years, with the highest rates in the years 2012 and 2013. It is important to note that the average rate for the period under study was 4.7 births for every 1,000 adolescents aged 10 to 14 years. The decline in rates is noteworthy when comparing 2011 to 2020, with the year 2020 having a rate of 3.6 births for every 1,000 adolescents aged 10 to 14 years.

Regarding the birth rates of children of mothers aged 15 to 19, these were the highest, with an average for the period under study of 75 births for every 1,000 adolescents aged 15 to 19. The birth rate in 2011 was 82.7 and that of 2020 was 59.1 births per 1,000 adolescents aged 15 to 19. A reduction in the rates can be observed.

As for the rates considering all adolescents between the ages of 10 and 19, for the period under study we observed an average of 39.4 births for every 1,000 adolescents between the ages of 10 and 19. A decline in the rates is also observed.

Graph 1: Rate of births to children of adolescent mothers in the state of Alagoas from 2011 to 2020, by age group, per 1,000 live births. Alagoas, Brazil, 2022.



Source: Information System on Live Births (SINASC).

When analyzing the maternal and gestational variables, it was observed that regarding education, 51.1% had between 8 and 11 years of schooling, and 45.8% were single. Regarding the number of prenatal consultations, 46.6% had 7 or more consultations. As for the type of pregnancy, more than 98% had a single fetus pregnancy and as for the route of delivery, 59.1% had their child by vaginal delivery (Table 2).

When analyzing the data by age stratification, one notices greater schooling among women aged 15 to 19 years, which is already expected. Regarding marital status, the adolescents aged 10 to 14 years were mostly single. The largest number of prenatal visits was higher among the adolescents aged 15 to 19 years. As for the type of pregnancy and route of delivery, the percentage values are similar (Table 2).

Table 2: Absolute and relative number of births to children of adolescent mothers in the state of Alagoas, from 2011 to 2020, according to maternal and gestational variables. Alagoas, Brazil, 2022.

Variables	10 to 14 years old	15 to 19 years old	0 to 19 years old
	n (%)	n (%)	n (%)
Instruction from the mother			
No	66 (0,9)	767 (0,6)	833 (0,7)
1 to 3 years	515 (6,6)	5.316 (4,5)	5.831 (4,6)
4 to 7 years old	5.064 (65,3)	46.238 (39,0)	51.302 (40,6)
8 to 11 years old	1.981 (25,5)	63.022 (53,2)	65.003 (51,5)
12 years and older	9 (0,1)	1.287 (1,1)	1.296 (1,0)
Ignored	123 (1,6)	1.846 (1,6)	1.969 (1,6)
Marital status			
Single	4.701 (60,6)	53.128 (44,8)	57.829 (45,8)
Married	147 (1,9)	13.216 (11,2)	13.363 (10,6)
Widow	2 (0,0)	109 (0,1)	111 (0,1)
Judicially separated	7 (0,1)	174 (0,1)	181 (0,1)
Consensual Union	2.790 (36,0)	50.235 (42,4)	53.025 (42,0)
Ignored	111 (1,4)	1.614 (1,4)	1.725 (1,4)
Prenatal consultation			
No	308 (4,0)	3.862 (3,3)	4.170 (3,3)
From 1 to 3 consultations	973 (12,5)	12.641 (10,7)	13.614 (10,8)
From 4 to 6 appointments	3.145 (40,5)	45.797 (38,7)	48.942 (38,8)
7 or more appointments	3.276 (42,2)	55.488 (46,8)	58.764 (46,6)
Ignored	56 (0,7)	688 (0,6)	744 (0,6)
Type of pregnancy			
Single	7.674 (98,9)	116.999 (98,8)	124.673 (98,8)
Double	61 (0,8)	1.256 (1,1)	1.317 (1,0)
Triple and more	4 (0,1)	24 (0,0)	28 (0,0)
Ignored	19 (0,2)	197 (0,2)	216 (0,2)
Type of delivery			
Vaginal	4.672 (60,2)	69.873 (59,0)	74.545 (59,1)
Cesario	3.068 (39,5)	48.370 (40,8)	51.438 (40,7)
Ignored	18 (0,2)	233 (0,2)	251 (0,2)

Source: Information System on Live Births (SINASC).

Regarding the variables of newborns without analysis by stratification of maternal age, there was a higher frequency of male newborns, brown, full-term, with Apgar scores at the 1st and 5th minutes equal to or greater than 8, weighing between 2,500g and 3,999g, and who did not present congenital anomalies.

When analyzing the NB profile by maternal age stratification, one notices that prematurity was higher in children of mothers aged between 10 and 14 years, in addition to a lower Apgar score, low birth weight, and greater presence of congenital anomalies (Table 3).

Table 3: Absolute and relative number of births to children of adolescent mothers in the state of Alagoas, in the period from 2011 to 2020, according to variables of newborns. Alagoas, Brazil, 2022.

Variables	10 to 14 years old	15 to 19 years old	10 to 19 years old
	n (%)	n (%)	n (%)
Sex			
Male	4.056 (52,3)	60.657 (51,2)	64.713 (51,3)
Female	3.701 (47,7)	57.789 (48,8)	61.490 (48,7)
Ignored	1 (0,0)	30 (0,0)	31 (0,0)
Color/race			
White	332 (4,3)	5.278 (4,5)	5.610 (4,4)
Black	71 (0,9)	1.235 (1,0)	1.306 (1,0)
Yellow	19 (0,2)	286 (0,2)	305 (0,2)
Brown	7.076 (91,2)	107.405 (90,7)	114.481 (90,7)
Indigenous	22 (0,3)	400 (0,3)	422 (0,3)
Ignored	238 (3,1)	3.872 (3,3)	4.110 (3,3)
Duration of gestation			
Preterm	1.236 (15,9)	14.573 (12,3)	15.809 (12,5)
Term	5.459 (70,4)	89.350 (75,4)	94.809 (75,1)
Post-term	365 (4,7)	5.915 (5,0)	6.280 (5,0)
Ignored	698 (9,0)	8.638 (7,3)	9.336 (7,4)
Apgar 1st minute			
0 a 2	85 (1,1)	942 (0,8)	1.027 (0,8)
3 a 5	287 (3,7)	3.411 (2,9)	3.698 (2,9)
6 a 7	723 (9,3)	9.672 (8,2)	10.395 (8,2)
8 a 10	6.362 (82,0)	99.253 (83,8)	105.615 (83,7)
Ignored	301 (3,9)	5.198 (4,4)	5.499 (4,4)
Apgar 5th minute			
0 a 2	25 (0,3)	234 (0,2)	259 (0,2)
3 a 5	45 (0,6)	431 (0,4)	476 (0,4)
6 a 7	125 (1,6)	1.578 (1,3)	1.703 (1,3)
8 a 10	7.234 (93,2)	110.938 (93,6)	118.172 (93,6)
Ignored	329 (4,2)	5.295 (4,5)	5.624 (4,5)
Birth Weight			
<2.500g	974 (12,6)	10.586 (8,9)	11.560 (9,2)
2,500g to 3,999g	6.620 (85,3)	103.344 (87,2)	109.964 (87,1)
≥4.000g	164 (2,1)	4.538 (3,8)	4.702 (3,7)
Ignored	0 (0,0)	8 (0,0)	8 (0,0)
Congenital anomaly			
Yes	69 (0,9)	875 (0,7)	944 (0,7)
No	7.323 (94,4)	111.151 (93,8)	118.474 (93,9)
Ignored	366 (4,7)	6.450 (5,4)	6.816 (5,4)

Source: Information System on Live Births (SINASC).

4 DISCUSSION

According to the survey results, it is possible to identify that the number of teenage pregnancy cases has been decreasing over the years, although in a discrete way, highlighting a concern of society today about an unplanned pregnancy among teenagers.

However, a study by Melo, Nascimento, Duarte, and Borges (2022), analyzed the vulnerability of women of reproductive age and SUS users who experienced an unplanned pregnancy, and highlighted a significant number of vulnerable women who did not use contraceptive methods or used some of low efficacy.

Adolescents in general, even in different socioeconomic contexts, have insufficient/absent knowledge regarding contraceptive methods, which also contributes directly to their inadequate use, associated with the low participation of professionals related to health education for this public (PIANTAVINHA; MACHADO, 2022).

The vulnerability can also be highlighted when analyzing the education of these women, since, according to Assis, Martinelli, da Gama, and Santos Neto (2022), it is inversely proportional to the recurrence of unplanned pregnancy, i.e., the fewer years of study, the more chances of a new unplanned pregnancy in the future, with education being a protective factor against teenage pregnancy, with the potential to perpetuate the history of poverty and context of social inequality (DE ANDRADE, et al., 2022).

This phenomenon "teenage pregnancy" can represent an adversity in that it hinders the advancement of the educational and socioeconomic status of women, so that the teenage pregnant woman has her rights to education, health, and autonomy mitigated (de ANDRADE, et al., 2022).

Considering the maternal variables related to pregnancy and childbirth, the data from this research shows, contrary to the aforementioned authors, that these women had adequate access to health care through a good percentage of prenatal consultations, single pregnancies, and a majority of vaginal deliveries.

However, it is a fact that because this is a study with secondary data, it is not possible to analyze the quality of these consultations, nor other objective factors such as individualized care for adolescents, nutritional monitoring, and lifestyle, which, according to Santos et al.

As for the variables related to the newborns of these women, they were well distributed in relation to the sexes, mostly full-term births and without congenital malformations, presenting satisfactory Apgar scores at the 1st and 5th minutes and adequate weight at birth.

Although these are positive data, teenage pregnancy itself is a risk factor for maternal and neonatal repercussions, requiring a careful look mainly as to the need for specialized monitoring, due to the gestational risk, and linkage to the maternity hospital, thus avoiding negative outcomes regarding labor and birth and avoiding neonatal *near miss* (ASSIS; MARTINELLI; DA GAMA et al. 2022).

The health professionals involved in the follow-up of teenage pregnant women have an important role with potential to transform the quality of care, in order to avoid, above all, negative access, fragility in the support, in the reception and in the prematurity outcome (MARQUES, et al., 2022) with emphasis on

the nurse's role in the promotion and prevention of teenage pregnancy through interdisciplinary integration and the involvement of the community, school and family (SILVA; da SILVA; FASSARELLA et al.2022).

5 CONCLUSION

It is evident that the percentage of births to adolescent mothers between the ages of 15 and 19, despite the reduction over the years, still remains high, with a significant number of adolescents between the ages of 10 and 14 continuing to get pregnant.

We highlight the predominance of male births, children of mixed color/race, born at term, without congenital anomalies and with ideal birth weight, as well as the positive association between adolescent mothers and the level of education.

The study of the phenomenon of teenage pregnancy, the related factors, the repercussion on the life of the woman/mother/adolescent, and its consequences in the socioeconomic and health context require constant and in-depth analysis.

This research has the limitation of using secondary data from the DATASUS platform, subjecting it to the bias of the professional who sends and enters the data.

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Chapter 6

Incidence of mental and behavioral disorders due to alcohol use in Tocantins state associated with the COVID-19 pandemic

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ABSTRACT
With the pandemic status declared on March 11, 2020 by the World Health Organization, countries adopted non-pharmacological social protective measures. The article relates how the pandemic directly entailed to the increase in the number of hospitalizations for mental illness associated with alcohol use, relating the difference of age groups, gender and the spending of the public health system in this area referring to the years 2018 to 2020 in the state of Tocantins. This is a descriptive quantitative epidemiological study, the data were obtained through the Department of Informatics of the Unified Health System in the periods 2018 to 2020. After analyzing the data, it was possible to observe a 41.41% increase in the number of hospitalizations in the year 2020, being mostly men between 40 and 49 years old. Furthermore, there was an increase in the amounts spent on hospital services, where there is a causal relationship of a decline between the amounts spent in 2018 to 2019, before the Covid-19 pandemic. In the year 2019 to 2020, there was a 51% increase. Therefore, there was an increase in the events examined in this paper, which may be related to a worsening mental health of this population due to the social isolation measures implemented in the world. Thus, it is necessary that the Family Health team program in Primary Care has an efficient and satisfactory preparation to serve this population in order to prevent these excessive expenses in Public Health that are avoidable.

Keywords: Alcoholism, Pandemic, Mental Health

1 INTRODUCTION

The global pandemic caused by the Sars- CoV-2 or Covid-19 virus was decreed on March 11, 2020 by the World Health Organization, with the first case recorded in Brazil on February 26, 2020. Due to the high infectivity of the virus itself, its uncontrolled spread and the lack of a vaccine, the WHO advised governments to adhere to non-pharmacological measures, among which are the social isolation associated with the total closure of public places and establishments (lockdown) in an attempt to reduce the contamination curve. (MALTA et al, 2020).

Due to such events, the habit of consuming alcoholic beverages has also changed and has become something that some Brazilians do in their own homes. The habit of drinking alcohol is associated with more than 230 diseases and health complications, mainly due to the fact that the substance ethanol is immunosuppressive, carcinogenic, toxic to cells and teratogenic (GARCIA et al, 2020).

Repeated ingestion of high doses of alcohol can affect virtually every organ system, especially the gastrointestinal tract, the cardiovascular system, and the central and peripheral nervous systems. (APA, 2014).

Concatenated with this, in the early moments of the pandemic there were misleading reports circulating on the internet that drinking alcohol would provide protection against Covid-19, the WHO had to intervene, issuing a note about such misleading information due to cases of people becoming intoxicated through the use of alcohol of unknown origin (GARCIA et al, 2020).

In this context, the consequences that a pandemic at this level can have on the mental health of individuals is associated with triggers for some mental disorders such as anxiety, depression, and increase in suicidal behavior, due to its stressful factors of social isolation such as: estrangement from friends, family, loss of collective conviviality, concern, fear, uncertainty regarding the time of isolation, among others (FARO et al, 2020).

It is also important to mention that due to isolation, people face the fear of going to the Basic Health Units in search of physical help and also psychological support, which has been discussed more openly in recent years due to social changes about mental health being as important as physical health. Furthermore, studies indicate that mortality due to excessive alcohol consumption exceeds 3 million every year, an alarming fact, noting that these deaths are preventable (GARCIA et al, 2020).

Thus, this study seeks to analyze a causal relationship between the increase in alcohol-related mental and behavioral disorders in relation to the COVID-19 pandemic in the state of Tocantins, due to the lack of literature on the subject in this state.

2 OBJECTIVES

This study has as its main objective to analyze the data collected through the Department of Informatics of the Unified Health System on the number of hospitalizations due to mental and behavioral disorders due to alcohol abuse in the state of Tocantins, analyzing age range, gender, and hospital spending amounts in the period from 2018 to 2020 correlating to the Covid-19 pandemic.

Thus, it became necessary to analyze the data regarding the compulsory notification, evaluation of the profile of involvement and morbidity and mortality of the disease in order to make a deeper understanding possible.

3 METHODS

The research refers to a retrospective cross-sectional study, of quantitative and descriptive approach, using data offered by the Department of Informatics of the Unified Health System (DATASUS). The criterion examined was the causal relationship between the increase in events associated with alcohol use in the periods from January 1, 2018 to December 31, 2020 in the state of Tocantins associated with the Covid-19 pandemic.

The variables determined for analysis were the number of hospitalizations, gender, age group, and hospital expenditures in this time frame. From this, a simple analysis was performed and the results were presented in tables using the Microsoft Excel program. For the literature search we used data collected through Google Scholar and Scientific Electronic Library Online (SciELO) using the descriptors "alcoholism and covid-19", "mental health and pandemic", "social isolation and alcohol" with the selection of articles published in the years 2018 to 2020 with selected languages in Portuguese and English. In addition, psychiatric books on the diagnosis and statistics of mental disorders were also used.

This study offers no harm to the population, since it used data obtained online, with the objective of contributing with information about public health and making society aware of the theme.

4 RESULTS AND DISCUSSION

According to the American Psychiatric Association (2014), alcohol use disorder is classified as a cluster of behavioral and physical symptoms, including withdrawal, tolerance and craving. Because alcohol withdrawal can be unpleasant, individuals continue drinking despite the side effects to avoid withdrawal in an attempt to relieve the symptoms.

Based on the data collected, it was possible to observe that in the time period from 2018 to 2020 a total of 326 hospitalizations occurred in the state of Tocantins for alcohol abuse. In the year 2018 there were 100 hospitalizations corresponding to a total of 30.67%, while in 2019 there were 91 cases representing 27.91% of hospitalizations, showing a slight reduction in the number of interventions. In the period of 2020 with the pandemic state declared by the World Health Organization, the number of cases rose to 135, which corresponds to the highest rate of hospitalizations in the state, reaching 41.41%. (Table 1).

Table 1. Incidence of alcohol abuse hospitalizations by year from 2018 to 2020 in the state of Tocantins.

Year.	No. of cases	%
2018	100	30,67%
2019	91	27,91%
2020	135	41,41%
TOTAL	326	99.99%

Source: DATASUS data (2021).

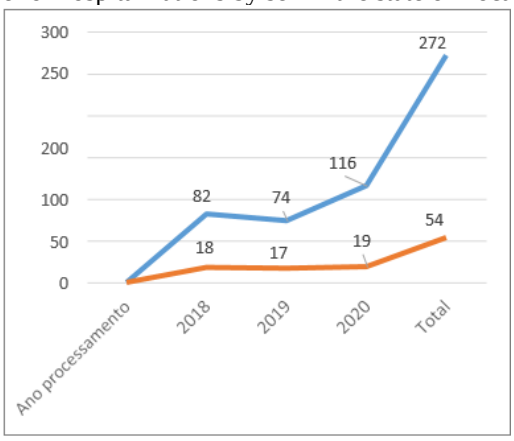
Regarding sex in these hospitalizations, there is a higher prevalence of males over females in the years. Although this article has limitations and there is no concrete explanation for the phenomenon described (Graph 1)

As far as, the registered cases according to age group were collected and showed the following results (Table 2). The age range most prevalent was 40 to 49 years old, totaling 110 cases out of a total of

326, in the interval from 2018 to 2020, resulting in 33.77% of the percentage of the total cases. Secondly, the 30 to 39 year old population, accounted for a total of 85 cases which equates to 26.07% of the total percentage. Consequently, the age group with the highest number of cases is the 50 to

59 years, which represents a total of 68 cases, characterizing the percentage of 20.85% of the total of 326 hospitalizations in the time interval of these three years.

Graph 1. Incidence of the number of hospitalizations by sex in the state of Tocantins in the years 2018 to 2020.



Source: Ministry of Health - SUS Hospital Information System (SIH/SUS)

Table 2. Hospitalization for alcohol abuse by age group in the state of Tocantins in the years 2018 to 2020.

AGE RATE	2018	2019	2020	TOTAL
15 to 19 years old	1	3	2	6
20 to 29 years old	7	12	12	31
30 to 39 years old	31	21	33	85
40 to 49 years old	33	28	49	110
50 to 59 years old	22	14	32	68
60 to 69 years old	3	8	5	16
70 to 79 years old	3	5	2	10

Source: DATASUS data (2021).

By analyzing table 3, it is possible to observe that in the year 2018 hospital services due to mental and behavioral disorders due to alcohol use were spent the amount of R$ 13,354.77 in the year 2019 R$ 8,298.84 and in the year 2020 R$ 16,271.42. Comparing the years 2018 and 2019 to 2020 there was an increase respectively of R$ 2,916.65 and R$ 7,972.58. (Table 3).

Table 3. Amounts spent on hospital services for alcohol abuse in the state of Tocantins in the periods 2018 to 2020.

YEAR	SERVICE VALUES HOSPITALS
2018	13.354,77
2019	8.298,84
2020	16.271,42
TOTAL	37.925,03

With this, it is possible to observe a relationship causal of a decline between the amounts spent in 2018 to 2019, before the Covid-19 pandemic. Whereas in the year 2019 to 2020, there was a 51% increase in the period from 2020, which corresponds to the start of the pandemic in hospital spending amounts.

Thus, there is possibly an association of the whole pandemic world context with the stressful factors of social isolation affecting the mental health of these individuals, who may or may not be susceptible to certain behaviors and conducts, among them, the alcohol misuse and abuse of this population in the state of Tocantins.

5 CONCLUSION

With this view, the causal relationship of increased events, hospitalizations, and hospital values related to mental and behavioral disorders due to alcohol abuse that may be associated with the Covid-19 pandemic in the state of Tocantins is visible. In this current scenario, alcoholism has a harmful particularity as a result of being a licit drug, low cost and with simple access for people of various age groups.

Thus, it is evident the need for greater attention from Public Health and the Family Health program staff on the subject, seeking a better preparation of these teams, so that they are willing and able to deal, guide, and coordinate the situations as much as possible, through efficient strategies and activities, and above all, empathy for the patients and families involved.

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Chapter 7

Level of physical activity and quality of sleep among high school students in Maranhão

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ABSTRACT
We aimed to analyze the level of Physical Activity (PA) and Quality of Sleep (QS) of High School students (MS) from a public school in São João dos Patos - MA during the pandemic of COVID-19. This was a cross-sectional study, with a quantitative approach. PA level and QS were assessed by the International PA questionnaire (short version) and Pittsburgh QS Index, applied online, between November and December 2021. Analyses were performed by descriptive data, Chi-square and Pearson's Correlation tests. A total of 138 students participated in the study, with a mean age of 16 ± 1.05 years, distributed by groups: 1st (n=50), 2nd (n=57) and 3rd (n=31) year of MS. In the 1st year, 66% of the sample attested to very active and active adjuncts, while in the 2nd year, 75% of the participants were considered physically active. In 3rd grade, students reported levels considered to be PA (78%). Students in 1st grade showed the highest percentage for poor QS, at 58%. This poor QS was also frequent in 2nd grade and 3rd grade, at 65% and 68%, respectively. QS and PA level in 1st grade showed a weak, negative association. However, in the 2nd and 3rd year showed a strong and positive correlation. Most of the investigated students are physically active (72.4%). However, poor QS (63%) is frequent in most of the participants. Classifications of PA and sleep, showed $p<0.0001$. The level of PA and QS of the investigated population may be associated with changes caused by the pandemic.

Keywords: Physical activity, Sleep, COVID-19, High school.

1 INTRODUCTION

Physical activity (PA) and quality of sleep (QS) are two factors that can influence the quality of life (QoL) of students during the adolescent phase, especially in a period of great challenges such as high school (EM) (SOUZA NETO *et al.*, 2021).

In this sense, it can be highlighted that there are numerous benefits of PA for physical and mental health of these individuals (BEZERRA *et al.*, 2021). The World Health Organization (WHO) defines PA as any body movement produced by the skeletal muscles that require energy expenditure , which includes those practiced during work, execution of household chores, games, leisure activities and travel (WHO, 2020).

On the other hand, regarding sleep, it is a fundamental biological process of the human being in which it manifests important functions in the restoration of homeostasis of organic activities, being characterized by an unconscious period of time that can influence behavioral and physiological factors (LOPES *et al.*, 2018).

Furthermore, it is important to point out that under normal conditions, it is possible to denote two divergent states of sleep: *rapid eye* movement (REM), in which rapid *eye* movements occur, and *non-rapid eye* movement (NREM), in which these eye movements do not occur (BERRY *et al.*, 2012). Thus, in a normal human being, NREM sleep and REM sleep interval periodically throughout the night, repeating themselves on average every 100 minutes (min), from 5 to 6 cycles (CARSKADON, DEMENT, 2011).

Thus, related to these factors, adolescence is the stage of the life cycle between childhood and adulthood, in which it is a period marked by several changes of habits, such as the decrease of PA practice and aspects related to sleep deprivation, whether intrinsic, through regulatory processes or extrinsic, through concerns about school and social responsibilities (TRINDADE, RAMOS, 2020).

Moreover, during this phase, most individuals who wish to enter later into Higher Education (HE), need to attend the ME, the final stage of Basic Education, considered a private public right of every Brazilian citizen (WELLER, SILVA, 2021). The educational system of the country has portrayed that this stage represents a huge opportunity in ensuring the right to education and consequently, the generalization of the offer, has proven essential and relevant to the process of teaching and learning of students, as well as their permanence in school, redarguing to their demands and expectations, whether present and/or future (BRASIL, 2018).

The MS is a very challenging period of the student's educational and personal life, especially because it is a public predominantly composed of adolescents, which requires a differentiated look at the various factors involving the teaching and learning process (SANTOS, SILVA, 2021). Therefore, it is up to the school as a physical and social environment to value the different characteristics of adolescents, providing them with support to understand reality, face the new designs of contemporary society, and make ethical and informed decisions (BRASIL, 2018).

In addition, another very relevant factor that altered the life routine of people in general, especially students, was the emergence of a severe pneumonia caused by the SARS-CoV-2 virus, a disease popularly called COVID-19 (*coronavirus disease* 2019) (CESPESDES, SOUSA, 2020). The appearance of the first case of this disease appeared in the city of Wuhan, China, spreading to several countries, leading to the declaration of pandemic status by the WHO on March 11, 2020, after more than 118,000 cases and 4,292 deaths were recorded worldwide (WHO, 2020).

In view of this, some preventive measures had to be implemented by health agencies (OLIVEIRA *et al.* , 2020). Among them, social distancing was considered an effective way against the contagion of COVID-19, but it has shown several side effects related to mental health, leading to the lack of control of

other clinical problems and negative influences in the sociocultural, economic, intellectual, educational, and labor fields (GONZALEZ, 2020).

Thus, according to scientific studies, the practice of PA shows significant relationship with the QS, and may present several benefits, especially during this phase of education and pandemic (PANCOTTO *et al*., 2021). However, the reduction of PA levels, as well as the restriction of healthy sleep habits in the long term, may lead to decreased physical fitness and increased chances of acquiring cardiovascular diseases (BERNARDO *et al*., 2018).

Therefore, the present study aimed to analyze the level of PA and QS in high school students of a public school in São João dos Patos - Maranhão (MA) during the COVID-19 pandemic.

2 MATERIALS AND METHODS

This is a cross-sectional study with a quantitative approach. Participants in this study were students of both genders, regularly enrolled in the Federal Institute of Maranhão (IFMA), São João dos Patos Campus. This research site was chosen for convenience for the application of the study and for presenting an audience from various localities (cities) surrounding the institution's center.

Thus, the students were chosen in a simple random manner, using the lists provided by the institution, so that any student could be selected. The sample of this study consisted of 138 students, subdivided according to the years they were in high school. Thus, we obtained 50 individuals belonging to the 1st year, 57 to the 2nd year, and 31 to the 3rd year.

Inclusion criteria were: being an effective student enrolled in IFMA, both genders, delivery of the informed consent form (TALE) for students and informed consent form (TCLE) attested by parents or legal guardians. On the other hand, we adopted as exclusion criteria: students who did not have access to the internet, who were suspended from the institution's activities due to any punishment, and who had 25% + 1 of absences in relation to the general workload of subjects.

The administration responsible for the selected school received a formal request for the study through a letter of authorization. Parents/guardians and participating students were also informed of the aspects inherent to the study, formally via TALE/TCLE and informally via clarifications made by the researchers. The study was submitted to the evaluation of the Research Ethics Committee of the Maranhão State University (UEMA) through the registration in Plataforma Brasil and was initiated only after its approval, with opinion No. 5.013.955.

Data collection was carried out between the months of November and December 2021. With that, the research participants were submitted to an evaluation of the sociodemographic profile, PA level, and QS through questionnaires, applied virtually through a google form (google *forms*).

Thus, regarding the sociodemographic variables, we assessed the age (years), gender (male/female/other), skin color, self-reported weight (Kg) and height (m), year of high school (1st, 2nd,

and 3rd), integrated course, experiences in preventive measures against COVID-19 (social distancing and social isolation), alcohol consumption, and smoking or not.

The analysis of the students' PA level was performed through the answers to the International PA Questionnaire (IPAQ), short version, validated by Matsudo *et al*. (2012). The IPAQ is an instrument applied to estimate the weekly time used to perform physical activities of moderate to vigorous intensity in various circumstances of life, whether at work, in household chores, for transportation or leisure. It is also possible to estimate the time spent on less strenuous activities, such as those performed while the person is sitting down. The questions in the questionnaire are related to the physical activities performed by the students in the week prior to filling it out.

On the other hand, the evaluation of the QS was analyzed through the instrument Pittsburgh QS Index (PSQI), where sleep disturbances present in the period of one month prior to the date of application of the questionnaire is investigated (BUYSSE *et al.*, 1989; BERTOLAZI, 2008). This tool allows classifying the individual's sleep in good, bad or indicative of disorder.

For the descriptive analysis, the data were presented as mean values ± standard deviation, frequencies and percentages. Pearson's chi-square statistical test was used to compare the results and Pearson's correlation test (r), which can have a range of values from +1 to -1. Thus, a value of 0 indicates that there is no association between the two variables. A value greater than 0 reports a positive association. Still, a value less than 0 indicates a negative association. The closer the r-value is to +1 or -1, the stronger the association is considered to be. In contrast, the closer the r-value is to 0, the weaker the correlation.

In addition, $p \leq 0.05$ values were indicative of statistical significance. In addition, data were manipulated using *Microsoft Excel* spreadsheet editor and Stata 13.0 statistical program (*Corporation College Station,* TX, USA) for the analyses. The results were displayed in tables and figures.

3 RESULTS

The study sample consisted of 138 participants with a mean age of 16 ± 1.05 years. The information about the characterization of the sample, by groups, is detailed in Table 1. More than 60% of the samples from the 1st, 2nd, and 3rd grade groups declared themselves to be brown in terms of skin color. Moreover, a little more than 24% of the students participating in this study are in social isolation for the three years of high school. Regarding social isolation, the 3rd year stands out with 16.2% of the participants experiencing this preventive measure.

It is important to point out that factors such as alcohol consumption and smoking did not influence the analysis of the main variables in this study (sleep and PA), since most participants for all levels of education (1st, 2nd, and 3rd) showed high relevance for not consuming these chemicals, as can be seen in Table 1.

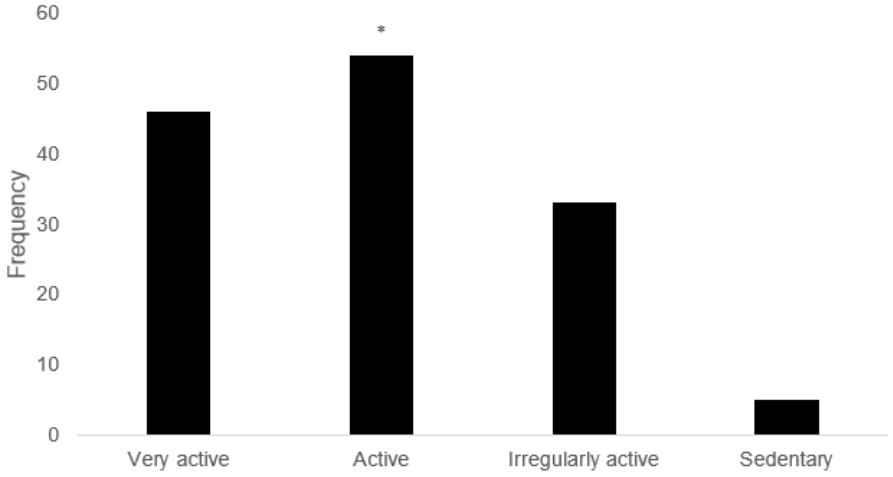
Table 1. Characterization of the sample composed of high school students from a federal public school in Maranhão (n= 138)

VARIABLES	1st Year (n=50)		2nd YEAR (n=57)		3rd YEAR (n=31)		Total n (%)
	Male	Female	Male	Female	Male	Female	
n (%)	26 (52,0)	24 (48,0)	28 (49,1)	29 (50,9)	17 (54,9)	14 (45,1)	138 (100)
Age (years)	16±0,86	16±0,83	17±1,03	16±0,59	17±0,70	17±0,63	16±1,05
Body mass (kg)	61,31±11,07	54,71±9,31	64,96±10,56	53,05±10,28	64,65±8,85	54,79±6,51	58,92±10,88
Height (m)	1,70±0,08	1,62±0,05	1,74±0,09	1,62±0,06	1,74±0,07	1,63±0,06	1,68±0,09
Skin Color							
White	5 (10,0)	2 (4,0)	11 (19,3)	6 (10,6)	2 (6,5)	2 (6,5)	28 (20,3)
Black	4 (8,0)	6 (12,0)	1 (1,7)	4 (7,0)	2 (6,5)	3 (9,7)	20 (14,5)
Brown	16 (32,0)	16 (32,0)	16 (28,1)	19 (33,3)	12 (38,7)	9 (28,9)	88 (63,8)
Yellow	1 (2,0)	-	-	-	1 (3,2)	-	2 (1,4)
Integrated Technical Course							
Food	2 (4,0)	7 (14,0)	2 (3,1)	13 (23,0)	1 (3,2)	3 (9,7)	28 (20,3)
Logistics	10 (20,0)	9 (18,0)	9 (16,0)	10 (17,3)	13 (42,0)	11 (35,4)	62 (44,9)
Computer Networks	14 (28,0)	8 (16,0)	17 (30,0)	6 (10,6)	3 (9,7)	-	48 (34,8)
Been in social isolation							
I have never been	12 (24,0)	7 (14,0)	8 (14,0)	4 (7,0)	2 (6,5)	2 (6,5)	35 (25,3)
1 year ago	6 (12,0)	11 (22,0)	12 (21,1)	12 (21,1)	9 (28,9)	6 (19,2)	56 (40,6)
9 months ago	1 (2,0)	1 (2,0)	3 (5,3)	1 (1,7)	-	2 (6,5)	8 (5,8)
6 months ago	3 (6,0)	1 (2,0)	1 (1,7)	4 (7,0)	2 (6,5)	1 (3,2)	12 (8,7)
3 months ago	2 (4,0)	4 (8,0)	3 (5,3)	5 (8,8)	2 (6,5)	3 (9,7)	19 (13,8)
1 month ago	2 (4,0)	-	1 (1,7)	3 (5,3)	2 (6,5)	-	8 (5,8)
Currently in social isolation							
Yes	3 (6,0)	2 (4,0)	3 (5,3)	3 (5,3)	2 (6,5)	3 (9,7)	16 (12,0)
No	23 (46,0)	22 (44,0)	25 (43,8)	26 (45,6)	15 (48,4)	11 (35,4)	122 (88,0)
Was in social withdrawal							
I have never been	10 (20,0)	6 (12,0)	8 (14,0)	5 (8,8)	2 (6,5)	1 (3,2)	32 (23,2)
1 year ago	5 (10,0)	8 (16,0)	12 (21,1)	12 (21,1)	9 (28,9)	3 (9,7)	49 (35,6)
9 months ago	-	4 (8,0)	3 (5,3)	1 (1,7)	2 (6,5)	-	10 (7,2)
6 months ago	4 (8,0)	2 (4,0)	1 (1,7)	4 (7,0)	-	2 (6,5)	13 (9,4)
3 months ago	5 (10,0)	4 (8,0)	1 (1,7)	3 (5,3)	2 (6,5)	6 (19,2)	21 (15,2)
1 month ago	2 (4,00)	-	3 (5,3)	4 (7,0)	2 (6,5)	2 (6,5)	13 (9,4)
Currently in social withdrawal							
Yes	3 (6,0)	8 (16,0)	8 (14,0)	8 (14,0)	4 (12,9)	4 (12,9)	35 (25,4)
No	23 (46,0)	16 (32,0)	20 (35,1)	21 (36,9)	13 (42,0)	10 (32,2)	103 (74,6)
Consumes alcoholic beverages							
No	21 (42,0)	21 (42,0)	22 (38,5)	25 (43,9)	16 (51,7)	11 (35,4)	116 (84,0)
Yes, regularly	2 (4,0)	2 (4,0)	3 (5,3)	1 (1,7)	-	3 (9,7)	11 (8,0)
Yes, but not regularly	3 (6,0)	1 (2,0)	3 (5,3)	3 (5,3)	1 (3,2)	-	11 (8,0)
You are a smoker							
No	26 (52,0)	24 (48,00)	27 (47,4)	29 (50,9)	17 (54,9)	14 (45,1)	137 (99,3)
Yes, but not regularly	-	-	1 (1,7)	-	-	-	1 (0,7)

Data presented as mean ± standard deviation; - : no data reported.

Figure 1 depicts the aspects linked to the overall PA level of the participants. It can be observed that 33.3% (n=46) and 39.1% (n=54) of the individuals were classified respectively in the very active and active categories, denoting that a little over 72% of the total study sample are physically active. Thus, 24% (n=33) were classified as irregularly active and only 3.6% (n=5) as sedentary. Furthermore, through the application of Pearson's chi-square test, a significant difference between the classification categories was verified with p<0.0001.

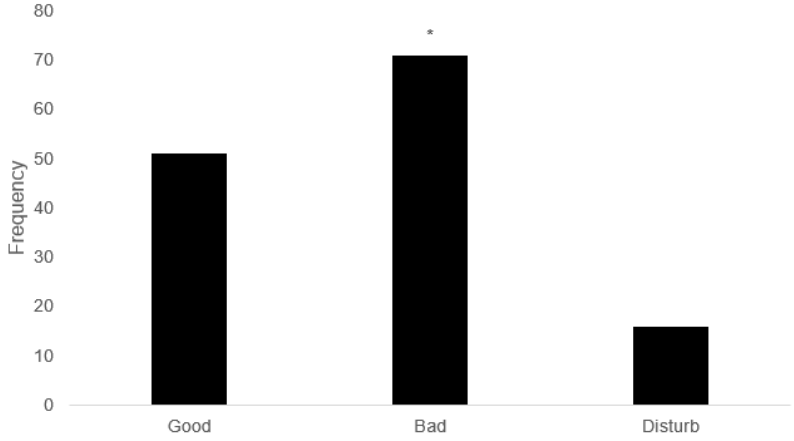
Figure 1. Classification of the general physical activity level of high school students (n=138)



Data expressed as frequency. Statistical analysis performed by Pearson's chi-square. *p<0,0001.

The students' overall QS is shown in figure 2. Thus, it is worth noting that 37% (n=51) of the participants had a good QS. On the other hand, 51.4% (n=71), and 11.6% (n=16) of the overall study sample were classified for poor quality and indicative of sleep disturbance, respectively. In addition, with the application of Pearson's chi-square test, a significant difference was found between the classification categories with p<0.0001.

Figure 2. Overall sleep quality rating of high school students (n=138)



Data expressed as frequency. Statistical analysis performed by Pearson's chi-square. *p<0,0001.

The PA level and the QS of the students were analyzed in a specific way regarding the year of course in the MS, as reported in Table 2. Given this, in the 1st year, the individuals accused a percentage of 66%, being the highest for the categories of very active and active adjunct (physically active). Regarding the PA level in 2nd grade, the participants showed a higher percentage also for the classification of very active and active associated, being considered physically active 75%. In the 3rd year, the majority of students presented levels considered to practice PA (78%).

Furthermore, it is worth noting that 1st graders attested to the highest percentage for poor QS (bad rating and adjunct disorder), 58%. This poor QS (bad rating and adjunct disorder) was also frequent in the 2nd year, with 65% of the sample. Also, regarding the last year of MS students showed a higher percentage (68%) for poor QS (bad rating and adjunct disorder).

Furthermore, through the application of Pearson's chi-square test, a value of $p>0.05$ was verified, consequently presenting no statistically significant difference between the classification categories analyzed.

Table 2. Classification of physical activity level and sleep quality by year of high school (n=138)

Variables	1st year n (%)	2nd year n (%)	3rd year n (%)	p* value
Level of physical activity				
Very active	19 (38)	17 (29)	10 (33)	
Active	14 (28)	26 (46)	14 (45)	0,55
Irregularly active	15 (30)	13 (23)	5 (16)	
Sedentary	2 (4)	1 (2)	2 (7)	
Quality of sleep				
Good	21 (42)	20 (35)	10 (32)	
Bad	24 (48)	30 (53)	17 (55)	0,92
Disorder	5 (10)	7 (12)	4 (13)	

Data presented as frequency and percentage; * Pearson's chi-square test.

Pearson's Correlation analysis(r) is presented in Table 3. In the 1st year (r=-0.259) of MS the results indicate a negative but weak association between the variables. However, in the 2nd (r=0.937) and 3rd year (r=0.999), QS shows a positive and strong correlation with students' PA level.

Table 3. Correlation values between sleep quality and physical activity level of students (n=138)

	LEVEL OF PHYSICAL ACTIVITY		
	1st year (n=50)	2nd year (n=57)	3rd year (n=31)
SLEEP QUALITY	-0,259	0,937	0,999

Statistical analysis performed by Pearson's Correlation.

4 DISCUSSION

The impact of PA and sleep duration on the QoL of MS students has shown extremely relevant aspects. Individuals considered physically active report some categories of their QoL as being better when compared to non-physically active people (CAMPOS *et. al.*, 2021). In this perspective, aiming to improve emotional and mental health, in addition to physical well-being, PA practice has a positive influence related to these aspects (MACHADO *et al.*, 2020).

In this sense, there are numerous benefits of PA practice, among them are the improvement of physical fitness and mental health (OLIVEIRA *et al.*, 2018), reduction of adipose tissue, strengthening of the musculoskeletal system and still, can prevent against chronic noncommunicable diseases (NCDs) (AGOSTINIS SOBRINHO, VILAN, 2021).

Thus, the main results of this study indicated that the level of PA and the QS are important variables as preponderant requirements for a good QL. It was observed that in this research, 72.4% of the overall sample showed to be physically active, while 27.6% were outside the standards of physically active as highlighted by the instrument used for evaluation (IPAQ - short version). Silva *et al.*, 2021 (30 children and adolescents evaluated) found divergent findings before this study. In their research the level of PA, assessed by the IPAQ short version (questionnaire), revealed that 64.6% of children and adolescents self-reported as sedentary.

This was also noticeable in the study by Santana *et al.*, 2021 (102,072 evaluated), in which the results showed high prevalence of sedentarism (56.3%) and physical inactivity (78.1%) among Brazilian schoolchildren. Adolescents whose parents or legal guardians always checked school physical activities were less likely to be sedentary and inactive compared to parents or guardians who never supervised the practices.

In contrast, the study by Gomes *et al. (*2017) presents different results regarding the sleep variable. In their study, conducted with 309 adolescents aged 10 to 19 years, they denoted a prevalence of poor QS of 28.2% of the study sample. Thus, this prevalence differs with the findings found in this research, as 63% of the adolescents charged for poor QS.

In the study by Santiago *et al.*, 2015, the initial diagnosis regarding the QS in adolescents portrayed that even in this average age, cases related to indications of sleep disorders are found. Thus, research has shown a high prevalence of insufficient sleep and poor QS among young students. Moreover, in the state of Santa Catarina, an investigation was conducted with the adolescent public of MS, between the years 2001 and 2011, in which Hoefelmann *et al., (*2013) identified prevalence of poor QS (26.3% and 34.5%) and insufficient duration (37% and 57%) in students of this level of education.

On the other hand, in a study conducted with adolescents in MS, it points out that the uncertainties of the future, social support and vocational identity, are directly related to mental impairments such as depression and anxiety, impairing the quality of sleep and life of these individuals and consequently, school performance (FRANCINE, DIANE, 2016).

These doubts regarding the future have been further aggravated with the advent of the pandemic of COVID-19. Because of this, social distancing presents itself as one of the preventive measures implemented by health organizations around the world, more effective against the proliferation of this infectious disease (WHO, 2020), but reports suggest that adolescents in their free time, away from school, colleagues and friends, whether on weekends, holidays or vacations, tend to be less physically active, showing a greater interest in digital technologies and consequently problems related to healthy sleep and eating habits (WANG *et al.*, 2019).

Therefore, there is a need to acquire healthy lifestyle habits, since this phase of the life cycle with optimal behaviors, can be determinants for the construction of a society marked by a good QoL (SILVA *et al.*, 2019). With that, in recent years, some studies have sought to identify the importance of regular PA practice related to QS of young students (OLIVEIRA *et al.*, 2018).

The results of this study may be associated with changes caused by the pandemic of COVID-19 through the restrictions implemented by means of the preventive measures, denoting free time to practice PA and the emergence or evolution of psychological problems arising from various feelings surfaced by the requirement and/or instruction of having to isolate themselves in their respective homes, thus affecting the QS.

Therefore, our findings may be important in aiding educational and public health mechanisms, denoting that QS and PA in adolescents are more strongly related to QoL. Moreover, the association between QS and PA level is influenced by the psychological burdens and demands of society in general for the strong demands for studies.

5 CONCLUSION

Thus, the data from this study showed that most of the students investigated are physically active. However, poor QS is frequent in the lives of most of the participants. Furthermore, the results obtained in this study suggest a positive relationship between the QS and the PA level of most of the MS students. Thus, the level of PA seems to be highly responsive to improve the QS of adolescents, especially during the pandemic period and dedication to studies at the same level of education, as well as related to the preparation for entry into higher education.

Therefore, in view of the results of this research, the application of intervention studies with the purpose of researching possible effects of PA on the improvement of QS in adolescents in a thorough manner becomes noteworthy, as they are of extreme relevance and necessity with regard to contributions to public health and educational management through the data to be found.

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Chapter 8

Anesthetic approach in cesarean section and postoperative pain control

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ABSTRACT
This article analyzed the scientific production on the anesthetic approach in cesarean section and postoperative pain control, in order to understand the benefits and harms of each technique used. It was noticed that the use of spinal anesthesia using a combination of drugs can be both a safe and reliable approach and also promote prolonged analgesia in the postoperative period. Combined spinal-epidural anesthesia allows better dose adjustment, reduces adverse effects, allows a shorter length of hospitalization, but may have problems with the technique and the catheter itself. On the other hand, epidural anesthesia, despite having some contraindications, such as sepsis, myelopathy and hypovolemia, for example, allows the conscious participation of the mother during childbirth, in addition to keeping the protective reflexes of the upper airways intact. Finally, general anesthesia should not be the technique of choice in cesarean section, except in some specific situations, such as hemodynamic instability and intracranial hypertension, due to its numerous adverse effects. There is, therefore, no ideal technique, and knowledge of all of them is necessary to provide better anesthesia for the mother and her fetus.

Keywords: anesthesia, cesarean section, postoperative pain.

1 INTRODUCTION

Surgical delivery, known as cesarean section, has regional anesthesia as the method of choice, being part of an enhanced recovery protocol with a strong degree of recommendation (CAUGHEY *et al.* , 2018). This type of anesthetic approach encompasses spinal anesthesia techniques, epidural anesthesia, and combined spinal - epidural anesthesia (SCHMIDT, 2009). It is known that in recent years, due to advances in anesthetic and surgical techniques, cesarean sections have become safer (LAVENDER *et al.* , 2012).

With respect to spinal anesthesia and epidural anesthesia, both have similar results; however, the incidence of intraoperative pain is lower in spinal anesthesia when compared to epidural anesthesia. It is also worth noting that the regional anesthesia method has a positive impact on recovery, pain control, mobility, organ function, hospital days, postoperative nausea and vomiting, and other adverse events (CAUGHEY *et al.* , 2018). In addition, obstetric regional anesthesia techniques have greater safety and advantages when compared to General Anesthesia (GA). With the regional anesthesia method there is less potential for postoperative sedation and a consequent decrease in maternal mortality rates from anesthesia (CAUGHEY *et al.* , 2018).

Obstetric anesthesia can also present complications, which can be attributed either to the anesthetic technique itself or to physiological changes during pregnancy. Among the main complications are headache after puncture of the dura mater, nerve lesion, and inadequate regional block. When it is necessary to resort to general anesthesia, it can occur accidentally, for example, return of consciousness of the mother during anesthesia, failure of tracheal intubation, and aspiration of gastric contents (MARONGE; BOGOD, 2018).

In addition, the control of post-surgical pain, which has an incidence of 25.5%, is of great relevance, since it interferes with the woman's well-being and her interaction with the newborn. Its main risk factors include anxiety before the cesarean section, smoking and high intensity pain in the immediate postoperative period, all of them relevant (BORGES *et al.* , 2020). This pain can be relieved with oral analgesia or with non-pharmacological techniques, such as aromatherapy and transcutaneous electrical nerve stimulation (ZIMPEL *et al.* , 2020).

In view of the above, the objective of this review is to establish which is the best anesthetic approach in cesarean section, as well as the advantages of each technique, and the management of postoperative pain.

2 LITERATURE REVIEW

Spinal anesthesia is one of the most used anesthetic techniques in abdominal and lower limb surgeries, such as cesarean delivery. In general, it is a safe and reliable anesthetic, low cost, easy to apply, and provides a rapid onset of analgesic and muscle relaxant effects. However, important disadvantages need to be addressed to ensure better performance of spinal anesthesia during surgical delivery, especially the limited duration of analgesic effect and delayed postoperative motor recovery, which contributes to longer maternal hospital stay and delayed return to free ambulation (SUN; XU; WANG, 2014; SUN *et al.* , 2017).

Classically, the analgesic drugs preferred for intrathecal administration in cesarean section anesthesia are local anesthetics, with bupivacaine being the most widely used. This medication is capable of promoting adequate intraoperative analgesia, although it is associated with significant adverse effects, such as nausea and vomiting, bradycardia, hypotension, and neurological changes, besides being unable to ensure appropriate postoperative analgesia (ROOFTHOOFT *et al.* , 2021).

In fact, pain after surgical delivery, often neglected, can culminate in severe repercussions for the mother-child binomial, such as difficulties in breastfeeding and in the connection between woman and child, delay in maternal recovery and return to daily activities, and persistence of chronic pain. This argument highlights the importance of ensuring adequate control of the pain stimulus during surgery and postoperative recovery, which is a major challenge for anesthesiologists (SUN; XU; WANG, 2014; ROOFTHOOFT *et al.* , 2021).

In this sense, several drugs have been studied and used as adjuvants to intrathecal local anesthetics, in order to mitigate the main disadvantages associated with spinal anesthesia, with greater emphasis on opioids (morphine and fentanyl) and alpha-2 adrenergic agonists (dexmedetomidine and clonidine) (SUN *et al.* , 2017). A meta-analysis study developed by Seki *et al.* (2021) demonstrated that all investigated opioids, including fentanyl, sufentanil, and morphine, showed promising results in prolonging the duration of postoperative analgesia of operative deliveries when associated with intrathecal local anesthetics, with morphine being the drug with the most relevant results, despite an elevated incidence of respiratory depression.

Similarly, Liu *et al.* (2019) concluded that the use of dexmedetomidine in association with bupivacaine in spinal anesthesia was associated with longer analgesia and earlier onset of action compared to intrathecal administration of the local anesthetic alone. Besides that, the combined use of both drugs allowed a reduction in the dose of bupivacaine used, reducing the incidence of its main adverse effects, without compromising maternal-fetal safety.

In turn, Sun *et al.* (2017) compared the effects related to the use of dexmedetomidine and fentanyl as adjuvants to local anesthetics in spinal anesthesia. From their observations, the study demonstrated that the former proved superior to opioid by prolonging the postoperative analgesic effect and pain-free period and reducing the incidence of pruritus, without raising the risk of significant hemodynamic repercussions.

Combined spinal-epidural anesthesia (CSE) has gained notoriety in obstetric surgeries. In practice, it consists of starting with the standard spinal anesthesia technique at the L1 level, in the subarachnoid space, identifying the return of CSF. Then, the epidural catheter is inserted into the epidural space and fixed, for the serial administration of medications during and after surgery. As a routine, intrathecal bupivacaine and morphine are recommended, while dipyrone and anti-inflammatory drugs are administered intravenously (CAUGHEY *et al.* , 2018).

In regional anesthesia, the use of intrathecal morphine is known to have good results in improving post-procedure pain; however, concomitantly, there is a greater risk of adverse effects such as nausea,

vomiting, and pruritus. On the other hand, the use of lipophilic opioids, such as fentanyl and sufentanil, which have limited intrathecal duration, have a positive impact on the improvement of intraoperative pain, which does not occur in the postoperative period. Regarding the management of postoperative pain, the best approach is multimodal analgesia, which has non-steroidal anti-inflammatory drugs (NSAIDs), acetaminophen, dipyrone, neuroaxial opioids, and non-opioid adjuvants, in addition to non-pharmacological measures. Systemic opioids, administered orally or parenterally, are prioritized only in the case of irruptive pain (HOLLANDA *et al.* , 2020).

The prospective cohort study by Macias *et al.* (2021), compared traditional patient-controlled analgesia with the multimodal regimen. As a result, the multimodal regimen was found to control pain adequately and optimally, reduced the use of opioids by milligrams, and was associated with early exclusive breastfeeding after cesarean delivery. Consequently, there was a reduction in postoperative complications and length of stay for patients on multimodal analgesia.

As for the use of oral gabapentin as an analgesic adjuvant, there is insufficient evidence of its influence on post-surgical pain, but benefits are suggested when used as part of multimodal treatment in women with chronic pain. Other additional medications should also be further studied and individualized. As a non-pharmacological measure, RCT research in China and India has shown that perioperative, intraoperative, and postoperative music can help manage patient anxiety, decreasing the total amount of analgesics per elective cesarean section (HOLLANDA *et al.* , 2020; MACIAS *et al.* , 2021).

Although it is a simple and refined technique, network meta-analysis research has not indicated significant advantages of spinal-peridural for elective, full-term, uneventful cesarean delivery. As an example, Kim *et al.* analyzed 46 randomized studies and compared neonatal and maternal outcomes secondary to the four anesthetic techniques performed in cesarean delivery. The result was inconclusive regarding combined anesthesia due to paucity of data and uncertain research bias, and more studies comparing spinal-epidural anesthesia to the other regional anesthesia modalities alone are needed. Similarly, the systematic review articles that set out to make this comparison in isolation lacked evidence favoring one block over another. Change in efficacy and clinically derisory adverse effects have been demonstrated (SIMMONS *et al.* , 2019; SIMMONS et *al.* , 2012; KLIMEK *et al.* , 2018).

Regarding advantages, this combined method provides rapid onset analgesia, lower incidence of motor block, and allows access to the epidural space via catheter. This is important because it ensures dose adjustments and titrations when necessary, which allows prolonged anesthesia during non-elective cesarean and vaginal delivery, as well as prolonged postoperative analgesia. This allows for the initial use of lower doses of local anesthetics and opioids, which reduces the risk of complications such as hypotension, nausea, vomiting, post-dural puncture headache (PDPH), and pruritus. It is worth noting that high-dose opioid use is directly related to pruritus (BRAGA *et al.* , 2019).

Furthermore, CSE may reduce the length of stay in the post-anesthesia recovery room (PRA). Among the main disadvantages of this technique for cesarean delivery are the increased risk of causing

total spinal anesthesia due to the possibility of migration of the epidural catheter into the subarachnoid space with injection of large volume of local anesthetic. Another unfavorable factor is CPPD as a potential side effect, and neurological injury as a complication (KLIMEK *et al.* , 2018).

The epidural anesthesia, which is a technique used worldwide, consists of injecting local anesthetic externally to the dura mater, in the epidural or extradural space, which is located deep to the ligamentum flavum and externally to the dura mater. Its use is mainly for anesthesia or analgesia of the thoracic, abdominal, pelvic, lower limbs, in chronic pain and labor. Absolute contraindications include allergy to drugs used in the technique, sepsis, and patient refusal. The relative contraindications are framed in neurological, such as myelopathy, peripheral neuropathy, spinal stenosis, spine surgery, multiple sclerosis and spina bifida; cardiac, such as aortic stenosis, fixed cardiac output and hypovolemia; hematological, such as thrombophilia and hereditary coagulopathy; and finally, infection (SANCHEZ; RIVEROS, 2022).

The advantages of this technique for the mother involve her participation during labor, preservation of the protective reflexes of the upper airways, and protection of maternal consciousness (BRAGA *et al.* , 2009). Among the drugs applied are local anesthetics such as lidocaine, bupivacaine, tetracaine, mepivacaine, ropivacaine, levobupivacaine, chloroprocaine, vasoconstrictors such as epinephrine and phenylephrine, and opioids such as fentanyl, morphine, hydromorphone, oxycodone or sufentanil, and alpha-agonists such as clonidine (SANCHEZ; RIVEROS, 2022).

Kaçmaz *et al.* (2020) conducted a randomized, double-blind study comparing the effects of epidural initiation volumes (5, 10, and 20 mL) with the use of bupivacaine associated with fentanyl, assessing postoperative pain scores in patients who underwent the epidural technique. As a result, they did not find significant differences between the different volumes. They also compared the use of ropivacaine in cesarean deliveries with bupivacaine, concluding that both have similar properties in sensorial and motor blockade, however with shorter duration of motor blockade, 0.9 h versus 2.5h respectively (GEORGE; LIU, 2021).

Recalde *et al.* (2018) pointed out epidural analgesia as the most used technique when having post-section pain; however, the disadvantages presented are related to the choice of drugs, not the technique used. In addition, the paper compared the use of fentanyl combined with levobupivacaine post cesarean section, which was shown to be worse than the use of levobupivacaine alone, leading to greater pictures of pruritus and dizziness.

Among the anesthetic techniques discussed, the key objective of general anesthesia is to prevent the surgical experience by inducing both unconsciousness and disconnection of consciousness from the environment, and the general anesthetic state is defined as a reversible condition induced by a substance that translates into amnesia, hypnosis, analgesia, akinesia, and attenuation of autonomic reflexes. GA in the context of obstetric surgeries, particularly cesarean sections, is reserved for specific circumstances, due to the association of its use with high rates of maternal morbidity and mortality, due to the increased risk of failure in endotracheal intubation and pulmonary aspiration of gastric contents (MILLER; PARDO, 2012).

For Corrêa (2019), in the context of cesarean section, the GA technique will be chosen when there are absolute or relative contraindications to the neuroaxial block. Among the absolute and/or relative contraindications are maternal refusal, situations that prevent the patient from cooperating during the execution of the technique, increasing the risk of lesions in neural structures and other complications (uncompensated severe psychiatric disease, severe neuropsychomotor development deficit, significant emotional immaturity), intracranial hypertension, hemodynamic instability, coagulation disorders/alterations, sepsis, infection at the puncture site, maternal heart disease, and preexisting neurological disease.

Among the most frequent complications of general anesthesia in patients undergoing obstetric procedures is accidental awareness, which can cause psychological morbidity of anxiety and nightmares. There are multiple factors that are associated with the risk of accidental awareness, among them the physiological changes of pregnancy, increased cardiac output, and, consequently, a change in the pharmacokinetics of induction agents (MARONGE; BOGOD, 2018).

Other complications related to the use of general anesthesia can be cited, such as the use of high number of drugs and their possible side effects, leading to neonatal repercussions, impossibility of using neuroaxial opioids for postoperative analgesia, high risk of developing chronic postpartum pelvic pain, high risk of postoperative venous thromboembolism; lower chance of breastfeeding in the immediate postpartum period and need for manipulation of the maternal airway, with a higher risk of intubation failure and pulmonary aspiration (LUCENA; SOARES; BOAS, 2010; DEVROEA; VALDEA; REX, 2015).

The use of general anesthesia should be evaluated according to the context and needs of each case, and it is strongly recommended in situations where it is not possible to position or time to perform an adequate neuroaxial block, in cases of persistent intraoperative pain resulting from an inadequate neuroaxial blockade and not solved with the use of other analgesic methods, and in emergency situations, especially in cases of acute fetal distress with intense bradycardia, without time to perform an adequate spinal block. Thus, it is an anesthetic technique reserved for emergency cases, in which the main advantages of general anesthesia are speed, predictability, results independent of patient compliance, control of the airway and ventilation, and hemodynamic stability (LUCENA; SOARES; BOAS, 2010).

3 FINAL CONSIDERATIONS

In view of the above, there are criteria for the use of each anesthetic technique described in this work. Spinal anesthesia is important to maintain good postoperative analgesia, besides being a safe and low cost technique, while combined spinal-epidural anesthesia, despite presenting fewer side effects, is related to the occurrence of technical failure. On the other hand, general anesthesia, which is not routinely recommended, is extremely useful in the emergency setting or due to inadequate neuroaxial blockade. Therefore, there is no ideal technique, and knowledge of all techniques is necessary to provide the best anesthesia for the mother and her child according to the particularities of the case.

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Chapter 9

The challenges of breastfeeding about myths and taboos

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ABSTRACT
The myths and taboos carry much of the understanding of nursing mothers, having strong cultural, social, and economic influence, being fundamental the expansion of health promotion by professionals. Thus, this paper aims to identify and discuss the challenges of breastfeeding regarding taboos and myths. This is an integrative review on the challenges of breastfeeding regarding myths and taboos. The information was collected through original scientific articles using the keywords: breastfeeding and taboos, breastfeeding and beliefs, as well as early weaning and its myths. The literature was retrieved from Google Scholar and Scientific Electronic Library Online (SCIELO) from 2011 to 2021. Among the numerous articles published, it was found that beliefs and myths that affect breastfeeding exist, as well as many prejudices about the theme, such as "milk is weak", "breastfeeding makes the breasts fall or become soft", "consuming alcohol does not harm the baby" and many other myths and taboos rooted in society. Pointing out the aspects that lead to early weaning brought to the study a reflection of the lack of effectiveness in the child's and mother's well-being, therefore, it is necessary that the health professional is able to break with the culturally constructed beliefs, which can bring harm to both the baby and the mother.

Keywords: Breastfeeding, Myths and taboos, Beliefs, Early weaning, Health promotion.

1 INTRODUCTION

Breastfeeding is fundamental for the baby's evolution and maturation, especially in the first 6 months of life. Breastfeeding acts on the immune and psychological systems during pregnancy. At birth, it acts on the stomatognathic process, in addition to the connection between mother and child. Lactation provides nutrients such as vitamins, minerals, carbohydrates, lipids, proteins, and antibodies. It is also noteworthy that only breast milk is necessary for the development of the baby, first exclusively in the period from 0 to 6 months and complementarily until 2 years, according to the recommendations of the World Health Organization (WHO) (BRAÇA, GONÇALVES, AUGUSTO, 2020).

It is instituted that the baby needs to be breastfed without having a specific time, having the freedom in this moment without having a duration time. Since, the child's hunger signal is an alert when to perform the breastfeeding. It is worth mentioning that some characteristics of when the baby is feeling hungry are demonstrated and issued some signs such as increasing the frequency in the movements of the eyes closed or open, stretch the tongue and turn his head to look for the breast, open the eyes, make soft moaning sounds, sucking and biting hands, fingers, cry loudly and have difficulty to take the breast are considered a sign to be evaluated by the nurse (SIQUEIRA, SANTOS, 2017).

The guidelines on how to put the child to breastfeed on demand are factors that contribute to the benefits for the breastfeeding process, so health professionals should be able to note that from the understanding and comprehension of women, it is necessary to raise the importance that governs this act. Mothers have an objective notion of the importance of breastfeeding, with this, the recognition that the support of breastfeeding guarantees a safe practice and the overcoming of fears. Moreover, this act prevents fissures, engorgement, and breast mastitis. Furthermore, the exposure of the mother to her knowledge about breastfeeding adds values linked to the well-being and affection between mother and child. And finally, a greater security to breastfeed on demand (SÁ, et al,2019).

For an adequate care management and breastfeeding promotion, it is essential that this is done with the participation of the nursing mother and her partner, identifying and respecting the family's organizational mode. Therefore, it is necessary that the professional gets closer to the nursing mother's family way of life to design strategies that raise awareness and inform the family about breastfeeding practices, because the maternal knowledge transmitted by family members is a determining factor for effective breastfeeding (SIQUEIRA, SANTOS, 2017).

Although the work is multi-professional, nurses, in particular, are very important for the success of breastfeeding. For this reason, it is essential to accompany the pregnant woman from the prenatal to the puerperium. It is fundamental that the nurse stimulates the act of breastfeeding and answers all of the pregnant woman's questions. It is worth pointing out that the nurse designates the contact between mother and child. One of the indispensable behaviors of nursing professionals is to stimulate breastfeeding and ensure the child's growth (ALBURQUERQUE,2021).

It is evident that there are several reasons that lead to early weaning, being justified by myths and taboos that explain this fact, such as cultural heritage, relationship with the spouse and family, daily problems, maternal work. In breastfeeding, several factors coexist that can positively or negatively influence its progress, such as the human being's way of acting, previous experiences, and emotional state, as well as family support. Moreover, it is worth mentioning that the need for the foundation of the concepts of taboos and myths is vital for mothers who are going through this process (SANTOS, et al, 2015).

It can be said that customs passed on from generation to generation lead to numerous myths and taboos within society that explain the origin of certain factors, raising a construction based on the common sense of past generations. Thus, it is possible to relate that a person's beliefs, worldview or spirituality can reflect on their health, especially in breastfeeding, the myths and taboos related to it can bring setbacks by interfering with the practice of breastfeeding (LAHÓS, et al, 2016). This study aims to identify and discuss the challenges of breastfeeding regarding taboos and myths. In addition, to unravel which beliefs are quite recurrent in society and mention the importance of the health professional to ensure the success of breastfeeding.

1.1 BREASTFEEDING

Breastfeeding is initially essential as a source of nutrients for the baby, so in the first hours of life the contact between mother and child is crucial for the development of the child's nutritional and cognitive status. Exclusive breastfeeding (EBF) involves offering the child only breast milk until six months of age without the addition of other liquids or solids. Containing all the necessary nutrients for the baby, breastfeeding brings anti-infectious properties and immune protection (MACHADO, 2016).

The milk production goes through a maturation process that causes the milk to go through three main phases in its production: Colostrum is produced in the first days after birth and has in its composition antibodies, proteins, vitamins, minerals, which is considered the first immunization that the baby receives soon after birth. Transition milk is produced from the 6th to the 15th day after birth and its composition is rich in fat, lactose, and other important nutrients. The Mature milk is considered the ideal milk with all the essential components for the child's development, is produced after the 15th day (MACHADO, 2016).

According to the World Health Organization (WHO), the evidence points out that breastfeeding shows benefits for the life of the mother and the baby, depending on the duration. The MS (2015) distinguishes that, in relation to the pathology correlated to the mother, there is uterine involution and reduced bleeding, prevention of postpartum depression, return of weight and body image, cancer, endometriosis, breast, ovarian and endometrial cancer, Alzheimer's disease, and generalized diseases, for example, diabetes mellitus, osteoporosis, and cardiovascular diseases. With regard to the baby the WHO states that for the infant among the main benefits are the reduction of infant obituary, weight gain, increased number of antibodies malnutrition, respiratory diseases, diabetes mellitus, atopic dermatitis, allergic rhinitis, obesity, better rates of neuro motor and cognitive development, intellectual quotient and exercises the perioral and intraoral region (BRAGA, GONÇALVES, AUGUSTO, 2020).

1.2 MYTHS AND TABOOS

Myth is a belief that is passed from generation to generation by people who use information as absolute truth. In relation to breastfeeding, it too, as well as other topics are affected by popular beliefs harming breastfeeding (SOUZA, *et al*, 2014).

In the social environment, countless people claim that milk is weakened, milk does not quench the baby's thirst, breastfeeding makes the breasts fall or become soft, small breasts do not produce milk, consumption of alcoholic beverages increases milk production without affecting the child, these are some myths that have historically been passed down in society (SOUZA, *et al*, 2014).

Nursing mothers think that the milk is weak because of the taste in comparison with milk from other animals. For this reason, they claim that it is insufficient for their children. Moreover, this premise is also associated with the child's disordered weight gain, which is justified by the way the baby latches on to the breast, as this influences the success of breastfeeding. When nursing mothers state that breast milk is

insufficient, they take into account the baby's crying, which is normal for its adaptation outside the mother's womb (MACHADO, 2016).

The belief that milk does not quench the baby's thirst is well explained in society, however, the composition of breast milk has all the nutrients that babies need, including water. Therefore, it is very common for mothers to introduce liquids such as water and teas before the age of six months, disregarding the recommendation of the World Health Organization (WHO), which recommends exclusive breastfeeding until the age of six months. In parallel to this, there is a myth, also quite common, that the breasts of lactating women fall out or become flaccid when they breastfeed. It should be noted that most women refuse to breastfeed for aesthetic reasons that are caused during pregnancy until the act of feeding the baby, because they assume that the natural changes that occur in the human body are related to the exclusive nutrition of the newborn (MARQUES, *et al*, 2011).

When it comes to breast size, due to lack of quality information, mothers believe that this influences the production of breast milk when, in fact, what acts in the production of milk is not the size, but the portion of glandular tissue. On the other hand, the consumption of alcoholic beverages is of no benefit to either mother or child. The alcohol content is passed into the milk in the same amount that is passed into the bloodstream, bringing negative consequences for the development of the newborn, since these drinks can modify the nutritional value of a milk as complete as breast milk (SOUZA, *et al*, 2014).

Another important point is that the family is fundamental in this process of breastfeeding, however, many old grandparents interfere negatively in breastfeeding, due to have their descendants in a period that did not have much knowledge about the importance of breast milk, so other types of milk were used and these beliefs being used as absolute truth without scientific evidence (MACHADO, 2016).

In a study conducted in Rio Grande do Sul about breastfeeding with 117 pregnant women about the myths and beliefs it was noticed that from the interviewees the most popular myth was that the milk dried up and the second most common is the unwillingness or laziness to breastfeed because the lactating woman should be available at any time to supply the baby's needs (LAHÓS, 2016).

1.3 EARLY WEANING

Early Weaning is characterized by the total or partial abandonment of breastfeeding before the newborn is six months old. According to the World Health Organization, it is recommended that the child continue to receive breast milk until the second year of life for the well-being of the child and the mother.

There are several factors that influence early weaning, such as oral dysfunctions that cause irregular movements in the newborn during breastfeeding, or anatomical characteristics that hinder the correct grip between the breast and the baby's mouth. In the article it was reported that the main causes of early weaning in the mother's view are: return to work, maternal age, maternal decision, depression, difficulties in breastfeeding, aesthetics of the mother, and the use of medication. The research shows that in the indexes of age group teenage mothers predominate in early weaning, weaning that can be caused by the mother's

insecurity, immaturity linked to the difficulties of self-image of this, which consequently end up hindering even more the lactation, because it is necessary a safe and comfortable environment for the production of this milk (ALENCAR, *et al*, 2017).

The baby's lack of interest or refusal also influences the exclusive free demand, refusal that can be caused by a wrong posture/latching of the child, another cause is also a possible immaturity of the baby that has not yet developed the sucking reflex. The recurrent pain during feedings directly interferes with the ejection of milk, and as a result the infant is not able to suckle properly, thus generating a feeling of anguish in the mother that directly interferes with her psychology, thus causing possible psychological traumas that can lead to low milk production (ALENCAR *et al*, 2017).

It is worth noting the consequences that this ablactation can bring to the newborn, in the article, diarrhea was considered one of the main consequences, followed by infant malnutrition and brings as a consequence an increase in the mortality rate. It is estimated that 52.3% of infant pneumonia can be attributed to protein-energy malnutrition, because children with exclusive breastfeeding had a lower prevalence of low weight and consequently low BMI, and those with consumption of infant formulas were associated with underweight. According to the WHO and UNICEF, about six million children's lives are saved every year by increasing the rates of exclusive breastfeeding (BONFIM *et al*, 2021).

1.4 IMPORTANCE OF BREASTFEEDING INFORMATION

It is emphasized that the promotion of breastfeeding up to the appropriate period should be a factor that contributes as an important action to improve the health and quality of life of children and their mothers. Promoting breastfeeding can be a good public policy strategy that encompasses all spheres - family, community, government, and civil society. In Brazil, there are numerous programs about the encouragement of breastfeeding, however, there still persists an inconsistency of the recommendations of the World Health Organization (WHO) for the female public to breastfeed their children with exclusive breastfeeding until six months of age (COSTA, *et al*, 2019).

In addition, the importance of information on breastfeeding also extends to the specialized education of health professionals that provides theoretical and practical knowledge on breastfeeding, with an emphasis on its immunological, anatomical, and physiological aspects, breastfeeding complications, and clinical management, thus, having the autonomy to transmit the knowledge in a creative and easy-to-understand manner to women, family members, and their social cycle, making them understand everything that encompasses breastfeeding and consequently increasing its duration and prevalence (SOUZA, *et al*, 2021).

1.5 ROLE OF THE NURSE

The nurse will formulate the purposes, objectives, and thus reach a care goal. These care strategies will be associated with each difficulty encountered and contain the necessary prescriptions, so that no setbacks occur at the time of breastfeeding or that they can be minimized, in case something different

happens. What happens even before the birth of the child is the assistance to the pregnant woman regarding the preparation of the breast. It is considerable, because it avoids certain obstacles, such as sore and cracked nipples that arise almost always accompanied by pain (CARVALHO, CARVALHO, MAGALHÃES, 2011).

The professional must be confident in his area of work, overcoming the physiological issues of breastfeeding, conquering the woman's safety and becoming a tool that transmits knowledge to her, being willing and able to meet her needs and perceptions about breastfeeding, as well as always enabling the understanding of breastfeeding, providing a warm and integral assistance for a new phase that the woman is starting (LUSTOSA, LIMA, 2020).

Health professionals often find nursing mothers in difficulties to breastfeed and do not always highlight the favorable points of this situation, as well as encounter difficulties in contextualizing so that the information is not easily absorbed. Taking into account the cultural, economic and social heterogeneity, it becomes essential that an understanding of language is performed, seeking a sufficient understanding by mothers and thus not harming the breastfeeding process (DANTAS, *et al*, 2020).

2 METHODOLOGY

This is an integrative review on the challenges of breastfeeding regarding myths and taboos. The information was collected through original scientific articles using the keywords: breastfeeding and taboos, breastfeeding and beliefs, as well as early weaning and its myths. The literature was retrieved from Google Scholar and Scientific Electronic Library Online (SCIELO) from 2011 to 2021.

Among the numerous articles published, 29 articles were chosen as the basis for the study, 10 of which were only used for results and discussion**.** The literature studied to understand the beliefs and myths that affect breastfeeding shows that there are many prejudices about the theme, such as "milk is weak," "breastfeeding makes the breasts fall or become soft," "consuming alcohol does not harm the baby," and many other myths and taboos rooted in society

3 RESULTS

During the research, 10 articles were used, which are organized in table 1 for better understanding. The studies were succinctly organized in the table according to title, author, year, professional category, and objective of the article.

Table 1: Description of the studies examined substantiated by article name, author (e), year, professional category, and objectives.

Article Name	Author and Year	Professional Category	Goal
Perception of the nursing woman: myths and popular beliefs in influencing infant nutrition	KINGS ET AL, 2021	Nutritionists	To demonstrate the perception of the nursing mother regarding the influence of food myths and popular beliefs on the influence of proper nutrition of infants.
Exclusive breastfeeding: this is a challenge	CARVALHO, 2020	Nurse	To determine the maternal profile regarding exclusive breastfeeding until the baby is six months old.
Early weaning: challenges of exclusive breastfeeding	VERTUNIN, 2019	Nurse	To describe the benefits of exclusive breastfeeding to the mother-child binomial. To report historical aspects of exclusive breastfeeding; Describe the anatomy and physiology of the breasts; Discuss the role of nurses in the prevention of early weaning; Introduce the consequences of early weaning
Mothers' knowledge about exclusive breastfeeding and exclusive feeding	CARVALHO, ET AL, 2019	Nurses and nutritionists	To investigate mothers' knowledge about breastfeeding practices Exclusive and Complementary Feeding.
Knowledge about breastfeeding from the perspective of nursing mothers	AMORIM ET AL, 2019	Nurses	To analyze the knowledge of nursing mothers in the gravidic-puerperal period about breastfeeding and discuss how the nurse participates in the counseling of these nursing mothers
Exclusive breastfeeding: obstacles presented by primiparas.	SILVA ET AL, 2018	Nurses	To identify the problems presented by primiparous women at the Unidades Básicas de Saúde (Basic Health Units), in relation to to exclusively breastfeed their children for the first 6 months of life
Influence of myths and beliefs on breastfeeding in a city in the Paraíba Valley	SIMÕES ET AL, 2015	Doctors and nurses	To identify if the nursing mothers know about exclusive breastfeeding, to identify myths and beliefs that the nursing mothers believe influence the breastfeeding process, and to identify the factors that influence the breastfeeding process. breastfeeding process and identify the personal characteristics of clinical nursing mothers.
Breastfeeding: orientation received in the prenatal, delivery, and puerperium stages	BARBIERI, 2015	Nurse and nutritionist	To analyze the orientation about breastfeeding given by health professionals to women during the prenatal, childbirth and puerperium stages
Factors influencing the interruption of exclusive breastfeeding in nursing mothers	AMARAL ET AL, 2015	Nurses and Doctors	To identify the factors that may influence mothers to discontinue exclusive breastfeeding during the first six months of an infant's life.
Breastfeeding: family influence and the role of health professionals	PRATES, 2014	Nurses and Doctors	To know the family influence on breastfeeding and reflect on the role of health professionals in this practice.

The table shows that most of the studies were produced by nurses, and some were produced by nutritionists and physicians, which can be justified by the fact that breastfeeding has an impact on the child's nutritional future, since breastfeeding is a multidisciplinary competence, because it has a significant influence on the child's health.

4 DISCUSSION

Breast milk is so important that you could say it is life, a source of everything the baby needs to develop. It is nutritionally healthy, it creates antibodies for the baby, it is psychologically good for the child, it is an economically cheap food, and it prevents breast and female reproductive system cancer and other types of diseases (VENTURIN, 2020).

In the 20th century, doctors advised pregnant women and mothers that if they did not want to breastfeed there would be no problems, because there were industrialized foods to feed children. Moreover, the advertisements about breastfeeding with the intention of using industrially made food were very strong at that time and this influenced a lot the nursing mothers and strengthened even more the myths and beliefs about the natural milk coming from the mother. As a result, the babies became malnourished and from that health policies were made to face this problem (VENTURIN, 2020).

> "Human milk is an actively protective and immunomodulating living substance. It is composed of 160 substances, represented by proteins, fats, carbohydrates and cells. It also contains living cells (macrophages and lymphocytes) and a large variety of biological active factors (such as IgA, lactoferrin, B12), and a large number of hormones such as steroids, thyroxine, gonadotropins, prolactin, erythropoietin, melatonin, etc." (SILVA; SOARES; MACEDO, 2017, p. 149).

Both in the prenatal and puerperal stages, the encouragement of breastfeeding must happen. The desire to breastfeed is shown since the gestational period, correlated to several factors in the decision process of each mother. Among them is the knowledge about breastfeeding, which can interfere directly in the mother's decision about whether to breastfeed or not. Furthermore, it is worth mentioning that in the first weeks after birth, there are several obstacles to breastfeeding, because many women do not have the knowledge about the lactation process, which leads them to give up because of the susceptible difficulties in this period. However, in this period when difficulties occur, when identified and treated in advance, they have a solution, providing a pleasant experience for both (AMORIM, *et al*, 2020).

During the breastfeeding process, the mothers filter many things and one of them is the opinion of their families regarding breastfeeding, being one of the paths followed by them as a form of support and incentive to continue this practice, in fact, the difficulties experienced by nursing mothers during this period reflect the importance of support in these moments. However, regardless of the help offered by these families, some of these women use their own beliefs as a parameter that can facilitate this passage, drawing their own routes and with their own verdicts within what they deem most appropriate for themselves and their child (AMARAL, et al, 2015).

Being a practice strongly influenced by the historical, social, and cultural context in which the nursing woman lives in her daily life, breastfeeding goes through a series of myths, taboos, and beliefs passed down through generations or created with the ignorance that ignorance causes. Many mothers and pregnant women do not have enough information on the subject, and many times, for this reason, they stop breastfeeding their babies the right way or simply do not breastfeed for the necessary time. This restriction or change in the mother's eating habits due to myths and taboos can cause nutritional disorders and deficiencies that will directly interfere in the baby's growth and development. The success of breastfeeding is directly linked to the support and proper guidance that were given at the beginning of the first prenatal consultation, and extends until delivery and postpartum (puerperium). The issue is that despite the guidance given to nursing mothers, the myths and beliefs found influence the breastfeeding process (SIMÕES, 2015).

A survey was conducted in the city of Picos, during the month of September, 2014 to June 2015, in which through research it can be found that the vast majority of mothers were young, aged 23 years, self-reported brown and with low education. Therefore, it can be observed that the low family income directly interferes with the care and demand of time that the lactating woman would need to perform this moment (OLIVEIRA, et al, 2017).

In Brazil, about 68% of newborns start breastfeeding in the first days of life, but only 41% of them remain in EBF until they are six months old and this number drops to 25% when it comes to children two years old. Therefore, it is necessary to highlight that this low rate shows poor quality of care that is offered to these pregnant women during their prenatal care (OLIVEIRA, et al, 2017).

There are common reports of mothers who deprived themselves of various foods during pregnancy and during lactation, with the justification that "it is good for the baby", there is also discrimination in the ingestion of acidic fruits, because the popular myth says that these affect the quantity and quality of milk, especially when it comes to the first days of breastfeeding, when the colostrum is released. Several nursing mothers reported that they suffer influences that directly interfered with their breastfeeding, due to cultural and family factors (CHAVES, et al, 2021).

With the myths and taboos rooted in contemporaneity, early weaning is one of the consequences of this cause. Premature weaning causes several types of problems for the baby's development, such as motor-oral, when starting a diet with industrialized products it affects the orofacial muscles among others (VENTURIN, 2020).

It is worth pointing out that for the health professional to intervene in a proper way, it is necessary to know a little about the lactating woman's life, her education, her socioeconomic status, whether she knows about breastfeeding, her beliefs, because several factors influence the success of breastfeeding. It is essential that professionals are prepared to deal with a diverse audience, encourage this practice in prenatal care, show the benefits, assist in the correct breastfeeding, remove all doubts, encourage the participation in conversations on the subject, with the purpose of breaking the myths and beliefs, since they lead mothers to early weaning (LIMA, et al, 2021).

Nurses need to be empowered with skills and knowledge, both in clinical lactation practice and in counseling. The instructions on breastfeeding are not only defined in prenatal care, but extends to the hospital area, prepartum, delivery, and puerperium. In this issue, the excellence of the health team stands out so that it knows the usual maternal and sociocultural context to which they belong, being able to remove their insecurities, fears and expectations, as well as helping them understand the subject and breaking myths and taboos relating to breastfeeding, in the end breaking certain practices that have been consolidated around that influence lactation (BARBIERI, 2014).

It is of utmost importance that the health professional aims to help this mother, trying to refute all the myths that surround this theme, because breastfeeding is of utmost importance for the NB and it must be exclusive during the first six months of life, because breast milk has a great impact on the reduction of deaths of children under 5 years of age (CHAVES, et al, 2021).

Thus, knowing and understanding breastfeeding experiences, in the family context, taking into account the culture, beliefs, customs, myths and taboos that influence the practice of breastfeeding and that interfere in the construction of this socio-historical-cultural heritage, would enable health professionals to reflect on the need for new strategies in the construction of their actions and analysis (SCHMALFUSS, 2014).

Therefore, orientation on Breastfeeding has a positive impact on the prevalence of breastfeeding, especially among first-time mothers. A step that can contribute to this process is the prenatal care and its follow-up throughout pregnancy, which is an excellent opportunity to clarify doubts, question myths and taboos, and ultimately further consolidate the practice of breastfeeding (SILVA, et al, 2018).

5 CONCLUSION

Given the results obtained with the research, it is concluded that myths and taboos carry much of the thoughts of nursing mothers. Considering the existence of this problem since the twentieth century, remaining in the current days, many nursing mothers are influenced by the strong cultural, social and economic history, being necessary the expansion of health promotion by multiprofessionals, taking into account the importance of prenatal care, as a source of information, and after pregnancy, as a form of guidance and encouragement of breastfeeding, demystifying the beliefs and contributing to this process. Pointing out the aspects that lead to early weaning brought to the study a reflection of the lack of effectiveness in the child's and mother's well-being, thus evidencing the relevance of the health professional to break with the culturally constructed beliefs.

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Chapter 10

The perspective of nursing students from Baixada Fluminense in carrying out oral hygiene of intubated patients in Intensive Care

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ABSTRACT
The study aimed to analyze the knowledge of nursing students from a Higher Education Institution in the Baixada Fluminense of oral hygiene in highly complex intubated patients. Methodology: This is a field research, with a qualitative approach, approved by the CEP of the Municipal Health Secretariat of Rio de Janeiro, by CAAE: 65400817.8.0000.5279, Opinion Number: 1.965.932, whose scenario took place in a Higher Education Institution Private from Baixada Fluminense, with 30 nursing students as participants, who were submitted to an open questionnaire, and the speeches were transcribed and interpreted by the content analysis method, in the thematic modality, which generated a thematic unit and two categories. Conclusion: The students pointed out that oral hygiene is essential for patients admitted to the ICU, to serve as a measuring instrument to reduce the risk of infections, as a consequence, reduce stress and suffering.

Keywords: Nursing, Team, Oral Hygiene, Respiration, Artificial.

1 INTRODUCTION

It is important for the clientele and family members to understand the Intensive Care Unit as an environment of recovery, in which nursing provides comfort and attention regardless of prognosis, respecting humanistic care to improve the clinical picture (Goulart Filho, 2015; Santos, 2018)

The oral cavity has its own characteristics and microbial growth from the resident and transient bacterial flora that allows the protection of the mucosa or can become a potential pathogen as the oral biofilm, which contributes in a process harmful to health in the clientele with use of endotracheal cannula (Spezzia, 2019; Bianchini, 2020; Pinheiro, 2022).

Thus, oral hygiene care has sparked interest from health scholars in the development of broader care and investigative protocols in the area of the Intensive Care Unit (Tulio et al., (2018; Guede et al., 2021; Passos et al., 2014).

Thus, I think that the patient with endotracheal cannula is predisposed to pathogens that may be in the future an etiology of pneumonia. For this reason, the oral care becomes necessary that the professionals involved in the assistance, comply with what the law no. 7,498, of June 25, 1986, states in the daily routine for the stabilization of the clinical condition and the maintenance of life (Brazil, 1986; Tulio et al., 2018; Goulart Filho et al., 2015).

Thus, the implementation of care directed to the patient using a mechanical ventilation device is important. Mainly, in the subglottic aspiration that significantly reduces the rates of Mechanical Ventilator-Associated Pneumonia and dental brushing with antiseptic that in several studies the benefits of chlorhexidine 0.12% every 12 hours are perceived (Miranda & Souza, 2018; Pinheiro, 2022).

Among the pathogenic complications in the intensive care clientele, endogenous and exogenous infections can be cited with about 80% of the increase in mortality rates, being related to the oral region, which justifies hygiene as a low-cost procedure for benefits and reduction of damage (Guede et al., 2021; Passos et al., 2014).

One of the authors mentioned oral hygiene in intensive care patients as a highly difficult procedure due to positioning of the orotracheal tube and other ventilatory support accessories. This hinders visibility of the oral cavity and limits the hygienization process. However, it does not exempt the professional responsibility in the intensive care unit (Freitas, 2015; Santos, 2018; D'Aquino, 2018).

With this in mind, the study aimed to analyze the knowledge of nursing students from a Higher Education Institution in Baixada Fluminense about oral hygiene in highly complex intubated patients.

2 METHODOLOGY

This is a field study, with a qualitative approach, approved by the Ethics and Research Committee of the Municipal Secretariat of Rio de Janeiro, in CAAE 65400817.8.0000.5279, with opinion number 1.965.932 that took place in a Private Higher Education Institution in Baixada Fluminense, for being an environment of knowledge construction and for the subject Nursing Assistance to the patient in Intensive Care (Minayo, 2014).

Thus, the 30 nursing students were approached, there was the possibility of reaching the phenomena of the theme, which met the inclusion criteria: students of a Private Higher Education Institution in Baixada Fluminense, over 18 years old, approved in the discipline of high complexity and who agreed to participate in the research, by signing in two copies of the Free and Informed Consent Form (Brazil, 2012).

Data collection took place through an open-ended questionnaire answered by handwriting, scheduled with date, place and time. I also emphasize that the instrument was validated by a professor of the discipline of high complexity before being applied to the participants (Minayo, 2014; Brazil, 2012).

To ensure anonymity, flavor names chosen by the researchers were assigned and I ratify that there were no dropouts by participants after the collection, which complied with Resolution 466 of 2012 (Brazil, 2012; Minayo, 2014).

The transcription of the data happened in full and then the participants received the typed text in which he approved and made the necessary corrections and then proceeded to the interpretative questions. By content analysis, in the thematic mode in which the relevant aspects were highlighted with keywords, which generated the grouping of speeches by similarities and / or proximity, allowing the determination of three categories and a thematic unit, which was explored with rigor in the light of the authors who address the study (Minayo, 2014).

3 RESULTS AND DISCUSSION

Oral hygiene in highly complex intubated patients from the perspective of nursing students at a Higher Education Institution in Baixada Fluminense

Category 1: The characterization of oral hygiene in intubated patients by the nursing student

It is with the individual in endotracheal cannula in the intensive care unit for maintenance of oxygenation. However, there is a very high risk of ventilator-associated pneumonia, which is one of the most frequent infections in this population (Passos et al., 2014; Goulart Filho et al., 2015). So much so that, according to nursing students, oral hygiene in intubated patients prevents the proliferation of pathogenic bacteria:

> Clean the site properly to avoid infection and bacteria proliferation (Alcohol).
>
> It consists in the conservation and cleaning of the oral cavity with the objective of preventing caries and oral infections, etc. (Sour).
>
> It is a basic indispensable procedure to keep the patient's oral cavity healthy (Sweet).
>
> Regular cleaning of the cavity is a fundamental procedure, to protect the patient from bronchoaspiration and infection (Bitter).

In view of the reports, adequate and regular oral hygiene in intubated patients is important to reduce and prevent pathologies resulting from bacteria proliferation and, consequently, may make them susceptible to infections of the upper and lower airways. So much so that the fact that the positioning of the endotracheal cannula hinders the visibility of the oral cavity and limits hygiene is a complicating factor that the Nursing team must handle with attention and care in intensive care (Freitas, 2015; Miranda & Souza, 2018; Guede et al., 2021).

Some academics explained the importance and effectiveness of oral hygiene in intubated patients as part of health promotion and harm prevention in relation to bacterial proliferation:

> It is important to clean effectively, because of the mouth structure and the orotracheal tube, to look after the patients' health, and it can be done in the bath (Refreshing).
>
> In the bath, disinfection of the oral tract is necessary to suppress the proliferation of bacteria in the oral region, which has the effect of preventing diseases in the lower airway such as pneumonia, thus avoiding harm to the patient (Picante).
>
> The hygiene of the oral cavity should be performed to avoid infection, and should be done by Nursing professionals at the time of bathing to ensure the prevention of aggravations such as pneumonia (Salgado).

It is perceived in the statements, the importance of intensive care nursing in preventing pulmonary infection by oral hygiene, when evaluating the patient in the care at bath time, with raised headboard, if necessary the oral aspiration of secretion (Vilela et al., 2015; Santos, 2018; Miranda & Souza, 2018; Pinheiro, 2022).

While for other students, they noted that cleaning and removal of dirt is essential for prevention of ventilator-associated bacterial aggravations and infections.

> It is characterized as the mechanical removal of dirt that ensures the control of bacteria proliferation is essential for cleaning the oral cavity (Bittersweet).
>
> Promote the cleaning of the oral structures and even of the tube, to avoid the pneumonia that leads to death by sepsis.

I found, that the methods and tools of hygiene decreased the risk of infections and damage by control measures based on orotracheal care during proper hygiene. Whose pneumonia can be prevented by oral hygiene protocols in removing infectious foci that can be aspirated, which implies greater cost and length of stay in the ICU (Vilela et al., 2015; Guede et al., 2021; Passos et al., 2014; Pinheiro, 2022).

Some students had insight into the materials used and the oral hygiene procedure, as we will note below:

> Hygiene performed with mouthwash (Salty).
>
> Chlorhexidine 0.12% (Azedo) should be used.

Participants reported that prevention can be accomplished through solutions used in operational protocols to oral hygiene, which Nursing professionals properly trained for the reduction of the amount of microorganisms, when performing the technique and care to provide comfort (Franco, et al., 2014; Santos, 2018; Passos et al., 2014).

For the academics, oral hygiene for intubated patients produces and promotes comfort and quality of life by preventing infections and bacteria proliferation.

> Important to avoid the proliferation of bacteria and infections in the intubated patient. It is performed with oral antiseptic and gauze (Azedo).
>
> Oral hygiene is primordial to prevent bacteria sites, avoiding infections (Salgado)
>
> Oral hygiene for intubated patients is characterized by aspiration of secretions, cleaning of teeth (Spicy)

I believe that proper cleaning brings comfort and support to the patient in the intensive care unit. Decreasing risks and worsening of bacteria proliferation that cause infections in the respiratory system. Oral hygiene brings basic conditions when thinking about health, such as well-being in the discharged clientele, whose diseases can lead to loss of dental elements and gum inflammation, alteration in the digestion of food which propitiates the appearance of bacterial infections (Freitas, 2015; Guede et al., 2021; Pinheiro, 2022; Goulart Filho et al., 2015).

In the view of Nursing students, the purpose of dirt removal is achieved by the sanitizing process that assesses the degree of risk by Nursing Care.

> Hygiene performed by the nursing staff on patients in high complexity. It should be done at least twice a day in order to ensure patient safety (Azedo).
>
> It is the asepsis of the oral cavity (Sour).
>
> It is the hygiene that is done in the oral cavity (Spicy).
>
> Hygienization of the oral mucosa, with the purpose of removing dirt, preventing infection, and ensuring patient comfort (Sweet).
>
> It means decreased bacterial flora and oral infection, also as foul smells (Bitter).
>
> Hygiene performed by the Nursing team usually with gauze moistened in solution for oral hygiene (Amarga).

It is of fundamental importance to make the nursing professional aware of the importance of promotion and prevention, which is done through adequate hygienization instituted by an operational protocol, being a care of the nursing professional. Nurses play an important role in the identification and notification of health care with infections, which over time has shown expertise in the creation and implementation of infection prevention techniques in intubated patients, and is responsible for guiding multidisciplinary teams regarding the handling of procedures performed during treatment and care (Martins & Benito, 2016; Santos, 2018; Brasil, 2007; Goulart Filho et al., 2015).

The students constructed a concept of hygiene according to their vision, also evaluating the risk of its inadequate performance in hospitalized patients:

> It is characterized as disinfection of the tongue and the entire oral cavity (Sour).
>
> It is the hygiene done in the patient's mouth using saline solution or mouthwash (Hot).
>
> The biggest risks are that it can lead to infections, as well as being a hygiene issue (Sweet).
>
> A toothbrush with the function of removing and aspirating plaque, debris, and oral secretion in one product (Doce).

I understand that the academics, know that the "adequate" hygienization with the "adequate" material, besides being part of patient care, decreases the risks and proliferation of bacteria in the intensive care environment, whose nurse supervises the nursing and multidisciplinary team in procedures, invasive or not, according to the Nursing Practice Law, both in working together and acting in front of permanent education programs (Martins & Benito, 2016; Santos, 2018; Pinheiro, 2022; Souza et al., 2019; Brazil, 1986)

Category 2: The main risks for infections in intubated patients that Nursing staff do not perform oral hygiene.

The participants said that a lack of hygiene, or if hygiene is performed inadequately, can become a culture medium, causing infections that can lead to patient death.

> Bacterial infections (Pure water) Risk of bacteria (Alcohol)
>
> It is of infections (Ice Cream).
>
> It is a reservoir for microorganism (Doce).
>
> Patient death (Saloba).
>
> Gingivitis and pericarditis (Salty).
>
> In cases where there is no proper cleaning, the patient can be taken to death (Hot).
>
> Infection, possibly leading to death (Sweet).
>
> Infections that can be responsible for high mortality rates (Azedo).

It is observed that the professional needs to perform adequate hand hygiene with water and degerming soap and alcohol 70% to start the oral hygiene of the patient in order to prevent the transmission of microorganisms from other sites to the oral cavity. The transmission of microorganisms by the hands of professionals can occur through direct contact of the patient with contaminated material or environment, so much so that hospital infections are seen as a challenge for professionals working in health areas at all levels of care (Padoveze & Fortaleza, 2014; Pinheiro, 2022; Stina et al., 2015).

I believe that the result is susceptible, because the reservoir indicates the severity of the patient and the time for proliferation, decreasing the rate of deaths, sequels, that it is important to emphasize the record of the Nursing performance in the functions of prevention and control of infection in the hospital environment, from the performance of Florence Nightingale in "Modern Nursing", who developed the practice of prevention and control with epidemiological support against infectious diseases and hospital infections, in a pre-bacteriological era, which resonates in the generations and today (MARTINS, BENITO 2016; Silva et al., 2014; Brazil, 2007).

Poor hygiene in patients can lead to the infectious process given by the accumulation of bacteria in the oral cavity and in the orotracheal tube, according to the students.

> Orophagitis, secretion accumulation (Salty)
>
> Accumulation of bacteria, which can be ingested through lack of mouth hygiene (Sour).
>
> Mouth, orotracheal, and even lung infection as they can be carried through the tube (Bitter).

I understand that proper orotracheal hygiene prevents the accumulation and proliferation of bacteria that have the potential to cause respiratory infections with the accumulation of secretion, including in the orotracheal tube. Hospital infection, constitutes a public health problem, since the early days of health institutions, before the formation of in-depth microbiological knowledge and means of transmission (Padoveze & Fortaleza, 2014; Santos, 2018; D'Aquino, 2018; Passos et al., 2014)

We obtained two participants who reported oral hygiene being an attribution of the Nursing team being one of the cares that is the team's responsibility

> There are cases that due to lack of hygiene, there is a risk of myiasis.
>
> Due to accumulation of secretion in the oral cavity, lack of salivation causing sores (Sour).

I believe that the patient is identified by the nurse's care, who identifies the need for frequent orotrochial hygienization of the patient to avoid the growth of myiasis, accumulation of secretions that cause health problems directly related to lack of hygiene. The practice is developed from the epidemiological support in the prevention and control of infectious diseases in hospital institutions, in a pre-bacteriological era, which still reverberates today. Florence's legacy points to health as a result of the interaction of environmental factors, highlighting the need to consider them as indispensable in the approach to the health-disease process and for the promotion of quality of life (Martins & Benito, 2016; Pinheiro, 2022; Stina et al., 2015; Goulart Filho et al., 2015).

The students linked and identified some diagnoses and aggravating factors caused by poor hygiene in intubated and intensive care patients:

> Pericarditis, ventilator-associated pneumonias (VAP).
>
> Gingivitis, pericarditis, endocarditis, and the appearance of myiasis (Bitter).
>
> Pneumonia orotracheal infection (Ice Cream).
>
> The main risk is that the patient's stay in the hospital will increase, worsening the condition (Hot).

It is understandable the observation of the participants by the aggravating factors that the lack of hygiene can cause, such as severe secondary infections, integrated to mechanical ventilation, to maintain oxygenation that also increases the stay in intensive care, which may reflect in a longer time at the bedside (Martins & Benito, 2016; Guede et al., 2021)

Some participants cited aggravating, infections arising from poor oral hygiene in hospitalized patients:

> One of the main risks is pneumonia (Spicy)
> Respiratory infection (pneumonia & Stinging).
>
> Risk of bacterial infections (Sweet).
>
> There are various types of infections, stench, suffocation, generalized infection leading the patient to death (Amarga).

I realize that adequate oral hygiene is necessary to avoid numerous infections that will impair the therapeutic progress of the patient, which may eventually lead to death. Intubation in mechanical ventilation is defined as an artificial treatment used in intensive care to maintain oxygenation and ventilation in critical patients diagnosed with respiratory failure, although there is an absence of national data, there are studies that show ventilator-associated pneumonia more frequently in infections (Martins & Benito, 2016; Stina et al., 2015; Goulart Filho et al., 2015).

Category 3: What strategies are used to perform oral hygiene in intubated patients

A number of academic nursing students have reported even though they are on and off the internship field, they do not receive such improperly performed procedures.

> Removal from the tube (Pure water).
>
> Proper cleaning with gauze and change the tube (Alcohol).
>
> Moisten a gauze with toothpaste by rolling it in a spatula (Bitter).
>
> Sanitize from least contaminating to most contaminating (Bitter).
>
> Use of 12% chlorhexidine (Bitter).

I believe that the nurse is prepared with knowledge to perform the function evaluates the daily needs of the patient for proper hygiene to give comfort and quality of life to clientele, however, contamination can happen by the occurrence of failures in the execution of procedures generated by errors or negligence by the health team in preventive measures of infection (Martins & Benito, 2016; Bianchini, 2020)

A higher education student incorrectly calls attention without protocols without the optics as it is a procedure in everyday life for the multiprofessional team in an ICU in a patient on ventilator prosthesis and its components

> Defection of the oral tongue channel and sanitization of the external area (Saboba).

I believe, that nurses attribute prevention through multiple care and basic procedures, to assess the patient's risk level in the use of pre-established protocols. In the execution of the body hygiene and the oral cavity in an adequate way and even the elevation of the bed headboard in an Intensive Care Unit for the wellbeing (Vilela et al., 2015; Guede et al., 2021; Goulart Filho et al., 2015)

The students reported Nursing care correctly, but without protocol or guidelines usually the patient in an ICU is on ventilator and other devices.

> Chlorhexidine 2% gel or mouth rinse with brushing (Ice Cream).
>
> Use of chlorhexidine antiseptic gel, tooth brushing, electric toothbrush, and oral care with other solutions (Ice Cream)
>
> Perform oral hygiene of the patient whenever necessary. Observe signs of need (Salty).
>
> Hygiene with antiseptic mouthwash and gauze in the entire oral cavity and then pass distilled water (Azedo).
>
> Cleaning the entire oral cavity (Hot).
>
> Clean the entire cavity, clean the tongue and teeth (Sweet) Clean the tongue, teeth and the entire oral cavity, using a spatula wrapped in gauze, with antiseptic solution (Sweet).
>
> Changing the tube fixative, mouthwash, plus gauze cleaning the upper cavity, sides of the mouth, tongue and gums (Sweet)

I believe that the assignment of the nurse in training, consists in the evaluation of the patient, investigation of the degree of severity, alteration of its state for the skillful care. Thus avoiding injuries and deaths, patient who is in an intensive care unit on mechanical ventilation and its devices (Guede et al., 2021; Miranda & Souza, 2018).

Faced with the important in the identification and notification in infection associated with care, it is necessary for assistance documents to be made, to implement the prevention techniques in intubated patients, with the professionals of the training sector, whose guidelines for the teams must be functional and applicable as to the handling of the procedures performed, in the patient of high complexity, which is vulnerable to cross-infections (Martins & Benito, 2016; D'Aquino, 2018; Goulart Filho et al., 2015).

Hygiene must be performed, taking care with the TOT, so that it does not depose it, because it is a fact that limits the multi-professional Nursing team for the hygienization process, but does not exclude the responsibility of the whole team.

> Care with the tube without changing its position, observe the way of cleaning, without hurting the patient (Hot)
>
> Normally used, I say, performed at bath time, with gauze moistened in solution for oral hygiene, throughout the oral cavity, tooth and tongue, always maintaining and certifying the fixation of the tube (Amarga).
>
> Change the tube fixative, clean with gauze and mouthwash on the gums, tongue and mouth (Doce)

I believe that for the performance of the multiprofessional nursing team in an ICU in the command of its function to be successfully performed, it is necessary the care performed with the patient always making sure of any alteration.

Oral hygiene in intubated patients is complex and considered as an assistance of high degree of difficulty by the positioning of the orotracheal tube and the accessories of mechanical ventilation, which hinder the visibility of the cavity and limit the process of hygiene, however, the responsibility of the Nursing team is not exempted before this common situation, despite having opinions that indicate the dentist to implement this function (Freitas, 2015; D'Aquino, 2018)

One student reported that hygiene is important for the health promotion of this patient in an intensive care unit to promote comfort, well-being, and quality of life for both the patient, his family members, and the entire nursing staff.

> Keeping the patient's oral cavity healthy by orienting the professional the importance of this procedure (Sweet)

This participant understands, that the nurse is qualified and should use the protocols and even teach the execution of the technique and care in a correct way, to offer the possibility to evaluate the patient during the procedure, as well as, make the professional aware to hygienization to provide comfort, which makes clear the importance of the future quality of life of the patient hospitalized in intensive care (Franco, et al., 2014; Santos, 2018).

4 FINAL CONSIDERATIONS

Every patient in an ICU it is essential to perform oral hygiene, where measures are used to reduce the risk of infection, thus reducing the patient's suffering.

In situations in which the procedure is not often performed on intubated patients, a protocol must be created for this activity in the sector, with all the technical details to perform the correct procedure.

In a planning that should be applied in continuing education in the sector along with supervision, and maintain the protocol along with continuing education for the patient's own well being.

Together with the CCIH, organize lectures and orientations with the Nursing team about the importance of orotracheal hygiene; the benefits will not necessarily be for the nurse, but for the population assisted.

Nurses play an important role in identifying and reporting cases of healthcare-associated infections. Thus, the nurse is responsible for creating and implementing infection prevention techniques in intubated patients, and for guiding the entire team regarding handling of care.

It is important to register the performance of Nursing that has been assuming the functions of prevention and control of contamination of the hospital environment, epidemiological for the prevention and control of infectious diseases and hospital infections.

Thus, the importance of the clinical look is perceived, in the high complexity clientele, whose nurse should care together with the team, and for such, the need for further studies, which shows the protection of human life, health promotion and prevention of injuries, with a goal for recovery, in order to minimize ventilator-associated pneumonia.

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Chapter 11

Teleconsultation service by the nursing office of a Federal University

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ABSTRACT
The objective of this report is to describe the experience and evaluation of the development of the teleconsultation service linked to the Nursing Clinic of the Universidade Federal Fluminense, Rio das Ostras campus. The teleconsultation extension project was carried out by faculty and nursing students and nurses from UFF. The target audience was the academic and administrative population of the university and the general population. There were 47(100%) teleconsultations in the period from June 2021 to September 2022, being 33(66%) in sexual and reproductive health; 3(6.4%) in cases of sexually transmitted infection; 5(10.6%) in drug use; 7 (14.9%) in breastfeeding and 1 (2.1%) with diabetes and hypertension. The level of user satisfaction with teleconsultations was considered satisfactory. We conclude that teleconsultations were fundamental to guarantee the continuity of care and the quality of nursing education and research, as they have produced positive impacts on training and local public health.

Keywords: Remote Query, Nursing Care, COVID-19.

1 INTRODUCTION

The pandemic scenario of COVID-19 and its negative repercussions on Brazilian public health demanded efforts from science, education, management, and nursing professionals, in order to ensure the continuity of training processes and care actions with quality and safety for all, based on the ethical and legal precepts of the profession (CASTRO et al., 2020).

In this health context, the pandemic has driven the adoption of digital health technologies such as telehealth and teleconsultation. Throughout the world, teleconsultation has contributed to expanding access to comprehensive, quality health care and saving time and costs for users, professionals, and health systems (COVES et al., 2022).

In Brazil, there was a need to reinvent the managerial and care practices of nursing at all levels of

health care, however, especially in health services in the context of Primary Health Care (PHC), including new forms of distance care guided by the digital health era, avoiding the deepening of health inequities. Thus, on this path, it is necessary to advance studies on the systematization of actions in teleconsultations, teleconsulting and telecare in the area of Nursing (DORAISWAMY et al., 2020; COFEN, 2022).

In this digital health scenario, the nursing teleconsultation may offer an innovative approach of adaptation to improve population health care. By nursing teleconsultation is meant the remote consultation, mediated by videoconference or telephone calls, between the nurse and the user (COFEN, 2020).

Considering the pandemic and post-pandemic transition scenario of COVID-19 in the year 2022, its profound impacts on public health, worker health, universities and public services at all levels of health care, it was possible to maintain the continuity of offering remote nursing consultations in a university context through the development of an extension and research project. Such consultations provided opportunities for tracking, monitoring and follow-up of altered conditions and health needs related to communicable and noncommunicable diseases through digital resources (MONIZ et al., 2022).

Thus, timely intervention and nursing care actions were performed for the prevention, diagnosis, treatment, and recovery of the health of the university's internal and external population (MONIZ et al., 2022).

It is emphasized that, the role of the university as a health promoting institution is fundamental, as it has the potential to affect the health and lives of students and workers and the community at large through initiatives that integrate appropriate organizational best practice models that are conducive to maintaining the health of all users in their daily lives (CASTILLO et al., 2020).

It is important to mention that the Universidade Federal Fluminense is a health promoting university affiliated with the Iberoamerican Network of Health Promoting Universities since November 2020. In view of this, the social, political, and scientific relevance of advancing the use of teleconsultations for nursing clinical practice as a service provided at the primary health care level by universities is pondered.

Thus, the objective of this report is to describe the experience and evaluation of the development of the teleconsultation service linked to the Nursing Clinic of the Fluminense Federal University, Rio das Ostras campus.

2 DEVELOPMENT OF NURSING TELECONSULTATIONS IN THE BRAZILIAN SCENARIO

Nursing teleconsultations provide an innovative approach to improve the quality of health care for the population at all levels of health care. They can be mediated through videoconferences or telephone calls between nurses and users (COFEN, 2020) and thus enable screening and follow-up actions for people with communicable and non-communicable diseases, among other health needs, such as breastfeeding and intervention in drug use (CAETANO et al., 2020; MARTÍNEZ-GARCIA et al., 2020).

French health authorities describe telehealth as a form of remote health practice based on the use of information and communication technologies, aiming to improve the accessibility of health services

(particularly in areas where access is poor) and the quality of life of patients by enabling management and follow-up in their homes (HURET et al., 2022).

Meanwhile, the World Health Organization (WHO) points to *mHealth* as a component of health practice in the digital age supported by mobile devices, such as cell phones, among others (WHO, 2011).

Thus, Information and Communication Technologies (ICT) are increasingly being developed and offered free of charge in order to provide remote care, notify cases, as well as provide and guide the population on health issues, increasing users' access to teleconsultation procedures performed by health professionals (FINEBERG, 2020; COFEN, 2020).

The advancement of telehealth applications has only been possible because of digital technologies. ICT, such as instant messaging applications, video communication services, and all the tools that can be employed via mobile phone, tablets, and mobile computer connected to the internet, can be used to perform health risk communication, health surveillance, digital education, telehealth, and telecare, meeting the health demands and needs of individuals and collectivities to make informed decisions about their own health and the health of others (KATZ et al., 2017; FRANCESCHINI et al., 2020).

With the advent of the COVID-19 epidemic in the Brazilian context, the Ministry of Health (MS) employed the digital health initiative called "Programa Conecte SUS," institutionalized by Portaria GM/MS no. 1,434, dated May 28, 2020, which serves to prioritize actions that are related to combating COVID-19 (BRASIL, 2020c).

Similarly, the MS led the approval of Bill no. 696/2020, authorizing the use of telemedicine in any health activity in Brazil, including remote consultation. The Ministry of Health's "Guidelines for Diagnosis and Treatment of COVID-19" were also published (BRASIL, 2020b), which makes reference to the use of TeleSUS, which consists of two tools for population orientation and case monitoring: the Coronavirus SUS application and the online chat.

Implementation of teleconsultation requires a reorganization of the healthcare system in which available technologies, organizational contextual factors, and funding policies and models are taken into consideration, especially in primary care settings, since their organizational structures, resources, and work practices vary around the world (COVES et al., 2022).

COFEN Resolution nº 634/2020 authorized and normatized the use of Teleconsultation in nursing during the pandemic, while COFEN Resolution nº 568/2018 regulated the operation of Nursing Offices and Clinics and COFEN Resolution nº 606/2019, with attachments, contains a model of the request for registration and registration of the Nursing Office in the scope of the Regional Nursing Councils. Recently, the legal basis of COFEN Resolution No. 696/2022 disposes on the performance of Nursing in Digital Health and regulated Telenfermagem (CAETANO et al., 2020; COFEN, 2022).

In the last three years, educational and health institutions have been emphasizing the importance of systematization of telehealth actions adapted to local realities in protocols and guides based on the best technical and scientific evidence available and in line with the principles of the Unified Health System

(SUS) in Brazil. Thus, there was a need for the use of instruments of the Systematization of Nursing Care (SAE) focused on specific areas of clinical care and adapted for use of ICT in remote nursing consultations (FERMO et al., 2021).

The strengthening of the role of Nursing in PHC is one of the paths adopted internationally for the sustainability of universal health systems and that, in recent years, has gained priority in the Brazilian system. The critical health situation imposed by the pandemic of COVID-19 led to the expansion of teleconsultation offer by nurses and this led to demands for institutional reorganization, especially in the elaboration and consolidation of nursing protocols.

The Nursing Protocols allow the Nurse autonomy in their clinical decisions, in addition to making ethical and safe care practice, ensuring through systematized instruments greater quality in decision making and resolving capacity of health problems. Manuals and protocols are useful tools that have an impact on the quality of nursing education and care provided to SUS users (LEMOS et al., 2021).

3 METHODOLOGY

This is an experience report about the implementation and development of teleconsultations performed during the period from June 2021 to September 2022 at the Érick Igor dos Santos Nursing Clinic at the Universidade Federal Fluminense (UFF), Rio das Ostras University Campus.

Teleconsultations occurred through the digital resource *Google Meet.* SNA instruments and other documents and electronic medical records were created for all users of the nursing office at UFF. For this, the tools available in the *Google* platform *(Forms, Drive, Meet, and Gmail*) were used.

The teleconsultations were scheduled by the project's scholarship nurses and the nurse in charge of the office, through the *WhatsApp* number made available on social networks and the academic community.

It is worth mentioning that, before the teleconsultations, users filled out a Term of Consent by form sent link via whatsApp. The extension project "Nursing Teleconsultation in the era of digital health" involved a team of 22 undergraduate nursing students, with 01 extension scholar and 12 scholars from the PET (Tutorial Education Program) Connections Nursing PURO group, 06 teachers and 02 nurses of the IES, totaling 30 participants and is linked to the research project: "Evaluation of the Nursing Teleconsultation service of a Federal University in the interior of the State of Rio de Janeiro", approved by the Ethics Committee on Human Research of the Universidade Federal Fluminense.

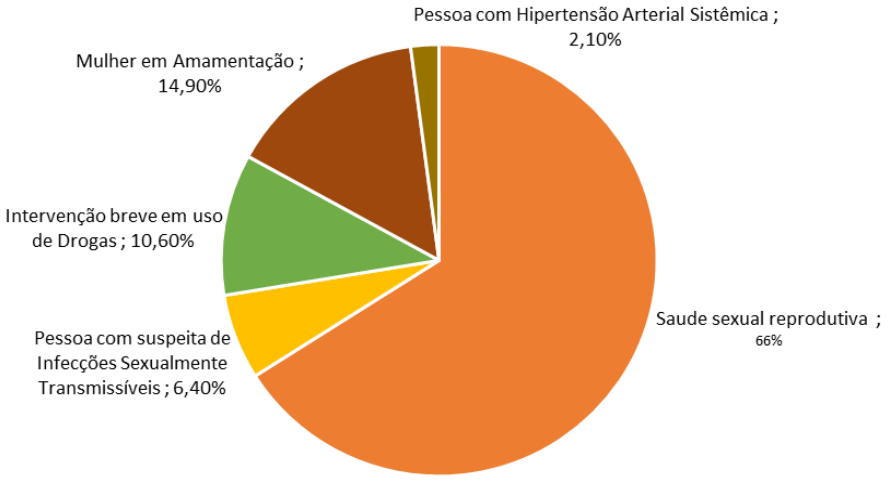
In this sense, the development of research, teaching, monitoring, and extension projects for nursing tele-consultations boosted the revision, approval, and publication of the (Tele)Consultation Protocols for Nursing Consultations by the Rio das Ostras Nursing Department of the Institute of Humanities and Health at UFF.

The evaluation occurred by the public through the satisfaction survey and by the project team. After 2 weeks of tele-consultation, an evaluation form link was made available via whatsApp to the user participating in the service and the project.

4 RESULT WITH DISCUSSION

There were 47 (100%) nursing teleconsultations, of which 31 (66%) on sexual and reproductive health, 3 (6.4%) on suspected cases of sexually transmitted infections, 5 (10.6%) on drug use, 7 (14.9%) on breastfeeding, and 1 (2.1%) on people with diabetes and hypertension. There was a predominance of demand from the target population for tele-consultations on sexual and reproductive health followed by tele-consultations on breastfeeding and brief intervention on drug use, as can be seen in **graph 1**.

Graph 1 - Types of nursing teleconsultations performed at the Erick Igor dos Santos Nursing Office at UFF, Rio das Ostras, 2021-2022.



Caption:
Breastfeeding woman: 14.90%.
Person with hypertension: 2.10%.
Sexual reproductive health: 66%
Person with suspected sexually transmitted infections: 6.40%
Brief intervention in drug use: 10.60%

Source: Own author, 2022.

Teleconsultation in sexual and reproductive health requires a positive and respectful approach to sexuality and sexual relations, reproduction, and the right to access appropriate health services to ensure that women can safely go through pregnancy and childbirth (SILVA et al., 2020).

The pandemic has instituted a new era of opportunities for teleconsultations to manage prevention and treatment actions and encourage a good quality of life for people at risk and people living with HIV and other sexually transmitted infections (BRASIL, 2013; GUARALDI et al., 2021).

Regarding teleconsultations of brief intervention in drug use, it was noted that the reason for seeking the service referred to the desire to quit smoking with the help of a health professional. 30.8% of the users informed that they had already used drugs in their lives. Telehealth services play an important role in the process of cessation of consumption and risk reduction of psychoactive substance use (BORTOLON et al., 2017).

In the pandemic scenario, it was necessary to provide assistance to breastfeeding women with the

purpose of guidance, education, evaluation of health risks and small problems related to breastfeeding, in order to encourage and strengthen breastfeeding, always taking all the necessary care when breastfeeding. Since, the offer of face-to-face consultations was reduced and the damage to the child for not receiving breast milk was more harmful to its development and health (BRASIL, 2020a).

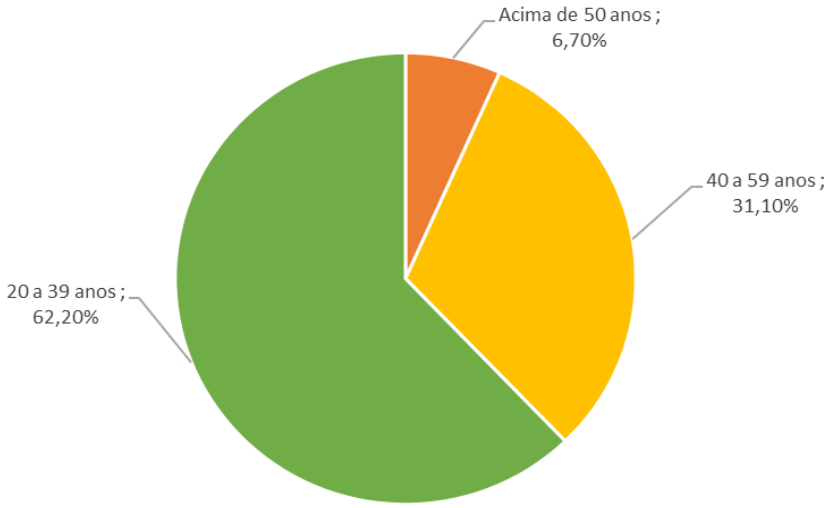
Such results may be related to the fact that the predominant profile of the pubic participating in the project was female (97.9%). Women tend to seek more public health services, especially for preventive consultations for diseases, either for specific reproductive health issues, such as prenatal care, preventive care, among others (COBO; CRUZ; DICK, 2021).

It is worth noting that the social gender and racial inequalities are axes of the Brazilian society, resulting in various dimensions of quality of life; restricting access, opportunities, and the very realization of legally constituted social rights (COBO; CRUZ; DICK, 2021).

The results found in **graph 2** show that most of the audience reached were young people in the 20 to 39 age group. Social media and contact with friends/family were the means of communication to learn about and receive referrals to seek the teleconsultation service. In 2019, the percentage of people between 30 and 39 years old who used the internet was 90.4% (AGÊNCIA BRASIL, 2022).

Young individuals are more likely to use teleconsultation, because the ease of access to smartphones allows the individual to use technology to choose the relevant time and place to perform the consultation (CATAPAN; CALVO, 2020; GONÇALVES et al., 2020). Meanwhile, even though technology is an extremely valuable tool, the elderly population still faces barriers to digital advances (CASTRO et al., 2020).

Graph 2 - Age range of users of nursing teleconsultations performed at the Erick Igor dos Santos Nursing Clinic at UFF, Rio das Ostras, 2021-2022.

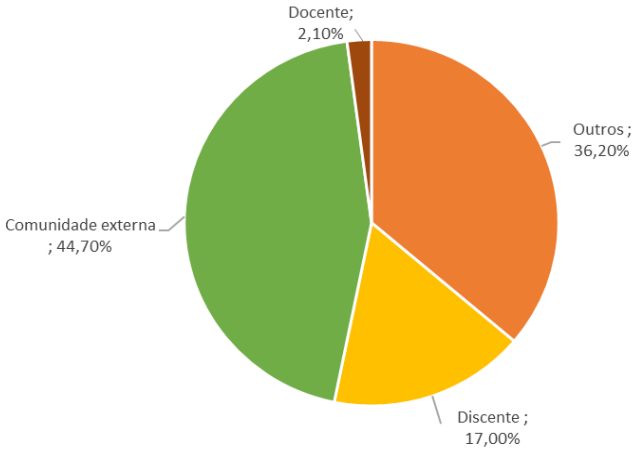


Caption:
Above 50 years old: 6.70%.
40 to 59 years old: 31.10%.
20 to 39 years old: 62.20%.

Source: Own author.

With regard to the type of bond of the users (graph 3) who accessed the nursing tele-consultation service, it was observed that there was a greater reach of the external public to the university, although the internal public was also reached, with the administrative community being more involved.

Chart 3 - Type of attachment of users who accessed the nursing teleconsultation service in the period 2021-2022, at the Érick Igor dos Santos/UFF Nursing Clinic, Rio das Ostras. RJ.



Caption:
Teacher: 2.10%.
Others: 36.20%
Student: 17.00%
External Community: 44.10%

Source: Own author.

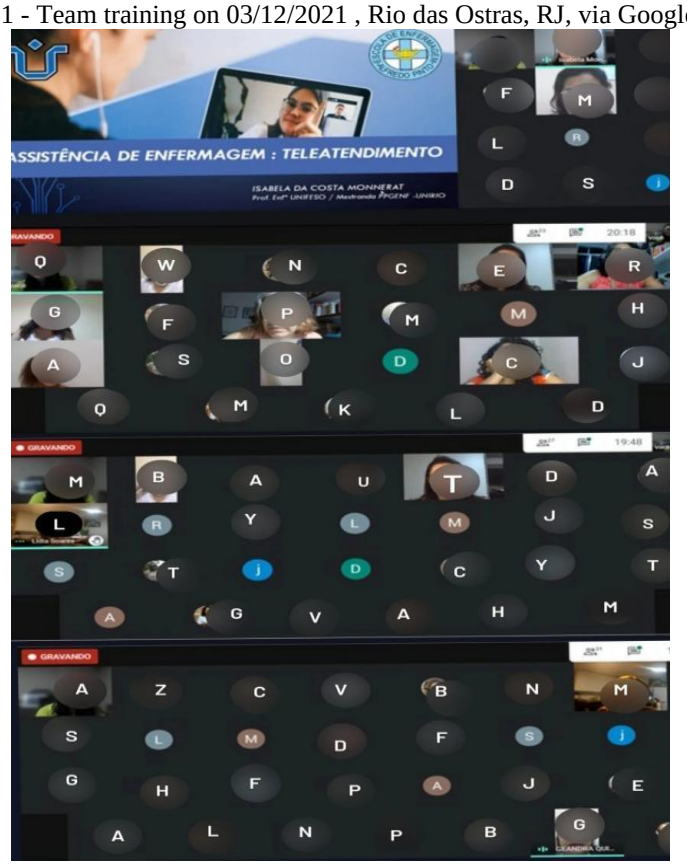
It is noted that there were difficulties of access to the teleconsultation target audience, either because it is a recent type of care provided by nurses and offered by the university, or because there could be difficulties of access and/or digital management by the public, or because the public prefers face-to-face care or is unaware of the benefits of this type of service (CASTRO et al., 2020).

Regarding the evaluation of tele-consultations, the values related to the level of satisfaction about the services provided were: 10.0 by the great majority of participants (82.7%), followed by 9.0 (11.2%), 8.0 (3.1%), and 7.0 (3.1%). The teleconsultations on nursing care for people with diabetes, on breastfeeding, and on sexual and reproductive health received the highest scores (10.0) for satisfaction.

Another positive result of the present project refers to the training and realistic simulation of teleconsultation, as it presented itself as a collaborative opportunity among the participants, even though it was carried out via videoconference, as it enabled significant and mutual learning of the undergraduates about the performance and the technical, scientific and ethical-legal responsibility of nurses (ROSA et al., 2020).

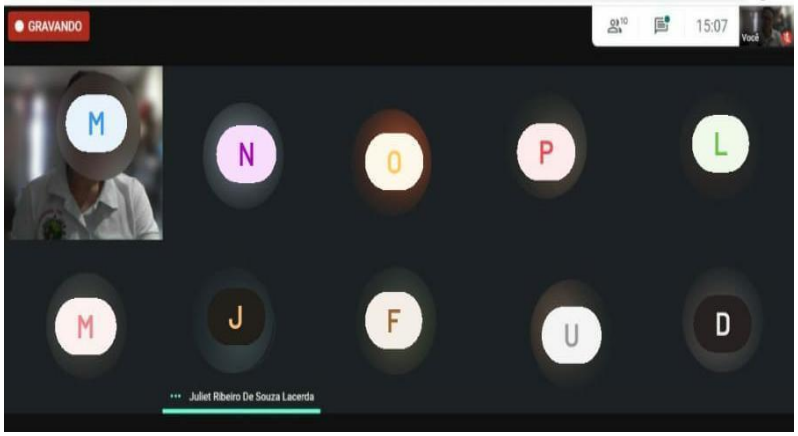
Positive points of the simulation and teleconsultations mentioned by the team were: development of the process in a systematic and assertive way; formation of critical thinking regarding clinical situations; evaluation of professional conduct; evaluation of protocols and other instruments used; identification of possible operational problems. The negative points were: audiovisual interference from the internet network and the long time of some consultations.

Image 1 - Team training on 03/12/2021 , Rio das Ostras, RJ, via Google meet



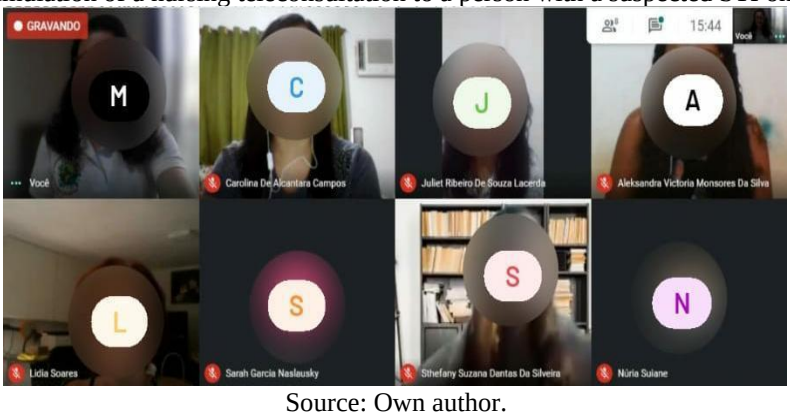
Source: Own author.

Image 2 - Simulation of Brief Intervention teleconsultation on drug use on 04/28/2021



Source: Own author.

Image 3 - Simulation of a nursing teleconsultation to a person with a suspected STI on 05/05/2021



Source: Own author.

It is noteworthy that the (tele)consultation protocols of the nursing office were published in the UFF service bulletin and will constitute a book, still in the editing phase, which may serve as a basis to drive new studies and technical and clinical guidelines for nursing. Moreover, this process has also contributed to ensure the quality of teaching and nursing care in the service.

Clinical protocols are characterized as care tools elaborated as a result of the various procedures available in SUS (CUNHA; RAMALHO, 2019; MONIZ et al., 2022). The protocols have facilitated the standardized use of digital resources and ICT by the professional, nursing student, and service user. The data produced have fostered new research, teaching and extension projects linked to the nursing practice.

In this sense, the implementation of the protocols (chart 1) has allowed professionals and students to quickly access the nursing process in an easy, practical, and didactic way, making the face-to-face or remote consultation more effective, efficient, and resolutive to the users' health needs.

Chart 1- Types of Nursing (Tele)consultation Protocols, Rio das Ostras/RJ, 2022.

Sexual and Reproductive Health	To the breastfeeding woman To women in the climacteric period To women in situations of sexual violence To the woman in preconceptional counseling When diagnosing pregnancy To women in reproductive planning To the usual risk pregnant woman To the puerperal woman and the newborn The woman in cervical cancer screening The woman in breast cancer screening
Transmissible Infections	To the person with a suspected sexually transmitted infection Suspected case of COVID-19
Drugs	Brief intervention in drug use risks
Chronic Noncommunicable Diseases	In the screening and follow-up of the person with systemic arterial hypertension In screening and follow-up of people with diabetes mellitus

Source: Moniz et al., 2022.

This project has led to important social and institutional transformations. Records of consultations began and continue to occur in users' electronic medical records, based on nursing protocols, and the continuity of health care was guaranteed.

The inseparability between teaching, research and extension was consolidated by this extension action through the link and the positive impacts of teaching, monitoring, extension and research projects in the context of nurse education. The results of the research on the evaluation of teleconsultations showed that the level of satisfaction of users was considered totally satisfactory. This fact is directly related to the reorganization of the service, professional practice and the implementation of nursing (tele)consultation protocols.

5 CONCLUDING REMARKS

The pandemic of COVID-19 impacted health care and health systems, requiring new alternatives and strategies to be adopted for prevention, diagnosis and treatment of diseases, and addressing the health needs of different population groups, especially the most vulnerable in health.

Since then, telehealth, through teleconsultations, has been instrumental in ensuring care for users with communicable diseases and pre-existing comorbidities, including health surveillance and education, health and nursing knowledge and research.

Teleconsultations were and still are essential to the scope of the undergraduate course in Nursing at UFF, Rio das Ostras campus, because they provided opportunities for students and teachers of the course and nurses from the service to develop telehealth with technical, scientific, legal, and autonomous competence, subsidizing the advanced practice of Nursing.

The methodological process aims to serve as a systematized model for reapplication in other healthcare higher education settings.

In conclusion, the products and results of the research and extension projects on teleconsultation showed that the academic activities related to the simulation of teleconsultations, cyclical evaluations by the team in charge, the elaboration and publication of protocols, and the services considered satisfactory by the users produced positive impacts on the nurse's education and on local public health.

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Chapter 12

Antenatal education on the signs of labor an integrative literature review

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ABSTRACT
The object of the present study was prenatal education about the signs of labor. From the perspective presented below, it is essential that there be research to identify in the literature a topic so relevant to women's health that goes through pregnancy, childbirth, and the puerperium.

Keywords: Early Labour, Antenatal Education, Nursing Care

1 INTRODUCTION

The object of the present study was prenatal education about the signs of labor. From the perspective presented below, it is essential that there be research to identify in the literature a topic so relevant to women's health that goes through pregnancy, childbirth, and the puerperium.

Pregnancy is characterized by a period when women are more susceptible to receive information, as well as to modify their behaviors, including the change by seeking health. Pregnancy also represents a special moment in a woman's life, in which the feeling of becoming a mother is often mixed with uncertainties, fears, and insecurities. Thus, it becomes a complete and complex event because it is surrounded by cultural, social and emotional values (ARAÚJO, 2011).

It is known that there is a lack of information or inadequate information about childbirth, the fear of the unknown, as well as the care to be provided to the newborn in the first days, and these become common factors of tension in pregnant women, which can even negatively influence the whole gravidic-puerperal process (ARAÚJO, 2011).

Thus, it is the competence of the health team to welcome the pregnant woman and her family since the first contact with the health unit, and offer all the necessary information for them to deal with this period in the best possible way (ARAÚJO, 2011).

Prenatal care coverage in Brazil is 98.7%, only 58.7% of women are informed about their reference maternity hospital, and 16.2% of women seek more than one maternity hospital for admission for delivery, which proves the antepartum maternal pilgrimage (FUNDAÇÃO OSWALDO CRUZ, 2022).

Only 60% of women receive guidance on risk signs during pregnancy, including signs of labor, indicating that prenatal care in the country still provides little guidance to pregnant women (Fundação OSWALDO CRUZ, 2022).

It is a common understanding that prenatal care should not be restricted to the clinical-traditional model focusing only on the physical evaluation of the pregnant woman. There is a need for prenatal care to be the gateway to health education for pregnant women, thus providing opportunities for understanding the physiological aspects and the care required in labor and delivery due to the specific clinical situation of the mother (SOUTO, 2021).

The guidance on the signs of labor and childbirth during prenatal care for several situations are limited to some extremely specific passages of information without a concern to check whether pregnant women understood what was passed to them. And even if it is an effective and recommended practice, health education in prenatal care still has many bottlenecks and flaws that need to be remedied (SOUTO, 2021).

In accordance with the above, the following question arose: *"what guidance about the signs of labor have been performed during prenatal education for pregnant women?"* Thus, it is aimed to identify the realization of prenatal education about the onset of labor during prenatal care.

2 METHODS

The present study is an integrative literature review that requires a standard of excellence as to methodological rigor in order to achieve content that brings significant contributions to science and clinical practice (SOUTO, 2021).

Literature reviews relate and unite the new knowledge produced, identify the controversial areas, the themes that still need investigation, and also include comparison, seeking to identify and group disagreements and concordances, among several authors (CALDAS, 1986). In this way, it represents the synthesis of knowledge produced daily and that must be consumed and analyzed.

To construct this review, the following steps were performed: identification of the guiding question; selection of studies; categorization of studies; evaluation of studies; discussion and interpretation of results; presentation of the integrative review, and synthesis of knowledge.

The data survey sought to answer the following guiding question: what instructions about the signs of labor have been performed during prenatal education for pregnant women? The guiding question was

constructed with the PICO strategy, which is an acronym for Patient or Problem (P), Intervention (I), Comparison (C) and Outcome (O) shown in the following chart (SANTOS, 2007).

Acronym	Definition	Description
P	patient or problem	pregnant and parturient women
I	intervention	instructions during prenatal care about the signs of labor
C	comparison	instructions received incorrectly or not received
O	outcome	knowledge about the signs of labor

In order to build the sample of the present study, a survey of articles was conducted in the databases Virtual Health Library (VHL), which includes LILACS, BDENF, and PubMed; SCIELO, Google Scholar, and Cochrane Library. These databases were selected because they group studies from several countries produced by numerous researchers.

The search for the studies took place in August 2022, and the following Health Science Descriptors (DeCS) and corresponding Medical Subject Headings (MeSH) were used: Labor Onset (Labor Onset), Prenatal Education (Prenatal Education), and Nursing Care (Nursing Care). To improve the search, the Boolean operator "AND" was used and the descriptors were paired in order to define two search strategies: **Strategy 1** - Labor Onset "AND" Prenatal Education "AND" Nursing Care **Strategy 2** - Labor Onset "AND" Prenatal Education "AND" Nursing Care.

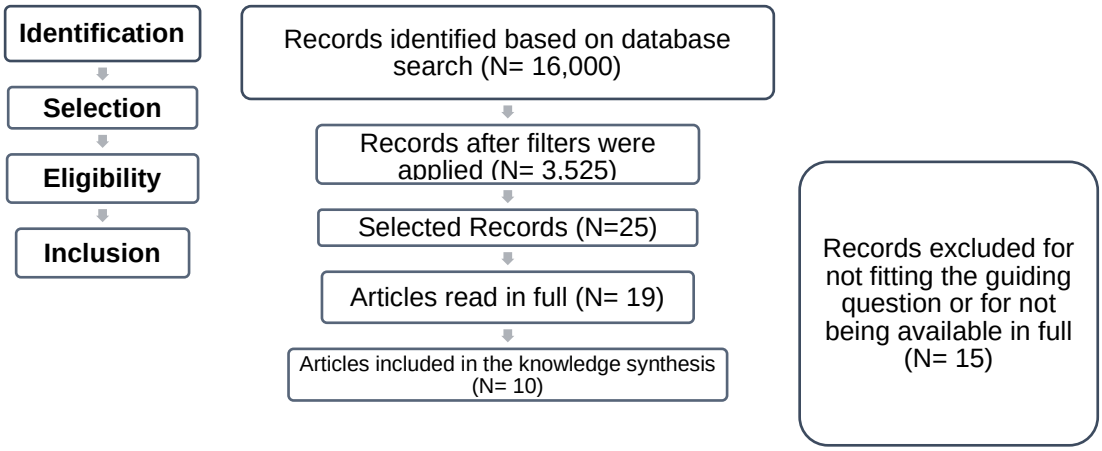
According to the objective of the study, the inclusion criteria were established as follows: original articles, available in full and published within the last five years (2018 to 2022), written in Portuguese, English or Spanish and addressing topics related to prenatal education, signs of the onset of labor and delivery, and nursing care.

All duplicate articles and those that did not answer the guiding question were excluded from this study. Each article methodologically selected to compose the sample of this review was individually and thoroughly analyzed through a critical reading and through the data extracted guided by the data collection instrument built.

For the results of this search, an instrument was built that addressed the following data: author, year of publication, title, general objective, method/sample, and conclusion or recommendation. Soon after this stage of study description, a critical and thorough evaluation of the included manuscripts was performed.

In order to increase the reliability and impact of this study, Figure 1 was constructed, according to PRISMA recommendations, which elucidates the inclusion process of the articles found (PAGE, et al 2022).

Figure 1 - Flow chart according to PRISMA recommendations.



16,000 articles were found in the databases, of which 3,525 were selected after applying the search filters, 25 articles were selected by the eligibility criteria; 19 articles were selected for reading in full and final sample of this research was composed of 12 articles selected for synthesis of knowledge according to the JBI checklist, after critical reading was presented the main contributions of the publications in relation to the studied theme and proposed objective (SANTOS, 2018).

3 RESULTS

Publications were identified from the year 2018, being observed, however, a quantitative of three productions in the years 2019 (30%) and 2021 (30%), followed by the years 2020 (20%) with two productions and 2018 with (10%) and 2022 (10%) with one production in each year. As for the methodological design, four integrative literature review studies were identified (40%), three studies with a descriptive and transversal approach (30%), one bibliographic study (10%), and one with a qualitative approach (10%). Regarding the place of publication, seven articles were published in national journals (70%) and three articles were published in European journals (30%).

Table 1 - Characteristics of the studies and summary of the conclusions, Maceió, 2022.

AUTHOR AND YEAR	TITLE	OBJECTIVE	METHODOLOGY	CONCLUSION
CARVALHO, S. S; OLIVEIRA, B. R.; BEZERRA, I. S., 2019.	Importance of guidance on labor in prenatal visits: a literature review	To analyze the importance of guidance on labor in prenatal visits through a literature survey.	This is a bibliographic study, in which we conducted a literature review on the importance of guidance on labor during prenatal visits.	The survey made it possible to identify that there are very few publications that deal exclusively with this theme.

PORTELA, R. G. and Et al. 2021	Clinical simulation in the nursing care of women in the third trimester of pregnancy: Scenario Validation	Elaborate and validate a scenario for clinical simulation and checklist for evaluation Teaching about nursing consultation in the third trimester of pregnancy.	This is a study of the type methodological approach, which adopted the assumptions of Gilbert and Adamson (2016) from recommendations of the *International Nursing Association for Clinical Simulation and Learning* (INACSL), for the elaboration and validation of a clinical simulation scenario.	The validation process attests to the scientific rigor with which the Scenario and ckecklist have been elaborated, so it allows it to be used safely, In undergraduate nursing education. It is hoped that this study will stimulate new Research on the topic.
MARTINS, A. P. C.; JESUS, M. V. N.; JUNIOR, P. P. P.; PASSOS, C. M. P.; 2018	Aspects that influence decision making The woman's decision on the type of delivery	To know the aspects that influence the decision making about the type of delivery by pregnant women in their third year of life Trimester of gestation	Descriptive, qualitative study conducted in 2015 with 15 pregnant women. We conducted Semi-structured interviews and the data were subsequently subjected to content analysis.	It was understood that The choice of the type of delivery was not influenced by one aspect alone, but by a series of inseparable factors Which, when analyzed separately, might not have been able to influence the decision.
TEIXEIRA, W. L.; ZOCCHE, D. A. A.; MARTINS, M. F. S. V.; 2022.	The dimensions of nurses' work in low-risk prenatal care: a review Integrative	To analyze the scientific evidence available in the literature concerning the prenatal consultation performed by the Prenatal nurse from 2016 to 2021	Integrative review in six steps in the databases: scielo, lilacs - medline, Pubmed, bdenf.	Evidenciou-se-se a lacuna de conhecimento com relação a dimensão investigativa do enfermeiro. The low number of publications reveals the need to expand the publications on the development of the systematization of prenatal nursing care and the importance of the role of nurses as managers of these services.
FERREIRA, G. E. e *et al*. 2020.	The nurse's care in low-risk prenatal care	To conduct a bibliographic survey on the nurse's care in low-risk prenatal care	This is a literature review study, descriptive in nature, based on the nurse's care during low-risk prenatal care.	There is a need for health education of the population about the importance of nursing care during prenatal care in institutions, and to seek constant measures to reduce the rate of neonatal deaths and birth complications, and implementation in hospital institutions, including practices with the multidisciplinary team for effectiveness in prenatal care.
AGUIAR, L. C.; SILVA, M. L. C.; OLIVEIRA, V. S.; AGUIAR, J. R. R.; DOURADO, L. K. M. 2020	Profile of pregnant women and content of the guidance on the signs of labor received during prenatal care	To know the guidance on the signs of labor given to pregnant women during prenatal care in a basic health unit	Descriptive study with quantitative approach in a health center in são luís, maranhão. For data collection, a questionnaire was applied to a sample of 11 pregnant women.	This study shows that guidance on the signs of labor are infrequent and sometimes are not even provided during consultations. This may explain the scarcity of publications addressing the topic, although it is a consensus that health education in prenatal care is essential to strengthen the autonomy of pregnant women during labor and delivery.

SOUTO, R. E. M. et *al.* 2021.	Guidance on labor and delivery during prenatal care: integrative review	Identify the guidance on labor and delivery given during prenatal care to pregnant women	This is an integrative literature review from August to November 2019	It was observed that the guidance on labor and delivery for pregnant women is often limited to specific transfers of information, without the concern of checking the woman's understanding. Even though it is a strong recommendation, demonstrably effective, health education in prenatal care still presents flaws and barriers.
SANTOS, L. Z. S. 2021.	Nursing orientations during normal risk prenatal care on the process of parturition: integrative review	To identify in the scientific production what has been discussed about the nursing orientations during the prenatal period of usual risk for the preparation of the parturition process.	This is an integrative review of the literature from the period 2010-2020.	The study concludes that the nursing orientations during the prenatal period of usual risk about the process of parturition are little addressed by professionals, it is recommended that during the training of nurses, so that they have a qualified performance in the area of women's health.
FELIX, H. C. R. *et al*. 2019.	Warning and labor signs: knowledge among pregnant women	Identify scores of pregnant women's knowledge about the warning signs and Labor and Delivery	This is a quantitative, cross-sectional study about the knowledge A survey on warning signs and signs of labor was conducted with 100 pregnant women.	Pregnant women who did not receive orientation had lower hit scores, which demonstrates the importance of health education during prenatal care.
MARQUES, B. L; TOMAS, Y. T.; SARAIVA, S. S; BOING, A. F.; GEREMIA, D. S. 2021.	Guidelines for pregnant women during prenatal care: the importance of shared care in primary health care	To analyze the association between the adequacy of the orientation received during prenatal care and the professional who attended the pregnant woman in the majority of consultations in primary health care.	This is a quantitative, cross-sectional study, carried out among postpartum women residing in the state of Santa Catarina.	The prevalence of orientation given by health professionals to pregnant women was higher when prenatal care was more shared between nurses and physicians, compared to the majority of care given by professionals from only one professional category

4 DISCUSSION

Carvalho pointed out in his study that some data are worrisome in relation to not receiving information about labor, delivery and puerperium during prenatal care, because it directly interferes in the adequacy and preparation of these pregnant women. This work highlights the insufficient role of prenatal care in this aspect, when there is this relationship of non-preparation and dissatisfaction of these pregnant women when dealing with the preparation for childbirth (CARVALHO, 2019). This finding brings up the discussion and the importance of using educational technologies to address this issue during pregnancy

Cassiano (2022) states in his study that educational technology has a positive influence on the knowledge of pregnant women about the signs of labor.

Regarding the importance of guidance about the signs of labor during prenatal care, most publications included in this study affirm this importance for positive outcomes, recognition and protagonism of women in this period (CARVALHO, 2019; PORTELA, 2021; TEIXEIRA, ZOCHE E MARTINS, 2022; MARTINS, 2018; FERREIRA, G. E. et *al.* 2020; AGUIAR, et al 2020; SOUTO, et *al.* 2021).

The analysis of the articles showed that in its majority that health professionals who perform prenatal consultations should promote adequate knowledge about the signs of labor, but also information about the whole period that involves childbirth (MARQUES, *et al* 2021; SANTOS, 2021; FÉLIX, *et al*. 2019).

With the exploration of the studies it is notorious the insufficiency or ineffectiveness of information during the preparation for childbirth in prenatal care (CARVALHO, 2019). This finding is explained because there is a scenario of lack of knowledge of pregnant women about the signs of labor, where they did not know the signs of labor and neither know how to recognize the appropriate time to seek the reference service, which is a reflection of the scarcity of guidance on the subject, since most pregnant women do not receive guidance during prenatal care (SILVA, 2021).

A study brought the importance of the approach about the recognition of labor and its stages so that during the third trimester of pregnancy women are prepared for this identification as well as to be resolutive before the situations that she will identify, so it is necessary that professionals are accurate and thorough in offering these guidelines (PORTELA, 2021). Costa, 2021 brings in his study that prenatal guidance fosters confidence, empowerment and coping capacity facing the peculiarities inherent in labor, reaffirming this need and gap existing in prenatal care.

Portela also says that these orientations should make it possible to go to the maternity hospital at the correct time, avoiding early hospitalization that can culminate in a longer and more painful labor for the pregnant woman, baby, and companion; excessive interventions, or even unnecessary cesarean sections (PORTELA, 2021).

The scenario proposed by Portela's study was the one that was most distant from the discussion proposed in this study, but it brought a great contribution in the sense of solving the problems pointed out and explored in the other selected studies where it proposed a simulation as an effective method to prepare future nurses for real clinical situations, including the preparation and orientation that should be given to the signs of labor, contributing to the daily nursing practice, and thus contributing to prenatal care (PORTELA, 2021).

Studies show that the approach of the assistance dimension of nursing care to prenatal care shows direct correlations between adequate prenatal care and the reduction of maternal and perinatal morbidity and mortality rates, being of such necessity and importance within the nursing category the application of

the nursing process aiming at identifying the needs of each pregnant woman/family during prenatal care (TEIXEIRA, ZOCHE E MARTINS, 2022).

This study highlights the need for standardization of instruments aimed at the educational assistance provided by nurses during the prenatal consultation as a key factor for the quality of care and its resoluteness. It is noteworthy that these guidelines are not exclusive to nursing, because prenatal care is shared with the medical category, being also necessary and productive that this category addresses the issue (TEIXEIRA, ZOCHE E MARTINS, 2022).

In summary, the educational competencies contribute to the qualification of prenatal care performed by nurses, especially with regard to the use of soft technologies and virtual objects, including the theme addressed in this study, where these competencies should be used to enhance the knowledge of the signs of labor (TEIXEIRA, ZOCHE AND MARTINS, 2022).

A study evidenced the absence of guidance as a flaw in assistance that ends up generating failures, doubts, insecurities, and dissatisfaction among pregnant women and their families. Therefore, it is necessary to establish the link and communication between the pregnant woman and the health professionals (MARTINS, 2018). In a scenario that evidenced inefficiency in the form of preparation for childbirth, it is prudent and necessary that nurses active in prenatal care assume their role with efficiency mainly because it is an assignment that is already present in the protocols and documents of the Ministry of Health related to women's health care (BRASIL, 2016).

The study of Ferreira (2020) observed a significant dissatisfaction in relation to health education, where it was evidenced the need for clearer and objective guidance to prepare for childbirth including clarification on the signs of labor, because this information prepares them to live the long-awaited and unknown moments of childbirth. When women and family members acquire more knowledge about pregnancy and parturition, they can experience satisfactory feelings, since they have better perception and understanding of the whole process (FREITAS, 2018).

I highlight before the analysis of this study the reported lack of reference of health services, which is a factor of great impact before a pregnant woman who needs to recognize the signs of labor and have knowledge of the health service reference to provide childbirth care. It is understood that these problems go beyond the categories or even professional performance before the prenatal care (FERREIRA, G. E. e et *al*. 2020).

Aguiar (2020) in his study showed that guidance on the signs of labor are infrequent and sometimes are not even provided during consultations. This may explain the scarcity of publications that address the theme, although it is a consensus among the research analyzed that health education in prenatal care is essential for strengthening the autonomy of pregnant women at the time of labor and childbirth, there is a shortage of publications in the scientific community that address the theme, especially with regard to interventions that change this reality (AGUIAR, e et al 2020; FREITAS, 2018).

With the purpose of identifying in the scientific literature the guidance on labor and childbirth given during prenatal care for pregnant women, Souto (2021) showed that the guidance on labor and childbirth for pregnant women is often limited to specific information without proper concern for the pregnant woman's understanding of the guidance.

Therefore, this study draws attention to the barriers and failures of prenatal education, even though it is a consolidated health resource, which has also been reported by other authors who have shown that pregnant women are not being prepared to face labor and delivery and that they need more guidance, emphasizing the strengthening of prenatal groups whether in the public health network or in private care (PEREIRA, SILVA, and MISSIO, 2018).

One of the studies analyzed showed that women who are properly oriented reported positive outcomes in labor and delivery and greater satisfaction after the events, highlighting mainly the use of educational technologies, given the difficulty of understanding the guidelines and the help that these technologies bring to fix the issues, sensitization of pregnant women, demystification of myths about childbirth (SANTOS, L. Z. S. 2021).

In the study by Felix (2019), most of the pregnant women interviewed reported not having received guidance on warning signs and signs of labor during prenatal care. In order to increase the companions' knowledge not only about the moment of labor, but also about what their actions are, which signs precede labor, and when to go to the maternity hospital, this study also developed a specific educational material (FÉLIX, H. C. R. *et al.* 2019)

In a southern state of Brazil, was observed prevalence of adequacy of guidelines received during prenatal care was 18.6%, it was observed that the adequacy of guidelines received during prenatal care is higher when there is shared attention between doctors and nurses even in the face of gaps in assistance (MARQUES, *et al* 2021). Thus, the improvement of educational actions should be strengthened, aiming to improve the quality of prenatal care implementation of specific protocols that cover prenatal care in its entirety regardless of the place where prenatal care is being performed or even the professional category (LOURENÇO, 2020).

5 CONCLUSION

The present study identified the realization of prenatal education about the signs of the onset of labor during prenatal care, as well as allowed to study and analyze the content of prenatal education about other topics present in the articles studied. The studies found added up to a small sample due to the need for association and answer to the research question. In summary, it was perceived that the orientations are a great resource for the satisfaction of pregnant women and for the positive outcomes in relation to childbirth. The search for open access articles, and the fact that the references of the articles that were selected were not searched, presented themselves as some limitations, because they may have limited access to relevant scientific production on the guidance about the signs of the onset of labor.

It is concluded that the results identified and reported in this study demonstrated the importance and the difference that guidance can make in prenatal care for the success and reduction of negative outcomes of childbirth. Moreover, through this survey the need for studies with this specific theme was identified, because publications are scarce regarding the exclusive approach to guidance on the signs of the onset of labor. Therefore, it is expected that this study contributes significantly during the conduction of women's health care in the gravidic-puerperal period.

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Chapter 13

Modified dyslipidemia model in rats: high-lard and high-cholesterol diet

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ABSTRACT
Background: In view of the increased global prevalence of cardiovascular and hepatic diseases, the diet lipid content and its relation with the accumulation of fat in hepatocytes have been investigated as a key factor in the prevention of these diseases.
Objective: To evaluate metabolic effects of a high-lard diet supplemented or not with cholesterol in modified model of dyslipidemia.
Methods: Twenty-four male Wistar rats were divided into three groups: standard diet (STD - 4% lipids), high-lard diet (HLD - 21% lard), and high-lard and high-cholesterol diet (HL/HCD - 20% lard, 1% cholesterol, 0.1% cholic acid). After six weeks of treatment, blood and liver were collected for biochemical (serum lipid profile and liver enzymes) and morphological analyses. Statistical analysis included one way analysis of variance (ANOVA), followed by Tukey test for comparisons of mean, and a 5% probability was considered statistically significant.
Results: Animals fed HL/HCD increased total cholesterol, triacylglycerol, LDL-c, non-HDL-c, alanine aminotransferase (ALT), and aspartate aminotransferase (AST) serum levels compared to those fed STD. In addition, the HL/HCD animals showed increased relative liver weight, which featured moderate macrovesicular hepatic steatosis and inflammatory infiltrate.
Conclusion: High-fat diet with lard (20%) and cholesterol (1%), in shorter experimental time than the previous reported models, triggered dyslipidemia with severe liver damage in rats. The high-lard diet without supplementation of cholesterol leaded to body weight gain, but did not to dyslipidemia.

Keywords: High-Fat Diet, Lipid Profile, Hepatic Steatosis, Inflammation, Rats

1 INTRODUCTION

The worldwide prevalence of metabolic disease and associated health complications have increased in recent decades. Excess body fat, insulin resistance, non-alcoholic fatty liver disease (NAFLD) and dyslipidemia lead to metabolic disorders related to higher risks of developing cardiovascular diseases.[1] NAFLD comprises from a minor hepatocyte fat accumulation to more severe stages of inflammatory necrosis, with or without fibrosis. Studies indicate an association between NAFLD and insulin resistance, hepatocyte inflammation, and lipid metabolism impairment,[2,3] as most patients with NAFLD present dyslipidemia.[4]

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Dyslipidemia is characterized by increased levels of triacylglycerol (TG) and low-density lipoprotein cholesterol (LDL-c), and by decreased high-density lipoprotein cholesterol (HDL-c).[5] Hypercholesterolemia (LDL-c isolated increase) and hypertriglyceridemia (TG isolated increase) are the most common forms of dyslipidemia.[6] In general, lipid metabolism imbalance results from the interaction between genetics and environmental factors, such as food habits, especially lipid consumption. Therefore, the diet lipid content has been investigated as a key factor in the prevention of cardiovascular and hepatic diseases.[7]

Experimental studies with high-fat diets have used very high contents of dietary fat (about 50% of the diet composition), in short-period (four weeks) protocols, without finding serum lipid impairment.[8,9] On the other hand, studies testing lipid concentrations closer to human consumption have been performed during relatively long experimental time, as in previous reports with rats (21% fat for 9 weeks),[10] and with mice (15% to 20% fat for 12 to 16 weeks).[11,12]

In this context, the aim of this study was to evaluate metabolic effects of a high-lard diet supplemented or not with cholesterol in a modified model of dyslipidemia, with shorter experimentation time and lower diet lipid concentration compared to previous reports.

2 MATERIAL AND METHODS

Animals, diets and experimental design

The experiment was carried out with adult male Wistar rats obtained from the University of São Paulo (Ribeirão Preto, Brazil). The rats were kept in plastic cages (2 animals/cage) for seven weeks (one week of acclimation and six weeks of assay), under controlled environmental conditions (12 h light, 12 h dark cycle, and temperature of 22 ± 2 ºC). In the experiment, 24 rats were randomly divided into 3 groups, according to randomized block design based on the body weight of the animals, containing 8 animals per group. The sample size was defined considering previous studies on experimental dyslipidemia. Each group was treated with one of the following diets: standard diet (STD; RH19521, Rhoster, Brazil) prepared according to AIN-93M,[13] high-lard diet (HLD; RH195143, Rhoster, Brazil), and high-lard and high-cholesterol diet (HL/HCD; RH195142, Rhoster, Brazil). Soybean oil (STD) and lard were used as lipid sources; cholesterol, for hypercholesterolemia induction; and cholic acid, to increase the hypercholesterolemic effect of supplemented cholesterol[14] (Table 1). The diets and filtered water were provided *ad libitum*. Dietary intake and body weight of animals were monitored three times a week.

After six weeks of experimentation, animals were euthanized (xilazin + quetamin/ 10 mg/kg + 100 mg/kg). Thereafter, blood samples were collected by abdominal puncture (about 5 mL) for biochemical analyses (serum lipid profile and liver enzymes). After euthanasia by abdominal aorta exsanguination, the animal's liver was extracted, weighed and prepared for morphological evaluation. All procedures were conducted according to the Guide for the Care and Use of Laboratory Animals,[15] and were approved by the Ethics Committee on Animal Use of the Federal University of Goiás (protocol number 039/15).

Biochemical analyses

The blood samples were collected in heparin tubes and centrifuged at 4000 rpm for 10 min to separate serum, which was immediately stored at -80 °C for analyses of lipid profile and liver enzymes. Total cholesterol (TC), TG, LDL-c, HDL-c, alanine aminotransferase (ALT), and aspartate aminotransferase (AST) levels were determined by commercially available kits (Labtest Diagnóstica S.A., Lagoa Santa, Brazil). Very low-density lipoprotein cholesterol (VLDL-c) was estimated by Friedewald equation, and the non-HDL-c fraction was obtained by the difference between TC and HDL-c levels. The importance of other lipid parameters, such as non HDL-c fraction, has been highlighted in CVD risk prediction. Boekholdt et al.[16] has shown that non-HDL-c concentrations had stronger direct association with CVD risk than LDL-c and Apo B.

Liver morphological evaluation

The liver lobes were rinsed in ice-cold 0.9% physiological solution and fixed by immersion in phosphate-buffered 10% formalin for 24 h. Thereafter, the lobes were cut into 4 to 5 mm thick fragments, dehydrated in increasing alcohol concentrations (80%, 95% and 100%), clarified in xylol (3 baths of 30 min each), and then embedded in paraffin. Five micrometer-thick serial sections were obtained and stained with hematoxylin and eosin (HE). HE-stained sections were used to analyze the alterations in the arrangement of hepatic parenchyma and the presence of inflammatory infiltrates using a Leica Las V4 Software (Leica Imaging Systems Ltd., Cambridge, UK) with a Leica DM2000 microscope (Leica Microsystems Wetzlar GmbH, Wetzlar, Switzerland), a Leica DC230 videocamera (Leica Microsystems AG, Heerbrugg, Switzerland) and an online computer. Twenty fields of the hepatic parenchyma of each animal were randomly selected and analyzed, at 100x and 400x magnification.

Statistical analysis

Data were expressed as mean ± standard deviation. Body weight and biochemical parameters obtained in animal models are considered parametric data, according to the literature.[8-12] Thus, statistical significance was determined using one way analysis of variance (ANOVA), followed by Tukey test for comparisons of mean ($p < 0.05$). STATISTICA software, version 7.0 (StatSoft, Inc., Tulsa, OK, USA) was used for the statistical analyses.

3 RESULTS

The lard used in the formulation of diets contained 39 g/100 g of saturated fat, and 72 mg/100 g of cholesterol. Based on the high-fat diets, lard contributed with, approximately, 15 mg of cholesterol/100 g of diet, in addition to cholesterol in the HL/HCD. Forty-four percent (44%) of the HLD and HL/HCD energy was from lipids, a value four times higher than the STD (11%).

The initial animals' body weight was not different among the groups, ensuring the homogeneity of the groups' repetitions. Animals fed HLD showed higher body weight gain than that of the STD group. Liver weight and relative weight of the animals fed HL/HCD were higher ($p < 0.05$) than those of other groups (Table 2).

Animals fed HL/HCD, but not rats fed HLD, showed higher TC, TG, LDL-c, VLDL-c, non-HDL-c, ALT and AST serum levels than those of STD group. Serum lipid profile and liver enzymes of the animals fed HLD were not different from STD (Table 2).

Microscopic changes (Figure 1) were observed in the liver of the animals fed HL/HCD, as the hepatic tissue architecture was not preserved, with balonization of hepatocytes (characterized by swelling and/or vacuolation), alterations of sinusoidal blood capillaries, and passive hyperemia (capillaries and veins engorged with blood). In addition, the presence of moderate macrovesicular hepatic steatosis associated with a marked infiltration by lymphomononuclear cells was observed in the rats fed HL/HCD. However, hepatic tissue architecture of animals fed HLD was preserved, containing hepatocytes with usual morphological aspect, preserved vascular distribution, centrilobular vein and portal triad. Furthermore, the presence of mild microvesicular hepatic steatosis associated with lower infiltration by lymphomononuclear cells was observed in HLD. The STD's hepatic tissue architecture was maintained with typical hepatocytes, preserved hepatic sinusoid and capillary strands; conserved vascular distribution, intact portal triads, with branches of the portal vein, hepatic artery, and bile duct.

4 DISCUSSION

The dyslipidemia was triggered in rats fed diet with 20% lard and 1% cholesterol, in six weeks, with increased liver weight, hepatic injury and inflammatory infiltrate.

In the present study, lipids contributed with 44% of the high-fat diets energy, which percentage is close to that reported for high-fat diet consumed by overweight or obese individuals (43% to 55%).[17-19] In previous animal studies, lipid contribution ranged from 67% to 75% of high-fat diet energy.[8,9] Therefore, these diets with very high contents of lipids do not reproduce, realistically, the high-fat diets consumed by humans. The daily lipid recommendation for human adults is 20% to 35% energy from lipids, according to the AMDR (Acceptable Macronutrients Distribution Ranges), considering that high lipid intake indicates higher risk for obesity and associated disorders.[20]

Higher body weight gain of the HLD group can be explained by its higher food consumption (17.6 g/day/rat) compared to the HL/HCD group (13.8 g/day/rat), since the energy density of the diets were similar (4.26 kcal/g). Higher weight gain was observed in previous study with mice fed high-fat and high-cholesterol diet (energy density= 4.27 kcal/g), for 12 weeks, compared to the control group.[12]

Despite the higher body weight gain, the HLD group did not show differences in the liver weight compared to STD group (Table 2). The relative liver weight of the HL/HCD was very high, representing 5% of the body weight of these animals. The increased liver weight of the HL/HCD group is related to the

strong presence of fatty vesicles in hepatocytes, as observed in the liver morphological evaluation (Figure 1). A previous study with mice treated for 16 weeks with high-fat and high-cholesterol diet, without cholic acid, presented similar results regarding liver weight and hepatic tissue lipid accumulation.[11] In our study, the presence of cholic acid probably accelerated the dyslipidemic effects of the cholesterol in the HL/HCD group, since the metabolic disorders was observed in only 6 weeks, whereas in the study of Jung et al.[11] the same effects were observed in 16 weeks. The serum lipid impairment observed in the animals fed HL/HCD is characteristic of dyslipidemia, and the marked increase of LDL-c may be related to the reduction of LDL-c receptor activity in hepatocytes.[21] In previous studies, changes in TC and TG serum levels were observed in rats and mice fed a high-fat and high-cholesterol diet.[10,12] However, the experimentation period of the reported studies (9 and 12 weeks, respectively) was longer than that used in the present study.

The serum lipid profile of the animals fed HLD did not differ from STD. Similar results were observed in studies with Wistar rats treated with 50% to 55% lard diets (67% to 75% of energy), for four weeks.[8,9] The harmful effect of very high saturated fatty acids consumption and the relation to dyslipidemia have been questioned.[1] Siri et al.[21] highlight that the effects of saturated fat on serum lipid profile may be modulated by the content and/or availability of polyunsaturated fatty acids, such that saturated fat may increase LDL cholesterol only if the polyunsaturated fat intake is below a threshold level (5% of energy). Our results confirmed that the excessive saturated fatty acids intake explains only part of the changes in serum lipid profile. There are other factors influencing these changes, such as dietary cholesterol, obesity, insulin resistance and hypertriglyceridemia.[23,24]

ALT and AST high serum levels are characteristic of NAFLD and are associated with insulin resistance. In this study, increased serum levels of ALT and AST were compatible with the hepatic damages observed in the animals fed HL/HCD. Other studies also found increased ALT and AST serum levels in mice fed high-fat and high-cholesterol diet.[11,12]

Morphological evaluation showed marked changes in the hepatic tissue of the animals fed HL/HCD, such as the presence of fatty macrovesicles and inflammatory infiltrates, characterizing a moderate hepatic steatosis[25], which confirmed the results of the hepatic enzymes (ALT and AST). Fat accumulation in the animals' liver is related to high cholesterol consumption, because this overload in the cells alters the cholesterol homeostasis.[26] In addition, the lipid intermediate metabolites accumulation, such as diacylglycerol, TG, and acylcarnitines, is associated with inflammation and insulin resistance.[27,28] A previous study suggests that high dietary cholesterol is a critical factor in the progression of hepatic steatosis and inflammation in animal models. However, the features of NAFLD are more evident when the supplemented cholesterol is associated with cholic acid in a high-fat diet,[14,29-31] as observed in our study.

The presence of inflammatory infiltrate in the hepatic tissue promotes cytokines and chemokines secretion, such as tumor necrosis factor α (TNF- α) and interleukin 6 (IL-6), which induce insulin resistance. In this metabolic disorder, the increased lipolysis of TG stored in the adipose tissue raises fatty acids production. The fatty acids released in the circulation, in turn, inhibit the anti-lipolytic action of insulin and

provide higher lipids absorption by the liver, leading to dyslipidemia and hepatic steatosis.[3,32,33] Hamsters treated for 10 weeks with a hyperlipidemic diet containing cholesterol (0.2%) developed dyslipidemia and hepatic steatosis, and impaired TC, TG, LDL-c, ALT and AST serum concentrations.[34] Liver histopathological analysis of Sprague-Dawley rats fed a high-cholesterol diet (1.5%) also revealed hepatic steatosis and inflammation.[35]

One limitation of our study was the inability to use more accurate methods for the evaluation of liver fatty macro and microvesicles and foam cells, such as Oil Red and immunohistochemistry, respectively, which could allow quantitative analyses of the liver damages. Moreover, we recommend further studies including a treatment with lard and cholic acid, in order to investigate if the cholic acid can enhance the metabolic effects of the lard's cholesterol.

5 CONCLUSION

High-fat diet with lard (20%) and cholesterol (1%), in shorter experimental time than the previous reported models, triggered dyslipidemia with severe liver damage in rats. The high-lard diet without supplementation of cholesterol leaded to body weight gain, but did not to dyslipidemia. This model may be useful to investigate metabolic disorders in different experimental design related to dyslipidemia and its comorbidities.

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AUTHOR'S CONTRIBUTION

Research design: Naves MMV; Obtaining data: Muniz LB, Alves-Santos AM, Camargo F, Martins DB; Synthesis, analysis and interpretation of the data: Muniz LB, Alves-Santos AM, Celes MRN, Naves MMV; Statistical analysis: Alves-Santos AM, Muniz LB; Obtaining financing: Naves MMV; Writing of the manuscript: Alves-Santos AM, Muniz LB; Critical review of the manuscript: Naves MMV.

POTENTIAL CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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STUDY ASSOCIATION

This article is part of the project of Post-doctoral of Lidiane B. Muniz, conducted at Universidade Federal de Goiás.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

All procedures were approved by the Animal Care and Use Ethics Committee of the Universidade Federal de Goiás under the protocol number 039/15.

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Table 1 - Composition of the experimental diets

Component (g/100g of diet)	Diet[1]		
	STD	HLD	HL/HCD
Casein (82.93 g of protein)	16.47	16.47	16.47
L-cystine	0.18	0.18	0.18
Soybean oil	4.00	0.00	0.00
Lard[2]	0.00	21.00	20.00
Cholesterol[2]	0.00	0.00	1.00
Cholic acid[2]	0.00	0.00	0.10
Sucrose	10.00	10.00	10.00
Cellulose	5.00	5.00	5.00
Mineral mix	3.50	3.50	3.50
Choline birtatrate	0.25	0.25	0.25
Vitamin mix	1.00	1.00	1.00
tert-Butylhydroquinone (TBHQ)	0.008	0.008	0.008
Dextrinized cornstarch	15.50	15.50	15.50
Corn starch	44.09	27.09	26.99
Lipids (g/100g)[3]	4.1 ± 0.1	19.7 ± 1.4	20.8 ± 1.6
Energy from lipids[4]	36	189	189
Diet energy (kcal/g)[4]	3.41	4.26	4.26
(Energy from lipids x 100)/diet energy (%)	11	44	44

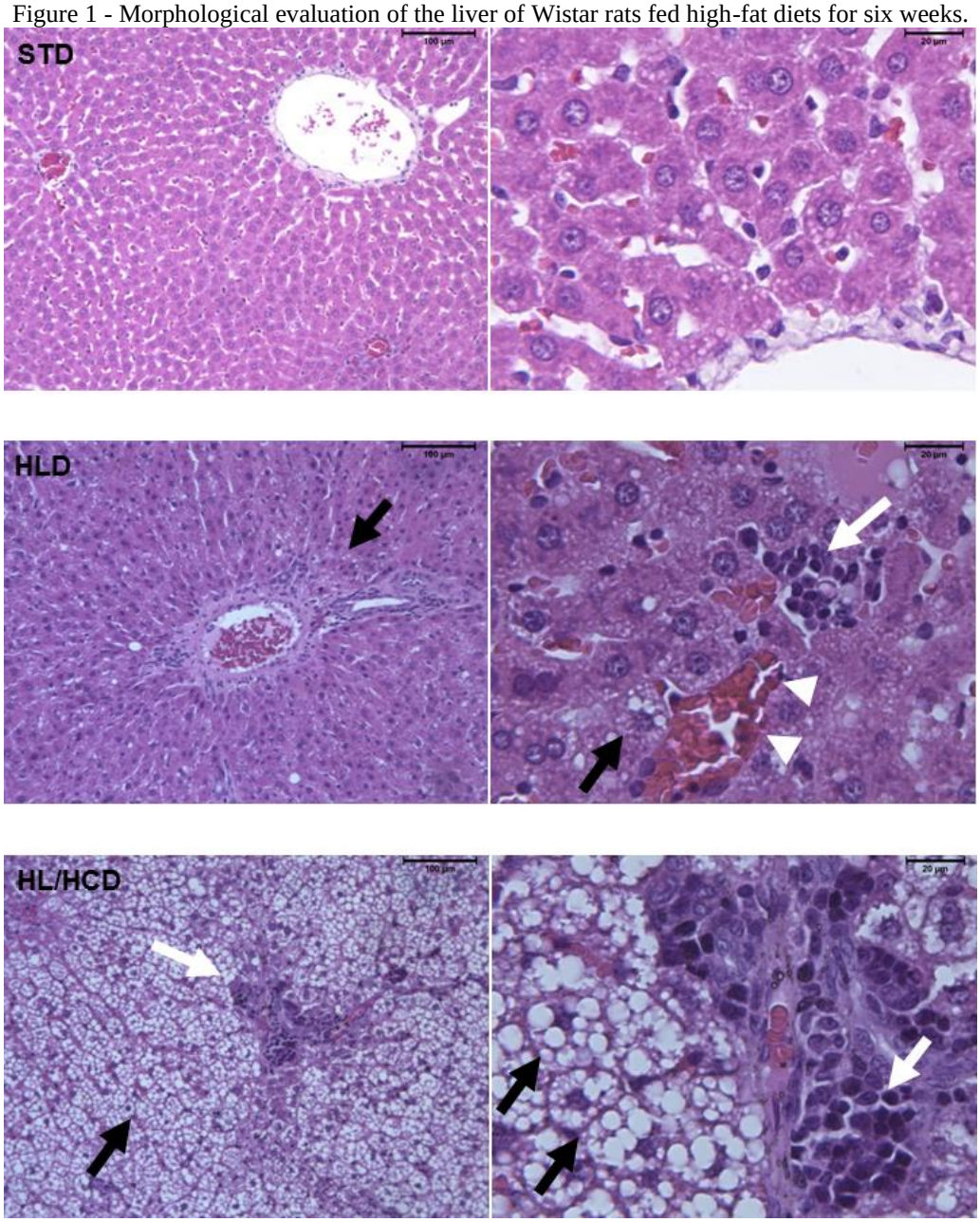
[1]Reeves et al.[13] STD: standard diet, HLD: high-lard diet and HL/HCD: high-lard and high-cholesterol diet; [2]Fernandes et al.[10]; [3]Results of the diets' chemical analysis; [4]Energy value of diets = 4, 4 and 9 kcal/g for protein, carbohydrate and lipid, respectively.

Table 2 - Body and liver weight, and biochemical parameters of Wistar rats after six weeks of treatment with standard and high-fat diets

Parameter	Diet		
	STD	HLD	HL/HCD
Body weight (g)			
Initial	249.05 ± 21.44[a]	243.85 ± 15.09[a]	242.35 ± 16.78[a]
Final	499.58 ± 65.32[a]	564.08 ± 39.73[a]	508.58 ± 47.68[a]
Gain	250.53 ± 48.40[b]	320.23 ± 44.50[a]	266.23 ± 38.21[a,b]
Liver			
Weight (g)	14.90 ± 2.33[b]	15.92 ± 1.65[b]	27.10 ± 5.94[a]
Relative weight (g/100g)	2.98 ± 0.24[b]	2.82 ± 0.14[b]	5.28 ± 0.80[a]
Serum lipid profile (mg/dL)			
TC	59.83 ± 15.99[b]	64.58 ± 14.13[b]	87.75 ± 8.54[a]
LDL-c	4.23 ± 0.71[b]	6.98 ± 2.09[b]	23.63 ± 4.55[a]
HDL-c	30.74 ± 4.11[a]	34.42 ± 7.77[a]	26.74 ± 4.23[a]
non-HDL-c	29.09 ± 12.13[b]	30.17 ± 10.84[b]	61.01 ± 6.95[a]
VLDL-c	10.68 ± 1.58[b]	16.77 ± 4.58[a,b]	18.52 ± 7.51[a]
TG	53.42 ± 7.91[b]	83.83 ± 22.90[a,b]	92.58 ± 37.55[a]
Liver enzymes (U/L)			
ALT	48.72 ± 15.91[b]	28.16 ± 6.00[b]	210.30 ± 137.78[a]
AST	154.67 ± 22.42[b]	117.00 ± 29.84[b]	300.63 ± 60.26[a]

Data are mean ± standard deviation. [a,b]Values in the same row with different superscript letters are significantly different (Tukey test, $p < 0.05$). STD: standard diet, HLD: high-lard diet, HL/HCD: high-lard and high-cholesterol diet; Relative liver weight = (liver weight/body weight) x 100; TC: total cholesterol; LDL-c: low-density lipoprotein cholesterol; HDL-c: high-density lipoprotein cholesterol; VLDL-c: very-low-density lipoprotein cholesterol; TG: triacylglycerol; non-HDL-c: non-high-density lipoprotein cholesterol; ALT: alanine aminotransferase; AST: aspartate aminotransferase.

Figure 1 - Morphological evaluation of the liver of Wistar rats fed high-fat diets for six weeks.



STD (standard diet): preserved hepatic tissue architecture with conserved vascular distribution is observed. HLD (high-lard diet): hepatic tissue architecture preserved with mild and uniform hepatic steatosis (black arrows), mild inflammatory infiltrate (white arrows) and mild passive hyperemia (arrowhead). HL/HCD (high-lard and high-cholesterol diet): change in tissue architecture with moderate hepatic steatosis, fat microvesicles and macrovesicles (black arrows), and marked inflammatory infiltrate (white arrows). The bars indicate 100 μm at a 100x magnification (left panel), and 20 μm at a 400x magnification (right panel).

Chapter 14

The humanized hospital project: project research as an inducer of healing in a post-pandemic scenario

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ABSTRACT
The healing process of the hospitalized patient goes beyond medical protocols. Subjective aspects, which involve sensations and feelings, are pointed out as determinants by the human and health sciences. The year 2020, with the pandemic scenario of COVID-19, demonstrated the urgency to transform the hospital into a more welcoming, private, and intimate space. Still, tendentially, hospitals that have more resources to seek the 'ideal' hospital space, seek to approach the configuration of large hotels. However, in a space that seeks to shelter the body invaded by procedures and reverses inherent to the disease, we notice in the sterility of hotels a counterpoint to the welcome of being at home, in a familiar environment, which stimulates the feeling of belonging.

1 INTRODUCTION

The healing process of the hospitalized patient goes beyond medical protocols. Subjective aspects, which involve sensations and feelings, are pointed out as determinants by the human and health sciences. The year 2020, with the pandemic scenario of COVID-19, demonstrated the urgency to transform the hospital into a more welcoming, private, and intimate space. Still, tendentially, hospitals that have more resources to seek the 'ideal' hospital space, seek to approach the configuration of large hotels. However, in a space that seeks to shelter the body invaded by procedures and reverses inherent to the disease, we notice in the sterility of hotels a counterpoint to the welcome of being at home, in a familiar environment, which stimulates the feeling of belonging.

The existing guidelines on welcoming and well-being of the patient can be enhanced from the insertion of new elements in the hospital environment that humanize it, reinforcing the specificities of each human being, their history and culture. The architecture, associated with technology that allows customizing experiences in a wider and simpler way, it is possible to treat spatial interventions as a medical *device* necessary for the well being. For this, the projectual process, from the Affective Theory - which encompasses the perception of the subject, as well as the cultural specificities of each one - is an important tool in understanding this hybrid space, which will be particular in the perceptions and sensations of each patient; and public, in relation to the forms of treatment and protocols legally established.

The theory of architectural design can stimulate the development of guidelines, which improve the inpatient's journey to the point of transforming hospitals as we know them today. The way of thinking the hospital space in the field of architecture encompasses subjectivities of the subjects involved and deserves to be disseminated, taught, and practiced.

2 HOSPITAL ARCHITECTURE IN THE HEALTHCARE CONTEXT

The understanding of architecture and urbanism as a multidisciplinary science that needs to immerse itself in other sciences for the production of knowledge is old. However, with the health science field, this dialogue and its immersion have always been more timid, possibly due to the apparent distance between the subjects that compose the two scientific fields.

Recently, graduate programs in public health have begun to search for architects interested in engaging in this field of research, because the understanding of humanized space as an attribute for healing has begun to be more widespread and inserted on a larger scale in the scientific literature on health systems. With the pandemic of COVID-19 in 2020, this process was accelerated and the importance of discussing hospital spaces became even more latent, especially due to the overwhelming manner in which this plague ravaged humanity and its impacts resulting from uncertainties and fears.

In the field of architecture, however, it was not observed many Brazilian studies that deal with the hospital theme encompassing the learnings and development points presented by the pandemic scenario and perspectives for the future, pointing out the need for hospital institutions to rethink their spaces. The fragility of the development of a more humanized hospital architecture is proven with the observation of contemporary campaign hospitals in a format very similar to those of the world wars, without incorporating in their conception spatial elements that could help in the cure.

In recent years, the healthcare system has orbited around hospitals. However, this reality began to be modified and accelerated by the pandemic of COVID-19, when the health system starts to have as its center the patient and his journey (BATRA; BETS, DAVIS, 2019). In this sense, the journey of each patient, the perception of space defined by previous experiences, cultural specificities moves to the center of the debate: it is necessary to welcome the life history beyond that of health. The space needs to interact specifically with each life trajectory in order to produce a space of great human permanence close to the feeling of home.

The patient's journey encompasses all the procedures and stages necessary for treatment: from scheduling appointments, exams, hospitalization, dehospitalization, and loyalty to a given hospital. In this process, which involves different stages of the patient-hospital relationship, user satisfaction goes beyond the objective and normative aspects, incorporating to a greater extent the sensory aspects.

In a survey conducted in 2019 at Hospital Alemão Oswaldo Cruz (São Paulo-SP), the clinical staff was asked which hospital innovation they thought was most important. Although expectations pointed to answers involving new technologies, the result was for the improvement of the patient journey .[1]

[1] In 2019, the Institute of Innovation, Research, and Education of the Hospital Alemão Oswaldo Cruz (SP), represented by its management body - of which the author of this paper was part at the time - asked, through a digital form, the clinical staff which innovation they most desired. This survey was systematized by the institution's People Development department and culminated in the definition of the hospital's object of interest to participate, as a "company", in the Connected Startups Challenge, organized by the Brazil Germany Chamber (SP), in the same year.

Otherwise, in research commissioned by Deloitte in 2018, it was pointed out that the hospital space is one of the top ten points in the patient journey of the future. This is as important as the development of telemedicine and robotic automation, two items that are in vogue in healthcare discussions.

The Hospital Albert Einstein (São Paulo-SP), for example, has invested in improving the sensory aspects that surround the space. One of these efforts is the development of a specific aroma for its environments, preventing the patient from feeling characteristic hospital odors and improving the patient's journey. The spatialization of odors characterizes objects and places, making them distinct from others (TUAN, 2011). This initiative is enhanced by the fact that people who have some kind of mobility reduction, which occurs in most patients, have their senses sharper, causing the environmental experience to be lived more intensely (MARTINS, 2004). In the case of the aforementioned hospital, the creation of its own smell brings with it the reinforcement of a way of caring and welcoming that is different from the others, helping in the process of remembrance of space, which corroborates the hypothesis that buildings never appear alone, only emerging when mixed with non-spatial elements, in a "myriad of heterogeneous elements that, by reaching a certain consistency, produces a singular space" (BRANDAO, 2002, p.15).

The search for making the patient's journey more pleasant by means of spatial or spatializable attributes is justified by the direct relationship between environmental quality and the dehospitalization process, since pleasant environments reduce anxiety and pain sensation (SAMPAIO; CHAGAS, 2009), thus accelerating the healing process.

At the other extreme of health, far from the reference hospitals, whose patients come from a higher social class and the investments in user satisfaction for loyalty are strategic and therefore high, the field hospitals assembled to attend patients who were victims of COVID-19 had beds that were very similar to the field hospitals of the two world wars, proving the need for architecture, as a scientific field, to investigate the health system, in the search for defining elements and spatial variables that help in the battle for the patient's life and, consequently, in the de-hospitalization process.

Architecture is as important as a medical device in the process of healing and patient safety (PATI, 2016)[2] . According to the author, hospital architecture should not stop at normative processes, because it needs to include in its scope positive emotional responses, proven by Evidence-Based Design.

The consideration of architecture as a medical device is reinforced when searching for theories about built space and its functionality, where:

> The scope of built spaces then goes well beyond their visible and functional structures. They are essentially machines, machines of sense, of sensation, abstract machines (...), machines carrying embodied universes that are not, however, universal, but that can work both towards a uniformizing crushing and towards a liberating re-singularization of individual and collective subjectivity." (GUATARRI, 1992, p.158).

When architecture starts to be suggested as a formal medical aspect, a machine of senses, a medical device with clear variables related to health science, the understanding of the urgency of tests and actions that do not necessarily involve the architectural "whole", as a new project and with its own attributes, one realizes the importance of acting in "parts" and in the journey of each patient in a unique way. To this end, the importance of architecture to understand and map journeys, combining with technologies that enhance the experience, allowing personalization aiming to bring the hospital closer to the space that is familiar to the user.

In this sense, it is possible to divide the architectural project into two distinct and equally necessary stages: i. The first deals with the generalist project and the fulfillment of general norms and guidelines, where it relates directly to the organs of standardization and regulation; ii. The second deals with the user's journey in space in a unique way, with respect to culture and spatial perceptions that relate to the user's life story.

The architecture becomes necessary not only when defining the program and spatialization of needs, but also when the hospital decides for an expansion, reform or construction, since the first meetings with the clinical and care staff (PATI, 2006). At the moment when the process for demanding a construction or reform starts, the architect specialized in hospital interventions needs to know the routine, the sensations, in a process that goes beyond the standardization and embraces the patient in his/her deepest sensations, using beyond the formal knowledge of the architect, by means of the recognition of specific local knowledge of each user (PERDIGÃO, 2020)[3] , entering the patient's hospital routine in a direct way.

To add to the idea of the architect who routinely experiences the hospital environment, the current norms for this type of project are outdated, not including new equipment and its dimensions and, therefore, many projects are approved via technical justification, which reinforces the need for the architect-patient-routine relationship.

2.1 SUBJECTIVITY AND THE HOSPITAL SPACE

The hospital space for the hospitalized patient brings with it a reflection about the finitude of life and the deconstruction of privacy limits. Whether they are corporeal, when invasive procedures need to be performed in order to maintain life and the "(...) inner space of the subject is searched, invaded by thoughts, feelings and actions of public order" (COSTA, 2001, s.p). Whether they are spatial, when the notion of privacy is shattered in environments that can be entered at any moment by strangers.

Hospitalization causes in the patient a process of body and mental reformulation (COSTA, Op Cit), because by living in the hospital for some period (whether days or months), it causes the universe of lived drawings of the individual to be diluted in a sterile and impersonal space that is characteristic of this category of building, causing strangeness and discomfort. The room that used to be a refuge of memories

(BACHELARD, 2002), which offered integral well-being to the user and not only physiological (PERDIGÃO, 2020), is now perceived as a space of not belonging.

The comparison of the hospital space with the home and hotels is not a new fact, since the meaning of hospitality is: "a founding element of cities, it relates not only to lodging and the hotel, but also to the hospital, hospice, and everything that may come from it. Hospitality speaks of a first abode, and also of a last." (FUÃO, 2010, s.p). The hospitality space has a gap when it comes to humanizing attributes and belonging.

The changes brought about by the 2020 COVID-19 pandemic, make efforts to make the hospital space more welcoming, close to the residential architecture of belonging. A good example of this was the Sírio-Libanês Hospital (São Paulo-SP), which organized a welcoming system to place pictures of the patients' relatives in the room of the patients recently released from the Intensive Care Unit (ICU). This is an attempt to personalize the space, proving the need for personification, but still without pointing out how this should be incorporated into the actual architectural project.

The answer on how these aspects deserve to be incorporated are punctuated and debated in the subjective design methods of architecture, beyond norms and metrics, but through the consideration of sensations. And, from these considerations, a new nuance, where the hospital user must answer about his health history, but also, about his life history and preferences, so that the space can accommodate needs beyond the drug treatment, but encompassing psychic aspects.

Although there are incursions to make the space of the hospital room more private, it should be understood as a hybrid space, where the public and private spheres act simultaneously (COSTA, 2001). The objective of the conception of these spaces is to enlarge the private sphere in order to get them closer to a refuge space, from the analysis of a subjectivity specific to hospitalized patients.

In this hybrid space, there is a space of intimacy where the fundamental needs of the human being are met and cared for, seeking an approximation to the concept of shelter, where the human being needs to feel protected from what makes him feel fragile (TUAN, 2011), while, concomitantly, the need for treatment violates the body and space, causing a dichotomy between protection and exposure. That is why the subjectivity present in the hospital is so complex, antagonistic and profound.

Since privacy and intimacy cannot be fully preserved in hospital spaces, subjectivity studies must focus on increasing levels of welcome and getting as close as possible to a shelter space, being aware that their reach will not be total.

The analysis of subjectivities in this context is important for the humanization policy developed by SUS to be met (SILVA, 2018). The projectual process of spaces makes the figure of the architect protagonist in the transformation of these buildings, where it is necessary to apply in the architectural design the *Affective Theory* for the integration of physical and psychic space from the point of view of the user, because "The field of architecture covers the totality of systems of spatial representation, geometric and topological,

in the creation in the appropriation of space, being the affect a human reaction that assigns meaning to them. " (PERDIGÃO & BRUNA, 2007, s.p).

In a time of pandemic, the hospital space becomes even more necessary, because the mental health of society is sickened by the context, increasing the need to talk about experience, sensation, and perception to develop qualities such as welcoming and belonging in tangible design concepts, necessary and teachable in architecture schools.

Talking about making subjectivity tangible seems to be antagonistic, but the implementation of this as a guiding instrument for the conception of architectural elements, overlapping the pure geometry, requires research to prove its effectiveness to the point of creating clear design guidelines that allow the implementation not only as a luxury artifact, but also to be implemented in public hospitals, which need to reduce their hospitalization time to relieve their occupation, reaching the population mass. This subjectivity brings with it topological and pulsional aspects "that deal with spatial relations and identification of affective equivalents, respectively, can ally to geometry as a starting point, since they offer important clarifications about the user's interaction with the built space." (PAIXÃO, 2019, p.14), allowing the design of a more human and suitable space for the healing process.

2.2 THE HUMAN DIMENSION IN THE HOSPITAL PROJECT

The understanding of the complexity of the integral care of the human being to be considered involving objective and subjective aspects, inherent to the hospital space, the project stops being normative and starts being experiential, inserted as an essential medical attribute in the field of health science. The protagonism is centered in the patient and in his or her experiences, and no longer in the norm, geometry, and deliberations of the designer.

The problematic that involves the architectural project is built from the traditional logic of the projectual process that is based "on geometric representation systems concentrated in the architectural form." (PERDIGÃO, 2019), when ideally the architectural form should be a consequence of a topological representation system, and the spatial relations arising from it (PERDIGAO & BRUNA, 2009), a knowledge that impacts on the technical look of the architect and urban planner.

Thus, the architectural project starts to detach itself from the traditional design precepts and start to consider that each decision can generate improvement in the lives of its users. The relationships: form x sensations; form x dehospitalization; form x patient survival, indicate that the project must go beyond tastes and seek evidence of how each decision will bring impacts.

The perspective that allows the reading of the space needs to be incorporated, creating project guidelines in order to guide the architect-designer about the relationship of elements and forms with the dehospitalization process. When bedridden, the patient no longer has a three-dimensional reading of space and starts to notice it in a two-dimensional way. Considering the inseparability of the elements of the

relation body and space (GUATTARI, 1992), the two-dimensionality with which the bedridden patient perceives the world must be considered as a new perspective of reading.

The studies and experiments about how spatial elements are proven effective in meeting a given need demonstrate the "relevance of studies related to topological relations (...), which can be reflected by the users' spatial experiences and can be taken as a reference for the design conception of spaces that present quality" (PAIXÃO, 2019, p.30). When it comes to hospital space, previous studies that have their effectiveness tested, are even more necessary, because it is important caution in the insertion of new props or changes that may generate changes in the routine of the hospital flow. In this sense, "the projectual method resorts to the same systematic of the scientific method, which is characterized by problematization and hypothesis testing for the achievement of results." (PERDIGÃO, 2019, p.57).

The hospital "whole" becomes not so important as the "parts", because they are the ones that will impact more directly on the improvement processes for the patient: decrease of pain sensation, increase of safety sensation, decrease of hospitalization time.

Within the design of the hospital space, the focus should not only be on the disease, but on the individual as a whole, on the psychological, social and cultural care that he demands, going beyond purely physical aspects. When the project enters the epistemological investigation, the mental construction process of the architectural object is increased (PAIXAO, 2019) and, therefore, places subjectivities at the core of the design process. Environmental sensations and perceptions, when coupled with objective variables, should be responsible for a transformation in the hospital space that is known today.

According to the National Policy for Humanization of the SUS (SILVA, 2018), ambience should consider three visions: optimization of space to make it more welcoming; spatial elements that impact on patient recovery such as: morphology, light, smell, sound, synesthesia, art, color, treatment of external areas and privacy and individuality; and finally the centering of spaces on people, considering their subjectivities.

In this perspective of the loss of one of the dimensions, two aspects must be considered:

i. The system of measurements of the bedridden patient: anthropometric measurements change according to the region of origin, implying the need for guidelines and standards that account for regional variations, which is a fundamental guideline for the inclusion of the human dimension of architecture in the design process (PEDROSO, 2012).
ii. Elements and shapes that facilitate spatial reading. To exemplify such aspect it is pertinent to cite studies that prove that right angles bring safety, facilitate the creation of reference points (EKAMBI-SCHMIDT, 1972). This fact is reinforced in research (PATI, et al, 2016) that indicates that squarer shapes and corners cause a decrease in fear in the patient.

3 CONCLUSION

The architectural conception becomes an important key for the improvement of hospital spaces. assuming that the good practices are concentrated in some model hospitals, either in the projectual conception of the hospital "whole", as is the case of those designed by Lelé[4] - where there is a concern with the patient by means of spatial solutions; or in actions that involve the space indirectly - these generally coordinated by the hospitality management and not by the infrastructure management of hospitals, thus showing the need for architecture to advance in this field of action, focusing on the humanization of spaces.

The Brazilian reference hospitals have innovative instruments being carried out by the hospitality sector, the infrastructure is limited to normative aspects, repairs and building maintenance, thus, the problematization directed to humanization articulates the healing process to the role of architectural space production inaugurating a new moment that brings together management and infrastructure to assist the medical area in human healing in hospitals.

The effectiveness of an architectural project conceived according to guidelines that prioritize the patient and her understanding as a direct attribute to the healing process comprises, first of all, an analysis on the health system and on how the space is inserted in her transformation process. The knowledge to be produced in this direction promotes the study of the hospital space well articulated to the demands of our time, glimpsing about the future of humanity and health care and the prioritization of shared strategies for an increasingly complex and dynamic world with the dissemination of physical and mental diseases.

The project of architecture for hospital spaces needs to seek for instruments of personalization of the day and welcoming of the user, according to their specificities. The reflections about the Affective Theory of Architecture (PERDIGAO, 2006) have attributes that need to be incorporated to the hospital project understood as a medical device.

The production of knowledge about the conceptual bridges needed with methodological adjustments that relate housing space and hospital space require validation tests so that the scientific results strengthen the notoriety that the theme deserves. Research in design faces a conceptual and methodological challenge where the production of knowledge for offering subsidies to the expansion of a technical knowledge that faces a paradigmatic change.

In conclusion, it is admitted that the field of architecture is one that is capable of offering answers through the science of space in the articulation of a huge variety of variables that act directly in human treatment and cure; therefore, a field that is capable of bringing together diverse problems and offering answers, extrapolating.

[4]João Filgueiras Lima (Rio de Janeiro, Rio de Janeiro, 1932 - Salvador, Bahia, 2014), better known as Lelé. Architect, urban planner, known for the projects developed with the Sarah Network of hospitals.

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Chapter 15

Toxicity of sewage from the City of Uberaba to the golden mussel: *Limnoperna fortunei* (Dunker, 1857).

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ABSTRACT
Some species of the Phylum Mollusca are of economic, social and public health importance. Directly impacting economic, social and environmental sustainability. In this scenario, the *Limnoperma fortunei* (Dunker, 1857) stands out, as they agglomerate and clog equipment that uses *in natura* water. As its geographic distribution area has been expanding, there is a concern of invading new industrial plants, such as sewage treatment plants (STP). Thus, the objective of this study was to verify eventual toxicity of the sewage, along a sewage treatment plant for the golden mussel. *Limnoperna fortunei* specimens were collected in Rio Grande and exposed to a dilution of fresh water from three different points in the STP. In the three treatments with water of the STP *in natura*, all mussels died. It is known that the STP effluents contain not only biological agents and organic compounds resulting from the decomposition of organic matter, but also heavy metals, oils and greases, drugs and biocides, increasing the toxicity of the effluents. In conclusion, the authors believe that the golden mussel will not be able to establish and form viable populations in STP in the long term.

Keywords: Bivalvia, biodiversity, public health, invasive species, environmental management.

1 INTRODUCTION

The Phylum Mollusca is accepted as a monophyletic group (CAMARGO et al., 2021a). It occupies different environments from marine, freshwater and terrestrial (CAMARGO et al., 2021b), using different resources (CAMARGO et al., 2021c).

Some species have economic, social, and environmental importance. Some are used in gastronomy, such as escargot, typical of French cuisine. The genus *Biomphalaria* is considered a serious public health problem in Brazil because it is the intermediary host of the trematode *Schistosoma mansoni*, which causes schistosomiasis mansoni, with 6.8 million carriers in Brazil (Silva, et al., 2020). In this scenario, a mollusk

of the Class Bivalvia Linnaeus, 1758, *Limnoperma fortunei* (Dunker, 1857) stands out. They swarm and clog equipment that use *fresh* water (MANSUR et al., 2012).

Most bivalves are filter feeders, feeding on plankton and organic materials suspended in the water (MMA, 2020). Some species are dioecious, some are hermaphrodite, and others can also have separate sexes and hermaphrodite individuals (GIGLIO et al., 2016).

The golden mussel or *Limnoperma fortunei* has shown expansion of its geographic range, which is due to its high dispersal power and colonization of new environments, as reported by Camargo and collaborators (2022a, 2022b, 2022c).

Camargo et al. (2022a) report that although the mussel is showing a large expansion in the area of geographical distribution, there is a paradox of the mussel distribution, because apparently it does not colonize some environments in particular. However, there is great concern that it can colonize environments in sewage treatment plants, as has occurred with *raw* water treatment plants. With the expansion of the mussel's geographical distribution area in mind, the present study aimed at checking the possibility of the mussel colonizing the Sewage Treatment Plant in the City of Uberaba, Minas Gerais.

2 METHODOLOGY

Limnoperna fortunei specimens were collected in the Rio Grande , near the geodetic location -20.090607, -48.107293 (Figure 01).

The mussels were transferred to the Nico Nieser vivarium of the Ecology & Evolution Laboratory at the Federal University of the Triangulo Mineiro, in Uberaba/MG.

Figure 1. Approximate geodesic location of *Limnoperma fortunei* (Dunker, 1857) specimen collection in Água Comprida/MG, February 2022.



Source: Google Maps®

The Francisco Velludo Sewage Treatment Plant, or "ETE Rio Uberaba" was inaugurated in June 2019 (Fig. 02). The flow rate of the WWTP fluctuates greatly, depending on the seasonal or daily cycle. In addition to water consumption by the population there are also clandestine releases of rainwater into the sewer. The concessionaire responsible estimates an average flow of 465 l/s, processing around 70% of the municipality's sewage.

Every industrial plant can eventually face environmental problems. Industrial plants that use "raw" water from water sources also face problems, even with apparently good quality water. These problems include disease vectors such as mosquitoes and snails; aquatic macrophytes; eutrophication; blue algae blooms, and also the growth of bivalve mollusk populations that can eventually clog fresh water systems.

Figure 02. Geodesic location of the Francisco Velludo Sewage Treatment Plant, near the Uberaba River, in the City of Uberaba, Minas Gerais.



Source: Google Maps®

According to Camargo et al. (2022a; 2022b; 2022c) the *Limnoperna fortunei*, known as the golden mussel has a high potential, with the ability to colonize different types of environments. Since the golden mussel is a filter-feeder, the authors believed that this animal could survive in an extreme environment, such as the effluent from a Sewage Treatment Plant. Thus, the objective of the present study was to verify the possible toxicity of the Uberaba sewage, in different stages of treatment, to *Limnoperna fortunei*.

In the laboratory, twelve aquariums were prepared with 400 ml of dechlorinated water and 400 ml of water from the collection site in Rio Grande. After drawing the aquariums, with a table of random numbers, three aquariums were determined for each of the three treatments and three aquariums as controls (Fig. 03). For the aquariums, determined as treatment, 200 ml of water were removed from the aquarium, for the addition of 200 ml of experimental water. The twelve aquariums started the experiments with six golden mussels each, totaling 18 animals in each treatment.

Figure 03. Toxicity experiment conducted with sewage from the City of Uberaba for the golden mussel, *Limnoperna fortunei* (Dunker, 1857).



Figures 4 to 12 show the sewage path in the Francisco Velludo Sewage Treatment Plant, or "ETE Rio Uberaba".

The sampling points were determined: sewage passage box to the upflow anaerobic reactors, named as P1 (Fig.09); sewage passage box after upflow anaerobic reactors, named as P2 (Fig. 11) and at the exit of the Facultative Aerated Lagoon, named as P3 (Fig. 12).

The sampling points were determined along the sewage treatment process, in order to sample different environmental conditions. The first point was marked after the coarse (Fig. 04) and fine (Fig. 05) grids and the removal of supernatant oils, greases and fats (Fig. 07). The second sampling point was marked after the upflow anaerobic reactors (Fig. 10). And the third point was marked at the effluent outlet of the facultative aerated lagoon, the water outlet of the WWTP.

Figure 04. Coarse grating at the raw sewage inlet, at the Francisco Velludo Sewage Treatment Plant, in Uberaba/MG.



Figure 05. Fine grating at the Francisco Velludo Sewage Treatment Plant, in Uberaba/MG.



Figure 06. Mechanical removal of solid waste in the fine screening at the Francisco Velludo Sewage Treatment Plant, in Uberaba/MG.



Figure 07. Box for removing oils, grease, and supernatant fats at the Francisco Velludo Sewage Treatment Plant, in Uberaba/MG.



Figure 08. Bottom outlet of the box for removal of oils, grease, and supernatant fats in the Francisco Velludo Sewage Treatment Plant, in Uberaba/MG.



Figure 09. Sewage passage box for the ascending flow anaerobic reactors, at the Francisco Velludo Sewage Treatment Plant, in Uberaba/MG. The passage box was designated as Collection Point 1 for toxicity testing.

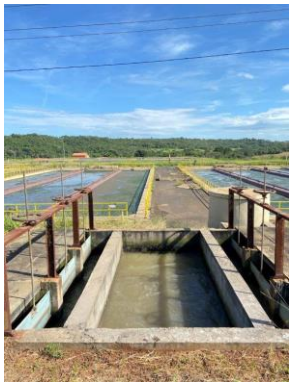


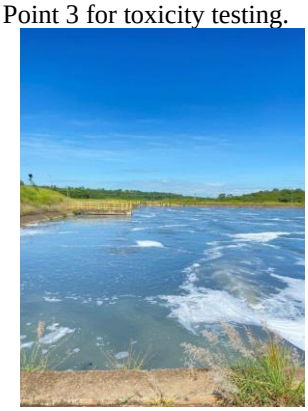
Figure 10. Upflow anaerobic reactors at the Francisco Velludo Sewage Treatment Plant, in Uberaba/MG.



Figure 11. Sewage passage box after ascending flow anaerobic reactors at the Francisco Velludo Sewage Treatment Plant in Uberaba/MG. The passage box was designated as Collection Point 2 for toxicity testing.



Figure 12. Effluent outlet of the aerated facultative lagoon, at the Francisco Velludo Sewage Treatment Plant, in Uberaba/MG. The effluent outlet was designated as Collection Point 3 for toxicity testing.

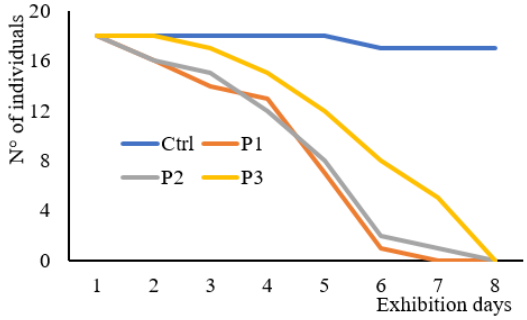


3 RESULTS AND DISCUSSION

The experiment lasted a total of nine days, when for all three treatments all animals died. For the control only one animal died during the experiment. This single death is attributed to the handling of the animals. The mussels are collected adhered to substrates, and in the laboratory they are pulled out of the substrate. Thus, eventually some animals may have their survival compromised, especially the smaller animals. However, in this experiment animals with similar sizes were used (18.775 ± 2.352), so the authors do not attribute mortality to this variable.

The mortality rate was very similar and higher in Collection Points 1 and 2 right after the second day of the experiment. Only on the eighth day all animals died, including the animals from Collection Point 3 (Fig. 13).

Figure 13. Mortality rate of the experimental animals - *Limnoperna fortunei* - over the experimental days.



The authors attribute the toxicity of the Sewage Treatment Plant effluent not only to biological agents, but in particular to complex organic compounds, which were not degraded in the process. The contaminants limit the potential uses of the sludge produced in the final process. Paulino et al. (2019) ponder that the material could be used for less noble purposes, such as on degraded soils aimed at the recovery of natural vegetation, which is regulated by the relevant legislation.

Urban, Isaac, Morita (2019) report that not only biological agents and organic compounds resulting from the decomposition of organic matter, but also heavy metals, oils and greases, pharmaceuticals and biocides are present in the effluent of Sewage Treatment Plants in Brazil, potentiating the toxicity of effluents. These active ingredients prevent the development of several relatively sensitive organisms, such as the golden mussel.

4 CONCLUSION

Due to the toxicity of the environment, the golden mussels in all experiments died within 8 days. This suggests that the screened environment would not be suitable for the maintenance and reproduction of golden mussels.

In conclusion, the authors point out that, probably, due to the toxicity of the effluent from the Francisco Velludo Sewage Treatment Plant in the Municipality of Uberaba, golden mussels will not be able to establish and form viable, long-term populations.

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Chapter 16

Experiences in a basic health unit directed to the riverside people from ilha do Combú - Pará: experience report

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ABSTRACT
Introduction: Primary Health Care (PHC) is the first level of health care and is distinguished by a set of health actions, at the individual and collective levels, which involves the promotion and protection of health, disease prevention, diagnosis, treatment, rehabilitation, harm reduction and health maintenance, in order to provide comprehensive health care that cause positive impacts on the health status of communities, i.e., PHC also serves to organize the flow of services in health networks, from the simplest to the most complex. In this sense, the health unit of the island of Combú, located in the Guamá River, near the city of Belém, in the state of Pará, was created and adapted for health control and continuous care of the riverside people of the island and its surroundings. Objectives: To report the experience of nursing students from the Federal University of Pará on a technical visit to the UBS do Combú, in order to get to know and identify peculiarities, such as services, care, and accessibility. Description of experience: This is an experience report about the technical visit to the UBS do Combú, located on the island of Combú, in the interior of the city of Belém-Pará. The visit was conducted in April 2022, by nursing students from the 3rd period of the course. The trip took about 15 minutes by boat to the unit. Before the visit, the teacher talked about SUS and its principles. Upon the unit's arrival, the teacher explained and presented the infrastructure, the work process flow, the services offered to the community, and the adaptations made in the unit's structure to serve the riverside people. A field journal and portable cameras were used to record the information and observations. Conclusion: It was

observed when arriving at the Combú unit peculiarities, such as wooden rafters to facilitate the access of the riverside community. The appointments were scheduled by community health agents (CHAs), through a messaging application or by free demand. It was found that the unit has an adequate infrastructure and multiprofessional team in accordance with the national policies of primary care: Preventive cervical cancer (PCCU), hypertension and diabetes consultations, dressings, guthrie test, eye test, prenatal follow-up, surgical stitch removal, rapid tests for HIV, Hepatitis B and C, Syphilis, COVID-19, aerosol administration and the application of vaccines. The doctor performed consultations for diabetics, hypertensives, elderly, children, pregnant women, and home visits. The concepts of primary care were evidenced in the practice, as well as the offer of care, services and accessibility in the UBS.

Keywords: Primary health care, community, accessibility to health services

1 INTRODUCTION

Primary Health Care (PHC) functions as the gateway to the National Health System, characterized by activities of high complexity and low technological density (FIGUEIRA et al, 2020). The Unified Health System (SUS) brings with it idea of oneness, in addition to a set of doctrinal and organizational elements, the principles of universalization, equity, integrality, decentralization, and popular participation (MELDAU, 2018). To meet these principles, it is necessary to welcome several groups, among which is the Family Health Strategy (ESF) for the care of the riparian population of the Legal Amazon, supported by Ordinance No. 2191 of August 3, 2010, established by the Ministry of Health (BRASIL, 2010). Riverside dwellers are individuals who live on the banks of rivers and have unique access to urban centers, due to their close relationship with them (COHEN-CARNEIRO et al., 2009). Many of these riverine communities are marked by a high degree of isolation and exclusion (COSTA et al., 2015), as is the case of the riverine population living on Combú Island and its surroundings in Pará. According to the Brazilian Institute of Geography and Statistics, in 2010, the Combú Island had a population of 1006 inhabitants, considered in size and territorial space, and with the title of fourth largest island of Belém, it is intersected by several streams, being the Combú and Piriquitaquara streams the ones with the highest population density. The island has a typical Amazonian estuary formation and is located 1.5 km south of the city of Belém. It has an area of 15 km², of floodplain, primary and secondary forests and reasonably fertile soils, where there is a predominance of açaizeiro, the palm tree that gives rise to açaí, a great source of income and widely consumed in the region (DERGAN, 2006). Even near the urban area of the city of Belém, the island still maintains characteristics and aspects of traditional communities, such as their own form of social organization, occupation and use of territory for subsistence, in addition to the use of natural resources as constraints to their representations of culture, society, religion, history and economy, as well as the use of empirical knowledge transmitted through their traditions and passed on from generation to generation (COSTA, 2015). Carvalho, Pimentel, and Lima (2019) highlight the difficulties of access to piped water and the influence of the tides on the pits of the residences, the residents of this region when they come into contact with the water to bathe run great risks, in view of the release of sanitary sewage from Belém directly into the Guamá River (LIMA, et al. 2019). Because it is located closer to the municipality of Belém, the island - unlike other more geographically isolated communities - has greater accessibility to services such

as education, health, and increment of the economy by other activities (tourism, for example), even if it cannot meet all their demands (COSTA, 2015).

The residents of Ilha do Combú have only one Basic Health Unit (BHU) installed on the island and linked to the Municipal Health Secretariat of Belém - Pará, which serves around 2,200 users from 560 families (SEMEC, 2017), and the most prevalent diseases are those characterized by gastrointestinal symptoms (COSTA, 2015). Thus, this unit in Combú emerges as an inclusive solution, aiming at accessibility and continuous assistance, whose goal, in addition to health control and prevention of health problems, would be to avoid unnecessary displacement to the urban area. Located on the banks of the Guamá River, the UBS of Combú was built in 1999 and re-inaugurated in 2021. The service includes the following programs: mental health care program, health of the elderly, children and adolescents, and adults (women and men) (SEMEC, 2017). When comparing the structure of the UBS do Combú with a Fluvial UBS, in addition to the fixed structure, even if in flooded terrain, the biggest differential to be highlighted is the mode of operation in which the two operate. The Basic Floating Health Units (UBSF) are boats that hold Family Health Teams on the river (ESFF), provided with the ambience, furniture, and equipment needed to serve the riverside population of the Legal Amazon. As well as, respond to the specificities of these regions, ensuring care to their populations, as provided in the National Policy for Primary Care (PNAB) (Brazil, 2019). Thus, this study is supported by the Constitution, which guarantees that the State must offer health care to all, taking into account the principles and guidelines of the SUS, ensuring it in a universal, equitable and integral way, demonstrating the importance of primary health care in the assistance to riparian peoples.

2 AIMS

To report the experience of nursing students from the Federal University of Pará on a technical visit of the Health Services Organization and Policies curricular activity, carried out at the UBS do Combú, in order to get to know and identify peculiarities, such as services, care, and accessibility.

3 DESCRIPTION OF THE EXPERIENCE

This is an experience report on the technical visit to the UBS do Combú, located on the island of Combú, in the interior of the city of Belém-Pará. The visit was conducted in April 2022, by nursing students from the 3rd period of the course and accompanied by the teacher of the subject. The trip took about 15 minutes by boat to the Combú unit. Prior to the visit and still in the classroom, the teacher talked about the SUS and its principles, so that the students could have more guidance and understanding during the field visit. Upon arrival at the unit, the teacher explained and presented the infrastructure, the flow of the work process, the services offered to the community, and the adaptations made in the structure of the unit, to serve the riverine people. A field journal and portable cameras were used to record the information and observations.

4 RESULTS

Upon arrival at the Combú unit, peculiarities were observed, such as wooden rafters that extend from the exit of the boat to the entrance door of the unit to facilitate the access of the riverside community. The appointments can be scheduled by community health agents (CHA), by means of a messaging application, or by free demand, which works as follows: the CHA responsible for the coverage area where the patient is, according to the mapping division, schedules the appointment, or the user goes to the unit and requests it. At the reception where the files are, the family's medical records are identified, consanguineous or residents of the same household, after the individual identification will be forwarded to triage and directed to the doctor's or nurse's office, where they will be evaluated and receive, if necessary, their prescription for medications to be possibly picked up at the unit's pharmacy or forwarded to another service at the unit itself or in the nearby city, depending on the case. Regarding the unit's infrastructure, it has men's and women's restrooms for users with adaptation for PCD (disabled people), an expurgation room, a room for sterilizing materials, restrooms for employees, a pantry, and a living room that has a map of the area covered by the UBS, demarcating the unit's entire service region. The UBS on the island also has a nursing room with gestational charts produced by the nurse; in the hallway there is a map of the FHS territory, with all the micro areas highlighted. It was found that the nursing team, consisting of a nurse and a nurse technician performs cervical cancer preventive care (PCCU), hypertension and diabetes consultations, dressings, guthrie test, eye test, prenatal follow-up, surgical stitch removal, rapid tests, and the removal of surgical stitches, surgical stitches removal, rapid tests for HIV, Hepatitis B and C, Syphilis, COVID-19, aerosol administration, and vaccine application, this application occurs every day of care, except on Thursdays, the day intended for the Covid-19 vaccination. It was observed that the physician performed consultations for diabetics, hypertensive patients, the elderly, children, pregnant women, and home visits on Fridays, together with the multiprofessional team.

The transportation of users to the UBS is done by water transportation and walking through the forest when the tide is low. The tide is a phenomenon of rising and falling sea waters by gravitational force, which is the result of the attraction between the Sun and the Moon exerted on the Earth. Although the Sun has more mass, the Moon is much closer to Earth, thus having twice the influence on the oceans (SOUZA, 2017). Moreover, it is observed the rooms for care and procedures: PCCU, file, pharmacy, pre-consultation/screening and immunization, where we find the storage of some vaccines in specific refrigerator for continuous use and that in possible eventualities such as power outage, which is very frequent in the locality, it maintains the conservation of immunobiologicals until the return of energy or it is transported to the nearest city.

5 DISCUSSION

According to the National Policy for Primary Health Care (PNAB), the ESF should ensure accessibility and welcoming to the population seeking health services, in addition to assistance to needs and demands, whose care occurs based on intersectoral actions (LAGO, 2021). In this sense, it was observed that the Combú unit has made adaptations to provide better accessibility to users, such as the construction of trapsiches that go from the boat to the entrance door of the unit. For better clarification, trapsiches are structures parallel to the coastline, without, however, being contiguous. They are usually connected by walkways (PEREIRA, TOBIAS, 2017).

In the context of health care to riparian populations, it is necessary to democratize the work process in the organization of services, respecting social needs and, especially, the performance of multiprofessional teams, incorporating the renewal of health practices in a holistic and respectful perspective in which the appreciation of health care and care can integrate all the characteristics that make up these communities (QUEIROZ MKS, et al., 2018). Based on these issues that cross the way of life of the riverside dwellers, it was possible to identify diversified challenges for the health teams that assist them, in order to offer more health to this population, despite considering them related to the low demographic density. This scenario refers to the operational difficulties for the work to be developed, by the unavailability of transport for timely displacement of the health team, the low frequency of contact with the riparians and the amount charged for transportation of patients to the Basic Unit of Combú. Thus, it is possible to glimpse the significant influence on the main axis of care with this population (MOTISUKI D, et al., 2018). Morim (2014) states that most riverside communities have a high degree of social and economic isolation, which leaves them at the margins of public policies and control mechanisms for quality of life. In this context, this study seeks to highlight the importance of primary care for residents of the island of Combú, since it has primary care services provided by the Basic Health Unit of the region, which are performed through the Family Health Team (FHS), the Oral Health Team (OHT) and the Family Health Support Centers (FHS), thus offering prevention, treatment, rehabilitation and health surveillance services. In addition to these services for health promotion, it is also possible to include the comprehensive care in these areas, which are covered inside and outside the unit, either in health actions, such as lectures in schools or home visits, not limiting the care only to the interior of the UBS. The services offered in the network of primary health care are focused on individual consultations by doctors, nurses, and dentists, home visits and care, oral health care, vaccination, dressings, cervical cancer screening (preventive), guthrie tests, rapid tests for syphilis and HIV, monitoring of chronic diseases such as hypertension and diabetes, and actions to promote health and social protection to the community (Instituto Mais Saúde, 2021). These services provided by primary care are present in the UBS of Combú, in order to cover the promotion and protection of health, prevention of diseases, treatment and health maintenance in order to develop a comprehensive care that positively impacts health (Brazil, 2011). Everything is done with efficiency in mind for the care of the island's riverside dwellers, given the difficulty of access that many find when traveling to the unit.

6 CONCLUSION

Given the above, which portrays the aspects and realities of the island, it was possible to understand the importance of the experience for the students who had contact with the system and structure of the UBS. The concepts of primary care were evidenced in practice, from the offer of care, services and accessibility in the UBS, in accordance with the National Policy of Primary Care, in the sphere of SUS, relating them to the main needs of the community through planning and organization based on the performance of the ESF, which organizes in an interdisciplinary way new health alternatives within what is interpreted and presented by epidemiological data that are collected with the help of the mapping of the micro-areas of Combú.

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Chapter 17

Repercussion of protein supplementation therapy to the detriment of changes in muscle composition in the elderly: a review

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ABSTRACT
INTRODUCTION: The act of aging brings with it numerous physiological changes, among them, sarcopenia stands out, which can sometimes lead to loss of functional capacity, which can impair mobility and ultimately lead to serious accidents or deaths. The current recommended daily concentration of protein per kilogram was not designed for an aging population, which can lead to an insufficient protein concentration. Protein supplementation emerged as an alternative way to preserve muscle maintenance. OBJECTIVE: To analyze the effects of protein supplementation on the maintenance of muscle functional capacity in the elderly population. METHODOLOGY: To this end, an integrative review of the literature with a qualitative aspect was carried out, in which, from a search in selected databases, it was based on studies that showed effects of protein supplementation in the maintenance of muscle functional capacity in the elderly. In the end, six studies were selected that addressed the topic in question. RESULTS AND DISCUSSION: The improvement in nutritional status is related to muscle performance, based on that, the following aspects were analyzed in the studies: muscle mass gain, fasted physical exercise, lower limbs, gait speed and other functional parameters and 25- hydroxyvitamin D, all of which are compared to protein supplementation as an interventionist way to maintain muscle functional capacity. Furthermore, an analysis of dietary supplementation with branched-chain amino acids (BCAAs) in relation to malnutrition was performed. CONCLUSION: The analysis of the aforementioned data revealed the relevance of the search for improvement in the quality of life and well-being of the senile population, so that the recommended daily consumption of protein is recommended as the main measure for maintaining muscle mass in this population. The daily consumption of protein-rich foods, such as meat, eggs, milk and dairy products, and food supplements should be encouraged, when their prescription is necessary. In view of the corroboration of sarcopenia in the increase in the incidence of falls in the elderly, it is necessary to guide and encourage the senile population to practice physical exercise regularly, in addition to the follow-up of a multidisciplinary team.

Keywords: supplementation, dietary supplements, protein, seniors, motor activity, exercise test, muscles, sarcopenia.

1 INTRODUCTION

It is known that population aging brings with it numerous physiological changes to the human organism, many of these perceptible even visually, such as the loss of muscle mass that occurs in most of the elderly. Therefore, the biggest problem is when such changes lead to loss of muscle functional capacity, which causes countless losses for the individual, such as sarcopenia, which often makes the elderly dependent on other people to perform their activities, in addition to predisposing to falls and consequent fractures , which affects the quality of life in an extremely significant way, and can lead to immobility over time, which is one of the great geriatric syndromes (BUONDONNO et al. , 2018).

This muscle loss is related to the recommendation of a protein diet of0.8g/kg, being a low concentration of proteins in the diet of the elderly, becoming insufficient to maintain muscle mass. In this way, the main factor limiting for muscle synthesis in the elderly is the low protein concentration of in the diet (ARTAZA-ARTABE et al. , 2016). Thus, amino acid supplementation improves muscle synthesis in both young and elderly people.

In order to preserve the independence of the elderly and, thus , offer a better quality of life, there are several studies that analyze the relationship between protein supplementation and the maintenance of functional capacity in the geriatric population, since much of the muscle cell is composed of proteins.

Thus, taking as the world population aging and the need to improve the quality of life of the elderly, the present work aims to analyze the effects of protein supplementation on the maintenance of muscle functional capacity in this group.

2 METHODOLOGY

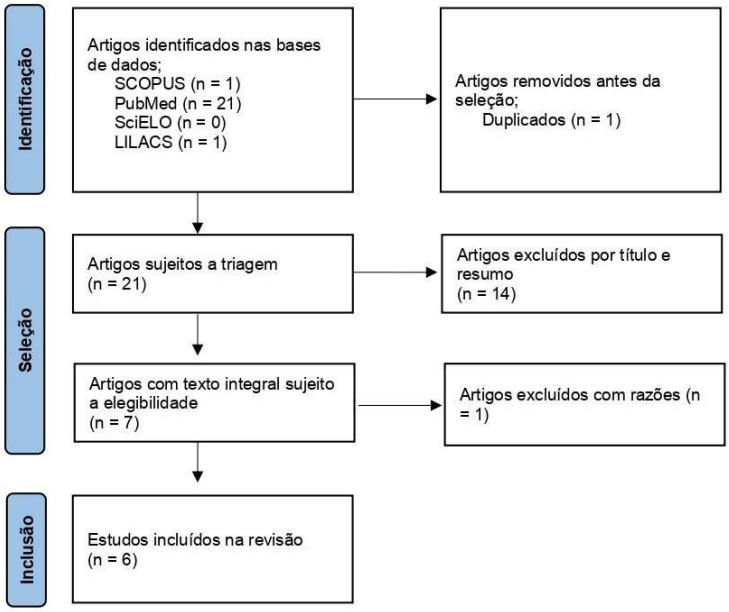
2.1 RESEARCH STRATEGY

This is an integrative literature review of qualitative nature, in which a bibliographical research was carried out in the following databases: National Library of Medicine National Institutes of Health (PubMed), Latin American and Caribbean Literature on Health Sciences (Lilacs), Scientific Electronic Library Online (SciELO) and Scopus, between May and July 2022, when the analysis ended. The research was carried out using the research terms of the Descriptors in Health Sciences (DeCS): "Supplementation", "Dietary Supplements", "Protein", "Seniors", "Motor Activity", "Exercise Test", "Muscles" and "Sarcopenia", which were associated through the Boolean operators "AND" and "OR", as follows: (Supplementation OR Dietary Supplements) AND Protein AND seniors AND (Motor Activity OR Exercise Test OR Muscles OR Sarcopenia). The search occurred independently by the authors.

2.2 SELECTION OF STUDIES

Studies that showed effects of protein supplementation in the maintenance of muscle functional capacity of the elderly were selected. The review followed the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) conference list (PAGE et al. , 2021) . Figure 1 presents a flow diagram about the selection of studies.

Figure 1. Research flowchart: identification, screening and inclusion of scientific articles in the integrative review, according to Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA)



articles identified in the databases
Articles subject to screening (n=21)
Full text articles subject to eligibility (n=7)
Studies included in the review (n=6)
Articles removed before selection
Duplicates (n=1)
Articles excluded by title and abstract (n=14)
Articles excluded with reasons (n=1)
Inclusion
Selection
Identification

2.3 EXCLUSION CRITERIA

The review studies and letters to the editor were excluded, as well as studies that did not present effects of protein supplementation in the maintenance of muscle functional capacity of the elderly.

2.4 DATA EXTRACTION

Data collected from eligible studies were organized in extraction spreadsheets by 3 reviewers. The authors' names, year of publication, journal and data related to the research were collected. The organization of the data and the preparation of the tables took place in the microsoft excel and microsoft ® word® softwares. After selected, the studies were organized with emphasis on authors and year of publication, journal, database (Table 1).

Table 1. Eligible studies according to title, authors, year of publication, journal, database, level of evidence and degree of recommendation

TITLE	**AUTHORS/ YEAR**	**PERIODIC**	**DATABASE**

Safety of a Combined WB-EMS and High-Protein Diet Intervention in Sarcopenic Obese Elderly Men	Kemmler et al (2020)	Clinical Interventions in Aging	Pubmed
Whey Protein Supplementation Post Resistance Exercise in Elderly Men Induces Changes in Muscle miRNA's Compared to Resistance Exercise Alonec	D'Souza et al (2019)	Frontiers in Nutrition	Pubmed
From mitochondria to healthy aging: The role of branched-chain amino acids treatment: MATeR a randomized study	Buondonno et al (2020)	Clinical Nutrition	Pubmed
Functional improvements to 6 months of physical activity are not related to changes in size or density of lower multiple-extremity muscles in mobility-limited older individuals	Skoglund et al (2022)	Experimental Gerontology	Pubmed
Efficacy of an Exercise and Nutritional Supplement Program on Physical Performance and Nutritional Status in Older Adults With Mobility Limitations Residing at Senior Living Facilities	Corcoran et al (2017)	Journal of Aging and Physical Activity.	Pubmed
Protein Intake for Skeletal Muscle Hypertrophy with Resistance Training in Seniors	Andrews, MacLean, Riechman (2006)	International Journal of Sport Nutrition and Exercise Metabolism	Pubmed

3 FINDINGS

3.1 MUSCLE MASS GAIN

Sarcopenia is considered physiological in the elderly due to the senescence process, however, the reduction of muscle mass with the increase of the fatty part of the body composition, especially in the trunk region and lower limbs, the smaller the ability of an individual to support himself, his balance and coordination motor. Thus, sarcopenia contributes to the higher risk of falls in the elderly. To overcome this, resistance exercise showed high effectiveness.

However, protein supplementation in the elderly after physical activity was not a relevant factor for improving body composition or increasing muscle mass. The comparison of muscle mass gain between groups of elderly beginners in the practice of physical exercises that ingested the highest and lowest protein amounts per body kilo (1.35 g · kg-1) and (0.72 g · kg-1) showed no significant variations in muscle mass increase. However, elderly people who presented protein deficiency in the diet showed that they had greater difficulties in maintaining muscle mass.

In a study by Andrews, MacLean, Riechman (2006) Resistance Exercise Training (RET) resulted in a significant increase in lean mass in similarly in men and women aged 60 to 69 years. However, the increase in lean mass of these individuals was not significantly associated with post-exercise

supplementation and daily target of 1.0 g · kg-1· D-1. In addition, the intake of branched chain amino acids

(BCAA) was also not significantly associated with changes in total lean mass. It has been suggested that protein intake of 0.4 g/kg after a resistance physical exercise session may act in the prevention of sarcopenia.

It was analyzed that people performing intense exercise end up losing more proteins than they synthesize. Therefore, especially for the elderly, post-workout supplementation is important in order to maintain lean mass.

3.2 ENDURANCE AND MUSCLE STRENGTH

When comparing the effect of protein supplementation in elderly with functional limitations, submitted to 6 months of physical activity, although there were no good results in increasing muscle mass, density or size, there were significant improvements in the resistance and strength of several muscles of the lower me sands analyzed of individuals using the hyper protein diet in relation to the control group. However, the data revealed that this comparative increment varied according to the muscles. For example, while the knee flexor muscles obtained a 22% increase in resistance, with concomitant increase in knee flexor torque , knee extensor muscles varied little between groups, but individuals in each group, possibly indicating greater influence of the type of exercise performed.

3.3 GAIT SPEED AND OTHER FUNCTIONAL PARAMETERS

There are several parameters used to measure the functional capacity of a person. In the case of the elderly, in particular, senescence contributes to the reduction of their mobility, making them progressively need greater adaptations or even people to help them maintain their activities. Thus, the ability to march quickly, lift the chair and climb stairs were the parameters used by the Short Physical Performance Battery (SPPB) to evaluate the functional mobility of the elderly, and demonstrated that protein supplementation was a remarkable factor in the recovery of these skills, improving the test results by 38%, gait speed by 13% and the ascent of gait by 13% and the ascent of after 6 months of physical activity combined with diet.

Other parameters that showed positive influence of protein diet were muscle strength gain not associated with hypertrophy and increased handshake strength measured by dynamometers, possibly associating protein intake with better ability to adapt body and neuroplasticity to restore more precise movements, even in individuals of advanced age.

3.4 NUTRITIONAL AOIO ASSOCIATED WITH PROTEIN SUPPLEMENTATION

Vitamin D is a liposoluble vitamin that, among its various functions, helps the body to absorb calcium and phosphorus, both minerals essential for stimulating the production of bone mass, so its active

form is widely used to prevent steoporosis in the elderly . Since vitamin D absorbed by the body via food requires several changes in the skin by exposure to the sun, liver and kidneys to become active, and the individual may have some obstacle in these reactions, many times due to low sun exposure. Therefore, the analysis of the articles demonstrated a possible symbiotic association of the association of protein supplementation with 25-hydroxyvitamin D to improve functional capacity in the elderly.

In addition, in a randomized trial by Buondonno et al (2020), they demonstrated that malnutrition in the elderly is associated with poor health outcomes. Malnutrition, predominantly protein malnutrition, often affects elderly patients and contributes significantly to the reduction of healthy life expectancy, causing high morbidity and mortality. Thus, it was identified that the maintenance of nutritional support may be clinically relevant in increasing physical performance in elderly malnourished patients and that the use of SPECIFIC BCAA can also soften cognitive performance thanks to a softening of bioenergetic mitochondria.

3.5 WHOLE-BODY ELECTROSTIMULATION

In a study by Kemmler et al (2020), whole-body electrostimulation (WB-EMS), especially in combination with high protein supplements, was identified as an effective treatment for sarcopenia. However, it has several reports of cases of rhabdomyolysis after application of WB-EMS. However, the combination of WB-EMS with high protein intake showed no short-term negative effect on renal function, even in the vulnerable population of obese elderly with sarcopenia. However, the consequences on the cardiovascular system require further evaluations.

3.6 ICRORNA POST-EXERCISE

A study by D'Souza et al (2019) identified a clear effect of whey protein supplementation in high doses on muscle miRNA expression patterns after exercise, suggesting that the intake of whey protein in elderly men in combination with exercise more closely mimics the evident post-exercise microRNA response in younger adults. However, the role that iRNAs in modulating acute anabolic response after exercise in the presence of whey protein and other sources of nutrition has not been established, although the expression of miR-133a at rest has the potential to act in muscle size control.

4 DISCUSSION

Indubitably, sarcopenia brings with it the loss in quality of life in old age. Therefore, caution is needed regarding the food care of this group. Among the studies chosen, some authors propose protein supplementation, as an additional form, the feeding of the elderly, aiming at increasing muscle mass, endurance and physical performance. However, post-training protein supplements did not demonstrate relevant substances regarding muscle mass increase, in relation to the elderly did not use this supplementation. On the other hand, other studies have observed a significant functional improvement in

gait development and muscle strengthening, but not in increasing size and density (KEMMLER et al. , 2020) .

A clinical trial, conducted to evaluate whey protein supplementation after resistance exercise in elderly men induces changes in muscle MiRNAs compared to exercise of isolated resistance, identified a claro effect of whey protein supplementation in high doses in post-exercise muscle miRNA expression patterns. The expression pattern suggests that the intake of whey protein in elderly men in combination with exercise more closely mimics the evident post-exercise microRNA response in younger adults (BUONDONNO et al. , 2020) .

Another randomized study demonstrated a beneficial role in the use of BCAAs in elderly patients with malnutrition. In addition to the improvement in nutritional status and general health, there were also indications of improvement in muscle mass,strength and performance. There has also been evidence that bcaa treatment induces biogenesis, activity and fusion of mitochondria after the first month of treatment, which follows a plateau, suggesting that mitochondrial organelles maintain increased function without an additional increase in their number (BUONDONNO et al. , 2020).

Improved nutritional status is associated with overall improvement in health status and muscle and cognitive performance in the elderly and malnourished patients. Studies show that this can be due to an improvement of its mitochondrial bioenergetic profile and decreased oxidative stress (BUONDONNO et al., 2020). Dietary supplementation of BCAAs in humans showed an association between the sea level of isoleucine, leucine and valine with lower risk of dementia; on the other hand the energy deficit - protein can accelerate the loss of muscle mass and its functions and considering the age factor we have what we call sarcopenia, and once diagnosed leads to risks of falls, disability, fragility, loss of independence and increased risk of death (BUONDONNO et al. , 2020; KEMMLER et al. , 2020) .

Another study suggests that the elevation of muscle protein synthesis can be achieved through the use of post-exercise supplementation. A key factor that can influence the delivery and transport of amino acids during the post-exercise period is the availability of blood flow to skeletal muscle after RET, which is greatly increased and can increase the delivery of amino acids to myocytes increasing the rate of protein synthesis. There was evidence that protein supplementation immediately after exercise was vital for skeletal muscle development. Individuals who consumed 10g of protein immediately after exercise reached a lean mass of 1.8% while those who waited 2 hours lost 1.5% lean mass. According to the present study , if the data were confirmed, consuming 0.4g/kg of protein after a RET may help prevent sarcopenia, allow individuals to reduce the total daily energy load of the protein, and reduce the total daily protein load for those who may need to restrict intake. Some authors evaluated electromyo estumulation combined with high protein supplementation in the treatment of sarcopenia, where they concluded that there was no negative impact , but lacked studies to evaluate possible long-term consequences for the cardiovascular system (ANDREWS; MACLEAN; RIECHMAN, 2006).

Despite the expressed concern, studies differ on the benefits in the use of protein supplements in relation to the increase in muscle mass in the elderly. However, the treatment of malnutrition is entirely associated with the improvement of the general content, which is due to a better energy production associated with an increase in respiratory chain activity and decreased oxidative stress; since oxidative damage is one of the components of aging by the production of free radicals and the decrease in defense against oxidative stress, which causes alteration and functional deterioration, an important factor in age-associated diseases. Supplementation of elderly patients with BCAAs may be a good strategy capable of improving bioenergetic capacity, offering positive muscle performance and cognitive performance of these patients (BUONDONNO et al. , 2020).

5 CONCLUSION

The analysis of the above-mentioned data revealed the relevance of the search for improvement in the quality of life and well-being of the senile population, considering that sarcopenia is one of the factors that worsen the quality of life of the elderly. Given the context of aging, sarcopenia is classified as stimulating the daily consumption of protein-rich foods, such as meats, eggs, milk and dairy products and dietary supplements, when its prescription is necessary.

Although it is a physiological process, the corroboration of sarcopenia in the increased incidence of falls in the elderly is highlighted, in which it is necessary to guide and stimulate the senile population for the regular practice of resistance physical exercise, in addition to the monitoring of a multidisciplinary team that performs the management in the different spheres of health that are necessary.

It is concluded about the importance of the recommended daily consumption of protein to maintain muscle mass in this population portion, aiming at good nutritional status, maintenance of muscle mass, strength and performance in daily activities and physical practice .

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Chapter 18

Epidemiological analysis of cases of sexual violence in Maranhão State from 2015 to 2020

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ABSTRACT

Objective: to analyze the reported cases of sexual violence that occurred in the State of Maranhão within a time frame. *Methodology*: this is an epidemiological study of the cross-sectional, descriptive, retrospective, mixed approach, warped by the findings available in DataSUS, via Tabnet, recorded through the Information System of Notifiable Diseases (SINAN) for the State of Maranhão, in the years 2015 to 2020. The following variables were used to govern the study: age group, sex (binary), race and degree of kinship or proximity, and years of notification. *Results*: there was a record of 3142 cases, with the main victims of this grievance being women 93.22%. In addition, children aged 10 to 14 years (36.38%) were highlighted among the findings, as well as cases among the brown race (72.66%), year of notification was 2020 with 24.44% and the prevalence of 633 cases whose rapist was unknown to the victim. *Discussion*: this violence is, historically, a prevalent aggravating public health state, highlighting the State of Maranhão, being fostered by the undeniable rape culture and impacting directly on the physical, sexual, psychological, patrimonial and economic health of the victims. *Conclusion*: given the relevance of this theme, the prevalence of cases in the female public (within the binary aspects) was verified in this study, as could be understood the perpetuation of a negative and vicious cycle historically known. Furthermore, there has been an increase in the number of cases reported, indicating the impacts of the use of the notification systems.

Keywords: Sex offenses; Epidemiology; Violence against women.

1 INTRODUCTION

According to the last census of the IBGE, (2021), Maranhão is configured as the 8th largest state in Brazil, in terms of land area, with an area of 329,651.496 km², with an estimated population of 7,153,262 inhabitants. The former hereditary captaincy, today the 2nd largest state in the Northeast had, until 2010, a Human Development Index (HDI) of 0.639.

However, it is worth pointing out that, according to the World Health Organization (WHO) (2002), the term violence refers to the intentional use of force or power to threaten or effectively harm oneself, another person, or a group or community, with a high probability of causing injury, death, psychological damage, developmental changes, or deprivation. It can occur under several manifestations: psychological, patrimonial, virtual, moral, physical, and sexual.

Therefore, it is necessary to highlight that sexual violence (SV) can be defined as any sexual act without the consent of the victim or as actions of commercialization and/or use of an individual's sexuality through any kind of imposition. It is worth noting that this violence can occur at all ages, however, its prevalence hovers mainly in children and adolescents, especially females (Souza et al., 2019).

Furthermore, the study by Souza et al. (2019) complements this information by explaining that the prevalence of such violence in females is grounded in the inequalities in gender relations and to the patriarchal values of society, as well as the denomination of the older over the younger.

In Brazil, since the reformulation of Law No. 12,015 of 2009, rape is now legally defined as the act of "forcing someone, through violence or serious threat, to have carnal intercourse or to practice or allow another libidinous act to be performed with him/her", and can be committed against anyone (Brazil, 1988). Still in the previous context, Ordinance No. 205, implemented on February 17, 2016, defines the National List of Compulsory Notification of diseases, diseases and public health events in public and private health services throughout the national territory. In this list, sexual violence and attempted

suicide are now notified immediately (24 hours) to the Municipal Health Secretariat, becoming an ally in the process of screening and identifying these cases.

According to Nunes et al. (2017), sexually violent acts can occur against anyone regardless of their phenotypic expression and various age groups. However, there is an undeniable prevalence of this violence towards women, making them the main victims.

For Sousa et al. (2019), sexual violence is capable of causing damage that can last a lifetime, as well as can have repercussions on the physical well-being, sexual, reproductive, emotional, mental and social issues of the battered women. Consequences of this assault include pregnancy (0.5 to 5.0%) and sexually transmitted infections (STIs) (16.0 to 58.0%), including HIV/AIDS.

It should be emphasized that sexual violence can manifest itself in various forms, such as harassment, rape, child pornography, incestuous abuse; forced sex in marriage; sexual games and non-consensual erotic practices; pedophilia; voyeurism; handling; forced oral, anal or genital penetration with penis or objects. It also includes coercive/constraining exposure to libidinous acts, exhibitionism,

masturbation, erotic language, sexual interactions of any kind, and pornographic material (Krindges & Habigzang 2018).

Furthermore, the Ministry of Health estimates that every 11 minutes there is a rape, totaling more than 500 thousand cases annually. Of these, approximately 10% seek the police; in the case of children in situations of sexual violence, 24% of the aggressors are parents or step-parents; and in 32% of the cases, they are assaulted by family acquaintances, friends or acquaintances of the child. The prevalence in the country reaches 66% of the violence suffered in the age group of 10 to 14 years and 40.4% between 18 and 39 years (Kataguiri et al., 2019).

Furthermore, care involving victims of such reality needs to be based on updated scientific knowledge, with appropriate technology, always respecting the uniqueness of each case and without discrimination. It is a process that requires articulation of services, adequate structure and qualified professionals to ensure comprehensive care to women in situations of sexual violence (Trentin et al., 2019).

Moreover, the articulation between the services of the care network, the improvement in the reception and the appreciation of the intersubjective relationship between the victim and the professionals are factors that increase adherence to outpatient follow-up by victims of sexual violence (Trentin et al., 2019).

This research seeks to identify the main characteristics of the victims of sexual abuse in the state of Maranhão, as well as to explain the consequences of this act in the life of the victim after the abuse, based on the current literature. Thus contributing to the epidemiological data, which, due to the fear of many professionals to delve into research related to the subject, because it is a sensitive and complex content, the studies are too superficial and limited.

Thus, the objective of this study is to analyze the rates of sexual violence in the state of Maranhão, as well as to understand the epidemiological factors that govern it, such as the profile of the victims and the main sequelae of this grievance.

2 METHODOLOGY

This is an epidemiological study, of the cross-sectional, descriptive, retrospective, mixed approach type, conducted based on the years 2015 to 2020. To compose the study, pre-existing data were collected from the records of the notification forms of the Sistema de Informação de Agravos De Notificação (SINAN)- notification system of domestic, sexual and/or other violence, made available through the Departamento de Informática do Sistema Único de Saúde (DATASUS-TABNET).

Cross-sectional studies are those that look at a specific point in time. They describe a kind of snapshot of the data not bothering with what happened before or after the study (Silveira, 2017). Descriptive studies consist of characterizing semiological, etiological, pathophysiological, and epidemiological aspects of a disease. They are used to learn about a new or rare disease, or health injury, studying its distribution in time, space and according to individual peculiarities (Hochman et al., 2005).

Mixed-type studies, on the other hand, are those that combine quantitative and qualitative approaches, for the analysis of results and theoretical deepening of their understanding, aiming to corroborate the data evidenced. That said, it is customary that mixed studies serve to merge the authors' expertises, associating their competencies (Galvão et al., 2018). The measurement of population health status is a tradition in public health that began with the systematic recording of mortality and survival data (vital statistics - mortality and live births). With advances in the control of infectious diseases (epidemiological and morbidity information) and a better understanding of the concept of health and its population determinants, the analysis of the health situation began to incorporate other dimensions of the state of health (Brazil, 2020).

The collection of data on domestic, sexual and/or other violence is done by the health service, whether public or private, which will forward a copy of the notification to the epidemiological surveillance of the municipal health departments, within twenty-four hours, because it refers to a compulsory notification of the immediate type, following the ordinance No. 264 of February 17, 2020 (Brazil, 2020).

Thus, data collection occurred from the notifications of cases of sexual violence in the state of Maranhão, which has an estimated population of 7,075,181 inhabitants according to the census conducted in 2019, with a time cut from 2015 to 2020. The data were collected from tables available for download from TABNET/DATASUS, through the Microsoft Office Excel program (2019 version), to thus elaborate the graphs of data found.

To complement the information, DATASUS/TABNET's own resources will be used, which allow the researcher to deepen his research with some variables of extreme importance, such as sex, age, or race. The data collected were stratified based on years of notification. The other characteristics were analyzed based on the information recorded in the notification forms of domestic, sexual and/or other violence.

To construct the graphs and tables arranged in this study, the following variables were taken into consideration:

- Victim variables: skin color (white, brown, black, yellow/indigenous).
- Variables regarding the offender: binary sex (male, female, both sexes).
- Variables regarding the relationship/degree of kinship with the victim: ex-spouse, father, mother, stepfather, and unknown.
- Variables in relation to the year: 2015, 2016, 2017, 2018, 2019 and 2020.

The study population will consist of victims of sexual violence, of both sexes, in the state of Maranhão, between the years 2015 and 2020. The exclusion criteria will be data that precedes the established time frame, along with data from other locations, other than Maranhão.

The present study did not require the approval of the Research Ethics Committee due to the use of secondary data, making it impossible to identify the research participants, besides not using biological materials originating from the participants, thus following the resolution No. 466 of June 13, 2012 of the National Health Council, which deals with research and testing on human beings.

3 RESULTS

In analyzing Table 1, it can be seen that, in the time period from 2015 to 2020, in the state of Maranhão, 3,142 cases of sexual violence were recorded, and the data show a growing incidence among the findings, with a significant increase of 134.86% of recorded occurrences. Notwithstanding this, it is also noticeable that, still in the base temporal period, the age group of children between 10 and 14 years old were the main victims of this unspeakable violence, making up 36.38% of the cases, followed by the age group of 15 to 19 years old, represented by a total of 21.64% (table 01). It is noteworthy that the year 2020 represented the largest record of reported cases (n= 768; 24.44%).

Table 1- Frequency by age group of sexual violence cases in Maranhão in the period from 2015 to 2020.

Age	2015	2016	2017	2018	2019	2020	Total
Ign/Bran		1			1		**2**
<1 Year	6	5	6	19	11	24	**71**
01-04	82	70	85	111	139	114	**601**
10-14	122	129	174	201	261	256	**1143**
15-19	54	49	78	118	135	246	**680**
20-29	40	37	52	55	93	80	**357**
30-39	18	25	33	29	38	26	**169**
40-49	4	8	12	16	21	16	**77**
50-59		5	2	5	8	3	**23**
60 or >	1		3	4	8	3	**19**
Total	**327**	**329**	**445**	**558**	**715**	**768**	**3142**

Source: Ministry of Health/SVS - Information System of Notifiable Diseases - Sinan Net

Table 2 shows the predominance of the female sex (in the binary view) with a total of 2,929, which represents 93.22% of the cases reported, as well as the discrepant but significant 213 cases of the male sex (in the binary view), making a total of 6.78%.

Table 2- Frequency by sex (binary), as provided in the DATASUS system of sexual violence cases in Maranhão in the period from 2015 to 2020.

Sex	2015	2016	2017	2018	2019	2020	Total
Male	26	19	41	37	50	40	**213**
Female	301	310	404	521	665	728	**2.929**
Total	**327**	**329**	**445**	**558**	**715**	**768**	**3.142**

Source: Ministry of Health/SVS - Information System of Notifiable Diseases - Sinan

Moreover, in terms of race, the available data allow us to show, as shown in Table 3, that the brown race, within the time frame, was the largest target of this offense, explained by a value of 2,283 cases, which represents a total of 72.66%. In addition, it is clear that there was an increase among new cases of this violence directed to the brown race, showing a growth of 141.42% when comparing the years 2015 and 2020.

Table 3- Frequency of sexual violence cases in Maranhão by race in the period 2015 to 2020.

Race	2015	2016	2017	2018	2019	2020	Total
Ign/White	13	4	2	2	5	14	**40**
White	50	38	52	93	107	79	**419**
Black	24	38	72	59	80	90	**363**
Yellow	-	3	2	2	7	3	**17**
Brown	239	244	315	398	510	577	**2283**
Indigenous	1	2	2	4	6	5	**20**
Total	**327**	**329**	**445**	**558**	**715**	**768**	**3142**

Source: Ministry of Health/SVS - Information System of Notifiable Diseases - Sinan.

In addition, from what is shown in Table 4, it is noted that sexual violence can occur regardless of kinship and/or proximity. The relationship of the victim with the aggressor, in most of the cases verified, occurs through unknown people, represented by 633 registered cases (59.10%). Aligned to the previous statement, it is also noted that the stepfather refers as one of the main aggressors, characterized by a total of 235 of the registered cases, which configures 21.94% of the notifications.

Table 4 - Frequency of sexual violence in Maranhão related to the relationship or degree of kinship in the period 2015- 2022.

Reporting year	Father	Stepfather	Mother	Ex-conj	Unknown	Total
2015	13	26	6	1	85	131
2016	15	24	3	5	83	130
2017	15	37	2	7	108	169
2018	33	53	8	6	95	195
2019	40	55	4	12	155	266
2020	19	40	3	11	107	180
Total	**135**	**235**	**26**	**42**	**633**	**1071**

Source: Ministry of Health/SVS - Information System of Notifiable Diseases - Sinan

4 DISCUSSION

The results of the present study expose an undoubtedly worrisome reality. It can be seen in this study that in the state of Maranhão the cases of sexual violence are perpetuated in a progressive incidence and, the information present in the tables above represent a tangible public health problem.

A priori, between the period 2015 to 2020, 3,142 notifications for sexual violence were made in the state of Maranhão. This study was based on the indicators evidenced by: age group, sex (binary), race and degree of kinship or proximity and years of notification.

In this sense, based on the age range of the victims, from less than 1 year to more than 60 years old, it was observed that there was a greater intensity of cases involving people between 10 and 19 years old, corresponding to 1,823 of the total (58.02%), followed by those between 01 and 04 years old (19.30%). It was also pointed out that 820 cases had children between 1 and 4 years old as victims, and 613 cases occurred with children under 1 year old.

Still in this perspective, it is fundamental to highlight that the numbers of sexual abuse that constantly afflict people in this age group alert us to the extreme vulnerability and exposure to violence. According to the National Plan for Confronting Sexual Violence against Children and Adolescents, sexual abuse against this public ranges from the libidinous act to the carnal conjunction of an adult, with the intention of feeling pleasure, which differs from sexual exploitation that has financial interests (Cruz et al., 2021).

In addition, the literature reports that the numbers of sexual abuses against children and adolescents alert us to their vulnerability and exposure to this violence. In the Brazilian scenario, data from the National Ombudsman for Human Rights reveals that, in 2015 and 2016, dial 100 received more than 33,000 complaints regarding sexual violence perpetrated against children and adolescents (Brazil, 2016).

The epidemiological bulletin of the Ministry of Health shows that from 2011 to 2018, 184,524 thousand cases of sexual violence were reported, of which 76.5% were committed against children and adolescents, a situation that may be related to the greater vulnerability of this age group (Brazil, 2016).

In addition, it is known that most cases of sexual abuse occur in girls between 5 and 10 years old. However, one cannot fail to mention that boys are also abused, but in a smaller proportion of occurrence and registration, especially when the abuse is intrafamilial (Platt et al., 2018).

In this context, it is worth pointing out that it was noticeable in the data obtained that sexual violence is clearly projected on the adult population, mostly female, instigating the questioning about the imperfections of public policies and their validations, as well as the reason for such perpetuation, having as a consequence, mostly, the feminicide or violence focused on gender (binary).

To deepen the previous assumption, Caicedo-Roa et al. (2022) explain that feminicide is a form of extreme interpersonal violence against women because of their gender, not being the consequence of involuntary and spontaneous acts, but the result of the intensification of the severity and frequency of other

forms of violence, having as perpetrator-aggressor, routinely, an acquaintance. Thus, an essential factor in this discussion is ratified: the rape culture.

In rape culture, women perceive the threat of violence as a continuum from sexual comments to sexual contact to rape. Rape culture tolerates physical and emotional terrorism against women as the norm. In a rape culture both men and women assume that sexual violence is a fact of life, as inevitable as death or taxes. This violence, however, is neither biologically nor divinely determined. Much of what we accept as inevitable is in fact the expression of values and attitudes that can be changed (Buchwald et al. 2005, p 132).

It is worth noting that the social configurations of dichotomous gender roles end up enabling the persistence of such rates of violence. In this lens, it is necessary to complement that violence against women goes beyond sexual aggression, and can be characterized as the disruption of any form of integrity of women, whether physical, sexual, psychological, property, economic or moral harassment and occur both in the private-family sphere and in the workplace and public spaces, according to Tassinari et al. (2022).

Associated with this, the research by Delziovo et al. (2018), emphasizes a national resource to minimize, as much as possible and practicable the high rates of this violence, the creation of the Maria da Penha law, and the compulsory notifications.

In this discussion, Law number 11.340/2006, known as Maria da Penha Law, gave visibility to the violence suffered by women and reaffirmed the need for intersectoral actions for prevention and confrontation. In the health context, sexual violence against women is among the axes of the National Policy of Integral Attention to Women's Health with the expansion and qualification of the network of integral attention, as well as the notification of violence is one of the components of the assistance performed by health professionals, making it possible to give visibility to the violence and the assistance provided to the people assaulted (Delziovo et al., 2018).

It was also noticed that "strangers" are indicated as the main aggressors in most cases, followed by the stepfather and the father. Thus, it is understood that men are mostly registered as the agents of these aggressions.

Corroborating the above, a study conducted in a Northeastern state highlights that most of the violence suffered by women is perpetrated by men, as well as highlights that the VS was characterized as extrafamilial in most of the cases analyzed, with the aggressors being identified as strangers, followed by friends/acquaintances, person with institutional relationship, in addition to others. In intrafamily violence, the aggressors were spouse/boyfriend, stepfather, biological father, and brother (Nunes et al., 2017).

Nevertheless, Viana et al. (2022) explain that the perpetrator of the violence, when known to the victim, usually takes advantage of the relationship of trust to get closer. In addition, when it comes to minors, it is interpreted that this contact is a demonstration of affection and affection. Despite this, even when the perpetrator is unknown, there is

The tendency to omit the narrative of violence, either for fear of the consequences of this revelation, or out of shame, or even because they feel guilty.

When analyzing the data obtained, it can be seen that there was a decrease in the occurrences notified in SINAN in the year 2020, this may be directly aligned to the growing number of cases of Covid-19 in the referred year, making it impossible to identify, notify, and solve such violence.

In this perspective, a descriptive ecological study that sought to study the reduction in the number of compulsory notifications in the year 2020 states that such a decrease may be related to the repercussions of the pandemic of COVID-19 in the health system in the country, culminating to the high projection of underreporting of cases, influenced by the compromise of activities and inaccessibility to care services, due to the pandemic (Sallas et al., 2022).

Thus, sexual violence is complex and must be analyzed considering the socioeconomic, political, and cultural contexts in which it is present, also pointing out that this type of violence occurs worldwide in various cultures and affects people throughout society (Kataguiri et al., 2019).

5 CONCLUDING REMARKS

After analyzing the aforementioned data, it can be inferred that in the State of Maranhão there is still a perpetuation of cases of sexual violence, and these, in turn, are in a gradual incidence, as seen in the time frame from 2015 to 2020.

In addition, it is notorious that children, especially female and mixed race, are the main victims of such violence, replicating a vicious and negative cycle that has been spreading for centuries in the national culture, the rape culture, as highlighted above. Aligned to this, it could be evidenced that men are the main aggressors and perpetuators of this serious public health problem, as well as it became noticeable that the degree of proximity or kinship does not oppose the reproduction of this aggression.

Furthermore, as evidenced in the literature, the Covid-19 pandemic directly implied the collection and recording of more data for the year 2020, which reflected in the decrease of reported cases, projecting an increase in underreporting.

Finally, it should be noted that, because this is a research based on secondary data, whose veracity depends on the quality of the information collected and recorded, the numbers exposed here do not demonstrate the exact reality of the state. Thus, it is suggested that new studies be conducted to investigate the cases of sexual violence in Maranhão between the years 2020 and 2022, under the aegis of the Covid-19 pandemic.

This study aims to increase the awareness of government managers, at the national level, about the knowledge of the rates of violence, especially sexual violence, with the objective of enabling the implementation of subsidies to minimize this epidemiological trend, and thus nurture a horizon of health and safety, warped in the scientific field, for its inhabitants.

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Chapter 19

Speech-language disorders in childhood cancer: literature review

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ABSTRACT

INTRODUCTION: Childhood cancer affects up to 4% of the pediatric population, with the increase in technology, a chance of cure for these children reaches 80%. For this, antineoplastic treatments are used, which generate short or long-term changes in child development. OBJECTIVE: To identify speech therapy changes in childhood cancer. METHODOLOGY: A literature review was performed in the following databases: MEDLINE, SCIELO, LILACS. The period of publication adopted from 2010 to 2021 and according to the inclusion and exclusion criteria the articles were sent. RESULTS AND DISCUSSION: According to the 7 articles, the most frequent tumors were those of the Central Nervous System, and all patients Speech-language pathology changes. CONCLUSION: This study identified that the most frequent changes were in communication, swallowing, orofacial motricity, hearing and cognition. The main group affected are children with solid tumors of the Head and Neck, tumors of the Central Nervous System and patients who use chemotherapy for a long period of time, and speech therapy is essential.

Keywords: Childhood. Radiotherapy. Effects. Speech therapy. Cancer

LIST OF ABBREVIATIONS

WHO - World Health Organization
CNS - Central Nervous System
CCP - Head and Neck Cancer
RT - Radiotherapy
CP - Head and Neck
IQ - Intelligence quotient
ABFW - Children's language test
AusTOMs- Australian Therapy Outcome Measures
FOIS - Functional oral intake scale
GRBASI- Perceptual-Auditory Assessment Scale

1 INTRODUCTION

According to the World Health Organization (WHO) cancer is a set of more than 100 diseases that have as characteristic the abnormal and disordered growth of cells with the ability to invade other organic structures due to loss of control of cell division, and can develop at any stage of life (National Cancer Institute,2011).

In childhood the incidence of neoplastic tumors reaches up to 4% of the population (National Cancer Institute, 2005), but with technological advances and increased globalization, the level of recovery for pediatric patients has grown dramatically, with an average of 70% of individuals having a prospect of cure (National Cancer Institute, 2006).

Treatment against neoplasms can be done through Chemotherapy, Radiation Therapy or Oncologic Surgery. The combined use of two or more therapies increases the likelihood of cure, however concomitant exposure of normal tissues to these therapies and dosages can result in serious side effects (National Cancer Institute,2018) ;(PADOVANI; LOPES;PEROSA,2021).

With this, the post-treatment evaluation must include the physical analysis of organs and systems in order to provide early identification of functional and psychological alterations such as: social interaction difficulties, neuropsychological deficits, oromiofunctional and learning alterations (ARGOLLO, LESSA,2000) (PATENAUDE; AF; KUPST,2005).

With the increase in healing and survival of this public ensuring the quality of life has become an increasing concern, currently having multidisciplinary and interdisciplinary teams to rehabilitate and assist during and after treatments aimed at the human dimension, having as a major concern the physical, emotional and social well-being of the child and family (BELTRÃO, VASCONCELOS.et al.,2009) (CAPRINI; MOTTA,2017).

In the multidisciplinary context, the role of speech therapy becomes primordial and enriching. Speech therapy is the science that deals with human communication processes and their development, and its objective is to help, assess, and rehabilitate swallowing, chewing, sucking, speech, learning, voice, and hearing disorders (FREIRE, 2010).

Thus, it is necessary to better understand the phonoaudiological consequences of childhood cancer in order to reinforce the importance of the phonoaudiologist in the multidisciplinary team that cares for this population. In this perspective, the present study aims to identify the phonoaudiological alterations in childhood cancer by means of a literature review.

2 METHODOLOGY

This study is characterized as a literature review. The bibliographical survey was carried out through searches in four databases, namely: National Library of Medicine (MEDLINE), Latin American and Caribbean Health Sciences Literature (LILACS) and Scientific Electronic Library Online (SciELO). The descriptors used for research were: Infancy, radiotherapy, effects, speech therapy and cancer, (infancy,

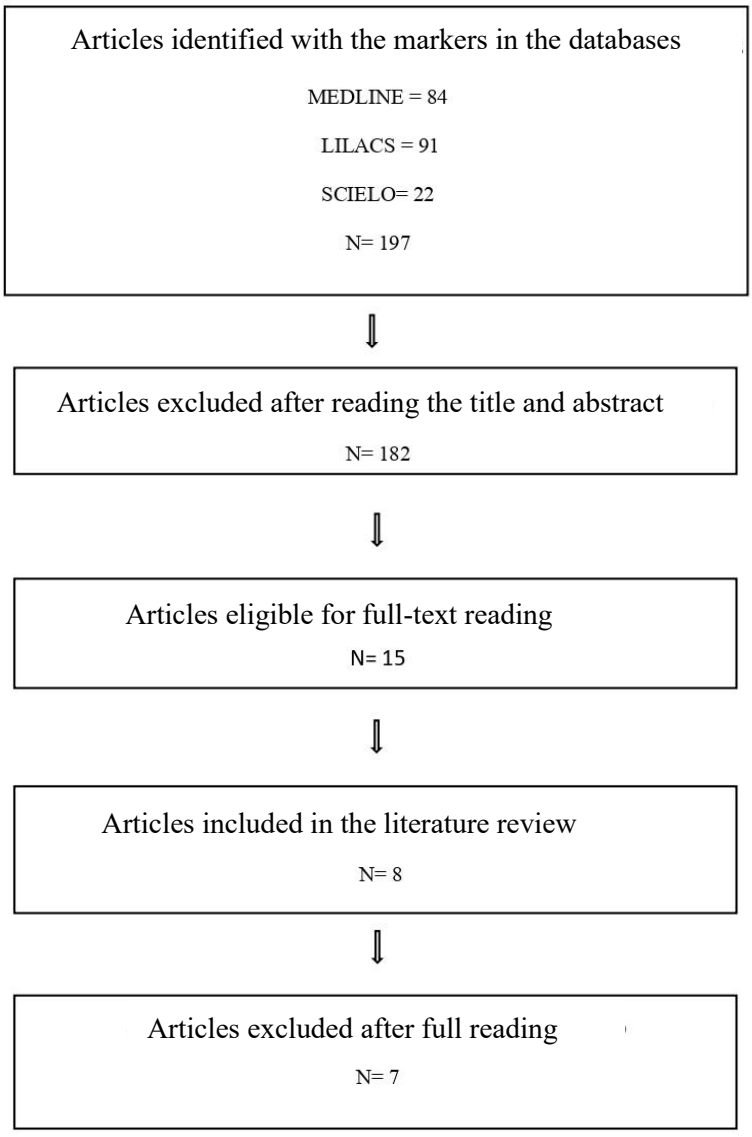
radiotherapy, effects, speech therapy, cancer). For the selection of articles, we included studies published in Portuguese, English and Spanish between the years 2010 and 2021, which had the full text available indexed in the databases and addressed the research theme.

Articles with subjects older than 18 years, studies with populations that had previous comorbidities and neurological alterations, and research that was duplicated in the databases were excluded.

The selection of articles was carried out in 3 steps: 1) initial search of references in the databases; 2) selection of references, based on the inclusion and exclusion criteria of the research, by reading the title and abstract; 3). The studies included in the previous step were read in their entirety. During the initial search, a total of 197 articles on the theme were found. Considering the search criteria, 8 papers remained for analysis (Figure I).

Figure I- Article Selection and Analysis.

I



3 RESULTS

From reading the articles in full, it is possible to describe that of the eight articles included, all addressed childhood cancer, its sequelae, categorization of the lesion and prevalence. Regarding the treatments used for the neoplasm, seven studies reported on the subject, with chemotherapy being the most cited, followed by radiotherapy described in six studies and, finally, surgical resections being discussed in only three articles.

The findings on the location of the neoplasms (central nervous system tumors being more frequent) and the speech and hearing alterations are arranged in table I.

Regarding speech therapy in childhood cancer, only two articles reported on this subject.

Table I -Location of the lesion and aa alterations.

AUTHOR/YEAR	OBJECTIVE	LESION LOCATION	FINDINGS	CONCLUSION
Oliveira, Almeida, Silva/2010	Identify and characterize after-effects neurocognitive resulting from the disease and tumor treatment children's brain	Brain Injuries Supratentorial and the offenders	Difficulty in language and learning.	The authors suggest further studies and projects that implement assessment and rehabilitation neurocognitive in the health service to minimize deficits and improve the quality of life.
Parsay et al / 2011	Evaluate the change behavioral hyperactivity and deficit of attention after chemotherapy and radiotherapy in children.	Leukemia, Tumors brain, Sarcoma, Lymphoma, Retinoblastoma	Memory problems, attention, concentration, functions executives, low performance school and intellectual.	Intellectual and behavioral complications need more attention, care, and management by the healthcare team.
Taylor, et al/2012	Describe the prevalence and severity of impacts on swallowing, feeding, and communication.	Central nervous system tumors.	Communication disorders, chewing and swallowing disorders.	The speech pathologist needs specialization and support in the clinical management of the medical complications present in this population.
Reddick, et al / 2014	Validate reduction of cerebral white matter, relate neurocognitive deficits to brain tumors, compare survivors with control group	Leukemia, malignant brain tumors.	Neurocognitive, intellectual, academic decline and attention deficits.	Young patients who received high-intensity therapy have less brain white matter, cancer survivors have a deficit in the transmission of information mainly between the brain lobes
Liberman et al / 2016	To characterize hearing after cancer treatment according to the type of treatment and predictive factors.	Lymphoma, leukemia, bone tumor, retinoblastoma germ cell tumor, kidney tumor, sarcoma, central nervous system tumor.	Sensorineural hearing loss	The audiological characteristic after cancer treatment was bilateral symmetrical sensorineural hearing loss with cisplatin chemotherapy being a risk factor.
Coura, Modesto/ 2016	Identify the late effects of radiation exposure in children surviving cancer.	Rhabdomyosarco ma, carcinoma, central nervous system neoplasms, pediatric solid tumor	Hearing loss	Regular follow-up of patients exposed to radiation in childhood is necessary to enable the diagnosis and treatment of side effects resulting in a better quality of life.
Canizares et al/2018	To evaluate the response to radiotherapy treatment in children with head and neck tumor	Carcinoma, sarcoma, lymphoma, neuroblastoma, hemangiopericytoma.	Carcinoma, sarcoma, lymphoma, neuroblastoma, hemangiopericytoma.	Follow-up is recommended for patients who received radiotherapy as part of the antineoplastic treatment to detect mid- and long-term sequelae
Scratch / 2018	Describe the prevalence of communication disorders, swallowing, orofacial motricity	Central nervous system tumor, head and neck tumor, other.	Language disorder, orofacial myofunctional disorder, facial paralysis, dysphonia, dysphagia, trismus.	High prevalence of speech-language disorders in children and adolescents at the time of oncology hospital enrollment.

	in children and adolescents.

4 DISCUSSION

Regarding childhood cancer, Coura, Modesto (2016) points out that its incidence has been increasing sharply and should be considered a public health issue, representing one of the leading causes of death among children and adolescents. Regarding the prognosis and responses to treatment Parsay et al. (2011) states that childhood cancer has a higher probability of cure compared to cancer in adults.

However, in contrast to this fact, studies by Oliveira, Almeida, Silva (2010) show that 25 to 65% of pediatric survivors experience late effects resulting from the disease and therapeutic interventions, which causes losses in the child's long-term maturation.

Parsay et al., (2011) conducted a survey that revealed that the treatment with more adverse effects among individuals at an early age were those undergoing radiotherapy therapy even at low doses. Despite the technological advances in imaging described by Cañizares et al., (2018) allow greater quality control with regard to the possibility of applying more accurate doses and a greater margin of safety the infiltration of radiation into adjacent organs and tissues is still inevitable, generating progressive impacts in the areas of child development (OLIVEIRA; ALMEIDA; SILVA, 2010).

Chemotherapy can also be harmful to the child's health, according to Oliveira, Almeida, Silva (2010) intrathecal chemotherapy can be harmful to cognitive functioning because it has neurotoxic agents. From another perspective, Liberman PH et al., (2016) presents that cisplatin chemotherapy widely used in clinical practice presents significant impacts on the hearing organ of irreversible character by having a high ototoxic gradient. Finally, Taylor et al., (2012) in his study mentions that vincristine chemotherapy refers to sequelae related to communication and swallowing, bringing as the main cause vocal fold paralysis.

In relation to brain tumors, the study by Parsay et al,(2011) narrates a decline in the Intelligence Quotient and academic performance induced by radiotherapy, in complementation, Oliveira, Almeida, Silva (2010) indicate hypotheses for this decline, some of them being: the death of neuronal cells, myelin degeneration, membrane oxidation, subcortical calcification, and the decrease in white matter, all of which lead to a development lower than that of healthy children, providing evidence that the dose of radiotherapy to which the brain is subjected generates long-term changes in verbal and non-verbal competence, compromising different cognitive dimensions, with the most recurrent being verbal and visual memory problems, concentration, attention, executive functions, visuospatial perception, psychomotricity, learning, and language.

Through research it has been portrayed that reduced brain white matter is the main factor for children with brain tumors to have primarily difficulties in the areas of attention, memory, and declining IQ performance (REDDICK et al., 2014).

Also in relation to head tumors Cañizares et al., (2018) reports that surgery is a fundamental therapeutic weapon, being effective as a single treatment in cases of head and neck tumors in early stages and essential in advanced stages coupled with other therapies. The advantages of resection of the tumor at an early stage are: fast recovery, better prognosis, propitiation of histological study of the lesion and the reduction of radiation doses. However, the surgery can cause aesthetic and functional complications in the child's oromiofunctional aspect.

According to the study by Taylor et al., (2012) 44.3% of the children evaluated in the research presented swallowing disorder, the incidence was 38.6% in oral phase alterations and 34.3% in pharyngeal phase. Regarding communication, deficits in expressive language represented 38.6% of the cases, followed by receptive language, which was considered deficient in 33% of the children. Moreover, speech limitations were found in 26 patients symbolizing 31.4% of the total, and vocal difficulties in 5.7% of the patients.

In contrast, Coça et al., (2018) portrays alterations that were not reported in the study of Taylor et al., (2012) such as trismus, tongue paralysis and facial paralysis. According to the author most of the disorders were oromiofunctional with 16.4%prevalence, followed by language disorders and dysphonia with the same percentage of 9.4%. Phonetic disorders represented 8% of the alterations, phonological 3.8%, dysarthria 3.8%, dysphagia 4% and dysacousia 2% of the total of patients with recent hearing evaluation in a period of less than 1 year.

Liberman et al., (2016) focused on tracing the audiological characteristics of children with cancer even knowing that the incidence of hearing loss is extremely variable according to the method used to administer the drugs, the location of the tumor, age, pre-existing diseases and use or not of radiation. Through the research it was found a predominance of bilateral, symmetrical losses of sensorineural character in the frequencies of 4.6 and 8 kHz.

Treatment involving cisplatin caused 41.9% loss in the right ear and 47.3% in the left ear, resulting that this type of approach generates an 11.7% higher risk of hearing loss on the right and 17.6% higher on the left. The issue of age was also described presenting a result that children aged 6 years or less have a 2.7 higher risk of developing hearing loss compared to children older than 6 years. (LIBERMAN et al., 2016)

Liberman et al., (2016) states in its literature that before demonstrations radiotherapy does not present risk for hearing loss unlike chemotherapy, which goes against the study Coura, Modesto (2016) that found that cranial RT caused ototoxicity in pediatric patients resulting in gradual hearing loss manifested after months or years of exposure. Regardless of the causal factor the hearing loss may impact the development of language, cognition and educational performance in children (LIBERMAN et al., 2016).

The posterior fossa is one of the most common sites for CNS tumors in children; it includes the cerebellum, brainstem and basal ganglia, which play an important role in the neurological control of speech and swallowing. CP tumors mainly lead to orofacial motricity alterations due to the possibility of cranial nerve injury (COÇA et al.,2018;CANIZARES et al., 2018).

The early detection of speech disorders helps in better monitoring of these patients throughout their treatment, this detection is due to a careful assessment by the professional working in the oncologic institution at the time of entry of the child and carefully redone during treatment. Thus, to evaluate the language, swallowing, voice, orofacial motricity and speech of pediatric oncology patients in the hospital environment five different protocols were used, namely ABFW, AusTOMs, RCH, FOIS, and GRBASI.

To assess language, the studies by Taylor et al., (2012) used the AusTOMs and RCH protocol in order to check receptive, expressive, pragmatic, stuttering, speech, and literacy language. On the other hand, Coça et al., (2016) made use of the ABFW protocol to assess the areas of Phonology, Vocabulary, Fluency, Pragmatics and articulation, prosody, speed and speech integrability through spontaneous speech.

The Orofacial Motricity area was verified in the study by Coça et al., (2016) validating the aspects of posture, strength, mobility, and sensitivity of the orofacial structures. For swallowing, the Functional Oral Ingestion Scale was used and clinically observed signs such as stasis in oral cavity, extra oral and/or nasal escape, multiple swallowing, coughing, hawking and wet voice being used cervical auscultation (COÇA et al., 2016).

Alternatively Taylor et al., (2012) measured and tracked the presence and severity of oral and pharyngeal phase swallowing changes with the RCH protocol, focusing on: feeding limitation, time used for feeding, ability to self-feed, need for non-oral nutritional supplementation, and need for specialized positioning during feeding.

The vocal aspect was assessed by Taylor et al., (2012) through the AusTOMs in order to know the level of impairment, limitation, restriction, participation, distress and vocal well-being. In contrast, Coça et al., (2016) used the Perceptual-auditory vocal scale - GRBASI to check the degree of dysphonia, roughness, soprosity, and voice instability.

The role of the speech therapist becomes essential in the multidisciplinary team before, during and after childhood oncological treatment due to the prevalence of communication and swallowing alterations. Having as a priority in the hospital context: optimize feeding avoiding mainly the low nutritional status, improve the quality of health and efficiency in communication that leads to better results of the physical, emotional and social status of the child (TAYLOR et al.,2012).

The need for pediatric monitoring after the completion of cancer coping allows for a better technical understanding of the evolution of findings at the initial time comparing them to the emergence of new treatment-associated disorders (COÇA et al.,2018).

For a better therapeutic action, it is necessary to have a broad analysis under several abilities, since many effects are discovered late or are amplified when the individual is put back to his social routine with others of his age. Thus, the return to social life brings mainly complaints related to difficulty hearing, social interaction, communication and low school performance due to difficulties in reading, writing, mathematics, memory, attention, concentration and visual perception, which are caused by the

consequences of short, medium or long term therapies (TAYLOR et al.,2012;OLIVEIRA;ALMEIDA;SILVA et al, 2010)

5 FINAL CONSIDERATIONS

The present study identified that the speech and hearing alterations in childhood cancer were in communication, swallowing, orofacial motricity, hearing and cognition. The main group affected are children with solid Head and Neck tumors, Central Nervous System tumors, and who have been on chemotherapy for a long period.

Finally, it is important to stress that speech therapy is indispensable in this population, because the alterations found in this review are closely linked to the oromiofunctional structures. It is essential to carry out previous and routine follow ups in order to enable the early diagnosis and treatment of these disorders, resulting in a better quality of life for the child and his/her family.

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Chapter 21

Importance of the use of the sterile glove by nurses in the performance of dressings in the hospital environment: integrative review

10.56238/eyohsc1-021

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ABSTRACT
Gloves used in health care are indicated as a protective barrier for health professionals, especially biological risk, and are part of Personal Protective Equipment. The performance of dressings aims to protect the injury or wound from the action of external agents and may be physical, chemical or biological, besides providing cleaning, absorption of exudates, immobilization and pain relief. Three different types of materials can be used: dressing kit, sterile glove and procedure glove. The study is an integrative review of the literature, is based on the question: What is the importance of the practice of the use of sterile gloves by nurses in the performance of dressings in the hospital environment? It aims to seek scientific evidence in the light of the literature that allows analyzing the practice of the use of sterile glove by nurses to perform dressings and the effectiveness of the sterile technique in this procedure. There are no absolute concepts regarding the clean and sterile technique in the most diverse situations in which patients can present. However, it can be understood that the practice of stereo technique in the hospital environment becomes safer for the prevention of infections in skin wounds. And that the use of sterile gloves cannot be classified as an incorrect technique.

Keywords: Nursing care; Nursing care; Wounds and injuries; Infection of the wounds.

1 INTRODUCTION

The gloves used in health care are indicated as a protection barrier for health professionals, especially to biological risk and are part of the Personal Protective Equipment (PPE), whose main purpose is to protect professionals from exposure to body fluids such as blood, secretions and excretions. The use of this equipment aims to reduce the direct contact of the professional's hands with possible contamination pathways such as patient tissues, injuries, mucous membranes, for example, when performing procedures (Ferreira et al. 2009).

As defined by the RDC in 05/2008, the gowns are a single use item and should be discarded and substituted in the different assistance activities of the same patient and between the care of different patients. They also need to be placed immediately before the procedures to be performed, with previous hand hygiene, and discarded at the end of these activities. This is in accordance with NR 32, which emphasizes that the use of gloves does not replace the hand washing process, which should occur, at least, before and after their use.

In the research conducted by Ferreira, et al. (2009), it is expected that the professional performs a risk assessment prior to the use of gauze in order to determine, first of all, if there is a need to use them,

and if so, to determine which type of gauze is most appropriate for the procedure. This judgment must take into consideration the nature of the activity, the type of possible contamination, whether the procedure is sterile or not.

The purpose of performing bandages is to protect the injury or wound from the action of external agents, which can be physical, chemical or biological, in addition to providing cleaning, absorption of exudates, immobilization and pain relief (Padula, et al. 2011). This makes it essential to practice a correct technique in the performance of curative procedures, so that their effectiveness, in terms of the aforementioned factors, is achieved.

Three different types of materials can be used to perform the curative procedure: curative kit, sterile drape and procedure drape. However, the professional must have theoretical and practical knowledge of clean and sterile techniques, as well as access to the necessary material for the development of the chosen technique.

Ferreira and Andrade (2008) define the sterile technique as being that which has guidelines that reduce the microbial load to a maximum through the use of inputs, objects free of microorganisms. The clean technique, in which sterile procedures and instruments are used, subject to the principles of assepsis, which includes the hands and the environment.

This study is relevant because there is little consensus on the use of tweezers or procedural or sterile drapes in the performance of wound healing and care, as well as on the type of solution and coverage used. In addition, the amount of scientific research on these care practices is insufficient, as well as the absence of institutional protocols that standardize the technique of performing bandages, in order to ensure patient safety and the quality of care provided by health professionals.

The aim of the study is to search for scientific evidence in light of the literature that allows the analysis of the practice of the use of sterile linen by the nurse for the performance of curative procedures and the effectiveness of the sterile technique in this procedure.

Given the exposition, the guiding question of the research was established according to the PCC strategy, being "P" - population: nurses; "C" - concept: the practice of the use of sterile water; "C" - context: performance of curatives in the environment. hospital. This study is guided by the following question: What is the importance of the practice of the use of sterile linen by the nurse in the performance of curative care in the hospital environment?

2 METHODOLOGY

This research is an integrative literature review. Souza, et. al. (2010) state that the main characteristic of this research is the possibility of contributing to the development of the theoretical context and effective applicability in practice. In addition, this method allows aggregating and synthesizing the results of research conducted on a specific subject, basically constituting an evidence-based practice tool.

Even referring to the above-mentioned authors, which refers to the breadth of this methodology, from the variety of review types, the integrative study is the one with the widest approach, allowing the inclusion of non-experimental and experimental research, providing a complete understanding of the analyzed phenomenon. In other words, the integrative review gathers data about a certain subject to be worked on, improving the understanding of it, and with this it is possible to apply the results with relevant meaning in clinical practice. This provides the effectiveness of the theoretical-prudential relationship in the field of health.

The research had as a guiding question "What is the importance of the practice of the use of sterile linen by the nurse in the performance of bandages in the hospital environment?", as well as being analyzed in parallel to this question, in accordance with the studies analyzed, which is the best technique, being the clean or stereo, for the performance of bandages of chronic or acute wounds in the hospital environment.

For the construction of the knowledge about the thematic worked, a search for articles was made in the following databases: BDENF - Nursing Data Base; SCIELO - Scientific Electronic Library Online; LILACS - Latin American and Caribbean Literature in Health Sciences; Medline - Medical Literature Analysis and Retrieval System on-line and sites of online scientific journals: ResearchGate and Sistema de Información Científica Redalyc.

The descriptors used were taken from the Banco de Descritores em Ciências da Saúde - DECS, being: infection of injuries; injuries and lesions; nursing assistance; nursing care. The Boolean operator "AND" was used in the operationalization of the sample collection. In addition to the descriptors, the following keywords were also used: clean technique and stereo technique for the search in online scientific journal sites. Table 1 shows the search strategy with the use of the descriptors and the respective values of the total number of articles found.

Table 1: Search strategy with the use of the descriptors and the respective values of the total number of articles found in each database.

Relationship between the descriptors and the Boolean operator "AND"	**Total number of articles available in the database**
Infection of wounds AND assistance from nurses	727
Injuries AND nursing care	4.500

Source: Alessandra Leão Brasileiro (2022).

The data collection had as support for the organization of the samples a collection instrument elaborated in Microsoft Excel 2010 software. This had the following variables: title, database in which they were indexed, author, year of publication, authors or keywords, type of study, guiding question and conclusion.

Included were articles that addressed the subject of the performance of curatives by nurses and the chosen technique, as well as the knowledge of these professionals about the development of the procedure for the performance of curatives. that reported the use of the sterile technique and the clean technique in

performing the above procedure, articles that were freely available in full text, with complete text, national publications, available in Portuguese, regardless of the year of publication. There was no time limit in order to broaden the possibilities of results.

As exclusion criteria, those that did not meet the inclusion criteria, duplicate publications, scientific event annals (abstracts), as well as studies that did not address the relevant topic for the research objective were withdrawn.

3 RESULTS

The search was conducted in July 2022. After the combination of the descriptors, a total of 5,227 articles were found in different databases, and with the application of the filters, a total of 451 available articles were obtained, where some of these were repeated in different databases. Table 2 shows the quantitative representation of the samples in relation to each database after applying the filters.

Table 2: Representation of the quantitative representation of the samples in relation to each database after the application of the filters for the descriptors "infection of injuries" AND "nursing care" and for the descriptors "injuries and lesions" AND "nursing care".

Describers with the operator's application Boolean "AND"	**Database - Total of available articles**
Infecção dos ferimentos AND assistência de enfermagem	BDENF - 22
	LILACS - 20
	MEDLINE - 1
	SCIELO - 0
Describers with the operator's application Boolean "AND"	**Database - Total of available articles**
Ferimentos e lesões AND cuidados de enfermagem	BDENF - 186
	LILACS - 166
	MEDLINE - 27
	SCIELO - 29

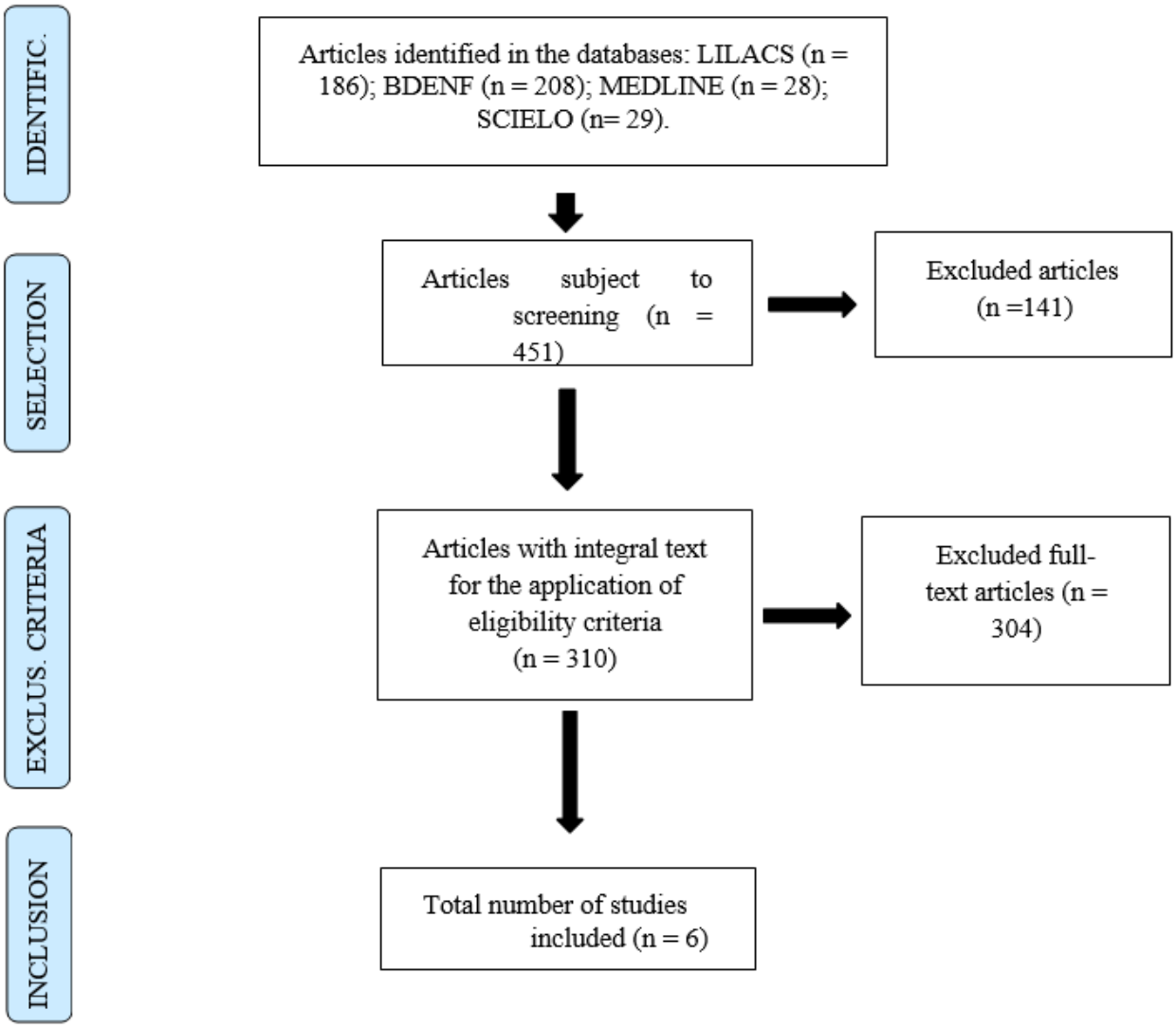
Source: Alessandra Leão Brasileiro (2022).

With the exclusion of the duplicated articles, there was a new presentation of these samples, where for the descriptions "infection of injuries" AND "nursing care" a total of 25 articles were obtained. After applying the filters, a total of 285 articles were obtained for the descriptions "injuries and lesions" AND "nursing care".

After a careful reading of the articles, those that did not have a direct relationship with the proposed topic and did not correspond to the northern question were excluded by title. Thus, from the initially selected texts, the summaries of the articles were read. Subsequently, after being subjected to the inclusion and exclusion criteria, 06 articles were selected.

The information was summarized in Figure 1, which consists of the flowchart adapted from the PRISMA method. The PRISMA flowchart aims to help authors to improve systematic reviews and meta-analyses (Page, et al. 2020).

Figure 1: Flowchart of the article selection process adapted from the PRISMA method (2020).



Source: Adapted from PRISMA recommendation (2020).

The articles were selected by means of the following sequence: reading the title-summary and reading the full text. For a better understanding of the results achieved by the authors, selected from the databases, and a better basis for the discussion of this research, the six articles chosen were listed in Table 3 by order number (N), where the pertinent information for the initial presentation of the publications was collected, being the title of the article, authors, year of publication and type of study, the main question and the conclusion of the study.

Table 3: Organization of the articles chosen for the development of the integrative review in terms of title, authors, year, type of study, guiding question and conclusion of the study.

N	Title	Authors	Type of study	Northern question	Conclusion
1	Infected wounds: method, diagnosis and nursing guidelines	FERREIR A, A. M. / 2004	Descriptive exploratory with quantitative approach	___	It was concluded that there were inadequacies in the application of the *swab* collection technique. This fact leads the clients to risks and exposure to inappropriate therapies, suggesting the need for updating and training of the nursing staff in this professional practice.

	Integrative review of the clean and sterile technique: consensus and controversiesna curative treatments	FERREIRA, A. M., ANDRADE, D. / 2008	Integrative literature review	Does the clean technique in curatives maintain microbiological safety and, consequently, does not predispose to the risk of infection?	There is consensus that the clean technique reduces costs. Considering the scarcity of studies, the need for more level I and II research, according to the hierarchy of evidence, ishighlighted.
	Validity of the instrument on the care of Chronic Illnesses of chronically injured people	GONZAGA, M.H.H.P. O.A., *et al.*/ 2022	Methodological study	What is the evidence of content validity of an instrument to investigate changes resulting from COVID-19 in the nursing care of chronically injured people in primary care?	The instrument showed evidence of content validity and could be used to investigate possible changes resulting from the COVID-19 pandemic in the nursing care of chronically ill people in primary care.
	The knowledge of nursing assistants and the tr eatment of injuries	PAULA, *et al.* / 2019	Observational, descriptive and quantitative study.	What is the clinical practice of nurses on injuries and the specific knowledge in their treatment?	The general knowledge of the interviewees was considered good. The most frequent form of updating was asking other professionals in the area about their doubts, followed by reading scientific articles, participating in congresses and searching for information with the pharmaceutical industry.
5	Actions of nurses in the care of skin lesions	CAUDURO, F.P., et al. al. / 2018	Qualitative, descriptive and exploratory study	How are nurses' actions in the care of patients with skin lesions characterized?	It was considered the improvement of the nurse, through permanent education, team work and the help of the Injury Prevention and Treatment Committee, a strategy for skin care, stimulating clinical reasoning by means of case study discussions, analyzing nurses' guidelines and directing the professional practice towards collective, dialogued and critical care.
	Profile of national nursing scientific production on wounds	AZEVEDO, I.C., et al. al./ 2018	Integrative review	What are the topics discussed in the studies produced by Brazilian nursing on injuries?	It was identified that Brazilian nursing studies focus especially on the topical treatment of the injury in the hospital environment, when it also disregards other primary points in the assistance to the skin injury patient, such as the care provided in basic care, the emotional aspects, the nutritional contribution, the costs of treatment, the professional training and the construction of protocols, which would guide the systematization of the production of care.

Source: Alessandra Leão Brasileiro (2022).

Table 4 shows the organization of the 06 articles chosen for the development of the integrative review in terms of the title, database and search criteria used. 02 articles were available on the SCIELO platform, 03 articles were available on the LILACS and BDENF - Nursing platforms and 01 article was found only on BDENF - Nursing.

Table 4: Organization of the articles chosen for the development of the integrative review in terms of title, database and descriptions used for the search.

N	Title	Authors	Type of study	Northern question	Conclusion
1	Infected wounds: method, diagnosis and nursing guidelines	FERREIR A, A. M. / 2004	Descriptive exploratory with quantitative approach	—	It was concluded that there were inadequacies in the application of the *swab* collection technique. This fact leads the clients to risks and exposure to inappropriate therapies, suggesting the need for updating and training of the nursing staff in this professional practice.
	Integrative review of the clean and sterile technique: consensus and controversiesna curative treatments	FERREIR A, A. M., ANDRAD E, D. / 2008	Integrative literature review	Does the clean technique in curatives maintain microbiological safety and, consequently, does not predispose to the risk of infection?	There is consensus that the clean technique reduces costs. Considering the scarcity of studies, the need for more level I and II research, according to the hierarchy of evidence, ishighlighted.
	Validity of the instrument on the care of Chronic Illnesses o f chronically injured people	GONZAG A, M.H.H.P. O.A., *et al.*/ 2022	Methodolog ical study	What is the evidence of content validity of an instrument to investigate changes resulting from COVID-19 in the nursing care of chronically injured people in primary care?	The instrument showed evidence of content validity and could be used to investigate possible changes resulting from the COVID-19 pandemic in the nursing care of chronically ill people in primary care.
	The knowledge of nursing assistants and the tr eatment of injuries	PAULA, *et al.* / 2019	Observation al, descriptive and quantitative study.	What is the clinical practice of nurses on injuries and the specific knowledge in their treatment?	The general knowledge of the interviewees was considered good. The most frequent form of updating was asking other professionals in the area about their doubts, followed by reading scientific articles, participating in congresses and searching for information with the pharmaceutical industry.
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	Profile of national nursing scientific production on wounds	AZEVED O, I.C., et al. al./ 2018	Integrativ e review	What are the topics discussed in the studies produced by Brazilian nursing on injuries?	It was identified that Brazilian nursing studies focus especially on the topical treatment of the injury in the hospital environment, when it also disregards other primary points in the assistance to the skin injury patient, such as the care provided in basic care, the emotional aspects, the nutritional contribution, the costs of treatment, the professional training and the construction of protocols, which would guide the systematization of the production of care.

Source: Alessandra Leão Brasileiro (2022).

In relation to the authors, only one article was found with the related authors "Infection of injuries AND nursing care", the other five publications were related to the authors "Injuries and injuries AND nursing care". And among the publications chosen, the one that presented the greatest relevance with the possibility of answering the question addressed by this study was that of the authors Ferreira, A. M., Andrade, D. (2008).

In view of the scarcity of articles relevant to the research and the absence of writers focused on the problem, which made data collection difficult, it was necessary to use other search sources. In addition to the articles indexed in the platforms, two more articles available in electronic sites, ResearchGate and the Scientific Information System Redalyc, were also used as a strengthening base for the contextualization and answer of the northern question, with the use of the keywords: clean technique and stereo technique.

In Table 5, the two articles are presented with the order of the title, publication site, authors, year, key words, research method, guiding question and conclusion of the research.

Table 5: Articles available in electronic journals presented in order of title, publication site, authors, year, keywords, research method, guiding question and conclusion.

Title	**Site**	**Authors/Year**	**Keywords**	**Method**	**Guiding question**	**Conclusion**
Use of the Clean Technique or Sterile in curatives.	Research Gate	PRADO, A.R.A., et al. al. / 2016	clean technique and stereo technique	Integrative literature review	The treatment of chronic or acute wounds must be performed with clean or sterile technique, by nurses, according to scientific products?	There is a need for new research initiatives with high power of evidence on the subject, as well as policies and educational programs on assepsis in health services to assist professionals in decision making.
Use of the sterile technique and performance of curative treatments by the nursing team	Sistema de Información Científica Redalyc	PADULA, M. et al./ 2011	clean technique and stereo technique	Quantitative descriptive and observational research	____	The percentage of errors and successes in performing the technique was very close, which demonstrates the need to bring these data to the knowledge of the institution.

Source: Alessandra Leão Brasileiro (2022).

4 DISCUSSION

Gonzaga, et al. (2022), brings a more current research compared to the other authors. In their study, they address the issue of nursing care in the performance of curative care in the face of the occurrence of the COVID-19 pandemic. And the challenges faced by the professionals for the continuity of care to these patients in primary care.

The above-mentioned authors bring the context of the nurse's responsibility in assisting and accompanying clients in the treatment of chronic injuries. They affirm that the professional is responsible for the nursing consultation, the holistic evaluation of the user, as well as the adequate choice of the topical treatment for the injury, health education and self-care guidance.

Paula, et al. (2019) address in their research the knowledge of nurses about wound care. The authors suggest that in order for nurses to be able to provide care to patients with injuries and improve the quality of care, it is necessary to search for more reliable resources such as information on scientific theoretical foundations, training courses and training.

Gonzaga, et al. (2022), as well as Paula, et al. (2019), do not directly address the relationship of the techniques chosen for the development of the procedure of performing curative procedures, but the authors bring a very relevant point to be cited, which is the formulation of strategies that enable the accompaniment of the patient in wound care. Without adequate assistance, the injuries have greater chances of aggravations such as the development of an infection, the occurrence of amputations and even death due to sepsis.

Gonzaga, et al. (2022), Cauduro, et al. (2018), & Paula, et al. (2019) report that for the development of a quality care practice for patients with skin lesions, it is necessary to implement assistance protocols on wound care, and the standardization must have the scientific basis associated with the reality of the institution.

The assistance protocol is an efficient method of care that facilitates communication between professionals, thus avoiding divergences between guidelines and decision making and, above all, improving the quality of the assistance provided.

by professionals, as well as optimizes the use of available resources (Paula, et al. 2019). And the lack of this instrument results in a high error rate during the development of assistance in the performance of curative procedures.

Paula, et al. (2019) also reinforces in their research the recommendation of continuing education for nurses, with the aim of offering training, thus improving the possibilities for the construction and improvement of knowledge of these professionals.

According to Azevedo, et al. (2018), the scientific evidence-based clinic does not aim to be sovereign in guiding health care practice. But it does contribute to the quality of health care through the continuous training of professionals, which makes it valid to highlight the need for the development of research in this area of knowledge in health and nursing. The authors also report that in the context of injuries, in general, nursing studies in Brazil have disregarded key points in the assistance to the skin injury patient.

In the research conducted by Ferreira & Andrade (2008), it was evidenced that since the eighties there had already been a questioning about the use of sterile and procedural drains for the performance of curative procedures and the citation of the need for more scientific production, since the scarcity of productions was prejudicing the judgment regarding the use of these materials.

Ferreira et al. (2004) reflects on the execution of the techniques developed by nurses. The development of the procedures requires from the professionals knowledge, dexterity, skill and critical reasoning, and for this practice, the nurse needs training and to be always updated on the subject.

The choice of the clean or sterile technique in the performance of curatives, in acute or chronic wounds, has been frequently questioned, taking into consideration the safety of the clean technique in relation to the higher cost of the sterile technique (Prado, et al. 2016).

Prado et. al. (2016) define sterile technique as being that which develops the procedure by reducing the microbial load as much as possible by means of strategies that restrict exposure to microorganisms. The clean technique refers to methods that minimize the total number of microorganisms, avoiding or reducing the risk of cross-contamination.

Ferreira & Andrade (2008) argue that the use of the clean technique applied in the performance of curative procedures in the hospital environment presents a low cost, however, it does not guarantee the reduction of the occurrence of lesion infections, mainly because there is evidence of contamination of procedural drains by bacteria, the most frequent type being Staphylococcus aureus, both in the external and internal region of the material.

Corroborating with the thinking of Ferreira & Andrade (2008), in what is understood as the objectives of the procedure of performing curative procedures in preventing the occurrence of infection in the hospital environment, the sterile technique is the most appropriate, although it has a high cost compared to the clean technique. However, the possibility of infection of the lesion cannot be neglected (Prado, et al. 2016), and the vision of immediate cost with supplies should not override Patient Safety.

In relation to the environment in which the wound is being treated, Ferreira & Andrade (2008), identified studies that reported on the choice of these materials by nursing professionals, where it was found that the choice of the dressing was related to the environment in which the healing procedure was being developed. The nursing assistants and stomatotherapists responsible for home care used less sterile linen compared to those in hospital care.

This behavior is understood, because the home environment presents a lower predisposition to colonization of microorganisms compared to the hospital environment, in addition to the availability of shared materials that occurs in the hospital environment. This does not occur in the home setting, since the supplies are specific to the patient's use.

The clean technique may be even more appropriate at home than in the hospital, because people can grow tolerant to infectious agents that inhabit their own body, and there is no risk of cross-infection. However, the final decision about the possibility of using a sterile or clean technique for patients with a wound at home is a matter of professional judgment and experience (Prado, et al. 2016).

However, Prado, et. al. (2016) warns that the care of clients with injuries in ambulatory, domiciliary, primary care and in environments with less risk of infection by hospital microbiota, and that there is usually a greater concern with cost reduction, should not be neglecting the safety and quality of the procedure of performing healing and treatment with the injury, being necessary to redouble the care in the application of the clean technique.

Padula, et al. (2011) argues that the use of procedural drapes to perform curatives cannot be classified as a correct technique, since it is not a clean technique, since the materials used were contaminated. And that there is no concrete evidence that proves that the use of clean technique should be recommended for the practice of curative procedures in the hospital environment.

There is a consensus among the authors regarding the lack of scientific research addressing this topic. There is a gap in the national field on the subject, being of fundamental importance that research be conducted in the country, because the reality of health and sanitation found in Brazil is different from that found in international studies (Prado, et al. 2016).

As recommended by Ferreira & Andrade (2008), it is necessary to elaborate researches with experimental delineations that will contribute to the decision making of professionals regarding the standardization of guidelines related to the clean and sterile technique. The authors warn about the scarcity of scientific evidence, which hinders the elaboration of recommendations for clinical practice and generates prejudices regarding the orientation of the professionals involved in the procedure.

5 FINAL CONSIDERATIONS

In general, few guidelines are accepted and used, which weakens the evidence found for the elaboration of recommendations for clinical practice. In addition, there are no absolute concepts as to the clean and sterile technique in the most diverse situations in which patients may present.

However, it can be understood that the practice of the stereotactic technique in the hospital environment becomes safer for the prevention of infection occurrence in cutaneous wounds. And that the use of sterile gauze cannot be classified as an incorrect technique, since there are bibliographic references in which the procedure is described, proving its efficacy.

The authors defend the stereotactic practice for the performance of curative procedures in a hospital environment, as well as encourage professionals to make use of empirical experience for each technique chosen according to the environment and condition of the wound, applying the critical judgment associated with the scientific approach.

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Chapter 22

Dynamic postural balance of volleyball players

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ABSTRACT

Introduction: Dynamic postural stability is a highly relevant requirement in sports, and its evaluation becomes important when related to performance. The objective of this study is to describe the dynamic postural balance of volleyball athletes. The research is characterized as quantitative and descriptive. Seventeen male volleyball athletes from the Federal Institute of Bahia - Jequié Pole team were recruited. Volunteers' data were collected and the *Star Excursion Balance Test* was used to evaluate dynamic postural balance. The data processing and analysis were performed using the *GraphPad 5* program, with a significance level of 5%. The averages obtained by calculating the composite score were 83.52 (± 2.96) for the right leg, and 83.79 (± 2.48) for the left leg, with no statistical difference between them, but the distances reached with both limbs in the anterior direction were significantly lower than the distances reached with both limbs in the posterolateral and posteromedial directions. Moreover, grade I sprains, as well as the amount of sports played in association, do not significantly affect the performance of Dynamic Postural Stability of amateur volleyball athletes.

Keywords: Sport; Proprioception; Sprain.

1 INTRODUCTION

Volleyball is one of the most popular sports in the world, second only to soccer[1] . Despite this popularity and the large number of players, there are not many studies on injuries and their prevention in volleyball players[2] . Since it is a game with little physical contact, it is expected that the incidence of injuries is low. According to some studies, the incidence of injuries in volleyball varies between 1.7 and 4.2 injuries per 1000h .[3,4]

The ankle inversion sprain is the most common injury in the sport, representing about 20% of all injuries, and may represent up to 73% of ankle injuries[5] . It is mostly caused by the eversion or inversion of the foot due to sudden and violent movements, and there may or may not be ligament rupture. 25% of all sports injuries are ankle sprains, and that of these 85% are inversion ankle sprains .[6]

Regarding the risk factors for ankle sprain in sports, two types of factors are considered: intrinsic factors (individual) and extrinsic factors (environment)[7] . Of these, the level of competition, number of games played, sports footwear and position of the player in the match are external risk factors. The internal factors include gender, age, height, weight, dominant limb, anatomical alignment, agility/coordination, muscle strength, proprioception, previous injury history, and joint stability .[8]

Proprioception is one of the systems responsible for the sensory input given to the central nervous system (CNS) and encompasses the sensations of kinesthesia, joint movement, directly influencing the postural balance. This is defined as the ability to maintain the center of body mass within the support base, and is an essential component in sports, for it unfolds in complex tasks, requiring the sum of activity of the visual, somatosensory, and vestibular systems in interaction with the CNS[9,10,11] , an ability which, under dynamic conditions, is a very important component in the practice of any physical activity.

This study demonstrates its importance for evaluating the dynamic postural stability (DP) of athletes, predicting injuries such as ankle sprain, very common to the modality[1-4] , and also for using a non-instrumented evaluation method, more common to clinical practice and of easy reproducibility, presenting a good cost-benefit ratio, with the main collection instrument being the *Star Excursion Balance Test* (*SEBT*), contrasting studies with instrumented methods, such as the force platform, electromyography, and isokinetics, carried out by large centers and laboratories, in which there are financial resources and incentives for research.

This paper aims to describe the DPS of volleyball athletes through *SEBT*.

2 METHODOLOGY

2.1 TYPE OF STUDY

This is a descriptive study with cross-sectional design and quantitative approach. Seventeen male volleyball athletes were recruited from the Federal Institute of Bahia - Jequié Pole, in the period from November 2017 to May 2018. The athletes were referred for evaluation and application of the Modified *SEBT* test[12]

The choice for the sample is justified by the fact that athletes in the formation phase often present inconsistencies in the execution of the sportive gesture, predisposing to proprioceptive reaction deficits. This is the same impression of Farina and Mansoldo[13] , when they mention that adolescent athletes have a higher rate of myoarticular lesions due to errors in technique execution, strength and flexibility deficits.

2.2 DATA COLLECTION INSTRUMENTS

2.1.1 Socio-demographic Anamnesis

For data collection, an evaluation form was used containing the personal data of the volunteers and information about possible injuries suffered by the athletes, according to the theoretical reference directed to the sports area. The anamnesis had questions such as how long the athletes have been playing sports, duration and frequency of training, if they practice stretching, if they do load training, among others.

After filling out each athlete's form with the answers provided by the evaluators, the examiner had to measure the real length of each athlete's lower limbs. The actual measurement was represented by the distance between the anterosuperior iliac spine and the ipsilateral medial malleolus. This distance was measured with the athlete in a static orthostatic position, with her limbs extended and in neutral position,

and with her feet symmetrical. To evaluate the proprioceptive activation of the lower limbs, a specific test protocol was used.

2.1.2 Star Excursion Balance Test (SEBT)

In an effort to minimize redundancy and improve efficiency, PLISKY *et al*. [12]proposed a reduction from eight reach directions to three directions (anterior, posterolateral and medial) in a study with basketball athletes. For these reasons, the modified *SEBT* was chosen as the research instrument.

This test consists in giving verbal and visual instructions to the subjects, who must place the most distal part of the 1st finger in the center of the Y. For each of the three directions (anterior, posteromedial, posterolateral), they must perform 6 training trials. The next 3 will count for the evaluation. The attempt must be repeated if there is a loss of balance, if the heel at any point does not remain in contact with the ground, if the body weight is transferred to the test leg, or if the test foot does not return to the starting position before another attempt is made.

It is important to point out that the lower limb to be evaluated is the one that stays fixed on the ground, and not the one that moves in different directions, thus the identification of the grid is different for the left leg than for the right leg. The grid was constructed on the ground with colored cardboard and attached with tape, with each line being one meter long. Each line was manually measured and marked every centimeter, with a larger marking every five centimeters, to make it stand out from the other points and facilitate identification during the execution of the test.

To quantify the length of the lower limb, the distance from the Anterior Superior Spine to the most distal part of the lateral malleolus was measured. The composite score is used to normalize the value, and is based on the formula, [(Max Anterior + Max PosteroMedial + Max PosteroLateral) / (Leg Length x 3)] x100, (Filipa *et al., 2010).*

2.3 FIELD OF STUDY

The research was conducted in the men's volleyball team of the Instituto Federal da Bahia (IFBA) - Polo Jequié, and the evaluation of all participants was carried out within the institution's gymnasium.

2.4 STUDY POPULATION

For this study, 17 athletes from the men's volleyball team, who agreed to participate in the research and signed the Free Informed Consent Form, were considered as subjects of the research.

2.5 INCLUSION AND EXCLUSION CRITERIA

Athletes who were in regular training were included, and athletes who were injured at the time of collection, or with a recent injury (less than 1 month), and left-handed athletes were excluded.

2.6 DATA ANALYSIS

The quantitative data were analyzed using descriptive statistics, with measures of central tendency (mean) and dispersion (standard deviation), with the data collected tabulated in an electronic spreadsheet of the *Excel* program for *Windows* and, subsequently, the *GraphPad Prism 5 software was* used for data processing and analysis. The ANOVA test was performed with Tukey's post-test for comparison correction. The significance level adopted was 5% ($\alpha = 0.05$).

2.7 ETHICAL ISSUES

Regarding ethical aspects, this study complies with the legal principles of study on human beings through Resolution 466 of 2012 of the National Health Council (CNS), and data were collected after approval by the Research Ethics Committee (CEP) of UESB (CAAE nº 2.450.650) and upon signature of the Informed Consent Form by the participant.

3 RESULTS

The mean, standard error, maximum and minimum values of the composite scores are described in Table 1, and the respective values of the ranges obtained in the *SEBT* test are shown in Table 2.

Table 1. Mean, standard error, maximum and minimum of the composite scores of the Right Lower Limb (RLL) and Left Lower Limb (LLL).

Variables	**Values**
Scores	
MID score	83,5 ± 2,96 (100,0 - 63,1)
MIE Score	83,7 ± 2,48 (105,8 - 65,9)

Table 2. Mean, standard error, maximum and minimum of the A, PM and PL directions achieved in the SEBT test with the right lower limb (RLL) and left lower limb (LLL)

Variables	**Values**
Directions	
Previous MID Direction	62,3 ± 1,44 (70,0 - 51,0)
Previous Steering MIE	61,8 ± 1,23 (75,0 - 55,0)
Postero-medial direction MID	83,5 ± 3,82 (115,0 - 60,0)
Postero-medial direction MIE	85,8 ± 3,15 (115,0 - 66,0)
Posterolateral direction MID	93,0 ± 3,83 (115,0 - 65,0)
Posterolateral direction MIE	91,9 ± 3,08 (110,0 - 65,0)

The averages obtained by calculating the composite score of the 17 athletes were 83.52 (± 2.96) for the right leg and 83.79 (± 2.48) for the left leg, with no statistical difference between them, despite the fact that all athletes had MID dominance. The mean, standard error, maximum and minimum values of the composite scores obtained in the *SEBT* test are described in Table 2. In the mean values found during the right lower limb (RLL) test, the anterior direction (62.3 ± 1.4 cm) was compared with the posteromedial (83 ± 3.8 cm) and posterolateral (93 ± 3.8 cm) directions; and the left lower limb (LHM), the Anterior direction (61.8 ± 1.2 cm) with the Posteromedial (85.8 ± 3.1 cm) and Posterolateral (91.9 ± 3.0 cm) directions, we will find that both the distance achieved in the ANT directions are significantly lower than the PL and PM directions. However, when comparing the ANT, PM, and PL directions of the MID with the corresponding ones of the ISS, we did not observe a statistically significant difference, as described in Figure 1.

Of the 17 sample members, only 8 (47.1%) are taller than 1.80m and weigh 75kg or more. 12 athletes have leg lengths greater than 90cm (70.5%), and with regard to age, 9 athletes (52.9%) are younger than 18 years old.

When observing how long they have practiced the sport, 10 athletes (58.9%) have practiced volleyball for 60 months (5 years) or more. As for the average duration per training session in minutes, 11 of the athletes (64.8%) train 90 minutes (1h30min), being the time available by the institution. 5 participants (29.4%) claimed not to practice any associated sport, while 10 (58.2%) practice only one, and 2 (11.8%) practice two or more associated sports.

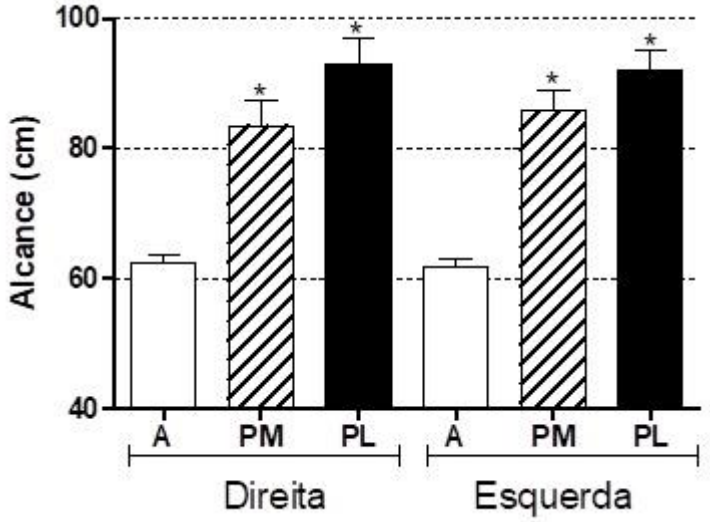
A low rate of orthopedic lesions (17.6%) was observed in the study, mainly due to the muscular preparation of these athletes, with 100% warming up and 94.2% stretching before training. Regarding sprains, only 3 (17.6%) reported an episode, but all of them were grade 1, in inversion, without physiotherapy and without major complications.

The descriptive results in numerical values are shown in Table 3.

Table 3. Mean, standard error, maximum and minimum values of the descriptive variables collected in the study.

Variables	**Values**
Height (cm)	178,0 ± 1,9 (194,0 - 165,0)
Weight (kg)	73,0 ± 3,5 (103,0 - 51,0)
Leg size (cm)	95,5 ± 1,4 (111,0 - 86,0)
Age (years)	18,0 ± 0,5 (24,0 - 14,0)
Volleyball time (months)	54,7 ± 11,1 (159,0 - 5,0)
Training duration (min)	102,3 ± 4,5 (150,0 - 90)
Associated Sports	0,9 ± 0,2 (3,0 - 0)
Warm-up duration (min)	16,4 ± 2,3 (30,0 - 5,0)

Figure 1: Comparison between the directions. A - anterior, PM - medial posterolateral and PL - lateral posterolateral. * p< 0.05 vs. right and left A.



4 DISCUSSION

After searching the Pubmed, Scielo, LILACS and Google Academic databases, despite the wide range of articles related to *SEBT* and YBT[9,14,15,16,17,18,19] , no articles were found that established pre-established DPS levels in values for *SEBT*, and there is no specific protocol tested and published for data analysis[20] , limiting the use of the tool only in studies that use comparisons.

A study by Corrêa[15] tried to perform a standardization, analyzing the Y Balance Test Kit - which is an instrumented version of the modified *SEBT* - regarding the performance of athletes in the test and its sensitivity to predict the risk of lower limb injuries without direct trauma mechanism. He found as a result that composite score < 89.6% increased 3.5 times the risk of injury in American Football athletes and asymmetry > 4 cm in the PM and ANT direction was associated with injuries in amateur and professional Football players and college athletes of different sports modalities, however, he also stated that cut points cannot be extrapolated to other modalities.

The averages obtained by calculating the composite score were 83.52 (± 2.96) for the right leg and 83.79 (± 2.48) for the left leg, with no statistical difference between them, although all athletes had MID dominance. Three athletes had a previous ankle sprain episode, but there was no statistical difference between the range of reach and score values achieved by them and the other athletes in the sample. All sprains were in their most common form, inversion, and grade I, characterizing a low severity injury, which after some resting period and restarted training, does not significantly affect the DPS performance. This finding corroborates another recent study[21] , which evaluated 189 college athletes from 6 different sports modalities, and no association was found between lower limb injury and reduced performance from the point of view of composite score and asymmetry in the *Y Balance Test* instrumented version.

Milanezi[22] proposed in his research to compare the inverse/eversive strength and proprioceptive capacity of recreational athletes with and without functional ankle instability (FTI), and the results were that athletes with FTI have reduced ankle eversive strength compared to healthy individuals, but there were

no deficits with respect to proprioception. Isakov and Mizrahi[23] used a force platform to measure the reaction forces between the anteroposterior and medio-lateral directions during unipodal support on ankles with and without sprain, and in the open and closed eye situations. The results presented for the controls in the anteroposterior and medio-lateral directions were the same between subjects with chronic sprain and subjects without injury, while the latter had their eyes open or closed.

The fact that higher values were obtained in the PL and PM directions in relation to the Anterior directions is justified by the complexity of the anterior reach movement, requiring a greater synergic contraction of stabilizing muscles, thus resulting in greater control of dynamic postural balance. Norris[24] found from electromyographic analyses that the gluteus medius produces a higher normalized signal in the Anterior direction than in the PM direction. Similarly, the reach movement in the Anterior direction is a unipodal squat, and as such, produces a high electromyographic activation of gluteus medius and maximus[25,26,27] . This increase in gluteal muscle activation occurs to promote pelvic stability during unipodal functional movements, minimize trunk imbalance and knee valgus .[28,29]

Relating the composite score of each athlete with the associated sports played, we found no statistical difference between them, so the amount of sports does not directly influence the DPS, resembling Gorman's study[30] that when evaluating high school athletes through the YBT-LQ (a derivation of the modified *SEBT*), comparing those who played a single sport with athletes who played multiple sports, found no statistically significant difference.

A low rate of orthopedic lesions was observed in the study, mainly due to the muscular preparation of these athletes, as all of them warmed up and 94.2% stretched before training. Warming up makes tendons and ligaments more elastic, which reduces the risk of injury for vigorous physical activity, thus increasing performance and reducing the risk of muscle injury. Moderate warm-up intensities can increase muscle performance by 3 to 9%[31] . The chronic effects of proctotic stretching, performed before sports practice or exercise, brings gains for flexibility and muscle performance in the long term[32] .

5 CONCLUSION

We conclude that, from the composite score calculation, the mean values presented were 83.52 (± 2.96) for the Right leg, and 83.79 (± 2.48) for the Left leg, with no statistical difference between them, despite 100% of the sample having MID dominance. Moreover, grade I sprains (low severity injury), after partial rest and functional training for the sport, as well as the amount of sports practiced in association with volleyball, does not significantly affect the performance of Dynamic Postural Stability of amateur volleyball athletes.

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Chapter 23

Electromatographic analysis of sternocleidomatoid muscle of individuals with tmd after rehabilitation with neopilates

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ABSTRACT
This study aims to evaluate the use of Neopilates in the rehabilitation of individuals with Temporomandibular Dysfunction (TMD), through electromyography. Four patients with a TMD positive diagnosis were evaluated, who underwent electromyographic analysis of the sternocleidomastoid muscle (SCM). After treatment in 10 sessions with exercises for the cervical spine region through neopilates, the patients were reevaluated. From the results obtained, it was possible to perceive the occurrence of a balance in the musculature, suggesting a possible improvement of the motor gesture of the Ecom muscle, after the use of Neopilates exercises, so we suggest new studies with a larger sample.

Keywords: Electromyography. Temporomandibular Disorders. Sternocleidomastoid. Neopilates.

1 INTRODUCTION

Electromyography (EMG) is a diagnostic method that allows the measurement of possible muscular alterations. Through this method, the evaluation of muscle activity is done by recording the electrical potentials generated by muscles in action and the muscle tension generated in a given contraction. In addition, EMG can identify changes in the autonomic nervous system, facing possible environmental and/or behavioral influences (de Nardi, 2010, de Amorim, 2017).

According to Oncins, de Camargo Freire and Marchesan (2006), the recording of muscle activity is done in a very short temporal pattern (tenths of seconds) and the capacitation of this recording is done by disposable electrodes that have different origins, and are chosen according to the function evaluated and shows the result of the recording in microvolts (μV). Because it is painless and non-invasive, it does not offer any risk to the individual being evaluated.

Multifactorial in origin, temporomandibular dysfunction (TMD) is a set of clinical signs and symptoms that affect the masticatory muscles. The person with TMD usually presents several symptoms, which can be: vertigo, ringing in the ears, muscle tenderness, discomfort, pain, reduced jaw movements, and headaches, with possible neck pain (Donnarumma et al., 2010; de Godoy, 2017).

Since TMD is a disorder that involves the masticatory muscles and the cervical region, it is possible to use EMG to identify the possible changes presented in its diagnosis. TMD generates a disturbance in the temporalis (Temp), masseter (Mass) and sternocleidomastoid (Ecom) muscles, thus causing pain and limitation to patients (de Nardi, 2010). This TMD reflex pain must be treated because it can worsen and become chronic. Chronic pain is directly related to the individual's quality of life status, reflecting in negative physiological, psychological and social effects (Novaes; Dantas; Figueiredo, 2018).

From this perspective, physical activity becomes an alternative adjuvant, aiming to minimize and/or restore the quality of life and neutralizing the negative effects. Studies have shown that physical exercise can positively influence the quality of life both in individuals with some pathology and in healthy populations (Silva; Silva, 2006; Ropke, 2018).

Among the several options to practice regular physical activity is the Pilates method, which provides an improvement in quality of life and offers quick results. It is also indicated for those who seek the improvement of movement, needing only to be disciplined in its practice, perform the exercises with fidelity, and follow all its principles, which are: concentration, control, precision, centering, breathing, and fluid movement (Camarão, 2009; Rodrigues; Valadares, 2015).

A current branch of the Pilates method, known as Neopilates, created as an innovative method, provides more challenges to the practitioners, because it includes, in addition to the traditional movements of Pilates, exercises considered functional and circus art. This method brings together the five classic principles of the Pilates method and creates three new principles, which are: instability, fun and challenge (Braz, 2011; Rodrigues; Valadares, 2015). Considering the above, this study aims to analyze the use of Neopilates in the rehabilitation of individuals with TMD through electromyography.

2 MATERIALS AND METHODS

To perform the evaluation and reevaluation we used an electromyograph model BR810C, EMG System da Brasil, portable version with twelve channels, with its own battery attached to a laptop, eight channels for EMG (for active and passive electrodes), four auxiliary channels, high performance data acquisition system and software for control, storage, processing and data analysis. The connectors have DC voltage outputs of ±12V @ ±100 mA, CMRR (common mode rejection ratio) of 112dB @ 60dB, input impedance for passive electrodes of 10^{1o} Ohms/6pf, input bias currents for active electrodes of ±2nA, voltage protection and bandpass filters for noise elimination from 5Hz to 5KHz. Silver differential single active electrodes were used, with two 10.0 x 1.0 mm contacts, 10.0 mm apart, and fixed in a 40x20x5 mm resin package.

The electrodes were positioned on the masseter, temporalis and sternocleidomastoid muscles following the recommendations of the international protocol Surface Electromyography for the Non-Invasive Assessment of Muscles (SENIAM) (Hermens et al, 2000), which comprises the intermediate region between the center of the innervation zone (motor point) and the muscle tendon, aligned

longitudinally and parallel to the direction of the muscle fibers, always keeping a distance between each pair of 1.5 cm from the center of the electrodes (Basmajian; de Luca, 1985). A reference electrode, ground, was positioned on the skin in the region of the carpal bones. Before placing the electrodes, the skin of the study sites was cleaned with alcohol in order to eliminate fat or pollution residues that may have been present on the patient's skin.

Four patients were evaluated, two male and two female, mean age 35.75 ± 14.31 years, with a positive diagnosis of right unilateral TMD. The patients had been presenting symptoms for an average of 28.5 ± 13.3 months and, according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) questionnaire, they had a mild to moderate degree of severity. Therefore, they underwent electromyographic analysis of the Ecom muscle, bilaterally in the following mandibular postures: resting, protrusion, right and left laterality.

During the electromyographic recording, the environment was kept quiet, and the individual was seated in a comfortable chair, with an upright posture, with the soles of the feet on the ground, the arms supported on the legs and the head positioned erect, with the Frankfurt plane as the standard. Before each experiment, the necessary instructions and explanations were given, always asking the patient to remain as calm as possible, breathing slowly and slowly.

The inclusion factors were: not being under any kind of drug or physical therapy treatment, not using a prosthesis, and presenting symptoms for at least 18 months.

The patients were seen three times a week, divided into 10 sessions, with the use of traction, mobility, and stretching exercises for the cervical region using the Neopilates technique.

To perform the exercises, the Lyra® , Gravity® , Core Skate® , Fix Ball® , Tonning Ball® and Super Band® were used. In the sessions, the patients were submitted to series of exercises, which should be repeated 3 times with a duration of 30 seconds each, respecting an interval of 15 seconds between the exercises.

The sequence of exercises was performed as follows: 1. cervical traction performed with the patient lying supine, with the body supported on the exercise roller and the head supported on the Gravity® , with the objective of generating an antigravity traction on the C1 and C2 vertebrae, and then from C3 to C7; 2. Myofascial release in the cervical musculature in the sagittal, frontal and transversal planes with the patient in prone position on the Gravity® and the frontal region of the head supported by the Tonning Ball® ; 3. mobility exercises for the thoracic and lumbar spine with the patient on his/her knees on the mat and hands supported on the Lyra® , in which a stretching of 4 supports and hip rolling was performed; 4. kneeling exercise, with the hands supported on the Core Skate® where, they performed a rolling, with an extension that included the cervical to the lumbar region. Other stretches for the trapezius (Trap), upper fibers, and levator scapulae were done with the Swiss ball on the Fix Ball, holding the Super Band .®

This study was approved by the Research Ethics Committee of Claretiano Centro Universitário with process number 2010/12.

3 RESULTS

Comparing the results of Pre (Table 1) and Post treatment (Table 2), we found that there was a balance of the right ECOM and left ECOM in relation to their functionality in all patients. Regarding protrusion, we can evidence a greater decrease in muscle activity in patient 1 Pre (0.68µV) and Post (0.14µV).

Regarding right laterality, only one of the patients (patient 4) showed an increase in muscle activity in the right Ecom compared to the other patients Pre (0.09µV) and Post (0.42µV). In the left Ecom, one of the patients (patient 3) showed a greater decrease in muscle activity compared to the others although this difference was not significant Pre (0.61µV) and Post (0.04µV).

Regarding left laterality, there was an increase in muscle activity of the right Ecom in 3 patients, with the exception of patient 2 Pre (0.65µV) and Post (0.95µV), and in the left Ecom, 3 of the 4 patients showed an increase in muscle activity, patient 1 Pre (0.08µV) and Post (0.16µV), patient 2 Pre (0.22µV) and Post (0.36µV) and patient 2 Pre (0.09µV) and Post (0.28µV).

Table 1: Electromyography results found in the Pre-treatment.

	Ecom D Protrusion	**Ecom E Protrusion**	**Lat D Ecom D**	**Lat D Ecom E**	**Lat E Ecom D**	**Lat E Ecom E**
	Pre	Pre	Pre	Pre	Pre	Pre
Patient 1	0.68µV	0.11µV	0.10µV	0.19µV	0.01µV	0.08µV
Patient 2	0.31µV	0.09µV	0.72µV	0.17µV	0.65µV	0,22µV
Patient 3	0.15µV	0.12µV	0.03µV	0.61µV	0.30µV	0,04µV
Patient 4	0.57µV	0.43µV	0.09µV	0.52µV	0.29µV	0.09µV

ECOM: sternocleidomastoid muscle, R: right side, L: left side, Lat: laterality

Table 2: Electromyography results found at post-treatment.

	Ecom D Protrusion	**Ecom E Protrusion**	**Lat D Ecom D**	**Lat D Ecom E**	**Lat E Ecom D**	**Lat E Ecom E**
	Post	Post	Post	Post	Post	Post
Patient 1	0.14µV	0.15µV	0.06µV	0.35µV	0.03µV	0.16µV
Patient 2	0.23µV	0.13µV	0,58µV	0.27µV	0.95µV	0.36µV
Patient 3	0.02µV	0.03µV	0.01µV	0,04µV	0.02µV	0.02µV
Patient 4	0.43µV	0.34µV	0,42µV	0.31µV	0.56µV	0.28µV

ECOM: sternocleidomastoid muscle, R: right side, L: left side, Lat: laterality

4 DISCUSSION

We use electromyography for the diagnosis and development of a treatment protocol for TMD patients (de Nardi, 2010). In our study, the electromyographic signal of the Ecom was hyperactivated on

the right side and hypoactivated on the left side, and the treatment with Neopilates showed that the Ecom on the right and left sides were in balance.

Most patients with TMD may have some dysfunction in the cervical spine. In order to observe this possibility, Armijo-Olivo and collaborators (2011), in their study, evaluated the Ecom muscle through EMG in one hundred and fifty subjects (47 healthy, 54 with myogenic TMD, and 49 with mixed TMD) using the functional cervical flexion test. The results showed a trend towards greater activation of the superficial cervical muscles. We can ratify this trend because the initial values of pre-treatment showed, in our study, higher electromyographic values in the Ecom.

A study conducted by Bini (2018) intended to analyze, through EMG, the effects of a swimming and respiratory re-education program for asthmatics, on the Ecom and Trap muscles, as well as on maximum inspiratory and expiratory pressures using the manovacuometer. The treatment program proved to be efficient for asthmatics and caused a decrease in the activation of the accessory respiratory muscles, which are used too much by this public and are harmful to their postures. There was also an improvement in the maximal expiratory pressure, being ideal exercises for asthmatics. Our study corroborates the findings of Bini (2018), in which the method used proved effective in reducing the activation of muscles involved in breathing in most patients.

Considering physical activity as a promoter of benefits, stretching is an interesting option because it promotes an improvement in flexibility, posture, and prepares the muscles for a functional performance. In order to have quality functional movements in daily life activities, good levels of proprioception are necessary (de Oliveira et al., 2018). The exercises proposed in our study, performed mostly on an unstable base, one of the proposals of proprioceptive training, were chosen to restore and/or improve this condition in patients. With a combination of stabilization and strengthening exercises the Pilates method provides a strengthening of the lumbar pelvic muscles, as well as in the activation of the deep muscles of the trunk (Mestriner; dos Santos Oliveira, 2018).

According to Braz (2014), the NeoPilates method in the cervical spine approach aims to strengthen the stabilizing muscles, promote relaxation of the superficial muscles, and gain joint mobility. To this end, strengthening exercises for the cervical stabilizing muscles, segmental and global stretching exercises, and joint mobility exercises can be used. Through a review of the literature, it was observed the importance that the sternocleidomastoid muscle plays in mobility and the relationship of the cervical spine with the thorax and head, in individuals with TMD this relationship is unbalanced causing pain and limitations (Gurjão, 2010; Donnarumma, 2010).

5 CONCLUSION

From the results obtained in the electromyographic analysis, we noticed that there was an improvement in the Ecom balance. From this balance we can suggest that possibly an improvement of the motor gesture would occur after the use of Neopilates exercises. We can suggest that the Neopilates

technique proved to be effective because it promoted a balance between the studied musculatures, which was proven through the electromyography. We understand, therefore, the need for new studies with a larger sample.

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Chapter 24

Smoking as a Risk Factor for Periodontal Disease

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ABSTRACT
Cigarette consumption is currently established as a risk factor for periodontal disease and as a potent modifier in its progression and severity. Tobacco worsens the clinical characteristics of periodontal disease, leading to a higher percentage of sites with deep pockets, loss of clinical insertion, bone loss, and a higher incidence of tooth loss. In addition, smoking has an unsatisfactory result on the response to surgical and non-surgical periodontal therapy.

Key words: Risk factor; smoking; periodontal disease; periodontal treatment; smoking cessation.

1 INTRODUCTION

Smoking is considered a disease by the World Health Organization (WHO) because of the physical, emotional, and behavioral changes it causes. In addition, cigarette smoke is a very complex mixture of substances with more than 4,000 known constituents, including carbon monoxide, hydrogen cyanide, reactive oxidizing radicals, a large number of carcinogens, and the main psychoactive and addictive molecule: nicotine (BENOWITS, 1996).

Cigarette smoking is currently determined as a risk factor for periodontal disease because it may affect vascularization, cell signaling processes, humoral and cellular immune response and tissue homeostasis. The influence of smoking on periodontal disease, demonstrate aspects the possible prevalence of pathogens, the negative impact on host immune-inflammatory responses and the healing process after periodontal therapy.

1.1 PERIODONTAL DISEASE

The periodontium consists of a set of tissues that protect and support the dental organ, which are: gingiva, periodontal ligament, alveolar bone and cementum. The main function of the periodontium is to insert the teeth into the jaws and maintain the integrity of the chewing mucosal surface of the oral cavity (LINDHE; KARRING, 1999).

The etiology of periodontal disease is currently considered multifactorial, with the host being a key component of this process. This disease seems to occur when the balance between microbial aggression and host response is altered, both with an increase in aggression and a modification of the defense. This imbalance may alter the progression and course of the disease, as well as its response to treatment (AZUMA, 2006).

Gingivitis is an inflammation of the gingiva, without loss of connective tissue attachment (ARMITAGE, 2004)

However, periodontitis is a multifactorial disease that presents gingival inflammation, apical migration of the epithelial attachment followed by loss of connective tissue and alveolar bone. In most patients, the evolution of periodontitis results in increased probing depth and periodontal pocket formation (ARMITAGE, 2004).

The association of periodontal disease with smoking is a significant independent risk factor for the onset, extent and severity of periodontal disease. Individuals who have a smoking habit have greater gingival recession and less attachment gain, as well as worse effects on periodontal treatments (MATOS; GODOY, 2011).

Studies show that smokers have several oral changes such as: decreased defense capacity against plaque, variations in the inflammatory and vascular degenerative process, impairment of dentinal and pulpal dental processes, negative influence on fibroblasts and periodontal disease, increasing its severity, incidence and difficulty of treatment (RIBEIRO; VELOSO, 2012).

Among the various toxic substances present in tobacco, nicotine and carbon monoxide are considered the main cause of immunological modifications, decrease of immunoglobulin G and damage to the functions of defense cells. In addition, they have vasoconstrictor effects and chronic blood flow attenuation, causing cytotoxic effects on tissues and cells, especially fibroblasts, modifying the pathogenic microbiota and increasing its prevalence (FERREIRA; NUNES; MACIEL, 2014).

Periodontal diseases are highly prevalent and affect more than 90% of the world's population, and are currently the leading cause of tooth loss in adults. Thus, it is extremely important to interfere and guide the population on how to avoid the progression of the disease, and provide the patient with an adequate treatment. The prevention of gingivitis and periodontitis is based on its causal factors and risk factors, through information and counseling to the patient about his oral hygiene, enabling an effective removal of the bacterial biofilm (PIHLSTROM, 2005).

2 SMOKING AND ITS INFLUENCE ON PERIODONTAL DISEASE

The influence of smoking on periodontal disease, demonstrate aspects the possible prevalence of pathogens, the negative impact on host immune-inflammatory responses, on tissue vasoconstriction, changes in oral microbiota and the healing process after periodontal therapy. Tobacco compromises patient quality of life and is considered an important risk factor in periodontal disease.

2.1 MICROBIOLOGY

Some studies propose that the difference in the amount of plaque accumulation in active smoking patients compared to non-smoking patients, indicates that if there are changes in microbial threat in smoking patients, the result is in more qualitative than quantitative changes in plaque (CARRANZA, 2016).

Studies on the periodontal microbiology of smoking patients show that they have similar microflora to nonsmoking patients, but some of these studies have observed that smoking patients have high counts of periodontal pathogens, indicating that tobacco may promote growth of certain bacterial species. However, none of the studies have shown that smoking patients have microorganisms that are not present in nonsmoking patients (BERGSTROM, 2004).

In divergence, smoking patients often have more periodontal pockets and deeper pockets, and deep pockets suffer more pathogen colonization than superficial pockets (BERGSTROM, 2004). Therefore, periodontal pathogens seem to obtain growth in superficial to moderate pockets in smoking patients, while in non-smoking patients the pathogens only develop in deep pockets (EGGERT et al., 2001).

2.2 IMMUNOLOGY

The host immune response to plaque accumulation is substantially protective. In periodontal health and gingivitis, there is a balance between the plaque threat and the immune response of the gingival tissues, without causing loss of periodontal support. In contrast, periodontitis appears to be associated with altered balance between the bacteria and the host, which can be initiated by changes in the bacterial composition of the subgingival plaque, changes in the immune response, or a combination of both elements (CARRANZA, 2016).

Smoking exerts a considerable effect on the protective principles of the immune response, resulting in an increase in the extent of periodontal destruction severity. In part, the decreased immune regulatory capacity to bacterial threat is due to the deleterious effects of smoking (CARRANZA, 2016).

Smokers develop a limitation of the chemotactic and phagocytic functions of polymorphonuclear leukocytes (PMNs) in saliva and tissues, increasing susceptibility to pathogens and periodontal disease. The condition of PMNs and their functions, such as phagocytosis, expression of integrins, production of superoxide and hydrogen peroxide, and production of protease inhibitors, also appear to be altered by smoking or various other tobacco components.

Leukocytes play a key role in host protection and also in tissue destruction, tobacco can particularly stimulate their destructive potential (JOHNSON, GUTHMILLER, 2007). It inhibits the production of IgG2 subclass of immunoglobulin (antibodies against Aggregatibacter actinomycetemcomitans and P Porphyromonas gingivalis are predominantly IgG2 class compounds), suggesting that suppression of IgG2 antibodies may be a primary mechanism that induces severe periodontitis. Importantly, nicotine increases monocytic release of PGE2 and interleukin (IL1) in response to lipopolysaccharide, and leads to accelerated destruction of periodontal tissue. Smokers have elevated levels of PGE2, metalloproteinase-8, and LPMN-elastase in the gingival sulcus fluid, increasing gingival inflammation. Neutrophils are the first line of defense against bacterial infection, and although smokers have significantly higher numbers of neutrophils in the peripheral circulation, their function is impaired. Neutrophils from smokers indicated decreased chemotaxis, phagocytosis, and adhesion. The production of antibodies is another host protective mechanism

also altered by smoking: by decreasing the proliferative capacity of T cells, which affect the function of B cells, there is a decrease in the concentration of IgG and the generation of antibodies (CHAMBRONE et al., 2009, BURT, 2005).

2.3 TISSUE VASCULARIZATION

Detrimental effects have been found on periodontal tissue vascularization in smoking patients, such as chronic reduction in gingival blood volume, gingival crevicular fluid levels, and hemoglobin oxygen saturation (CHAMBRONE et al., 2009).

2.4 BONE TISSUE

At the oral cavity level, several effects of smoking on bone tissue are also described. Therefore, smokers have a higher risk of alveolar bone loss, tooth mobility and early tooth loss, alveolar ridge resorption, delayed wound healing after tooth extraction, periodontal disease, mobility in bone grafts and failure in implant osseointegration (PEREIRA et al., 2005).

2.5 SALIVATION

Smoking causes an initial increase in salivation, followed by an inhibition of secretions. The initial salivation can be attributed to the acidity of the cigarette. By increasing the acidity in the oral cavity and decreasing the buffering capacity of saliva, smokers had more caries (PALMER, 1988). The increased calculus deposition in smokers may be attributed to the decreased saliva flow caused by nicotine (BAIN, 1996).

3 PERIODONTAL TREATMENT FOR SMOKING PATIENTS

Smoking has been studied as a factor that reduces the efficiency of periodontal therapy (LABRIOLA et al., 2005, BERGSTROM, 2004). Thus, smokers have a less favorable response to periodontal treatment, whether surgical or non-surgical (MEULMAN et al., 2012, DASTOOR et al., 2007, WAN et al., 2009).

Smoking has a negative impact on regenerative therapy, which includes bone grafting, guided tissue regeneration, or a combination of these treatments. Chemicals and toxins from tobacco smoke can delay wound healing by impairing the biological evolution of healing and inhibiting the basic, cellular functions responsible for its initiation (JACOB et al., 2007).

In several areas of health, the unfavorable effect of cigarette smoking on tissue repair has been addressed. The periodontal therapy is used with satisfactory results both in smokers and non-smokers, studies have shown that the levels of improvement in some clinical parameters are lower in smokers. More than 90% of patients with refractory periodontitis are smokers. Smoking patients have a worse response to periodontal treatment, whether surgical or non-surgical, and a greater need for retreatment. Studies show that the reduction in depth and clinical gain of insertion in smoking patients is about 50% less than those

achieved in non-smoking patients after surgical and non-surgical periodontal therapy (VINHAS, PACHECO, 2008).

Smokers were observed in patients after regenerative periodontal treatment with less reduction in depth, less clinical attachment gain and lower percentage of bone filling. Guided tissue regeneration shows a gain of clinical attachment about 50% lower in smokers compared to non-smokers. In addition to smokers have a less favorable response to periodontal treatment, postoperative complications are also more frequent (VINHAS, PACHECO, 2008).

The processes of tissue repair and regeneration may be affected by nicotine, through its direct effects on the cells and structures that compose the periodontal tissues, such as reduced production of collagen and increased production of collagenase, important in the process of tissue destruction. The differentiation and proliferation of osteoprogenitor cells are inhibited by cigarette smoking, thus limiting the process of tissue repair or regeneration. Besides the effects on the cells of the periodontium, nicotine can also reduce the potential for tissue repair behind the reduction of blood supply due to vasoconstriction induced by the release of catecholamines, resulting in less blood nutrition (CARVALHO, PACHECO, 2008).

3.1 NON-SURGICAL THERAPY

Smokers show favorable responses to various types of periodontal treatments, including non-surgical, surgical, regenerative procedures and mucogengival surgeries (MILLER, 1987). In the non-surgical treatment the smoker patients have a lesser reduction of the probing depth and lesser insertion gain.

In a study of patients with periodontal disease, instruction for effective oral hygiene and root scaling resulted in more significant reductions in pocket depth and bleeding on probing in nonsmoking patients than in smokers when evaluated six months after completion of therapy. A mean pocket reduction of 2.5 mm for nonsmokers and 1.9 mm for smokers was observed in periodontal pockets with a mean depth of 7 mm before therapy, even though the amount of plaque was less than favorable. In another study, nonsurgical treatment of pockets equal to or greater than 5 mm or more showed that smokers had less pocket reduction than nonsmokers after three months, as well as lower clinical attachment gains. When a higher level of plaque control is achieved as part of the non-surgical treatment, the difference in resolution of pockets of 4 to 6 mm between smokers and nonsmokers become less clinically significant. When pockets persist in smokers and nonsmokers after therapy, topical antimicrobial treatment can be used to try to resolve the remaining pocket depths (CARRANZA, 2006).

3.2 SURGICAL THERAPY

Non-surgical periodontal treatment is effective in both smoking and non-smoking patients, and achieves the primary goals of plaque and calculus removal and root planing. However, in cases where improvement has not been achieved after TPNC, surgical treatment may be necessary to achieve further depth reduction and gain clinical attachment level (JAVED et al., 2012).

The intent in a flap-assisted surgical curettage therapy is a pocket reduction approach where the intent is to gain access to the root surfaces affected by disease and bone in order to perform effective root smoothing and soft tissue debridement. Surgical periodontal therapy provides an expectation of maintaining periodontally compromised teeth longer and in function, also considering the aesthetics and comfort of the patient (SCABBIA et al., 2001).

Generally, smokers present inferior results to non-smokers (BOSTROM et al., 1998, SCABBIA et al., 2001, TROMBELLI et al., 2003) however, the results of the surgical therapy were favorable to both smokers and non-smokers patients (BOSTROM et al., 1998, SCABBIA et al., 2001). In some cases a gain of CIN and decrease of OS was presented after surgical treatment (TROMBELLI et al., 2003, DASTOOR et al., 2007, BOSTROM et al., 1998).

Smoking patients were found to have no significant change in bone height after treatment, whereas non-smoking patients showed satisfactory results (BOSTROM et al., 1998).

3.3 PREVENTIVE MEASURES

The biggest challenge for dentistry nowadays is to make the population aware of the risks that smoking brings to periodontal health. Prevention means changes in lifestyle habits. The daily removal of biofilm by brushing with a correct technique, the use of dental floss and rinses associated with a periodic visit to the dentist are prevention methods that should be used, in addition to the abandonment of smoking, since without the cessation of the habit, the results are not very significant.

Regular maintenance appointments are made after one month of periodontal treatment. Subsequently, review appointments are established every three months. If plaque control continues to be satisfactory and the individual has stopped smoking, after one year or more the interval between appointments can be extended to every four to six months. Otherwise, appointments should remain at quarterly intervals or the frequency should be increased. For cases in which the user maintains good hygiene and has stopped the habit, annual check-ups are sufficient (LINDHE, 1998).

4 FINAL CONSIDERATIONS

Smoking has been defined as an important risk factor for the establishment and progression of periodontal disease. Therefore, it is necessary that the dental surgeon knows the effects that tobacco components can cause on periodontal tissues, the immune system, the inflammatory response, and the therapeutic response.

Considering all these effects that smoking can cause, it is important to have a dental intervention based on preventive measures and patient orientation regarding the risks that smoking presents.

Based on this knowledge, the dental surgeon will be able to intervene more safely, given the deficiencies in the treatment of periodontal disease when there is a patient with smoking habit. It is the responsibility of health professionals, and especially the dental surgeon, to make patients aware of the

damage caused by smoking, thus encouraging patients to quit the habit for better results in periodontal therapy, as well as better health conditions in general.

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Chapter 25

The understanding of palliative sedation in cancer patients by multidisciplinary residents

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ABSTRACT

The challenges experienced by multiprofessional residents facing palliative sedation and the need for training for the formation of ethical, human and reflective professionals in palliative care assistance are impasses that reflect directly on the assistance provided to the patient. The objective of this work is to discuss the perception of multiprofessional residents regarding oncologic palliative sedation based on an analysis of scientific articles on the subject. This is an integrative review including primary articles indexed in LILACS, MEDLINE, BDENF, IBECS and COLECIONA SUS databases, according to the recommendations of the PRISMA tool, published from 2017. After analysis it was observed that the publications involved related aspects, categorizing 03 main themes: bioethical perception of residents on palliative sedation; perception of good practices of palliative sedation and perception of professional training of residents on palliative sedation. A large gap was identified in the approached theme. All these aspects directly impact the residents' performance in the process of approaching oncologic palliative sedation due to insecurity and lack of preparation, making it necessary to approach the theme in the training of these professionals.

Keywords: Conscious Sedation; Perception; Training of Human Resources in Health; Oncology.

1 INTRODUCTION

The most recent global estimate, conducted in the year 2018, points out that 18 million new cancer cases (17 million not counting non-melanoma skin cancer cases) and 9.6 million deaths (9.5 million excluding non-melanoma skin cancers) occurred in the world. For Brazil, the estimate for each year in the triennium 2020-2022 is that 625,000 new cases of cancer will occur (National Cancer Institute, 2019). Research points to the scarcity of palliative care practice and palliative sedation in Brazil. It is believed that the prevalence of palliative sedation varies between 17% and 37%, emphasizing that the main barrier for this implementation is the influence of the family (Piedade, Filho, & Priolli, 2020).

Palliative sedation (SP) is the deliberate administration of sedative drugs to induce varying degrees of reduced level of consciousness in patients with progressive and irreversible diseases and who are in end-of-life care, in order to relieve intolerable and refractory symptoms (Satomi, 2020).

Palliative care (PC), as "a basic human right and an essential component of comprehensive and integrated care," advocates that people at the end of life have access to technical-scientific and human resources that favor care for dignified death. Among such resources is palliative sedation (PS) that, in general, must be discussed by all professionals involved in the process, based on each one's competence (Eich, Verdi, Finkler, & Martins, 2018).

The maintenance of the quality of life of patients with advanced disease and refractory symptoms is a great challenge for health professionals, including students and residents. (Piedade, Filho, & Priolli, 2020)The assistance to the healthcare team regarding the best handling of palliative sedation, based on ethical criteria and the best current scientific evidence, is indispensable. (Satomi, 2020).

In this sense, education is a guiding strategy for the use of palliative sedation, reducing the obstacles and doubts of these professionals and students. Thus, this theme is of great relevance, since palliative care has become a basic condition of respect and dignity to save people suffering from a life-threatening disease.

The study will contribute to a better training of these multiprofessional residents and consequently humanize the care provided to users. Based on these considerations and on the gap about this theme, the objective of this study is to identify scientific evidence about the perception of multiprofessional residents regarding oncologic palliative sedation.

2 METHOD

This is an integrative literature review supported by the recommendations proposed by Ganong (Ganong, 1987)Ganong proposes: formulation of the research guiding question, selection of the sample from the descriptors selected for the theme, categorization of the studies, evaluation of the studies, interpretation of the results, and dissemination of the review or synthesis of knowledge.

The guiding question of the research was formulated according to the PICo strategy (Population or Problem, Interest and Context) (Joanna Briggs Institute, 2014). Considering these elements, the following structure was outlined:

Q: Multiprofessional Residents ;

I: Understanding perception and

Co: Palliative Oncologic Sedation.

From this perspective, the following guiding question was formulated: What is the perception of multiprofessional residents about oncologic palliative sedation?

The search for publications on the theme took place from November 2021 to January 2022. An investigation was conducted in the portal of the Virtual Health Library (VHL), through the following databases: Latin American and Caribbean Literature on Health Sciences (LILACS), Medical Literature Analysis and Retrieval System online (MEDLINE) and BDENF (Nursing Database);

As a search strategy, we used the Descriptors in Health Sciences (DeCS) and Medical Subject Headings (MeSH): "Training of human resources in health", "Perception", and "Conscious Sedation", with the combination of the Boolean operator "AND" and the last one by the Boolean operator "OR".

The inclusion criteria for the selection of articles were: articles obtained in full, publications with a time frame between 2017 and 2022 in English, Spanish, and Portuguese-Brazilian. Repeated articles, articles without abstracts or full texts, review articles, those methodologically classified as theses, dissertations, or monographs, and those that did not fit the theme were excluded.

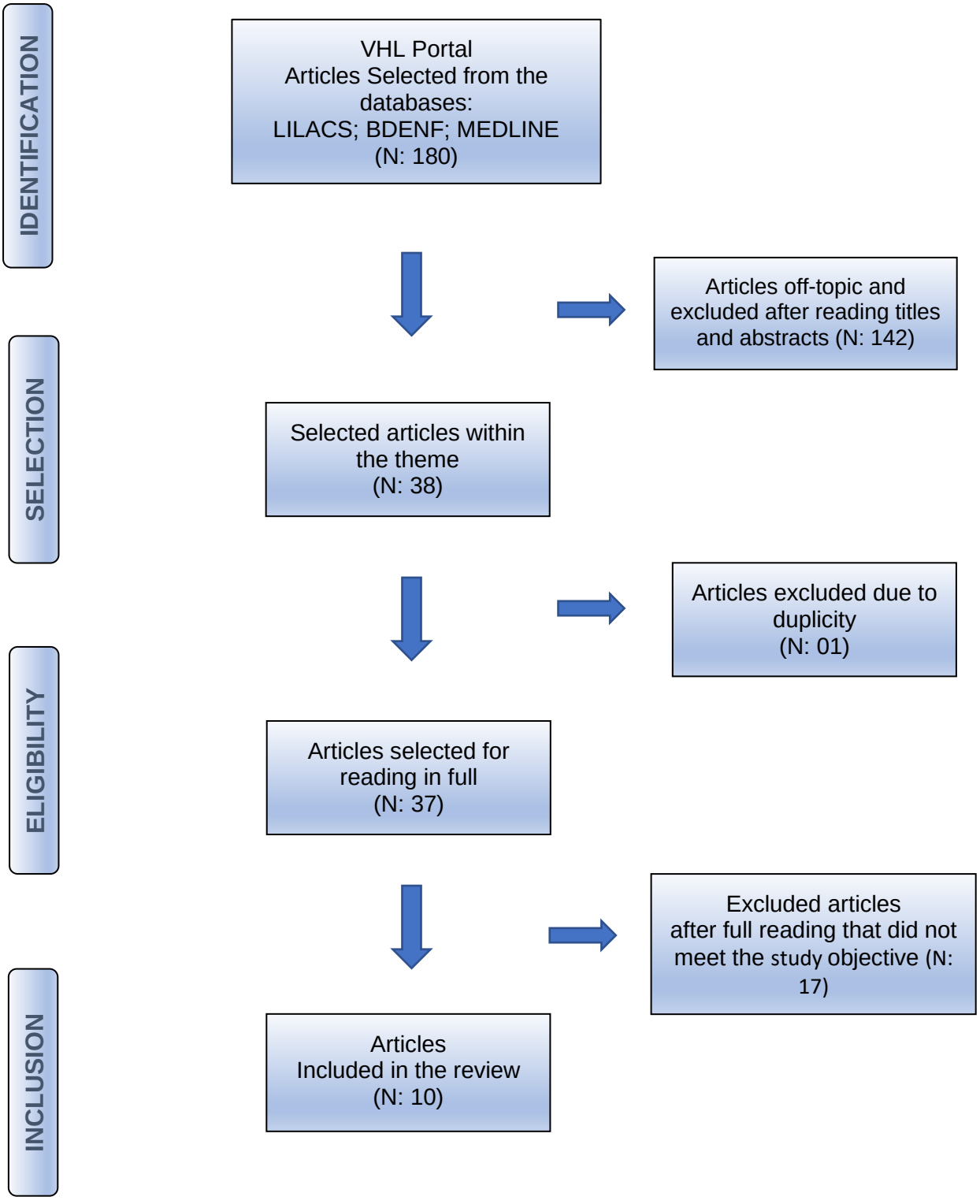
Following these criteria, the search resulted in 180 articles, located in the BVS. After refining the publications and then reading the titles and abstracts present in the databases, 37 articles were excluded for not being pertinent to the research subject. Among the 37 articles selected for full reading, only 10 were related to the study objective. Thus, the final sample consisted of 10 articles.

The critical analysis of the selected publications was considered and treated descriptively and qualitatively, and the results presented followed the rigor and recommendations of the PRISMA tool (Moher , Liberati, Tetzlaff, & Altman, 2009)tool, according to the flowchart presented in Figure 1.

Then, by means of two independent researchers, the articles were evaluated by their titles and abstracts, and those that did not fit the theme were excluded. Then, the remaining articles were carefully read and only those in line with the study's objective were selected.

Once the final sample was determined for the extraction of information pertinent to the study, a synthesis of the 10 selected articles was prepared in a synoptic table, Chart 1, ordered with the following information: Author/date, Title, Objective, Method, and results.

Figure 1. Flowchart identifying the selection process of the studies included in the integrative review, 2021.



Source: Flowchart prepared by the author.

Table 1. Categories and categorization of the selected articles.

TITLE/YEAR/ COUNTRY/PERIODIC	OBJECTIVE/STUDY DESIGN	OUTCOME / LEVEL OF EVIDENCE
French laypeople's and health professionals' views on the acceptability of terminal sedation. 2016, France, *Journal Med Ethics.*	To study the opinions on the acceptability of terminal sedation by laypersons and healthcare professionals in France.	Laymen and professionals do not seem to oppose palliative sedation. Its acceptability has increased due to the patients' request for sedation and the collective character in decision making.
A Survey of Hospice and Palliative Care Clinician's Experiences and Attitudes Regarding the Use of Palliative Sedation. 2017, Minnesota, *Journal of Palliative Medicine*.	Identify physician attitudes in palliative care, and their experiences with palliative sedation.	From a medical point of view, palliative sedation is a bioethically appropriate treatment for refractory symptoms in terminally ill patients, but there are still questions about how this practice can best be applied.
Palliative sedation challenging the professional competency of health care providers and staff: a qualitative focus group and personal written narrative study. 2017, France, *BMC Palliative Care.*	To identify the insecurities of healthcare professionals regarding the decisions they make regarding palliative sedation according to their attributions.	The multidisciplinary data analysis highlights the opinions of healthcare professionals and staff regarding their professional stance and competencies when using Midazolan and practicing sedation in palliative care, fundamentals of professional competence were examined, as well as the role played by the healthcare team in terms of providing support and minimizing suffering in the workplace.
The last low whispers of our dead: when is it ethically justifiable to render a patient unconscious until death? 2018, USA, *Theoretical Medicine and Bioethics*.	Describe the variety of end-of-life practices that can result in decreased consciousness, bringing greater clarity to what is actually being proposed in each practice by relating them to the underlying philosophical issues.	It was identified through this study that the practice of palliative sedation, be it parsimonious direct sedation as well as sedation for less extreme symptoms, is only justified if the professional believes that euthanasia and assisted suicide are medically and ethically justifiable measures, and can fall within the scope of good medical practice.
The Involvement of cancer patients in the four stages of decision-making preceding continuous sedation until death: A qualitative study. 2018, Belgium, *Palliative Medicine.*	Distinguish and analyze the four phases of decision making from the hypothesis of palliative sedation.	The patient's involvement in the decision-making stages is variable, as their decision may be affected by their condition. To be sensitive to a patient's individual preferences and, at the same time, recognize the potential sensitivity of raising the issue of continued sedation until death with dying people, with a view to creating a practice building opportunity to discuss their goals and preferences for future medical treatment.
Level of knowledge, emotional impact and perception about the role of nursing professionals concerning palliative. 2018, Colombia, *Journal of Clinical Nursing.*	To explore aspects related to performing the nursing role, including their level of knowledge, confidence in skills and knowledge in performing the role, their perception of it, and the emotional impact derived.	The nurses expressed having basic knowledge coming from experience, but not from formal training, considered insufficient to clarify doubts and educate patients, family members and support team, they also expressed the importance of receiving education in this practice, mainly because, in their first experience with the application of palliative sedation, many confuse it with euthanasia, making more training on this topic necessary. The emotional impact of this type of treatment can positively or negatively affect the performance of the nursing role.

Training of nurses for oncology care, 2018, Brazil. *Journal of Nursing UFPE.*	To analyze the aspects related to the training of resident nurses, the difficulties and facilities for oncology care.	We conclude that the training of resident nurses is still considered insipient when it comes to oncology, due not only to the lack of theoretical basis, but also to deficient practice.
Weakening the ethical distinction between euthanasia, palliative opioid use and palliative sedation. 2018, Australia, *Journal Med Ethics.*	Evaluate the empirical evidence on sedative/opioid use and survival time, and advocate a position of agnosticism.	There are a number of important questions about whether appropriate opioid administration and palliative sedation satisfy the four criteria argued in the article, strengthening arguments that weaken the claimed ethical distinction between euthanasia and the widely accepted dominant practices of opioid/palliative sedation use.
Challenges to the integrality of palliative care assistance in . pediatric oncology at the José Alencar Gomes da Silva National Cancer Institute, 2017, Brazil, *Brazilian Journal of Cancerology*.	To identify and reflect on the challenges listed by the multidisciplinary team of pediatric oncology at INCA, which interfere in the completeness of assistance in palliative care.	Insufficient physical structure and human resources, lack of training, and fragmentation of the health services network constitute the difficulty of integrality in palliative care assistance in the pediatric ward of INCA.
Nursing oncology: university-community integration in the teaching-learning process, 2021, Brazil. *Revista de Enfermagem UFPE.*	To describe the operational aspects and the experiences of nursing students in a university extension project in oncology nursing.	The teaching-learning model seeking the integration of university and community brings possibilities of interdisciplinary practices, with critical reflection of being a "nurse" in the field of oncology.

Source: Table prepared by the author.

3 RESULTS:

Ten articles were selected in the final sample. As for the language approximately 70% were written in the English language and approximately another 30% were written in Portuguese. The year of publication ranged from 2017 to 2022. The years with the highest numbers of publications were 2017 and 2018, respectively with, 30% in 2017 and 40% in 2018, noting a gap in production after the year 2018.

As for the methodological design, 80% used a qualitative approach, 10% a quantitative approach, and 10% a mixed approach.

It was observed a discrete production of material about the objective of the study, since, in a period of 6 years, only 10 articles were identified that discussed the perception of multiprofessional residents regarding oncologic palliative sedation.

Table 2. Categorization of the selected articles according to similarity of content.

RESULTS	✓ Ten articles were selected in the final sample. ✓ The year of publication ranged from 2017 to 2022, with the years with the highest numbers of publications being 2017 and 2018, respectively with, 30% in 2017 and 40% in 2018, noting a gap in production after the year 2018. ✓ As for the methodological design, 80% used a qualitative approach, 10% a quantitative approach, and 10% a mixed approach. ✓ A discrete production of material about the objective of the study was verified, since, in a period of 5 years, only 10 articles were identified that discussed the perception of multiprofessional residents regarding palliative oncologic sedation.
DISCUSSION	✓ Residents' bioethical perceptions of palliative sedation. ✓ Perception of palliative sedation best practices ✓ Perceptions of residents' professional training on palliative sedation.
LIMITATION OF THE STUDY	✓ It is observed that the generation of scientific knowledge comes mainly from developed countries and international scope. Due to cultural, financial, social, religious, and technological differences and their characteristics, the survival experience of these professionals cannot be generalized ✓ It is necessary to deepen the studies so that new elements can emerge to support the knowledge on the subject. ✓ The generalization of the modality of palliative care relative to the study developed, thus fitting new studies in specific contexts in the various palliative units aiming to expand new spaces for discussion and articulations between the existential experiences of the multiprofessional residents and their care practices.
CONTRIBUTIONS	✓ The results pointed out may subsidize new research on issues related to the perception of multiprofessional residents regarding palliative sedation, especially in Brazil where scientific production is incipient. ✓ Support for multiprofessional residents to consciously present their practice, contributing in an ethical and humane way to patients in need of palliative care. ✓ Manage interfaces with current public health policies.

Source: Table prepared by the author.

To better ratify the findings and discuss them in a substantiated manner, through the convergence of the subjects (on the perception of the multiprofessional resident regarding palliative sedation), these were categorized into three main themes, namely: "Bioethical issues in palliative sedation", "Good practices in palliative sedation", and "Palliative sedation in professional training", presented below .

4 DISCUSSION:

4.1 RESIDENTS' BIOETHICAL PERCEPTIONS OF PALLIATIVE SEDATION.

Palliative sedation is one of the most debated end-of-life care practices currently, emphasized by the guidelines that the decision making to initiate sedation should be performed according to the patient's wishes and preceded by the patient's consent or in case of inability to do so, their legal guardian, however empirical studies portray that this conduct is not always obtained or sought (Robijn, et al., 2018). It is necessary to approach both the patient and the family member in a humanized and sensitive way, building opportunities to address the issue, aiming at their preferences within the current and future treatment, thus knowing and understanding their choices.

The prevalence of the use of palliative sedation highlights the importance of institutionalized protocols, avoiding the possibility of error on the part of professionals, since the lack of knowledge can underpin misconduct, since the amount of professional with specific theoretical training on the subject is low, and the lack of knowledge can carry misconduct (Piedade, Filho, & Priolli, 2020). The work is marked by organizational and practical processes, which mobilize ideologies, create strategies for preparation, generate identities according to various sociocultural groups, and maintain a constant relationship in the social dynamics (Siqueira & Teixeira, 2019). The presence of protocols with guidelines makes the routine not only less stressful for professionals, but also clearer and more efficient for patients.

Professional training is deficient on the subject, making it insufficient to clarify doubts, guide and educate patients and families. The importance of receiving education in this practice is fundamental because many students in their first experience with palliative sedation confuse the practice with euthanasia, thinking that the application of palliative sedation accelerates death as well as euthanasia and assisted suicide, reflecting the deficit of knowledge about the practice addressed (Zuleta-Benjumea, Muñoz, Vélez, & Krikorian, 2018). Therefore, literature on the subject is scarce, leading to a knowledge gap, causing prejudices and misconceptions on the subject.

4.2 PERCEPTION OF PALLIATIVE SEDATION BEST PRACTICES

For palliative sedation to be a consistent and complementary strategy to the treatment of the patient, it is essential that a multiprofessional team exists, in which the patient is fully assisted, and this requires an exchange of knowledge and responsibilities on the part of the team, where the demands are solved together. This interdisciplinarity is understood as an intrinsic need, since the integration of knowledge allows the recognition of the complexity of the phenomena, and facilitates the process of understanding, understanding each natural process of the evolutionary cycle (Mazoyer, Sastre, Sorum, & Mullet, 2016). For the care to be provided in an effective way, a multidisciplinary approach is necessary, and that this team presents a good integration and commitment to the patient. (Cruz, et al., 2021). Understanding the role of other professionals is an important prerequisite for effective care, because such understanding facilitates rapid communication with the appropriate professionals for each situation.

In general, teamwork can be described as people working together, sharing the same goals of planning and evaluating the best patient care (Eloia, Vieira, & Eloia, 2019). Sharing knowledge and experiences with the purpose of providing an environment of exchange, zeal and partnership, offering with this a better care for the patient, a humanized care.

The assistance provided to cancer patients under sedation is sometimes still insufficient, these patients do not receive the attention and comprehensive care, requiring a more socialized look, in addition to continuous learning in the care of patients and their families. Humanization should not be something that can be trained, but rather the sensitization of professionals, and that they consider care and place it in a prominent place, and not as a consequence of the humanization process (Molin, Lanferdini, Vanini, Ebel, & Picinin, 2021). Caring for a cancer patient in palliative care and being able to meet all their needs is not an easy activity. This type of assistance demands personal and vocational attitude, balance and maturity to work with the several vicissitudes inherent to this patient (Siqueira & Teixeira, 2019).

4.3 PERCEPTIONS OF RESIDENTS' PROFESSIONAL TRAINING ON PALLIATIVE SEDATION.

Practitioners in training doubt their ability to reason and construct a clinical action plan; they have difficulty analyzing, defining, and interpreting patients' symptoms, in determining whether symptoms are refractory, and in accepting that they are unbearable for the patient. As a consequence, they hesitate to use the indicated treatment mainly because they fear that the medication may not be effective, but they also fear its sedative effects (Leboul, et al., 2017).

The unpreparedness to work with human finitude and powerlessness in the face of the evolving course of the disease, brings the importance of training at the academic and labor level (Lima, Bezerra, Morais, Veras, & Menezes, 2017). Professionals and students that deal with palliative sedation need to possess emotional and affective abilities, besides technical and scientific competence, as they are frequently confronted with numerous challenges in their activities, needing to understand their essence so that they can bring meaning to their existence through the work developed. (Rocha, Pereira, Silva, Medeiros, & Marins, 2020).

For Merleau-Ponty, feeling and perception are the essential connection with the world and the basis of human existence. The Consciousness of being, is the experience existing and inserted in the world (Ponty, 2011). The resident assumes a responsibility before the other, through phenomenological care, perceiving this subject in a singular way, what is visible and invisible, ponderable and imponderable, but this professional also needs to be cared for. Therefore, it is important to recognize the subjective aspects, the individual difficulty that a resident may have to face certain situations in the hospital, considering that this professional still has little age and experience (Vallois, Silva, & Pereira, 2017).

The connection of residents, as well as health professionals with their spirituality consolidates the construction of their professional identity, being a prerequisite to transcend obstacles and maintain balance

in the development of their practice, seeking to fill educational gaps with training and guidance in order to improve their professional experience (Rocha, Pereira, Silva, Medeiros, & Marins, 2020)..

Finally, the study suggests that educating healthcare team members and residents with a focus on how to recognize the correct timing of the indication for sedation, as well as guiding the patient as well as their family member clearly, will help the team to provide quality end-of-life care.

5 CONCLUSION:

This study presented an integrative review on the perception of multiprofessional residents regarding oncologic palliative sedation. It was found that the perception of the resident brings the deficit found in their training on palliative sedation, forming professionals with limited knowledge and consequently insecure when faced with the theme.

It was identified that for the performance of these multiprofessional residents to be carried out safely and effectively, the importance of addressing the topic is essential, solving their doubts and vulnerabilities.

In addition, the studies suggest that there is a need to address the issue of palliative sedation during undergraduate studies, as well as the importance of palliative care due to the increase in cancer cases worldwide, and to encourage studies and discussions on the subject, increasing the resources for professionals in training and/or specialization.

Regarding the limitations of the research, highlights that the generation of scientific knowledge comes mainly from developed countries and international scope. Therefore, due to cultural, financial, social, religious, and technological differences and their characteristics, the survival experience of these professionals cannot be generalized. It is necessary to deepen the studies so that new elements can emerge and subsidize the knowledge on the subject.

Another limiting aspect is in relation to the generalization of the palliative care modality relative to the study developed. Thus, new studies in specific contexts in the various branches of palliative units would be appropriate, aiming at expanding new spaces for discussion and articulations between the existential experiences of multiprofessional residents and their care practices.

Despite these limitations, the results pointed out may subsidize new research on issues related to the perception of multiprofessional residents facing palliative sedation, especially in Brazil where scientific production is incipient. Indeed, it is hoped that this study will serve as a support for multiprofessional residents to present their practice conscientiously, contributing in an ethical and humane manner to patients who need palliative care, also managing interfaces with current public health policies.

The purpose of this article is to contribute, through phenomenology, to the improvement of the teaching-learning process of the multiprofessional residency professionals, recognizing their importance in palliative care assistance, exercising a humanized and individualized care, and elucidating the little enunciated theme.

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Chapter 26

Crohn's Disease: advantages of the Konos-S surgical technique

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ABSTRACT
Introduction: Crohn's Disease (CD) belongs to the group of diseases called Inflammatory Bowel Diseases (IBD). CD is an inflammatory disease characterized by idiopathic, local and chronic nonspecific inflammation, currently the real cause is still unknown. The recurrence of anastomosis after intestinal resection is one of the most significant problems in the management of CD, recently a new surgical technique was described and used to reduce recurrence, the Konos- S technique described by Konos et al. (2011). Objective: To carry out a systematic review of the literature to describe Crohn's disease and the use of the Konos-S surgical technique for the treatment of the disease. Methodology: This study is a systematic review of the literature on the main search platforms for scientific articles: ScienceDirect, PubMed, SciELO, BIREME, from 2011 to 2022, 18 articles were selected. Results and Discussion: Kono and colleagues introduced into surgery their unique surgical technique to reduce the risk of surgical recurrence of the anastomosis is a hand-stitched end-to-end functional antimesenteric anastomosis. Some clinical studies have demonstrated the effectiveness of the technique in significantly reducing anastomotic and endoscopic recurrence, as it is able to preserve innervation and blood supply, important factors for proper healing of the anastomosis, with a lower risk of reoperation. However, more research is needed to universally validate Konos-S surgery for patients with an indication, as the treatment approach must be personalized for CD cases and complications must be analyzed individually for the patient.

Keywords: Chron's Disease; Surgical technique; Konos- S; Health teaching.

1 INTRODUCTION

Crohn's Disease (CD) belongs to the group of diseases called Inflammatory Bowel Diseases (IBD)1. CD is an inflammatory disease characterized by idiopathic, local and chronic non-specific inflammation,

currently the real cause is still unknown, but there are many theories as to what could be the focus of the disease. The most recent ones point to the immune system and bacteria as the main causes due to a dysregulated immune reaction to the intestinal microbiota (Actis et al., 2019; Ramos & Papadakis, 2019; Chang, 2020; Cushing & Higgins, 2021).

A recent estimate suggests that 1.3% (3 million individuals) of the US population is diagnosed with IBD.3 Crohn's disease is a chronic disease with an annual incidence ranging from 3 to 20 cases per 100,000. The average onset of the disease is at age 30 and has 2 peaks, first between the ages of 20 and 30 and then a smaller peak around age 50. Crohn's disease is more common in the industrialized world, particularly in North America and Western Europe, although the incidence is increasing in Asia and South America. In Brazil, the prevalence of IBD was 38.2 per 100,000 inhabitants, DC was 14.1 per 100,000/ inhabitants/year) (Van Rheenen et al., 2021; Atreya & Siegmund, 2021).

Crohn's disease is one of the two main subtypes of inflammatory bowel disease (IBD), along with ulcerative colitis. The disease has an unpredictable clinic, characterized by periods of active inflammation and outbreaks of symptoms that are separated by periods of quiescence or remission, with different complications and variable responses to treatment. Typical symptoms experienced in CD include abdominal pain and cramping, (common) diarrhea, blood in the stool, fever, fatigue, reduced appetite, and weight loss. Inflammation in Crohn's disease is transmural, affecting the entire thickness of the intestinal wall, this chronic and recurrent inflammation in the gastrointestinal (GI) tract can be in any portion of the tract, although it usually occurs in the ileum and colon (Veauthier & Hornecker, 2018; Roda et al., 2020; Chang, 2020; Cushing & Higgins, 2021).

In addition to the symptoms described above, the presence of intestinal inflammation alone can produce several symptoms. These include abdominal pain, diarrhea, fecal urgency, intestinal bleeding, and weight loss. These symptoms significantly impact the patient's quality of life, functional capacity, and emotional state. Generally speaking, treatment falls within either medical or surgical approaches and is largely determined by patient demographics, disease location, disease severity, and presence of complications. In practice, this involves a thorough clinical, biochemical and endoscopic evaluation of all patients to allow for an individualized approach to therapy (Veauthier & Hornecker et al., 2018; Gajendran et al., 2018; Rubin et al., 2020).

Given the previously described pathophysiological models for IBD, it is not surprising that the basis of IBD therapy is based on manipulation of the immune system or gut microbiota. Major classes of drugs used in the treatment of CD include corticosteroids, aminosalicylate or 5-aminosalicylic acid (5-ASA) compounds, antibiotics, immunomodulators, and the new biological class of drugs that specifically target the cytokine pathways that are upregulated in IBD. . The objective is to control the symptoms, the inflammatory reaction, the healing of the mucosal lesions, keep the disease in remission as long as possible and improve the patient's quality of life (Fragoulis et al., 2019; Adamina et al., 2020; Rubin et al., 2020).

Despite recent innovations in the medical treatment of CD through the emergence of new and more potent drugs, the majority of CD patients (70-80%) will still require one or more surgeries during their lifetime (from Buck van Overstraeten et al. 2012). Surgery is indicated in symptomatic patients with CD who do not tolerate, and do not respond to, or do not comply with medical treatment (Adamina et al., 2020; Lightner et al., 2020). Anastomotic recurrence after intestinal resection is one of the most significant problems in the management of CD, in this context, the choice of surgical approach is essential to evaluate the risk-benefit in each situation and should be as limited as possible. Recently, a new surgical technique has been described and used to reduce recurrence, the Konos-S technique, described by Konos et al. (2011). Thanks to this procedure, they concluded that the Kono-S anastomosis appears to be effective in preventing surgical recurrence of anastomosis and that it is more advantageous compared to other anastomoses as it is able to preserve both innervation and blood supply. important factors in the proper healing of the anastomosis. Therefore, the objective of this work is to review the Kono-S surgical technique in the treatment of Crohn's disease.

2 METHODOLOGY

This study is a systematic literature review, with a qualitative approach, with interpretation and analysis of the elements obtained. The guiding question of the study was: "What are the main advantages of using the Konos-S surgical technique in patients with Crohn's disease", after which the following subsequent steps were taken to identify the theme, select the pertinent hypothesis or question of research, the criteria for inclusion and exclusion, definition of information and clinical studies to be included in this review study, interpretation of results and presentation of the review with synthesis of knowledge were defined (Pereira et al., 2018).

2.1 1ST STEP: IDENTIFICATION OF THE TOPIC AND SELECTION OF THE RESEARCH QUESTION

First, the theme was defined to start the elaboration of the integrative review and proceed to the subsequent stages of the study, the guiding question was formulated (Mendes et al., 2008). Thus, in relation to the chosen theme, the guiding question was: What are the benefits of using the Konos surgical technique in Crohn's disease?

2.2 2ND STAGE: CRITERIA FOR SAMPLE SELECTION

The research was carried out from the survey of scientific articles found in the main search platforms for scientific articles: ScienceDirect, PubMed, Scientific Electronic Library Online (SciELO) and Latin American and Caribbean Center for Health Sciences Information (BIREME) and NCBI. Using the descriptors present in the Descriptors in Health Sciences (DeCS) which are: Crohn's disease, Treatment of Crohn's disease, Surgery, Konos-S Technique, in Portuguese and English with the Boolean operator "e" in

all bases, eventually associating the terms with the use of quotation marks (““). Considering the need to perform a broader search, these keywords and the Boolean operator were always used in the search field related to the abstract. These descriptors were combined in order to find as many publications as possible suitable for the review. The review was done from December 2021 to February 2022.

2.3 3RD STAGE: IDENTIFICATION OF PRE-SELECTED AND SELECTED STUDIES

For the collection of articles, the search limits were chosen (free full text, 11 years, humans) to specify the results and thus collect pertinent information to support the theme in question. Thus, in the first search, 33 articles were found in Search I, after applying the filters in Search II, the search returned articles and from these, 29 articles were selected for the systematic review. In the SCIELO database, no article was found based on the Search II criteria. After the selection, the titles, keywords and abstracts of all publications resulting from the investigation carried out by the search strategy were carefully read in order to analyze the texts adequate to the previously established inclusion criteria and filters. All 18 selected articles were read in full to properly verify the purpose of the study, including clinical studies, cohort studies, reviews and meta-analyses.

2.4 4TH STAGE: ANALYSIS AND INTERPRETATION OF RESULTS

In the last phase, the articles were analyzed and discussed in order to extract all the information that was relevant to the research for the formulation of the work, and all the questions were raised and propositions for the writing of the scientific work were made for the sedimentation of knowledge.

2.5 5TH STAGE: PRESENTATION OF THE KNOWLEDGE SYNTHESIS

In this phase, the synthesis of the results was carried out through the analysis of the scientific material from the evaluation of the results and conclusions drawn from the selected articles. The document's formulation authorizes readers to assess the veracity of the procedures used in carrying out the review in question.

3 RESULTS AND DISCUSSION

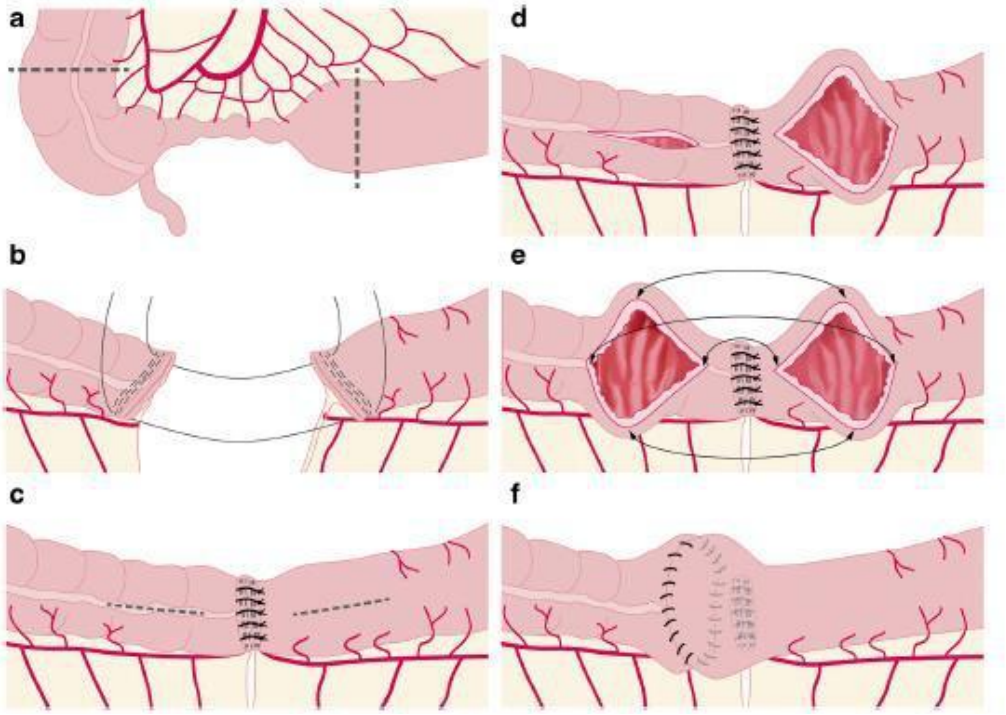
In the present study, 18 articles were selected, Table 4 shows the distribution of articles, according to authors, titles and type of study, all of these articles were published in the ScienceDirect, PubMed, Bireme and Lilacs databases.In keeping with the natural history of the disease, the percentage of CD patients requiring surgery remains dramatically high: up to 80% of patients undergo surgical treatment, but such treatment is non-curative. In fact, the rate of postoperative recurrence varies according to current definitions: clinical, endoscopic, radiological and surgical recurrence. Population studies suggest that without maintenance therapy, up to 90% of patients will experience a relapse of their condition at some stage, making complications and the need for surgical intervention more likely (Aniwan; Loftus, 2021).

Post-surgical endoscopic recurrence of CD is established as the appearance of mucosal lesions observed through ileocolonoscopy and classified according to the Rutgeerts score. This classification is widely used in cases of ileocolic resection and was recently updated in 2014, where the classification i0 (absence of lesions in the distal ileum), i1 (aphthoid erosions/ulcers in a number less than or equal to 5), i2a (lesions restricted to the anastomosis, including anastomotic stricture), i2b (more than 5 erosions or aphthoid ulcers where normal mucosa or larger ulcers can be seen in isolated areas), i3 (diffuse inflammation with aphthoid erosions/ulcers) and i4 (diffuse inflammation with larger ulcers, nodules or strictures). This classification can be associated as follows: in patients with scores i0 or i1, symptomatic recurrence is less than 10% at 10 years, while CD patients with scores i3 and i4 are associated with a clinical recurrence of almost 100% at the end of Four years (Alshantti et al., 2021).

Anastomotic recurrence after intestinal resection is one of the most significant problems in the management of CD. In September 2003, Kono and colleagues at Asahikawa a University Medical Hospital in Japan introduced their unique surgical technique to reduce the risk of surgical anastomotic recurrence (Kono-S anastomosis) in patients with CD involving the small or large intestine. His approach was later adopted at several other medical institutions in Japan, in May 2010, this procedure was introduced at the University of Chicago and later at the University of Washington. (Kono et al., 2011)

The Kono-S anastomosis is defined as a functional hand-stitched antimesenteric end-to-end anastomosis. This surgical procedure consists of cutting the intestine with a cutter so that the mesentery side is located in the center of the stump after the intermediate mesentery has been cut close to the intestine. Both stumps are sutured together to create a support column to maintain the diameter and dimension of the anastomosis. Longitudinal enterotomies are performed on the antimesenteric sides of the 2 segments of the intestine. The side-to-side antimesenteric anastomosis is then performed transversely (Figure 1). Thanks to this procedure, Kono et al. concluded that the Kono-S anastomosis appears to be effective in preventing surgical recurrence of anastomosis in CD (Kono et al., 2016; Kono & Fichera, 2020).

Figure 1: Scheme of the Konos-S Surgical Technique.

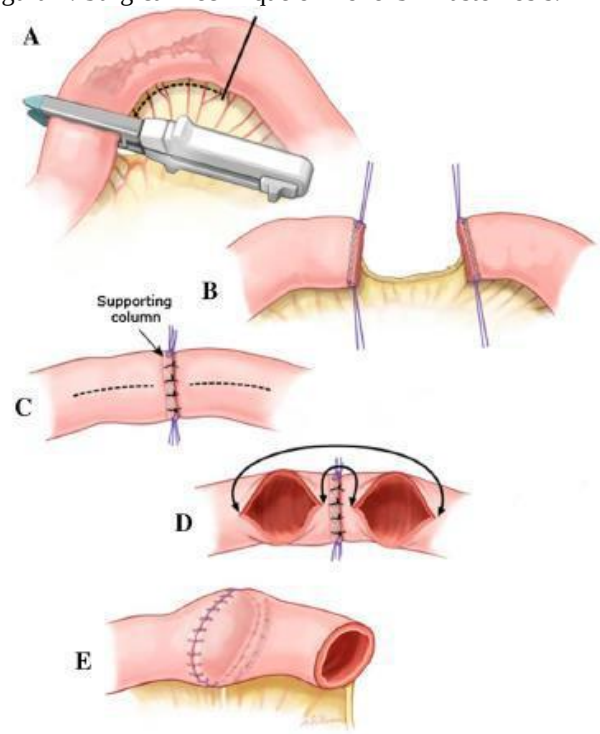


A) The mesentery is divided into the mesenteric wall of the intestine. B) The intestine is sectioned using a linear staple cutter so that the mesentery is in the middle of the staple line and at a 90° angle to it. C) The staple lines are sutured transversely to create a supporting column that must support the eventual dimension of the anastomosis. D) Longitudinal enterotomies of 7 cm in length are then performed in the antimesenteric aspect, starting 1 cm from the supporting column and the anastomosis is then created transversely in a hand-stitched fashion. The back wall using a double layer continuous way, the front wall using a single layer continuous suture. F) Pale lines indicate the mesenteric side below the anastomosis with the supporting column that is created with the proximal and distal bowel stumps (Horisberger et al., 2021).

The theoretical advantages of the Kono-S anastomosis include preservation of innervation as well as blood supply, both of which are important factors in proper healing of the anastomosis. Blood flow to the intestine is reportedly decreased by more than 50% in CD patients due to the action of the neuronal peptide vasodilator (calcitonin gene-related peptide). Decreased blood flow is associated with recurrence at the anastomotic site. The Kono-S anastomosis is a combination of stapled and hand-stitched techniques, several studies suggest that this technique results in a dramatic reduction in surgical relapse.

A particular aspect of the Kono-S anastomosis is the preservation of the mesentery. reasoning based on the premise that this preserves vascular and nerve supply to the remaining resection margin (Figure 2). However, the literature also argues that the mesentery is the underlying factor in the disease process and a more radical resection of the mesentery is appropriate. Given the potential importance of the mesentery and the fact that mesenteric preservation is an integral part of the Kono-S technique, some principles of Kono-S anastomosis make anatomical and pathological sense and may explain this low surgical recurrence.

Figura 2: Surgical Technique of Kono-S Anastomosis.



A - Intestinal resection; B) Each intestinal stump is reinforced with sutures. C) Both stumps are sutured together to create a support column to maintain the diameter and dimension of the anastomosis. D) The side-to-side antimesenteric anastomosis is then performed transversely. And the support column is located between the anastomosis and the mesentery when the anastomosis is completed. Source: Dasharathy et al., 2021.

From a surgical point of view, the recurrence of CD should be considered an inevitable consequence. In this context, the choice of surgical approach is essential to assess the risk-benefit in each situation and should be as limited as possible. Therefore, the objective of this work is to carry out a review on Crohn's disease and the use of the Kono-S technique in the treatment of the disease.

Studies show that endoscopic evaluation after ileocolic resection in the absence of medical treatment, the postoperative endoscopic recurrence rate is about 65% to 90% at 12 months and 80% to 100% at 3 years; at the same time, without medical therapy, recurrence is about 20% to 25% per year. Another significant problem is that new drugs (i.e., biological drugs) do not change the rate of surgical treatment of CD, even if biological therapy improves disease management and short-term surgery, remission rates, and long-term impact. of this therapy is still unknown (Actis et al., 2019).

For this reason, there is growing interest in the role of surgery in preventing CD recurrence. Anastomotic configuration and extent of mesenteric resection may play a role in postoperative recurrence (POOR). Side-by-side ileocolostomy has been widely adopted due to the fact that it is an easy and reproducible surgical technique. The large anastomotic lumen prevents fecal stasis and bacterial overgrowth. However, high-level evidence of such anastomotic entry configuration at the level of the

neoterminal of the ileum represents the critical diameter of the entire anastomosis and precisely this is the most frequent site of recurrence (Adamina et al., 2020).

Recently, a new surgical technique called anastomosis (Kono-S) was described to try to reduce anastomotic recurrences arising on the mesenteric side, which is the ileocolic anastomosis (Kono-S). The Kono-S anastomosis is defined as a functional, end-to-end, hand-stitched antimesenteric anastomosis. The mesentery of the intestinal segment to be excised is initially sectioned at the mesenteric border of the intestinal wall using a vessel-sealing system in order to prevent unnecessary devascularization and denervation of the residual intestine, thereby maintaining an adequate blood supply. as the neural control for local anastomosis (fichera et al., 2012; Katsuno et al. 2015; Bislenghi et al., 2022).

Posteriorly The intestine is sectioned with a linear stapler in such a way that the mesenteric side remains located in the center of the stump, at a 90° angle to the mesentery being manipulated. Both ends of the stump should be reinforced with 3/0 braided lactide polyglycolide (Vicryl). Before starting the anastomosis process, the stumps must be sutured by 4 or 5 stitches together so that they can form a support column, hence the name Kono-S, as a support, which the objective of the technique is to maintain the orientation and large diameter of the anastomosis lumen. Longitudinal enterotomies of approximately 7-8 cm are then performed to obtain a transverse lumen on the antimesenteric side, 0.5-1 cm from the supporting column to further enhance the supporting effect of the column on the anastomosis (Kono et al., 2011; Kono et al., 2011; Kono et al., 2016; Katsunu et al., 2015; Bislenghi et al., 2022)

The anastomosis is then created transversely using the hand-stitching technique with continuous one- or two-layer Vicryl 3/0 sutures, which will culminate in a large anastomosis, in addition to a rigid and stable support to avoid mechanical deformation and functional constriction of the anastomotic lumen compared to a "posterior bone" of the anastomosis. Since the recurrence occurs mainly on the mesenteric side of the anastomosis, the Kono technique is capable of ekiminating the mesentery from the anastomotic surface, and maintaining the innervation and vascularization of the intestine, both factors are related in the process of recurrence and consolidation of the anastomosis. anastomosis (Peltrin et al., 2020; Kellil et al., 2021).

On the other hand, the "support column" that was formed maintains the shape of the original intestine and preserves a wide lumen, preventing distortions and stenosis due to recurrence. The studies considered show a low rate of surgical recurrence (0-3.4%), significantly lower especially when compared to a conventional anastomosis and an acceptable rate of post-surgical complications (Kono et al., 2011; Kono et al., 2016; Kono ; Ficheira, 2021) Other positive points of this innovative surgical technique already mentioned above include preservation of blood flow and innervation, both factors associated with a high risk of anastomosis recurrence in DC (Reynolds et al., 2021; Dasharathy et al., 2021).

Table 1 - Selected articles.

Autores	Título	Ano de publicação	Tipo de Estudo
LUGLIO, G. et al. 2020. .	Surgical prevention of anastomotic recurrence by excluding mesentery in Crohn's disease: the SuPREMe-CD study-a randomized clinical trial.	2020	Randomized clinical trial
KATSUNO, Hidetoshi et al.	Novel antimesenteric functional end-to-end handsewn (Kono-S) anastomoses for Crohn's disease: a report of surgical procedure and short-term outcomes.	2015	Case Report
FICHERA, A.; ZOCCALI, M.; KONO, T.,	Antimesenteric functional end-to-end handsewn (Kono-S) anastomosis. Journal of gastrointestinal surgery.	2012	Case Report
KONO, T.; FICHERA, A. Clinics in colon and rectal surgery, v. 33, n. 06, p. 335-343, 2020.	Surgical Treatment for Crohn's Disease: A Role of Kono-S Anastomosis in the West.	2020	Surgical technique
DASHARATHY, S. S.; LIMKETKAI, B. N.; SAUK, J. S.	What's New in the Postoperative Management of Crohn's Disease?.	2021	Review
ALSHANTTI, A. et al.	The role of Kono-S anastomosis and mesenteric resection in reducing recurrence after surgery for Crohn's disease: a systematic review. .	2021	Review
GERMER, C. T.; REIBETANZ, J.	Kono-S-Anastomose vs. ileokolische Seit-zu-Seit-Klammernahtanastomose	2020	Retrospective observational study
LUGLIO, G.; KONO,	Surgical Techniques and risk of postoperative recurrence in CD: a game changer?	2021	Review
LUGLIO, G. et al. v. 24, n. 11, p. 1213-1214, 2020b.	Preventing recurrence in Crohn's disease: the Kono-S anastomosis with two-layer technique. Techniques in Coloproctology,	2020b	Retrospective observational study
KONO, T. et al.	A new antimesenteric functional end-to-end handsewn anastomosis: surgical prevention of anastomotic recurrence in Crohn's disease	2011	Surgical technique
KONO, T. et al., 2016.	Kono-S anastomosis for surgical prophylaxis of anastomotic recurrence in Crohn's disease: an international multicenter study.	2016	Randomized clinical trial
COFFEY, C. J. et al. 2018.	Inclusion of the mesentery in ileocolic resection for Crohn's disease is associated with reduced surgical recurrence.	2028	Retrospective observational study
SHIMADA, N. et al.	Surgical recurrence at anastomotic site after bowel resection in Crohn's disease: comparison of Kono-S and end-to-end anastomosis..	2019	Retrospective observational study
KELLIL, T. et al.	Surgical features to reduce anastomotic recurrence of Crohn's disease that requires reoperation: a systematic review.	2021	Review
PELTRINI, R. et al.	Kono-S anastomosis after intestinal resection for Crohn's disease.	2020	Review
SHIMADA, N. et al.	Surgical recurrence at anastomotic site after bowel resection in Crohn's disease: comparison of Kono-S and end-to-end anastomosis..	2019	Retrospective observational study
NG, C. H. et al.	Kono-S anastomosis for Crohn's disease: a systemic review, meta-analysis, and meta-regression.	2021	Review e meta-analysis
BISLENGHI, G. et al.	Totally stapled Kono-S anastomosis for Crohn's disease.	2022	Review

Source: Prepared by the authors from: ScienceDirect, PubMed, SciELO, Bireme and NCBI.

The initial retrospective study by Kono et al (2011) compared 69 patients who underwent Kono-S anastomosis between 2003 and 2009 with 73 patients who underwent hand-stitched end-to-end anastomosis (n = 424) and stapled or sutured side-by-side anastomosis between 1993 and 2003. They found that the median endoscopic recurrence score in the Kono-S group was lower than in the conventional anastomosis group, the risk of reoperation was also lower in the Kono-S group (0 vs. 15%, p = 0.0013) (74). Kono et al. reported similar findings in a group of 187 patients undergoing Kono-S anastomosis in Japan and the USA.

The cumulative surgical recurrence rate at 5 and 10 years was 1.7%, with surgical recurrence occurring in only two Japanese patients (Luglio et al., 2021; Luglio et al., 2020; Luglio et al, 2020b;)

A survey by Konos et al (2015) at a center in Japan showed that the mean endoscopic recurrence score (Rutgeerts score) was i2 at 5 years after Kono-S anastomosis, which was significantly lower than in patients undergoing conventional treatment anastomotic procedures (i3). In our study, 65% of patients did not develop surgical recurrence after bowel resection, although they were not on anti-TNF therapy, with a median follow-up of 60 months (range, 12-138). While the role of anti- TNF after surgical resection remains unproven, Kono-S anastomosis should be strongly considered in CD patients who are not candidates for anti-TNF therapy due to adverse effects loss of effectiveness or financial reasons.

Preliminary results comparing the Kono-S anastomosis with conventional surgical techniques show a significant reduction in endoscopic recurrence score (mean Rutgeerts score 2.6 vs 3.4; $P < 0.008$) and surgical recurrence rate (0% vs 15%; $P < 0.0013$), although the data were not randomized or controlled. During the study period, a total of 79 CD patients were finally enrolled and randomized into the Kono group (36 subjects, 50% male, mean age 34 years (Mean 25–50), mean disease duration 101 months, and the Conventional group. [43 subjects, 51.1% men, mean age 43 years (Mean 27-60), mean disease duration 105 months (Luglio et al., 2020).

Most patients had undergone previous surgery (52% vs 65%, respectively for the 2 groups; $P = 0.4$). CD length was 41cm (Mean 34-52) in the Kono group versus 48cm (Mean 38-55) in the Conventional group (P 1⁄4 0.2). Regarding the behavior of CD, fistulization was found in 16 (44.4%) patients in the Kono group versus 19 (44.2%) individuals in the Conventional group ($P = 0.98$). The restrictive behavior was presented by 15 (41.7%) and 16 (37.2%) patients in the respective groups ($P = 0.68$), while the stricture/fistulizing form was present in 5 (13.9%) and 18 (8.6%) patients, respectively ($P = 0.2$). Preoperative treatment was performed during the 6 months before surgery. The laparoscopic approach was used in 52.7% of the cases in the Kono group and in 51.2% of the cases in the Conventional group ($P = 0.8$) (Luglio et al., 2020).

After 6 months, 8 patients in the Kono group (22.2%) and 27 patients in the conventional group (62.8%) had endoscopic recurrence (Rutgeerts score i2). The mean Rutgeerts score (0-4) after 6 months was 0.92 1.05 in the Kono group versus 2.06 1.31 in the Conventional group ($P < 0.001$). In addition, a severe postoperative endoscopic recurrence (Rutgeerts score i3) occurred in 13.8% of Kono versus 34.8% of the Conventional group, but none of the subjects in the Kono group had a Rutgeerts score of i4 (Luglio et al., 2020; Peltrini et al., 2020)

After 18 months of surgery all patients underwent colonoscopy at 18 months found that an endoscopic recurrence (Rutgeerts score i2) occurred in 9 patients in the Kono group (25%, also including patients with endoscopic recurrence at 6 months) and 29 in the Conventional group. (67.4%, of whom 27 had known endoscopic recurrence at 6 months) with a mean Rutgeerts score (0–4) of 1.05 1.06 in the Kono group versus (2.30 1.32) in the conventional (Luglio et al., 2020; Kellil et al., 2021)

Postoperative clinical recurrence was evaluated after 12 months, 3 patients in the Kono group and 8 patients in the Conventional group had clinical recurrence (8% vs 18%). After 24 months, 4 patients in the Kono group and 13 patients in the Conventional group had clinical recurrence (11.1% vs. 30.2%). In Kaplan-Meyer analysis, patients with Kono-S anastomosis had a higher recurrence-free survival rate than patients with anastomosis, postoperative surgical recurrence after 24 months occurred in only 2 patients in the conventional group (4.6%), but none of the Kono group, the postoperative results, there were no differences in terms of duration of surgery, days for flatulence, stool, length of stay (Shimada et al., 2019; Luglio et al., 2020).

Another point that reinforces the importance of this surgery was proven in the recent study by Coffey et al (2018) who demonstrated, for the first time, that the inclusion of the mesentery as part of intestinal resection is associated with a reduction in surgical recurrence. The authors compared surgical recurrence in 2 cohorts: in cohort A (30 patients), standard ileocecal resection was performed, cutting the mesentery close to the intestinal wall; in cohort B (34 patients), the mesentery that supplies the affected ileocecal segment was fully mobilized and resected along with the intestine. The cumulative reoperation rate in cohort A was 40%, while in cohort B it was only 2.9%. Most recurrences occurred within 2 years after surgery. Mesentery-sparing resection was therefore recognized as an independent risk factor for surgical recurrence.

A recent randomized controlled trial was able to demonstrate a reduction in postoperative endoscopic and clinical recurrences 2 years postoperatively, with Kono-S anastomosis being the only variable associated with reduced risk of endoscopic recurrence on multivariate analysis. These findings were confirmed in a meta-analysis including 9 studies and 676 patients, showing an endoscopic examination recurrence rate of 5% after a median follow-up of 12 months (Luglio et al., 2020; Ng et al., 2021).

The present randomized clinical trial by Luglio et al. (2021) was able to demonstrate that the Kono-S anastomosis is associated with a lower rate of endoscopic recurrence after 6 months (22.2% in the Kono group and 62.8% in the Conventional group). and 18 months (25% vs 67.4%, respectively), with less endoscopic recurrence after 6 months and after 18 and a lower rate of clinical recurrence both after 12 and 24 months. Analysis showed that surgical recurrence-free survival at 5 and 10 years the rate was 98.6%. However, this study remains limited by its retrospective nature and comparison with a historical cohort, by differences in study populations at baseline, by the absence of randomization, and by significant differences in post- operative treatment. Similar limitations affect a more recent Kono-S versus end-to-end anastomosis comparative study done in 2019 (Shimada et al., 2019).

Shimada et al (2019) showed that the new anastomotic configuration, Konos-S reduced the risk of anastomotic leak after resection compared technique with hand-stitched end-to-end anastomosis and the surgery-free survival rate was 5 years at the site. of anastomosis with Konos-S was significantly high at 95% (95% CI, 0.90-1.00). An additional advantage of the Konos-S is that the lumen on the mesenteric side

does not need to be sutured. Mesenteric intestinal wall suturing is one of the main factors involved in anastomosis leakage in the hand-stitched end-to-end anastomosis technique, especially in patients with CD, the thickened fat pad hinders the vision necessary for suturing in this region. Avoiding suturing in this area helps reduce anastomotic leakage, the Konos-S technique, despite being more complicated, does not extend the operating time, and in the present study, it was associated with low rates of surgical recurrence at the anastomotic site and anastomotic leakage.

In another study, a total of 79 patients were randomized between 2015 and 2017: 36 patients in the Kono group and 43 patients in the conventional group. Both groups of patients did not differ in demographics or manifestation of Crohn's disease (fistulant Crohn's disease: Kono-S: 44.4% vs. conventional: 44.2%; p = 0.98), the route of surgical access (p = 0.8) and the rate of drug recurrence prophylaxis (p = 0.15). Regarding the primary outcome, 8 patients in the Kono-S group (22.2%) vs. 27 patients in the conventional group (62.8%) had endoscopic recurrence with a Rutgeerts score ≥i2 (odds ratio (OR) = 5.91, 95% confidence interval (CI): 2.17-16.05, p< 0.001). In regression analysis, Kono-S anastomosis was the only variable significantly associated with reduced endoscopic Crohn's recurrence (OR=0.19; 95% CI: 0.08–0.74; p<0.001) (Germer; Reibetanz, 2020).

A systematic review of 9 studies, including 896 patients, that examined the results of Kono-S anastomosis, Overall, surgical recurrence was lower in the Kono-S anastomosis group compared with the standard anastomosis. Recurrence ranged from 0-3.4% after a median follow-up of 35 months compared to 15-24.4% after a median of 60 months for standard anastomosis. Endoscopic recurrence was significantly lower in the Kono-S group compared to the standard anastomosis group. The results showed a mean Rutgeerts Score of i1.05+/-1.06 at 18 months for the Kono-S group compared to i2.30 +/-1.32 in

the conventional group. A Rutgeerts score above i.2 was observed in 9/36 patients (25%) after a Kono S anastomosis compared with 29/43 (67.4%) in the conventional anastomosis group (Alshantti et al., 2021).

4 FINAL CONSIDERATIONS

The endoscopic recurrence score of CD patients who were operated on with the Konos-S technique was lower than in the conventional anastomosis group, the risk of reoperation was also lower in the Kono-S group. In the included studies, the mean endoscopic recurrence rate ranged from 5% to 30% after a mean follow-up of 12 months, 60 months to 10 years. In addition, other studies have shown that the inclusion of the mesentery as part of intestinal resection is associated with a reduction in surgical recurrence.

Mesentery-sparing resection was therefore recognized as an independent risk factor for surgical recurrence, so the Konos-S technique, despite being more complicated, does not extend the operating time, and in the present study, it was associated with low rates. surgical recurrence at the anastomotic site and anastomotic leak. The Kono technique may play a key role in those patients who can no longer receive

biological drugs due to adverse effects or lack of treatment efficacy, but more efforts are needed to obtain higher levels of evidence.

For this reason, an institutional survey (NCT02631967) and a prospective randomized multicenter study (NCT03256240) are underway to evaluate the Kono-S anastomosis in CD in preventing endoscopic and surgical recurrences when compared to conventional side-by-side anastomosis. Therefore, further research needs to be done to universally validate the Konos-S surgery for patients with indication, always emphasizing that the treatment approach should be comprehensive and personalized for CD cases and that all symptoms of recurrence and complications should be analyzed individually so that the choice of treatment strategy is beneficial for the patient.

This study concluded that this technique appears safe and may benefit the recurrence rate, but cautioned that included studies were scarce and that higher-level global multicenter studies are needed. A larger multicenter randomized trial (NCT03256240) and (NCT02631967) is currently underway, recruiting patients from the US and Europe, who fully substantiate and establish the role of the Kono-S anastomosis in the impact of the natural history of CD, this study is comparing the Kono-S anastomosis. S anastomosis with the other techniques, when this study is completed, it may provide more definitive answers about the impact of the Kono-S anastomosis on the natural history of CD after ileocolic resection. Therefore, new double-blind randomized clinical trials should be carried out by different centers to ensure and affirm the benefits of this surgery.

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Chapter 27

Cecal volvulus: a rare cause of intestinal obstruction

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ABSTRACT
Introduction: Cecal volvulus corresponds to 1% of the causes of obstructive acute abdomen, resulting from a twisting of the intestinal cecum on its own mesentery. The clinical presentation is variable, from intermittent and self-limited abdominal pain to acute abdominal pain associated with intestinal ischemia and sepsis. Methodology: Female, 78 years old, abdominal pain and distension, obstipation, emesis and nausea. Through exploratory laparotomy identified cecal volvulus. Submitted to ileocolectomy and terminal ileostomy, obtaining good results. Results and discussions: When faced with an obstructive abdomen, imaging tests and colonoscopy are useful to guide the diagnosis. Therapy is influenced by intestinal vitality, ranging from procedures such as colonoscopic reduction to right colectomy. Conclusions: This report emphasizes the importance of cecal volvulus as a diagnostic hypothesis in obstructive cases, aiming at a quick diagnosis and subsequent correction, avoiding complications such as intestinal perforation and ischemia.

Keywords: Ileostomy. Colectomy. Bowel obstruction.

1 INTRODUCTION

The torsion of a segment of the digestive tract at a fixed point is defined as volvulus and represents 15% of the causes of acute obstructive abdomen, a clinical syndrome characterized by the impediment to the progression of the intestinal contents. The main sites affected by volvulus are the sigmoid colon and the cecum. Cecal volvulus, corresponding to 22% of cases of volvulus, occurs due to an axial twist involving the cecum, terminal ileum, and ascending colon. It is established that the occurrence of VC is a multifactorial process that depends on the mobility of the cecum in the peritoneal cavity and a mobile mesocolon. In addition, some risk factors may be associated, such as: postoperative adhesions, late stage of pregnancy, high fiber intake, adynamic ileus and chronic constipation. High morbidity and mortality have been detected after surgical resection of VC, about 60% of patients will present some complication and the delay in its diagnosis is highly associated with the increase of this percentage. The illustration of this case and the exposition of its epidemiological, clinical, diagnostic and therapeutic aspects, may enable early detections that improve the prognosis of patients, since immediate treatment can avoid important outcomes.

2 METHODOLOGY

A 78-year-old female patient. Abdominal pain for 3 days, colic type, with worsening of intensity over time, associated with abdominal distension, stoppage of elimination of feces and flatus, nausea, emesis, sweating and chills, sought the Samuel Libanio (MG) Emergency Department. She had diabetes mellitus and systemic arterial hypertension. She had undergone hysterectomy surgery 30 years ago. On examination, she was in a good general state, ruddy, dehydrated (+/4+), eupneic. The abdomen was distended, painful on deep palpation and with absent AHR. Laboratory tests showed a CRP of 360 mg/l; potassium of 3.2 mEq/l; Hb of 11.7 g/dL; urea of 166 mg/dL; glucose of 125 mg/dL; phosphorus of 6.4 mg/dL; creatinine of 1.8 mg/dL; chlorides of 112 mg/dL; lactate of 0 mg/dL; direct bilirubin of 0.50 mg/dL; BE -3.3 mmol; cHCO3 of 21.2 mmol. On abdominal radiography, signs suggestive of volvulus in the proximal portion of the large intestine. With suspicion of obstructive abdomen, an exploratory laparotomy was performed. The patient was diagnosed with a volvulus of the cecum and underwent ileocolectomy and terminal ileostomy. The patient was referred for admission to the ICU. Needed dobutamine because of her history of HF, 2.5 L crystalloid solution because of low blood pressure, and Ciprofloxacin and Metronidazole as antibiotics. Eupnea at 5l/min of supplemental O2. Ileostomy in the right flank was functioning. Due to the good evolution, the patient was discharged from the ICU and admitted to a ward bed. Good acceptance of a paste-like diet and optimized prokinetic medications. She was discharged with orientation to return early for evaluation of the Japanese drain and outpatient follow-up. A TCLE was requested for the current cross-sectional observational study, in addition to data collection via medical records and procedure log.

3 RESULTS AND DISCUSSIONS

The present case illustrates a typical picture of volvulus of the cecum (VC), whose incidence is about 1 in every 3-7 million people per year, affecting people at older ages (between 60-79 years), females in about 70% of cases, and with risk factors, especially previous abdominal surgery[1] , allowing us to verify that the reported patient fit into all of these most affected groups. VC usually presents as acute obstructive abdomen, marked by localized or diffuse abdominal pain of strong intensity, with progressive worsening, associated with vomiting and stoppage of gas and stool elimination. When the condition is suspected, complementary exams should be requested for better diagnostic elucidation, including plain abdominal radiography, which generally demonstrates dilation of the cecum, hydroaereal level and dilation of the small intestine upstream, absence of gas downstream and, in some situations, the cecum in an unusual position[1,2] . Abdominal computed tomography (CT) demonstrates the presence and location of the volvulus, besides allowing the evaluation of intestinal ischemia and perforation, the main complications of the condition, from the presence of the "swirl sign", which demonstrates the torsion of the meso. Colonoscopy is a more diagnostic than therapeutic method, although it can be used for this purpose, allowing the identification of the point of colonic torsion[3] . The therapeutic conducts vary according to the patient's clinical picture and the observation of intestinal viability during the surgical procedure, and may be performed colonoscopic reduction, de-volvulation with cecopexy, or right colectomy. In the case reported here, the patient's clinical condition was indicative of a surgical approach, which allowed, during the procedure, the visualization of areas of vascular suffering, and the performance of ileocolectomy + terminal ileostomy was indicated, an approach that, in most situations, presents a good prognosis[4,5] . Although it is an infrequent condition, responsible for only 1-1.5% of the causes of intestinal obstruction in adults, volvulus of the cecum presents clinical-radiological signs that are widely discussed in the literature, allowing early diagnosis and therapeutic approach, with total improvement of the condition and good prognosis.

4 CONCLUDING REMARKS

Bowel rotation about the mesenteric axis is most prevalent in the sigmoid colon and cecum. Constipation, abdominal pain, and distension compose the clinical picture of this scenario, and imaging exams are useful to clarify the etiology of the obstruction. Therefore, the appropriate treatment for the patient's stability must be instituted early, avoiding complications such as gangrene or intestinal perforation. The described report coincided favorably with surgical treatment, although it evolved to later complications and death.

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Chapter 28

Didactics with ICT in Environmental Education and care for the Environment

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ABSTRACT
The research project corresponds to the experience carried out in a comparative mixed study with a quasi-experimental design, in which, through the development of a didactic strategy, it was possible to establish that the integration and articulation of the school curriculum with ICT, where the students have the possibility of assuming a participatory role with which they better infer knowledge, examples and experiences that tend to respect and care for the environment. The project in question looks at the incidence of ICT as a didactic tool, which tends to strengthen respect and care for the environment by students of basic primary education. Which affects the environmental training of students to raise awareness of environmental problems and educate themselves by incorporating values and empowering themselves with ICT tools to help prevent and solve problems that may arise in different environments.

Key Words: Educational context, Environmental Education, Ethical Values, ICT

1 INTRODUCTION

Environmental education is part of the training process of any learner, which allows them to clearly understand the benefits of conserving and generating positive impacts on the environment, which contributes to the formation of learners with a sense of relevance for the proper use of natural resources.

And just as Cabero and Llorente (2005, pp. 20-25) state that it is necessary to generate actions or strategies to promote social skills that facilitate the relationship between man and nature, in that sense, the implementation of strategies and activities mediated by the use of information and communication technologies guaranteeing access to a diverse world of problems which require intervention for their solution through advertising messages with visual impact where the attention of individuals is captured in a striking way to awaken citizen awareness to respect the spaces of nature.

On the other hand, Romualdo (2014), refers that it is urgent to become aware that we live in a complex and plural society. This means that a training in values that defend Human and Social Rights must be carried out, because, although it is difficult at the same time, there are many possibilities to be able to

build a better future. Nowadays, coexistence, the capacity for dialogue, relationship and communication are more and more valued. For this reason, it is necessary a formation in and for Human Rights, which makes possible the coexistence and respect for all people and living beings with whom we interact, regardless of their culture or customs, or if they are animals or plants.

Medina (Quoted in Romualdo,2014), indicates that: "rights, no matter how much they are enshrined in the constitutions, are only respected when they are known and exercised, and, for this, it is required that knowledge and the corresponding training have been previously provided" (p.40).

From these reflections arises the research "Educating in human and social rights: Care for the environment through ICT", conducted by Zambrano (2019), which sought to demonstrate whether the development and implementation of a pedagogical strategy mediated by ICT allows students in fifth grade of elementary school to develop attitudes and values that favor the fulfillment and implementation of human and social rights aimed at the care and protection of the environment, It also strengthens communication skills so that students can generate spaces for assertive communication based on self-esteem, respect for natural beings, elements of the environment and thus give them the opportunity to become promoters of the care of our planet and natural resources that every day are more threatened by the bad actions of some people.

The research process was focused on determining whether the integration and use of ICTs as mediation in the teaching-learning process of social rights such as environmental care, allow elementary school students to know, appropriate and assertively apply the principles of these rights in their social, family and school environment.

With respect to the methodological component, the study followed the guidelines of mixed research, i.e. a two-stage study: one quantitative and the other qualitative; the approach used was the comparison through which a pre-test / post-test contrast was established, which served to identify the changes and incidence of ICT in the appropriation of behaviors and values tending to care for the environment, respect for living beings and elements that constitute it, as an option to generate awareness that allows guaranteeing a healthy environment for future generations. The design of the study was framed in quasi-experimental research.

2 THEORETICAL REFERENCE

The theoretical reference outlined in the following lines, allowed to understand and interpret the study carried out from the existing reality in the educational context in relation to environmental education and environmental protection.

2.1 ENVIRONMENTAL EDUCATION

Tokuhama-Espinosa and Bramwell **(**Cited in Cortes,2017) refer that: Environmental Education can refer to education in, about and for the environment. Education based on environmental issues helps people

develop an affinity for the natural world. Education about the environment promotes greater understanding of the natural, physical, and social systems of our world. Finally, education for the environment is intended to motivate people to take action to improve the environment (p.22).

In a changing world it is necessary for educational institutions to be the place where alternatives and proposals emerge that allow students to develop a conscience for the care of the environment, the process should not have limiting age barriers, because regardless of the grade of schooling of students should be taught from an early age values and actions aimed at the care and preservation of natural resources, since with climate change and the accelerated destruction of non-renewable natural resources the future of new generations is threatened.

In this sense, Muñoz (2010) points out that environmental education should have an approach capable of permeating all curricular areas, their contents and activities, working in all areas of the classroom, being assumed by all teachers and with the commitment of the entire educational community. (p.19).

2.2 CONCEPT OF ENVIRONMENT AND OBJECTIVES OF ENVIRONMENTAL EDUCATION

Montoya (2010), citing the colloquium of Aix-en-Provence, France, held in 1972, defines the environment as "the set of beings and things that constitute the near or distant space of man, on which he can act, but which reciprocally can act on him and determine, totally or partially, his existence and ways of life" (p.67).

Therefore, it can be established that the environment not only refers to the living beings in the environment, but also involves cultural aspects in that environment that have come to affect the way we live, specifically atmospheric pollution, contamination and degradation of soils, extinction of species, reduction of green areas "lungs of the Earth", noise pollution, limited resources, population growth and increased poverty, chemical and thermal pollution, acid rains, forest fires, among others (Montoya,2010,p.67).

Based on these approaches, schools should not be oblivious to these realities, but should take curricular measures that allow from within the classroom to generate awareness towards the care of each and every one of its elements, so that in the future the children of today will not suffer from the negligence of their educators, for this reason it is necessary to implement the objectives of environmental education among which Gutiérrez (1995) states:

- To promote the acquisition of knowledge for the understanding of the structure of the environment, which will lead to behaviors and attitudes that make the improvement of living conditions compatible with the respect and conservation of the environment from a point of view of global solidarity for those who now live on earth and for future generations.
- To achieve the necessary change in the structures, management methods and analysis of environmental issues to enable a coherent and coordinated approach to the various sectoral policies at the regional, national and international levels.

- To help discover the values that underlie the actions carried out in relation to the environment.
- To guide and stimulate social participation and decision making to demand effective policies for the conservation and improvement of the environment and communities.
- To introduce in formal and non-formal educational contexts Environmental Education as a curricular dimension in an integrating process of the different disciplines that allows a critical analysis of the environment in all its globality and complexity.

The author's proposals coincide with the research carried out, given that its purpose is focused on the development of ethical values in students and that through them they acquire a conscience of respect and care towards the elements that constitute their natural environment.

2.3 ENVIRONMENTAL EDUCATION IN THE SCHOOL CONTEXT

According to the postulates of the Ministry of Environment and Natural Resources of El Salvador (MARN, 2013), environmental education in schools should be implemented in order to contribute to improve the behavior of students regarding the care of natural resources, generating a sense of belonging and interest in the care of their environment. With respect to environmental awareness, it is considered a tool for strengthening the attention sectors and focuses on institutional priority issues with the purpose of achieving a multiplier effect. (p.1).

Consequently, it is necessary that educators together with students and parents integrate strategies to be sensitized in relation to the importance of caring for the environment and recognize that in today's world there are different problematic situations, thereby knowing the damage caused, taking a commitment, generating actions and responsibilities to then be able to socialize and provide a healthy space.

Thus, MARN (2013) proposes that environmental education from educational institutions should be developed in a reflective manner based on topics such as: water resources, environmental sanitation, good environmental practices, climate change, environmental legislation, biodiversity and risk prevention culture. Therefore, environmental awareness should be implemented in reflections such as good environmental practices that can include the other topics related by MARN (2013). Through awareness workshops and integration of ICTs, respect for the environment can be fostered from the lower grades, to change attitudes regarding the care and preservation of the environment and thus, leave a planet in the best conditions for future generations.

3 ECOLOGY AND ICT

For an effective interrelation between Ecology and ICT, an analysis should be made showing the background and the use of technological resources to improve the state of our planet. Carranza(2007) indicates that modernity was a process of change for the human being, affecting the concept that man had with respect to the environment; once in postmodernity, the human being makes a rupture with his natural environment and this brings with it global warming.

> The rupture and fragmentation that has been generated between the space occupied by man and the space occupied by the rest of the world's beings is evident, in particular, its separation from the natural environment has resulted in global warming, desertification, loss of biodiversity, among many other events relevant to life on the planet (Carranza, 2007, p.1). (Carranza, 2007, p.1).

The second moment exposed by Carranza (2007), is Media Ecology, which is a process that takes into account environmental education and takes into account the use of ICT in an adequate and well implemented way. He proposes that there must be a change in the student's mentality with respect to mother earth:

> We must direct our students towards the restructuring and restoration of the fragmented balance of Mother Earth, which, if not restored, will prevent us from developing in a sustainable world. We must make use of the technologies and means offered by globalization and current times to reach our goal, which must be a sustainable environmental education carried out within the framework of the new options offered by technology. (Carranza, 2007, p. 6).

Finally, the author affirms that there is a great influence of ICT in education to generate ecological thinking within the classroom:

> Information and communication technologies have several aspects that must be taken into account especially if we are talking about ICT focused on pedagogy, since they have to be used within the instrumental methodology of a competency-based curriculum in which the use of ICT is a mediating tool in the teaching-learning process for the conceptualization of content. It is also important to point out the different types of ICT such as teaching and learning platforms, and the software that are used in intelligent classrooms, all that with the service of multimedia, gives us as a result an impressive change in the quality of teaching and learning. Today's world and the areas of life of man are surrounded by the use of ICT, the same that respond to the daily needs of man and society (Carranza, 2007, p. 3).

Based on the advantages offered by these technologies, it is worth questioning whether the pedagogical use of ICTs as a teaching strategy allows elementary school students to develop attitudes and values aimed at caring for and protecting the environment.

4 TEACHING STRATEGIES FOR ENVIRONMENTAL EDUCATION

The teacher from any space, implements different ways to reach the student and motivate him to learn, but it is evident that according to experience it is much more striking for students to learn when tools other than the board and the marker are used or when the teacher copies verbatim from a book and does not allow the student to inquire about the subject or interact so that he can reach the knowledge, that is why there is a need to worry about improving and innovating, so that students can learn and be motivated to perform activities such as those they practice daily for example, the use of multimedia elements, participation in social networks, create a blog, a web page where they interact with other people and exchange knowledge. (Cifuentes,2018, p. 60)

Peña (2015) states that "there are a number of strategies that can be used in the classroom; but the most appropriate in this case are: the recovery of prior learning through inquiry" (p.1). The internet and the

tools provided by multimedia are the most used by students to reach knowledge, there are also ways such as games, concept mapping, prezi presentations, blogs, forums and wikis that work as resources to solve students' questions and reach the knowledge of environmental education, what is relevant is to make use of them and that teachers update pedagogical strategies that encourage the use of ICT, even if a collaborative work can be more interesting and productive for students and teachers.

This study focused on integrating ICT as a didactic strategy through the design, development and implementation of the educational software "Human Rights in the Social Environment: Caring for the Environment", which allowed students in the fifth grade of elementary school to use multimedia elements and develop activities to appropriate fundamental concepts for the protection and care of the environment.

Below are some images of the software developed and implemented as a pedagogical strategy to strengthen the knowledge inherent to the care of the environment from the school context.

Figure I. Presentation entry of the software Human Rights in the Social Environment: Caring for the Environment - general menu.



Source: (Property of the author).

Figure II. Menu of activities - Educational software "Human Rights in the Social Environment: Caring for the Environment".



Source: (Property of the author).

5 METHODOLOGY

The research process followed the guidelines of mixed research, the approach used was comparative and quasi-experimental design, through which a pre-test / post-test contrast was established that served to identify the changes and incidence of ICT in the appropriation of behaviors and values tending to care for the environment, respect for natural resources and beings of the natural environment. Two groups of students of the fifth grade of elementary school of the Comfaboy educational institution of the municipality of Tunja - Boyacá, with homogeneous characteristics, each group integrated by 23 students, were taken, in the experimental group activities framed in the use of ICT were carried out, with the control group the teaching of ethical values and environmental education was worked, it was developed in a class environment framed in the traditional education model, that is to say, ICT mediation was not carried out.

The qualitative data provided by the informants were analyzed with the qualitative software Atlas Ti Version 7.0, from the results obtained emerged categories of emergent order from which it was possible to interpret the reality of the educational context and implement strategies and measures to solve problems inherent to the care of the environment, from the quantitative method the data resulting from the pre-test and post-test application of knowledge for environmental care, were analyzed and comparisons were established through inferential statistics, for which the statistical software R was used.

5.1 GENERAL OBJECTIVE

To demonstrate whether the development and implementation of a pedagogical strategy mediated by ICT allows students in the fifth grade of elementary school to develop attitudes and values that favor the fulfillment and implementation of human and social rights aimed at the care and protection of the environment. **Hypothesis**

Since this was a quasi-experimental study with a comparative approach, the following hypothesis was proposed:

Hi: The pedagogical use of ICTs with elementary school students allows them to develop attitudes and values aimed at caring for and protecting the environment.

Hi = $\bar{X}$ **1 =** $\bar{X}$ **2**

As a counterpart to the alternative hypothesis, the null hypothesis (**Ho)** was proposed.

Ho = The pedagogical use of ICT with elementary school students does not have an impact on the development of attitudes and values in students to care for and protect the environment.

Ho = $\bar{X}$ **1** $\neq$ $\bar{X}$ **2**

5.2 VARIABLE SYSTEM

The variables used in the study are as follows:

Table 1. *Variable System*

Independent variables	Dependent variables
Didactic learning sequences, software, digital and educational multimedia resources. Pedagogical use of ICT (Hypothesis)	**Care for the environment**

Source: own elaboration.

5.3 POPULATION

The study population corresponds to students in the fifth grade of elementary school belonging to the Comfaboy school in Tunja - Boyacá - Colombia, a total of 46 students as detailed in the following table.

Table 2. *Population Participating in the study*

Item	Description
School level	Grade 5 of basic primary education
Genre	Women: 24 Men: 22
Average age	Years: 10 to 12 years
School context	Urban
Economic Stratum	1 y 2
Level of access to ICT	Low only when they are inside the educational institution.

Source: own elaboration.

5.4 STAGES OF THE STUDY

The study was developed in three stages related to the proposed objectives.

First stage: In this stage, the first proposed objective (to determine what knowledge the students have in relation to the care, protection and conservation of natural resources and the environment) was fulfilled by designing a test consisting of ten questions, which was applied to the two groups of students (control group and experimental group).

Table 3. Pre-test applied to students in the control and experimental groups.

Ask	Control Group		Experimental Group	
	Correct answers	**Responses incorrect**	**Correct answers**	**Responses incorrect**
1. Which of the definitions is closest to the concept of environment?	14 students	32 students	12 students	34 students
2. Select three ways in which water can be contaminated?	18 students	28 students	16 students	30 students
3. Of the options presented, which actions contribute to water saving?	20 students	26 students	15 students	31 students
4. Which concept best defines environmental pollution?	16 students	30 students	13 students	33 students
5. Why is it important to take care of the environment?	14 students	32 students	16 students	30 students
6. Select the option that accurately explains the importance of trees in the environment.	12 students	34 students	10 students	36 students
7. How are natural resources classified?	10 students	36 students	14 students	32 students
8. Select three aspects that contribute to air pollution.	8 students	38 students	17 students	29 students
9. Which of the above concepts pertains to recycling?	14 students	32 students	10 students	36 students
10. The acronym that identifies electronic devices that pollute the environment is?	6 students	40 students	8 students	38 students
Average Rating Diagnostic Test	**Control group** 2.6 points out of 5.0		**Experimental group** 2.8 points out of 5.0	

Source: own elaboration

With the application of the diagnostic test, it was possible to establish in both groups of students that the knowledge related to the care of the environment is very basic and it could be said that null, the

number of incorrect answers was evidenced with greater frequency, which establishes that it is necessary to implement pedagogical strategies that strengthen environmental education, so that students appropriate concepts that lead them to develop values aimed at caring for, protecting and safeguarding the environment and natural resources existing in their social, family and school environment.

Second stage: Based on the applied diagnosis and the students' references, it was possible to determine that in the teaching-learning process they have gaps in the knowledge of different topics related to the respect and care of the environment; in this sense, this phase is related to the second specific objective proposed in the research (Design and implement a pedagogical strategy that generates awareness in students towards environmental care, the strategy was addressed from two approaches: one oriented from the traditional learning model and the other mediated by ICT).

The implementation process of the pedagogical strategy was carried out through projects focused on the care of the environment: recycling of waste elements, workshops on environmental care, beautification of the school by planting ornamental plants, among other tasks, the process covered thirty two-hour class sessions in both the control and experimental groups, during which time the students with the support of the teacher of natural sciences performed the assigned tasks, during these 60 hours of class, the development of the objectives proposed in the study were fulfilled.

Third stage: The third stage corresponds to the evaluation of each of the activities carried out by the students. At the end of the development of the pedagogical strategy, a post-test was applied to measure again the knowledge inherent to the respect, care and preservation of the environment by the students; inferential statistics were used to contrast the difference of pre-test/post-test means in both groups of control and experimental students, particularly when the data presented normality, the T-Student test for related samples was used.

6 RESULTS AND DISCUSSION

The first stage of the study focused on the application of an initial test of knowledge inherent to the care and preservation of the environment, using the scale standardized by the educational institution to assess the students' knowledge:

Table 4. COMFABOY Educational Institution Assessment Scale - Tunja - Boyacá - Colombia

Qualitative qualification	Quantitative qualification
Under	1.0 a 3.3
Basic	3.4 a 3.9
High	4.0 a 4.5
Excellent	4.6 a 5.0

Source: Own elaboration

With the application of the diagnostic test, it was possible to establish in both groups of students that their knowledge in relation to environmental care is at a low level and could be said to be almost null, with a higher frequency of incorrect answers from the students, which shows the need to implement actions and pedagogical strategies to strengthen environmental education.

Based on the students' answers, it was possible to identify that they are not precise in defining the environment; some of them stated that this only refers to natural beings, such as animals and plants; they also do not recognize the forms of water pollution and the possible strategies for its conservation; regarding the care of trees, it was identified that students are not clear about the role that trees play in the environment; regarding the process of recycling elements in the school context, it is not clear in which container the waste elements generated in the school should be deposited.

The average score of the control group was 2.6 points out of 5.0 and 2.8 points out of 5.0 in the experimental group, scores that allowed us to identify the need to redefine environmental education in schools, since students, in many cases, due to lack of information, are harmful to the environment, disrespecting the beings around them, throwing garbage, polluting or wasting water, among other actions that at first glance are seen as insignificant, but that day by day, if committed constantly, can degrade and destroy the environment; In this sense it is necessary to propose measures to strengthen the knowledge of children from an early age, so that in the future they will not regret having lived in ignorance about the care of the environment. The educational institutions as a space of formation are the ones called to inculcate in each child the care and respect for the environment, not only from the lecture but also through tangible exemplifying actions.

In the second stage of the methodological design, both groups of students developed activities aimed at caring for the environment from the educational scenario. The students of the control group developed activities framed from the traditional learning model, the students made posters, exhibitions, cleaning days among other activities, while the experimental group with the use of the software "Human Rights in the Social Environment: Care for the Environment" focused their learning on the interpretation of videos and exemplifying situations inherent to the care and preservation of the environment, the students carried out interactive playful activities with which they increased their sense of environmental conservation.

In both groups it was identified that the students felt motivated when dealing with the topic of care and conservation of the environment, the friendly and cordial treatment among them prevailed during the development of activities, especially in the ecological days and beautification of the educational institution, recycling of elements and waste generated inside the school classrooms; Based on this educational experience, the educational project ***"Taking care of my natural environment"*** was created, in addition, alliances were established between the educational institution and companies dedicated to the collection of recycling elements, currently the recycled elements are sold and with the money obtained, ornamental plants have been bought to beautify the school, paint to fix some classrooms and money is being saved to make a pedagogical trip with the students to the Botanical Garden of Bogota - Colombia.

It was evident that the development of this series of activities and the implementation of the transversal educational project ***taking care of my natural environment***, served to modify the behavior of the students in such a way that at present, for example, they do not break the plants in the school environment, on the contrary, they have taken turns to give them water and care during the course of the school week, On the contrary, they have taken turns to water them and take care of them during the course of the school week; likewise, they no longer throw garbage all over the school, these are deposited by the students in the corresponding container; regarding water care, the children no longer leave the faucets open, wasting water; they have already acquired the habit of bathing their hands and immediately turn off the faucet.

Broadly speaking, significant changes are evident in both groups of students, being relevant to observe how children when motivated from school develop empathy and love for the beings of nature and for the care of their natural environment, because of their age it is easy to generate in them an awareness towards the care of the environment, children like animals and plants in their environment, they are affectionate with these beings of nature, therefore, it is necessary to take advantage of the sensitivity of the infant to generate emotional ties with the environment, It is necessary to take advantage of the infant's sensitivity to be able to generate affective bonds with the environment, in the past there were no pedagogical strategies for this purpose, so it is evident today as worldwide has generated great destruction and loss of natural resources, a situation that could have been avoided if the infant had been educated, in this sense it is worth applying the maxim of the adage it is better to educate the child and not the man.

Finally, in the third stage of the study, a test was applied to the students to establish if there were pre-test/post-test differences in relation to the knowledge of different topics related to the respect, care and protection of the environment.

The rating scale to determine the level of knowledge of the students is shown in Table 4; the questions of the final test applied to the students are shown below:

Table 5. Post-test applied to students in the control and experimental groups.

Ask	**Control Group**		**Experimental Group**	
	Correct answers	**Responses incorrect**	**Correct answers**	**Responses incorrect**
1. Which of the options clearly explains what non-renewable natural resources are?	18 students	28 students		
Of the options presented, which ones indicate consequences related to water pollution?	22 students	24 students		
3. 3 aspects for which trees are important for the care of the environment are?	28 students	18 students		
4. They are causes of deforestation:	20 students	26 students		
According to the options presented, how many trees would be saved if we recycled 1 ton of paper?	22 students	24 students		
Which statement best explains the importance of the ozone layer?	18 students	28 students		

7. Select only those agents that can cause the greenhouse effect.	16 students	30 students		
8. Choose 4 RAE that cause environmental pollution	12 students	34 students		
9. According to the activities carried out, it can be stated that it is important to receive environmental education because:	16 students	30 students		
10. Select the correct answer. Acid rain is a consequence of:	10 students	36 students		
Average Rating Final test (post test)	**Control group**	3.3 points out of 5.0	**Experimental group**	4.2 points out of 5.0

Source: own elaboration

Normality tests (Shapiro-Wilk) of the scores obtained by the students inherent to environmental care were performed to validate assumptions of the difference of means in related samples. With a significance level of 5%(α=0.05), normality tests are performed on the scores as shown in the table:

Table 6. *Normality test: Shapiro Wilk*

P-value - Normality test : Shapiro Wilk	
ENVIRONMENTAL CARE	
Environmental care within the framework of traditional education	Environmental Care with ICT Mediation
0.8358	0.4215

Source: Own elaboration

The hypothesis of normality is accepted for the scores in the table above since p-value > 0.05. So the normality test is not rejected and the related samples T-Student test: Comparison of dependent (paired) population means can be applied.

Figure III. Parametric tests and their non-parametric alternative.

Muestra	Prueba paramétrica	Prueba no paramétrica
Muestras relacionadas		
2 muestras	t-Student	Wilcoxon
> 2 muestras	ANOVA	Friedman
Muestras independientes		
2 muestras	t-Student	U de Mann-Whitney
> 2 muestras	ANOVA	Kruskal-Wallis

Source (Own elaboration)

After applying the post-test in both groups, inferential statistics were used to establish the difference in means, for which, based on the normality test, it was decided to use the Student's t-test.

7 CONSERVATION AND CARE OF THE ENVIRONMENT

Scores obtained: Test applied (Control group without ICT mediation and Experimental group with ICT mediation).

It is assumed that the Variances are unknown but different in each of the groups (This was verified by means of a test: variance ratio) CI (0.6937662- 3.8570654) with a p-value of 0.2562.

Hypothesis to be tested:

Ho: The post-test scores obtained in the control group, with which ICTs were not used in the development of activities aimed at the care and protection of the environment, are equal to those obtained in the experimental group where educational multimedia was used for the same purpose.

$$\mu_{g\ control\ \mathrm{sin}\ TIC} = \mu_{g\ experimental\ con\ TIC}) \text{ ó } (\mu_{g\ control\ \mathrm{sin}\ TIC} - \mu_{g\ experimental\ con\ TIC} = 0\ )$$

Ha: The post-test scores obtained in the control group, with which ICT were not used in the development of activities aimed at the care and protection of the environment, are different from those obtained in the experimental group where educational multimedia were used for the same purpose.

$$(\mu_{g\ control\ \mathrm{sin}\ TIC} \neq \mu_{g\ experimental\ con\ TIC}) \text{ ó } (\mu_{g\ control\ \mathrm{sin}\ TIC} - \mu_{g\ experimental\ con\ TIC} \neq 0\ )$$

Test Statistics:

t = -10.972,

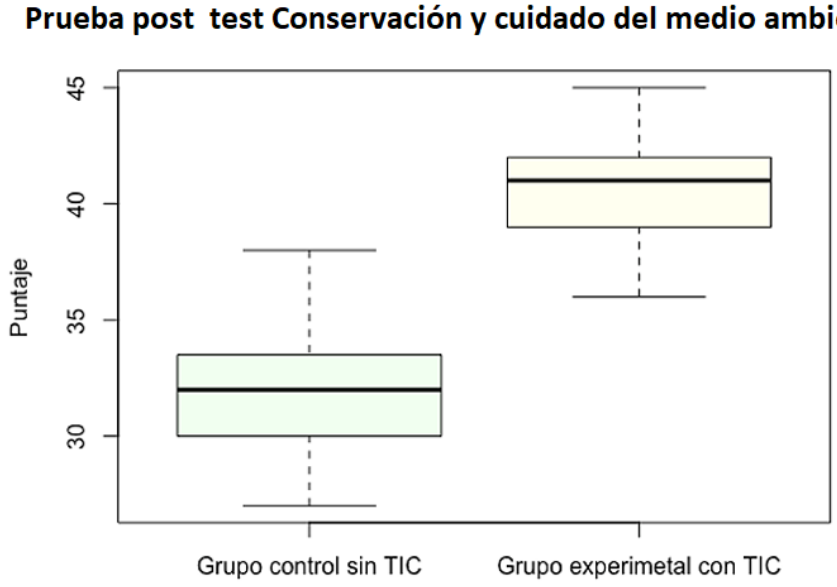
degrees of freedom = 22,

p-value= 2.174e-10

Decision: Ho is rejected since (p-value < α; . 174e-10< 0.05).

Interpretation: With a significance level of 5% and a confidence interval of 95%, there is sufficient statistical evidence to determine that the post-test scores obtained in the control group, with which ICTs were not used in the development of activities aimed at environmental care and protection, are different from those obtained in the experimental group where educational multimedia was used for the same purpose; therefore, the alternative hypothesis Ha is accepted.

Figure IV. Difference of means post test test conservation and environmental care.



Source (Own elaboration, R software)

The qualitative results were obtained from an opinion survey applied to the students of the experimental group after the ICT intervention, the table shows the emerging categories after the coding process with the Atlas ti software.

Table 7. *Emerging categories and subcategories of the opinion survey applied to students of the experimental group - Post test.*

Central Category: (Knowledge Construction)	
Category	**Subcategory**
Knowledge Construction	Development of values for environmental protection
Collaborative Work	Improved interpersonal relationships Group work in activities related to environmental care. Sense of responsibility for the environment
Willingness to work	Motivation Change of mentality of the student, awareness in the care of natural resources and the environment.
Interactive Learning	ICT resources adapted to the student's learning pace Diverse didactic resources to strengthen environmental protection, care and conservation

Source: own elaboration

The categories presented emerge from the coding process of a post-test survey applied to the experimental group; the Atlasti 7.0 program was used to carry out the categorization process.

Knowledge Construction: Based on the experience, the students of the experimental group with whom the ICT-mediated pedagogical strategy was developed, stated that it was quite significant, since they were the managers of knowledge and builders of their own learning, and cognitive faculties such as creativity, critical, analytical and reflective thinking to care for and protect the environment and its natural resources were also put to the test.

Collaborative work: based on the information provided by the informants, it was emphasized that ICT-mediated school activities enable the development of collaborative work between the educator and the student or among classmates. It was particularly evident when students worked in groups that in the assigned tasks, the children collaborated mutually in the development of the proposed activities. A relationship of camaraderie was evident. The goal they set was to develop a good job to beat the other classmates, that is, a healthy competition, it was also clear that the motivation of the students was always at a very high level.

Willingness to work: With the use of ICT as didactic mediation in the care and protection of the environment, students reported feeling pleasure and pleasure in learning, they were happy and not like when working in the traditional classroom, in which many times the student feels tired and unmotivated due to the daily routine, with ICT it was evident that each student was willing to develop the activities assigned.

Interactive Learning: The integration of information and communication technologies ICT in the educational process, makes reinterpret and resignify the learning methods rooted for a long time in the educational scenario, with these technologies the learning of students does not become monotonous and without sufficient significance that must have for the student to truly acquire knowledge and can be said that he learned, the diversity of software, tools, platforms and digital resources give the learner the possibility to learn at their own pace by taking into account their particularities, processes that in traditional education are somewhat wasteful.

With the study carried out through participatory observation, it was possible to determine the way in which these technologies have taken a leading role in the learning of modern students, particularly the taste for work, the integration with classmates to achieve compliance with the assigned tasks, the change of attitude towards discipline and order, the constant motivation and joy of the students when performing the work.

On the other hand, by using ICT as mediation for the development of values aimed at the protection and care of the environment, not only is it possible to develop or acquire knowledge of a discipline of knowledge, but interdisciplinary processes are carried out where the student acquires knowledge of different areas, in this research particularly the student appropriated and developed knowledge of the area of study Natural Sciences, as well as the area of technology and computer science, art education, ethics and values.

8 CONCLUSIONS

The emerging conclusions of the study allow us to understand the importance of training students in ethical values that allow them to develop awareness and respect for environmental conservation, in this sense it is concluded that:

- The better disposition and motivation on the part of the students, when making use of ICT, towards the

care of the environment, corroborated the validation of the hypothesis proposed, since it was concluded that the learning of the students was done in an entertaining and enjoyable way, through samples of real cases that affect the natural environment, the use of ICT empowered the students to create an awareness and sensitize the process of protection of each and every one of the elements and beings that are part of the environment closest to the students. This conclusion is consistent with the postulates of Gutiérrez (1995), who indicates that it is necessary to put into practice the objectives of environmental education starting with educational institutions; one of the tasks to achieve this purpose is to help students discover and develop the values that underlie the actions that are carried out for the conservation of the environment. Therefore, it is necessary to integrate Environmental Education in educational contexts as a strategy to protect the natural environment.

- The forms of access to the concepts of environmental problems allowed interacting with the multimedia components (animation, sound and image), which is reflected in the cohesion and connection between the curricular content and the student, in such a way that the students become empowered, apply values tending to care for the environment in the social, family and school contexts where they interact daily. The conclusion coincides with the postulates of Carranza (2007), who affirms that the use of ICT through a methodology articulated with a competency-based curriculum and taken as a tool to strengthen the teaching-learning process, undoubtedly produces significant changes in the learning and integral formation of students.
- Helping to build by example and training educators, allows to resignify the teaching of environmental care, it is not possible to continue with endless magisterial speeches. It is necessary to exemplify the situations that damage or destroy the environment, and from this to raise awareness, creating awareness of care, respect and protection, so that new generations do not have to lament a damaged and battered environment, but can enjoy the environmental legacy that we entrust and leave under their protection and care.

Therefore, it is necessary that the government, educational leaders and the community seek channels and strategies to strengthen environmental education from schools and also understand that awareness makes better processes are generated and that not everything has to be decreed, but must be and respond to a call of the environment care, to live better.

Environmental education should be given from childhood, which begins to generate environmental culture, improving the quality of life of the population and thus help maintain natural resources and contribute with various strategies to mitigate and account for the major problems of the environmental crisis. Therefore, from the educational institutions is what should be done, educate, train, and tend not to generate more environmental problems. This is consistent with what was proposed by the Ministry of Environment and Natural Resources of El Salvador (MARN, 2013), which indicates that environmental

education from schools should be significant, aimed at modifying student behaviors that are detrimental to natural resources and the environment, and the knowledge generated from the classroom must overcome the barriers of the educational context and be disseminated to other scenarios in order to safeguard natural resources and thus preserve the environment.

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Chapter 29

Telemedicine and its variables in the global pandemic scenario: a literature review

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ABSTRACT
Telemedicine, in the general sense, enables the offer of health-related services through the use of information and communication technologies, having great relevance in cases in which distance is a critical factor, as in the current pandemic situation. At this conjuncture, telemedicine has been conquering great space in the contemporary scenario in Brazil, despite already being used in developed countries, by means of biometric measuring devices, such as glucose, heart rate, and blood pressure meters. Telemedicine or telehealth, more than a technological resource to provide the performance of activities at a distance, acquires effectiveness when it is associated with strategic plans that include a process of logistics distribution of health services. Its link with strategies is due to the need for telemedicine to be inserted within a global plan of action, considering factors such as time (moment) and space (geographical location). This means that telemedicine must be contextualized in relation to the temporal moment and the characteristics of the locality where it will be deployed, so that it is possible to define the types of activities to be performed. Putting telemedicine into a strategy means placing it in an exclusive and valuable position.

Keywords: Telemedicine. Technology. Health.

1 INTRODUCTION

Telemedicine, characterized by the use of informational and communicative technologies in the area of human health, enables the provision of services related to improvement in obtaining care by the patient. With the secular evolution of technological processes until the 21st century, there was the advent of technological capabilities and, by interconnecting them to the healthcare delivery system, provided opportunities to enhance the clinical care in place. (ZANOTTO et al., 2020)

The first milestone for consolidation in Brazil was the launching of telemedicine as an induced demand in the 2005 call for proposals of the Millennium Institutes Program. To this end, CNPq (National

Council for Scientific and Technological Development) developed electronic tutoring environments and virtual ambulatories, established several partnerships, promoted training in institutions and government agencies such as the Ministry of Health and encouraged the emergence of new centers. (WEN, 2008)

Telemedicine, besides adding efficiency and reducing costs, can expand primary care, meaning access to health services in remote regions, since it has the potential to expand the actions of health professionals, integrating them to health services located in hospitals and reference centers, in terms of prevention, diagnosis and treatment. In this sense, the primary aspect of telemedicine is its potential to democratize access to health services: from the social point of view, it represents an activity of great importance, especially since it is increasingly referenced in the literature as related to increasing quality and safety in the provision of medical care, and also to the reforms needed in universal health systems. (WEN, 2008)

Thus, it is understood that there is a medical insufficiency to meet the high in-person demand in specific geographic regions, since it was observed by Zanotto et al. (2020) the need for specialized ophthalmological consultation 10 times greater than the actual availability in the analyzed territory. Despite the fact that the country has relevant conditions for the development and application of telemedicine, due to its large territory, it can be seen that this technological means has been little covered in the medical field, with hesitation about its beneficial capacity and patient safety. Thus, the present work aims to discuss the advantages in the social, economic and health spheres for society.

2 METHODOLOGY

For the development of this article, a thorough research of scientific articles on the topic of telemedicine was carried out, especially those dating from the last two decades. For the selection of studies, the electronic virtual platform of Pubmed, Scielo, Elsevier and Periódicos CAPES were used. Of the 15 pre-selected articles, nine were chosen for in-depth study and approach in the paper, since they had better content on the theme and its variations, whether in financial, social or health promotion in individuals.

3 RESULTS AND DISCUSSION

From the bibliographical survey carried out in this work, a synthesis was made of the material found in 9 scientific articles, considering several sectors of the theme in question.

According to Zanotto et al. (2020), the large existing world population and the constant use of resources, with the need for sustainability measures, have promoted greater interest in the broad network of possibilities of telemedicine. Among these, its role in primary health care (PHC) stands out through the quick access of patients to high complexity referrals, the possible resolvability at the primary care level and the reduction of referrals for specialized care, besides its ability to assist in monitoring and controlling the value of care delivery to the individual.

In the literature in general, telemedicine is attributed an enormous potential to promote and add socioeconomic benefits to society as it: promotes access to health services, creates opportunities for improvement (education) for professionals and improves care and quality of life, besides of course, helping in the organization of providers (institutions and companies). (MEDEIROS; JACQUES, 2004)

The Federal Council of Medicine (CFM) defines telemedicine, by document written in 2002, as the activity of the medical profession through the use of methodologies of communicative interaction audio-visual and data, in which the purpose is to provide assistance, education and research in health. However, for its effectiveness in the current scenario, one must follow the rules established by the council for data safekeeping, confidentiality, and privacy, as well as to ensure the confidentiality of the medical professional and to base it on the benefit of the individual. (CFM Resolution nº 1.643/2002; 2002, p. 205).

Furthermore, according to CFM Resolution nº 1.643/2002 (2002, p. 205), remote service providers are obliged to be registered in the Legal Entity Registry of the Regional Medical Council of the respective locality where they are located, since this body will establish continuous surveillance regarding the quality of health care, as well as the preservation of information and the appropriate relationship between patient and professional.

According to Wen (2008), one can group telemedicine activities into three major sets:

Interactive Teleeducation and Collaborative Learning Network: these are terms that designate the use of interactive technologies to expand the possibilities of knowledge construction, either by increasing the facilities of access to quality educational materials, or by allowing access to reference centers or the structuring of new educational systems.

2. Telecare/Regulation and Epidemiological Surveillance: development of activities with distance assistance purposes, such as specialized second opinion. Systems can be developed to allow the integration of care activities with education, epidemiological surveillance, and health process management.

3. Multicenter Research/Collaboration of Centers of Excellence and the Tele-Science Network: integration of several research centers, allowing the optimization of time and costs, through data sharing, training and standardization of methods.

Education is a complex process, and nowadays, with the ease of access to technologies, it can be reinforced, enhancing the classic educational methods. There are several interactive support technologies, whether for face-to-face education, or for Interactive Teleeducation or Distance Education (DE). Among them, we can mention computer graphics, surgical simulators, realistic simulation environments, and skill labs with robotic mannequins, among others (WEN, 2008).

Regarding the economic bias, analyzed by Zanotto et al. (2020), the expenses required for the introduction of these technological mechanisms are high, requiring micro-costing methods for cost valuation with a high degree of detail. In this sense, the Time-Driven Activity-Based Costing (TDABC) is a measurement alternative that allows relating the essential time to perform the consultation, in addition to the unit price of the service.

A study carried out in Rio Grande do Sul about the measurement of consultations values by the professional team in the ophthalmologic area, called teleophthalmologic care, showed that the standard cost per telediagnosis in the area was R$ 199.00. The entire process was evaluated during a one-year period and it was defined that there was a cost decrease from R$783.00 to R$283.30, which determines the learning curve of the current technology implementation. (ZANOTTO et al., 2020)

Besides the financial issue, telemedicine has the possibility of qualifying the health system, promoting improved access to services through greater resoluteness of PHC, which has a direct impact on the secondary and tertiary sectors, being positive for the reduction of referrals. Thus, according to Zanotto et al. (2020), teleophthalmology systems are feasible in the Brazilian scenario, being of fundamental importance regarding the qualification of the waiting line for primary health care services in this area. Through it, it is possible to classify the patient's risk, which allows better access to the specialty and care to the individual.

In face of the pandemic of COVID-19 witnessed in Brazil and worldwide, the Federal Council of Medicine has determined the improvement of the qualitative capacity of medical services performed by professionals, recognizing the beneficial utility of telemedicine. Besides what was prescribed in the CFM Resolution nº 1.643, of August 26, 2002, it was determined: the teleorientation of patients at a distance, with instruction and referral of individuals in isolation; telemonitoring, performed under the supervision of a health professional to control health or disease parameters; and teleinterconsultation, being performed in a way to exchange information among physicians, for diagnostic or therapeutic assistance. (Ofício CFM nº 1756/2020 - COJUR; 2020)

In the field of genetics, telemedicine has a relevant characteristic in the process of care in an efficient manner to the population, since telegenetics makes it possible to reach and overcome geographical and labor barriers in the region, enabling greater cost efficiency. Thus, once moving information instead of the patient, telemedicine provides a favorable environment for the advancement of health care and removes impasses about not providing services in the genetic area, especially in genetic counseling in oncology and in the syndrome of genetic predisposition to cancer. (FERNANDES TAVARES et al., 2020).

In a study conducted on the subject in the United States of America (USA), Australia and Wales, Fernandes Tavares et al. (2020) observed low disadvantages of the virtual method, raising the possibility of its continuous installation. Among the advantages obtained by the patients in this study, the following stand out: low cost, no need for prolonged transportation to large centers, possibility of scheduling genetic counseling in conjunction with a face-to-face consultation, ease of transmitting information, and access to rural areas that previously lacked services. Still, the disadvantages of the process are: lack of emotional support and affective bond between doctor and patient.

Telemedicine must be applied with specialist physicians, i.e., when it has Specialist Qualification Registration (RQE), and can be applied when the patient is in vulnerable areas or in areas of difficult access

to the health center, in situations, such as natural disasters, prisons, special stations and nursing homes.(MALDONADO; MARQUES; CRUZ, 2016)

According to Maldonado, Marques and Cruz (2016), two specialties stand out, being teleradiology and teledermatology. Teleradiology relies on the opinion of the radiologist who analyzes X-Ray and CT images, the exams are done in areas with few resources and later referred to more advanced health centers. There was proof that the digital analyses were more effective when associated with the original images. In the dermatology area, the use of images transferred to the doctor was successful in the diagnoses, and the main disease identified was leprosy, and 95.8% of the diagnoses were effective.

At the University of São Paulo Medical School, its Telemedicine group, created a web site about skin cancer prevention and Tele-education in Microbiology. The web site aimed to prepare individuals who are not specialists in the area, to detect possible malignant lesions and influence the search for a professional. Moreover, it seeks to promote a multiprofessional interchange in microbiology, to monitor the emergence of bacterial resistance (URTIGA; LOUZADA; COSTA, 2004)

In October 2000, the Instituto Marteno Infantil de Pernambuco (IMIP) established an international telepathology program between IMIP and St. Jude Chidren's Research Hospital in the USA. The project had the purpose of a simultaneous study between the pathologists of the two institutions about the diagnosis of pediatric cancer, which had communication in real time and in the destination of still images. According to Urtiga, Louzada and Costa (2004), the initial result showed that it was a viable procedure, which made it possible to speed up and increase the quality of treatment for children with cancer.

In addition, telemedicine contributes to doctors being able to interpret long-distance exams because of the use of the camera, in this case the transmission of digital data, for example, ECG, EEG, ultrasound and vital signs monitoring. This facilitates the speed of diagnosis and conduct that the doctor must have with the patient, but also avoids excessive travel with these individuals.(CL, 2015)

Moreover, this model of genetic counseling by virtual means studied demonstrates that this method can be used both in underdeveloped and developing countries, where there are greater difficulties in accessing health services in their entirety. Therefore, it is imperative that the health professional analyze the case of the individual in question, and telemedicine should not replace the work of the medical professional, but should be adapted as an instrument of assistance. (FERNANDES TAVARES et al., 2020).

4 CONCLUSION

Given the scenario observed, telemedicine can become a great complement to the healthcare process. Among the positive points observed are its great geographic reach, reducing the distance barriers between the patient and the physician chosen/appropriate for his/her treatment, as well as the lower cost in relation to consultations or procedures performed in person. In addition, an interesting aspect is the facilitation of the doctor-patient relationship, since the contact between them can become more frequent and viable due to the lesser difficulty encountered in bureaucratic issues such as des locamento, waiting

rooms, and other situations highlighted by users of this new type of service. Considering this panorama, telemedicine emerges as an alternative to offer a range of services which, for many times, were restricted only to large centers.

With this, it is also visible a great advantage of the Unified Health System (SUS) in the search for integral health, since the distance care can add directly in primary care and in the use of various services to remotely serve people who live in places with little physical structure or with a restricted number of specialist professionals, or even regions where the displacement of the patient is inaccessible in the search for a solution to their problem.

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Chapter 30

Telemedicine and the Covid-19 crisis in Brazil: challenges and possibilities for the right to health in the digital environment

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ABSTRACT
Telemedicine is a mode of medical care, performed at a distance, which was essential in the worldwide crisis faced by the Covid-19 virus. Despite being a recent, current and emerging issue, the digital health care method was already developed in Brazil, although with some restrictions and criticism from the medical community, more precisely by the Federal Council of Medicine. In this condition, the work will be developed from the problematic of data protection in digital platforms, in the dynamics of telemedicine. Furthermore, the legislation that involves the themes will be explored, with a special focus on the General Law of Data Protection and the constitutional right to health and human dignity.

Keywords: LGPD; digital platforms; data protection; telemedicine.

1 INTRODUCTION

Approximately three years ago, the subject of telemedicine acquired due focus, although it was a technique known previously at the time mentioned, but which has become more popular and accepted now. It was necessary and fundamental to cope with the worldwide health crisis caused by the Covid-19 virus. Thus, it is of utmost importance to debate and study about telemedicine, as well as to turn attention to data protection for the parties involved, physician and patient.

The governments and societies of all nations have faced significant changes to the reality of their previously conceived health policies. And, with all due respect to the shattered lives and all the sadness caused by the pandemic, in a positive perspective, the coronavirus has provided an absurd and extremely favorable progression in the health field. By the way, not only in the health field, but also in the field of technology, legal rules, and especially the adaptation of the human being. Everyone had to reinvent themselves and adapt, even as a way to survive to all this "pandemic madness".

Lives were turned upside down and, even so, health professionals performed their duties perfectly, putting their own lives at risk to support people infected with the virus, in an almost totally collapsed health system. Doctors, nurses, nursing technicians, physical therapists, and other health-related professions acted like heroes, doing their best on the front lines to fight the enemy, when there were still no vaccines or proven effective drugs for the treatment.

In turn, scientists in general have also worked hard to find a solution for the coronavirus. All these efforts were crowned with the achievement in a little more than a year of the elaboration of an efficient vaccine against this virus. It was a historical milestone, for the admirable efficiency of science that, in a short period of time, was able to produce effective and safe vaccines to curb the number of deaths and reduce the rates of contamination of people.

In the same way, telemedicine played a great collaborative role in confronting the pandemic. Through the use of virtual and remote means of medical care, it was possible that the numbers of infected and deaths were not greater and more frightening. With this remote mode of medical care, people with mild symptoms could be assisted from their homes, without the risk of contaminating the doctor and other people who would come into contact with the patient. He could be treated from his home, avoiding contagion and the further spread of the virus.

And, to provide this means of virtual medical care in an accessible way, digital platforms were used, as well as information and communication technology tools.

After the acute period of the pandemic, it is understood that now is the time to discuss some essential points of the use of telemedicine in health care, such as the issue of data protection and the personality rights of those involved in telecare. The General Law of Data Protection provides for the treatment of personal data, including in the digital environment, being merely intuitive to protect them, since they are vulnerable on the *Internet*, as will be discussed in the following.

If the practice of telemedicine requires the use of a digital medium, through applications, programs, social networks, or simply by connecting to the *Internet*, there is a problem in effectively protecting the data made available on such platforms, which are a *place* where surveillance is almost nonexistent. Furthermore, very few people are aware of the exposure of data in the digital orbit and the risks that the revelation of personal data can bring, not only in the context of telemedicine.

Therefore, this article will address issues that go beyond telemedicine and the concern with personal data in their exposure on digital platforms. It is imperative to address the dignity of the human person, as well as health, as a fundamental right. Likewise, the Federal Constitution of 1988 provides for the right to privacy, intimacy, secrecy, inviolability of personality rights, and honor.

2 THE GENERAL DATA PROTECTION LAW AS A FUNDAMENTAL RIGHT

In fact, every revolution brings about a significant change in society and, for the birth of constitutional law, the occurrence of two historical facts was essential: the Independence of the United States and the French Revolution, which inaugurated a new state model, characterized by the need to limit state power by organizing a State of Law, with the establishment of fundamental rights and guarantees to its citizens. (COMPARATO, 201 8, p. 118).

These fundamental rights are the basis for the perfectibilization of democracy, given the preponderance of the sovereignty of the people, as well as the interdependent correlation between the three

powers: Executive, Legislative and Judiciary. The people have the power to choose their representatives, in order to determine the future of the nation; however, even if the power is delegated to someone, this power is not unquestionable. There are limitations, both to the decision-making of the governors in general, and to the individual rights and guarantees of the human being (MORAES, 20 22, p. 29).

In the Brazilian Federal Constitution of 1988, in its 5th article, it is established that everyone is equal before the law and has the same fundamental rights, such as the right to life, liberty, equality, property and security, among others. And, as long as there is a direct relationship with one of these rights, even if it is not expressly delineated in the *main section of the aforementioned* article of the Constitution, this right is valid as fundamental. One can give as an example the rights to privacy and intimacy of the human person, foreseen in item X of Article 5 of the Constitution, with the following textualization: "privacy, private life, honor, and image of people are inviolable, being assured the right to compensation for the material or moral damage resulting from its violation". Finally, Constitutional Amendment no. 115 of 2022, inserted one more individual right in the list of article 5, which is subsection LXXIX: "the right to protection of personal data is assured, under the law, including in digital media. "

The Federal Constitution is the basis for the entire Brazilian legal system, being the most important law in the country. Therefore, any questioning that has the intention of going against what is duly constitutionalized must be declared unconstitutional and removed from the legal world, provided that this bias is not used to exempt from responsibilities or penalties (MORAES, 20 22, p. 805).

2.1 CONCEPTUALIZING THE RIGHTS TO PRIVACY, INTIMACY, AND LIBERTY

When it comes to fundamental rights, all are legitimate as to their importance and legal relevance, but for this study the focus will be on the rights to privacy, intimacy, freedom and access to health. Respectively, privacy and intimacy have stood out in the face of major technological advances; since, in the digital media in particular, there have been incidents of violation of these rights, either through exposure or through the degradation of the honor of the human person when freedom of expression is abused.

The rights to privacy and intimacy are duly legislated in article 5, item X, of the Federal Constitution, with the following wording: "privacy, private life, honor, and personal image are inviolable, and the right to compensation for material or moral damage resulting from their violation is assured".

Furthermore, according to the understanding of Maria Helena Diniz

> Personhood is not a right, so that it would be erroneous to state that human beings have a right to personality. It is the personality that supports the rights and duties that radiate from it, it is the object of law, the first good of the person, which belongs to him as a first utility, so that he can be what he is, to survive and adapt to the conditions of the environment in which he finds himself, serving him as a criterion to assess, acquire, and order other goods. (2005, p. 121)

The purpose of protecting human dignity is evident, even in a more individual way. In this vein, in all its aspects, fundamental rights are inviolable, because they protect the most precise good, which is life

with dignity. Violating constitutional rules means committing an unconstitutional act, which is totally forbidden, except when the legitimacy for such unconstitutional practice is proven, such as, for example, for purposes of self-defense, state of necessity or in compliance with a legal duty, or with regard to the exercise of a regular right (art. 23, clauses I, II and III, of the Brazilian Penal Code).

The right to freedom is outlined in the caput of art. 5 of the Federal Constitution, namely: "All are equal before the law, without distinction of any kind, guaranteeing Brazilians and foreigners residing in the country the inviolability of the right to life, liberty, equality, safety and property, as follows [...]".

Therefore, the right to freedom is considered one of the most important fundamental rights, providing a sequence of other rights also essential to human dignity. It is a right that has also been positively stated in international law, in the Universal Declaration of Human Rights, in which there is a deep concern with the protection of life and with the dignity of the human being (COMPARATO, 201 8, p. 236 and 240).

At first, the right to freedom was restricted, more linked to the issue of the possibility of coming and going, being associated with free movement and also the free expression of thought (SALEME, 2021 , p. 139-140). However, with the complexity of today's societies and the use of new information and communication technologies, there has been an amplification of freedom of expression and communication, which has reached a scope unimaginable at the time of the declarations of human rights. Thus, it is understood that giving freedom a very broad conceptualization may generate many conflicts, thus problematizing its delimitation nowadays.

Freedom goes beyond a physical and spatial issue, such as the one foreseen in Article 5, item XV, of the Federal Constitution. It also involves the perception as to the freedom to express oneself, to manifest one's thought, conscience and choice as to belief, relating directly to the individual's will, either to act or to abstain, in accordance with his desire (ALEXY, 20 08, p. 218-226).

2.2 HUMAN DIGNITY, TECHNOLOGICAL MODERNIZATION AND CONSENT

With the passage of time and the development of societies, several significant changes have occurred, many positive and others negative. However, there is something that is considered unchangeable, due to its magnitude, which is the recognition of the need to verify the dignity of the human person and its origins, such as individual and collective fundamental rights, considered by the doctrine as fundamental principles.

Considering the great technological advances, the *Internet* was one of the most revolutionary milestones that happened in the most recent history of mankind. Through it, other changes have come about, such as connection on a worldwide scale, the approximation of individuals regardless of where they are, the dissemination of knowledge in a quick and practical way, access to information and communication of rule free of charge, instantaneous and global. However, the law has not kept up with this accelerated progress of the *internet* and new information and communication technologies. The internet was created in

the 1960s, in the United States of America, and in Brazil, it was only made available in 1991. However, the edition of laws to regulate the *web* connection in Brazil took place only in the year 2014, known as Marco Civil da *Internet* (Law 12,965/2014). This law established principles, guarantees, rights and duties for the use of the Internet in Brazil. (SANTOS, 2021).

It was through Law 12,965/14 that the *internet* ceased to be a "lawless land," as it was popularly seen in Brazil. However, it was not enough to cover all issues pertaining to data protection. Because of this, the General Law of Data Protection (Law 13,709) was thought up and drafted in 2018, but it came into force, in all its contents, only in 2021, as provided in its art. 65. Its wording was changed the very next year, by Law No. 13,853 of 2019.

In short, even though it is written in law, and not just in one law, but in several, many people and technology companies break the rules; moreover, this is not just an isolated case concerning data protection, but a social and even humanitarian problem. Psychology should even be allied with law, in a more imposing way, since, for the creation of laws, the ideal would be to know the human mind, so that the law can be effectively enforced. However, this is a discussion beyond the scope of this article and deserves special attention to be discussed.

That being said, it has become commonplace to attack people's honor on social networks; it has become customary, using freedom of speech and thought for people to comment on everything and everyone, even if this may instigate hatred, discrimination, violence, and the most varied forms of prejudice. Psychological abuse and manipulation have become frequent; caring for others has become commonplace, aiming only at profit and popularity in the digital media; the violation of laws, principles, and constitutionalized rights has become commonplace, for one's own benefit.

The General Law of Data Protection, sanctioned on August 14, 2018, brought with it hope regarding the delimitation of the abuse of freedom and power of communication in this digital medium, being extremely important for justice and for the future of the nation. The main focus of the law, as stated in the main *section of* Article 1, is on the protection of fundamental rights, specifically freedom and privacy, and the free development of the human personality.

For the edition of the General Data Protection Law, the Brazilian legislator based itself on the *General Data Protection Regulation*, a European law that came into force in 2018, but which has specific characteristics, differing from the Brazilian law in some aspects. In fact, these are two very different social and cultural realities (PINHEIRO, 2020 , p. 15).

Moreover, the General Law of Data Protection has seven fundamentals disciplined in Article 2, which are basic, namely

> I - respect for privacy; II - informational self-determination; III - freedom of expression, information, communication, and opinion; IV - inviolability of privacy, honor, and image; V - economic and technological development, and innovation; VI - free enterprise, free competition, and consumer protection; and VII - human rights, the free development of personality, dignity, and the exercise of citizenship by natural persons.

The protection of the data subject's data has gained greater proportion in view of the above, such as the evolution of technology, but also by the development of global trade in personal data. Now, the consent of the data subject is required to capture certain personal information of the user, in order to avoid an invasion of intimacy and privacy as a result of this "collection".

However, this personal right is not being truly respected, because many companies use this personal data for marketing purposes, without even the actual knowledge of the consumer. And, although there has been consent at a certain time of the consumption relationship, this does not allow the disclosure of data to third parties (PARISER *apud* FREITAS; BORGES; RIOS, 2016, p. 01-11).

It is also discussed, in the current practices of Internet use, whether the user is actually consenting or being induced to consent to access digital media. In this sense, consent under the General Data Protection Law, as provided in Article 5, is: "XII - consent: free, informed and unequivocal manifestation by which the holder agrees with the treatment of his personal data for a specific purpose". There are situations in which it is not necessary to request the consent of the data holder, as long as it is duly provided for in the law, for example, when certain data is already publicly available by the data holder himself, as long as the owner's rights are safeguarded.

Consent to the provision and collection of data by the data subject is a major discussion of the General Law of Data Protection. In the form of the law, the clarification regarding consent must occur in a simplified, accessible and detachable manner, for the clear visualization and understanding of the holder, as stated in arts. 8, §§ 1, 2, 3 and 4, of Law No. 13,709/2018:

> Art. 8 The consent provided for in item I of art. 7 of this Law must be given in writing or by any other means that demonstrates the manifestation of the holder's will.
> § If the consent is given in writing, it must be included in a clause detached from the other contractual clauses.
> § Paragraph 2 The controller is responsible for the burden of proof that consent was obtained in accordance with the provisions of this Law.
> § 3. The processing of personal data is forbidden if the consent is faulty.
> § Consent must refer to specific purposes, and generic authorizations to process personal data will be null and void.

And, even with all the legislator's concern regarding the data subject's consent, means to circumvent this personal and constitutional right are still found. When requesting consent, digital platforms use bureaucratic means that are not accessible to the data subject, with long texts and terms that are difficult to understand, making it difficult for the data subject to understand. This occurs with a specific purpose: to make the user not read the policy and privacy terms and consent without actually reading something that is already occurring (HERNANDES, 2017).

For the General Data Protection Act, data protection alone could not be an end aimed only at itself (DONEDA, 2019, p. 177-186). And, one of its most important pillars is the self-control of the data subject regarding the release of his personal information, being up to him the exclusive consent, in the manner

provided by law. Reinforcing this issue the law provides that it will be up to the user, at any time, the power to revoke his consent and cease the provision of his data (art. 9, § 2 of Law 13.709/18).

In practice, however, this is not quite the case. Facebook, a major social network that impacts the lives of billions of users, as well as Instagram, Google, YouTube and, most recently, Tik Tok, have terms of use to obtain user consent. And, through this consent, users' personal information is used for commercial purposes, which starts the moment you like a photo, or make a post, visit websites and social network profiles. In the specific case of Facebook, it is a platform that, by obtaining consent from the data subject, may use name and even other content, images and sounds that are linked to the user's profile, according to Eli Pariser (PARISER *apud* FREITAS; BORGES; RIOS, 2016, p. 01-11).

From this perspective, it has become usual for digital platforms to apply generic consent, with the information that the terms will always be available, all that is required is to click on accept or agree. However, this type of consent is forbidden by the General Data Protection Law, because it must be informed and free, under the terms of art. 5 of the law, already exposed above.

Furthermore, once the purpose established by the collection of personal data has been achieved, they should be deleted, by the principle of necessity; or else, from the moment in which the data subject wishes the data to be deleted, as provided in the article below:

> Art. 60 - Law No. 12,965 of April 23, 2014 (Marco Civil da Internet) shall come into force with the following changes: "Art. 7 [...] X - permanent exclusion of personal data provided to a given Internet application, at its request, at the end of the relationship between the parties, except in the cases of mandatory storage of records provided for in this Law and in the law that provides for the protection of personal data;.

However, there is no proof that the data is actually deleted, nor any specific control over this. Not to mention that when data has been shared with another provider, there would be great difficulty in applying this article.

Finally, it is important to discuss the responsibility of the data owner itself (art. 42 of Law 13.709), since it is the user's civil responsibility when there is a violation of the rule, both legal and technical, causing material or moral damage to another data owner or to a collectivity (CAPANEMA, 2020, p. 163-170). In addition, it is incumbent on the consumer to read the privacy policy terms of each website or digital platforms in general, to truly know what happens with the provision of data.

However, with the convenience and lack of habit of exercising this reading, about 97% of users do not read the privacy terms and just agree to them, according to a survey conducted by Deloitte in 2017, which corresponds to a very worrying percentage (DAVID, 2020). Thus, there are many problems regarding consent, both by the data subject's own practice and by the bad faith of digital companies.

2.3 THE PROBLEM OF FALSE CONSENT AND THE COMMERCIALIZATION OF DATA

In view of all the foregoing, in summary, the problem of the false consent is in the very vice that it brings with it, to the extent that it is not legitimate. It is an induced consent to obtain illicit advantage to the detriment of the consumer, who is the weakest link in the consumer relationship, according to the following provision of the Consumer Protection Code:

> Art. 4 The National Policy for Consumer Relations aims at meeting consumers' needs, respecting their dignity, health and safety, protecting their economic interests, improving their quality of life, as well as the transparency and harmony of consumer relations, according to the following principles I - recognition of the consumer's vulnerability in the consumer market; [...]

Not long ago, digital platform companies had to reformulate their privacy policies in order to comply with the General Data Protection Law, especially regarding the data owner's consent, which was not even questioned before. With this reformulation, given the importance of the right to privacy and intimacy, the user of any platform, websites or social networks, would need to consent to the sharing of their data in this digital environment. Thus, when registering in a social account, for example, in order for the registration to be validated, an acceptance to share one's private life is imposed, upon consent; that is, only those who agree to access their private data will be able to use the social network. And, furthermore, it has become usual to obtain this data to market them, because it is a way for technology companies to profit from other companies, especially online stores. (PARISER *apud* FREITAS; BORGES; RIOS, 2016, p. 01-11).

The trade happens, initially, with the development of a personalized profile for each user, achieved by analyzing digital interactions, with care to glimpse what kind of content is most interesting to each consumer, as well as their tastes and preferences in general. And for this to be possible, *Facebook* has enhanced the approach of algorithms, as the example of the algorithm called *EdgeRank*, which customizes what information arrives in each user, according to their affinities (relative to interaction with other users and, potentially, friends), with the content (personal exposure and news) and as to time (newer posts have priority over older ones) (PARISER *apud* FREITAS; BORGES; RIOS, 2016, p. 01-11).

The question is to what extent these algorithms are beneficial to the consumer and the data subject. And if there is a need for greater transparency and the possibility of democratic choice of these algorithms by users. It is interesting to have content directed in a subjective and particular way. But this may trigger severe consequences in the future, not far from the current reality, which is already worrisome.

2.4 THE USE OF ALGORITHMS AND BUBBLE FILTERS AND THE DIFFICULTY OF CONTROL

Currently, algorithms and filter-bullets are widespread in the global digital market. The amount of users reaches 150 million Brazilians (REDAÇÃO, 2021), which leads to the incidence of "algorithmic alienation", conceptualized by Mark Andrejevic (VALENTE, 2020 , p. 05). This alienation is harmful, as it deprives people of content that could contradict a personal perception, which most of the time is not the

real one. It is also a way to monopolize or manipulate information and spread "fake news", as long as it meets the user's opinion and interest.

The *Internet*, being an unlimited environment, makes it difficult to control and supervise it, but since there is no regulatory agency, it is important for users to be careful when using it. It has become so easy to use digital media for everything in everyday life that there is not enough concern about the risks that this grandiose medium can cause.

As for consumer rights, the Consumer Protection Code provides that the responsibility to supervise consumer relations lies with the Union, the States, the Federal District and the Municipalities, through their specialized agencies, as provided in art. 55, §§ 1 and 3, of the CDC. Logically, the relationship of digital media with users would fit into a consumer and supplier relationship, and it is also feasible to have the support of the General Law of Data Protection to regulate and supervise this relationship in the digital environment. However, the scope of consumer relations is very large and bringing one more issue to be supported could harm other areas, which also need such support.

Therefore, the most interesting would be to determine in a separate manner, but not totally, the different means of having consumer relations such as, for example, in the digital environment regarding the exposed data, with the separate attendance of this universe to the more usual consumer relations, since it could involve products other than private data. This theme is an emerging issue, which deserves a greater concern, considering the great technological evolution that has been experienced in a short period of time.

However, is it possible to accurately predict that people are aware of all the revolution and social change that the *Internet* is causing in their lives? Is it possible to predict that users know how their data is actually used and the consequences that their consent may bring about? Finally, is it possible to have a worldwide control to monitor this high demand for cybercrime? There are more questions than answers. And there is also an emerging concern, not only about protecting data on social networks and from malicious companies, but also in the field of telemedicine, which allows medical consultations to be performed through a digital medium.

This fear is related to the obtaining, through the use of telemedicine, of countless sensitive data from those involved in this relationship of health and care, both patients and physicians. How to respect the principle of confidentiality, the terms of the medical code of ethics, and the fundamental rights and guarantees of the human being are great challenges, as will be addressed in the following section.

3 TELEMEDICINE, WHAT IT IS AND THE INCENTIVE TO USE IT WITH THE PANDEMIC

Contrary to what most people think about telemedicine, it is not a new method, nor is it a recently used term to denominate a medical care or service provision, related to health, at a distance. Such denomination originated from the telematic means, which appeared in the mid 1838s, with the telegraph and later with the telephone (JÚNIOR; CAVET; NOGAROLI, 2020, p. 327-362).

Then, in 1905, the terminology "telemedicine" was used for the first time by Willem Einthoven, a Dutchman who developed the tele-electrocardiogram, which was located in his laboratory and 1.6 kilometers away from the academic hospital. From this instrument, it was possible to perform the analysis of electrocardiogram exams, by means of transmitted impulses (BAROLD, 2003, p. 99-104). Then, the radio was used to provide remote medical care for soldiers in the First World War (JÚNIOR; CAVET; NOGAROLI, 2020, p. 327-362).

Over time and with technological evolution, it was possible to promote the physiological monitoring of astronauts, in the first expeditions to space (YOUNG; BORGETTI; CLAPHAM, 2018, p. 01-15). However, as very well exposed by the authors José Faleiros Júnior, Caroline Cavet and Rafaella Nogaroli, the expansion of projects in telemedicine was favored by the dissemination of the use of microcomputers:

> However, the expansion of several projects in Health Telematics had more prominence and versatility with the popularization of microcomputers in the 70's.12 And, since then, Telemedicine, guided by technological advances and the dissemination of Internet access, is scaled as an instrument to ensure the promotion of health, in the contours idealized in the list of human rights, to those who, for some reason, can not get in person and directly (JÚNIOR; CAVET; NOGAROLI, 2020, p. 329).

According to the "Tel Aviv Declaration", adopted by the 51st General Assembly of the World Medical Association in Tel Aviv, Israel, in October 1999, it established modalities for the use of telemedicine, teleassistance, telesurveillance, teleconsultation, integration between two physicians and teleintervention, as well as dealing with responsibilities and ethical standards in the use of telemedicine (JÚNIOR; CAVET; NOGAROLI, 2020, p. 327-362). Telecare would consist in providing health care assistance, performed at a distance. In telesurveillance or telemonitoring, applications are used, by means of smartphones, to remotely monitor the patient (CIPERJ, 1999).

In teleconsultation, on the other hand, a medical consultation is not carried out in person, through any telecommunication mechanism. And the integration between doctors is called teleinterconsultation, which consists in the patient's care, performed by a doctor in person and another doctor at a distance, both acting concomitantly, with medical information being transmitted by electronic resources. Teleintervention, on the other hand, is a mode that, despite not being duly foreseen in the aforementioned Declaration, disposes of the remote command to perform exams and surgeries, with the aid of a robot or assistant physician (CIPERJ, 1999).

Therefore, there are different levels of complexity and services to develop the practice of telemedicine, depending on the patient's needs and the adjustment of the health institutions that will perform this type of care (JÚNIOR; CAVET; NOGAROLI, 2020, p. 327-362).

Currently, in Brazil, there are several programs related to telemedicine, an example is the "Programa Telessaúde Brasil Redes", from the public health network; as well as, from the private sector, the project "Telemedicina Einstein", from Albert Einstein Hospital, which exists since 2012. However, it was only in 2019, with the Covid-19 pandemic that the discussion about the importance of telemedicine and its

application to provide care to those affected by Covid in various locations in the country without the risk of contamination to those involved in the consultation intensified.

The major focus for the adoption of telemedicine by both the Unified Health System and private health care was the fact that, in order to avoid a greater number of Covid-19 virus infections, social isolation and distance would be fundamental as safety measures. In this way, telemedicine gained a new look, despite the severe criticism, especially from health professionals themselves. However, due to the needs of that terrible and chaotic moment of global health crisis, it was necessary to open minds to the technological evolution in the health area.

3.1 LEGAL EVOLUTION OF TELEMEDICINE

As a rule, medical care in Brazil occurs in person; it is even a determination of the Brazilian Code of Medical Ethics (Resolution of the Federal Council of Medicine No. 2117/2018). As previously mentioned, there was considerable resistance from the medical community itself to accept this new variety of telemedicine at the time of the Covid-19 pandemic. As with anything new, it causes strangeness at first and requires a process of adaptation.

In this vein, there is a prohibition in the Code of Medical Ethics regarding the prescription of treatments or procedures without, at first, an examination, with direct contact between the physician and the patient. Therefore, when interpreting this prohibition, it is understood that telemedicine would not be allowed in Brazil. However, in article 37 of the Federal Council of Medicine Resolution no. 2117/2018, in chapter V, there is a proviso that, in cases of urgency or emergency, when there is a proven impossibility of direct examination by the physician, the possibility of adopting telematic means to bring the right to health to the patient. See: "The physician is forbidden to:":

> Art. 37 Prescribing treatment and other procedures without directly examining the patient, except in cases of urgency or emergency and proven impossibility of performing them, in which case they must do so immediately after the impediment ceases, as well as consulting, diagnosing or prescribing through any means of mass communication.

Still, in the aforementioned article, paragraphs 1 and 2 bring the idea of telemedicine, as denoted below:

> § 1. Distance medical care, in the molds of telemedicine or any other method, will take place under the regulation of the Federal Council of Medicine.
> § When using social media and related tools, the physician must respect the norms elaborated by the Federal Council of Medicine.

However, the use of telemedicine has moved very slowly in the country since then. In 2020, during the crisis faced by the coronavirus (SARS-CoV-2), Law No. 13989 also provided for the use of telemedicine, but authorizing it to be used during the crisis, as well as in emergencies (art. 1 and art. 2). And, in its article 3, it brings a new concept for telemedicine, incorporating the technologies and,

inclusively, in article 4, it states the physician's duty to inform the patient about the limitations of telemedicine, in the face of the impossibility of face-to-face care and direct examination.

Finally, other regulations coexist, such as the CFM Official Letter nº 1.756/2020, also from 2020, which recognizes the procedures to be performed by medical professionals through telemedicine. In the same way, the Ministry of Health Ordinance nº 467, from March 20th, 2020, besides foreseeing the possibility of practicing telemedicine and the ethical part, for that; however, with the limitation of application for the time the pandemic lasts.

In summary, despite the restrictions on the use of telemedicine in Brazil, it can be considered an activity with ethical prevision, and can be performed, but in obedience to the regulated rules and legislations, such as the predictions of the Federal Council of Medicine, the Council of Medical Ethics, Resolution nº 1,643/2002, Law nº 13,989/2020, Ministerial Ordinance 467/2020, and the CFM Official Letter nº 1,756/2020. And, of course, with the care of observing the other laws, which are inherent to the human being.

In addition, Federal Deputy Adriana Ventura presented two bills, PL 1.998/2020 and PL 2.394/2020, related to telemedicine. These bills are, in due order, awaiting consideration by the Federal Senate and awaiting the opinion of the Rapporteur of the Social Security Commission, as informed by the House of Representatives. In the PL 1.998/2020, the intention of the bill is to authorize and define the practice of telemedicine throughout the country. While in the other PL referred to, the authorization is attributed, "to health professionals, the exercise of the profession at a distance through technologies, in the manner specified."

Therefore, it is a theme, legally speaking, that needs much discussion and an effective normative regularization, as well as a majority and specific understanding, since the biggest concern is data protection, both of the professional and the patient. Taking into account that it is also a major problem faced by the wide use of digital media today. And, unfortunately, the *internet* is still not a safe environment and all digital platforms are directly connected to the networks.

3.2 PANDEMIC CONTRIBUTION

In a way, like everything bad that happens, there is always something good and profitable to learn. After all, everything is learning. And despite all the sadness, significant losses, and fears that the pandemic, caused by the Covid-19 virus, has brought, it is vital to look at the proficient side of the whole situation.

SARS-CoV-2, known as the "coronavirus," has not only left the world population more "prepared" for the next possible pandemic, but obviously without the desire for it to happen again, but it has also favored the evolution of science and expanded the use of digital media to promote socialization, while maintaining the precautions for contagion containment.

In addition, it has enabled work to be performed remotely, that is, from their respective homes. The use of social networks and platforms, in general, increased the incidence of virtual commerce; after all,

physical stores, with the isolation, needed to reinvent their way of selling, for their own sustenance. In short, much has happened from the pandemic, from the digital technological point of view.

In this same follow-up, sanitary measures, in general, aimed at the population, with the design of stopping the contagion of the Covid-19 virus, extended also to medical care. And, as is perfectly conveyed by scholars Vinícius César, Yara, Nathalia, Felipe, Vinícius, Alex, and Juliano:

> Thus, the usual methods of approach in health had their standard flow of care reduced due to the new reality, which created a gap in the care and diagnosis of patients, i.e., it was necessary to apply mechanisms to ease the public health apparatus. Consequently, telemedicine became an important instrument of health care in the face of the demand for care during social distancing (CELUPPI, et al, 2021, p. 01-12).

In fact, during the pandemic, through the application of telemedicine systems, it became possible to care for patients with suspected Covid-19, with milder symptoms, and who did not need to be hospitalized. As a result, more beds were freed up for the serious demands of the disease, and the frontline staff was a little more protected from contamination. Still, other diseases could be supported from a distance, protecting everyone, also, from the imminent contagion (CAETANO, et al., 2020, p. 01-16).

Consequently, through studies conducted, it was found that distance health systems can improve, as they have already expressly improved, the part of triage, the management of care and treatment itself. And, these data were verified, even during the mentioned pandemic, as it strongly reduced its impact, both in the infectious and mental health spheres (SMITH, et al., 2020, p. 01-05).

4 LGPD IN TELEMEDICINE

According to all the theme exposed above, telemedicine, covering the understanding with respect to the General Law of Data Protection, presented itself in a way, a little, uncontrolled; because the pandemic put at risk the health and life of everyone, on a global scale and made necessary this speed. Given this unfavorable scenario, some other risks became susceptible, such as the threat to integrity, security and confidentiality of patient data (JÚNIOR; CAVET; NOGAROLI, 2020, p. 327-362).

Considering the pre-existing flaws, in the application of the LGPD, as signaled in this paper, corroborates the lack of transparency, security and explanations, by the government, in the process of managing personal data and in the application of facial recognition technology, for example. And, due to the urgency of adopting digital and communication technological means in general to combat coronavirus, it demonstrated that the systems connected to the *internet* were not and are not prepared to secure the personal data of all users, given the sudden increase in the circulation of new users and their said data (JÚNIOR; CAVET; NOGAROLI, 2020, p. 327-362).

The commodification of personal data is nothing new these days. And, with telemedicine, the risk increases, since it is another means of collecting and storing data, now from patients, enabling their identification. In order to reduce this danger, the LGPD adopts in its legislation the consent of the data

subject, enabling, in art. 7, item VIII, the approach of personal data, "for the protection of health, exclusively, in procedures performed by health professionals, health services or health authority;". While in section 11, clause II, of the mentioned law, sensitive data is dealt with, also composing on the protection of health, in paragraph 'f, "for the protection of health, exclusively, in procedures performed by health professionals, health services or health authority;".

However, this exclusivity must be restricted and respect, primarily, the principle of transparency and access to adequate information to the data subject, observing good faith and other principles, according to the provisions of art. 6, item VI, of LGPD. In addition, unusually, the law for data protection brings the following provision in art. 13 and its paragraphs:

> Art. 13 - In conducting public health studies, research organizations may have access to personal databases, which shall be processed exclusively within the organization and strictly for the purpose of conducting studies and research and kept in a controlled and safe environment, according to security practices provided for in specific regulations and that include, whenever possible, anonymization or pseudonymization of the data, as well as considering the due ethical standards related to studies and research.
> § The disclosure of the results or of any excerpt from the study or research referred to in the head of this article may under no circumstances reveal personal data.
> § The research institute will be responsible for the security of the information provided in the caput of this article, and under no circumstances will it be permitted to transfer the data to a third party.
> § The access to the data mentioned in this article will be subject to regulation by the national authority and the health and sanitary authorities, within the scope of their competencies.
> § For the purposes of this article, pseudonymization is the treatment whereby a piece of data loses the possibility of being associated, directly or indirectly, with an individual, except through the use of additional information kept separately by the controller in a controlled and secure environment.

Although the aforementioned article alludes to a possible application of a pseudonym to preserve the identification of the patient, through his personal data, there is a controversy in the law itself, as to this. In its art. 12, the law does not consider anonymization as a data to be preserved; however, some authors, as is the case of Guilherme Martins and José Faleiros Júnior explain that the re-identification of data falls within the norm, although the limits are not clear (MARTINS; JÚNIOR, 2019, p. 77).

Nevertheless, it is forbidden to share data, according to the LGPD, for purposes of obtaining economic advantage or preventing the free development of the personality of the data subject, as well as favoring discrimination of the individual. In this sense, there is a prohibition approach to the provision of personal data to health insurance providers, in order to avoid a selection of risks at the time of hiring the service in health care by the user, as well as preventing it from being excluded from possible benefits (art. 11, paragraphs 4 and 5 of LGPD).

Now, it is not only in the private sphere the presence of responsibilities, the government also has obligations, including in the General Law of Data Protection, which consequently encompasses telemedicine, incorporating the State and the Indirect Public Administration, whether by autarchies, mixed economy societies, public foundations and public companies, which have the duty of execution and legal attribution. Moreover, the government behaves as a "data agent", being responsible (Chapter IV, Treatment of Personal Data by Public Authorities, articles 23 to 30, of the LGPD).

Due to all this overwhelming development to obtain virtual services, especially to telemedicine, Solution Reach has developed a complete and practical guide to proceed with telehealth in practice. First, it brings about the means of the practice in different species, such as the telehealth visit, prepared by telecommunication technology (audio and video in real time); telephonic visits, basically occurs via telephone contact; virtual check-ins, either by phone or other device, with the purpose of evaluating the need for an in-person visit or other service, to proceed with the patient's review (videos or photos sent by the patient); e-visits, it is an asynchronous visitation of the office with the patient, through a portal or secure e-mail; and, remote monitoring, which consists in monitoring the patient's physiological parameters, by medical devices.

This guide seeks to ensure data protection for both the patient and the healthcare professional. Thus, there is freedom of choice as to the type of visit and the tools to be used to perform the care; also, observing the guarantee of maintaining a quality support to the patient, as a priority. Furthermore, the health professional can determine which services will be provided through telemedicine, considering the factors of implementation, cost, digital support, technological resources, and increased security.

Next, the consent of the patient and data subject is discussed, which must be collected in strict legal compliance, and may be expressed in written or verbal form, something that is new, due to the pandemic there has been a "loosening" in allowing verbal consent. This is new, due to the pandemic, there has been a "loosening" in allowing verbal consent. The Content Management System states about the permission to capture the verbal consent at the moment the health service is provided; however, the ideal is still the written and documented consent.

Finally, although there is comprehensive legislation and resources to assist the telemedicine enterprise, there is still much to be improved, since the human being is prone to find loopholes in the laws and to act with malice, for his own benefit. The remote medical assistance system is innovative and has many advantages that benefit everyone involved in this relationship. Nevertheless, care must be taken, especially in the caution with the personal data and sensitive personal data of the holder, in this case the patients, who are the most vulnerable and susceptible to the occurrence of injustices. Technology has also come to benefit, but an immediate control must be adopted, the *Internet* needs to be urgently supervised.

5 FINAL CONSIDERATIONS

In the completeness of the addressed mentions, is society, in a generalized way, prepared for all the evolution that the digital and technological means are causing, as well as, will originate in the course of time? Are the virtual services available over the *Internet* adequately protected by law and are they being observed by people? Is consent especially prized on digital platforms? And, above all, is telemedicine properly fit to be exercised in Brazil, in reverence to the norms and laws in force?

All the aforementioned questions must be taken into consideration for a genuine analysis, in the present work. Evidently, there is much to discuss and improve in the legislation regarding data protection

and the regular implementation of telemedicine; but, also, all the evolution that has already been achieved up to the present day cannot be forgotten. Besides everything, it is necessary a process of adaptation and verification of how the laws will be covered and the changes they will bring in the social environment, to subsequently improve them, always taking into consideration the most precious and protected legal good, which is life, and it must be dignified. After all, it is the discussions and disagreements that provide us with a more critical look, driven to seek improvement and evolution.

Before the General Law of Data Protection, the conditions of use of the *internet* were more precarious, being evident the great advance that the Law has already provided, since before the request for consent, the websites and digital platforms in general, just *linked*, without the slightest care with the data exposed there. Moreover, just the fact of accessing a certain platform was considered as an implicit acceptance of the ways of application on the *internet* and of that certain site.

Therefore, in addition to what has already been normatively changed, regarding data protection and remote health care, it is important to study the possibility of having an agency focused on conflicts and crimes in the digital realm, because even though the data holder is responsible for taking care of his own data, he cannot be helpless in cases of abuse in the consumer relationship and/or between professional and patient. In addition, it would be interesting to open the possibility to include a standard model and accessible to all consumers, considering the social unequal existing in Brazil, for the policy and privacy terms. Ending to obtain the user's consent, without the technological companies luding their consumers and users for profit; as well as, extending even to health professionals.

Finally, with special attention to telemedicine, there should be an implementation of regulations, not only based on the LGPD or the Federal Council of Medicine, or even legislative resolutions. It must be something specific, governing the conduct of digital platforms, since it is not merely a consumer relationship, it involves the health of a protected person, the profession and professionalism of a health professional, common personal data and sensitive personal data of both (professional and patient), the collection and storage of such data, as well as an entire technological network, which is difficult to control and monitor. In view of this, it is also of great interest to study the possibility of developing a supervisory body for the entire technological sphere.

Therefore, in this vein, that the law is always an instrument of change for the social good, for the best of all and as fair as possible, this is what society as a whole needs and longs for. And, it is through justice, based on an honorable and inclusive law, united to the study of the mind and the human being as a whole, that one day we will have a better society and, consequently, a better world to live in, in the fullness of human dignity. Thus, it will stop being a purely Platonic idea and will become reality.

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Chapter 31

The use and acceptance of generic drugs in community pharmacy: a bibliographic review

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ABSTRACT

Through Law No. 9,787, of 10/02/1999, the entry of generic drugs in the Brazilian pharmaceutical market was made possible, which appears as the main key to access to drugs by the general population, at a low cost. Even 22 years after its implementation in Brazil, with these pharmacological and economic benefits, it is notorious in community pharmacies the lack of information about generic drugs by patients and even prescribers. The present work aimed to carry out a bibliographic review of the scientific literature that provides about the population's knowledge about generic drugs in Brazilian community pharmacies. The articles were collected from a database (SciELO, LILACS, PubMed), including 9 articles published between 2010 and 2020. As a result, the existence of factors that contribute to both use and disuse, according to information from respondents. Where the easy access, low cost and quality of generics has contributed to their use, on the other hand, misinformation and absence in medical prescriptions has favored disuse. It was notorious that it continues to evolve, as over the past 10 years, the degree of popular and health professionals' acceptance has grown.

Keywords: Health Care; Generic Drug Policy; Intercharge of Drugs; Generic drug; Community pharmacy;

1 INTRODUCTION

Health is a right of all and a duty of the state, guaranteeing it through public and economic policies that aim to ensure the promotion and accessibility to services and actions that reduce the risks and worsening of specific diseases or any other grievance, in accordance with the Federal Constitution of 1998.

Medicines are characterized as a pharmaceutical product, technically obtained or prepared, with prophylactic, curative, palliative or diagnostic purposes. It is a finished pharmaceutical form that contains the drug, usually in association with pharmacotechnical adjuvants (BRASIL, 2007).

Generic drugs are perfect copies of the reference drugs where bioavailability and bioequivalence are relatively similar to the origin drug, with the same active ingredient, excipients and action in the body. These drugs are available at an affordable price through the National Drug Policy (PNM), which came into effect by the federal government as of 1999, to facilitate access and patients' right to choose in the acquisition of qualified drugs (LEMES et al, 2018).

Generic drugs are similar to innovative medicines, also known as reference drugs, whose patent has expired. Having its production a strict quality control standard. Following the Generics Act, Law 9.787 of February 10, 1999, regulated by the national health agency (ANVISA), Article 2 determines the generics as therapeutic equivalent to the references, which already have a known pharmacological formula. Always being presented by the name of the active substance and labeling specifying to be generic, where they can only be released for use after passing bioequivalence tests in humans and pharmaceutical equivalence, which ensure the pharmacological functionality and patient safety, identical to the innovative drug that gave rise to it (PROGENERICS, 2021).

Reference Drug is understood as that innovative product, first to be studied and developed certified and registered with the federal agency responsible where it presents quality, efficacy and safety scientifically certified by means of numerous quality control tests and pharmacological action by the agency in force (BRASIL, 1999).

Similar medicines are those that have the same active ingredient, concentration, route of administration, pharmaceutical form, dosage and therapeutic indication, being equivalent to the innovator medicine, but may differ from it in aspects related to size, product form, shelf life, packaging, labeling, excipients and vehicle, and should always be identified by a commercial name or brand name (FREITAS, 2016).

Generic drugs eventually emerged from the 60s, in the United States. In the 1980s, with the HatchWaxmanact, the inclusion of a regulatory framework whose goal would be to reduce the patent life of drugs, aiming at increasing and accelerating the trade of generics, a fact that revolutionized the pharmaceutical market by the great purpose of marketing these drugs at low cost compared to reference drugs (GOMES, 2017).

In Brazil, still in 1993, the use of generic denominations being recognized, constituted one of the mechanisms for regulating drug prices, thus causing the adoption of generic drugs as a health and economic policy of the Brazilian government. It then became mandatory to use the Brazilian Common Denomination (DCB) for all drugs and, in cases of importation of pharmaceutical products and inputs, the Mercosul Common Nomenclature (NCM). With the regulation of the Generics Act in 1999, the policy was effectively implemented (ARAÚJO et al, 2010).

Based on the regulation of the Generic Drugs Law, following in 1999, through a Resolution of the Board of Directors of the National Health Surveillance Agency (ANVISA), it was possible to insert innovative concepts for the registration of a drug in Brazil, such as pharmacological equivalence (scientifically proven by *in vitro* tests) and bioequivalence (scientifically proven by *in vivo* tests). This established a new standard for drug development and registration in the country. This large gap between the first legislation and the effectiveness of the policy in Brazil (from 1993 to 1999), was due in large part to the fact that there were many similar drugs in the Brazilian market, being marketed by different laboratories. These companies, aiming to keep their products on the market, were only motivated to invest

in developing generic drugs after the end of their registrations, which further delayed the effective implementation of generic drugs in the country (ARAÚJO et al, 2010).

The biggest advantages of using generic drugs would be the efficacy, quality and safety with proof attested by the agency at a more affordable price, where they are 35% cheaper than the reference drug from which they originated (BRASIL, 2008).

When analyzing the variants that govern the greatest resistance to the use of generic drugs, one can point to the low availability of these products in pharmacies, the low incentive to prescription by medical professionals, the lack of knowledge among health professionals regarding guidance on their use and the lack of knowledge and negative beliefs of patients about their quality and effectiveness (LIRA et al, 2014).

In a study conducted in Spain, it was reported that 98.8% of patients agreed to switch from reference drugs to generics after being informed about what generic drugs truly are (VALLÈS et al,2002).

When it comes to the prescription of generic drugs by physicians, there is a duality of opinions, where some point out confidence in the production of these drugs and others do not believe it is as strict as the control for the production of those considered innovative. According to data from ProTeste (Brazilian Association of Consumer Protection) in a survey conducted in 2011, points out that 46% of doctors interviewed said they believe that quality control for the production of generic drugs is not as strict as for reference drugs. Still, 92% of them reported having prescribed generics in the last 12 months of the interview, to cheapen the treatment or at the request of patients. 83% of consumers heard believe that generics are as effective as the reference ones. ProTeste heard 690 people and 119 physicians in several regions of the country.

According to data found by Pró Genéricos (Brazilian Association of Generic Drug Industries), since their inception in the market in the 2000s, these drugs have generated around R$150 billion in savings on drug expenses for Brazilian consumers. According to data from IQVIA (multinational company specialized in auditing pharmaceutical retail), of the 20 most prescribed drugs during 2019, 15 of them had in the prescription the prescription indicated the active formula pointing to the generic drug, ensuring confidence and credibility with the population.

According to the article 196 of the 1998 federal constitution, we have that health is a right of all and a duty of the state, ensuring it through public and economic policies, guaranteeing the reduction of risks of diseases and other illnesses, as well as actions and services that ensure global and equal access to measures aimed at the promotion, protection, and recovery of health (BRASIL, 1998).

In this context of right to health, the generic drug policy was implemented in Brazil through Law no. 9.787, dated February 10, 1999. With the great objective of facilitating the population's access to drug treatments, generating a low cost in these drugs, which consequently improves drug quality and causes a higher turnover and stimulates commercial competition. The process of introduction of this policy presented concepts never before discussed in Brazil, such as: bioavailability, bioequivalence, pharmacological equivalence and interchangeability among drugs (ARAÚJO et al,2009).

Generic drugs to reach consumers, initially must undergo pharmacological equivalence and bioequivalence tests, so as to prove their efficacy, safety and quality, before the drugs had as reference. This will allow their interchangeability, i.e., replacement of a reference drug by a generic or even similar one, if it meets the quality and equivalence criteria of the original drug.

According to and collaborators (2006), the generic drug has a reduced cost due to the fact that the manufacturing laboratories do not need to invest in research for its development, since its formula is based on and defined by the reference drug. Moreover, they do not need large investments in marketing, in other words, the pharmaceutical industries do not need to make advertisements, because there is no brand to be advertised, considering that the generic is presented only with the name of its active ingredient.

Despite their pharmacological and economic benefits, it is notorious in community pharmacies the misinformation about generic drugs by patients and even prescribers, many do not know their origin, which leads to often erroneous interpretation about their efficacy, safety and quality. Moreover, this misinformation prevents the increase in adherence to the use of generics, even after 22 years of implementation of the generic policy.

In view of the above, this study aimed to evaluate the degree of acceptance for the use of generic drugs among consumers in commercial pharmacies over the last 10 years, where we will seek to identify whether there has been an increase or decrease in the acceptance of generics over the last 10 years and to characterize the factors that contributed to this increase or decrease in the consumption of generics;

2 METHODOLOGY

2.1 TYPE OF STUDY

The resulting study is an integrative review of scientific literature, which is characterized as a method that seeks to understand a given phenomenon through the aggregation of multiple scientific studies that establish decision making and the incorporation of evidence in the professional field. The research was developed through the PICO strategy, with the formulation of a guiding question that serves as a basis for answering the results that will be obtained. This review is operationalized through six basic steps: (1) formulation of the research question; (2) establishment of exclusion and inclusion criteria; (3) data collection; (4) evaluation of the selected studies; (5) analysis and interpretation of results; and (6) presentation of the knowledge summary. (VIANNA, et al, 2013)

This integrative review aimed to establish a compilation of scientific information about the following question: "What is the degree of generic drug use and acceptance in community pharmacies over the past 10 years? ". This is a study based on data collection from secondary sources through a literature survey. For the survey of literature data, the search for articles was made in the following databases: LILACS (Latin American and Caribbean Literature on Health Sciences), SciELO (Scientific Electronic Library Online), Google Scholar and PubMed.

2.2 DESCRIPTORS USED:

All descriptors present in this project are present in DeCS/MeSH. It was searched: generic drug utilization, health care, Generic Drug Policy, Public Health Politics, Interchange of Drugs, Brazil.

2.3 INCLUSION AND EXCLUSION CRITERIA:

- **Inclusion Criteria:**
  - Articles published between the years 2010 to 2020;
  - Articles that present, at a minimum: Type of study, approach, data collection, and population related to the object of study;
- **Exclusion Criteria:**
  - Articles whose methodology does not clarify the reader's understanding;
  - Articles unrelated to the general idea of the object of study;
  - Articles whose research is repetitive**;**

2.4 DATA ANALYSIS:

The final sample resulting from this literature review consists of 9 scientific articles published between the years 2010 and 2020, selected according to pre-established inclusion criteria in this project. The search verified an analysis of the use and acceptance of generic drugs by the population in the last 10 years. Time exercised to establish a theoretical basis that substantiates the object of study. The control instrument will be a spreadsheet created in Excel, which will bring the organization of the articles analyzed through: title, date, method, design, and conclusion.

3 RESULTS AND DISCUSSION

A total of 113 articles were found, of which 55 were found in google, 49 in SciELO, and 9 in LILACS. After applying the inclusion and exclusion criteria, 42 articles were read in their entirety, leaving only 9 articles. Among the studies that remained, they allow an overview of the use and perception of generic drugs in Brazil, since the study covered the five regions: North, Northeast, Midwest, South and Southeast. Also the selected studies, although with a search margin of the last 10 years, more than 50% of the selected studies focused on the last five years, favoring an even more current view of the theme.

Regarding publication in relevant journals on the generic drug theme, two articles were found, one in a public health journal and the other in Acta biomédica. Therefore, revealing that despite the relevance of the theme and the existence of studies, they have a low national and even less international reach.

The types of studies were quite varied despite the small number of papers selected. In addition, most studies were conducted in pharmacies, and only one study was conducted in homes. This is a disadvantage for the study as most of the population keeps medicine at home and studies visiting homes provide a more reliable picture of the topic as the general population does not remember which medicines are available at home.

Figure 1. Flowchart of the article selection for the results

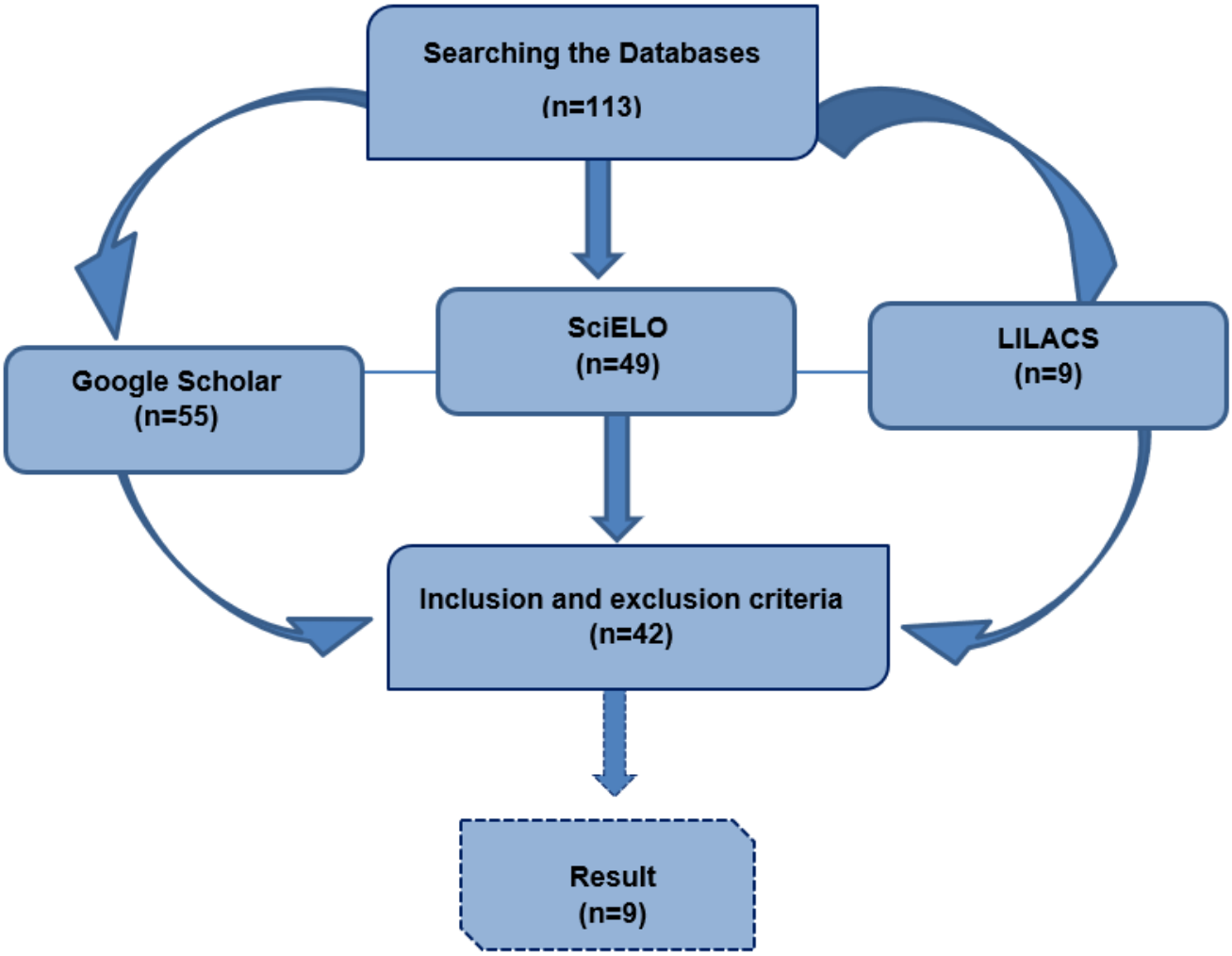


Table 1- Description of the papers selected as results of the Review

Authors	Article Title	Year	Magazine	Study Type	Population profile	Factors Promoting Use	Conclusion
Silveira, et al.	Knowledge and acceptance of generic drugs in the population of São Miguel do Anta, MG	2010	Anais II SIMPAC	Quantitative	Elderly	Low cost	The results revealed high rates of knowledge, acceptance and trust in generics by the respondents. It was also observed that there is a lack of habit of prescribing generics by physicians and insufficient incentive for their use, which generates disbelief and lack of information by the population.
Marco, *Thayane*	Verification of the degree of acceptance of generic drugs in a medium-sized pharmacy located in southern Santa Catarina	2013	Repositorio Unesc	Quantitative	Pharmacy Customers	Low cost	The study population showed a regular level of knowledge to identify and differentiate generic drugs from other drugs in the pharmacy, but they are confident in their use and prefer them because of their low cost.
Bertoldi, *et al.*	Use of generic drugs in the Brazilian	2014	Rev. Saúde Publica	Transversal	Resident Inhabitants	Low cost and effectiveness	It can be concluded from this study that

	population: an evaluation of PNAUM 2014		(Public Health Review)				today there is an alternative way of buying medicines, characterized by quality assurance and reduced price compared to brand-name drugs. Much of the observed population is opting for the use of generics, thanks to the availability and low cost
Lira, *et al.*	Knowledge, perceptions and use of generics: a cross-sectional study	2014	Einstein	Descriptive and Cross-Sectional	City Inhabitants	Low cost	The population has demonstrated sufficient knowledge about quality, efficacy, and cost, which would easily lead to use; however, it needs to come in the prescription, they do not trust in performing the interchangeability of the brand-name drug prescribed, by the generic.
Januário, *M. B.*	The use of generic drugs among adult consumers of a medium-sized drugstore in the city of Buritus/RO	2016	Repins Faema	Exploratory	Pharmacy Customers	Low cost	The study showed that the population has knowledge about generic drugs regarding their efficacy and low cost, and that they are well used. The difficulties are the lack of medical prescription, which decreases the public's confidence in these drugs, and the rejection by some consumers of interchangeability of the prescribed brand-name drug with the more cost-effective generic.
Jarczewski, *et al.*	Evaluation of the knowledge about generic drugs in a sample of drug users in the city of São Miguel do Iguaçu - Paraná	2019	Uningá	Exploratory	Pharmacy Customers	Low cost	It was observed that most of the interviewees had already used generic drugs, the most frequently mentioned means of information was the pharmacist, and they also showed confidence in the quality of these drugs, but the most advantageous differential pointed out was the reduced price. It was noted that although most trusted the generic, they would not accept the substitution if there was a "reference" on the prescription.
Silva, et al.	Generic drugs: an approach in the municipality of vale do paraíso, Rondônia	2017	Acta Biomedica	Transversal	City Inhabitants	Easy access	It is concluded that most of the interviewees already know and use generic drugs, due to their efficacy and low cost. In addition, physicians and pharmacists provide orientation regarding interchangeability

Alcântara, R. F.	Perception of the population of consumers of generic drugs in commercial pharmacies in the metropolitan region of Cariri	2017	BioFarm	Description	Drugstore Customers	Low cost	The population of this study showed good knowledge to identify generic drugs in the pharmacy, however, the use was not well accepted, they showed to have observed some difference between the generic and reference drugs, it is also noteworthy that customers believe that the therapeutic action is interfered by the low price. It was observed a certain misinformation of customers and shows a failure of physicians in the absence of generic drugs in prescriptions and pharmacists in providing guidance on quality and efficacy.
Tavares, *et al.*	Use of generic drugs in the population of the municipality of Aurora-CE, in the period January 2018	2018	Id on Line	Quantitative	City Inhabitants	Efficacy and Safety	The population of this study showed acceptance for the use of generic drugs and that the substitution of the reference by the generic, made by the pharmacist, is well accepted by the interviewees, who show trust in the professional. However, the population showed difficulty in differentiating reference, generic and similar drugs, and that a good point of confidence is that the generic drug comes more often in the medical prescription.

Among the factors promoting use were easy access, low cost, and efficacy. Easy access because, although often purchased, they are available for free in health care units and even in many private settings such as those commercial pharmacies that adhere to the program to increase access to the drug. The low cost expands the generic drug consumption and will always be an attractive factor, especially in a country like ours where 46% of the population has a family income below R$1,356.00 . However, it was not only the easy access and low cost, curiously, the efficacy was an attraction, revealing a paradigm shift, because for many years we had heard that generic drugs were "no good", unsafe. Thus, we observe that a gradual awareness has been achieved by the population, a result of the national policy of access to medication, and of the awareness of health professionals about generic efficacy and safety.

However, despite the advances, the selected studies revealed that patients still have difficulty in accepting interchangeability, as well as differentiating generic, reference and similar drugs. In addition, the subject about the use and acceptance of generic drugs by the population in community pharmacies covers three main difficulties: the first comprises the population's lack of knowledge about what generic drugs are and how they are produced; the second, from the point of view of health professionals and regulatory

agencies that do not eagerly promote educational campaigns that disseminate truthful and safe information on the subject to the population; and the third, from the prescribing professional's perspective, who has a barrier regarding the prescription and indication of generic drugs for their patients. Thus, the pharmacist can play an important role in resolving doubts regarding efficacy, safety and interchangeability for the general population, consumers and health professionals.

According to Silveira and collaborators (2010) in their study the survey data showed that the physician still has a certain distrust of the quality of generic drugs and their incentive to use is insufficient, which generates disbelief and lack of information by the population. Where 59% of respondents reported not using because there was no doctor's prescription, although 79% of respondents trust the effectiveness of generics and believe they have the same effectiveness of the ethical drug.

A predominant factor for popular acceptance of these drugs is low cost, Bertoldi and colleagues (2014) in his study demonstrates that the observed population is opting to use generic drugs when purchasing, thanks to its availability and low cost, his sample used data from the 2010 Census and showed that 45.5% of the Brazilian population has prevalence to the use of generics, ie, 1/3 of all drugs used were generic, showing important participation of this group of medicine in the Brazilian market.

In their sample, Tavares and collaborators (2018) demonstrated that the population has chosen to exchange the ethical drug for the generic one, being guided by the pharmacist, pointing confidence in this professional, however, it was observed that the population had difficulty in differentiating reference, generic and similar drugs. It was exposed that 69% of the study population uses generic drugs because they believe in their efficacy and safety, being satisfied with the results obtained from their use. The belief in the efficacy and quality of generic drugs was strongly demonstrated, suggesting a considerable degree of confidence in this type of drug. The population had difficulty in differentiating the drugs where 56% stated that they did not know how to differentiate.

A recent study conducted in the municipality of Vale do Paraíso in Rondônia showed that physicians have been more willing to prescribe generics, with 72% of respondents stating that they have received a prescription indicating a generic. It was also observed that 76% of respondents have already used generic drugs because they believe in their efficacy and low cost (SILVA, et al, 2017). Similar results could be observed by Lira and collaborators (2014), where the price was the crucial point when choosing a generic, since 80.2% of the survey participants indicated buying the generic because of the low price.

4 FINAL CONSIDERATIONS

With this review it is possible to conclude that generic drugs after 22 years, since their arrival in Brazil, are still the subject of doubts about their efficacy, quality and safety, when compared to reference drugs, by the population and part of the prescribing health professionals. Due mainly to its low cost, there is the ideal of its low quality, which this study proves not to be a true fact, since generic drugs are proven, through several studies that point their quality, safety and efficient, as the reference drugs.

Produced with the objective of improving the population's access to drugs, governed by rigorous standards and criteria for surveillance, generic drugs have proven to be effective in treating pathologies. As for their acceptance, a considerable increase was found by the population, as long as the indication is backed up by information from health agencies and prescribing professionals, showing the magnitude of pharmaceutical care when dispensing generic drugs, and guiding them about their pharmacological action, their effects, and the reason for their low cost, making their acceptance credible.

Therefore, the journey for us to have generic drugs widely disseminated in the country as a cost-effective alternative to access to medication for the population is long, but still very progressive. The main problems to be worked on are the intensification of educational and informative campaigns about the drugs and promotion of access to these drugs through medical prescriptions and encouragement of the rational consumption of generics. With this, it will be possible to achieve the ideal proposed by the national generic drug policy of ensuring the entire population unrestricted access to the means of health promotion and recovery, and consequently improve the quality of life of the population in general.

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Chapter 32

Description of the anesthetic technique used in laparoscopic surgery for the treatment of deep endometriosis with intestinal involvement

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ABSTRACT

Introduction: An ideal anesthetic technique aims for good operative conditions, agility in the surgical environment, absence of side effects, fast recovery with the possibility of early discharge and low cost. Objective: This study aims to describe the anesthetic technique used in laparoscopic surgeries in the management of deep endometriosis. Methodology: The present study is based on literature review carried out from articles selected by the criteria of relevance and timeliness inserted in scientific databases. Results: Epidural anesthesia (EA) is used as an adjuvant procedure for postoperative pain control during laparoscopic surgery for the treatment of deep endometriosis. In addition to analgesia, the modulatory effects of EA on spinal sympathetic blockade result in better perioperative outcome and reduced complications. Conclusion: General anesthesia combined with epidural anesthesia is considered an effective and satisfactory technique in the surgical management of patients with deep endometriosis.

1 INTRODUCTION

According to Giannella, endometriosis is a benign, complex, chronic, inflammatory and estrogen-dependent pathology. For this reason, it is more frequent in women in the reproductive period. This disease is characterized by the implantation of functional endometrial tissue outside the uterine cavity (1). Gianella also describes the clinical picture of endometriosis as a multifactorial pathology, depending on where the endometrial tissue is implanted. The main signs and symptoms are dysmenorrhea, infertility, dyspareunia, nausea, micturition complications, pain with sacral irradiation, metrorrhagia, irregular menstruation and chronic pelvic pain. Because of these factors, this disease significantly affects not only the physical well being, but there is also psychological and social impairment of the affected person (1). Chronic pelvic pain (CPD) is a frequent complaint in primary care, present in 2.1 to 24% of the female population worldwide, accounting for 20% of gynecological consultations (2). This condition greatly impacts the quality of life of the patient, interfering with sexual activity, urination, work activities, among others, thus representing a major social and health problem (2). Among patients with CPD, it is estimated that one third is caused by endometriosis, the most common diagnosis in this population. Generally of multifactorial origin, the pathophysiology of CPS suggests that there is a final common portion of inflammatory and neurogenic insults, which finally manifest as chronic pain.

Somatic pain thresholds for different stimuli are reduced at painful and non-painful sites in CPD, indicating generalized hyperalgesia (increased pain sensitivity) and central sensitization (2). Although surgical procedures aim to improve health and the feeling of well-being, they can also generate enough discomfort and emotional fragility to reduce the perception of quality of life, even without

the presence of specific complications (3). An ideal anesthetic technique aims at good operative conditions, agility in the surgical environment, absence of side effects, fast recovery with possibility of early discharge, and low cost (4). Thus, taking into account that endometriosis is a chronic inflammatory disease that has significant repercussions in the lives of patients, the present study aims to describe the anesthetic technique used in surgeries for deep endometriosis based on the most current scientific literature.

2 METHODOLOGY

This study is based on a literature review based on articles selected according to the criteria of relevance and timeliness in scientific databases such as PubMed and Scientific Electronic Library. The search was guided by the use of keywords: endometriosis; anesthesia; laparoscopic surgery. According to Forza (5), this methodology aims to build a preambular idea about a subject, providing support for further research, i.e., to improve a set of current methods and procedures. The description of the anesthetic technique was prepared by the author of this study, as this technique is used by him in his clinical practice, due to his experience in participating in laparoscopic surgeries to remove foci of endometriosis. Initially, 30 studies that addressed the theme of the study were selected, and inconclusive articles were excluded. Thus, all types of scientific materials considered useful for the research were analyzed, such as theses and dissertations, scientific articles, and publications in scientific articles. This study considered works published in Portuguese, English, and Spanish.

Combination of Anesthetic Technique and its Advantages: General anesthesia eliminates the discomfort caused by pneumoperitoneum and changes in patient position on the operating table. Ventilation must be controlled because several factors contribute to the appearance of hypercarbia, such as: depression of breathing by drugs, absorption of CO2 by the abdominal cavity, changes in ventilatory mechanics determined by the increase in IAP and the position of the patient on the operating table (accentuated Trendelenburg) (6). Epidural (or epidural) anesthesia is a technique for perioperative pain control with multiple applications in anesthesiology. It is useful as a stand-alone technique, although more commonly used as an adjunct to general anesthesia in laparoscopic procedures (in cases of difficult to control pain). It is often given as a single injection or as a continuous infusion through a catheter for long-term pain relief. Besides the benefit of potentially providing almost complete freedom from pain, its use reduces exposure to other anesthetics and analgesics, thus reducing the systemic side effects of these drugs (7).

2.1 PERIOPERATIVE CONSIDERATIONS

Patient Safety: Today's society delegates to institutions and medical professionals, the responsibility for the health of patients and demands a seamless dynamic of care for sick individuals (8). With technological advances, the anesthetic process has become much safer and more predictable. In the operating room, automation has entered the application stages. Patient monitoring methods have become

less invasive and there has been an adherence to clinical decision support systems, which are now commonplace (9).

Monitoring: As with all general anesthesia, in addition to clinical evaluation (skin and mucous membrane staining, hydration, fingernail perfusion, pupillary reflexes, etc.) routine monitoring during anesthesia includes electrocardiography, direct monitoring of blood pressure, pulse oximetry, expired capnography, urine output, and temperature.

Pre-Operative Evaluation: Considering the physiological aspects exposed above, these patients must be submitted to a careful preoperative clinical evaluation, including investigation of thromboembolic phenomena, evaluation of cardiac, pulmonary, hepatic and renal functions. In cases of patients with pathologies that include dysfunctions of these organs, the evaluation must include specific exams for such disorders (10).

Description of Anesthetic Technique: Patient is admitted to operating room after checking pre anesthetic evaluation and signed informed consent form about the technique(balanced general anesthesia combined with continuous epidural). A pre-induction evaluation was performed after continuous non-invasive monitoring of blood pressure, pulse oximetry, and a 5-lead electrocardiogram. Venoclysis in right or left upper limb with 18G calibrous jelco and double extender line. Intravenous sedation with ketamine (0.5 mg/kg) and dexmedetomidine (0.5mcg/kg) minutes before epidural puncture for installation of the epidural catheter (PDC). Positioning of the patient in lateral decubitus followed by asepsis and antisepsis of the dorsal-lumbar region with alcoholic chlorhexidine, use of fenestrated sterile field and infiltration of the skin and deep tissues with 2% lidocaine. A lumbar puncture was performed at T12- L1 with a 17g Tuohy needle via paramedian via the loss of resistance technique. CPD (18g) was passed cephalad and fixed to maintain analgesia for the following day. Injected levobupivacaine 0.5% with 15ml vase and dimorf 1mg after negative aspiration of blood or CSF via CPD. Combined with continuous epidural anesthesia, we associated balanced general anesthesia without opioid. Intravenous induction with propofol 1.5mg/kg , lidocaine 1.5mg/kg, and rocuronium 0.6mg/kg. Inhalation maintenance with sevoflurane 1.2 to 1.5% and IV adjuvants in infusion (magnesium sulfate 30mg/kg, dexmedetomidine 0.25mcg/kg/h and lidocaine 1mg/kg/h). Orotracheal intubation (tube with cuff) and capnography installed. Controlled ventilation in PCV mode up to the limit of 35cmH2O, RR = 14-16 siblings, peep of 6 to 8cm H2O, I/E ratio 1:2, 35% wire. Patient positioned in lithotomy with both arms along the body. Leg and shoulder restraints installed to keep patient safe during accentuated Trendenlenburg and reverse Trendelenburg maneuvers. Intraoperative consciousness was monitored with the BIS monitor. Volume replacement with plasmalyte. Core temperature maintained around 36.5. Used esophageal thermometer, warmed fluids, and upper thermal blanket attached to heater.

3 DISCUSSION

In laparoscopic surgeries to remove foci of deep endometriosis, general anesthesia is well indicated to provide comfort and safety for the patient and also for the surgeon. The combined use of epidural anesthesia results in advantages in these cases by providing less pain in the postoperative period, lower amounts of intraoperative bleeding, as well as lower consumption of general anesthetics and possibly shorter recovery time (11). Due to ventilatory and hemodynamic alterations and possible acid-base alterations (acidosis), general anesthesia under controlled mechanical ventilation with orotracheal intubation with a balloon cannula is considered the option of choice (12). To have a good visualization of the anatomic structures on which the surgeon will act, it is necessary to introduce gas into the abdominal-pelvic cavity, which will cause its distension, separating the walls of the internal organs and these from each other, which, in the end, will result in more space for surgical work (13). General anesthesia eliminates the discomfort caused by pneumoperitoneum and changes in the position of the patient on the operating table. Ventilation should be controlled because several factors contribute to the appearance of hypercarbia, such as depression of breathing by drugs, absorption of CO2 by the abdominal cavity, changes in ventilatory mechanics determined by the increase in IAP and by the position of the patient on the operating table (14). The tracheal tube should be fitted with a balloon to prevent regurgitation of the gastric contents from being aspirated into the lung. After induction of anesthesia, a nasogastric tube and a bladder catheter should be introduced to decompress the stomach and bladder and prevent visceral trauma during the introduction of the trocar. The choice of anesthetic drugs should aim at early awakening, free of residual actions and with lower incidence of side effects, such as nausea, vomiting, pain and respiratory depression in the postoperative period (15). Pneumoperitoneum, an obligatory component of the technique, gives special characteristics for the conduction of anesthesia, since the intra abdominal pressure is inverted from negative to positive, which results in a change in physiology, which should be known by all who participate in the procedure (16). For pre-anesthetic medication, midazolam is a good option because of its fast elimination half-life and for providing amnesia (17). With regard to antiemetics, ondansetron and dexamethasone were effective in preventing nausea and vomiting in the postoperative period of patients undergoing gynecological laparoscopy. Alizapride has also shown efficacy (17).

Conflicts of Interest: There are no conflicts of interest.

4 CONCLUSION

Balanced general anesthesia combined with continuous epidural anesthesia is considered a satisfactory technique in the surgical management of deep endometriosis. The intraoperative benefits are evident for the surgical team, and the patient's experience in combating pain is superior to general anesthesia alone. In this sense, patients in surgical programming must go through a preoperative evaluation with an anesthesiologist, and the anesthetic and analgesic programming must be discussed in detail. It is fundamental that the trusting relationship between anesthesiologist and surgeon allows, many times,

without disappointments or frustration on the part of the surgical team, that the considerations of conversion or non-use of the technique be accepted, considering the sovereignty in the context of patient safety. One must take into consideration comorbidities, technical criteria, anesthetic risk, and the opinion to be accepted in the risk/benefit evaluation for generalization in any surgery. In conclusion, in addition to describing the anesthetic technique used in laparoscopic surgeries for treatment of endometriosis, this study also demonstrates that compared to general anesthesia alone, combined epidural anesthesia can reduce postoperative pain, improve short-term quality of life, and reduce unwanted surgical injuries. Importantly, there is also a reduction in the use of general anesthetics when the technique is combined, and consequently an earlier awakening is achieved.

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Chapter 33

Clinical Considerations of Retention Ligaments of the Face: A Literature Review

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ABSTRACT
With the advancement of techniques and technologies used in procedures aimed at rejuvenation, several structures of the face deserve emphasis to achieve clinical success, among them the Retaining Facial Ligaments (SFLR). It is known that the classic characteristics of the aging face imply, above all, in the FRL, since the intimate relationship of the ligaments with the skin can be modified by structural and, consequently, functional changes. In this sense, the understanding of the LRF should be considered, by the professional, as targets for clinical action, as a way to increase the effectiveness, naturalness of results and patient satisfaction. In order to understand the clinical importance of the retention ligaments of the face, 29 articles were used in this research, as a form of literature review. According to the results found, the understanding of physiological changes over time, and their clinical repercussions demonstrate that the retention ligaments of the face are of fundamental importance in deciding the technique and protocol to be adopted in rejuvenation procedures.

Keywords: Facial retention ligaments; Aging; Facial rejuvenation.

1 INTRODUCTION

Aging is a systemic process, of multidimensional and factorial nature, and when associated with the face, several conditions come together, leading to the clinical condition called inversion of the triangle of youth, characterized by facial sagging and "fall" (Michaud; Gassia & Behaouari, 2015). In order to

attenuate, reverse or decrease the speed and intensity with which these signs are observed, a diversity of studies are done to evaluate new materials, techniques and protocols for their realization (Rzany et al., 2015; Cotofana et al. 2015; Myung & Jung, 2020). Nevertheless, in addition to new technologies, cosmetic and aesthetic procedures, knowledge of facial anatomy is increasingly necessary for clinical success (Michaud; Gassia & Behaouari, 2015; Cotofana et al., 2016).

According to Cotofana et al. (2016), knowledge of the complex organization of support, retention, and lining tissues deserves special attention for the improvement of rejuvenating procedures. Among the structures, the ligaments of retention of the face (LRF) deserve prominence, since aging promotes a decrease in their function, weakening of support and, consequently, makes it as one of the preponderant factors for clinical observation of the aging face (Alghoul & Codner, 2013).

In this sense, understanding and deepening the knowledge about the retention ligaments of the face becomes relevant for the choice of treatment techniques and protocols that ensure greater effectiveness of the desired clinical results and level of patient satisfaction (Mendelson, 2013).

1.1 RETAINING LIGAMENTS OF THE FACE

First described in 1959 (Mcgregor, 1959), the ligaments of facial retention (LRF) are thick and deep fibrous bands that insert into the dermis, acting as anchor points, ensuring stability to the skin (Alghoul & Codner, 2013). Also according to Alghoul and Codner (2013), these structures, along with subcutaneous fibrous septae divide the face into a superficial and deep layer, by creating areas of adhesion in different planes.

According to their origin, LRF are classified as "true" or osteocutaneous, originating in the periosteum, such as the temporal, orbital, zygomatic, maxillary, mentual, and mandibular ligaments. The "false" or fasciocutaneous retention ligaments, on the other hand, originate in more superficial planes, in the muscle fascia, and may attach to the skin or the Superficial *Musculo-Aponeurotic System* (SMAS), which are: masseteric, auriculo-platysmal and parotid-cutaneous (Brandt et al., 2012; Alghoul & Codner, 2013; Furnas, 1989).

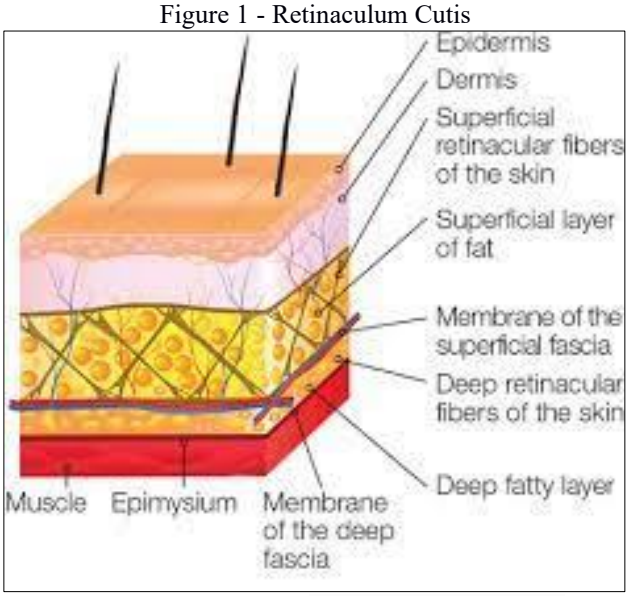
1.2 FACIAL COMPARTMENTS

LRFs are present in certain locations on the viscerocranium and serve to support, position, and stabilize the soft tissues of this same region. These retaining ligaments extend through concentric layers, joining them to fixed points, called insertion points (Alghoul & Codner, 2013).

In the most superficial regions of the LRF, a structural modification is observed, characterized by the branching of the ligaments to the subcutaneous layer, called the reticular cutis (Gosain; Yousif & Madiedo, 1993) (Figure 1). This specialization of the ligaments is responsible for increasing the insertion area and greater anchorage, ensuring en bloc facial movement, that is, in a unique manner over the entire supported region (Mendelson, 2013; Michaud; Gassia & Behaouari, 2015). As the ligaments divide the sub-

SMAS plane into deep facial compartments, the retinaculum cutis with their fibrous septa, divide the pre-SMAS plane, which is the subcutaneous layer, into fat compartments (Alghoul & Codner, 2013).

Figure 1 - Retinaculum Cutis



Source: Adapted from Kim; Oh & Jung. 2019

1.2.1 SMAS

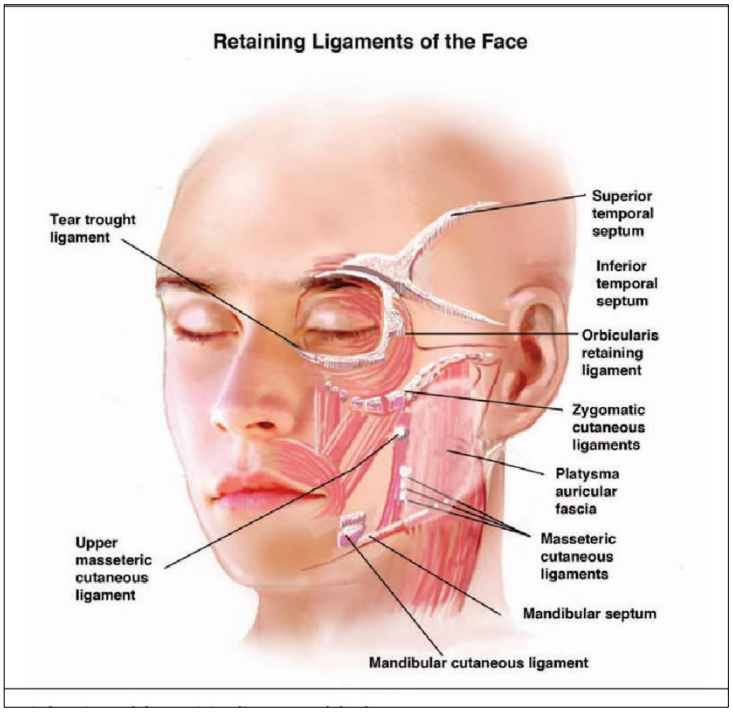
*Superficial Musculoaponeurotic System (*SMASS) is a fibrous network associated with the middle and lower thirds of the face, and according to its relationship with adjacent structures (Mitz & Peyronie, 1976; Gosain et al., 1993; Whitney & Zito, 2020). According to Owsley (1983), the SMAS ensures support and amplification of the mimic muscles and its organization promotes facial compartmentalization (Owsley, 1983).

According to depth, the SMAS is divided into supra-SMAS and Sub-SMAS, and are considered key process structures in facial harmonization procedures (Surek, 2019). Delimited anatomically by the malar equator, the SMAS can be subdivided into superior and inferior, which relate to the pre-zygomatic space. sub-orbicular and pre-periostalmedial fat compartment, as well as the deep cheek fat compartment and deep piriform space, respectively (Rohrich & Pessa, 2012).

1.2.2 Ligaments of the Temporal Area

In a frontal view, in the viscerocranium region, one can observe an adhesion zone located medially to the line of superior temporal insertion, where the aponeurotic galea and periosteum fuse to the frontal bone. From its distal portion emerges a dense ligament with great traction force called the orbital ligament. This ligament, in turn, is inserted into the supraorbital border (Figure 2) (Alghoul & Codner, 2013).

Figure 2 - Retaining ligaments of the face



Source: Adapted from Alghoul & Codner, 2013

Meeting the anatomical path of this ligament, a thin zone of insertion, permeating the superficial and deep planes of the temporal fascia, was called the orbicular-temporal ligament (Knize, 2009). From a different classification system, Moss et al. (2000) gave a different denomination to the structures of the orbital and periorbital region, including orbital ligament, being called temporal ligament (Moss; Mendelson & Taylor, 2000).

Also according to these authors, the temporal ligament deserves prominence for being the region of communication with 3 other retaining structures*:* the (a) superior, (b) lateral inferior temporal septum and the (c) medial supraorbital ligament adhesion zone (Moss; Mendelson & Taylor, 2000). In consensus of structure, but with different naming, the inferior temporal septum is similar as described by temporal orbicular ligament (Moss; Mendelson & Taylor, 2000; Knize, 2009).

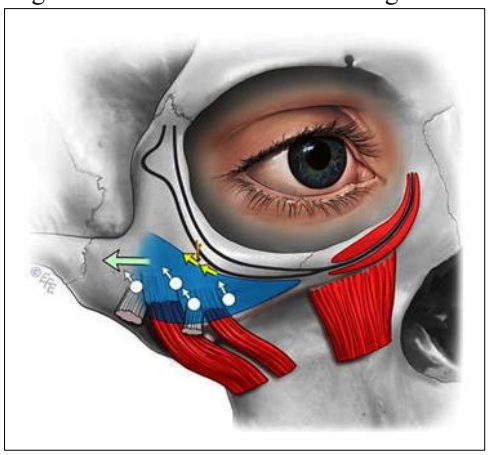
Sinna et al. (2017), describe that the temporal ligament as an adhesion zone extended by the supraorbital adhesion zone and formed by the fusion of 2 septa located lateral to the orbital, the superior temporal septum (STS) and inferior temporal septum (ITS). Projected superiorly, the STS separates the frontal region from the temporal region and inserts into the superior temporal ridge. In continuity to the STS, the ITS separates the superficial temporal aponeurosis in two, delimiting an inferior triangular space, which contains branches of the facial nerve.(Sinna *et al*., 2017).

1.2.3 Ligaments of the Periorbital Area

Unlike the temporal ligaments and septa, which also show proximity to the orbital region, the orbicular retaining ligaments (ORL) (Figure 3) differ in that they originate from the periosteum of the orbital rim and insert into the transition skin tissue from the eyelid to the cheek (Alghul & Codner, 2013).

The LRO transpasses the orbicular muscle, projects laterally to the lateral orbital rim in a fibrous, dense area called the lateral orbital thickening. In this region, the orbicular retaining ligament connects superiorly with the temporal ligament and inferiorly with the tear trough ligament (Knize, 1996).

Figure 3: Periorbital muscles and ligaments.



Source: Mendelson, 2013

The tear trough ligament is a retaining structure of osteocutaneous nature, originating in the maxillary medial sub-orbital region and inserting into the tear trough skin (Quatela & Antunes, 2015)

1.2.4 Ligaments of the Mandibular Area and Cheeks

In general, like the ligaments described above, the ligaments of the mandibular and cheek region were discovered and described in a progressive way and had their nomenclature modified with the advance of research and dissection techniques (Knize, 1996; Knize, 2009; Moss; Mendelson & Taylor, 2000).

The zygomatic ligaments (LZ) (Patch McGregor), are true retaining structures, since they originate in bone, more precisely in the inferior border of the zygomatic arch and insert directly into the skin. Of fibrous and dense constitution, these ligaments have a close relationship with the origin of the zygomatic major, minor, and levator of the angle of the mouth muscles and with the superior zygomatic branch of the facial nerve, in addition to the branch of the transverse artery of the face (Alghoul et al., 2013; Alghoul & Codner, 2013).

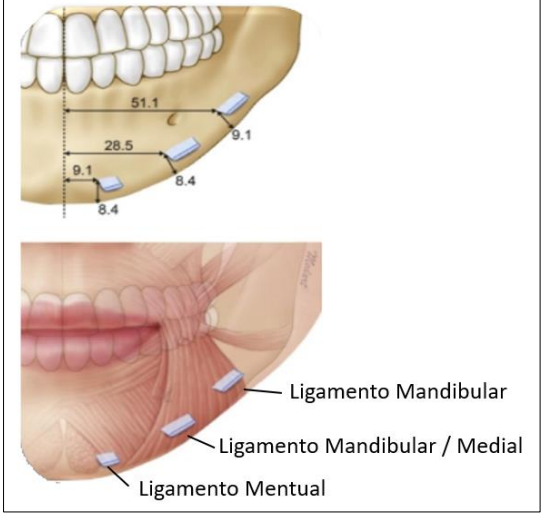
Located below the zygomatic ligament, the masseteric cutaneous ligaments arise from the masseteric fascia of the masseter muscle and connect to the LZ forming a T-shaped septal structure (Alghul & Codner, 2013). This "T" structure borders, laterally, another ligament: the plastima-auricular fascia.

The platysma-auricular fascia ligament (LFPA) is described as originating from the parotid fascia and inserts at the posterior border of the platysma muscle to the preauricular skin (Furnas, 1989). Although controversies can still be observed regarding the names and constituent structures, it is known that these ligaments extend from the preauricular and subauricular regions as a result of fusion of deep fascial layers or periosteum, SMAS and skin tissue (Ozdemir et al., 2002).

Another ligament belonging to this region is the maxillary ligament (LM). In fact, the LM consists of 2 bundles of fibrous tissue that are separated by the crossing of the levator labii muscle (Fogli, 2008). Fogli (2008) further adds that this ligament originates at the base of the nasal wing and projects laterally, with its close relationship to the zygomatic ligament being a denser insertion point and delimiting the region known as the premaxilla (Sinna et al., 2017).

In the lower third of the viscerocranium, three osteocutaneous ligaments stand out as being highly relevant to clinical rejuvenation procedures: the mandibular, medial and mentual ligaments (Figure 3). The mandibular ligaments originate laterally to the midline in the anterior third of the mandible, approximately 5 cm and 1 cm above the mandibular lower border. The mentual ligament is a set of fibers originating +/- 1 cm from the midline, 0.8 mm above the mandibular border. And the medial mandibular ligament, or simply, medial ligament of the mandible is located between the first 2 ligaments described above. These ligaments together during the aging process and at the inversion of the youth triangle represent the main retaining structures associated with the fall of fat compartments and jowl formation (Kang *et al.* , 2016).

Figure 4 - Ligaments of the mandibular region and cheeks.

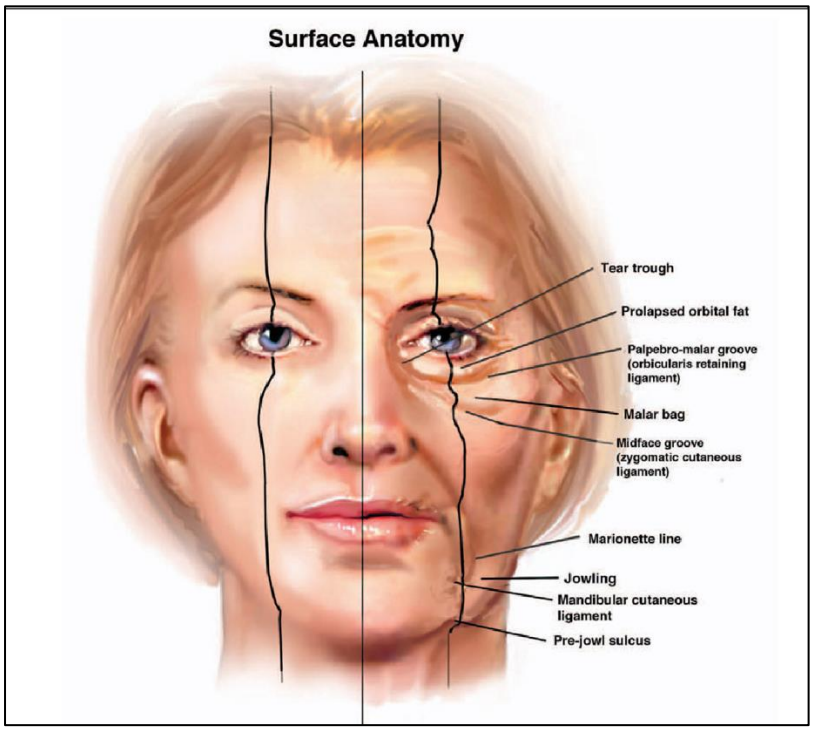


Source: Adapted from Kang *et al*., 2016.

1.2.5 Retaining ligaments of the face and aging

In the aging process, the attenuation of the stability of the layers supported by these ligaments is correlated much more to the underlying bone remodeling than to the direct action of aging on LRFs. Studies show that the decrease in bone volume alters the location and decreases the anchorage of the retention ligaments, especially the osteocutaneous ones, promoting cascading effect on the tissues supported by them and contributing to the inversion of the triangle of youth (Thornton et al., 2015; Wong & Mendelson, 2019) (Figure 5).

Figure 5: Aging of the face and associated ligaments.



Source: Adapted from Alghoul & Codner, 2013

In this sense, knowledge about the anatomical changes resulting from the physiological changes of aging and its consequent action on retaining ligaments and modification of the vectors and force of tractions, presents itself with fundamental importance for choosing the procedure that may have greater clinical success and patient satisfaction. Thus, this study sought to evaluate the importance of retaining ligaments of the face and their clinical significance in the process of facial rejuvenation.

2 MATERIAL AND METHODS

In this study, an exploratory bibliographic research was developed, of the narrative literature review type, with the purpose of analyzing the existing scientific knowledge on the topic of the importance and clinical considerations of the retentor ligaments of the face. The research was carried out by means of a scientific database search. This research was based on national and international publications, using as descriptors: *facial retaining ligaments*, *cheek ligaments*, *mandibular ligaments*, and *facial rejuvenation*.

In order to recapitulate and deepen the knowledge on the subject, articles by Mcgregor (1959), Gosain et al. (1993), Furnas (1989), Knize (1996; 2009), Moss, Mendelson & Taylor (2000), Ozdemir et al. (2002), Thornton et al., (2015), Kang et al. (2016) were used

In addition, the rationale for this research was based on the articles of clinical interest, for professionals in the field, such as Brandt et al. (2012), Alghoul et al. (2013), Alghoul & Codner, (2013), Cotofana et al. (2016), Sinna et al. (2017), Cotofana & Lachman (2019), Casabona et al. (2019), Wong & Mendelson, (2019), Myung & Jung (2020).

3 RESULTS AND DISCUSSION

Clinically, facial aging can be observed as a result of factors ranging from bone remodeling, with soft tissue decline and volumetric deflation of facial fat compartments (Furnas, 1898; Michaud; Gassia & Belhaouari, 2015, Cotofana et al. , 2016). In another study, using dissection techniques, it was shown that laxity of the retaining ligaments resulted from weakening of the ligament traction and lowering of the soft tissues supported by these ligaments (Reece; Pessa & Rohrich, 2008).

For Kikkawa et al. (1996), the physiological aging process promotes loss of tensile elasticity of the retaining ligaments which, added to constant muscle contracture and the action of the gravitational force, promotes the propensity to fall.

Another report on the action of the retention ligaments of the face is associated with physiological bone changes. For Kretlow et al. (2012), bone resorption and remodeling processes, such as decreasing bone density and volume, directly affect the origin of ligaments, especially the osteocutaneous ligaments, thus modifying adherence, location and force vectoring, decreasing the stability of ligaments (Kretlow; Hollier & Hatef, 2012).

However, oppositely, some research shows that ligaments remain strong over time without significant loss of tensile strength and tissue decline is caused by lack of support from adjacent structures, such as facial fat compartments and compartmental spaces formed (Warren; Aston & Mendelson, 2011; Myung & Jung, 2020).

In more recent research, which evaluated the composition of the ligaments longitudinally, as well as lubrication and mechanical properties, it was reported that decreased action of the retaining ligaments is a consequence of decreased intrafascicular lubrication (Thornton et al., 2015).

For Cotofana et al. (2016), aging occurs in all facial structures, but the onset and speed of changes differ between each specific structure, between each individual, and between different ethnic groups. Therefore, knowledge of age-related anatomy is crucial to the work of trying to restore a facial (Cotofana otofanaet al. , 2016).

According to Sinna et al. (2017), in rejuvenation procedures, the ligament line, which delimits the anterior face and lateral face, should be considered because of its clinical importance due to the increased density of the SMAS in this region (Sinna et al., 2017). This fibrous and dense line is an anchor point for a large amount of retention ligaments that attach superficial layers to bone tissue, such as the zygomatic, masseteric, temporal, and mandibular ligaments (Sinna et al. , 2017; Cotofana & Lachman, 2019, Wong & Mendelson, 2019).

The construction of the concept of the ligament line and its importance are recent, being debated regarding the different effects that can result from clinical procedures associated with it. For example, fillers when injected medially to the line, promotes only volumizing effects, while when used laterally, they produce a *lifting* effect (Cotofana & Lachman, 2019; Casabona et al., 2019) To test this hypothesis, Casabona *et al.* (2019) performed an interventional study, where injection of

hyaluronic acid was performed, considering points medial and lateral to the ligament line, for each side of the face. The results, considered 3 medial and 3 lateral points, demonstrate that minimally invasive applications of filler materials, in soft tissues, can be performed more efficiently if the anatomy of the underlying structures is respected (Casabona et al., 2019).

According to Brandt et al. (2012), facial rejuvenation processes correlate directly with the resizing of ptotic facial tissues, through the release of the insertion of the facial retention ligaments and the attachment of the SMAS to deeper facial structures, such as periosteum or deep fascia. In this work, a better understanding of the role of osteocutaneous ligaments in facial aging by characterizing their biophysical properties was sought. The ligaments studied were: Orbital, Zygomatic, Buccomaxillary and Mandibular (Brandt et al., 2012; Casabona et al. , 2019).

In this study by Brandt et al. (2012), it was shown that from the force generated at the beginning to the end with the rupture of the ligament, the zygomatic ligament as the strongest, followed by the orbital, mandibular and maxillary; the most rigid, followed by the orbital, maxillary and mandibular. The ligament with the greatest stretching property, i.e., greatest elasticity is the mandibular ligament followed by the orbital, zygomatic and buccomaxillary Brandt et al., 2012).

An important result of this study is evaluation of the bucomaxillary ligament *this ligament was identified* as the weakest. This evidence supports the clinical observation of midface drop in the infraorbital region (Brandt et al., 2012; Cotofana et al. , 2016)

Ptosis in mandibular region, as a failure of a mechanical overload, happens over a ligament that has great elasticity, suggesting a delicate balance between this ligament and the descent of the midface, clinically resulting in the jowl appearance (Cotofana et al, 2016). The orbital ligament is well resistant to mechanical load and maintains a good degree of elasticity, and this is the likely aspect of maintaining the lateral position of the eyebrow.(Brandt et al, 2012)

4 CONCLUSION

Aging of the face is a multifactorial process and occurs in all its constituent structures, changing their anatomical and physiological patterns and, consequently, their mechanical properties. In this context, ligaments deserve attention, since their close relationship with adjacent structures and, therefore, their interdependence causes their traction pattern and stability of the superficial layers to be impaired. Anatomical knowledge of these structures is of utmost importance in facial rejuvenation.

Therefore, through the discovery of studies to identify new traction tissues, microanatomical arrangements and their correlations with the targets and bases for facial rejuvenation procedures, the deepening of the study of anatomy should be constant for the discovery of therapeutic protocols that result in procedures with greater efficacy, greater naturalness of effect, and higher rates of patient satisfaction, ensuring lower risks and success for the orofacial harmonization professional.

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Chapter 34

Morel- Lavallée lesions: a review of the literature

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ABSTRACT
Morel-Lavallée lesions (MLL) are unusual soft tissue injuries resulting from abrupt shearing movements of the skin, subcutaneous tissue, and underlying fascial tissue. Early diagnosis and treatment of the lesion is essential to prevent complications such as cutaneous and extensive necrosis. This time, we resorted to the available scientific literature in order to understand the propaedeutics of such condition.

Keywords: Morel-Lavallée; lesion; trauma; surgery, management and diagnosis.

1 INTRODUCTION

Closed dislocations are rare soft tissue traumas that can affect various parts of the body and have diverse outcomes. Post-traumatic injuries result from abrupt shear movements of the skin, subcutaneous tissue and underlying fascia tissue [(1)] . Morel-Lavallée lesions are soft tissue lesions that originate deep in the subcutaneous plane, whose trauma mechanism occurs through avulsions of the skin and subcutaneous tissue with the muscle fascia planes, which can lead to various infectious morbid complications to the patient [(2).]

Early diagnosis and treatment of the injury is critical to prevent complications such as infection and extensive skin necrosis such as Fournier syndrome. The diagnosis is based on the clinical history and the trauma mechanism involved, high-impact contusions and crush injuries to which the patient has been subjected[(3)] , physical examination and imaging examinations, if necessary, for proper classification of the type of injury.

Magnetic resonance imaging (MRI) is the modality of choice in the diagnosis of Morel-Lavallée lesion, identifying a non-calcified soft tissue mass or the presence of encapsulated collections[(4)] . Other exams can corroborate to the diagnosis and management of the lesion, such as ultrasonography (USG), which can demonstrate thick and septated fluids in the affected region. Another more easily accessible exam that can also diagnose the lesion is computed tomography (CT), which can diagnose hypodense collections and rule out some vascular lesions.

The treatment is based on the correct classification of the type of lesion and on surgical intervention or conservative treatment. Depending on the patient's clinical condition, the hematoma should be evacuated and the necrotic material removed, because it may become infected and the necrosis may extend, leading to severe cases of fasciitis. [5].

The dislocation injuries, especially the Morel-Lavallée lesion, occur with a low incidence and its recognition is fundamental for the adequate management of the patients. Thus, we resorted to the available scientific literature in order to understand the propedeutics of this affection.

2 METHODOLOGY

We searched the CAPES, Biblioteca Virtual em Saúde, Scielo, and PubMed journal databases using the keywords "Morel-Lavallée", "lesion", "trauma", "surgery", "management", and "diagnosis" for articles published in the last 15 years, from 2007 to 2022, in Portuguese and English. After further refinement, duplicity was identified in 5 studies, resulting in 8 distinct articles, of which 1 was not possible to access its full content. Finally, the new database analysis included 8 articles to complement the content of this literature review study.

3 RESULTS AND DISCUSSION

3.1 HISTORY OF THE CONDITION

The Morel-Lavallée lesion was first described by Victor Auguste-Francois Morel-Lavallée in 1853 and represents a post-traumatic avulsion of the subcutaneous cellular tissue onto the muscle fascia, a situation in which a virtual space is created with subsequent accumulation of hemolymphatic components, cell debris, and liquefied fat, which can occur quickly or slowly, depending on the predominant type of vascular structure that was injured during the tissue shear mechanism. [6]

As the lesion is perpetuated through therapeutic or diagnostic failure, there is a chronification of the inflammatory process and a tendency to develop a fibrous pseudocapsule[7] , which impairs the proper absorption of the lesion contents, feeding an indefinite growth cycle [8] .

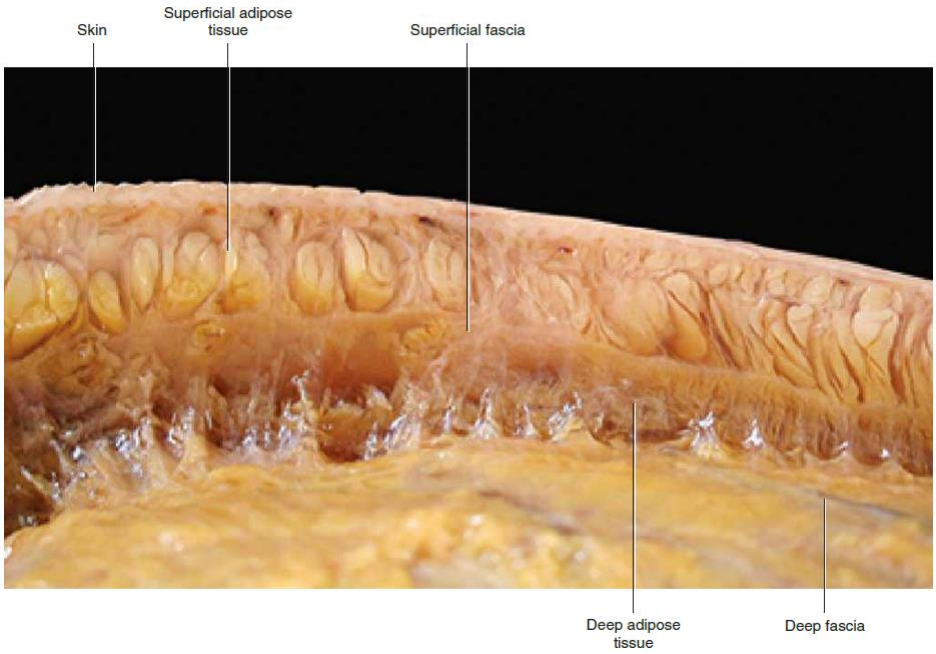
3.2 PATHOPHYSIOLOGY:

SCI is most commonly described in high-energy traumas involving the pelvic girdle and the proximal region of the thighs, especially in the peri-trochanteric region (> 60% of cases) [9]. However, this injury can also occur in minor but successive traumas, such as those related to contact sports, and also in the postoperative period of surgical procedures such as liposuction and abdominoplasty[2] .

As a result of a shear injury, the subcutaneous cellular tissue and skin are detached from the underlying tissues (which are firmly attached to the muscle fascia), forming a dead space and promoting the rupture of the perforating and lymphatic vessels that nourish this region (images 1 and 2). The release

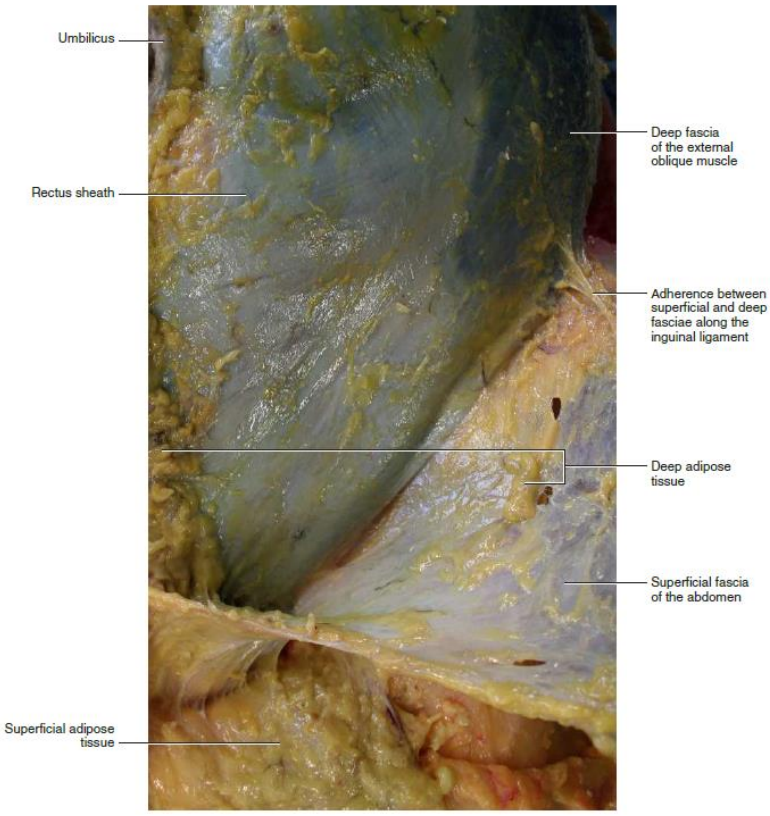
of the contents of these vessels, as well as the injury to the fatty and subcutaneous structures, results in the creation of a cavity occupied with hemolymphatic, fatty material and cellular debris[10] .

Image 1: Anatomy of the subcutaneous tissue of the thigh. The layers of the subcutaneous tissue are shown. The superficial fascia divides the superficial adipose tissue from the deep adipose tissue. The superficial adipose tissue has a structure with vertically oriented fibrous septa with fat lobes situated between them. Deep adipose tissue is formed by loose connective tissue, there are few fat cells, and the septa are thinner and less fibrous. This structure allows a gliding plane between the superficial and deep fascia.



Source: STECCO, CARLA. Functional atlas of the human fascial system. Elsevier Health Sciences, 2014.

Image 2: Macroscopic view of the superficial fascia of the abdomen, a fibrous layer also known as Scarpa's fascia.



Source: STECCO, CARLA. Functional atlas of the human fascial system. Elsevier Health Sciences, 2014.

4 CLINICAL MANIFESTATIONS:

Due to the association with high-energy trauma, this injury is often not diagnosed or adequately treated in the acute phase, usually due to the attention given by the attending team to priority treatment injuries .[2]

In the acute phase, we can observe, in the area affected by the lesion, a progressive increase in volume, accompanied by pain, flaccidity, compressibility and hypermobility of the skin. Some patients may report hypoesthesia (the latter due to traumatic avulsion of branches of the peripheral nervous system). The main sign that can help in the clinical diagnosis of this lesion is the presence of fluctuation. Some signs such as ecchymosis and asphalt abrasions may also, if present, increase clinical suspicion (image 3) [11] . In chronic cases, we can identify trophic alterations of the skin or even signs of infectious complications evolving with tissue necrosis[7] .

Image 3. Clinical appearance of a Morel-Lavallée lesion 7 days after the patient presented a shear injury to the greater trochanter during snowboarding.



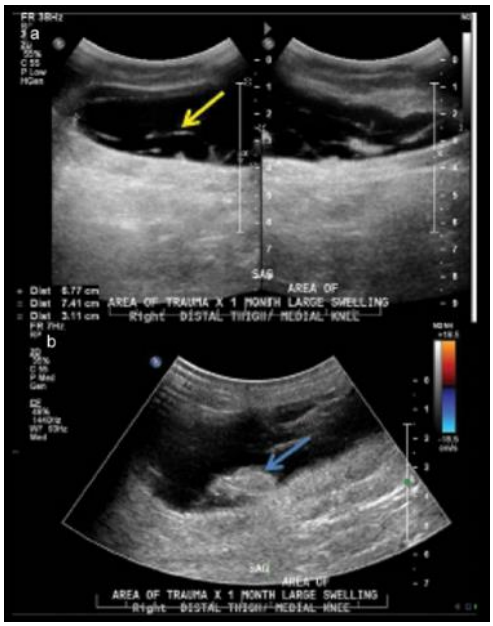
Source: Greenhill D, Haydel C, Rehman S. Management of the Morel-Lavallée Lesion. Orthop Clin North Am. 2016 Jan;47(1):115-25.

5 COMPLEMENTARY EXAMS:

The diagnosis of Morel-Lavallée lesion is predominantly clinical, but the similarity of this condition with differential diagnoses such as deep vein thrombosis and soft tissue abscesses increases the need for diagnostic complementation with radiological examinations[9] .

Among the most used tests for diagnosis, we highlight ultrasonography and magnetic resonance imaging. The advantages of ultrasonography are its great availability, low cost and speed in the evaluation of the lesion, including dynamically. However, it has low specificity, is an operator-dependent exam, and cannot be adequately performed in areas with open wounds. The characteristic images change according to the time of lesion evolution and depend on the characteristics of the fluid and debris, as well as on the presence or absence of the pseudocapsule in chronic cases (image 4)[7] .

Image 4: Sonographic image of the medial aspect of the right thigh (a) and (b) demonstrating heterogeneous collection with internal septations (yellow arrow) and echogenic focus (blue arrow). There is no internal vascularization at Doppler in the echogenic focus (blue arrow).

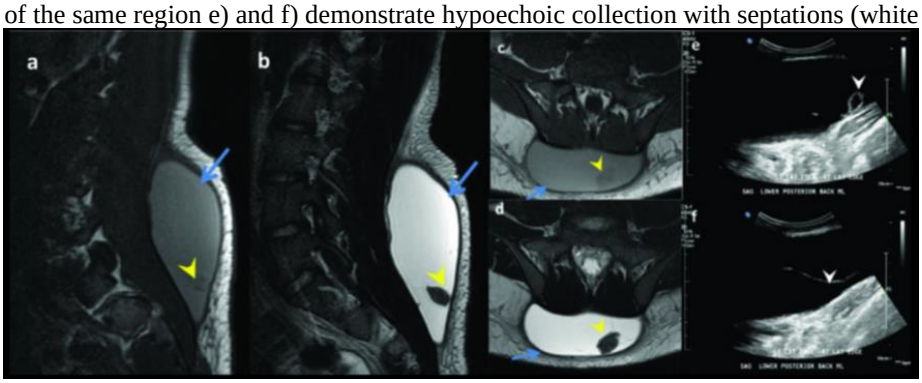


Source: Diviti S, Gupta N, Hooda K, Sharma K, lo. Morel-Lavallee Lesions-Review of Pathophysiology, Clinical Findings, Imaging Findings and Management. J Clin Diagn Res. 2017;11(4):TE01-TE04.

MRI is the gold standard test for the characterization of Morel-Lavallée lesions. It has advantages such as high sensitivity and specificity, being able to accurately discriminate the predominant content of the lesion and infer the time of evolution from the radiological characteristics[12] . A disadvantage is its availability, still scarce in large trauma centers, especially in developing countries such as Brazil.

In the acute phase, clots and debris can be found in a hyperintense collection on T2. With the organization of the hematoma, due to the conversion of deoxyhemoglobin to methemoglobin, these lesions appear iso to hyperintense on T1. The periphery becomes hypointense on T1 and T2 over time, due to the presence of hemosiderin. Over time, the collection becomes a hyperintense seroma on T2 with a pseudocapsule hypointense on T1 and T2 (image 3)[12] .

Image 3: MRI of the lumbar spine a) T1 sagittal cut, b) T2 sagittal cut and; c) and d) T1 & T2 axial cut images demonstrate a lenticular shaped collection between the thoracolumbar fascia and overlying subcutaneous fat and superficial fascia, consistent with Morel-Lavallée lesion. There is a slight T1 hyperintensity, relative to the muscles, with an internal area hypointense on T1 and T2 (yellow arrows) representing a retracted clot. There is a hypointense capsule (blue arrow) with internal septations. Sonographic images of the same region e) and f) demonstrate hypoechoic collection with septations (white arrows).



Source: Diviti S, Gupta N, Hooda K, Sharma K, lo. Morel-Lavallee Lesions-Review of Pathophysiology, Clinical Findings, Imaging Findings and Management. J Clin Diagn Res. 2017;11(4):TE01-TE04.

6 TREATMENT

The therapies of choice in patients with minor acute injuries without capsule and without underlying fractures are managed with the application of compression bandaging, NSAID (nonsteroidal anti-inflammatory drugs), absolute bed rest, and specific physical therapy[13] . Percutaneous guided drainage, either by CT scan or ultrasound, can be used for larger acute injuries. [7]

Fluid collections relapsed with aspiration treatment, can be effectively treated with sclerosing with doxycycline, other sclerosing agents[13] with reported efficacy of 95.7%[5] .

Lesions, especially those with volume greater than 50 ml, usually have a high recurrence rate, requiring multiple aspirations or even continuous aspirations[5] .

In chronic cases and with the presence of capsules, open drainage including the use of fibrin sealant, padded sutures and low suction drains is usually required. If the skin condition adjacent to the lesion is necrotic, debridement of the site is required .[15]

7 CONCLUSION:

Morel-Lavallée lesion is rare, besides being commonly underdiagnosed, which results in delay in the adoption of an appropriate treatment and, consequently, in an increase in the frequency of complications associated with it. The knowledge of propaedeutics for the early diagnosis of closed degloving lesions is essential for an appropriate management of this condition, and it is necessary to promote the continuing education of health professionals engaged in trauma care services, especially regarding the identification of risk factors, causes and clinical manifestations related to this pathology, for an appropriate management and use of imaging exams in order to establish the most appropriate therapeutic modalities for this lesion.

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Chapter 35

Analysis of the Severity of Insomnia in Patients with End Stage Renal Disease: comparison between hemodialysis and automated peritoneal dialysis

10.56238/eyohsc1-035

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ABSTRACT

Introduction: Sleep disorders in end-stage renal disease patients are prevalent and represent a significant cause of worsening patients' quality of life. The aim of this study was to evaluate the prevalence of insomnia disorders in chronic renal patients on renal replacement therapy, comparing the two dialysis methods (hemodialysis and peritoneal dialysis) in a service in southern Brazil. In addition to insomnia, other symptoms such as leg restlessness and presence of skin itching were evaluated.

Method: A descriptive observational study with a total of 118 clinically stable patients on dialysis for at least 3 months were selected and divided into two groups: 81 patients were on hemodialysis (HD) and 37 on automated peritoneal dialysis (APD). Clinical, socio-demographic, and laboratory parameters were collected and a validated insomnia questionnaire was applied by the investigators. In addition, the presence of symptoms such as irresistible urge to move the legs, skin itching and tingling, as well as recurrent use of sedatives and/or hypnotics were actively questioned.

Results: No statistically significant difference was observed regarding the insomnia score between patients on peritoneal dialysis or hemodialysis, even after adjustment for hypnotic use, 6.8 ± 1.0 vs 6.5 ± 0.7 (p=0.788).

Discussion: Although there is no significant difference between the dialysis method and the presence/severity of insomnia, there was a high rate of patients reporting some degree of insomnia: 30.9% in HD patients and

27.8% in APD patients. Therefore, it is worth studying this complaint more precisely in order to better understand the subject, leading to an improvement in the quality of life of dialysis patients.

Keywords: Hemodialysis, Peritoneal dialysis, Insomnia, Restless legs syndrome, Skin itching.

1 INTRODUCTION

Sleep disturbances during dialysis contribute to a worse quality of life[3,5] . Patients with end-stage renal disease (ESRD), especially those on dialysis, have significantly higher rates of sleep disturbances compared to the general population .[1]

Each dialysis modality has its own characteristics and, therefore, may differ in its association with sleep disorders[1] . While hemodialysis is performed intermittently, usually about three times a week, automated peritoneal dialysis can be performed while the patient sleeps, on all nights of the week[6] . The prevalence of sleep disturbances is believed to be similar between hemodialysis and peritoneal dialysis[4] , but data in the literature comparing the dialysis methods in the same survey are still uncommon.

Thus, the objective of the present study was to investigate and compare the prevalence of sleep disturbances among patients on hemodialysis and automated peritoneal dialysis using specific questions, clinical and laboratory data in a Brazilian renal replacement therapy service, as well as to observe accompanying nocturnal symptoms such as skin itching and leg restlessness in this same group.

2 MATERIALS AND METHODS

This descriptive observational study evaluated 118 patients of the Hemodialysis Service of the Hospital São Vicente de Paulo, in the city of Passo Fundo, divided into two groups according to the dialysis method: 81 on hemodialysis and 37 on automated peritoneal dialysis. All patients of the Renal Replacement Therapy center of the Hospital São Vicente de Paulo (HSVP) were invited to participate in the study. Data collection occurred between the second half of 2016 and the second half of 2019.

The study was approved by the Ethics Committee of the University of Passo Fundo and of the aforementioned hospital. In Plataforma Brasil, it has the number 75785417.0.0000.5342 as Certificate of Ethical Appraisal Submission (CAAE) and was approved under opinion 2.300.998. Informed consent was obtained from all study participants.

The exclusion criteria were as follows: diagnosis confirmed by polysomnography of sleep apnea; home use of BiPAP or CPAP; hospitalization due to severe decompensation of any comorbidity, presence of active infection, and cognitive changes that prevented the understanding of the questionnaire.

A questionnaire evaluating the Insomnia Severity Index (IGI) was applied, validated for Portuguese[9] . The presence or absence of insomnia was defined according to the score obtained by this questionnaire, as well as the sleep-inducing medications used by the patients. This questionnaire consists of 7 questions that assess the nature, severity and impact of insomnia, assigning points from 0 to 4 for each variable.

Values between 8 and 14 indicate mild insomnia; between 15 and 21, moderate insomnia, and between 22 and 28, severe insomnia (Appendix 1). In addition to insomnia, we analyzed the presence of symptoms suggestive of comorbidities common in dialysis patients and that interfere in the quality of sleep: tingling, skin itching, and uncontrollable desire to move the legs when lying in bed to sleep.

To evaluate the associations between type of dialysis and insomnia score, considered numerically, the Mann-Whitney U test was used. Between dialysis and insomnia score, in a categorized way, we used Pearson's chi-square test. Finally, between the insomnia score and the type of dialysis, adjusted for the use of hypnotics, analysis of variance with two-way ANOVA was used.

3 RESULTS

Among the 118 interviewees, 81 were on hemodialysis and 37 on peritoneal dialysis. Considering the 118 patients, age ranged from 19 to 87 years. Of the population studied, 64.4% had been performing some method of dialysis for less than 4 years, and the hemodialysis patients had been, on average, for 2012.9 days (5.51 years) in the therapeutic modality, while the peritoneal dialysis patients had been, on average, for 2015.35 days (5.52 years). Regarding the profession, most patients are out of the labor market, being 37 retired and 18 homemakers.

Regarding the most frequent comorbidities in these patients, 34 (28.8%) have Type 2 *Diabetes Mellitus* and 77 (65.3%) patients have Hypertension.

Data regarding gender, time on dialysis, and presence of comorbidities according to each dialysis method are presented in table 1.

Table 1. Clinical aspects of the patients according to the dialysis modality.

Variable	Hemodialysis n=81	Peritoneal dialysis n=36
Gender Male, *n* (%) Gender female, *n* (%)	55 (67,9) 26 (32,1)	19(51,4) 18 (48,6)
DM2, *n* (%)	22 (27,2)	12 (32,4)
SAH, *n* (%)	47 (58)	30 (81,1)
CI, *n* (%)	3 (3,7)	2 (5,4)
Cancer, *n* (%)	2 (2,5)	2 (5,4)
Smoking, *n* (%)	9 (11,1)	0 (0)

- DM2: *diabetes mellitus* type 2, SAH: hypertension, HF: heart failure.

In a model that considered insomnia score as the outcome, type of dialysis and use of hypnotics as predictors, a statistically significant effect of hypnotic use ($p = 0.033$) but not type of dialysis ($p = 0.788$) was observed. After adjustment for hypnotic use the mean insomnia score among peritoneal dialysis patients was 6.8 ± 1.0 while among hemodialysis patients it was 6.5 ± 0.7, $p=0.788$.

It is also noted that 106 patients (89.8%) consume caffeinated products, and of these, 94 report using them at least once a day.

Of the 118 patients, 47(39.8%,) use sleeping medication, with benzodiazepines being the most commonly used (Clonazepan, 14 and Diazepan, 6). In addition, of the total respondents, 51 (43.2%) report skin itching, 35 (29.5%) report tingling, and 40 (33.9%) have leg restlessness.

The relationship between dialysis method and the use of sedatives/hypnotics, presence of insomnia, and other symptoms is described in table 2.

Table 2. methods of dialysis crossed with nocturnal symptoms or use of hypnotics/sedatives

Variable	Hemodialysis	Peritoneal dialysis	p*
Hypnotics/sedatives, *n* (%)	33 (40,7)	14 (38,9)	0,850
Pruritus, *n* (%)	33 (40,7)	18 (50)	0,351
Tingling, *n* (%)	23 (28,4)	12 (33,3)	0,590
Restless legs, *n* (%)	23 (28,4)	17 (47,2)	0,048
Insomnia, *n* (%)	25 (30,9)	10 (27,8)	0,736

* p = Pearson Chi-Square test

The use of sleep inducing drugs was high in these patients, reaching 38.9% in the peritoneal dialysis group and 40.7% in the hemodialysis patients. Insomnia was present in 30.9% of the patients in the hemodialysis group and 27.8% in the peritoneal dialysis group, with no statistically significant difference between them.

We also analyzed the gender, the presence of some comorbidities, and the use of hypnotics/sedatives and their relationship or not with insomnia.

Table 3. Clinical aspects of patients with and without insomnia according to the IGI.

Variable	With insomnia	No insomnia
Gender Male n, (%) Sex female n, (%)	20 (57,1) 15 (42,9)	54 (65,9) 28 (34,1)
DM2, n (%)	15 (42,9)	18 (22)
SAH, n (%)	24 (68,6)	52 (63,4)
Smoking, n (%)	5 (14,3)	4 (4,9)
Hypnotics/sedatives, n(%)	18 (51,4)	29 (35,4)

Finally, we crossed the data on the severity of insomnia with the dialysis modality and other clinical variables, and in this case, the patient should have already had insomnia classified as at least mild. The data are shown in table 4.

Table 4: Insomnia severity according to dialysis modality and other clinical variables.

Grade	Light	Moderate/Severe
Hemodialysis *n*, (%)	17 (68)	8 (32)
Peritoneal dialysis *n*, (%)	4 (40)	6 (60)

Gender Male *n*, (%) Sex female *n*, (%)	9 (50) 9 (50)	8 (57,1) 6 (42,9)
DM2 *n*, (%)	6 (33,3)	7 (50)
SAH *n*, (%)*	12 (66,7)	9 (64,3)
Hypnotics/sedatives *n*,(%)	9 (50)	8 (57,1)
Pruritus *n*, (%)	11 (61,1)	10 (71,4)
Tingling *n*, (%)	6 (33,3)	8 (57,1)
Restless legs *n*, (%)	7 (38,9)	20 (71,4)

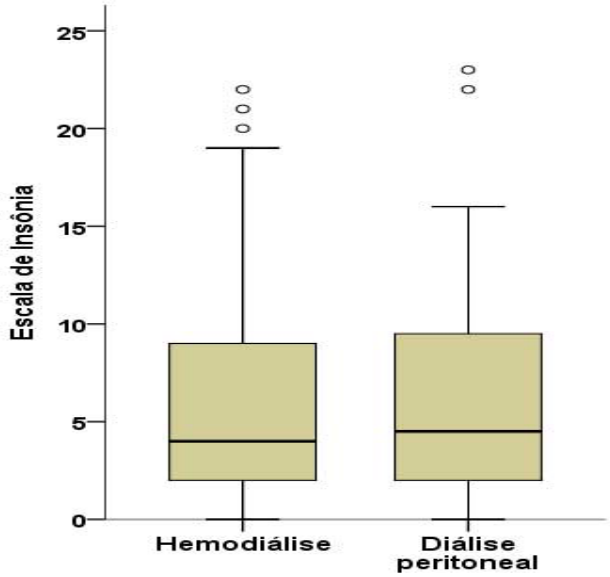
- DM2: *diabetes mellitus* type 2, SAH: systemic arterial hypertension.
* Of the 24 patients with hypertension and insomnia, 3 did not classify their disease as mild, moderate, or severe.

4 DISCUSSION

Sleep disturbances including delayed sleep onset, frequent awakenings, restlessness, and daytime sleepiness are extremely common in dialysis patients[5] which corroborates with the high rate of insomnia in the study population (about 1/3 of the respondents).

The results related to the presence of insomnia and the comparison between the two dialysis methods were in line with the data already existing in the literature, that is, there is no significant difference between peritoneal dialysis and hemodialysis[1] , as shown below in figure 1.

Figure 1. Presence of insomnia according to dialysis modality



Although the literature indicates degrees of insomnia around 50% or more in the dialysis population[2,5,7] , in our service, about 30% of patients had some degree of insomnia. However, we must consider that of the 118 patients, 47 (39.8%) were using hypnotics, and this may be a confounding bias, because although it is a strong indicator of insomnia, we chose not to consider it a defining criterion of insomnia. Moreover, it is common that the patient does not mention the disease and its symptoms when it is compensated by medications, in this case, hypnotics and sedatives.

Regarding the accompanying nocturnal symptoms, considering the total of patients assessed, 51 (43.2%) reported skin itching, 35 (29.5%) reported tingling, and 40 (33.9%) reported restless legs. When

these symptoms were observed according to the dialysis method, similar results were obtained: in hemodialysis patients, 40.7% had pruritus, 28.4% had tingling, and 28.4% had restless legs. Of the patients on peritoneal dialysis, 50% reported cutaneous pruritus, 33.3% reported tingling, and 47.2% reported a constant need to move their legs. It is concluded, then, that there is no significant difference between the dialysis method and the accompanying symptoms.

Another relevant finding is that of those interviewed, 37 are retired and 18 are housewives, which may be related, in addition to other factors and comorbidities, to the physical, psychological, and labor limitation caused by end-stage chronic kidney disease and its dialysis treatment.

The present study also corroborates data from the literature[8] that show Systemic Arterial Hypertension (SAH) as the most prevalent comorbidity among dialysis patients. In absolute numbers, 77 (65.3%) patients have SAH, while 34 (28.8%) have *Diabetes Mellitus*. Glomerulonephritis ranks third, with 11 patients in this study population.

Regarding the limitations of the study, it is important to consider the accuracy of the instrument used to measure insomnia. Only the IGI questionnaire was used and it is known that by increasing the number of measurement instruments, more reliable results are obtained. Another limitation is the small sample of patients on PD, which compromises the performance of statistical tests. Studies with a larger population sample would be necessary to confirm the findings of this study.

Finally, another limitation is the low educational level of the patients, who may have answered the questionnaires incorrectly, despite the precautions taken by the researchers.

5 CONCLUSION

It is known that the absolute number of patients and incidence and prevalence rates on dialysis in the country increased substantially in the period from 2009 to 2018 according to the Brazilian Census of Dialysis[8] . Given this, it is expected that common complaints in this population such as insomnia, are also on the rise.

In our study, there was no statistically significant difference in the insomnia score between patients on peritoneal dialysis or hemodialysis, even after adjustment for hypnotic use, 6.8 ± 1.0 vs 6.5 ± 0.7 (p=0.788).

Although there is no significant difference between hemodialysis and peritoneal dialysis, it was found that one third of dialysis patients have some degree of insomnia. Therefore, it is essential to carefully evaluate these symptoms through more studies in order to understand and treat them correctly, giving the dialysis patient a better quality of life.

CONFLICTS OF INTEREST:

The authors declare that they have no conflict of interest.

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APPENDIX 1: INSOMNIA SEVERITY INDEX

1. Please assess the current severity of your insomnia (for example, in the last two weeks) in relation to the difficulty in getting to sleep:

No	Light	Moderate	Severe	Very Severe
0	1	2	3	4

2. How satisfied or dissatisfied are you with your current sleep pattern?

Very satisfied	Satisfied	Indifferent	Dissatisfied	Very dissatisfied
0	1	2	3	4

3. To what extent do you consider that your sleep problem interferes with your day-to-day activities (e.g. daily fatigue, ability to work/perform daily activities, concentration, memory, mood, etc.)

Does not interfere	It interferes a little	Interferes in some way	Interferes a lot	Extremely interferes
0	1	2	3	4

4. How much do you think others perceive that your sleep problem hinders your quality of life?

They don't understand	They understand a little	They perceive in some way	They perceive very	They perceive extremely
0	1	2	3	4

5. How worried/stressed are you about your sleep problem?

I'm not worried	A little worried	Somehow worried	Very concerned	Extremely worried
0	1	2	3	4

Chapter 36

Impacts of the COVID-19 pandemic on patients with dementia and their caregivers

10.56238/eyohsc1-036

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ABSTRACT
Introduction: Sleep disorders in end-stage renal Introduction: Dementia is a clinical syndrome resulting from impaired cognitive function, whose incidence and prevalence increase with age, being one of the main causes of loss of independence and autonomy in the elderly. During the pandemic, elderly people with dementia formed a highly vulnerable group, suffering extensive impact on the clinical management of their disease, generating consequences in the entire family environment, especially in their caregivers. Methodology: Integrative literature review through bibliographic search in the following databases: Scielo, Lilacs and BVS. Descriptors used: "dementia", "pandemic" and "COVID-19". A total of 112 articles were found, 82 of which were discarded because they did not relate directly to the theme or did not have texts available in full. Included in this study were articles that addressed thematic axes of dementia and the pandemic and articles with less than 10 years old that addressed the concept of dementia. Results: Studies show that the pandemic has brought limitations in different areas for patients with dementia and their caregivers. The difficulty in accessing or knowing the technology and the lack of comprehensive follow-up generated a reduction in confidence in the diagnosis. In addition, they showed that social isolation can compromise access to cognitive stimulation and overload families in caring for this patient. Conclusion: Therefore, patients with dementia and their caregivers are vulnerable populations that were notably affected during the pandemic. This study shows the need for health interventions, the management of psychological and behavioral symptoms in these patients and the importance of a support network for their caregivers.

Key-words: Dementia; COVID-19; Caregivers, Mental Health.

1 INTRODUCTION

Dementia is a clinical syndrome, with a chronic and progressive character, which evolves with cognitive dysfunction, affecting the fields of memory, comprehension, and learning. Cognition and memory are essential factors for the development of an independent life, and it is through them that the human being is able to have attention to acquire new learning that allows the performance of more elaborate tasks or

even of everyday life . An alteration in these functions can become a problem for the autonomy of people, especially at older ages.[13] This condition affects about 50 million people worldwide, with its incidence and prevalence increasing progressively with age, being one of the main causes of loss of independence and autonomy in the elderly.[13,19]

Dementia has multifactorial origin and may be reversible or not. Some factors have already been associated with the condition as possible triggers of the dementia syndrome in the elderly, such as hypovitaminosis D, depression, hypertension, and age over 80 years.[10] The pandemic of COVID-19 impacted this population on two fronts: social isolation (contributing to less cognitive stimulation and close monitoring of the condition of these patients) and the direct impacts of the virus itself on the infected individual. The distancing imposed by the restrictive measures adopted directly affected this public, which had the access to the necessary care initially limited. The reclusion from socializing with other people and interaction with the outside environment deprived the elderly of a greater cognitive stimulus, which is a factor that contributes to delaying the progression of dementia[11] .

In this perspective, Long-Stay Institutions (LTCI) also suffered changes with the pandemic of COVID-19. The individuals who live in these institutions are at increased risk for severe forms of infection and death (association of advanced age and comorbidities). Thus , these institutions needed to adapt to the pandemic protocols, including primary prevention measures, early recognition and isolation of suspected or confirmed cases. Moreover, they became one of the priorities in immunization plans, further intensifying the process of social isolation. In this line, the WHO has also adopted some measures based on physical distancing of institutionalized elderly people, such as: alternative with virtual meetings , staggered meals taken on an individual basis, and suspension of physical contact. [27]

The emergence of the pandemic also caused a major change in the lives of those responsible for the care of the elderly. They suddenly found themselves in a situation where, with limited resources, they would need to work hard to maintain the necessary care in order to prevent further progression of the disease. On the other hand, the caregivers of individuals with dementia went through situations of greater stress and perception of overload, which turned out to be another problem in the care of these patients, for the one responsible for the support now also found himself needing help, since the number of caregivers with mental health demands increased during the pandemic. [29,38]

The impact of the emergence of COVID-19 on the daily lives of these populations was evident. The elderly population, being a more vulnerable population, suffered with higher numbers of morbidity and mortality due to the disease, besides having the access to services and activities (in community) restricted[10] . While caregivers have needed to develop new ways to maintain the care of this population and, at the same time, seek ways to maintain a good quality of their own mental health. The objective of this study is

to perform an integrative review on this topic and thus, be a source of information for future studies and new health policies aimed at the care of this population.

2 METHODOLOGY

This is an integrative literature review done through a literature search that allowed the The analysis of the results of the included studies through their systematization and contributed to the understanding of the investigated topic. The guiding question of this research was "What were the impacts of the pandemic on dementia patients and their caregivers?"

The literature search was conducted in March 2022 in the following electronic databases: *Scientific Electronic Library Online* (SciELO), Latin American and Caribbean Literature on Health Sciences (Lilacs) and the Virtual Health Library (VHL). To select the articles, the Descriptors in Health Sciences (DeCS/MeSH) were used together with the Boolean operators: Dementia and COVID-19 and Caregivers.

The inclusion criteria adopted were the studies published in scientific article format, in English, Portuguese, and Spanish, published in the last five years that addressed the thematic axes on dementias and the COVID-19 pandemic, besides those that addressed the caregivers of these patients. Duplicate articles in the databases, those that did not have their texts available in full and those that did not address the proposed thematic axis were excluded from the analysis.

3 RESULTS

The papers reviewed on addressed the decline in the mental and physical health of people with dementia and their caregivers during the pandemic period. Many articles provide direct results of the impact suffered by both people with dementia syndromes, and caregivers responsible for helping this group.

The **social** isolation imposed by the pandemic and the restrictive measures adopted had the impact of reducing activities previously considered daily. and became an important factor in the physical and emotional decline of both caregivers and those under **their** care.[18] The reduced level of social activities and support had a negative influence on motivation, fatigue levels, apathy, irritability, and cognitive impairment, in addition to increased pain complaints.[3,9,36] In a survey carried out at South America , there was worsening of memory function in 53% of the individuals with dementia, with a greater feeling of sadness in 31% and presentation of anxiety symptoms in 37% of **them**.[3] The most commonly reported symptoms in people with dementia were apathy, anxiety, aggression/irritability, and depression, with studies indicating that the onset or worsening of neuropsychiatric symptoms occurred after the *lockdown*.[23] A Canadian study indicated that most participants felt lonely at some or most times, as well as reports of

feelings of abandonment and lack of companionship, and these feelings were worsened after the pandemic.[32]

The onset or worsening of these symptoms acts as a trigger contributing to the loss of reduced functionality of these individuals. Data in the literature indicate that 1/3 of those living with dementia experienced a worsening in daily functional activities , especially with personal care, attention and urinary/fecal continence, these being the most common alterations in individuals with present cognitive alteration .[5] From the caregivers' point of view, about half of the patients showed cognitive worsening, especially in the fields of memory, attention and orientation.[5]

On the other hand, caregivers also experienced impacts on their health during the pandemic. Most of the articles addressed the burden on caregivers of dementia patients. The changes brought about by the pandemic caused caregivers to experience changes in their own care.[39] Both in home care and in nursing homes, the workload of this professional increased due to the additional responsibilities and caregiving tasks they were given.[30] While some caregivers were able to share caregiving through help from other family members, others gave up their own time to invest in the care of loved ones in need.[26] In an international study covering Australia, Germany, Spain and the Netherlands, a narrow group reported experiencing worsening mental health, reduced social networks and increased stress since the pandemic began. The same article links the worsening mental health of caregivers to the gender of the same , the country in which they live, uncertainty about the future, and loneliness. [37]

Throughout the literature on the topic, there are reports of greater feelings of fatigue among members of this group when compared to the pre-pandemic years. In the United States, 41% of caregivers reported taking on additional caregiving tasks since the onset of COVID-19 and 62% manifested one or more symptoms of anxiety.[39] In another study from South America , 50% reported feeling more tired, while more than 1/3 showed more pictures of sadness and feeling more irritable, with 33% reporting insomnia.[3] The severity of psychological and behavioral symptoms has a direct relationship to the amount of hours spent assisting those who require supervision in basic activities of daily living.[25] Increased household chores, technological challenges, and performing complex medical tasks such as tube feeding, catheter manipulation, injections, and home dialysis lead caregivers to work overtime, with less time available for rest. In addition, the fear of dealing with grief in this population makes these professionals prone to greater risks of affecting their own mental health. [4,20,22] Among other concerns that most afflict caregivers of people with dementia are the inability to visit those in need, infection from COVID-19, and increased responsibilities as a caregiver.

The feeling of stress was perceived by both people with dementia and caregivers, as well as the feeling of not being able to control stress.[32] Thus, leisure activities figure as important escape valves for stress relief. Among the most commonly reported activities are talking to family members and friends,

walking in the neighborhood, and watching television.[32] The use of currently available technology has been useful in providing some level of support during the pandemic.[15] Although the technological adaptation has been positive for some groups, even serving as a starting point for interest in this area[32] many people with dementia have difficulties with the use of messages and videos or do not understand the need to avoid contact, increasing the helplessness of these and their caregivers, family members or Long Term Care Institution responsible, who in addition to the repeated explanation and the feeling of uncertainty, took on extra tasks with direct supervision, increasingly increasing the feeling of overload. [9,15,20]

4 DISCUSSION

The number of people living with dementia has more than doubled in the last 20 years worldwide, representing a growing demand on family caregivers and a challenge to health care systems.[12] It is clear that the pandemic caused by the SARS-CoV-2 virus has had direct impacts on the elderly with dementia, since it is already postulated that the coronavirus invades the central nervous system and can even trigger neurological symptoms. Infection in the elderly can serve as a precursor to a dementia syndrome or even worsen a previously installed condition.[22] Besides the biological factor, the virus brought with it social isolation and restrictive measures, which triggered a series of changes in everyday life around the world.

The coexistence between dementia patients and their caregivers was sometimes perceived as a worsening of the relationship[5] , due to a greater demand for responsibilities and a feeling of overload on the part of caregivers, as well as a greater difficulty for those with dementia to understand the pandemic context and the changes it demands.[14,31] The lack of socialization and reduced activities of daily living contribute to the neuropsychiatric symptoms evidenced in the results found, acting as a negative factor for the mental health of both people with dementia and caregivers. [14,24,31,35] The development of a routine may emerge as a way to help maintain the stability of the person with dementia, in addition to encouraging cognitive stimulation in order to halt the progression of dementia.

Since the beginning of the pandemic, not being fully aware of the disease mechanism and the reasons for following protective measures has brought more and more responsibility to the caregiver.[39] Increases in tasks have affected the willingness to attend to their own needs. Family members interviewed described a loss of freedom, with declining mental and physical health and *burnout* also present in extensive literature.[4,9] Reported psychological impacts of quarantine include symptoms of post-traumatic stress, confusion or anger. The stressful conditions of quarantine are known to require only a 10-day stay, but the pandemic has been going on for more than two years. Added to this is the withdrawal from other activities as a source of income, creating financial worries and dissatisfaction with the monetary situation.[4,39] The impact on the caregiver's health is due to several variables, such as the worsening of his or her patient's

clinical condition. Factors such as neglect of self-care and excessive worry in the face of a new uncertain reality also interfere with the mental health of those whose purpose is to provide support. Thus, a close monitoring of this population and offering psychological help is an important measure to be taken in order to reduce the overload of function.[21] Moreover, the difficulty in the availability of health services and support offered for the specific demand of dementia, associated to the reduction of contact with family members by means of face-to-face visits, caused part of this care to be directed to caregivers, who faced a greater pressure due to the growing responsibility without necessarily a greater offer of resources.[1,6,24]

This survey highlights how COVID-19 does not impact the lives of the elderly only through susceptibility and mortality, it produces a global restriction that permeates physical and mental health. With restrictions imposed to contain the spread of the virus, multiple support services were unable to offer relief to these people as well as their caregivers.[15] While isolation is crucial, including to protect the elderly and people with dementia from SARS-COV2 morbidity and mortality, governments and long-term care facilities can adjust their policies, guidelines, and activities to maintain the health and well-being of this population.

In this context, technology serves as an ally in facing these challenges. Through it, it was possible to keep patients closer to their families through video calls, as well as maintain a continuity in the monitoring of their clinical conditions through telemedicine.[31,35] In addition, the inclusion of new changes in the routine of caregivers and those in need is an essential factor to avoid overload of functions and to allow a better development of the functionality of those who are dependent on care. The organization of care schedules can allow the caregiver to have a period of rest, in addition to being able to dedicate more time to his or her function by having the availability to recover physically and emotionally.

However, there are additional challenges for families living with dementia. Comparative research across countries suggests that when the person diagnosed with dementia is considered the family's responsibility, it is usually due to a lack of available services to care for this population, religion, customs or a lack of ability to pay for care.[8,15] Even when the choice is made to seek professional help, there are difficulties in recruiting help or managing complex tasks involving health problems at home.[4] There has been less impact on care in India for example, due to limited acceptance and care being restricted to the family for cultural reasons. But the use of medication in general emerged more strongly in the Indian context as a form of support for the person living with dementia .[15] For the institutionalized elderly, the lack of personal contact between family caregivers and staff is another obstacle. Dialogue between the facilities and family members is an important step in developing mutual trust for a good relationship. The units' incentives for vaccinated family members to visit can improve the patient's condition and help in the grieving process in case of death.[9,20]

These data highlight the impact and need for comprehensive care for people with dementia, and the need to develop educational interventions and training for families. Work stoppages due to the need for care were highly frequent and associated with greater burden, highlighting the economic impact of caregiving. [25] Thus, a study with rural family members identified different strategies to help in this context, such as gardening, outdoor activities, making protective masks, and games. Furthermore, the caregivers who maintained daily tasks and leisure activities, such as reading, news, extending stimuli and strengthening support networks, suffered less in the process.[4]

Assessment of caregivers' needs and guidance for caregivers should be widely disseminated in order to improve management in a lighter way. As recommended by the **NGO** *Alzheimer's Disease International*, support for people living with dementia and their caregivers is crucial. In addition to protection against virus infection, psychosocial support is needed.[3]

5 CONCLUSION

Dementia patients and their caregivers are vulnerable populations and were notably affected during the pandemic period. The significant impact of loneliness and social isolation on biopsychosocial wellbeing for both caregivers and care recipients stands out. Although social withdrawal was a public health measure, it generated numerous repercussions in the world population, especially in the elderly with dementia and their caregivers.

Therefore, it is of fundamental importance that caregivers prioritize their own physical and psychological health in order to be able to overcome additional burdens and help others in need. Thus, targeting *online* psychological and educational programs aimed at building coping strategies and skills to reduce levels of depression and anxiety should have been instituted to best cope with the pandemic scenario. In addition, health interventions and management of psychological psychological and behavioral symptoms are needed in these patients, as well as the importance of a support network for their caregivers.

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Chapter 37

Application and evaluation of the creative framework for customer retention business model

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ABSTRACT
In every business, the acquisition and maintenance of customers are strategic factors and of great value for any company. Not only to increase profit, but also for the company to increase the added value of its products. In this context, creativity being a tool for solving problems and important for the innovation process, collaborates for the development of customer retention strategies. Thus, this work has as main focus the application of an ideation framework as an enhancer of a customer retention model in health plan operators. The results point to a considerable potentialization of this business model based on the application of a creative framework.

Key-words: retention, health operators, framework, creativity

1 INTRODUCTION

Creative processes and creativity triggers, which for many times have been understood as magical abilities or inherent t o very rare elected individuals, are actually conditioned as intrinsic potentials of every human being, as Ostrower (1977) reports in 'Creativity and the Creation Process'. Another important point, highlighted by the author, refers to the fact that creativity and creative processes are not restricted to specific sectors such as the arts or other humanistic areas, but are linked to all existing segments.

Therefore, as mentioned in the previous paragraph, one can observe the application of creativity mechanisms in the most different segments of society. Silva (2018), in 'Comics as a trigger for creative thinking in business administration students', through a teaching experiment, demonstrates the use of comics in the development of the creative process of students. In this direction, the author concludes that creativity is fundamental in the formation of an administrator, in the process of solving problems quickly, as well as understanding different contexts.

Within the context of creativity triggers as enhancers for different marketing scenarios is the present research, which uses creativity triggers, methodologies, and creative frameworks as enhancers of a business model, a case study focused on Data Mining for Customer Retention in Health Insurance Companies.

2 REVIEW OF LITERATURE

2.1 CREATIVE APPROACHES, METHODOLOGIES AND TOOLS

The following sections describe the methodological approaches and creation tools that will be used as the conceptual framework for this research.

2.1.1 Creation Approaches

From the definition "Approach is the term used to characterize a type of approach, either between people or things", it is understood that approach is the term used when trying to approach the problem that is being used as the object of study (SIGNIFICADOS, 2020).

Oliveira (2018) in "Comparative and relational analysis between Blue Ocean strategy and Design Thinking for innovation management", in a first moment, offers an exercise to the reader for understanding about the Blue Ocean methodology.

> "To understand what Blue Ocean is, it is necessary to imagine the existence of a market divided into two parts: red ocean and blue ocean. The red ocean is the existing and known market, while the blue ocean is the unexplored markets or those that do not exist yet. The red ocean represents the "bloody war, where companies seek to outdo the competition by all means, reducing profit and its capacity to grow. In Blue Ocean, competition becomes irrelevant, you have a demand creation market, without defined rules and more profitable.

In a second step, the author (2018) offers a simple comparison on Design Thinking and the Blue Ocean Strategy (EOA).

> "EOA presents itself as a set of analytical tools in some moments, and in others as a roadmap to create new markets, Design Thinking presents itself as a new way of thinking based on the designers' thinking model. This difference becomes more evident when we notice the importance given by Design Thinking to human needs, creative and inspiring environments that are also mentioned in the EOA, but with less emphasis in detriment of the analytical tools. The main point in common of the approaches is the need to create something of perceptible value the users/consumers through innovation."

Carvalho (2017) makes a comparison in relation to the DFMA (Design for Manufacturing and Assembly) approach. Design Thinking has stood out as a management methodology. In terms of design, it is worth highlighting its low focus on manufacturing and cost aspects, which often becomes an obstacle within companies when it comes to the construction of the developed project. On the other hand, DFMA seeks to balance user and manufacturing, considering that its principles aim to create projects that optimize the manufacturing and assembly process, collaborating in the activity performed by users who have a direct interface with the development process.

Thus, based on the mentioned analyses we conclude that different approaches have been effective within different contexts with the common point of focusing on innovation, but one cannot forget that each

one of them has different approaches for obtaining results, while the Blue Ocean methodology has its focus on understanding the market and extrapolating it through the discovery of the "Blue Ocean", Design Thinking has its focus on understanding the user experience and obtaining the improvement of this user experience process. Finally, DFMA seeks a balance between user and manufacturing since its focus is on production.

2.1.2 Creation Methodologies

From the definition "Methodology can be defined as a word derived from "method", from the Latin "methodus" whose meaning is "path or the way to accomplish something", method is the process to achieve a certain end or to reach knowledge. Methodology is the field in which one studies the best methods practiced in a certain area for the production of knowledge (SIGNIFICADOS, 2020). Thus, it is understood that the term methodology is related to a way of solving a problem through empirical or scientific knowledge.

The SCRUM methodology is an agile process for managing and controlling project development, a process that controls chaos resulting from conflicting needs and interests, is scalable from small projects to large enterprise-wide projects, is a development process iterative and incremental (FERREIRA, 2005).

About Lean Startup, Ries (2012) defines the methodology in 5 basic principles: (i) The entrepreneur can be in a company or in a startup, as long as he is creating products and services under conditions of extreme uncertainty; (ii) A startup is an institution that requires specific management for its context of extreme uncertainty; (iii) Startups must first of all learn. That is, the startup's objective is not simply to make money, it is to learn how to develop a sustainable business model; (iv) The Lean Startup methodology is based on the build-measure-learn cycle, so when creating new products, the startup must measure how customers react and decide whether to maintain the strategy or pivot; (v) To measure progress, traditional metrics should not be used.

Finally, in a more detailed analysis of the Kickbox, Santos (2015) defines it as a process to encourage creativity in corporations through a closed box that should be opened whenever the co-worker has an idea, when he opens the box he will find post-its, a chocolate bar and the most important $ 1000, to implement his idea, so the company besides encouraging creativity internally in your company it is willing to partially fund ideas with development potential.

In this brief review, it is possible to verify three different methodological proposals. While Lean startup is used for entrepreneurs who are developing a product amidst several uncertainties, Kickbox presents itself as an incentive for projects with higher risks, presenting itself as a proposal for calculated risks, Scrum presents itself as a methodology for different and varied projects based on an iterative and

incremental approach. Thus, these methodologies are understood as extremely important tools to enhance services and products.

2.1.3 Creation Tools

A tool can be understood as any instrument that is used to carry out a job. Thus, it is understood that the term tool refers to the instrument used to implement an approach or methodology.

In a more detailed investigation about the tools of creation, the Mind Map is listed (Figure 1). It is identified as a structure of multiple connections that facilitates the registration of various elements that arise in the mind in an unusual way. In this way, mind maps allow overcoming the difficulties of organizing a lot of information and some blockages of linear writing through a set of images, words, colors and arrows that articulate thinking (CORREIA, 2010).

Figure 1 - Mind Map Structure



Source:Okada (2004)

Another tool widely used in ideation processes is the Brainstorm which, according to Monica (2017), for a brainstorming session to be effective, that is, for a large amount of ideas to be generated in the face of a theme or a question asked, it is important that certain rules are followed:

i. withholding criticism and pre-judgments: at the beginning of the session, while ideas are being expressed, none of the participants should make criticisms or pre-judgments, even though some idea may be inaccurate or even absurd. The evaluation of the ideas listed should be carried out only in a second stage of the session .

ii. fly and dream: this means that the participants must put aside restrictions on free thinking i n order to try to overcome common sense and preconceived ideas. This is even more important in the case of tasks that involve creativity or problem-solving.

iii. put emphasis on quantity: the greater the number of ideas, the better. This makes it easier and richer to select and sort ideas.

iv. document all ideas: everything that is said in the session should be recorded and exposed to the participants. Even ideas that seem trivial or redundant.

v. combine and refine ideas: right after listening to all the participants, it is important to give them the opportunity to complete or clarify some of the ideas presented, if they think it necessary.

Finally, there is the PMI(Plus, Minus, Interesting) tool that, For Portmann (1992), is intended to direct the thinker's attention to those aspects that might otherwise be ignored." Doing a PMI consists of looking in the direction of Plus, Minus, and Interesting, and devoting roughly equal time to exploring each of these directions. PMI "is always from the point of view of the thinker who applies it (Portman, 1992)."

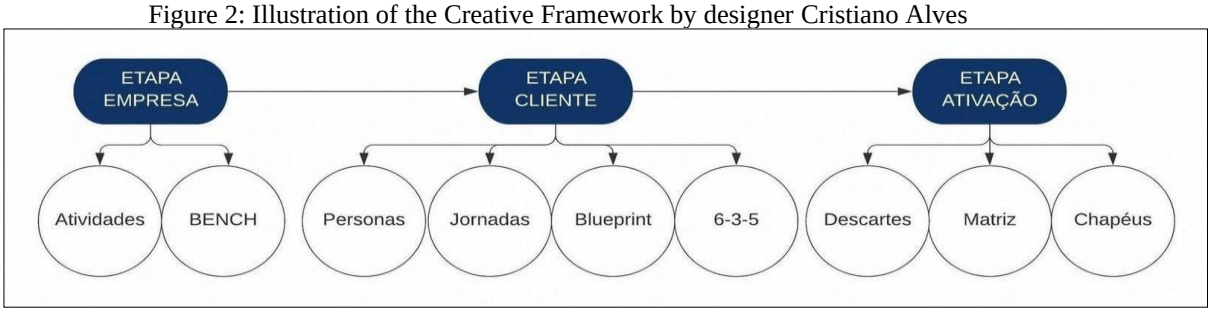
It is possible to notice that the tools addressed intend to innovate and look at other aspects of the problems commonly addressed. Mind maps as a tool to facilitate the understanding of projects, while Brainstorming is characterized as a tool for exploring creativity through the exposure of ideas, and finally PMI is characterized by having an overview of the project with different views in areas of the project that would not commonly be observed.

2.2 CREATIVE FRAMEWORK

The Creative Framework used in this research was developed by Designer Cristiano Alves from the Federal University of Santa Catarina and can be seen in Figure 2. It can be seen that the framework has as main focuses and activities the following topics: understanding the company and its business segment and domain (Company Stage), Perspective of the client who uses the company's products or services (Client Stage) and management:mechanics for the activation of applicable ideas (Activation Stage).

The Framework for its application requires 5 components, which will have the mission to act as a team with the objective of obtaining the best results. It is important to note that the components that will be applying the framework together do not need any prior knowledge, nor do they know each other. The application of the framework occurs in timed steps in times of 5, 10, 15 or 20 minutes according to the needs of the step that is being executed.

Figure 2: Illustration of the Creative Framework by designer Cristiano Alves



Source: Alves (2020)

2.2.1 Stage Company

The first step in applying the framework is to understand the company and its business domain by identifying its core activities. To do this, the following questions must be asked: What is the company's business? What is the goal of this business for the customer? What is the main value proposition to deliver value to the customer? What are the vital activities that the company performs well? What are the vital activities that the company invests time and money in to provide value? Through these central questions we understand more broadly the context to which the company presents itself and can define the four core activities of the company.

To complete the first stage of the framework there is the Benchmarking activity. For Cima (1996) it means the establishment of a practice, data collection, objectives and buyers, with which it is possible to identify certain levels of performance. Through the adoption of the best practices identified it is supposed to improve the performance of certain areas of the company.

2.2.2 Client Step

The second stage of the framework's application is the customer- focused stage, in which customer profiles that would be the company's target audience must be identified and understood.

The activity of defining personas related to the company is characterized as the initial activity of this stage, in which fictional characters that would be the company's target audience must be created. When starting the creation, the following guidelines must be defined: Who are the company's customers? How do they interact with the company? Describe them as people and make them real with such characteristics as gender, age and profession.

As a subsequent activity of the framework there is the definition of the user journey, in this activity you should create a schedule for the personas created in the previous activity, when creating this schedule for a day you should raise the following questions: How does he get in touch with the company in his routine? What are the pains of this persona? What are their emotions? What are their joys?

Lovelock (2011) defines Blueprint as another form of detailing processes and a way to visualize their stages. It consists of a schematic and detailed visualization, allowing the deepening of the processes through which a particular service passes, ensuring greater visibility, which leads to facilitate improvements and perception of failures or gaps in the service delivery process. The third activity of this stage focuses on the mapping of process interactions through the Blueprint tool, mapping the service delivery processes, finding gaps and determining value propositions.

Paldês (2017) defines the 6-3-5 as a technique in which it is possible to have everyone giving their opinion freely and without intimidation from leaders. Therefore, through this technique, it is possible to have a cooperative of ideas free of judgments in an extremely dynamic way through temporizations.

2.2.3 Activation Step

The activation stage is characterized by being a stage in which the ideas generated in the previous stage have to be filtered and the value that these ideas add to the business analyzed. Through discussions and analysis the best results are obtained.

Thus, there is the discarding activity, in which the group must discard the ideas that do not make sense within the context, on average 40 to 50% of the ideas generated in the previous step must be cut. Subsequently, the matrix Ideas x Pains must be made. In the matrix generated should analyze the chosen ideas and evaluate what benefit impact each idea would have on the journey of the personas created and thus evaluate the most effective ideas according to the matrix score.

Finally Bono's 6 Hat Technique is applied. The problem is divided into its different aspects (hats). At each moment, the group "wears" the hat chosen by the facilitator and directs their thinking according to the point of view determined by the color of the hat.

3 METHODOLOGY

To perform the scientific and technological mapping of this study, the Google Scholar search base was consulted. The queries were conducted from August 2 to August 4, 2020. The expressions used were "Creative Approaches", "Comparison between Design Thinking", "Creation Methodologies", "KickBox", "Scrum", "Lean Startup", "Creation Tools", "PMI", "Mind Maps" and "Brainstorming" as shown in Table 1 below. For the research we did not use restrictions as to the date of publication.

Table 1. Expressions used to perform the database queries.

Database	Expression
Google Scholar	"Creative Approaches" "Comparison between Design Thinking" "Creation Methodologies" "KickBox" "Scrum" "Lean Startup" "Creation Tools" "PMI" "Mind-maps" "Brainstorming"

Source: Authors (2020).

Additionally, the Creative Framework was applied, described in section 2.2, developed by the designer Cristiano Alves from the Federal University of Santa Catarina. The application of the framework had 5 components from different areas of knowledge, namely: Biomedical Engineering, Biology, Information Technology , Design and Management. The components interacted in a mechanism of cooperation and in timed steps with an average of 5, 10, 15, and 20 minutes with the objective of obtaining the best results for the potentialization of the study.

4 RESULTS AND DISCUSSION

With the support of a multidisciplinary team, the Creative Framework was applied to a customer retention business model.

4.1 CUSTOMER RETENTION BUSINESS MODEL - CASE STUDY

In every business, acquiring and maintaining customers is a strategic and valuable factor for any company, not only to increase profit, but also to increase the added value of its products. This business model has as its main focus the study of a customer maintenance model, by reducing the churn rate. According to Campomar (2006), churn is the act of a customer abandoning a company's service, usually in favor of a competitor, ending the relationship with the previous company.

This business model aims to build a tool, entitled "ChurnAnalytcs", which should model the probability of customers leaving the relationship with an organization using customer/company relationship history data and deep data analysis and AI (Artificial Intelligence) mechanisms.

Monard (2003) defines Machine Learning as an area of AI whose goal is the development of computational techniques on learning as well as the construction of systems capable of acquiring knowledge

automatically. A learning system is a computer program that makes decisions based on experiences accumulated through the successful solution of previous problems.

The tool built will work through a deep data analysis with the help of data mining and machine learning mechanisms, thus being able to predict which customers are about to leave the company.

The vast majority of health insurance companies are located in this context, which aims to retain and build customer loyalty. These operators use databases to store information about their routines, services, and internal processes, but the vast majority of this data is not used or is used incompletely, thus losing its potential to generate value and decisive strategies in favor of the company.

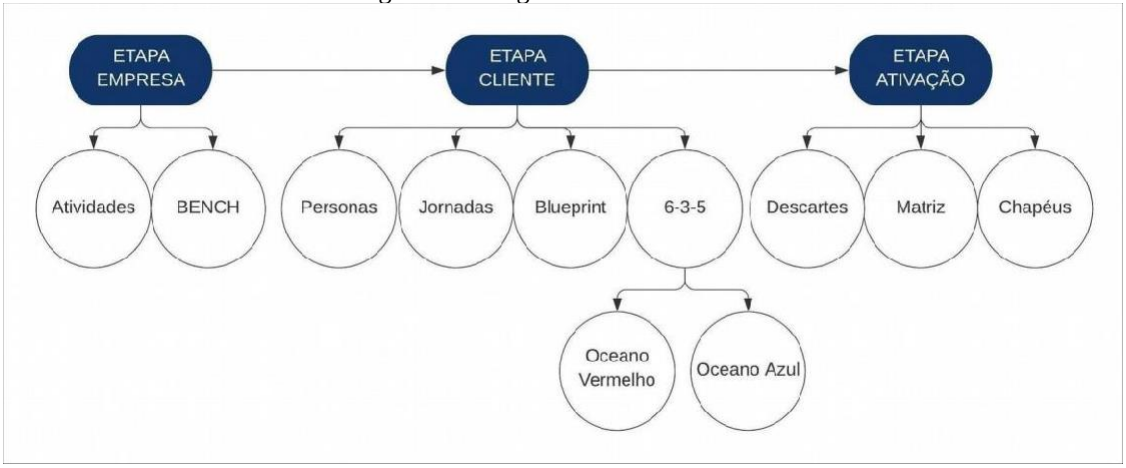
The proposed tool is aimed at companies that work with customer loyalty, as long as the company has a database with relevant information so that the tool can survey the company's customer profile, as well as a possible prediction of evasion.

4.2 FRAMEWORK APPLICATION AND ENHANCEMENTS

With the wide range of different approaches to the creation and conception of products, projects, and services it is understood that several contributions can be made to the framework addressed. The application of the Creative Framework resulted in the addition of 12 ideas that can be absorbed by the business model, case study.

Additionally, improvements were made to the Creative Framework, described in section 2.2: the addition of the EOA (Blue Ocean Strategy) approach. The addition of this approach in particular within the Customer Stage in activity 6-3-5 has the potential to add a gain to the framework, since when thinking about idea activation one must think not only about the target audience to which the product W W or service is included but also about new oceans new markets to which the product or service can reach, Figure 3 illustrates in a flowchart what this change would look like.

Figure 3: Changed framework schema.



Source: Authors

At first, from the application the modified framework, one can observe the immense contribution that can be given when there are different points of view of people from different contexts to those who were in the original conception of the project. Therefore, the application of the framework validates its fostering of creativity and innovation in projects. Gun (2019), offers the following parallel:

> "Creativity arises from the diverse repertoire. It is unlikely that someone who has the same inputs will make different outputs."

Another important point, verified in the experiment of both the original and the modified Creative Framework, is the fact that all 5 participants attest to the validity of the proposal and its innovative content. It is also interesting to mention the fact that one of the participants in the experiment has worked actively with customer retention in a call center environment and reported that he was not aware of any market tool with the completeness of ChurnAnalitycs.

After the application of the 6-3-5 technique, a technique that allowed a cooperative approach of ideas free of judgments in an extremely dynamic way, through temporizations, with the collaborators of the experiment, a total of 20 distinct contributions to the project were obtained. From this vast range of contributions we can classify 13 contributions identified within the "Red Ocean" in which there are already many similar initiatives and a lot of competition, and 7 contributions in other contexts related to the proposal. characterized as "Blue Ocean" contributions, which can be widely studied and applied.

At a later moment, within the dynamics of the framework, the Bono Hat technique was applied to the project and important feedbacks were obtained, according to different visions and interpretations in which the problem is involved. In general, the technical part of the solution was well received by all participants. However, it is important to mention that the different viewpoints caused other problems related

to evasion of health insurance customers to be exposed and, in this way, it is possible to reflect on the beyond predictions and diagnoses, reaching the resolution of deep problems related to this segment.

5 CONCLUSION

We conclude the validity of this work, where we had as main points the survey of approaches, methodologies and creativity tools, in a second moment we study the Creative Framework that is applied and propose improvements, within the case study a customer retention model for health insurance carriers.

We emphasize the validity of the experiment because through the application of the Creative Framework and its modified version, we obtained different points of view organized in a systematic and timed manner in order to enhance the business model, case study.

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Chapter 38

Eosinophilic Esophagitis

10.56238/eyohsc1-038

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ABSTRACT

Eosinophilic esophagitis (EEo) is a chronic inflammatory immune disease, considered the most common eosinophilic gastrointestinal disorder. It is the leading cause of food impaction in young patients, with peak incidence between 20 and 40 years of age, and is more common in males, with a 3:1 ratio between men and women.(BIEDERMANN, 2021)(VISAGI, 2021)

1 INTRODUCTION

Eosinophilic esophagitis (EEo) is a chronic inflammatory immune disease, considered the most common eosinophilic gastrointestinal disorder. It is the leading cause of food impaction in young patients, with peak incidence between 20 and 40 years of age, and is more common in males, with a 3:1 ratio between men and women.(BIEDERMANN, 2021)(VISAGI, 2021)

In recent years, an increase in its incidence has been demonstrated, but it is not understood whether it is due to a real increase in pathology or diagnosis (MENDONÇA, 2020).

The estimated incidence in adults and children is 7.0 and 5.1 per 100,000/year, respectively. The estimated overall combined prevalence is 22.7/100,000. It is higher in adults (32.5/100,000) than in children (19.1/100,000). (VISAGI, 2021)

Evidence points out that EEo is mediated by Th2 lymphocytes and induced by food antigens. In addition, interleukin-5 and interleukin-13 have also been shown to be part of the pathogenesis of the disease.(OSHEA, 2018)

Personal and/or family history of atopic conditions such as asthma, eczema and rhinitis is common. Some environmental factors are associated with increased predisposition to the disease, such as cesarean or premature birth, exposure to antibiotics in childhood, food allergy, lack of breastfeeding, and living in a low population density area, which may be related to lack of early microbial exposure.(OSHEA, 2018)(DELLON, 2018)

There is esophageal dysfunction and accumulation of eosinophils in the mucosa of the organ, with the presence of 15 or more eosinophils per high magnification field, in the absence of eosinophilic infiltration in the gastric and duodenal mucosa.(MENDONÇA, 2020)

In adults, eosinophilic esophagitis is characterized by dysphagia for solids, precordial pain, and heartburn.(BIEDERMANN, 2021) In children, on the other hand, there are manifestations such as vomiting, food refusal, growth deficit, and symptoms associated with GERD.(CARR, 2018)

Patients with EEo often develop behavior modifications to prevent symptoms, such as avoiding large meals or hard or lumpy foods, prolonged chewing, cutting food into smaller pieces, and lubricating with sauces and liquids.(REED, 2018

Complications that can occur include esophageal stenosis, food impaction, perforation, and malnutrition, but it is not related to cancer.(BIEDERMANN, 2021)

Diagnosis is made by upper digestive endoscopy (EDA) with biopsy and analysis of esophageal mucosal fragments.(BIEDERMANN, 2021) The most commonly described endoscopic findings are: alteration of the esophageal mucosa into concentric rings, whitish exudates, Schatzki ring, narrowing of the esophagus, and linear surface erosions of the mucosa. (CARR, 2018) Endoscopic features change from childhood to adulthood; this is because chronic inflammation leads to progressive fibrosis and esophageal remodeling.(VISAGI, 2021)

As differential diagnoses, GERD, achalasia, eosinophilic gastroenteritis, connective tissue disorders, and esophageal infections such as candidiasis and cytomegalovirus can be cited.(MENDONÇA, 2020)(MOHAMED, 2019)(SUZAKI, 2020)

Regarding treatment, systemic or topical corticosteroids have been shown to be effective in both symptom remission and histological improvement. (BIEDERMANN, 2021)

Some patients respond well to the use of proton pump inhibitors (PPIs). This can be explained because PPIs also act in inhibiting Th2 cytokines and eotaxin-3 production and improving barrier function. These patients present with so-called esophageal eosinophilia responsive to PPIs.(FERREIRA 2019)

In addition, diet is also proven to improve clinical and histology in most patients, with guidance from skin testing and serologic testing for food allergens. In more severe situations, endoscopic esophageal dilation may be required.(MUIR, 2021)

This study aims to discuss the particularities of the diagnosis of eosinophilic esophagitis and the existing treatment alternatives based on the case report of a 27-year-old patient with the disease.

2 THEORETICAL FOUNDATION

2.1 EPIDEMIOLOGY

Eosinophilic esophagitis (EEo) had its first reported cases in the late 1970s. Once rare, today it can be found frequently in Gastroenterology offices.(DELLON, 2018)

This disease has had its prevalence increased in recent years, becoming one of the main causes of esophageal dysphagia and food impaction in adults. (BIEDERMANN, 2021)

The current prevalence of the disease in the West is approximately 1 in 2,500 individuals (1-9/100,000). (BIEDERMANN, 2021)

By the calculations of a meta-analysis, the incidence was higher in adults (7.0/100,000/year) than in children (5.1/100,000/year).(DELLON, 2018)

Studies agree that the large increase in incidence is not just due to increased recognition about the disease, but is due to an actual increase.(DELLON, 2018) This is because the number of esophageal biopsies with high eosinophil counts is much higher than the overall rate of biopsies obtained during endoscopic examination in recent years.(BIEDERMANN, 2021)

The prevalence appears to be of the same magnitude in Western Europe, North America, and Australia, but much lower in Japan and China.(DELLON, 2018) It is more common in cold or arid climates and in rural areas. Higher prevalence is also noted in Caucasian men under the age of 50.(REED, 2018)

This disease has a genetic component, increasing the individual risk by approximately 1/2000 relative to the rest of the population.(REED, 2018)

2.2 PATHOPHYSIOLOGY

EEo has a recognized genetic etiology. Some genes have been reported as contributors to the development of the disease, such as thymic stromal lymphopoietin (TSLP), calpain 14, EMSY, LRRC32, STT6, ANKRD27 and CCL26. The most expressive is the IL-13-induced CCL26.(OSHEA, 2018)

The 1q21 region contains genes that carry out the differentiation of squamous epithelial cells, such as filaggrin. In EEo, these genes are negatively regulated, leading to losses of differentiation of these cells and barrier function.(OSHEA, 2018)

TSLP, in turn, induces Th2 differentiation, being at increased levels in patients with atopic diseases in general. (OSHEA, 2018) Th2 lymphocytes activate basophils and secretion of cytokines, such as IL-4, IL-5, IL-3, CCL3 and CCL, occurs, which activate the STAT5 and STAT6 pathways. STAT6 regulates eotaxin 3, calpain 14, and desmoglein-1.(ALDANA, 2019)

Calpain 14 appears to be more specific for EEo compared to other atopias, as it encodes a proteolytic enzyme specific to the esophagus, and is also associated with barrier integrity.(OSHEA, 2018)

In addition, the allergic component in the etiology of the disease is known. Patients with EEo have a higher prevalence of asthma and airway hyperresponsiveness. Food, skin and/or inhaled allergens also play an important role. For this reason, dietary antigen elimination therapy is part of the treatment.(OSHEA, 2018)

In addition to asthma, children with EEo are also more likely to develop allergic rhinitis, IgE-mediated environmental and food allergies, such as urticaria and anaphylaxis.(REED, 2018)

As mentioned earlier, Th2 cytokines are closely tied to the pathophysiology of EEo. IL-5, for example, is necessary in driving esophageal eosinophilia and tissue remodeling. IL- 13, on the other hand, present in other atopic diseases, contributes to eosinophil chemotaxis, calyceal cell hyperplasia, collagen deposition, and smooth muscle contractility.(OSHEA, 2018) It negatively regulates filaggrin and desmoglein-1 and positively regulates calpain-14, causing barrier downregulation.(INAGE, 2018)

IgE does not show a great relevance in these patients, since it is not greatly increased compared to the control group.(OSHEA, 2018) However, there was an increase in food allergen-specific IgG4 and IgG4 in tissue and serum samples, respectively.(ALDANA, 2019)

As with other atopic diseases, gut dysbiosis appears to influence the development of the disease. Cesarean and/or premature delivery and exposure to antibiotics in childhood favor the Th2 cytokine profile.(OSHEA, 2018) Oral or sublingual immunotherapy, cold or arid climates, rural areas, and decreased population density are also related to increased incidence of EEo.(DELLON, 2018)(BIEDERMANN, 2021)

Regarding Helicobacter pylori (H.pylori), an inverse relationship has been demonstrated. Its presence favors the Th1 cytokine profile, and its lack, the Th2 profile. However, a protective effect of H. pylori in EEo has not been confirmed.(OSHEA, 2018) Having had a furry pet in childhood, and current use of anti-inflammatory drugs, have also been shown to be a reduced risk.(BIEDERMANN, 2021)

There are some hypotheses that aim to explain the decreased barrier function in EEo. The first one says that patients already present this decrease even before inflammation, due to altered filaggrin and calpain 14 expression. A second one states that the barrier has an impairment due to a previous injury, such as trauma or chemical injury. The third explains that there is a self-perpetuation of the process, where the barrier function becomes increasingly impaired due to inflammation, allowing allergens to exert their function. (INAGE, 2018)

Esophageal fibrosis can be explained by activation of the TFG-beta pathway, which increases fibrotic gene expression and changes the phenotype from fibroblast to myofibroblast. Thus, contraction of esophageal smooth muscle cells is increased through expression of contractile proteins, such as the sarcoendoplasmic reticulum protein phospholambam. This fibrotic environment induces smooth muscle hypertrophy, causing esophageal remodeling in a manner independent of inflammation.(OSHEA, 2018)

Some genetic conditions are associated with EEo, such as connective tissue disorders with hypermobility, Loeys-Dietz syndrome, and Ehlers-Danlos syndrome. Other associated syndromes are PTEN-hamartoma tumor, hyper-IgE, and SAM.(OSHEA, 2018) Autoimmune conditions, such as Hashimoto's thyroiditis, rheumatoid arthritis, celiac disease, inflammatory bowel disease, combined variable immunodeficiency, sclerosis multiple and Sjögren's syndrome can also occur.(OSHEA, 2018)

2.3 DIAGNOSIS

In adults and adolescents, the main symptom is dysphagia for solids. However, chest pain unrelated to swallowing is also reported in more than half of the patients. This pain can be triggered by physical exercise, drinking alcoholic beverages, or spontaneously.(BIEDERMANN, 2021) Many also present with intractable pyrosis (ALDANA, 2019).

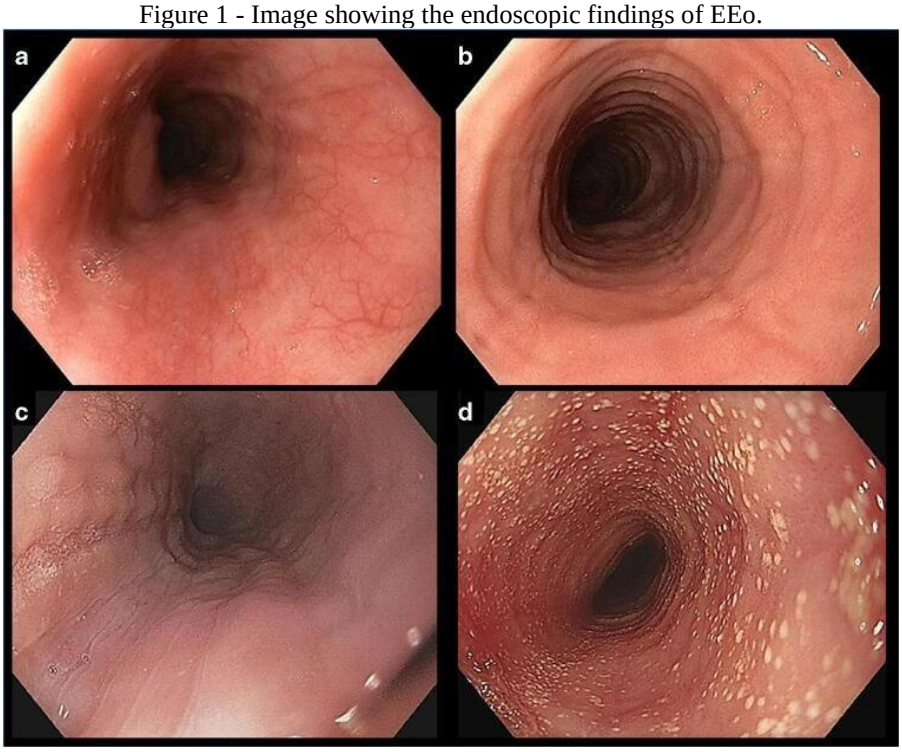
These patients tend to develop certain habits over the years of illness to compensate for symptoms, such as eating slowly, chewing food excessively, taking too much liquid along with food or lubricating it before taking it to the mouth, swallowing repeatedly, avoiding some foods, and crushing pills before administration.(REED, 2018)

In children, the symptoms are more extensive, the main ones being: food refusal, chest pain, abdominal pain, diarrhea, regurgitation, vomiting, and growth deficit. The most important differential diagnoses are gastroesophageal reflux, celiac disease, intestinal malformations, Crohn's disease, food allergies and functional disorders (BIEDERMANN, 2021)

In adults, when there are symptoms of abdominal pain, nausea, vomiting, diarrhea, weight loss, or gastrointestinal bleeding, other diagnoses such as gastroenteritis and eosinophilic colitis should be considered. (REED, 2018) Differential diagnoses also include infections, such as schistosomiasis, anisaquiasis and toxocariasis, hypereosinophilic syndrome, inflammatory bowel diseases, and eosinophilic granulomatosis with polyangiitis (ALDANA, 2019).

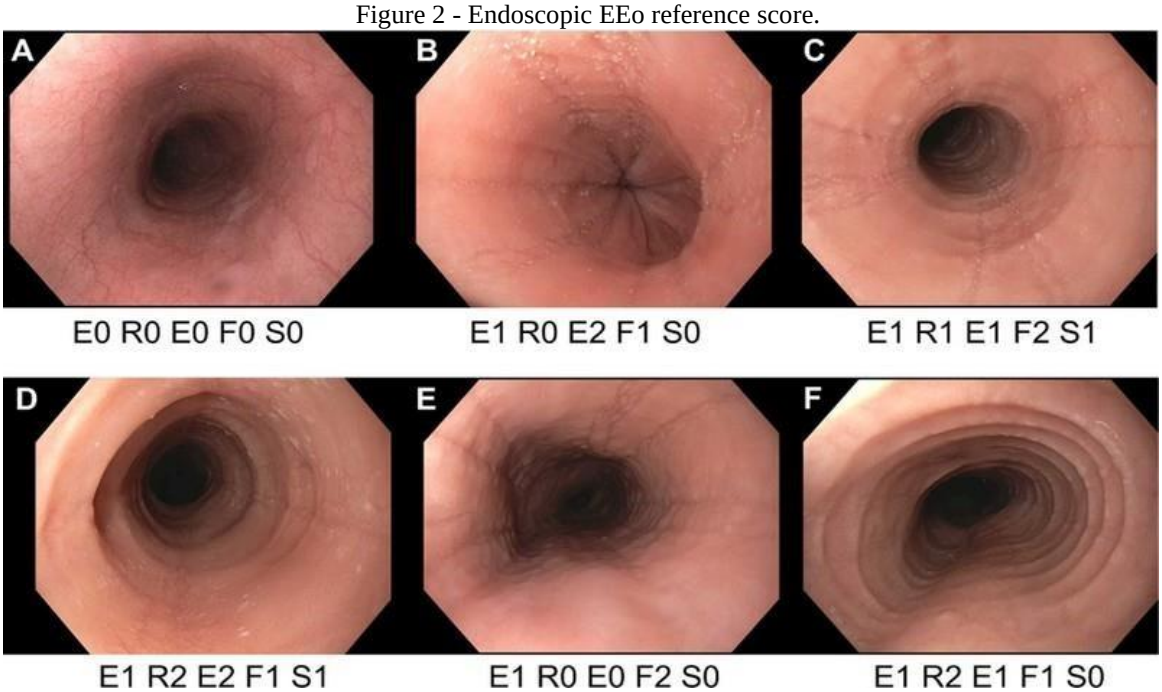
Endoscopic features include longitudinal grooves, white exudates, edema, stenosis of long and short segments, Schatzki's ring and "crepe paper mucosa". [Figure 1] The white exudates, edema and longitudinal grooves speak for acute inflammation, while the rings and stenosis reflect longstanding inflammation with fibrosis. (BIEDERMANN, 2021) There is a grading system for these findings, which is the endoscopic EEo referral score: the EREFS. [Figure 2] (ALDANA, 2019) It represents the main findings, which are edema, rings, exudates, sulci, and stenosis.(REED, 2018)

Figure 1 - Image showing the endoscopic findings of EEo.



Legend: (a) edema (b) edema, rings and furrows (c) furrows and exudates (d) white exudates
Source: Biedermann L, Straumann A, Greuter T, Schreiner P. Eosinophilic esophagitis-established facts and new horizons. Semin Immunopathol. 2021;43(3):319-335. doi:10.1007/s00281-021-00855-y

Figure 2 - Endoscopic EEo reference score.



Legend: (A) normal EDA (B) edema, exudates and furrows (C) edema, rings, exudates, furrows and stenosis (D) edema, rings, exudates, furrows and stenosis (E) edema and furrows (F) edema, rings, exudates and furrows.
Source: Steinbach EC, Hernandez M, Dellon ES. Eosinophilic Esophagitis and the Eosinophilic Gastrointestinal Diseases: Approach to Diagnosis and Management. J Allergy Clin Immunol Pract. 2018;6(5):1483-1495. doi:10.1016/j.jaip.2018.06.012

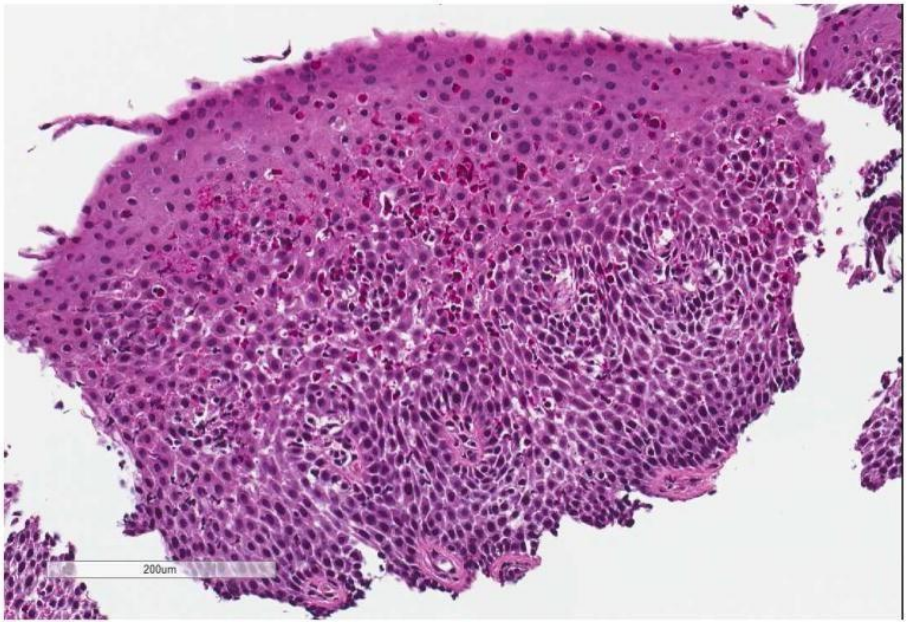
With the presence of characteristic findings, histological confirmation is necessary. If there is a history of dysphagia for solids, even without visible changes on endoscopy, biopsy is

necessary.(BIEDERMANN, 2021) Despite its drawbacks, there is no other less invasive test that replaces the need for biopsy.(HIRANO, 2019)

Biopsies should be taken in the upper, middle, and lower third of the esophagus and 6 to 9 mucosal fragments should be collected for increased sensitivity.(ALDANA, 2019) After 6 to 8 weeks from the start of treatment, another test is requested to assess response. After that, there is no universally accepted interval for follow-up, but many physicians perform the EDA annually.(STEINBACH, 2019)

In the histopathological evaluation, cellular infiltration by eosinophils, lymphocytes, and mast cells is observed. Non-cellular structural abnormalities also occur, such as dilated intercellular spaces, superficial stratification, basal zone hyperplasia, papillary elongation (BIEDERMANN, 2021) and extracellular deposition of eosinophilic granules. [Figure 3] Patients with stenosis have greater collagen deposition within the lamina propria.(REED, 2018) There is no relationship between the amount of eosinophils in the biopsy and the severity of symptoms.(HIRANO, 2019)

Figure 3 - Histological image of EEo demonstrating eosinophilic infiltration (> 15 eosinophils/field), eosinophil degranulation, and basal zone hyperplasia.



Source: Reed CC, Dellon ES. Eosinophilic Esophagitis. Med Clin North Am. 2019;103(1):29-42. doi:10.1016/j.mcna.2018.08.009

The integrity of the epithelium can be assessed by measuring the impedance of the mucosa. This test has the benefit of avoiding repeated endoscopies and biopsies. One study showed that in patients with GERD, mucosal impedance values were low in the distal esophagus and normal in the proximal esophagus, and in those with EEo, the measurements

were low in all segments of the esophagus.(ALDANA, 2019) Another test that can be performed to assess esophageal remodeling is the barium esophagogram.(HIRANO, 2019)

The diagnostic criteria for EEo are: prolonged existence of symptoms of esophageal dysfunction, predominant infiltration of eosinophils in the esophageal epithelium with a value greater than or equal to 15 eosinophils per high-power field, and exclusion of other causes of eosinophilia in the esophageal tissue, such as GERD, eosinophilic gastroenteritis, and Crohn's disease. (BIEDERMANN, 2021)

According to recent update, besides the criteria already mentioned, there are also as new criteria: concomitant atopic conditions, typical endoscopic findings and eosinophilic infiltration restricted to the esophagus.(ALDANA, 2019)

Nowadays, there are non-invasive methods for evaluating disease activity. For example, the esophageal cord test consists of a capsule with an absorbent cord that remains for one hour in the esophagus, where it absorbs secretions for evaluation of the eosinophil count. This test demonstrated a sensitivity of 80% and specificity of 75% in a study of 134 patients. (MUIR, 2021)

Another option is to use the capsule with a mesh sponge at the tip. The capsule dissolves and the mesh sponge expands, allowing collection of esophageal fragments. This method has demonstrated 75% sensitivity and 86% specificity. Transnasal endoscopy may also be considered (MUIR, 2021)

There is also a new technology for assessing esophageal remodeling, which is characterized by a catheter that is inflated to measure esophageal compliance.(INAGE, 2018)

2.4 NATURAL HISTORY OF THE DISEASE

Eosinophilic esophagitis is a chronic disease, with a chronic-persistent or relapsing course. (BIEDERMANN, 2021)

The major concern regarding the disease is the occurrence of fibrosis, stenosis, and wall fragility if treatment is not performed, generating structural and functional damage to the esophagus.(BIEDERMANN, 2021)

This remodeling causes food impaction, the main complication. Long-term impactions increase the risk of nausea- and vomiting-induced esophageal rupture (Boerhaave Syndrome), procedure-related perforation, pneumonia by

aspiration and secondary reflux due to lower esophageal sphincter dysfunction (BIEDERMANN, 2021)

So far, there is no association of EEo with cancer. (BIEDERMANN, 2021)

2.5 TREATMENT

The main goal of treatment is to control symptoms and inflammation, reaching a cut- off point of less than 15 eosinophils per high-power field. (BIEDERMANN, 2021)

There is no Food and Drug Administration (FDA) approved drug for EEo, so the drugs are used "off-label" in the U.S. (REED, 2018)

2.5.1 Corticosteroids

One of the main drug treatments are corticosteroids (CE), which can be systemic or swallowed topically. Both have been shown to be equally effective, with topicals being preferable because they cause fewer side effects. (BIEDERMANN, 2021) These drugs appear to restore the epithelial barrier function and act by preventing tissue remodeling. (GREUTER, 2021)

One study demonstrated that EC ingested in a viscous vehicle such as sucralose would be more effective than by swallowing the inhaled drug.(ALDANA, 2019)

Another, comparing the efficacy of budesonide oral suspension with viscous vehicle and inhaled fluticasone, came to the conclusion that they are similar. It was concluded that both drugs can be used as initial therapy and that the decision can be made by the patient based on their personal preferences.(DELLON, 2019)

In addition to administration by multidoses inhalers or nasal drops, fluticasone has also demonstrated benefits by disintegrating tablets. (ORTEGA, 2022)

Studies suggest that the topical ECs budesonide, fluticasone, ciclesonide, or mometasone have optimal effects on clinical and histological improvement in adult and pediatric patients. (BIEDERMANN, 2021)

Initially, the recommended treatment is at a dose of 1mg of budesonide or 880mcg of fluticasone, twice daily.(ALDANA, 2019) In children, you can start with 440mcg of fluticasone per day.(REED, 2018) Initial therapy should be given for 12 weeks.(MUIR, 2021)

Topical ECs should be taken after meals and the patient should avoid eating or drinking for 30 to 60 minutes after taking the medication.(REED, 2018)

Long-term maintenance therapy is indicated for patients with esophageal stenosis, recurrence of symptoms after stopping treatment, recurrent food impaction, and comorbidities that increase the risk of complications from EDA, such as esophageal perforation.(ALDANA, 2019)

These drugs control the disease, but do not cure it. Symptoms often return after they are stopped (BIEDERMANN, 2021)

Prolonged use can bring side effects, such as Candida albicans colonization in 10-15% of patients.(BIEDERMANN, 2021) According to systematic review, there are some reports of adrenal insufficiency, but it is rare for major clinical repercussions to occur from this effect.(STEINBACH, 2019) However, cortisol monitoring is recommended for children receiving high doses of EC for long periods or joint use of EC by other routes.(ORTEGA, 2022)

Although there is no FDA-approved EC, new formulations for topical administration are being studied, such as budesonide orodispersible tablet and a viscous budesonide pre- preparation.(REED, 2018)

Budesonide orodispersible tablet is the first drug to be developed for esophageal administration and has been approved by the European Medicines Agency for induction treatment in adult patients. The tablet should be pressed against the hard palate, where it will disintegrate and its components swallowed for two to twenty minutes. The taste and handling of this formulation make it chosen by most patients compared to the viscous suspension. (MIEHLKE, 2020)

Studies have shown a good safety profile when compared to the capsule formulation, and also significant histological remission in almost all patients, decreased eosinophilic burden and improved endoscopic appearance. (MIEHLKE, 2020)

Viscous budesonide pre-preparation, when compared with placebo, demonstrates clinical, endoscopic and histological improvement and is well tolerated.(HIRANO, 2021)

There are some factors related to low response to ECs, such as advanced age, atopy, absence of CC polymorphism in the TGF beta 1 gene, severe esophageal stenosis,

Prior esophageal dilatation, family history of EEo, and lower dose of topical EC ingested.(HIRANO, 2019)

The use of immunomodulators, such as azathioprine and 6-mercaptopurine, has been found to be beneficial in EC-dependent patients, causing induction and maintenance of clinical and histological remission. However, there are still no controlled clinical trials proving this fact.(ALDANA, 2019)

2.5.2 Proton pump inhibitors

First-line treatment using proton pump inhibitors has an anti-inflammatory effect independent of their action on gastric acid secretion.(Pérez, 2019) They have anti-oxidant properties, inhibit immune cell function and reduce the expression of inflammatory cytokines of epithelial cells, such as eotaxin-3 and CCL26. They also restore the integrity of the esophageal mucosa and reverse remodeling.(ORTEGA, 2022)

PPIs are inexpensive, readily available, well tolerated, and easy to administer. Because of this, they are often chosen as the initial therapy. Their use causes symptomatic and histological remission, and they are also effective as maintenance therapy (ORTEGA, 2022). (ORTEGA, 2022)

Treatment should be given for at least 8 weeks, with starting doses of 20-40mg in adults and 1-2mg/kg/dose in children, twice daily. (ORTEGA, 2022) In the long term, one aims to use the lowest effective dose possible to achieve remission. (ORTEGA, 2022)

Studies have shown a greater chance of remission in patients who used higher doses of the drug and in those who had treatment extended to 12 weeks. In addition, there was no major difference between the PPIs (ORTEGA, 2022)

Temporary discontinuation of these drugs results in clinical and/or histological recurrence. However, with reintroduction, there is recovery of response.(REED, 2018)

It used to be considered that GERD and EEo could not exist simultaneously. Therefore, a therapeutic test with PPIs was tried, and if the patient did not respond, the diagnosis of EEo was confirmed. However, today it is known that both diseases can respond to these medications. Therefore, a category was created that covers patients with typical symptoms of EEo, eosinophilic infitration in the esophagus and a clinical response and histological to PPIs, which is called esophageal eosinophilia responsive to PPIs.(FERREIRA, 2019)

Patients with GERD and endoscopic findings of esophagitis or Barrett's esophagus who have eosinophilia on biopsy also benefit from the use of IBPs.(ALDANA, 2019)

In those with esophageal stenosis there was a decrease in the effectiveness of PPIs, and the use of ECs is recommended (ORTEGA, 2022)

2.5.3 Elimination Diet

Elimination of certain foods has been shown to be effective in remission of the disease in some patients. (MUIR, 2021)

There are three approaches to this therapy: the elemental diet (drinking only formulas consisting of amino acids, no intact proteins), empirical elimination of foods, and guided by allergy testing. (MUIR, 2021)

The elemental diet, which is a liquid nutrition with amino acids, fats, sugars, vitamins, and nutrients, has shown histological remission in a systematic review. However, it is expensive, unpalatable, and required, ingesting large amounts of liquid to promote adequate nutrition.(MUIR, 2021) This strategy has been shown to be more effective than the other two dietary therapies.(ALDANA, 2019)

Empirical elimination of food groups is the approach of excluding the six food groups most related to eosinophilic esophagitis, which are milk, wheat, eggs, soy, peanuts, tree nuts, fish, and shellfish. This was related to histological improvement in most patients. (MUIR, 2021)

Follow-up is done with progressive reintroduction of foods, starting with seafood for two weeks, and then peanuts and tree nuts for two weeks. After six weeks, EDA is performed (STEINBACH, 2019). If satisfactory response, soy and eggs are introduced and, the test is repeated again. (MUIR, 2021) If symptoms recur, the patient should have an elimination period for six weeks before introducing new foods. The most allergenic, such as seafood, peanuts, eggs, and milk are usually added individually.(STEINBACH, 2019)

The disadvantage of this method is the need for repeated endoscopies and dietary restriction. The advantage is that by identifying the culprit food and excluding it from the diet, many patients achieve

symptomatic and histological remission without the need for other pharmacological strategies.(STEINBACH, 2019)

The last approach, which is dietary elimination through allergy testing, uses the results to guide the exclusion of certain foods. However, since EEo is not mediated by IgE, this method becomes less effective.(MUIR, 2021)

The choice of dietary therapy should be individual, assessing the patient's nutritional status, financial resources, and family preferences.(STEINBACH, 2019)

2.5.4 Dilation

Patients with older age or late diagnosis have a higher chance of evolving with a stenosing or fibrotic phenotype. In these patients, endoscopic dilatation may be beneficial. This therapeutic strategy has no impact on decreasing eosinophilic inflammation and mucosal damage. (MUIR, 2021) Therefore, medication should be recommended to avoid the need for further dilation. (ORTEGA, 2022)

This dilatation is done by Maloney or Savary bougie and hydropneumatic balloons and should be indicated in patients with persistent dysphagia that has not improved with clinical treatment in the presence of remission of inflammation, and also in the presence of severe dysphagia and history of food impaction. (ORTEGA, 2022)

If possible, the inflammation should be controlled before dilation. However, in situations where there is stenosis that does not respond to treatment, high-grade stenosis, or recurrent food impaction, dilation may be performed first. (MUIR, 2021)

The goal is an esophageal diameter of at least 16 mm, which can be achieved in one session or gradually, depending on the patient's level of stenosis. (ORTEGA, 2022)

2.5.5 Biologicals

Monoclonal antibodies against IL-5, such as mepolizumab and reslizumab, have demonstrated decreased esophageal eosinophilia, clinical improvement, and increased quality of life. They act on eosinophil activation and recruitment.(HIRANO, 2019) They can cause headache, cough, nasal congestion, and lower respiratory tract infections as adverse events.(ALDANA, 2019)

Antibodies against IL-3 have also shown clinical, endoscopic and histological improvement, improvement in mast cell markers and barrier function.(ALDANA, 2019) More recently, a monoclonal antibody that acts on the IL-4 receptor, dupilumab, has been studied as a therapeutic alternative. It acts by inhibiting IL-4 and IL-13 signaling through negative regulation of the Th2 response.(ALDANA, 2019) Treatment with dupilumab brought symptomatic, endoscopic and histological improvement in study (GREUTER, 2021)

Therapy with anti- IL-13 antibody demonstrated elevation of markers of esophageal barrier function, tissue remodeling, and decreased inflammation.(OSHEA, 2018)

Antibodies against TNF-alpha and IgE have not shown significant effects on EEo in studies. (GREUTER, 2021)

Biologics have advantages in patients who have other concomitant allergic conditions, as they have a systemic mechanism of action.(HIRANO, 2019)

2.5.6 Combination Therapy

Patients with incomplete clinical and histological response to PPIs may have benefit from the use of swallowed topical ECs in conjunction.(HIRANO, 2019)

2.5.7 New treatments

Some drugs have been tested for use in EEo, such as angiotensin receptor blockers, JAK inhibitors, and OCT000459, which blocks the effects of prostaglandin D2. (REED, 2018)

Anti-leukotrienes have shown no benefit in studies and are not recommended.(ALDANA, 2019)

2.5.8 Maintenance Therapy

Although there are arguments against maintenance therapy, such as the side effects of medications and restrictive diets and the fact that not all patients develop complications, it is proven that the benefits outweigh the harm.(HIRANO, 2019)

Guidelines indicate the continued use of swallowed topical ECs in remission. One study demonstrated clinical and histological response in over 70% of patients who performed the induction therapy regimen with budesonide 1mg twice daily, followed by maintenance with budesonide 0.5mg or 1mg twice daily. The patient is also included in the choice of whether or not to perform maintenance treatment. The possible complications of not taking it should be explained, but the individual should be given the freedom to consider the benefits and harms. Clinical follow-up is always indicated in these cases.(HIRANO, 2019)

3 MONITORING

Response after treatment can be divided into three groups: no response, response, or complete normalization. (ALDANA, 2019)

Regarding histology, when there is persistent eosinophilia equal to or above 15 eosinophils/field, no response was obtained. If there is a reduction, with eosinophilia between 7-14 eosinophils/field, a

response was obtained. When the biopsy result is normal, that is, less than 1 eosinophils/field, it is called a complete response. (ALDANA, 2019)

If symptoms persist, with less than a 30% reduction on a symptom scale, there has been no response. If they improve, with a reduction of 30-90% there has been a response. If they have resolved, with more than 90%, it is called a complete response. (ALDANA, 2019)

In endoscopy, it is said that when the findings persist, with a less than 30% reduction in the baseline EEo score, there has been no response. If the EREFS is greater than or equal to 2, but lower than baseline, there has been a response. If the esophagus is normal, i.e., EREFS less than 2, there has been a complete response. (ALDANA, 2019)

When the patient presents refractory to optimal treatment, with esophageal eosinophilia greater than or equal to 15/field, with persistent clinical and endoscopic findings, one should investigate adherence, ineffective dose or administration of the medication, ongoing exposure to the allergen, concurrent infection, esophageal stenosis, or misdiagnosis. If it still remains unimproved, second-line medications can be tried, such as systemic ECs, immunomodulators, or biologics.(STEINBACH, 2019)

In addition to the noninvasive methods already mentioned, such as the sponge and esophageal cord, blood markers such as IL-3, IL-5, IL-6, IL-9, IL-13, TGF-alpha, TGF-beta, TNF-alpha, eotaxin-1, 2 and 3, thymic stromal lymphopoietin, and eosinophil-derived neurotoxin can also be requested.(ALDANA, 2019)

3 MATERIAL AND METHODS

3.1 METHODOLOGY OF BIBLIOGRAPHIC RESEARCH

To meet the objectives and goals of the present work, a bibliographic survey was conducted in the Scielo, Lilacs, and Medline databases, with literature delimited from the period 2015 to 2022, in English and Portuguese languages. The keywords used were "eosinophilic esophagitis"; "eosinophils"; "swallowing disorders"; "dysphagia"; "odynophagia" in addition to their English counterparts. After analyzing and reading different articles, it was noted that some did not meet the criteria of this study, and thus were excluded.

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Chapter 39

Kikuchi-Fujimoto disease, associated with sjogren syndrome and hashimoto thyroiditis: a case report

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ABSTRACT

Necrotizing Histiocytic Lymphadenitis, known as Kikuchi-Fujimoto Disease (DFK) is a rare, benign disease of undefined cause (2). There is no well-established pathogenesis, however, an autoimmune reaction induced by different antigenic stimuli can be noted, in addition to apoptosis mediated by TCD8 cells(3,5,15). Sjogren's Syndrome (SS) is a systemic autoimmune disease, mainly characterized by xerostomia and xerophthalmia due to involvement of the salivary and lacrimal glands. In turn, also characterized by lymphocytic infiltration of tissues, we have Hashimoto's Thyroiditis (HT) (8), a common disorder in which antithyroid antibodies cause gland dysfunction, which may lead to a temporary decrease or increase in its activity (9)

Keywords: Kikuchi-Fujimoto Disease, Hashimoto's Thyroiditis, Sjogren's Syndrome, Autoimmune Disease.

1 INTRODUCTION

Necrotizing Histiocytic Lymphadenitis, known as Kikuchi-Fujimoto Disease (DFK), was first described in Japan in 1972(1). It is a rare disease, with an incidence of 0.5 to 5% in the population, with a predominantly benign course and of undefined cause (2). Most studies show a preferential involvement of young, previously healthy women under 40 years of age(2), however, some studies in Asian countries show a 1:1 involvement between genders (15). The pathogenesis is not well established; however, one can notice an autoimmune reaction induced by different antigenic stimuli, such as infectious agents of the Herpesviridae family, Parvovirus B19, human immunodeficiency virus, Parainfluenza, Hepatitis B, dengue virus and others, besides apoptosis mediated by TCD8 cells(3,5,15).

The most prevalent presentation is cervical or supraclavicular lymphadenopathy. The onset is acute or subacute, with a course of two to three weeks(4). Extranodal involvement is not common, but there are reports of kidney, adrenal, bone marrow, liver, gastrointestinal tract, thyroid and parathyroid involvement(3). The diagnosis is made histopathologically by lymph node biopsy, characterized by areas of necrosis usually circumscribed to the paracortical region, with nuclear debris and cellular infiltrates constituted by histiocytes(2;6).

There are also descriptions of associations with autoimmune diseases, the most frequent being Systemic Lupus Erythematosus (SLE)(5).

Sjogren's Syndrome (SS) is a systemic autoimmune disease, characterized mainly by xerostomia and xerophthalmia due to the involvement of the salivary and lacrimal glands. It is a chronic inflammatory disease of connective tissue characterized by focal and progressive lymphocytic infiltration of the tissues. It is considered one of the most common rheumatic diseases, in all ethnic groups, with a greater predilection for women between the fourth and fifth decades of life (7).

In turn, also characterized by lymphocytic infiltration of tissues, we have Hashimoto's thyroiditis (HT) (8). It is a common disorder where antithyroid antibodies cause dysfunction of the gland, and may course with temporary decrease or increase of its activity (9).

The following is a case report of a female patient with Kikuchi- Fujimoto Disease (DFK) associated later with Hashimoto's thyroiditis and Sjogren's syndrome.

2 CASE REPORT:

A 20-year-old female patient reported daily evening fever, associated with headache and hyporexia associated with increased neck volume, weight loss of approximately 3 kg and night sweats, which started 35 days ago. He denied previous comorbidities. Physical examination revealed lymph node enlargement in the cervical and submandibular chains. Laboratory tests showed hyperbilirubinemia without predominance of direct or indirect bilirubin, a slight increase in CPK, LDH, and liver enzymes, besides anemia and leukopenia. EAS demonstrated pyuria, hemoglobinuria, and hematuria.

After hospital admission, the patient evolved with intermittent hematuria, xerostomia, facial edema, and oral moniliasis, treated with fluconazole. Chest and abdominal tomography with contrast showed no alterations. Considering the clinical symptoms and the presence of B symptoms, the diagnosis of lymphoma was suspected, so that dexamethasone was initiated, aiming at cytoreduction and allopurinol, to avoid tumor lysis syndrome.Excisional biopsy of the lymph node of the right posterior cervical chain was requested, which showed altered architecture at the expense of areas of paracortical necrosis extending to the capsule; apoptosis figures associated with eosinophilic debris, permeating the necrosis areas; in contiguity, numerous immunoblasts, xanthomatous histiocytes, besides small lymphocytes; compatible with histiocytic necrotizing lymphadenitis (kikuchi- fujimoto lymphadenopathy).

Due to clinical improvement, she was discharged from the hospital and considering the main differential diagnoses, among them lymphoproliferative disease and immune-mediated rheumatologic diseases, the patient was referred to the Rheumatology and Hematology outpatient clinics for further evaluation.

At the first rheumatologic evaluation, when questioned, she complained of alopecia and arthralgia lasting 2 days. She had 1 episode of episcleritis. Autoantibodies were requested and showed: FAN 1/160 fine dotted nuclear pattern; AntiRo 367; positive direct Coombs. Systemic lupus erythematosus was suspected. However, since the patient had no other symptoms, we opted for outpatient follow-up every six months, without the use of medications.

After 5 years of clinical follow-up, the complaint of xerostomia recurred, now associated with xerophthalmia and vaginal dryness, adding headache, dizziness and asthenia with recurrence of fever and lymph node enlargement. New laboratory tests were done, which, according to chart 3, showed a significant increase in TSH, associated with Anti TPO and Anti TGB positivity, besides a reduction in T4L. With the suspicion of Sjogren's Syndrome and diagnosis of Hashimoto's thyroiditis, it was decided to start Levothyroxine, prednisone, and Hydroxychloroquine. Ophthalmology follow-up was chosen. Outpatient follow-up with Rheumatology was maintained.

TABLE 1.

LABORATORY	ADMISSION	5TH DAY OF HOSPITALIZATION	10TH DAY OF HOSPITALIZATION	HOSPITAL DISCHARGE
Total bilirubin - direct - indirect	7,0 - 3,6 - 3,4	0,3 - 0,1 - 0,2	0,3 - 0,1 - 0,2	0,3 - 0,1 - 0,2
Hemoglobin	10,0	9,2	10,9	11,9
Hematocrit	30,3	29,2	33,2	37,1
Leukocytes	2500	1700	4300	5800
CPK	273	147	-	18
DHL	2760	2849	1865	533
TGO	149	121	229	31
TGP	67	78	329	125
Alkaline phosphatase	-	284	377	309
GGT	-	180	448	340
Creatinine	0,60	0,57	0,57	0,58
Magnesium	2,3	2,3	-	2,5
Sodium	140	142	-	135
Potassium	4,5	4,04	-	4,9
PCR	-	<0,3	-	<0,3

TABLE 2.

LABORATORY	RESULTS
TSH	52,3
T4L	0,58
ANTI TPO	positive
ANTI TBG	positive

3 DISCUSSION

We report a case of a previously healthy female patient of childbearing age diagnosed with Kikuchi-Fujimoto's Disease (DFK) and subsequent association with Hashimoto's Thyroiditis (HT) and Dry Syndrome secondary to probable Sjogren's Syndrome (SS).

DFK is an uncommon clinical condition, usually benign and self-limited, with acute evolution, characterized by lymph node enlargement. It affects preferentially the posterior cervical chains (6). It was initially described by Kikuchi and Fujimoto in Japan, observing in literature a higher prevalence in women of fertile age, of Asian origin (4). However, some works demonstrate equivalence between sexes (15).

The histological findings in biopsies of affected lymph nodes suggest cell death by apoptosis. These are: lymphocytes in and around the typical areas of necrosis, and nuclear fragmentation. There are also associations to CD8+ T lymphocytes being the cells to undergo apoptosis, through differentiation by staining (4).

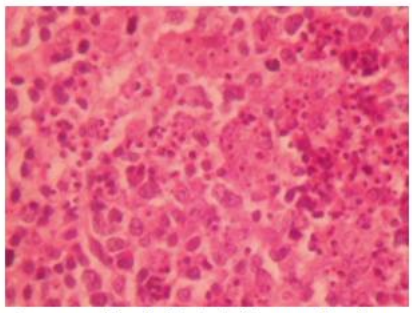


Figura 1. Infiltrado histiocitário com abundantes focos de cariorrexe (HE, 40X).

Source: DE OLIVEIRA, Tayná Cristinne Barros et al. Kikuchi-Fujimoto disease: case report. **Brasília Med**, v. 49, n. 3, p. 202-205, 2012.

There are hypotheses that DFK may fit into a lupus-like syndrome due to clinical, laboratory, and histopathological similarities, however, the results of serological studies testing antinuclear antibodies and other immunological parameters have been consistently negative in these patients, providing no support for an autoimmune nature of the disease (4).

The most prevalent initial symptom is fever. However, joint pain, fatigue, skin rash, hepatomegaly, and arthritis can be found. There is a greater association between relevant systemic symptoms and extranodal involvement (2). Cervical lymphadenopathy presents in 56 to 98% of cases. Generalized lymphadenomegaly may be found in 1 to 22% of cases. Mediastinal, peritoneal, and retroperitoneal involvement are uncommon (4). Leukopenia, anemia, and elevated CRP are common laboratory findings (2).

The diagnosis was made by histopathology, which found compatibility with histiocytic necrotizing lymphadenitis, as determined in the literature(1-5).

Despite being a generally self-limited and benign condition, there are descriptions in the literature of associations of Kikuchi- Fujimoto Disease (KFK) with several autoimmune diseases, the most frequent being Systemic Lupus Erythematosus. However, it can also be associated with Antiphospholipid Syndrome, Polymyositis, Still's Disease, Hashimoto's Thyroiditis (HT), Scleroderma, Interstitial Lung Disease and Sjogren's Syndrome(3,5).

Such associations may occur before, during, or after the DFK condition. In the above report, the patient opened with hypothyroidism and Sjogren's syndrome (SS) 5 years after the first diagnosis. Eun Joo Lee and co-workers(9)presented the case of an 11-year-old patient with an initial diagnosis of DFK and later thyroiditis. Athanasios Saratziotis and co-workers(10), on the other hand, presented the case of a 19-year-old patient with already established TH, opening the DFK picture. We also did not find a pattern in the association with Sjogren's syndrome (SS)(11,12,13).

In addition, DFK is an important differential diagnosis for more aggressive pathologies that require early diagnosis for appropriate treatment. The main examples are lymphoproliferative diseases, infectious diseases, such as ganglionic tuberculosis, and Systemic Lupus Erythematosus, which, as seen previously, can also be found in association with it (5,14).

4 CONCLUSION

After discussing the case in question, it was found that, although rare, DFK should be considered in the differential diagnosis of lymph node enlargement, since its course differs significantly from other conditions that may require specific treatment and evolve more aggressively.

It is also necessary to follow up the patient and make him/her aware of the need to seek care in case other symptoms appear, since he/she is predisposed to other autoimmune pathologies as we can see in this report and in others available in the literature.

In the case of the referred patient, the symptoms of xerostomia and xerophthalmia led to a probable diagnosis of Sjogren's Syndrome and laboratory screening confirmed Hashimoto's Thyroiditis. Both

conditions require clinical follow-up and institution of specific therapy to avoid complications and serious conditions.

For these reasons, the diagnosis through biopsy of the affected lymph node is extremely necessary.

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Chapter 40

E-learning and its impact on health sciences education as a consequence of the COVID-19 Pandemic: Literature review

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ABSTRACT
Objective: The objective of this study is to establish the importance of the E-learning system in health sciences as well as the impact that it generated due to the COVID-19 pandemic. Methodology: An exhaustive search strategy of the scientific literature was carried out using the PUBMED database, through the keywords "E-Learning", "Health Sciences" and " COVID-19", where a total of 20 scientific articles could be obtained. Results: E-learning education represented a fundamental tool to be able to fulfill several objectives of health sciences, however, there appeared several advantages and disadvantages during its execution. Conclusion: The usefulness of E-learning in the context of the COVID-19 pandemic was of great importance for the health sciences. However, based on this experience, several parameters can be established to take into account to improve and explore various fields of this educational system.

Keywords: E-Learning; Health Sciences; COVID-19

1 INTRODUCTION

Health practitioners faced a new difficulty as a result of the COVID-19 pandemic, in addition to the effects on people's health: the shift from traditional classroom learning to online learning (Fitzgerald, Scott, & Ryan, 2022). Virtual education, which played a major role during the COVID-19 epidemic when institutions were forced to make drastic adjustments to the educational system, is one of the ways that education has evolved in recent years. education. New ideas, like e-learning (EL), have become important (Jaoua, Almurad, Elshaer, & Mohamed, 2022). Electronic solutions including meeting platforms like Zoom, G-suite, Google Meet, etc. have started to be employed to fill this vacuum since the pandemic's inception. Many medical institutions and other health sciences have closed across the globe since then. WebEx Meet, which became true protagonists of the teaching-learning process worldwide (Rani, Kumar, Mishra, & Sharma, 2021).

Due to the great drastic change in the change from face-to-face to virtual modality in health sciences, many problems were generated during the students' learning process, these problems translated into difficulty in receiving their classes and being able to learn satisfactorily. The main factor related to these

inconveniences occurred with the practices of both undergraduate and graduate students in different areas of health, since there was a decrease in demand by patients and therefore their practices were nobly affected. pre-professionals (Sneyd et al., 2020).

E-learning is a term for an electronic teaching-learning system that uses technology to facilitate information and is an active, cooperative learning environment that is bolstered by the Internet (Chong et al., 2021). On the other hand, essential components for the E-learning system's operation include student engagement and preparation for electronic learning. These factors can help the E-learning system function more effectively (Jaoua et al., 2022). This is referred to be a combination of in-person learning, but with online information, it is crucial that teachers receive training in cutting-edge technologies (Chong et al., 2021).

Authors such as Patano A. et al., refer to the term E-learning as a generic term that includes modalities and terms of web-based learning, online learning, computer-assisted instruction, internet learning. This can be of a synchronous nature when all participants log in at the same time and allows students to interact with each other with the teacher. It can also be asynchronous or “pre-recorded” which is available to students at any time of the day from anywhere. Several studies have shown that e-learning is considered an effective reinforcement for medical training (Patano et al., 2021).

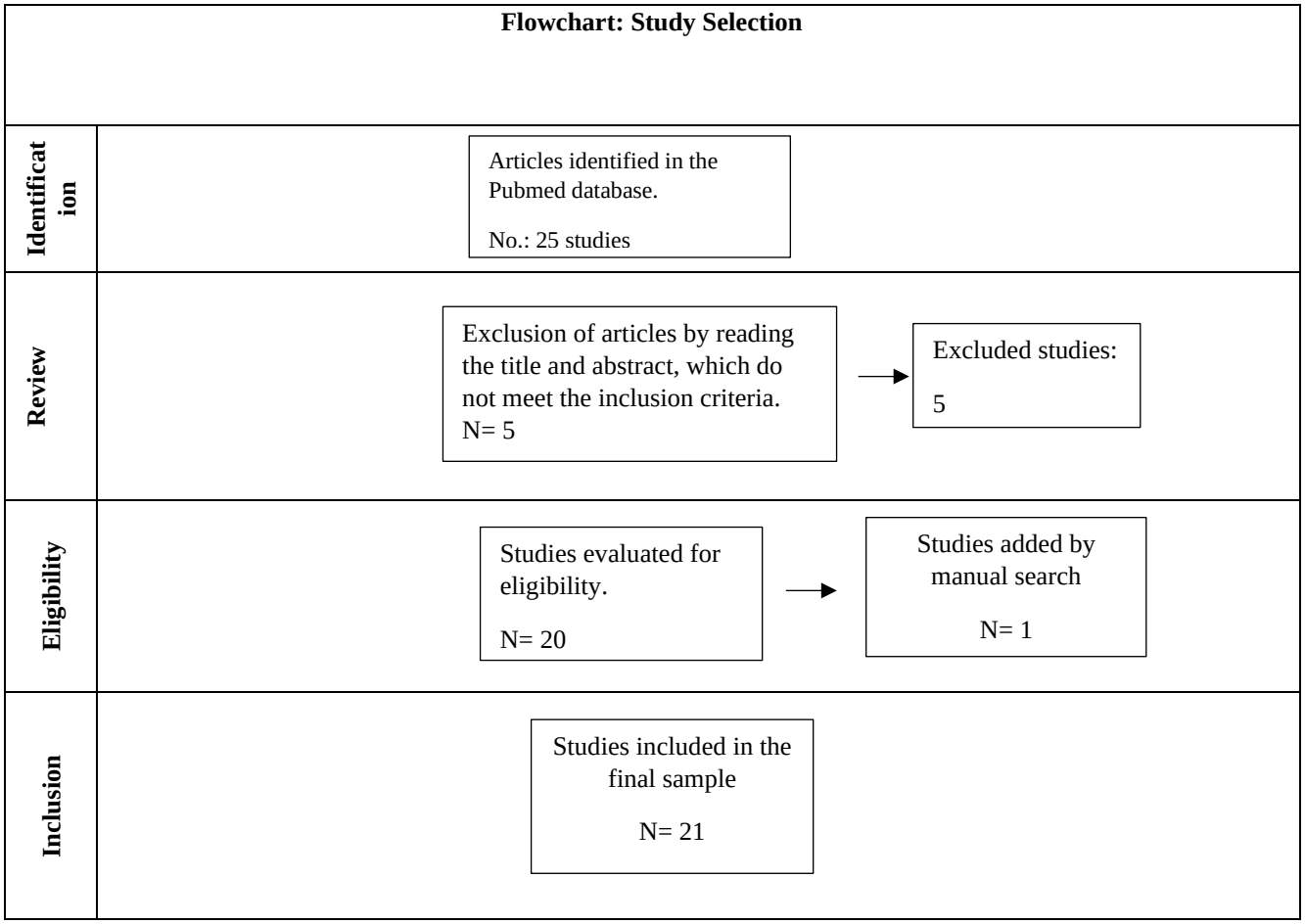
The global adoption of the E-learning educational system, which was initially approved to protect students from COVID 19, sparked much debate about its efficacy in helping students learn and, more specifically, about some of its limitations, including the lack of universal access to electronic devices like computers and smartphones as well as the absence of internet access globally. To examine fundamental ideas about what e-learning is, how it relates to health sciences, and its benefits and drawbacks, the goal of this review is to analyze numerous topics related to this teaching technique(Naciri, Radid, Kharbach, & Chemsi, 2021).

2 METHODOLOGY

A narrative review of the literature represents a critical and objective analysis of interesting knowledge of a specific topic in science (Baker, 2016). This review was done with an exhaustive search strategy of the scientific literature was carried out using the PUBMED database, where through the keywords "E-Learning", "Health Sciences" and " COVID-19", and through the use of the Boolean operator "AND", a total of 20 scientific articles could be obtained.

The inclusion criteria were secondary scientific articles related to the main topic of the research present in the PUBMED database, also publications in English or Spanish. The research was limited to the years 2020 - 2022 because information that related E-learning education and COVID-19 were obtained in 2020. The exclusion criteria were studies based on case reports, protocols, opinions, letters and brief

communications also with investigations without a clear methodology that could lead us to a bias in this research. At first, the articles were selected through their title, then we analyzed their abstracts and after reading the entire article, the theoretical framework was elaborated.



Source: Authors (2022).

3 RESULTS AND DISCUSSION

3.1 RELATIONSHIP OF E-LEARNING WITH HEALTH SCIENCES

The medical education community joined together to address the need to sustain medical education and learner assessment by preserving teaching and developing emergency teaching (Fitzgerald et al., 2022).

Students in the medical field can research, train, and support resources for meaningful learning thanks to technical facilities, which were strengthened during the pandemic (Chong et al., 2021). In different medical areas, virtual learning was used, creating new models of continuous professional development and health care, such as in the area of pediatrics, where e-learning was implemented (Fitzgerald et al., 2022).

In the area of mental health, an application of the e-learning system was used to contribute to support sessions for health science workers (Drissi et al., 2021). Likewise, e-learning contributed greatly to the

psychological support of students who were anxious and in high levels of stress due to isolation, contributing significantly to social interaction (Di Giacomo, Martelli, Guerra, Cielo, & Ranieri, 2021).

In the dental area, e-learning gained great strength through digital learning models in laboratory areas for subjects such as histopathology, where models and stained microscope sections were scanned and shared through computer networks (Khlem, Kannappan, & Choudhury, 2022). Likewise, in the restorative dental area, videos were uploaded where the process is explained so that the students can then simulate (Santos et al., 2021).

One of the great concerns in teaching-learning through the e-learning system was the interruption of laboratory, preclinical and clinical activities. How could students receive their theoretical-practical training without preclinical and clinical activities? Simulation slides were used for this, and in some cases, as in the dental area, simulation mannequins, although this means very high costs for the students (Machado, Bonan, Perez, & Martelli JÚnior, 2020).

Similarly, in different specialty areas of medicine, such as radiology, the implementation of a virtual learning system represented a great challenge not only for students but also for teachers, who had to be trained and able to adapt to the use of new technologies. as well as employing and developing various teaching strategies that could be significant in student learning, mainly in professional practice (Majumder et al., 2021).

In the same way, there are several factors to take into consideration to obtain a success of this learning method: Human factors such as teachers, technical competence, collaboration capacity and attitudes of students as well as teachers (Patano et al., 2021).

3.2 ADVANTAGES

- The ease of low costs, flexible hours, and avoiding traveling from one location to another (Nimavat et al., 2021).
- Students' worries about fundamental costs of in-person instruction, such as travel charges, clothing, and food in the location of the institution, have significantly decreased thanks to the usage of virtual platforms (Fitzgerald et al., 2022).
- Quickness of material processing and information acquisition using online databases and search engines (Machado et al., 2020).
- More people can be reached through the use of technology in education, and even countries with little resources where face-to-face instruction is inaccessible can receive high-quality medical education, such as cancer treatments (Asana et al., 2021).

- It is a student-centered approach in which the teacher merely serves as a mentor for the student's academic training process (López-Belmonte, Segura-Robles, Moreno-Guerrero, & Parra-González, 2021). It allows didactic spaces where through the use of audiovisual material, suitable learning spaces can be generated according to the needs of the students (López-Belmonte et al., 2021).
- Certain virtual platforms such as social networks can be used in a positive way during the learning process, since authors such as Al Kalbani et al. in 2019 they recommend the use of Facebook, Twitter or YouTube to be able to share their doubts and obtain new knowledge (Agarwal, 2020).

3.3 DISADVANTAGES

- Teachers' scant expertise in technology subjects (López-Belmonte et al., 2021)
- The pupils' ability to switch between classes with a strong, reliable internet connection (Khlem et al., 2022; López-Belmonte et al., 2021; Santos et al., 2021).
- "Zoom fatigue," a reaction to the numerous educational sessions that take place on these platforms (Fitzgerald et al., 2022).
- The privacy of the students was compromised by issues with the control of noise and camera movement (Patano et al., 2021).
- Students' difficulties learning how to use various digital tools, as well as the stress, anxiety, and frustration associated with online learning (Khlem et al., 2022). University students experienced the most periods of extreme stress, which had an adverse effect on their mental health because of the new learning obstacles and the greater level of schooling (Cielo, Ulberg, & Di Giacomo, 2021).

Santos N et al. claim in their study that consumers favored Zoom because of its synchronization and asynchronous interactions, conference recording, chats, screen sharing, and file sending and receiving capabilities (Santos et al., 2021). In order to gain meaningful learning through e-learning, student motivation is crucial (Asana et al., 2021). The team's quality system, information quality, service quality, interactivity, and resistance to change were the five pillars of the e-learning challenge (Jaoua et al., 2022).

Similarly, Rani R et al. reports that despite the importance and help provided by the use and implementation of new technologies as a short-term and emerging response to the pandemic crisis, several problems related to these electronic devices also arose. and internet applications, such as lack of familiarity with the application, lack of resources, electricity and time zone problems are among the most common problems inherent to e-learning (Rani et al., 2021).

Bartnicka J et al., mentions that in order to counteract the untimely effects of technological management, prior training should be carried out, facilitating the development of personnel. The post-training result showed new skills in the staff, due to this it is essential that the actors of the teaching-learning process dominate the technological bases to obtain a better quality of learning (Bartnicka et al., 2021).

Mheidly M. et al., describes the development of various pathological conditions related to the pandemic and the constant use of electronic devices. He describes stress as an emotional, physical or mental reaction that produces tension and also "Burnout" as a state of exhaustion in mental health which is related to work and produces behaviors such as cynicism and detachment. The correlation between the constant use of electronic and intelligent devices, the COVID 19 pandemic and e-learning represents being factors of interest which lead to stress and burnout, which can significantly affect the quality of life with deficiencies. psychological, cognitive and even musculoskeletal (Mheidly, Fares, & Fares, 2020).

4 CONCLUSION

On the basis of the information provided earlier, a thorough understanding of what the E-learning system stood for in the sphere of education can be attained. Its benefit is evident because many students in numerous health-related fields would not have been able to complete their education without its implementation. However, as this system evolved, a number educational issues emerged, chief among them the unequal access that different pupils had to modern technologies and the Internet network. Similar to this, psychological changes were the main players as they reflected a number of issues that both pupils and teachers displayed at such crucial times throughout the beginning of the epidemic. It is important to take this experience as a possible projection of the future of teaching, since, based on all the present errors, an organized plan can be established that allows the large-scale use of this innovative teaching-learning strategy.

As a recommendation it is necessary to apply TIC´s in education and also professors and pupils should accept these new paradigms that could lead to a new a better level in education, let's remember that the main objective of education is to guide people to get new tools and to have a correct behavior with their professional lives. We suggest that more studies be carried out in the area of virtual learning applied to new technologies.

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Chapter 41

Sports public policy in the municipality of Campos dos Goytacazes: "viva o esporte”

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ABSTRACT
The CIPP model is a system where evaluation has as its main focus the improvement of a project or program. The objective of this study was to evaluate the sport policy "Viva o Esporte" of the municipality of Campos dos Goytacazes between the years 2017 to 2020. Based on the CIPP model. A bibliographic and documental research methodology was used, with an exploratory, descriptive and qualitative approach. Based on the analysis of the results, it was possible to identify that the program has reduced the budget in relation to the previous management, expanded the offer of sports activities, and the number of places for the practices. The number of people benefited increased by 19%, serving mainly people between 6 and 17 years old (68.9%). Although there has been an increase in the number of activities, the modalities athletics, badminton, beach tennis, frescobol, and tennis were not offered, and all of them are practiced in the municipality. The program made it possible for people with disabilities to practice sports; 1,009 people were benefited. It is extremely necessary that the number of beneficiaries be increased. For this, it is important to offer more sports and activities to attract more participants to the program.

Keywords: Evaluation, CIPP, Sports, Public Policy.

1 INTRODUCTION

Sport is a phenomenon full of symbolism and characteristic values that, at the same time that they transform, also suffer influence from the society in which it is inserted (MARQUES, 2007; ARAÚJO, 2011). The manifestations of the body culture of human movement cannot be isolated from the practice of sport, considering that this is a sociocultural phenomenon with different forms of expression (STIGGER, 2005). The traditional sport and the adapted sport may present themselves as a tool that enables social ascension, equality in the conditions of its practice, improvement of physical condition and health (ARAÚJO, 2011).

As of 1937, with Getúlio Vargas' Estado Novo - a ruler characterized as nationalist and populist who sought to reconcile class interests in the quest for national development - the relationship between State and sport in Brazil gains special attention. Seeking to develop and strengthen a nation ideology, the sportive sector was institutionally structured as of Decree 3.199 of 1941, which proposed the sportive centralization and organization in the country (LINHALES, 1996). This measure favored the High Performance Sport, called Pro-EAR (High Performance Sport). Besides, the sport practices proposed by Getúlio's Government also reflected a desire to implement hygienist and eugenicist values, concepts brought from Europe.

As in Vargas' model, the military regime, from 1964 on, tried to rescue the nationalist appeals, making sport an important component for the government. Physical Education was recovered as an instrument, no longer for the eugenics of the race, but as a means to select the most skilled, the fittest; using performance as a goal and mass and school sports as means (DARIDO, 2003).

Another important movement in defense of sport was the International Charter on Physical Education, Physical Activity and Sport released by UNESCO in 1978, in which Art. 1 states that every human being has the fundamental right of access to Physical Education, physical activity and sport, without any type of discrimination. Its main point involves its management, recommending that this should be the State's role and that its main goal would be to use sport, through its practice, as a way to improve health and social development.

This scenario starts to be consolidated at the end of the 1980's with the enactment of the Brazilian Federative Constitution (FC) (BRASIL, 1988), which assigns the State the duty of fostering sports practices as "everyone's right". The Constitution established by the FC in 1988 makes sport to have a more social and less nationalist character, being the encouragement of this a function of the State and of the governments (LINHALES, 1996).

After the enactment of the 1988 Federal Constitution, other interests manifested themselves. Law no. 7,752 (Mendes Thame Law), which was already in progress in Congress, was approved by the Senate on 04/14/1989 aiming to provide means of financing amateur sports. This Law presented forms and limits of deductions of income tax in a gradual manner and other taxes to the taxpayer, individual or legal entity (with different rules), which made donations and/or sponsorships to sports companies, provided these were registered with the Ministry of Education - MEC (BRASIL, 1989).

Even with the production of researches and international organizations indicating the importance of sports in the citizen's life, its benefits and contributions for the human development, it is observed that public policies are still in the process of materialization. Many countries still choose to invest in high performance sports, since many of them assume that a strong nation must be represented by a high performance sports team, which symbolizes the idea of a developed nation, as in the Cold War period (MARQUES, 2009).

From the 1988 Federal Constitution, which established sports and leisure as citizens' rights, these should be contemplated in the City's Organic Law (LOM) because, in its article 29, the municipalities will be governed by this Law. Based on this orientation, the municipality of Campos dos Goytacazes has its LOM promulgated on March 28, 1990. Updated and published on August 26, 2014 and republished on August 29, 2014, it highlights a specific section to sports and leisure. According to section IV, article 291, "it is the duty of the municipality to support, encourage, based on the fundamentals of physical education,

sports, recreation and leisure, body expression, as a form of education and social promotion" (CAMPOS DOS GOYTACAZES CITY COUNCIL, 2014).

With the change in municipal management in 2017, a new format of public management was introduced. The "Viva o Esporte" program was implemented in the municipality. This program aimed to provide opportunities to practice sports for children and young people of school age, as well as other age groups, including the elderly. Thus, we sought to evaluate the sports and adapted sports policy "Viva o Esporte" of the municipality of Campos dos Goytacazes between the years 2017 and 2020.

2 MATERIALS AND METHODS

This study was characterized as a bibliographic and documental research where an exploratory, descriptive, and qualitative approach was used, needing to describe it from the research of several sources and its correct interpretation.

The first stage of this research (bibliographic) consisted of collecting data from the theoretical framework between the years 1990 and 2018, consisting of a variety of articles from national journals, the Capes Periodical Portal and the *Scopus database,* which presented the main concepts on sport, adapted sport, sport public policies, public policies, sport and leisure. This survey occurred in 2018, in the months from October to December, in 2019, in the months from March to July, and subsequently in 2021 in the months from March to June.

In the second stage, a thorough evaluation of the articles and official documents was carried out, taking into consideration the relevance of the material analyzed, its contribution to the study, and its correlation with the study proposal, as well as its application in the management of the Campos dos Goytacazes EMF.

In the third stage, in April, May, November and December 2019, surveys were conducted with the FME about which and how many activities were offered, the number of participants, and the conditions of the places of sports practice and physical activity. The selection of the practice sites were carried out randomly, separating the practice sites according to the activities offered in these spaces, divided into categories as follows: Sports School Center - CEDE's, sports gyms, swimming pools, gymnastics and dance practice sites, fighting sites, public squares. One site from each category was randomly selected. Qualitative and quantitative data was also collected, and interviews were conducted with the manager and three other teachers participating in the program. The teachers were randomly selected, taking into account the following characteristics: one professional who worked with team sports, one who worked with fights or gymnastics, and another who worked with adapted sports. The interviews took place in March 2020.

In the fourth stage, there were notes and considerations about the analyzed material, as well as suggestions that can contribute to the better development and service provision in the area of sports for the community of Campos dos Goytacazes.

The evaluation of the sports policy of the municipality of Campos dos Goytacazes was carried out based on the CIPP model (Context, Input, Process and Product) developed by Stufflebeam (1968, 1987, 2003). The author contemplates that evaluation is a "political process of outlining, obtaining reliable information so that managers can make decisions". Thus, the four variables listed above become ideal constructs for managers to structure information that contributes to adequate decision making.

3 RESULTS AND DISCUSSION

The audience participating in sports activities and physical activities was of about 21,000 people/attendance, being basically composed of students from public and private schools, with ages ranging from 6 to 17 years old, totaling 68.9% of the attendance; followed by adults with ages ranging from 18 to 59 years old, totaling 14.6%; the elderly, above 60 years old, totaling 11.7% of the attendance; and the participants of the Parad sport (adapted sports), which accounted for 4.8% of the attendance, as described in table 1.

Table 1 - characterization of the public participating in the FME's sports and physical activities

Public	Attendances	%
Students (6 to 17 years old)	14.467	68,9%
Adults (18 to 59 years old)	3.066	14,6%
Elderly (60 years or older)	2.458	11,7%
Paraesporte (children, youth and adults)	1.009	4,8%
Total	**21.000**	**100%**

Source: prepared by the author.

It is necessary to clarify that the number presented, of approximately 21,000 attendances/participants, is characterized by the attendance in the activities themselves, not the number of people, i.e., if a person participates in more than one activity, the value attributed to this person will be the total of participations. Ex. for a person participates in three activities three attendances are computed (SIQUEIRA, 2019).

From the information obtained in an interview with the president of the FME regarding the number of participants, he reported that this number was possible due to a campaign in public and private schools, using various means of dissemination such as: social networks, news articles, interviews on local radio stations, sending text messages to parents registered in the public school network, and making and distributing pamphlets. This is in accordance with the guidelines described in the LOM of the Campos dos Goytacazes City Hall (2014), in its Art. 241, whose priority of resources allocated to sports and leisure must

first take into consideration educational sport, community sport, and then high performance sport. It is also important to adapt (accessibility) existing spaces to the practice of sports for people with disabilities, the elderly, and pregnant women, in an integrated manner to citizens.

It is worth highlighting here the implementation of Paraesporte, a sports activity adapted for people with disabilities that, during the first three years of its development, reached more than 1,000 attendances. This is a very different picture from that found by Caravage and Oliver (2018) in a study conducted on the public policy for people with disabilities in a municipality in the state of São Paulo, where they analyzed the process of its implementation related to political dynamics (*politics*). They observed that, in sports programs that serve the general population, there is almost no participation of people with disabilities and, when they do participate, being this an inclusive activity, they come up against architectural barriers, i.e., public spaces for sports and leisure without accessibility.

To carry out the activities of the "Viva o esporte" program, the Municipal Sports Foundation - FME, has made several agreements with public-private entities, which has made it possible to advance even further in offering sports and wellness activities and services to the population. In the years 2017 to 2019, 38 agreements were made. These agreements also enabled the participants of the "Viva o esporte" program to participate in various competitions within the state of Rio de Janeiro, as well as outside the state. Swimming was the modality that competed most in competitive events among all the program's modalities, totaling 30 competitions. Swimming also stood out for the number of students enrolled, more than 2,500 students participated in the swimming activities and another 2,000 in the water aerobics activities.

For the development of the "Viva o esporte" program, 51 sites were selected to carry out the activities. Many sites are spaces for multiple activities, both sports and physical activities (gymnastics in its various forms and manifestations, water aerobics, dance, rhythm, Pilates, walking, and sports (futsal, volleyball, handball, basketball, wrestling, and swimming). This is one of the characteristics of the CEDE's (Centros Escola do Esporte). These centers have a physical structure composed of a multi-sports court, a semi-olympic swimming pool, an aquagym pool, a gym, dance and wrestling hall, changing rooms, a walking track and a social center. It also makes medical care available.

It is important to remember that the CEDE's are the former Olympic Villages, created in the 2009-2012 management, whose construction work began in July 2012, and the first Olympic Village delivered to the community occurred on May 1, 2013 in Guarus Park. This possibility of implementing the Olympic Villages in Campos dos Goytacazes was only possible due to incentives from the Federal Government due to the Rio 2016 Olympics. In order to receive the funds, the interested municipalities needed to present projects to the Ministry of Sports that aimed at the development of sports for the school-age population. The project submitted by the municipality of Campos dos Goytacazes contemplated the construction and implementation of eight Olympic Villages (MACHADO, 2012; ABREU, 2013).

Currently there are 7 CEDE's in operation. The most distant is located in the community of Travessão, approximately 19 km from downtown. Another place where the program was present was Morro do Coco, approximately 50 km from downtown Campos. Some locations went through revitalization, painting and small repairs for the beginning of the activities. It has generally been a common practice when a new administration takes over, to use the painting and revitalization of the sites in an attempt to detach these spaces from the activities done before. In a visit to some of the activity sites (swimming pools, courts, gyms, public squares, wrestling and gymnastics rooms) it was found that the spaces were in good condition, safe, and adequate for the practices they were intended for.

The sports offered by the FME, totaling 28 sports, are 9 fighting sports, 8 team sports, 5 water sports, and 6 individual sports. Some individual sports have a variation for team or duo sports, such as Cycling, Olympic Gymnastics, Swimming, Table Tennis, Triathlon, and Chess.

After analyzing the documents provided by the communication department of the FME, one notices with surprise the lack of Athletics, Badminton, Tennis, Beach Tennis and Frescoball, all of them developed in the city. For Meurer (2008), athletics has been neglected in public and private schools, in view of the lack of knowledge of physical education professionals and of commitment in dealing with the knowledge of the body culture contents where athletics is inserted, justified, most of the time, by the lack of material and adequate physical space.

Athletics is considered the base sport. That is, it is based on it that many other sports practices may be better performed by its practitioners. Its fundamental characteristic is the fact that its practice is the extension of basic human movements: walking, running, jumping, and throwing (ORO, 1983).

We cannot let athletics be excluded from physical education classes in basic education, especially in the early grades of elementary school, being able to increasingly explore the movements of the student discovering their physical abilities (PIERI, 2013).

The other sports, Tennis, Badminton, Frescol and Beach Tennis (BT), not only could, but should be part of the list of sports offered by FME. As already mentioned, all of them are developed in the city. Badminton is practiced in some schools in Campos, Tennis and Beach Tennis are practiced in clubs and gyms, and frescobol is privately developed in the city squares. That is, there are professionals with technical/pedagogical knowledge to teach these sports. Among these sports, possibly the easiest to be developed is Badminton, because it is already practiced in schools in the city and because it is easy to learn. In the first lesson, the student is already able to hit the shuttlecock, which is very motivating (Quinaz, 1986) and Beach Tennis, having in mind its great ascension as of 2008, in the Brazilian coast and mainly in the state of Rio de Janeiro.

Racquet sports, along with other sports, contribute to the various dimensions of individual development. Playing racket sports require concentration and attention, and also develop motor

coordination, which is the basis of motor skills and essential to be developed in the school phase (GRECO; SILVA, 2013).

In addition to sports, the FME made available 15 other activities, highlighting the physical activity and exercise programs. In a survey carried out with the FME, there were more than 5,000 participants in these activities (FME, 2019). The practice of adapted sports was also encouraged, 12 para-sports modalities were offered, being 8 collective and 4 individual modalities, besides dance and ecotherapy. The Para-sport program carried out by the FME was a great surprise of this public policy, benefiting 1009 users with the activities of sports initiation, dance, and ecotherapy. This number of beneficiaries was only possible due to partnerships made with other institutions such as APAEAPE, APOE and Educandário São José Operário.

Continuing with the presentation of the results, we could not fail to mention the budget allocated to the EMF for the execution of its program and other activities. Possibly, here lies the big difference between the 2013-2016 management and the 2017-2020 management, where the latter used a budget 75% smaller than the 2013-2016 management. At the same time that the number of activities and practice sites increased, the number of beneficiaries was 19% higher, with an emphasis on Para-sports activities.

After the data presentations according to the research objectives, it is necessary to analyze and evaluate the Public Policy of Sport (Viva o Esporte Program) carried out by the 2017-2020 management according to the criteria of the CIPP method of Stufflebeam (2003). The basic function of evaluation is to offer relevant information that enables the improvement of the quality of a program. The author posits four types of decisions, represented by the phases of: planning (what should we do?); structuring (how should we do it?); implementation (are we doing it as planned? And if not, why?); and recycling (does it work?), which specifically corresponds to four types of evaluations: context, input or input, process, and product evaluation.

3.1 CONTEXT EVALUATION

Context assessment aims to determine needs, specify the population/sample of individuals to be considered, and establish the objectives that should realize the needs. It is a type of assessment that is used for planning decisions.

The Viva o Esporte program had as goals the expansion of the offer of activities and the increase in the number of beneficiaries, besides seeking ways to reduce investments, without affecting the quality of the service provided. Previous studies were carried out with a multi-professional team made up of physical education teachers from public and private schools, coaches, managers, and other FME employees, for a proposition of which activities would be offered, taking into account the previous demands and the municipality's sports cultural context, besides proposing new modalities, if necessary. The sporting venues were also selected after technical visits. After four months, the program was launched.

3.2 INPUT EVALUATION

The evaluation of inputs evaluates the proposal of the program or project and, based on it, defines a strategy and work plan that includes the budget for carrying out the work (STUFFLEBEAM, 2000) considering the resources available to the evaluated object (inputs). The inputs are a kind of raw material necessary for the development of the program and can be of diverse nature, however most of them are grouped in the categories of human, material, and financial resources.

3.3 HUMAN RESOURCES

Of the professionals who worked in the Viva o Esporte program, 72% (N=177) had a college degree, 74% (N=131) with a degree in Physical Education. The others (N=46), besides having a degree in other areas, had technical training in a specific modality, accredited by CREF. The number of trainees who worked in the program was 28% (N=69). All the Viva o Esporte program participants went through an average of 4 training courses per year, in the most diverse areas of sports, para-sports and wellbeing.

3.4 MATERIAL RESOURCES

The Campos dos Goytacazes municipality presents a very satisfactory infrastructure of public sports spaces, composed of gymnasiums, sports courts, sand courts, soccer fields, swimming pools, athletics tracks, public squares with various sports equipment, and places to practice martial arts, dance, and gymnastics.

3.5 FINANCIAL RESOURCES

With the creation of the Viva o esporte program, the FME stopped transferring resources to sports entities and NGOs, becoming solely responsible for the public management of sports in the municipality. The average annual budget used by FME was R$1,300,000.00. This budget value was enough to meet the program's activities.

3.6 PROCESS EVALUATION

Process evaluation is intended to detect deficiencies in planning or implementation and to monitor various aspects of the project in order to identify and correct possible problems.

The processes refer to the activities carried out with a view to participation and interaction with the students. All activities were initially planned to attend the sport initiation.

The sports practice classes were taught mostly by one professional and one assistant. In the physical activity practices, most of the classes were taught by a single professional.

The purpose of a product evaluation is to measure, interpret, and judge the accomplishments of a program to see how well it meets the needs of the beneficiaries, and such *feedbacks* are important both during the activity cycle and at its conclusion (STUFFLEBEAM; SHINKFIELD, 2007).

The focus of the Program was to dynamize the practice of sports and physical activities of the population of Campinas. Mainly in the population between 6 and 17 years old. When it came to sports, especially for the school-age population, the goal was the learning of one or more sports, not the formation of sports teams.

The average number of practices per student was two sports, a relevant fact considering the current poor physical activity habits of the population, both children and adults. Although there has been a reduction in the investment in the program:

- An increase in the supply of activities has occurred;
- The practice sites have been expanded by 5 locations;
- The number of beneficiaries increased by 19% in relation to the previous management;
- The Viva o Esporte program also made it possible for people with disabilities to practice sports; 1,009 people benefited from Paraesporte;
- It made it possible to revive the Campos School Games - JEC's, interrupted for 11 years, and the Campista Swimming Championship, interrupted for 25 years.

4 FINAL CONSIDERATIONS

Although the largest portion of the population benefited by the program were children and teenagers 14.1% of those enrolled in public and private schools in Campos, it is not that significant, as it is close to the national average. It is extremely necessary that this number of beneficiaries be increased. For this, it is important to offer more sports modalities to attract new participants in the program. The other parts of the population should also be attended to so that this number of beneficiaries can increase. Specific fitness programs are very well accepted by the adult public. Agreements and partnerships are extremely important for the development and visibility of the program, even more so if these partnerships contribute to the reduction of FME's investments. It is necessary to be very careful with the valorization of some sports to the detriment of others. All of them have the same formative and educational value and contribute significantly to the development of the individual. Although 58 sports activities have been offered, exercise programs and physical activities, in addition to adapted sports, some sports have not been offered to the population, a negative highlight being athletics, which lately has been neglected by several physical education professionals, as well as by the managers of sports programs. The non offer of this modality is caused by the lack of knowledge about it and the low qualification of the professionals about athletics. Besides athletics, other sports that are practiced in the city were left out, such as: Badminton, Tennis, Beach

Tennis, Frescoball, and Skateboarding. This should change. With the inclusion of these sports, the number of participants will possibly increase. The evaluation using the CIPP model provided important information, based on a systemic approach to the Viva o Esporte program, in terms of context, resources made available and used, processes, and products. From this model it is possible to identify that the program reached the intended goals positively, expanding the offer of activities, increasing the number of beneficiaries and reducing the investment. The rendering of accounts occurred in a clear way, made available on the Transparency Portal. However, it is necessary to review the amount of remuneration paid to the professionals who worked in the program.

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Chapter 42

Clinical profile and determinant risk factors in outpatient follow-up in nephrology

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ABSTRACT
Introduction: Acute renal injury (ARF) and chronic kidney disease (CKD) are distinct clinical disorders that promote decline in kidney function and systemic changes evaluated in outpatient nephrology consultations. Outpatient care with specialized attention in CKD is ensured by Ordinance No. 1,675/18 of the Ministry of Health. The Clinical Guidelines for the Care of CKD Patients (BRASIL, 2014) aim to recognize individuals at risk of developing CKD, aiming at early diagnosis. Objective: To identify the risk factors for early diagnosis of CKD in outpatient follow-up. Method: A descriptive, retrospective study, conducted in the GSUS electronic medical records system in a public hospital in the municipality of Ponta Grossa/PR, by accessing the clinical information of patients seen at the Nephrology Outpatient Clinic during the months of October and November 2019. Results: 228 patients and 528 consultations were verified, with a predominance of females, average age of 57 years, overweight and obese, average of 2 consultations per patient and total follow-up time of 19 months. The anamnesis showed the most frequent diseases considered risk factors for CKD, which are hypertension and diabetes mellitus, associated diseases such as dyslipidemias and vascular diseases, in addition to aging and metabolic changes of overweight and obesity. The physical examination proved to be incomplete and with insufficient clinical evidence to contribute to the patient's follow-up in the conservative treatment. Conclusion: it is important to delimit the risk factors, complaints, clinical signs within the outpatient follow-up in nephrology, but seeking to compose the consultation with all the necessary items and recommended in the Guidelines and protocols of SUS, including the participation of the multidisciplinary team, with the Nurse acting directly in the prevention and control of underlying diseases and associated with kidney injury, in order to avoid or even postpone dialysis treatment, essential goal of conservative treatment in nephrology.

Keywords: Kidney Disease, Health Profile, Outpatient Care.

1 INTRODUCTION

In our body, the excretory system has the function of eliminating products of metabolism, as well as excess substances, using the kidneys as the main pathway. Among the functions of the kidneys, five stand out for their importance: maintenance of water balance, maintenance of electrolyte balance, maintenance of acid-base balance, excretion of catabolites and hormonal regulation; all very important for body homeostasis and that is maintained in an adaptive way in initial moments of renal aggression (MORAES e COLICIGNO, 2007).

Renal function is assessed by the Glomerular Filtration Rate (GFR), considered the most important evaluation of function. Studies have shown that the number of glomeruli quantified in autopsies have varied due to congenital and acquired factors, such as diseases that promote changes in the renal parenchyma (DENIC et al., 2017). The normal GFR in a healthy adult aged 20 years is about 100-110 ml/min/1.73 m^2 and may decrease to <60 ml/min/1.73 m^2 in healthy adults after age 60-65 years, depending on gender and age attained. The frequency distribution of GFR remains approximately Gaussian at all ages, i.e. it reduces driven by a physiological process. The decline in GFR with aging is independent of blood pressure-related changes, and occurs even in indigenous populations free of cardiovascular disease (GLASSOCK and RULE, 2016).

Acute renal injury (ARF) and chronic kidney disease (CKD) have been recognized as important but distinct clinical entities since their original descriptions by Bright, Heberden, and Abercrombie in the 19th century. Until recently, scholars considered that oliguric ARF is often fatal if untreated, but with the aid of dialysis therapies, complete recovery may be possible. CKD, on the other hand, is characterized as a separate and irreversible disease, which progresses, if not properly monitored, to the terminal stage (FERENBACH and BONVENTRE, 2016).

ARF, is the result of abrupt decline in renal function and measured by the accumulation of serum creatinine and change in urine output, but Chronic Kidney Disease (CKD) has a progressive characteristic, slow and with silent manifestations. The main causes of CKD are Arterial Hypertension (SAH) and Diabetes Mellitus (DM), which represent 36% and 26% of primary diagnoses, respectively (FREITAS et.al, 2021; SILVA, et al. , 2021; RODRIGUES et. al. 2021).

Recent studies indicate that lifestyle has directly influenced the quality of life of the population, generating a cascade effect in the development of Chronic Noncommunicable Diseases (NCDs). Diabetes Mellitus (DM), Systemic Arterial Hypertension (SAH) and aging are the main risk factors for the development of nephropathies and consequently CKD (GUO, LIANG, WANG et al., 2021; PEN, SHEN, WEN et al., 2019).

We realize that CKD is underdiagnosed worldwide, besides being inadequately treated, resulting in the loss of chances for the implementation of primary, secondary and tertiary prevention, as well as the non-use of simple tests for early diagnosis and functional evaluation of the disease. (SILVA, SILVA, SANTOS et al. , 2020). According to the ordinance No. 1.675, June 7, 2018 of the Ministry of Health, it is up to the outpatient and hospital health service to offer specialized attention in CKD, early detection and slowing the progression of the disease, either through Conservative Therapy (CT) or Replacement Renal Therapy (SRT) and offering the appropriate treatment, according to the needs presented by patients (BRASIL, 2018).

Despite finding in health facilities the conduct for clinical evaluation of clients with complaints or risk factors for kidney disease, we still observe several reports, both in Brazil and in other countries, of late referral of nephropathic patients to specialized care, which implies more morbidity and higher mortality in this population. Many of the patients received for dialysis therapy program had little or no contact with specialized care before starting dialysis (OKAKA, ADEJUNO and AKINBODEWA, 2020).

The Clinical Guidelines for the care of patients with CKD (BRASIL, 2014), offers guidelines for multidisciplinary teams on the care of people at risk or diagnosed with CKD, mentioning that it is important to recognize who are the individuals who are at risk of developing CKD, with the goal of early diagnosis. For this reason it becomes valid the evaluation of customers in outpatient care in order to:

- Identify risk groups through underlying diseases (Diabetes, hypertension);
- Identify associated diseases (vascular diseases, dyslipidemias);
- Identify the predominant age group, highlighting aging;
- Identify metabolic risk (overweight and degrees of obesity);
- Identify drugs in use and risk of nephrotoxicity;

The survey of risk factors and the continuous follow-up of the client allow the diagnosis of CKD and the identification of those with a worse prognosis for kidney function loss throughout the clinical evolution in the outpatient follow-up.

In this context, the aim of this study is to identify the clinical profile of individuals followed in the outpatient follow-up, highlighting the presence of risk factors for early diagnosis of CKD, since they can contribute negatively to patient outcomes, accelerating functional failure in conservative treatment.

2 MATERIAL AND METHODS

2.1 ETHICAL ASPECTS

The ethical aspects were according to Resolution n. 466/2012 of the National Health Council (CNS), which deals with the regulation of ethics in research with human beings. We obtained authorization from the institution where the collection was carried out, and it was not necessary to use the direct identification data of the subjects. Data collection was performed after the analysis and approval of the project by the Research Ethics Committee of the State University of Ponta Grossa (UEPG/PR), under Opinion No. 3.695.435

2.2 METHODS

Quantitative, descriptive, retrospective evaluations were performed on the electronic medical records of patients who were in consultation at the Nephrology Outpatient Clinic, GSUS system, of a public university hospital in the municipality of Ponta Grossa/PR, in the period October and November 2019.

2.3 POPULATION/SAMPLE, INCLUSION AND EXCLUSION CRITERIA

The study population was composed of patients referred to the nephrology outpatient clinic who were being followed-up during the specified period. The sample was selected by convenience, according to the period of data collection, including all medical records that were properly filled out according to the research objectives.

2.4 EVALUATED PARAMETERS

The parameters evaluated within the consultation were information related to the patient's name, gender, date of birth, age, origin, and also clinical information referring to: complaints, clinical signs, physical examination, and underlying disease/associated disease.

The collection covered the information entered in the consultations performed by each patient in the outpatient clinic, but priority was given to the survey of what was included in the first and subsequent consultations up to a total of 10 consultations per patient.

2.5 ANALYSIS OF RESULTS AND STATISTICS

The collection was arranged in an Exel® spreadsheet, validated and checked, then transferred to the Statistical Package of Social Sciences (SPSS) version 21.0 program, in which the descriptive statistical analyses were generated: measures of position, dispersion and variability for quantitative variables and simple frequency for categorical variables. The tests were considered significant when $p<0.05$. (IBM, 2012).

3 RESULTS AND DISCUSSIONS

During the evaluated period, information from 228 participants and 528 attendances were analyzed.

Tables 1, 2, 3, and 4 characterize the sample in relation to the variables gender, age, weight, mean number of consultations and follow-up time in months, as well as BMI, and the outcome at the first visit.

The distribution of the 228 patients and 528 attendances showed that 118 were female (51.53%). The mean age was 57.5±16.43 years and the mean weight was 74.12±16.26. The mean number of consultations was 2.3±1.65 and the mean follow-up time was 19.45±24.66 months. The Body Mass Index (BMI), showed overweight in 80 patients (35.09%), Grade I Obesity in 51 (22.37%), and Grade II in 15

patients (6.58%). The results show that there is a request for return visits, that is, continuity of clinical follow-up, with 472 (89.56%) of patients in the general outcome and 216 (94.74%) in the outcome after the first visit.

Table 1: Sex frequencies among patients seen at the Nephrology Outpatient Clinic of a public university hospital in the city of Ponta Grossa/PR.

Variable (n=228)		**N**	**%**
Sex	Female	118	51,53%
	Male	111	48,47%

Source: author, 2022

Table 2: Weight, age, number of consultations, and follow-up time of patients seen at a public university hospital in the city of Ponta Grossa/PR.

Variable (n=228)	**M**	**DP**
Weight	74,12	16,26
Age at first visit	57,55	16,43
Number of consultations	2,3	1,65
Follow-up time (months)	19,45	24,66

Source: author, 2022

Table 3: BMI data of patients seen at a public university hospital in the city of Ponta Grossa/PR.

Variable (n=228)		**N**	**%**
BMI Classification	Low weight	10	4,39%
	Obesity grade I	51	22,37%
	Obesity grade II	15	6,58%
	Obesity grade III	4	1,75%
	Normal weight	52	22,81%
	Overweight	80	35,09%
	Not informed	16	7,02%

Source: author, 2022

Table 4: General outcome in relation to the first consultation of patients seen at a public university hospital in the city of Ponta Grossa/PR

		General		**First appointment**	
Variable (n=528 attendances)		N	%	N	%
Outcome of the 1st consultation	High	42	7,97%	9	3,95%
	Forwarded to another sector	11	2,09%	3	1,32%
	Return	472	89,56%	216	94,74%

	Not Informed	2	0,38%

Source: the author, 2022

The results show the prevalence of female gender and average age of 57 years, information that in the study of PICCIN et al., (2022) with respect to gender were similar, but divergent with respect to age. The profiles outlined in the studies by AGUIAR et al., (2020) and ROCHA et al., (2018) were in agreement regarding the predominance of the female gender and high average age, with an age range above 55 years. CARRERO et al. (2018), describes that women are more affected by the longer life expectancy and greater adequacy to lifestyle, while men tend to enter faster to TRS, with accelerated loss of kidney function. CKD prevalence studies, highlight overweight and obesity as predisposing factors for the onset and worsening of kidney failure. (AGUIAR et al., 2020; AMARAL et al., 2019; LEÃO, 2020), which is close to the results observed in our sample.

The information presented makes us reflect on the public who seeks specialized services and realize its relationship with other recently published studies confirms this profile that helps us direct health actions. According to data from the National Health Survey (PNS, 2019), the prevalence of NCDs is high in Brazil (45.1%) and affects all socioeconomic strata, being more intense in vulnerable groups. The higher prevalence of NCDs is observed with aging; and in women, who use more health services (both in consultations and hospitalizations) (SILVA cols., 2022).

We cannot forget the negative aspect that overweight and obesity can bring to people's quality of life, especially when associated with aging. There is scientific evidence that obesity is present in more than 50% of the elderly population with some type of NCD. The comprehensive care of the elderly population plays an essential role in the control of NCDs and the possibility of a longitudinal look at the occurrence of NCDs in the elderly population allows to know the magnitude and behavior of these diseases (SILVA et al., 2022).

The Ministry of Health has Guidelines and recommendations for the comprehensive care of chronic non-communicable diseases that were the basis for a Plan of Strategic Actions for the Confrontation of Chronic Non-communicable Diseases (CNCDs) in Brazil for the period 2011 to 2022, considering the CNCDs as a serious public health problem with major economic and social impacts. The main risk factors for NCDs are tobacco, unhealthy diet, physical inactivity and harmful alcohol consumption, largely responsible for the epidemic of overweight and obesity, high prevalence of hypertension and dyslipidemia (BRASIL, 2008; BRASIL, 2011).

As can be seen, there were difficulties in the implementation of the aforementioned action plan with the health actions in Primary Care, since we continue to observe the aging population strongly associated with poor outcomes, such as the risk factors that lead to NCDs.

With regard to outpatient follow-up, we see in the literature a context of both high spontaneous demand for care and inadequate referral (NUNES et al., 2021). They add that the justification could be attributed to the short period for adherence to conservative treatment or access of these patients to the nephrologist in more advanced stages. Such information converges positively with the evaluation of our results since we revealed an average of only 2 consultations per patient and a mean follow-up time of less than 2 years, which may suggest failures in outpatient management.

According to the Clinical Guidelines for the care of patients with CKD (BRASIL, 2014), the flowchart for the evaluation of CKD suggests the survey of patients at risk of CKD, such as elderly people, BMI > 30 and smoking; and our results show the presence of this information in the medical records, with the exception of smoking that was not described in the clinical consultation.

Table 5 shows the main general complaints identified in outpatient care. We confirmed that the medical records brought several complaints of diabetic/hypertensive nephropathy (94.88%), besides more specific complaints such as alterations in serum creatinine (47.82%), clearance (31.12%), edema (15.75%), other altered laboratory tests (27.13%), and nephrotic syndrome (68.88%).

Table 5: Frequency of general complaints in patients seen at a public university hospital in the city of Ponta Grossa/PR.

Variable (n=528 attendances)	N (%)
Complaint: Nephropathy	500(94,88)
Complaint: Other lab tests Altered	143(27,13)
Complaint: Anemia	22(4,17)
Complaint: Clearance ≤ 60ml/min	164(31,12)
Complaint: Creatinine ≥ 1.3 mg/dl	252(47,82)
Complaint: Cramps	10(1,9)
Complaint: Dyspnea	32(6,07)
Complaint: Edema	83(15,75)
Complaint: Fatigue	35(6,64)
Complaint: Nausea/Vomiting	16(3,04)
Complaint: Nephritic Syndrome	63(11,95)
Complaint: Nephrotic Syndrome	363(68,88)

Source: author, 2022

Key: Creatinine clearance: assessment of renal filtration rate;
Dyspnea: alteration in the efficiency of breathing; Nephritic Syndrome: clinical syndrome
Nephrotic Syndrome: clinical syndrome with hypertension, hematuria, edema, oliguria
It courses with edema, proteinuria, hyperlipidemia, hypoalbuminemia.

Table 6 shows the main clinical signs identified in outpatient care. We confirmed that the medical records brought clinical signs of glomerulopathies (69.07%) and nephritis (12.14%), besides other more specific ones such as arterial hypertension (49.15%), diabetes mellitus (22.01%), microscopic hematuria (31.88%), elevated serum creatinine (8.92%), oliguria (7.97%), and urinary tract infection (6.83%).

Table 6: Frequency of clinical signs in patients seen at a public university hospital in the city of Ponta Grossa/PR.

Variable (n=528 attendances)	N (%)
Clinical Sign: Oliguria	42(7,97)
Clinical sign: Nysturia	3(0,57)
Clinical Sign: Anuria	3(0,57)
Clinical Sign: Elevated Creatinine	47(8,92)
Clinical sign: Elevated urea	23(4,36)
Clinical Sign: Anemia	28(5,31)
Clinical sign: SAH	259(49,15)
Clinical Sign: DM	116(22,01)
Clinical Sign: Vasculitis	127(24,1)
Clinical Sign: Glomerulopathies	364(69,07)
Clinical Sign: Nephrites	64(12,14)
Clinical sign: Macro hematuria	6(1,14)
Clinical sign: Micro hematuria	168(31,88)
Clinical sign: UTI	36(6,83)

Source: author, 2022

Legend: Anuria: Urine volume equal to or less than 100 ml/day; Oliguria: Urine volume less than or equal to 400 ml/day; Nicturia: nocturnal predominance of diuresis; SAH: Hypertension Systemic; DM: Diabetes Mellitus; Macroscopic Hematuria: presence of live RBCs in the urine; Microscopic hematuria: presence of red blood cells in the urine, visible on urinalysis; UTI: urinary tract infection Urinary.

In the outpatient clinical evaluation several complaints and clinical signs were raised, which could relate to those more evident in the course of renal function loss, such as nephropathies, abnormal tests with elevated creatinine and creatinine clearance ≤ 60ml/min, and other important complaints related to the loss of renal function, such as anemia, dyspnea, cramps, edema, fatigue, nausea and vomiting

According to the protocol of the CKD care line in adults (BRASIL, 2022), the flowchart of specialized care, which is characterized by specialized CKD units (with or without renal replacement therapy - RRT) or High Complexity Care Units in Nephrology, provides, as soon as the patient is admitted, identification of warning signs of aggravation/complication, clinical evaluation or health surveillance. With regard to clinical evaluation, the objective would be to investigate from the medical history and physical examination the evidence of renal function loss in order to stage CKD in stages 1, 2, 3 (3A, 3B), 4 and 5.

Thus, we realize how relevant it becomes the consultation in nephrology with the survey of all necessary information, but it is clear in our results that at the same time that we bring characteristic signs other also important signs have low frequencies of appearance, which can lead us to question whether the anamnesis was performed in all patients, or even if some signs would not be so evident. WEBSTER et al. (2017) demonstrates that there are asymptomatic patients who will present casual findings, i.e., nonspecific, such as those described in our results, and that other patients will present symptoms directly related to progressive loss of renal function, without any chance of conservative treatment.

Renal function markers such as serum creatinine and creatinine clearance contribute to the early diagnosis of CKD and for this reason can also be listed among the complaints in the outpatient consultation, as evidenced in our results. A study by MALTA et al. (2019) showed the prevalence of these markers showing that GFR below < 60 mL/min was higher in women and with worsening associated with aging.

The presence of SAH and DM as important clinical signs identified in our study strongly corroborates the literature. CRYER et al. (2016) explain from the pathogenic mechanisms that propose the association between SAH and DM, through mediators of the adrenergic system, to the interrelation of both comorbidities with CKD. ROCHA et al. (2015), confirm the impact of CKD on the individual's life and the difficulty in noticing symptoms before a significant loss of kidney function, facts that the authors justify as essential for the follow-up of hypertensive and diabetic patients in primary care. Emphasizing, LIM et al. (2021), mention the presence of cardiovascular events with the progression of kidney disease, and reinforce the prevalent risk factors in CKD such as hypertension, DM, aging, dyslipidemia, anemia, malnutrition, as well as oxidative stress and inflammation.

The Clinical Guidelines for the care of patients with CKD (BRASIL, 2014), do not mention clinical complaints and signs to be raised in the outpatient consultation to aid early diagnosis, but the Manual of approach "Transdisciplinary Care to Chronic Renal" (Secretaria de Saúde MS, 2011) mentions that clinical signs and symptoms should be investigated in periodic consultations and with this our results would be complementing the information for early diagnosis, since the SUS guidelines and protocols can be changed, provided that in a supplementary way, considering the local specificities.

Table 7 shows the frequency of changes found in the physical examination performed during the outpatient visit. In the cardiovascular exam we noticed the presence of hypophonetic sounds (41.9%) and engorged jugular veins (16.8%) and in the limbs exam we saw the presence of edema (14.9%) and pain was reported both in limbs (13.6%) and abdominal (14%). Respiratory examination, although relevant, did not contextualize any clinical signs.

Table 7: Frequency of the investigation of the cardiovascular, respiratory, abdominal, and limbs physical exams of patients seen at a public university hospital in the city of Ponta Grossa/PR.

Variable (n=528 attendances)		**N (%)**
Cardiovascular: Hypophonetic sounds	Yes	221(41,94)
Cardiovascular: Engorged Jugulars	Yes	89(16,89)
Cardiovascular: audible systolic murmur pulmonary focus	Yes	2(0,38)
Cardiovascular: audible systolic murmur tricuspid focus	Yes	5(0,95)
Cardiovascular: audible systolic murmur aortic focus	Yes	11(2,09)
Cardiovascular: audible systolic murmur mitral focus	Yes	11(2,09)
Respiratory: Sparse thin rales	Yes	9(1,71)
Respiratory: Decreased MV	Yes	7(1,33)

Abdomen: Left flank pain/ hypogastrium/ mesogastrium	Yes	74(14,04)
pain	Yes	22(4,17)
Abdomen: Palpable kidney		
Abdomen: Increased tympanic/hipppanic tympanism	Yes	6(1,14)
Abdomen: VMG	Yes	7(1,33)
Members: Pain	Yes	72(13,66)
Limbs: Edema	Yes	79(14,99)
Members: Erythema	Yes	2(0,38)
Limbs: Injuries	Yes	26(4,93)
Limbs: Limitation to flexion/ atrophy	Yes	40(7,59)
Limbs: Decreased pulse	Yes	2(0,38)
Members: CVI Signs	Yes	27(5,12)

Source: author, 2022

Legend: MV: Vesicular Murmur; VMG: Visceromegaly; IVC: Vascular insufficiency

According to protocols for conservative care to patients with CKD (BRASIL, 2015), the assistance in nephrology care line provides the direction of physical examination based on the reason for referral. We noticed that our results are in accordance with the literature when we found that for referrals based on complaints related to urinary pattern changes, edema, and suspected kidney damage secondary to SAH and DM, it would be appropriate to assess nutritional status and skin pallor, in addition to the sectored physical examination of the chest, respiratory and cardiovascular system, abdomen, and limbs.

The Manual of approach "Transdisciplinary Care for Chronic Renal" (Secretaria de Saúde MS, 2011) mentions the anamnesis as an important tool to identify the possible causes of CKD, prevent and treat the associated risk factors, and in this should be performed the survey of clinical history and physical examination, in addition to the complementation of tests to direct the diagnosis.

FREITAS and CIRINO (2017) mention that clinical changes such as dyspnea, edema of the lower limbs or fatigue accompanied by signs such as high jugular venous pressure and pulmonary crackles characterize the complex clinical of Heart Failure (HF). BANERJEE, ROSANO and HERZOG (2021), help us in this close relationship between HF and CRD when they say that CRD is common in patients with HF, also associated with high morbidity and mortality.

These explanations reinforce how defining the physical examination is in the outpatient consultation, but, despite being well justified, we evidence flaws in the execution by showing low frequency of several items within the evaluation of the systems, making it clear that it, as well as the clinical history survey, may have been performed incompletely or even not at all in several patients.

Although the evaluation of the respiratory system was not relevant the literature converges to ensure that they can exist depending on the degree of loss of renal function, because as mentioned by CASTRO (2018), dyspnea, also identified by diminished vesicular murmur, can be referred by 65% of patients in

conservative treatment, not to mention that dyspnea associated with uremia is multifactorial and can involve anemia, hypertensive cardiomyopathy, fluid overload and pulmonary edema.

Table 8 shows the frequency of underlying diseases, associated diseases and stage of kidney disease. We verified the baseline diseases as SAH (38.52%), DM (24.86%) and renal lithiasis (16.13%). Concerning associated diseases, we also observed arterial hypertension (76.85%), diabetes mellitus (31.88%), dyslipidemia (47.63%), vascular disease (40.42%), and kidney disease (43.64%).

Table 8: Frequency of underlying diseases and associated diseases in patients seen at a public university hospital in the city of Ponta Grossa/PR.

Variable (n=528 attendances)		**N (%)**
Systemic underlying disease: DM	No	394(74,76)
	Yes	131(24,86)
	Absent	2(0,38)
Systemic underlying disease: SAH	No	322(61,1)
	Yes	203(38,52)
	Absent	2(0,38)
Systemic underlying disease: Renal lithiasis	No	440(83,49)
	Yes	85(16,13)
	Absent	2(0,38)
Associated Illness: SAH	No	120(22,77)
	Yes	405(76,85)
	Absent	2(0,38)
Associated Illness: DM	No	357(67,74)
	Yes	168(31,88)
	Absent	2(0,38)
Associated Illness: Dyslipidemia	No	274(51,99)
	Yes	251(47,63)
	Absent	2(0,38)
Associated Illness: vascular	No	312(59,2)
	Yes	213(40,42)
	Absent	2(0,38)
Associated Illness: renal cysts	No	401(76,09)
	Yes	124(23,53)
	Absent	2(0,38)
Associated Illness: renal	No	295(55,98)
	Yes	230(43,64)
	Absent	2(0,38)

Source: author, 2022

Legend: SAH: Systemic Arterial Hypertension; DM: Diabetes Mellitus;

It is understandable that NCDs have a high representation in morbidity and mortality, since they are directly associated with four risk factors: smoking, physical inactivity, inadequate diet and excess alcohol (DUNCAN et al., 2012). These authors also report an important "Adult Longitudinal Health Study (ELSA)"

for the investigation of NCDs, which highlighted the outcomes related to the risk factors cited, which would be overweight/obesity, cardiovascular disease, diabetes and chronic inflammation. Our results are similar to what was exposed when it demonstrates that hypertension and diabetes as two important systemic NCDs.

Renal lithiasis or nephrolithiasis is not described as an NCD, but it is on the list of diseases that course with acute pain, has frequent occurrence and direct relationship with food, which modifies the composition of urine (MAYANS, 2019). The author also states symptoms evident in this clinical condition are cramps, flank pain, hematuria, nausea and vomiting, symptoms that we evidenced in our study and help to confirm that lithiasis is a systemic-based disease found in the outpatient consultation.

AGUIAR et al. (2020) with respect to diseases associated with loss of kidney function state that the greatest chance of CKD was associated with age over 65 years, hypertension, hypercholesterolemia, which is in accordance with our study, since we observed as associated diseases hypertension, dyslipidemia, besides DM and vascular diseases.

The Clinical Guidelines for the care of patients with CKD (BRASIL, 2014), are redundant in information already discussed when it says that NCDs are responsible for high morbidity and mortality, that among the main types of NCDs, cardiovascular disease (CVD) is the one with the greatest epidemiological impact, that risk factors such as SAH, DM and aging bring greater risk and that CKD would be the complicating outcome of this line of reasoning.

We evidenced from this protocol something that reinforces the need for investigation of underlying and associated diseases, as seen in our results, because individuals categorized with a higher chance of developing renal function loss, are: a) People with diabetes (whether type 1 or type 2; b) Hypertensive person; c) Elderly; d) Carriers of obesity (BMI > 30 Kg/m²); e) History of circulatory system disease (heart failure); f) History of CKD in the family; g) Smoking; h) Use of nephrotoxic agents, remembering that many drugs require adjustments in patients with altered renal function.

Blood pressure levels, blood glucose levels, and lipid profile should always be monitored to pace the progression of the loss of function, not forgetting to assess the stage of CKD that the patient may be in, as there is a tendency for faster loss of kidney function in the more advanced stages of the disease.

The Protocol for Attention to SAH in Primary Care of the municipality of Ponta Grossa (FMS/PG, 2019), brings the Staging of CKD and the importance of performing it in order to assess the degree of renal impairment associated with hypertensive nephropathy.

FIGURA 4. ESTADIAMENTO DA DOENÇA RENAL CRÔNICA (DE ACORDO COM KDOQI/KDIGO)

Estágio	TFG (ml/min)	Descrição
1	≥ 90	Lesão renal + TFG normal ou aumentada
2	60 - 89	Lesão renal + TFG levemente diminuida
3A	45 - 59	Lesão renal + TFG moderadamente diminuída
3B	30 - 44	
4	15 - 29	Lesão renal + TFG severamente diminuída
5	<15	IRC estando ou não em TRS

TFG = Filtração glomerular em mL/min/1,73 m2

IRC - Insuficiência renal crônica (insuficiência ou falência funcional renal) TRS - Terapia renal substitutiva (diálise ou transplante renal)

Classificação	Albuminúria Persistente	Descrição
A1	< 30 mg/g	Normal a levemente aumentada
A2	30 - 300 mg/g	Moderadamente aumentada
A3	> 300 mg/g	Severamente aumentada

Fonte: Consenso KDOQI/KDIGO - Kidney Disease Outcomes Quality Initiative (K/DOQI) da National Kidney Foundation (NKF), Estados Unidos, 2002. Fonte: KDIGO 2012 Clinical Practice Guideline for Evaluation and Management of Chronic Kidney Disease

*Dano renal: qualquer alteração bioquímica (ex: micro ou macroalbuminúria) ou de imagem dos rins; TFG - taxa de filtração glomerular; IR - insuficiência renal. Fonte: Adaptado da Fundação Nacional do Rim
De acordo com a taxa de excreção de albumina, as pessoas podem ser classificadas como normo, micro ou macroalbuminúricas.

Source: https://fms.pontagrossa.pr.gov.br/coordenacao-de-atencao-primaria/

5 CONCLUSIONS

Faced with the growing increase of NCDs associated with CKD, we believe that it is urgent to encourage all strategies to prevent kidney disease through outpatient monitoring with an interdisciplinary team capable of providing comprehensive care and tracking crucial points of progressive loss of function such as changes in urinary pattern, biomarkers of kidney function, degrees of overweight and obesity, and diseases such as hypertension and diabetes.

Our study concludes that it is important to delimit the risk factors, complaints, clinical signs within the outpatient follow-up in nephrology, but seeking to compose the consultation with all the necessary items and recommended in the Guidelines and protocols of SUS, including the participation of the multidisciplinary team, with the Nurse acting directly in the prevention and control of underlying diseases and associated with kidney injury, in order to avoid or even postpone dialysis treatment, essential goal of conservative treatment in nephrology.

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Chapter 43

Crossfit effects and risks: a narrative review

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ABSTRACT
CrossFit, a recent method of multi-joint physical training, has been gaining popularity since its creation in the 90's. Allied to the growing number of practitioners, there has also been an increase in injuries in sport, resulting in the need to investigate these conditions. The study aims to analyze the main injuries and body regions affected, as well as the factors associated with such conditions. The prevalence of injuries in CrossFit practitioners ranged from 1.94 to 18.9 injuries per 1,000 hours of training. The most affected body regions were the shoulders, followed by the back and knees in addition to complaints of pelvic floor injuries and urinary incontinence in the female audience. Regarding the factors associated with injuries, the type of exercise performed, the time of CrossFit practice, gender and execution of the exercises stood out. It was concluded that the subject is little investigated in the academic area, therefore, it is necessary to deepen in research.

Keywords: Exercise; Wounds and Injuries; CrossFit.

1 INTRODUCTION

CrossFit is a multi-modality physical activity that requires high-intensity performance. This practice has been gaining a lot of visibility since its creation in the 1990s by coaches Greg Glassman and Lauren Glassman, in California. The performance of CrossFit brings several benefits, however, it is also observed risk factors that enable the occurrence of injuries, a motivational fact for this review article.

CrossFit has several objectives related to the wellbeing of the individual practitioner, which is related to the benefits offered by the sport. CrossFit is a physical activity known for being motivational and democratic, since it covers several physical areas, known as Multimodal Training, allowing different people to practice this activity, which directly contributes to the growth in the number of adherents to the modality. It relates the different directions of the practice with the risks of injuries. (SZELES et al. 2020)

Due to this vision of a practice with high intensity, it became important to analyze data on the risks of injuries during its execution. According to the above analysis, the regions most affected by injuries in CrossFit are the shoulders, knees and lumbar spine, these areas are related to such risks because they are areas of great impact. There are different risk factors for these injuries, such as incorrect performance of the exercise, some previous injuries and even gender, in which men present a higher number of injuries (DOMINISKI; SIQUEIRA; SERAFIM; ANDRADE, 2004).

The general objective of this work is to conduct a systematic review referring to the benefits, effects and risks of injuries during the practice of CrossFit, seeking through data and questions about the subject and central articles different information. In this way, we can reach conclusions about the sport and comparisons with other sports. Finally, the anatomical and orthopedic analysis of possible fractures caused by the practice of CrossFit in association with risk factors.

2 BIBLIOGRAPHIC REVIEW

The databases used were PubMed, SciELO, and Google Academic. The descriptors used were "exercises", "CrossFit" and "injuries and lesions". Nine articles were analyzed in which all identify the prevalence of musculoskeletal injuries in the Crossfit modality.

Dominski et al. (2018) highlights CrossFit as a new training modality, showing an alternative way for those not adept at other sports. The exercises performed aim to promote physical fitness through the development of components such as aerobic capacity, muscular strength and endurance, speed, coordination, agility, and balance, performing sports and functional exercises, contemplating Olympic lifting exercises, gymnastic movements, and aerobic conditioning, which can be performed at high intensity, thus providing the risk of injury. Information was gathered, with the injury prevalence rate

not being considered high when compared to other modalities, such as street running, handball, triathlon, gymnastics, soccer, and rugby per 1,000 hours of training. Moreover, regarding the areas of the body with the highest incidence of injuries, the shoulder is the most affected, related to the execution of exercises considered harmful because they have a high range of motion, rhabdomyolysis, usually triggered by poor exercise prescription or unsupervised performance, as well as knee and back injuries. Also related to this incidence is the presence of risk factors such as previous injuries, often obtained in other modalities, and a higher risk of injury in males. Galvão et al. (2003) defines rhabdomyolysis as a syndrome characterized by the destruction of muscle fibers, leading to muscle necrosis and the release of cellular substances such as myoglobin, hemoglobin, endotoxins, purine vasoactive toxic substances, creatine, potassium uric acid, calcium, phosphate, and creatine kinase into the bloodstream.

Hak et al. (2013) defined injury as anything that would prevent an individual from training, working, or competing in any way and for any period of time. The authors found similarities between injury rates sustained during CrossFit training and injury rates reported in Olympic weightlifting. Similar to Dominski et al, Szeles et al, Da Costa et al. and Xavier and Lopes, the results report a high incidence of shoulder injuries, caused by mechanisms involving the requirement that the shoulders move beyond their normal physiological range of motion coupled with muscle fatigue due to the high number of repetitions performed during CrossFit sessions, which may have effects on the glenohumeral joint, as the congruence of this joint depends on sustained muscle activation, as well as contributing to the loss of proper exercise technique and resulting injury.

Sprey JW et al. (2016) state that the CrossFit exercise routine consists of a combination of several synchronous exercises. These movements are often performed at high intensity with little or no rest between sets, hence the high risk of injury among practitioners. When it comes to the practicing public, one usually notices young people with experience in CrossFit. most of them are physically active, reporting the practice of other sports during the week, such as running, weight training, surfing, yoga, pilates, and cycling. Usually, this sport draws attention because it breaks the routine of dynamic workouts and presents a rapid improvement in physical conditioning. Although the practice of this sport may present a higher risk of injury for individuals under the age of 18, there are recent studies that show the efficiency and positivity regarding a better health condition for these practitioners.

Szeles et al. (2020) studied the injury rate in CrossFit participants through a baseline questionnaire printed and distributed to CrossFit boxes. In total, there was an assessment of the participants, and there was the presence of injuries, with the most reported being muscle injuries and joint pain. Right after, shoulders and lumbar spine were highlighted. Regarding these injuries, it is understood that, because it is a practice that involves high-intensity multi-articular functional movements, including weight lifting activities, gymnastics, running, cycling, polymetric training, and

rowing, a high susceptibility to injury is observed due to the continuous exposure to high-energy traumatic mechanisms that are associated with factors such as alternating loads and the presence of previous injuries.

Da Costa et al. (2019) collected data over a period of 12 months through a questionnaire applied directly to practitioners of gyms associated with CrossFit in the state of São Paulo, in which participants were evaluated, with the presence of injuries related to variables such as previous injuries and the time of CrossFit practice as risk factors, There were also associations between the presence of injuries and the athlete's proficiency, being 5 times higher the probability of injuries in competitive level athletes and 2 times higher in recreational level athletes than in novice athletes. Regarding injuries, as in the previously cited article, the shoulder and lumbar spine were the most affected sites. Xavier and Lopes (2017) relate injuries from CrossFit to a series of factors that will be divided into intrinsic and extrinsic, being the extrinsic those linked to the preparation or practice of CrossFit, involving errors in planning and execution, problems in the training surface, duration, strength, balance and physical conditioning. Regarding the intrinsic ones, they are classified as those inherent to the body, including biomechanical and anatomical abnormalities such as flexibility, injury history, bone density, anthropometric characteristics, body composition, and cardiovascular and cardiorespiratory conditioning.

Still on injuries, Xavier and Lopes (2017) characterize them as a challenge to specialists for having a slow recovery and highlight as the most common injuries in the sport the contusion, distention or stretching, cramp and tendinopathy. An online questionnaire was made in Google Drive/Plans, exclusively for Crossfit practitioners in two gyms in Belo Horizonte, in which, in the sample of CrossFit practitioners, 56.2% had already presented some injury related to the practice in the past, and the most common locations were the shoulder, the spine and the knee. Variables such as gender, length of time practicing the activity and daily training time were associated to the injuries, with a higher proportion of men who presented injuries and higher in patients with a high average time of practice. Besides, the article highlights social habits surveyed, such asThe use of alcoholic beverages, cigarettes, and dietary supplements as factors that predispose the appearance of musculoskeletal injuries.

When it comes to the practicing female public, the risk of lesions of the pelvic floor musculature associated with complaints of urinary incontinence is noted. Ketiane et al. (2021) point out the practice of high intensity physical exercises as a risk factor for the appearance of stress urinary incontinence in women, a fact explained due to the increase of intra-abdominal pressure during training, causing an impact force on the floor three to four times greater than the body weight, causing an overload of the pelvic musculature. When there is no such balance, there is an excessive increase in intra-abdominal pressure, favoring the involuntary loss of urine. Allied to this, it was observed the relationship between the type of previous delivery, occurring greater episodes of urinary incontinence during practice, a fact

that is justified by labor and vaginal delivery favor lesions in the pelvic soft tissues, vaginal walls, rupture of the endopelvic fascia and nerves, these structures represent an important factor in the maintenance of urinary continence, besides the weight gain during pregnancy can raise the risk for the onset of UI. Yang et al. (2019) mention the three types of exercises that most cause incontinence: the Double Under, the Jumping Rope and the Box Jump, all of them having in common the presence of jumps with maximum reaction of the feet with the ground and/or box, abrupt changes of movements, squats supporting large loads and cyclical movements causing, fact that causes constant pressure on the pelvic floor and increases in abdominal pressure.

Regarding the prevalence sites of injuries, there was a consensus in the analyzed articles, and it can associate the affected joints to the number of exercises with high repetitions and movements performed in high amplitude and speed, a combination that, together with other factors, seems to offer a high risk of injury to the CrossFit practitioner (DOMINSKY et al., 2018; XAVIER AND LOPES, 2017). However, the result of the epidemiological study mentioned above shows that the injury rates in CrossFit are similar or even lower than those of other sports, contrary to the common sense that associates such modality to a high incidence of injuries when compared to other modalities (DOMINSKY et al.,2018). Thus, when assessing such incidence, it is possible to associate these levels to the increase of practitioners due to the growing popularity of the sport.

When comparing the risk factors mentioned in the articles, divergences were found regarding the variables, with gender, time of practice and daily training, history of injuries, planning and execution errors being among the main ones cited (DOMINSKY et al., 2018; SZELES et al., 2020; DA COSTA et al., 2019; XAVIER E LOPES, 2017). Thus, it is worth noting the importance of care that aims to prevent the occurrence of injuries and minimize injuries, such as the need to search for professionals specialized in the sport, in order to design individual strategies that respect the limits of each individual, prioritizing the improvement and enhancement of performance with appropriate breaks and strengthening exercises to reduce the overload on the musculoskeletal system. Furthermore, it is clear, from the complaints of pelvic floor lesions and urinary incontinence, the need for strengthening the pelvic muscles, in order to increased muscular contraction capacity and endurance, preventing injuries when practicing CrossFit (KETIANE ET AL., 2021).

Regarding the methodology of the cited references, there is a discrepancy in terms of data analysis, with two of the studies having data obtained through online questionnaires that limit the full knowledge of the injury and its implications, in addition to the follow-up of the evolution of these injuries, both in terms of their treatment and the possibility of return of the practitioner to the sport. It is also possible to see in this type of sampling the possible presence of selection bias due to the collection method. Another impacting factor of the study was the small number of articles that approached the

presence of injuries in the CrossFit context, a fact explained by the recent popularization of the sport, which is a theme that is not very well studied in the literature.

3 FINAL CONSIDERATIONS

It is understood in this review study that the injuries in the CrossFit sport modality are due to the high intensity of the multi-articular movements, thus becoming susceptible to musculoskeletal injuries, especially in the shoulder joints, knee and lumbar spine. Concomitant to the exposure to traumatic mechanisms, which demand a high associated load, it can be related to previous injuries, prolonged practice time, inadequate execution, and a higher probability in individuals who are beginners in the sport. However, it is still inconclusive that CrossFit causes more injuries than other sports, thus being compared as equal to others. Therefore, it is a little investigated subject that demands more in-depth research.

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Chapter 44

Thanatology: a literature review

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ABSTRACT
Thanatology is a recent area of study, and can be defined synthesized as the study of death, according to the Houaiss dictionary, thanatology is established as the "Theory or scientific study on death, its causes and phenomena linked to it". Because thanatology covers several phenomena related to death this makes it a science with great participation in other areas that may be directly or indirectly related to death, such as palliative care, forensic anthropology, psychology and physiology. The knowledge of thanatology about the processes that take place in the ante-mortem are of paramount importance within palliative care, because it is necessary to have the information of the psychological processes that present the patient in terminal stage, in order to answer doubts that he can present, trying to alleviate as much as possible the suffering that the patient will go through during all the processes of an imminent death. The understanding of post-mortem processes are very related to forensic anthropology, having as a fundamental arm of thanatology. This science is responsible for studying the causes that generated death, investigating the various nuclei in which the individual is inserted, so that not only the cause of death is investigated, but in every area that that individual was surrounded.

Keywords: Thanatology, Forensic; Anthropology; Palliative care.

1 INTRODUCTION

Death is defined as an inevitable and universal process, occurring with all living beings. Characterizing death only as the permanent and irreversible cessation of all biological functions would be a very simplistic way of observing it, since it comprises periods ranging from the diagnosis of a terminal disease to the study of corpses after death.

In the present article we approached aspects of the period that precedes death, Palliative Care, bringing from its concepts to its historical aspect. Recognized as a revolutionary method of supporting health, Palliative Care is focused on the holistic care of patients in terminal stages, minimizing their suffering by controlling symptoms and contemplating psychological and spiritual aspects. In this way, the acceptance of death by the patient and family is promoted, as well as the experience of this natural process, overcoming the culture of denial of death.

Considering the importance of studies before thanatological research, being a tool of extreme importance, transposing to other issues governing society, thanatology is the part of forensic medicine that deals with death, the phenomena related to it, and the legislation that concerns it. In other words, it is a science that will emerge with the purpose of clarifying the reality of death, the characteristics before and after death, and, in this way, collaborate to the differential medico-legal diagnosis. Within the researchers of thanatology, there are still divergences to conceptualize death, generating several discussions.

Given the importance of the topic for health care workers, this article seeks to unravel the study of thanatology from the perspective of complicating factors of the grieving process in the most diverse causes of death, age, and cultures to help these professionals recognize and understand their patients.

Besides the specific analyses about the death process, the issue of thanatological understanding throughout the various historical periods will be addressed, relating the context of each period of the recent past and the present with the conception and interpretation of the human being in the pre- and post-death period. It is important to point out that man's interpretation of any individual decision is ruled mainly by knowledge and by the context in which each individual is inserted, causing a range of variation in the interpretation of actions in the same historical period. The approach to be unraveled is in the midst of a general conjuncture in the Western conception, something that is closer to the research objective.

As a study objective before the thanatological analysis, Forensic Anthropology is an extremely useful tool. The practice of this science allows us to identify diversities before the material offered, such as age, sex, social hierarchy, work, cause of death, social situation, among other things about the subject studied. It is extremely important to approach the protocols in the correct way, because the historical material is a cultural heritage of every society, and the study of the corpse leads us to understand about the various nuclei in which the individual was inserted.

2 MATERIALS AND METHODS

A bibliographic research was carried out, seeking information about Thanatology, by means of searches on Google Scholar®, PubMed®, on the SciELO® database, books, articles and other works that deal with the theme.

3 ANTE MORTEM

3.1 PALLIATIVE CARE

According to Cabe-Willians Wilson (2009), the fastest growing age group in contemporary civilization is the elderly between 80 and 89 years old. Despite this, the increase in the population group corresponding to this age does not necessarily imply a better quality in old age or after the disease process. According to Galriça Neto (2010), the scientific evolution in the area of health, added to the intense search

for the cure of diseases, has given rise to a culture of denial of death, postponing the studies and health interventions aimed at an appropriate end of life, in situations where a cure is not guaranteed. Thus, death and its process by health professionals were despised and seen as failure and failure.

Facing this complex and challenging portrait of reality, Palliative Care presents itself as an innovative form of assistance in the health area and has been gaining space in Brazil in the last decade. It differs fundamentally from curative medicine for focusing on integral care, through prevention and control of symptoms, for all patients facing serious, life-threatening diseases. This concept applies, in fact, to the patient and his surroundings, who get sick and suffer together - family members, caregivers, and also the health team (Matsumoto, 2012 apud GOMES; ETHERO, 2016).

Palliative care started during the Middle Ages and the Crusades, in the period of antiquity by religious organizations. At this time, it was common the existence of houses called Hospices, which corresponded to inns destined to take care of pilgrims and travelers, sheltering poor people and, mainly, performing the work of relief of suffering rather than the search for cure. The term palliative, from the Latin pallium, later used, refers to the cloak worn by the knights of the Crusades to protect themselves from storms. The nomenclature reflects its main idea, to protect and support (MATSUMOTO, 2012).

Officially, through the physician, nurse and social worker Cicely Saunders, Palliative Care came to light in the 1960s. Cicely dedicated her efforts to the relief of human suffering and initiated palliative care by creating in 1967, in London, the St. Christophers Hospice, the first service to offer holistic care to the sick, concerned with their symptoms, as well as mitigating the process of psychological and physical illness and facing death (Du Boulay, 2007).

A few years later, in 1970, the Swiss psychiatrist living in the United States, Elisabeth Kübler-Ross, brought this revolution to America, after meeting Cicely Saunders. In 1974, in the state of Connecticut, in the United States, Elisabeth founded a hospice, a fact that leveraged palliative care, which started to be used in several countries for the sick who had no therapeutic possibility of cure (MATSUMOTO, 2012).

In 1990, the World Health Organization (WHO) recognized palliative care and defined its concepts, which initially focused on

cancer patients, being an axis for the treatment of these patients (WHO, 2007).

Today the WHO has a broad concept of the actions promoted by palliative care, and the spectrum of patients to be treated has been expanded:

> Palliative care is an approach to improving the quality of life of patients and families facing life-threatening illness through the prevention and relief of suffering by early identification and thorough assessment and treatment of pain and other problems, physical, psychosocial and spiritual (WHO, 2002).

Based on the WHO concepts, Matsumoto (2012) listed the main principles of palliative care:

1. To promote the relief of pain and other unpleasant symptoms through the prescription of drugs (Morphine, Haloperidol, Diazepam, and Nystatin), as well as contemplating the psychological and spiritual aspects. The signs and symptoms of patients at the end of life are very similar, regardless of the disease. The most common symptoms, which arise in the last moments of life and are attended to patients in Palliative care are: "anorexia, asthenia, mental confusion, constipation, dry mouth, dyspnea, nausea and vomiting, pain, delirium, sweating and urinary dysfunction, as well as altered sleep/wakefulness and depression." (KIRA, 2008).
2. Affirm life and consider death as a normal process of life
3. Do not hasten or postpone death, making it clear that palliative care has nothing to do with euthanasia
4. Integrate the psychological and spiritual aspects in patient care. The terminal illness and the grieving process that patient and family are forced to live with is a novelty that both are unprepared for. This brings feelings of anguish, fear, and depression that individual spirituality comforts each patient.
5. To provide a support system that enables the patient to live as actively as possible until the time of his or her death.
6. Provide support system to assist family members during the patient's illness and to cope with bereavement. Mental health disorders have a major impact on people's lives and on society. Better palliative care potentially reduces this impact on the family and social nucleus of the patient who also becomes ill
7. Multi-professional approach to focus on the needs of the patients and their families, including bereavement support.
8. To improve the quality of life and positively influence the course of the disease, i.e., to control the symptoms of the patient's illness process, to meet the patient's wishes and needs, and to enable the patient to live with his or her family
9. It should be started as early as possible, together with other life-prolonging measures, such as chemotherapy and radiotherapy, and include all necessary investigations to better understand and control stressful clinical situations. According to the WHO definition (2007), palliative care should be initiated from the diagnosis of severe, progressive and incurable illnesses that threaten the continuity of life. However, if this were fulfilled as it should, a large contingent of patients would continue without palliative aid, because there is no availability of health professionals who would be able to meet the sick (ARANTES, 2012).

Thus, it can be listed as the main guide for assistance in palliative care: "prevention and symptom control; psychosocial and spiritual intervention; patient and family as a unit of care; autonomy and independence, communication and multiprofessional teamwork" (GOMES; OTHERO, 2016) .

The patient on palliative care wishes to be understood, requiring health professionals to rescue the empathic interpersonal relationship, possessing a relationship grounded in compassion, respect, and humility. The implementation of these principles is only possible through communication skills with these terminally ill patients. One should seek open and active communication, in a process of trust and bond with the patient and family, always considering the availability of information through slow truth along with techniques such as the Spike protocol.(SILVA; ARAÚJO, 2012)

3.2 MOURNING PROCESS

The grieving process is characterized by strong emotions and feelings that the expectation of loss or death of someone. Contrary to what many people think, grief begins when the news of the disease is received in cases of terminally ill patients, and this is a multifaceted process in which several biological-psychological factors govern the behavior and attitude of those who experience it, and must be understood by the professionals responsible for palliative care in order to generate a better reception.

Research on grief verifies how losses affect meaning structures in life, in a situation of existential transition. Epidemiological data point out that deaths after widowhood due to suppression of the immune system, as Parkes (1998) points out. Psychic disturbances can manifest as physical symptoms and physicians are sought by bereaved people with various symptoms including: depression, insomnia, anorexia, increased use of alcohol and drugs. These symptoms are related to the grieving process and not seen as a disease, as attested by the author's studies, which point out singularities in the grieving process, emphasizing the important role of cultural aspects, developmental stages, and risk factors for complicated grief. Currently, the concern is with the bereavement of the elderly, for the loss of caregivers, financial problems, loneliness, and serious illnesses. Elderly people are burying adult children, living, sometimes alone, this very difficult loss. Parental grief is a current issue due to the increase of violence in big cities, as Rangel (2005) points out. Complicated grief, previously considered pathological, raises controversies. According to Franco (2010), care must be taken not to classify bereavement as dysfunctional. It is essential that risk factors are identified; socio-cultural trends and observe what needs to be cared for in bereaved people. Suicides and accidents bring suffering, involving violence and guilt, on the other hand, prolonged illnesses with suffering are stressful, making grief difficult.

Maria Helena Franco, a Brazilian specialist in grief and member of the International Work Group on Death, Dying and Bereavement, presents the issues researched on the subject in the world and in Brazil. In a book she coordinated (Franco, 2010) she indicates that mourning is a normal process of elaboration of losses, as the current version of DSM V states. In this work, mourning that lasts more than two weeks is considered as depression, requiring professional care, a form of medicalization of a natural process of existence, as a form of elaboration of losses. The author emphasizes the controversy of the issue by differentiating the grief aroused by the loss of significant people and depression. More recent theories seek to understand the singularities of the mourning process, the personal history, and the construction of meanings from the elaboration of the loss. There is an understanding that bonds are continuous and do not end with death. The understanding of the dual process of mourning, cited by Mazzorra (2009), considers the suffering for the loss concomitant with the attempt to reorganize life. Bereaved people oscillate between the two roles in readapting life without the deceased.

Elizabeth Kubler-Ross, Swiss psychiatrist, was one of the first professionals to deal with psychosocial aspects in terminally ill patients. In her book On Death Or Dying (1969) she dealt with the five phases of the grieving process in patients who received a prognosis of terminality. These phases are described as follows.

3.2.1 Denial Stage

The denial stage consists of the denial of the negative diagnosis of a loved one or of oneself, and many times patients seek homeric explanations to invalidate the medical opinion. According to Kubler-Ross (1969) "Denial, or at least partial denial, is used by almost all patients, either in the early stages of the disease or soon after the finding, or sometimes at a later stage."

This stage can act as a shield, protecting the patient from the intense news in the previous periods, until the patient can reason about it. Kubler-Ross further states that "denial is a temporary defense, soon being replaced by partial acceptance."

3.2.2 Anger Stage

The denial stage is followed by the anger stage, where the patient presents a very intemperate emotional picture, where angry outbursts are common, and directed at any person or object. According to Kubler-Ross, "In contrast to the denial stage, the anger stage is very difficult for the family and hospital staff to deal with. This is due to the fact that this anger spreads in all directions and projects itself into the environment, often for no good reason."

3.2.3 Bargaining Stage

The Bargaining stage is subsequent to that of anger, here the patient usually calms down and seeks various ways to reverse his condition, where he has the false idea or conviction that his terminality can be reversed, and seeks means to achieve an inexorable cure for his illness. Paraphrasing Kubler-Ross (1969) "Bargaining, in reality, is an attempt at postponement; it must include a prize offered "for good behavior."

At this stage it is common for patients to make promises, counting on some "entity" to cure their illness if the promise is kept.

3.2.4 Stage of Depression

In this stage the patient makes the transition from a fictional idea of a possible resolution of his case to the cold reality of his prognosis, which accompanies a deep depression and desolation. The patient may have a desire to remain secluded in his room for long periods of time in a stage of anhedonia and anergia.

> When the terminally ill patient can no longer deny his illness, when he is forced to undergo further surgery or hospitalization, when he begins to show new symptoms and becomes weaker and thinner, he can no longer hide his illness, His aloofness or stoicism, his anger and rage give way to a feeling of great loss KUBLER-ROSS (1969).

3.2.5 Acceptance Stage

> A patient who has had the necessary time (that is, who has not had a sudden and unexpected death) and has received some help to overcome everything as we described above will reach a stage where he will no longer feel depression or anger about his fate" Kubler-Ross (1969).

In this stage, the patients accept their imminent future, what after so long in a relentless fight against inevitable death, which usually leads to a feeling of relief, making the patient able to eat and sleep better. Still according to Kubler-Ross (1969) "Do not mistake acceptance for a stage of happiness. It is almost an escape from feelings. It is as if the pain had faded, the struggle had ceased, and the time had come for the final rest before the long journey.

4 MORS

4.1 TANATOLOGY

Forensic thanatology is the part of legal medicine that deals with death, related phenomena, and the legislation that concerns it. In other words, it is a science that will emerge with the purpose of clarifying the reality of death, the characteristics before and after death and, in this way, collaborate to the differential medico-legal diagnosis. The thanatological examination is of great importance forensically, defining the time, cause and even the place of death, also using peculiar characteristics present in the corpse, and even finalizing a case that is difficult to elucidate through the analysis and examination of the dental arches.

4.2 CONCEPT OF DEATH, CRITERIA, PROTOCOL AND THE MEDICAL BEING IN FRONT OF IT

Medical-legal thanatology is the part of Forensic Medicine that studies death and the deceased, and their repercussions in the legal-social sphere. Today, through the criteria established by the Federal Council of Medicine (Resolution CFM no 1,480/97), death, for purposes of removal of organs and tissues for transplants, is defined by what is called brain death. CFM Resolution #1826/2007, in turn, provides about the legality and ethical character of suspending therapeutic support procedures when brain death is determined for a non-donor individual, in accordance with Law 9434, dated February 4, 1997.

The simplest and most traditional definition of death is the one that considered it as the total and permanent cessation of vital functions, and thus the law admitted it, without trying to delve into its details. This concept, previously admitted, was for a long time a pacific point, until the modern processes of organ and tissue transplantation appeared, and, from then on, the exact moment to consider someone dead was

reviewed. It is not possible today to applaud the idea that the body can only be in two states - life or death -, because it is known that death is produced by successive stages, in a certain space of time, individualized and dependent on its cause, and, therefore, it is not simply a moment or an instant, as the spiritualists defend, but a real process.

Earlier, in 1967, Harvard's Breecher (Med. Tribune, N.Y., Dec. 25, 1967) said, "The desires to accept the criteria of irreversible brain injury to formulate a new conception of death proceed from certain created interests." And among these created interests, he cited those of families who wish to end the interminable agony by suppressing resuscitation measures; those of surgeons, who seek fresh organs for transplantation; and those of society at large, alarmed at the expense of caring for hopeless cases deemed unrecoverable.

The criterion of brain death, among others, is based on the cessation of electrical activity of the brain, both of the cortex and of deeper structures. However, interpretation by EEG has created several controversies. Wertheimer and Jouvet (Press Medical, 1969, 67, 87) were the first to propose a new definition, that of brain death, based on clinical and electroencephalographic criteria. A silent EEG is indicative of death when persistent. However, barbiturate intoxications have shown that the apparently isoelectric EEG can persist for hours or days, and the patient can recover (Haider et al., British Medical Journal, A. transl., p. 314, August 3, 1968 - Statistics of 5 cases).

Revilard de Lyon also proposes the interruption of cerebral circulation proven by angiography and the absence of reaction to atropine.

Gerin and Frache present as irrefutable and irreversible proof of death the electroencephalogram associated with the intracardiac injection of epinephrine. The permanence of a null tracing, without the slightest oscillation, allows a diagnosis of real death (Villanova y Morales, Injertos y Transplantes del Cadáver, Madrid: Editora Paz Montalvo, 1969).

The German Society of Surgery asked its committee on resuscitation and organ transplantation for a definition of death. The committee, in reviewing in Der Chirurg (April 1968, 38, 196) and other German journals, reported that, in practice, there are three conditions for defining death:

I. The brain is dead when a) classic signs of death are observed, or b) circulatory depression has caused a respiratory or cardiac arrest that does not respond to treatment at the end of the incurable and progressive disease or in the course of a gradual loss of vital functions;

II. Brain death can occur before the heart beats cease (traumatic brain injury); the brain will be considered brain dead after 12 h of unconsciousness with lack of spontaneous breathing, bilateral mydriasis, and isoelectric EEG, or when the angiogram reveals cessation of intracranial circulation for 30 min;

III. It can happen that the heart stops and the central nervous system is intact or able to recover. If the heart beats do not reappear, the patient can be considered dead, but if they reappear, even without reestablishing consciousness or spontaneous respiration, the usual intensive care procedures must be followed until brain death is demonstrated.

The diagnosis of BD in Brazil is currently based on Resolution No. 2173/17, which replaced CFM Resolution No. 1480/97. This resolution even guides the development of protocols, approved by the Ethics Committees of each institution, for this purpose. "In the 20 years that Resolution 1480/97 has been in effect, more than 100,000 brain death diagnoses have been made in Brazil, without any challenges. However, social transformations and the evolution of medicine have led the CFM to update the criteria," explained the rapporteur of Resolution No. 2173/17, neurologist Hideraldo Cabeça. According to law 9434/97, the removal of tissues, organs, or human body parts for transplant or treatment must be preceded by a diagnosis of brain death, verified by two physicians not participating in the removal and transplant teams, using clinical and technological criteria defined by a CFM resolution. CFM Resolution No. 2173/17 establishes that procedures for determining brain death should be initiated in all patients presenting with nonperceptive coma, absence of supraspinal reactivity, and persistent apnea.

The current physician, trained to exercise an increasingly sophisticated medicine, with exams, surgical procedures and drugs that are more and more complex and expensive, many times under pressure from long working days and exhausting shifts, ends up creating psychological defense mechanisms against death, which represents the total frustration of all his expectations and efforts (besides always bringing him the awareness of death itself, since only time separates him from the situation of the dying patient in front of him). On the other hand, today's society has demanded from physicians, in an increasingly intense way, an immediate ethical and legal position regarding all issues, especially those related to death. It is also worth remembering that our current pluralistic society is totally at the mercy of opinion leaders with intentions that are not always right. It is up to the physician, therefore, to first reflect and mature his own personal concepts about death, for an adequate individual and later collective position on the subject of brain death. It is also essential to constantly study and update the concepts and criteria related to its diagnosis. Only in this way will the physician be well prepared to face this conflicting and challenging situation, which is increasingly frequent in daily practice.

4.3 BIOPSYCHOSOCIAL ASPECTS OF GRIEF

Mourning is an object of study in several areas of health, and this process can go from intense psychological suffering to physical suffering, which can present symptoms such as changes in the immune system, insomnia, alcoholism, and anorexia. Parkes, a great scholar in this area, considers mourning to be a profound existential transition. Thus, being a primarily emotional loss, several authors seek to understand the rituals and the passage through this process in the various biopsychosocial aspects involved.

The post-industrialization lifestyle also intensifies this psychological suffering, troubled daily routines, anxiety about the future of the country and the fear of dismissal are examples of factors preventing

an adequate mourning period to deal with these feelings, thus may be a factor of intensification and chronification of the symptoms cited in the paragraph above. Accordingly, urbanization has brought with it a high number of deaths from traffic accidents, drug abuse or violence, all of these cited risk factors for complicated bereavements.(KÓVACS, 2008).

The grieving process can be aggravated by individuals who try to repress the feelings associated with grief. Thus, cultures that tend to "standardize" people and deny feelings can be a complicating factor in this process. In this bias, for example, adolescents, often due to a tendency to isolate themselves and repress their emotions, don't have their mourning recognized and may have great difficulties in this "existential transition". (KÓVACS, 2008).

The way in which death occurs also influences how people will deal with it. Long-term death processes, in chronic or degenerative diseases can cause a feeling of "ambivalence" between sadness for the death of the loved one and relief for the end of suffering, but this can cause guilt to people close to them during mourning and aggravate the process. Also, the affinity of the individual with the deceased is added as a factor for complicated bereavements (KÓVACS, 2008).

> According to Kóvacs apud Rando (1992/1993): There are serious consequences when people who present a risk for complicated grief processes are not cared for. It is essential to: (a) identify risk factors; (b) outline socio-cultural and technological trends that may exacerbate them;(c) observe what needs to be worked on to avoid complicated mourning.

In each period of human history, each society understood and dealt with the process of death in a different way, with its own particularities. To make a correct interpretation, it is necessary to analyze the context in which each culture is inserted and how each group understands about the pre- and post-death, considering its religiosity and customs.

> It is important to understand that everything that is actually said, implied, or misunderstood will be interpreted: people and families listen through very different historical, cultural, and ethnic filters. Therefore, the experience of illness cannot be considered a simple reflection of the pathological process in the biomedical sense of the term, but rather a cultural construction expressed in 'specific ways of thinking and acting'. The profane knowledge of the interviewees obeys their worldview to tell about the sufferings or surprises that the body reveals, but medicine does not listen from this ear, because it participates in a wise culture, proper to a restricted group with other values and knowledge. The doctor's language is not that of one who lives the bodily experience, immersed in his own cultural attitudes and values, which the medical culture is unaware of. (GIACOMIN et al. pp. 2491-2492)

De Franco (2017) states that, in general, the process of industrialization of contemporary society has emptied the religious content of death as an elaboration of a collective project of coping with the chaos caused by death. The author portrays that due to the conceptions of extreme productive capacity and the spread of a social mentality focused on individualism in the twentieth century, the Western world ended up keeping death away from social coexistence, however, despite all these efforts science has not yet managed

to overcome death, despite the reigning ideology that our society is a society that provides for the flourishing of life. A clear example is the valorization of the myth of life with "the thought that we can produce life, thanks to our medical science, our agriculture, our animal husbandry, and our 'progress'" RODRIGUES (2006).

In this sense, in general, one can divide the social understanding of death into two periods, before and after industrialization. "Until the early twentieth century death was a factor of social commotion that was always expressed through a series of ritual behaviors notably of diverse religious matrices so that the community and its members could reunite in the face of the chaos caused by the death of one of its members" DE FRANCO (2017). After this period, the "death, which ceases to be "everything", a constituent part of normal life and the personal cycle, to become "nothing", hidden from everyday life, treated with apparent indifference" RODRIGUES (2006).

Another important factor in changing the social representation of death is the advancement of technology during the 20th century. De Lucas Freitas (2013), states that death in the hospital became more representative than the process of dying with relatives or alone. The advances in science allow prolonging life, patients can be condemned to months or years of vegetative life connected to tubes and devices, i.e., it was extirpated from the dying not only the knowledge about his own death, but also his right to it - it is the forbidden death that presents itself (ARIÈS, 2003).

> It is increasingly noticeable how much the Western world avoids anguish and seeks the neutralization of discomfort and psychic pain (Elias, 2001; Ariès, 2003). The contexts of hyper-medicalization and emotional discretion present in our contemporary culture are two relevant factors in understanding the experience of mourning (Kouri, 2005, 2010).The denial of mourning occurs through social practices such as, for example, the imposition of returning to work after seven days, as if there was a predetermined period for going through this process. (DE LUCAS FREITAS, 2013 apud Elias, Ariès, Kouri).

Analyzing the human interpretation in relation to the (increasingly) rapid technological advancement in health care, De Lucas Freitas (2013) opens a discussion in the sense that modernity is always associated with low productivity and lack of ability to deal with their feelings and this is not tolerated by modernity. Expressions linked to sadness, frustration, and loss have low tolerance in contemporary Western society, and it is necessary to re-signify the value of loss to the bereaved.

In this sense, Freud was the first to open discussions related to mourning. According to the author, mourning is a normal experience, specific to the significant loss of an object. Such experiences are conscious and imply an impoverishment of the world since the lack of its object of investment. Its symptoms are the same as those of melancholia, except that self-esteem is not disturbed (Freud, 1917/2010).

Thus, Da Soledade (2021) portrays that in today's contemporary society one can observe the behavior of watching and punishing developed by Focault to discipline from the use of social networks,

where the subject before a need for approval from the other exposes himself and this other, by putting himself in the position of watcher and through the sense of morality, decides to approve or not the behavior of the exposed subject. Since the culture of cancellation is a way to discipline the individual who has his behavior disapproved, he is judged and his penalty is to be forgotten, after suffering several virtual attacks, forgetfulness that may result in the virtual, media and/or social death of man.

Bringing it into the context of the 21st century, "a new social rupture about death and dying is occurring, the COVID has forced society to "face death head on". Death that was previously veiled, avoided, little commented on and now "knocks at the door" making individuals leave the illusory "comfort zone", which is configured by avoiding even talking about death." DA SOLEDADE, 2021. In parallel to this, Hortegas; Santos (2020), brings a view that the pandemic of COVID-19 brought a radical change in the funeral process, since there is a decrease in the possibility of gathering family and friends in the sharing of mourning. Today the preparation of the body becomes closed due to the risk of transmission of the virus and may induce an increase in the feeling of individual loneliness of individuals who go through this process alone, causing, in a way, the interpretation of death to return to that which stood out in the early twentieth century with an increase in individuality, but with an increase in diseases related to this, such as depression, as a result of the increasing induction to collectivity occurred from the twenty-first century.

5 POST MORTEM

The determination of the cause of death is of extreme importance to thanatology. In this vein, the need for forensic anthropology is emphasized, since the reflection of many cultures is given through rituals and funeral ceremonies, as well as forensic anthropology studies the ancestry and living standards of societies, examples being the work, social position, age, gender, reproduction and health conditions offered

The collection of human materials is done carefully. Thus, all human parts are carefully selected and non-human parts discarded, however, mistakes about this rarely happen. This means is done by legal experts and necropsy agents, and training is required. The methodology for removing human materials for anthropological research in fully skeletonized corpses and in a state of preservation is started by cleaning with soft bristle brushes to remove unwanted materials for research, as well as washing bone parts with running water and neutral detergent.

For putrefying corpses, surgical materials are used to discard materials that are of no use to the investigation, taking all necessary care not to remove the parts that still have some anthropological use. Thus, the parts without use are placed in a machine that liquefies such parts, which is an adaptation of industrial fryers by heating air, and are only acquired by specific manufacture and upon legal request. The process consists in leaving the corpse for 24 hours at a temperature of 80-90c, and not letting it reach boiling point. During this process of denudation, the use of chemical products is expressly forbidden. Concomitant

to this, it is of extreme importance that DNA samples be taken from the hard tissues (skull and teeth) of the individual studied. After that, femur and sternum should be collected, as long as they do not harm the progress of the study.

After this step, the investigation of the collected material begins. The first step consists of anatomically positioning the bone parts on a table, it is of utmost importance to pay attention to the laterality of all the pieces. After this is done, the LAF/CEMEL protocol is then used to perform the REAF (Report of Forensic Anthropology Examination), the protocol consists of a comparison of bone accidents, wear, fractures, pathologies, and malformations against a huge database that gathers several samples from the most diverse anthropological studies previously catalogued. Some of the bones are assembled into so-called "multiple bones" such as vertebrae and ribs, since it is not possible to accurately report their anatomical positions. After death, a very important removal is the thyroid cartilage, as this is able to determine the sex of the corpse being studied. Another essential thing to be collected is the dental arch. The positions and anatomical presence, cavities, tartar, and number of teeth are analyzed.

So, after all this data has been collected, the evaluation of individual characteristics is performed, which are checked by the following bones: Sex (pelvis, skull and thyroid cartilage) ancestry (skull and rib cage, variable.) age in adults (clavicle, symphysis pubis, sacroiliac joint and fourth rib) age in children and adolescents (epiphyseal blades) estimated manual dexterity (humerus, clavicle and radius). As mentioned above, all these data should be meticulously compared with the LAF/CEMEL database of the REAF.

6 CONCLUSION

Thanatology is an area of study with a high philosophical content and difficult to understand, given the ludic material in which it is studied. However, it is of essential importance for health professionals who eventually work with the bereaved to understand the mourning process in the ante-mortem and post-mortem periods, as well as all associated processes. It is also important to understand the stages of mourning adjuvant to palliative care, with the intention of comforting the terminally ill patient and their families, thus improving the doctor-patient relationship and empowering and dignifying the patients facing the inexorable fate of their terminality.

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Chapter 45

Feelings and attitudes of the population in social isolation in the period of the coronavirus pandemic

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ABSTRACT

Introduction: The world stopped before the pandemic caused by the new coronavirus. Abruptly several countries went into social distancing and/or isolation in an attempt to contain the spread of SARS-CoV-2, leading the general population to risks and vulnerabilities of all kinds, including emotional ones and with several risk factors for the mental health of the population. Objective and Method: Aiming at understanding aspects of mental health regarding feelings and attitudes of people of different ages, from children to adults of both sexes, about the social withdrawal and isolation associated with the COVID-19 pandemic, the Laboratory of Mental Health and Social Clinics of the Institute of Psychology, University of São Paulo USP, APOIAR project, carried out an online survey, of quantitative nature, by means of a questionnaire, between April and May 2020, reaching the population in this period. The questionnaire was entitled "Feelings and attitudes of the population in social isolation during the pandemic period of coronavirus", and was filled out voluntarily by the participants themselves, who received the questions via messenger application, with random assignment among cities and states, asking the target population itself, who received the survey link, to share it. The questionnaires were answered by 7476 people, including 511 children aged 4 to 10 years; 974 adolescents aged 11 to 18 years; 621 adult men; 5370 adult women, and 59 pregnant women.... Results: As a result of the questionnaire, it was found that the population showed a high rate of adherence to social distancing or isolation, as well as demonstrated understanding and agreement as being important their role in the dissemination or not of COVID-19. In the surveyed sample, however, it could be seen that in this period the adult population denoted mostly more irritation and feelings of loneliness, followed by feelings of sadness. The feelings of hope and optimism were relegated to a smaller portion of the sample surveyed, in the face of the pandemic of the new coronavirus. Effects n of the pandemic were also observed in the group of pregnant women. Conclusion: The results confirm those pointed out by the literature, that there is psychic suffering caused by the pandemic, and by the isolation and social distancing to all segments of the population. They also point to the need of mental health care for all.

1 INTRODUCTION

In December 2019, in Wuhan Province, China, there was talk of an outbreak of pneumonia of unknown etiology, and in January 2020, the discovery of the pathogen was announced, as SARS-CoV-2, causing a disease called COVID-19 (Al-Quteimat and Amer, 2020). With the rapid rise in the number of cases and spread of the virus to countries other than China, on March 11 of the same year the World Health Organization WHO communicated to the world pandemic status by the new coronavirus. Several nations adopted health responses in an attempt to contain the new virus, among them, the adoption of social distancing and isolation (WHO/PAHO,2020). Because of the high rate of transmissibility, measures of social distancing, isolation, home confinement, and quarantine started to be adopted to try to reduce the

number of infected people (Braga, Oliveira, & Santos, 2020; Brooks et al., 2020; Freitas, Napimoga, & Donaliso, 2020; Oliveira et al., 2020; Silva, 2020).

The pandemic triggered several crises that shook individuals, families, and social groups. Crises in health and education, disorganization of production chains and the world of work, resulting in financial and even food insecurity for the most vulnerable families, have been noted. Authors comment that the pandemic has aroused anguish and increased psychological suffering, generating a growing demand for hospitalization and help from mental health professionals (Oliveira et al., 2020). Distributed around the world, with no scientifically proven medication or vaccine, COVID-19 destroyed thousands of lives due to its considerable lethality and unprecedentedness; unfortunately, in an upward curve regarding the number of deaths, in the early days of the pandemic (HEALTH, 2020).

It is considered that the pandemic arrived in Brazil at a difficult moment in the economic and political plan. Social security policies are an important indicator in this sense. The social determinants of the health-disease process go through the material conditions of this layer of the population, which also contributes to the difficulty in fulfilling the mental health recommendations during the pandemic (Garrido & Rodrigues. 2020).

The concern with the mental health of the entire population has been maintained since the beginning of the pandemic and in the following years. Parallel to the uncontrolled advance of the pandemic in our country, the increase in the prevalence of psychic symptoms and the worsening of pre-existing mental disorders to the repercussions of the emergency situation on mental health (Ferracioli et al., 2021; Oliveira et al., 2021, Santos, 2022).

Studies on quarantine situations have indicated a high prevalence of negative psychological effects, especially lowered mood and irritability, along with anger, fear, and insomnia, often of long duration (Brooks et al., 2020). In an integrative literature review study, Pereira et al (2020) found that individuals undergoing social isolation are more susceptible to mental health disorders due to social deprivation and containment, with symptoms of psychological distress, mainly related to stress, anxiety, and depression. The authors also point out the need to ensure clear and informative communication about strategies to reduce these symptoms of psychological distress, in addition to providing fundamental psychological and social support for individuals.

Orientations for vulnerable groups, such as the elderly, especially those with cognitive decline/dementia, were provided with clear information about the pandemic and objective orientations about hygiene measures. And to the general population, guidelines in the sense of seeking to reduce the stigma of infected people; avoid idleness, but also the lack of breaks and rests at *home office;* organize a routine that would balance attention to self, work and family; maintain physical activities, in protected environments or in open spaces without crowds; practice relaxation and meditation activities; maintain

telephone or *online* contact with family and friends; have solidarity initiatives in relation to neighbors or other people or families in the community, especially older people living alone (La Follia et al, 2020; Lima, 2020).

Regarding the mental health of children and adolescents, several risk factors have been observed, such as: anxiety, loneliness, stress, proximity to parents' mental illness, domestic violence, child abuse, among others (Fegert, Vitiello , Plener & Clemens, 2020). Although it is considered that the age group in which the adolescent is found did not represent a significant risk of contracting COVID-19 in its most severe form, the young person was configured as an important vector of disease transmission (Oswaldo Cruz Foundation FIOCRUZ, 2020). From this perspective, being part of the control actions to face the pandemic demanded that young people adhere to confinement.

Several situations and feelings arose or intensified at this certainly unprecedented time in the lives of the population. Brooks, Webster, Smith, Woodland, Wessely, Greenberg, and Rubin (2020) found negative feelings such as confusion and anger, as well as post-traumatic stress related to the quarantine situation. Witt, Ordóñez, Martin, Benedetto, and Fegert (2020) pointed out that children, adolescents, and young adults suffered more from prolonged social withdrawal, especially with anxiety and depression, and the effects of withdrawal and isolation can be long-lasting on mental health (Santos, 2022).

Regarding the group of pregnant women, some studies can be cited. The World Health Organization points out that worldwide about 10% of pregnant women suffer from mental disorders, especially depression. The pandemic context associated with social isolation, health protection routines, reduced social and family support network, concern about contagion and transmission to the fetus, and financial problems have been shown to increase the risk of physical and mental health disorders in pregnant women (López-Morales et al, 2020).

Ng at al,(2020) studied the level of anxiety and knowledge about COVID-19 in 324 healthy pregnant women in Singapore from March to April 2020 and found that the most common source of information was the Internet and a significant proportion were unaware of COVID-19 infection ;, 35.8% had data indicative of anxiety, 18.2% of depression and 11.1 of stress . Cross-sectional online survey on Google platform was conducted by Lee et al (2020) on the attitudes and precautionary practices of 167 uninfected pregnant women towards COVID-19 in Singapore . They found results indicating the factors: age over 36 years, Malay ethnicity, frontline work and attendance at high-risk clinics influence positive attitudes and precautionary practices towards COVID-19 .

It was necessary to find ways to approach and intervene in the face of the great concern with the teenager away from school, friends, leisure and sports, and close to situations potentially dangerous to his well-being. Telemedicine channels in psychiatry and *online* psychological care, contemplating varied working models, have tried to lessen the impact of isolation, as well as research has been and continues to

be developed to seek ways to offer the possible help in the face of the complex picture of the COVID-19 pandemic (Santos, 2022).

2 OBJECTIVE

Given the global public health emergency, we aimed to understand, by means of an *online* questionnaire, aspects of mental health regarding the feelings and attitudes of the Brazilian population, composed of samples of five groups, in face of the social isolation and isolation associated with the pandemic of COVID-19. Research data is fundamental to think of ways to help the population of wide vulnerability.

3 METHOD

The Laboratory of Mental Health and Social Clinics of the Institute of Psychology at the University of São Paulo USP, APOIAR project, conducted a quantitative *online* survey, by means of a questionnaire, from April to May 2020. The questionnaire was made up of closed questions. The questionnaires aimed to find out about feelings that arose or intensified during the pandemic. We also tried to find out about family relationships during the confinement, as well as the number of people together in the same environment.

The Google Forms platform was used to prepare the questionnaire, and a *link* was created for sharing through text messages and electronic mail. An initial text was also prepared, which was published in the introduction of the message, inviting the participants to fill out the questions and asking them to receive the research report, and to collaborate in the dissemination of the research. The data collection method was carried out by the platform itself, which transformed the main questions into percentage data, characterizing the research in the quantitative, descriptive, and exploratory spectrum.

The questionnaires had some differences according to age: the one for children was composed of images extracted from a free access application, as can be seen in Figure 1. The images were extracted from the free image bank on the site: http://br.freepik.com. It is important to point out that in the selection of the images, we tried to present pictures of children and family members of different ethnicities.

For the other ages, and for pregnant women, they were all written, with few alternatives per question. An initial Informed Consent Form was inserted before the questions (for adults and guardians) and, in the case of participants under 18 years of age, an Informed Consent Form was also inserted. In the case of children, parents or guardians were asked to stay with them during the questionnaire responses.

1. You are

Figure 1



Girl ( )



Boy ( )

3.1 PARTICIPANTS:

Responses were obtained from 7476 people in the same 30-day period, including 511 children aged 4 to 10 years; 974 adolescents aged 11 to 18 years; 621 adult men; and 5370 adult women.

4 RESULTS

The questionnaire was entitled "**Feelings and Attitudes of the *population in* Social Isolation during the period of the coronavirus pandemic**", and was voluntarily filled out by the participants themselves, who received the questions by message application. The questionnaire received specific names with respect to the target audience: children, adolescents, or adult men and women. The allocation was random among national cities and states.

4.1 DESCRIPTION OF THE PARTICIPANTS

As results we have the number of people who answered from April to May 2020; and their characteristics, by age group; we chose to insert some graphics in order to allow a better visualization of these aspects of population characterization.

5 CHILDREN:

Responses were received from 511 participants, with ages ranging from 04 to 10 years old. Children from several Brazilian states participated, 34.8% were girls, and 65.2% boys. Children from 04 to 06 had the highest participation. Most were at home with two or three people, the majority with the mother, followed by the father and grandparents, as can be seen in Figures 2, 3, and 4 below.:

Figure 2 - Distribution of children by age

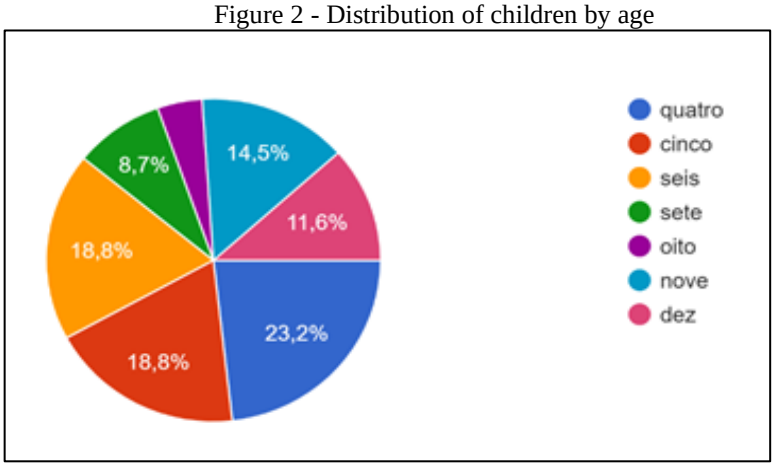


Figure 3 - Number of people the child is with

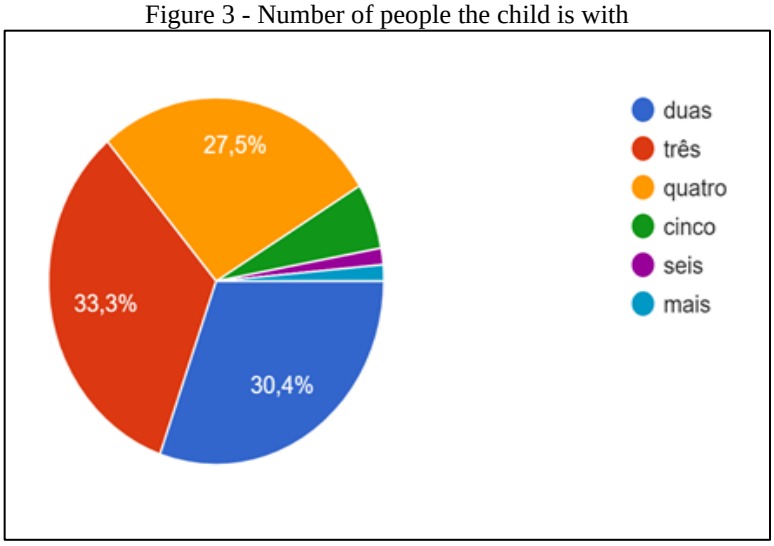
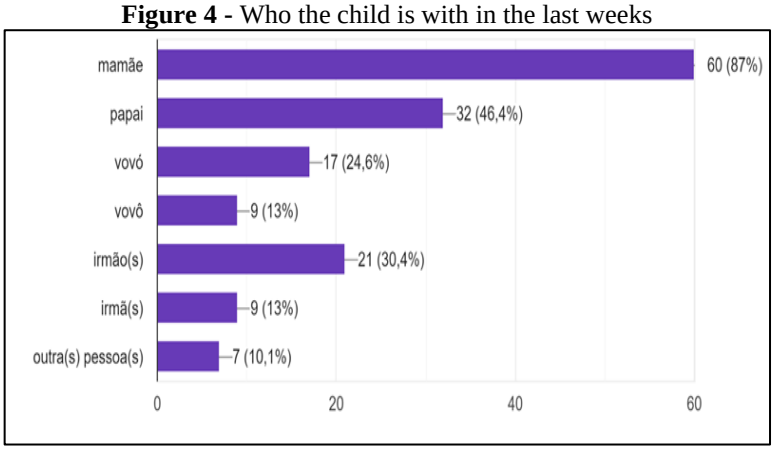


Figure 4 - Who the child is with in the last weeks



6 ADOLESCENTS:

A total of 974 answers were received from adolescents, predominantly females (67.3%), most of them between 14 and 16 years old (50.7%). Public school students were the ones who answered the survey the most (61.7%), and the others (38.3%) in private schools. Most agree that isolation is necessary (82.7%)

and think it is important to collaborate to prevent the spread of the coronavirus. Most (63.1%) are in three or four people in the same house during the period of detachment or social isolation (Figures 5, 6 and 7).

Figure 5 - Sex of the adolescent participants

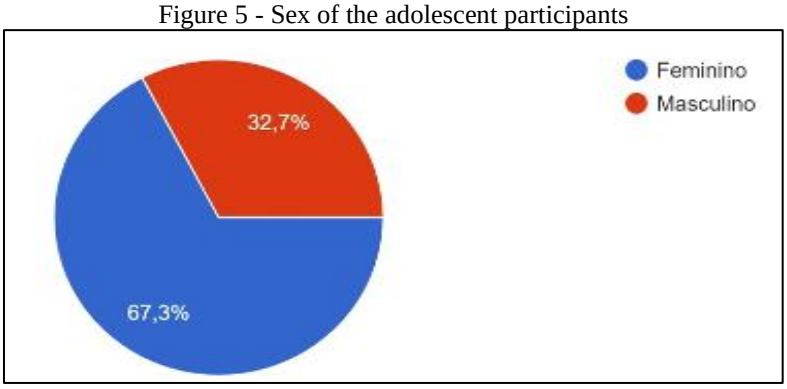


Figure 6 - Distribution of adolescents by age

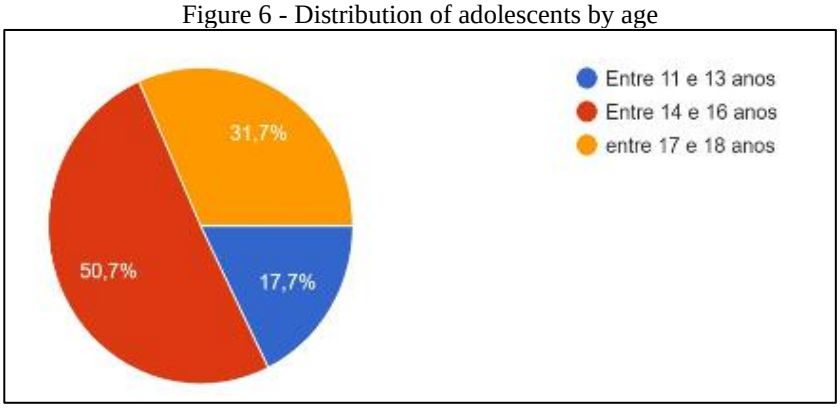
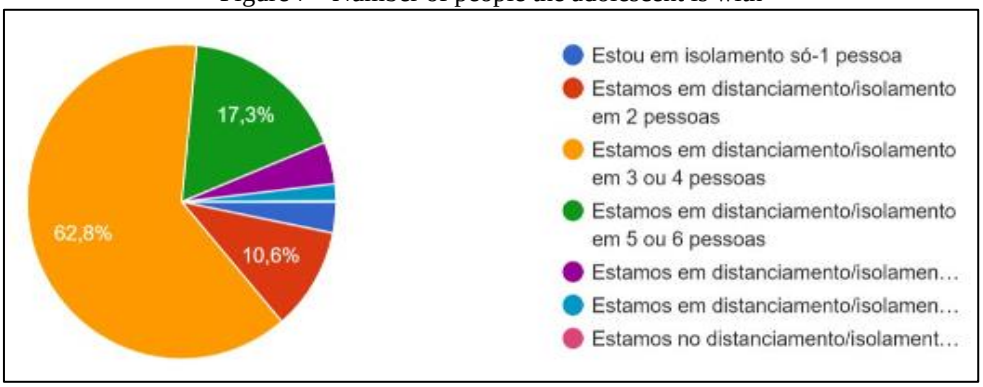


Figure 7 - Number of people the adolescent is with



7 ADULT MEN:

The age of the 621 participants was between 21 and 30 years old, followed closely by the age groups 41 to 50, 31 to 40, and 51 to 59. This group is mostly college educated, has a paid or volunteer job, and most are not retired. More than half have children, and among these, a little more than 50% have two to three children, followed by one child. The ages of the children are slightly more than half over 18, and in the other age groups they are more evenly distributed, with fewer babies under 1 year old. The vast majority

have no grandchildren. As for social isolation most were, at the time of the questionnaire, for more than 15 days, and in two to three people, followed by isolation in two people and less frequently, only the participant (Figures 8 to 12).

Figure 8- Distribution of adult men by age

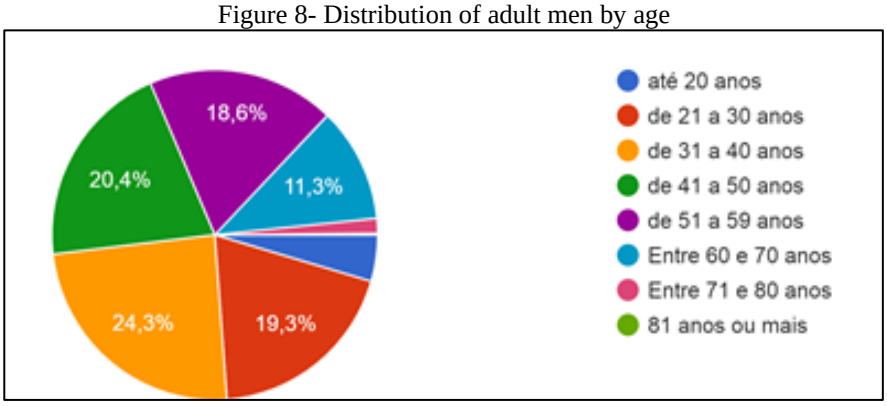


Figure 9 - Schooling of adult men

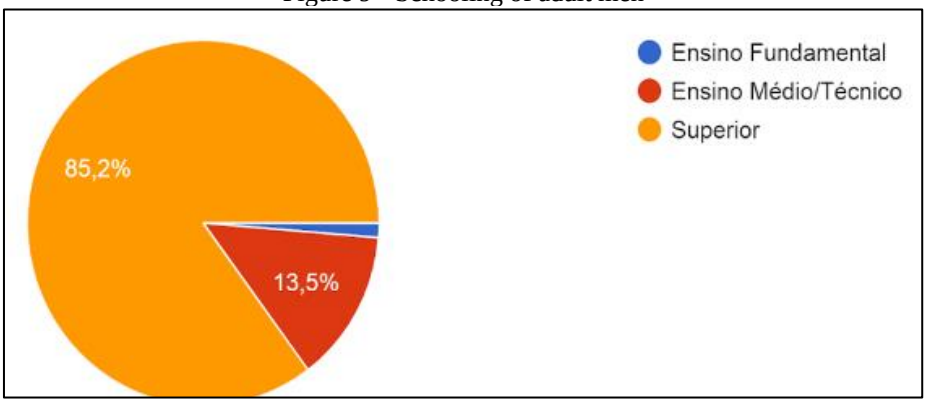


Figure 10 - Adult men have children

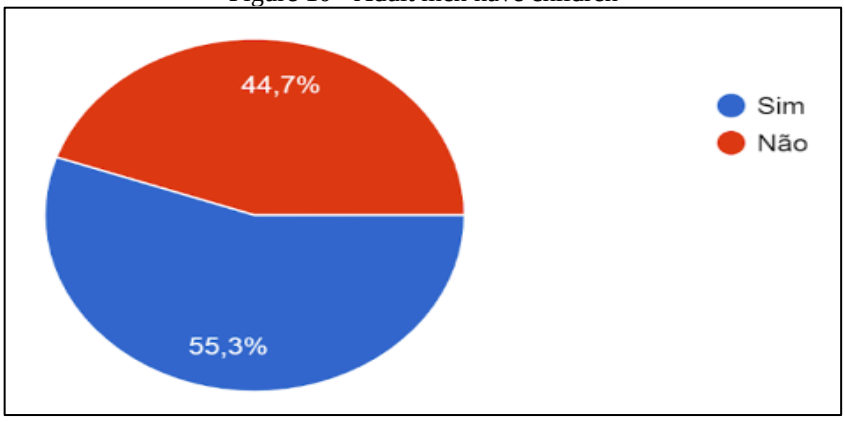


Figure 11 - number of children of adult men

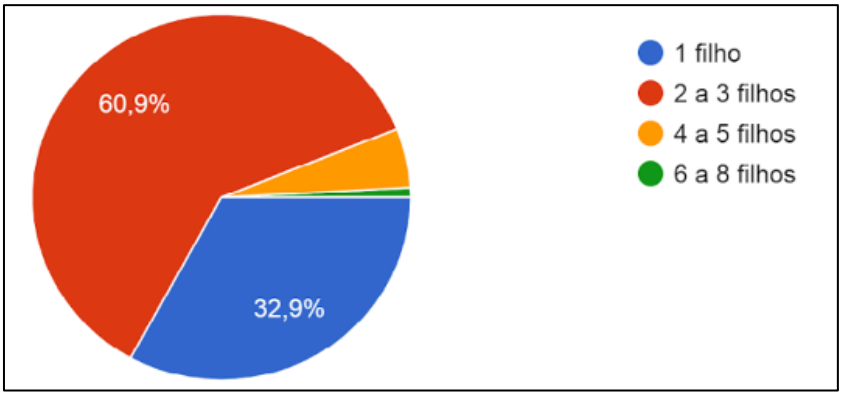
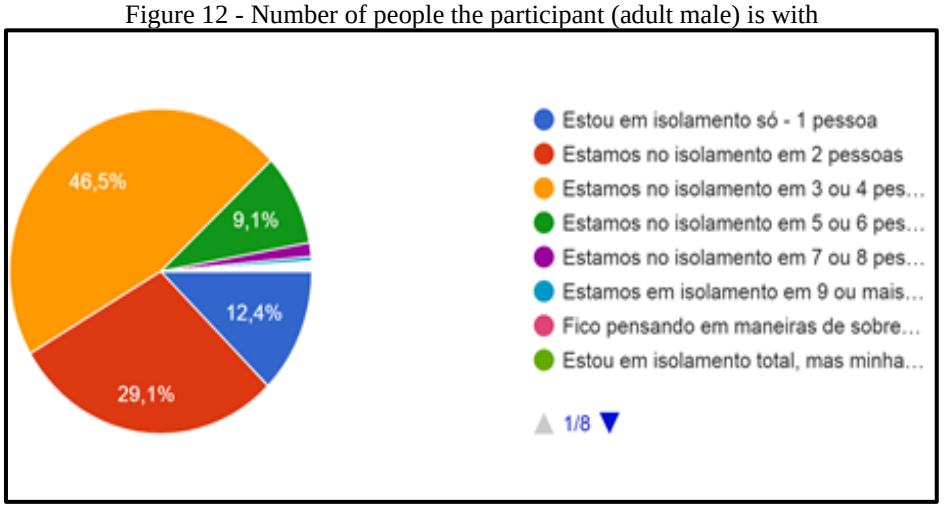


Figure 12 - Number of people the participant (adult male) is with



8 ADULT WOMEN:

The age of the 5370 female respondents was distributed in the following ranges: 31 to 40 years old, followed closely by 41 to 50 years old, 21 to 30 years old, and 51 to 59 years old. This group is mostly college educated, has a paid or voluntary job, and most are not retired. More than half have children, and two to three children, and then one child. The vast majority have no grandchildren. Regarding social isolation, most had been at the time of the questionnaire for more than 15 days, most in two to three people, followed by isolation in two people and less frequently, only the participant. Regarding isolation, most agree with the isolation and even fewer partially agree, with no women against the measure (Figures 13 to 18).

Figure 13 - Distribution of women by age

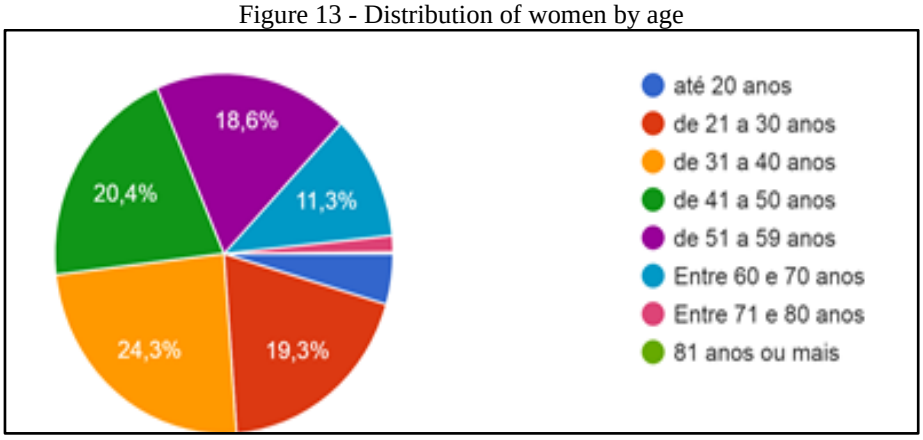


Figure 14 - Schooling of the women participants

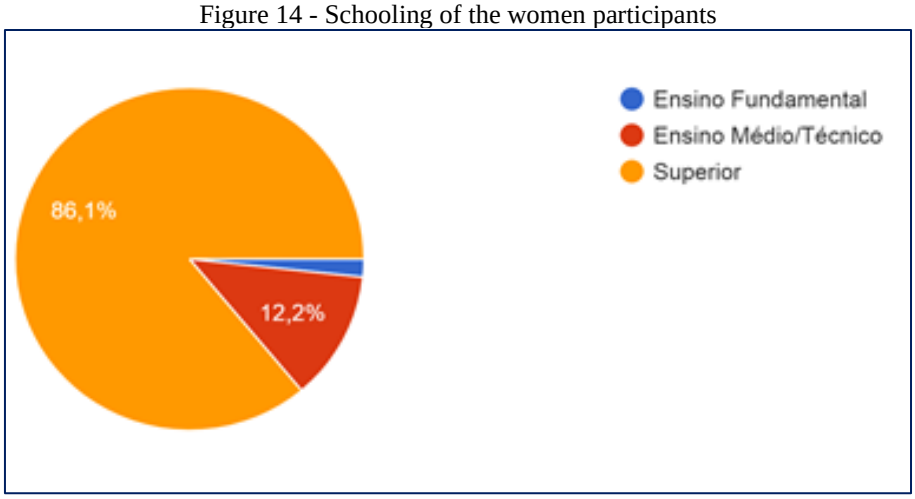


Figure 15 - number of children of the participating women

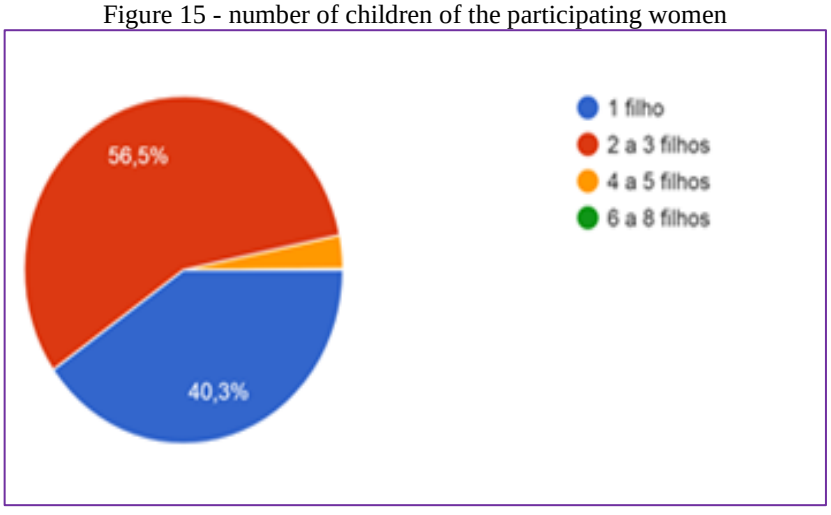


Figure 16 - Number of people the participant (female) is with

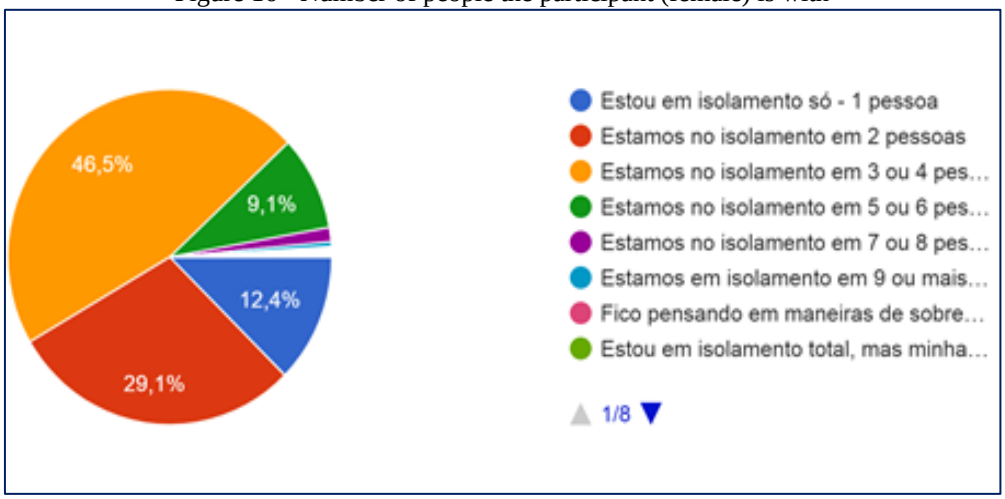


Figure 17 - Participating women have children

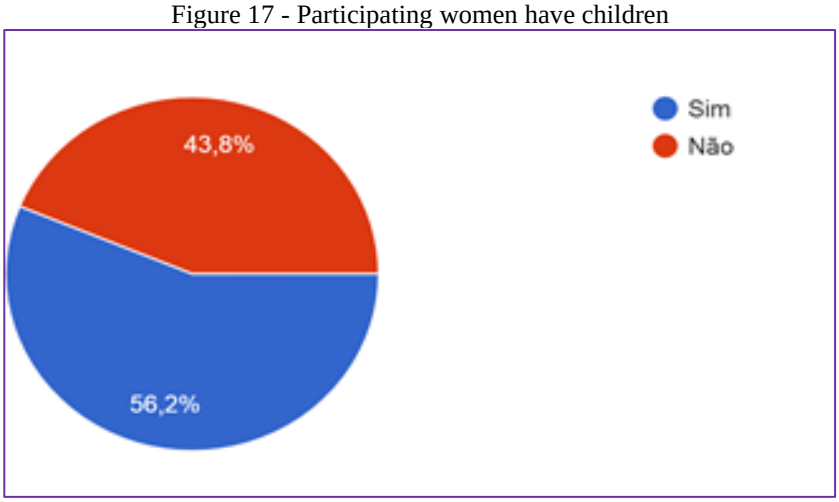
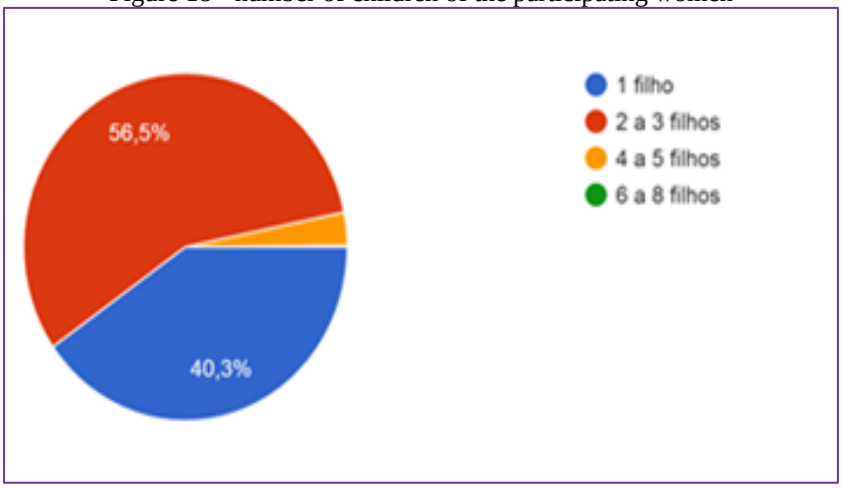


Figure 18 - number of children of the participating women



8.1 PREGNANT WOMEN

Fifty-nine questionnaires were answered, and the ages of the pregnant women are shown in Figure 19. It is observed that the youngest, less than 20 years old, is the minority. From 31 to 40 years old, the majority of pregnant women 61% followed by 21 to 30 years old (28.5%).

Figure 19 Distribution of pregnant women by age

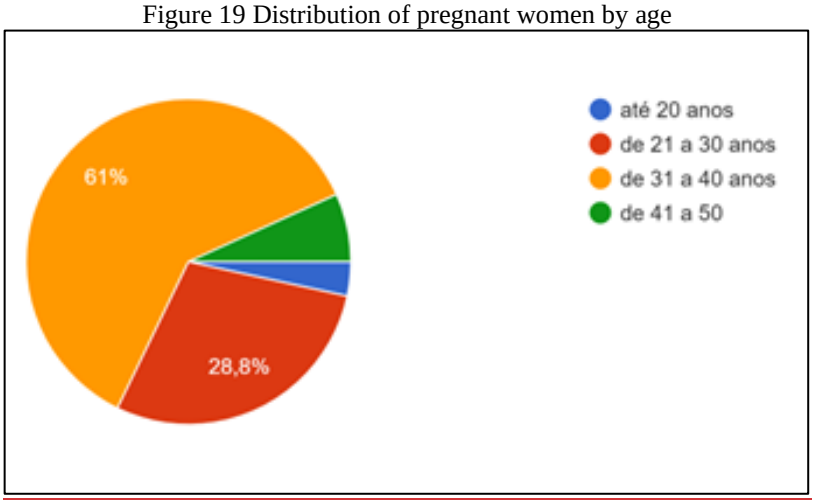
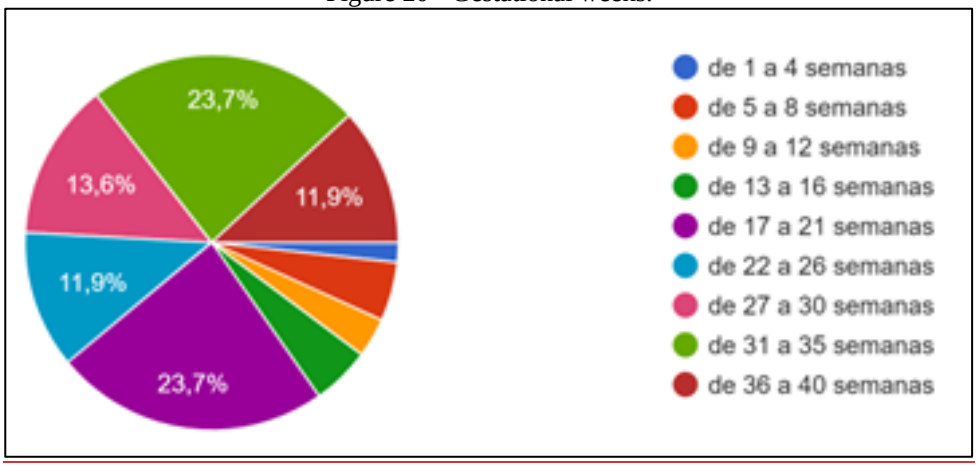


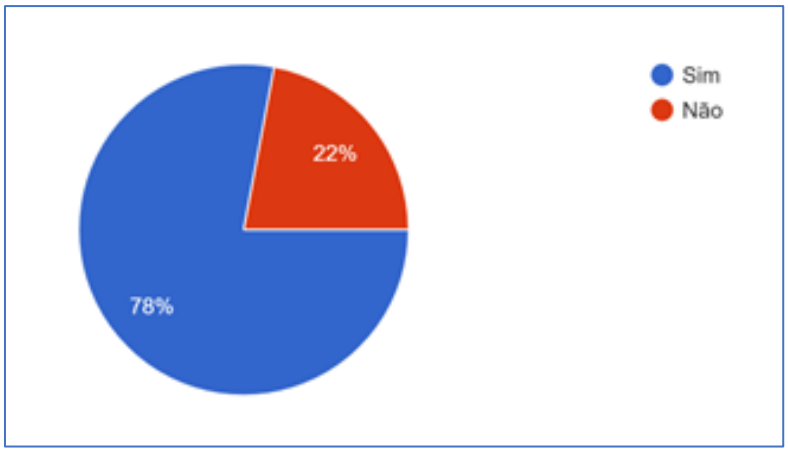
Figure 20 has the participants' gestational age data, with 17 to 21 weeks, and 13 to 16 weeks predominating. 23.7% in each. The others with a lower presence.

Figure 20 - Gestational weeks.



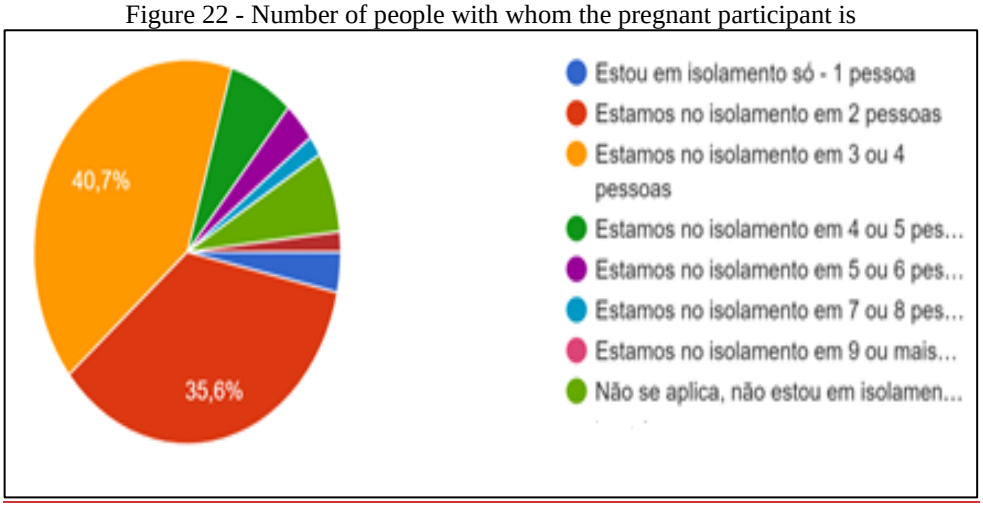
With respect to having voluntary or paid activities at home office, 70% of the participating pregnant women perform such activities, as shown in figure 21:

Figure 21- Voluntary or paid activity in home office by the participating pregnant women



As for adherence to isolation and how many people the pregnant woman is with, there is a predominance of being with 3 or 4 people, followed by 2 people, being alone, and with a larger number of people, there is less participation; as can be seen in Figure 22

Figure 22 - Number of people with whom the pregnant participant is



9 POPULATION'S FEELINGS, ACTIVITIES AND ATTITUDES

It is observed that children, as activities at home (Figure 23), watch movies or cartoons on TV (66.7%), do lessons connected to school (60.9%); stay on the cell phone (59.4%) and play in the living room (59.4%); and draw (50.7%), and the other activities have less frequency (as observed in Figure 19). Figure 22 shows what the child misses most during the period, playing in the park (59.4%), followed by friends (55.1%), and the teacher and the school (53.6%). In relation to the children's feelings in the period it is observed, in Figure 24, more positive expressions, such as joy (56.5%); and animation (30.4%) and with significant presence of negative feelings, such as sadness and tiredness (29%) and irritation (39.1%). Figures 23 to 25 follow, in which the sums of the percentages exceed 100%, since the child could point to more than one alternative.

Figure 23 - What the child is doing at home these days

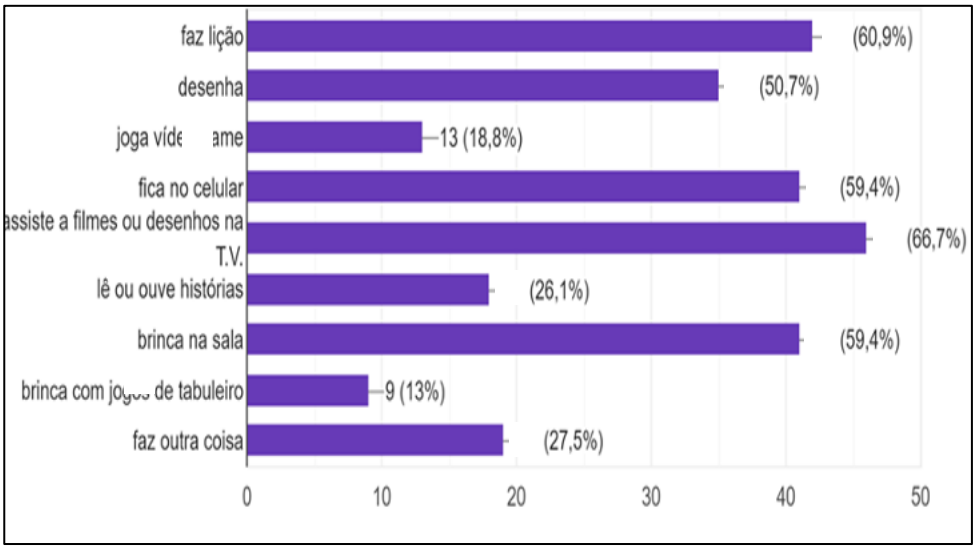


Figure 24 - What the child misses most

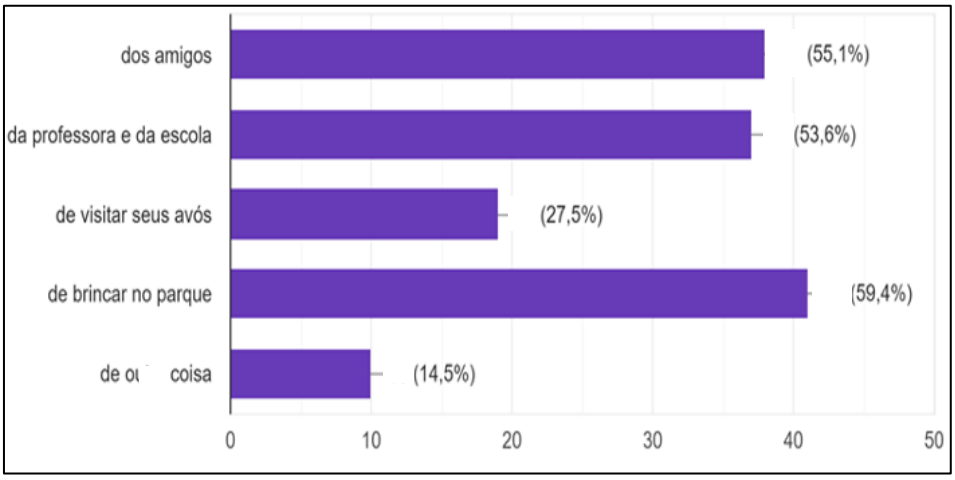
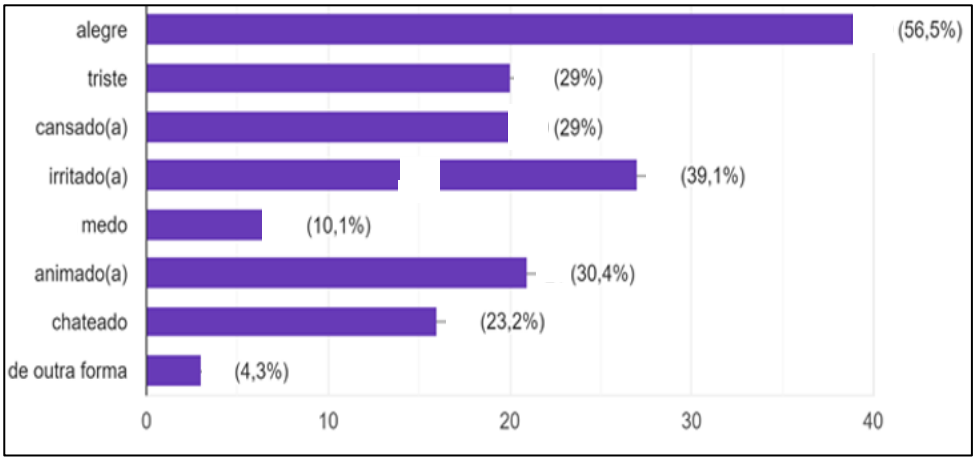


Figure 25 - How the child has felt during the past weeks at home



The adolescents positioned themselves regarding the activities at home referring to family coexistence, (figure 26) the adolescents point out that they are in harmony and close (42.7%), however, the experience of some conflicts that existed before (37.4%) and some that happened or worsened in the period (12.7%) overcome the harmony (Figure 26). A large part of the adolescents (78.6%) used to do school activities using the Internet, and most (73.5%) say they have increased this use. However, as for the time spent, (figure 27) entertainment (44.8%) appears mostly followed by talking to friends (39.9%), as well as social networks appear as the main platform of use (86.1%). The feelings of sadness (19.60%) were the main ones among the adolescent participants, followed by irritation (16.70%) and loneliness (15.80%) and fear (11.20%). The feeling of hope (6.80%) comes after, followed by solidarity (5.10%). Most of the participating adolescents (60.30%) relate their feelings to the pandemic. Regarding the perspectives about the pandemic, in 2020, most of the adolescents (77.80%) considered that life should change. Figures 26 to 30 show the main results of the adolescent participants.

Figure 26 - Family interaction in the adolescent pandemic

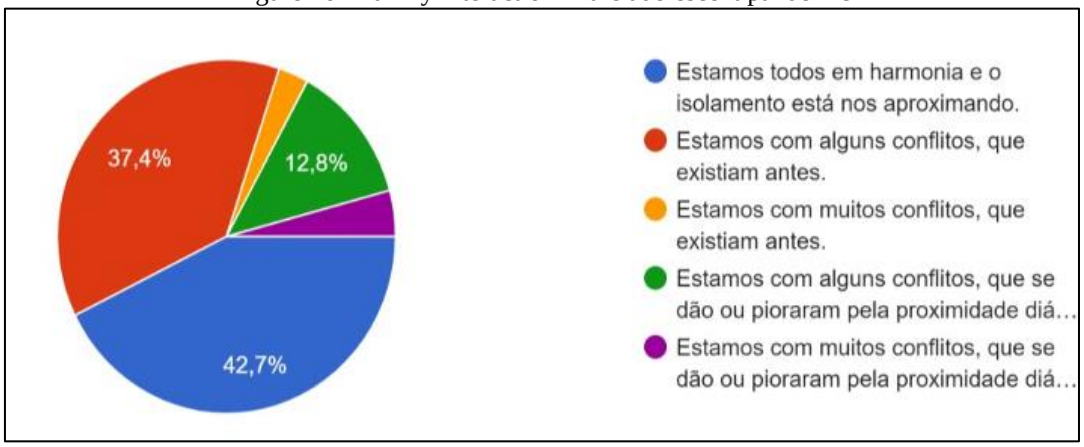


Figure 27 - Adolescents' use of the Internet and social networks in the pandemic

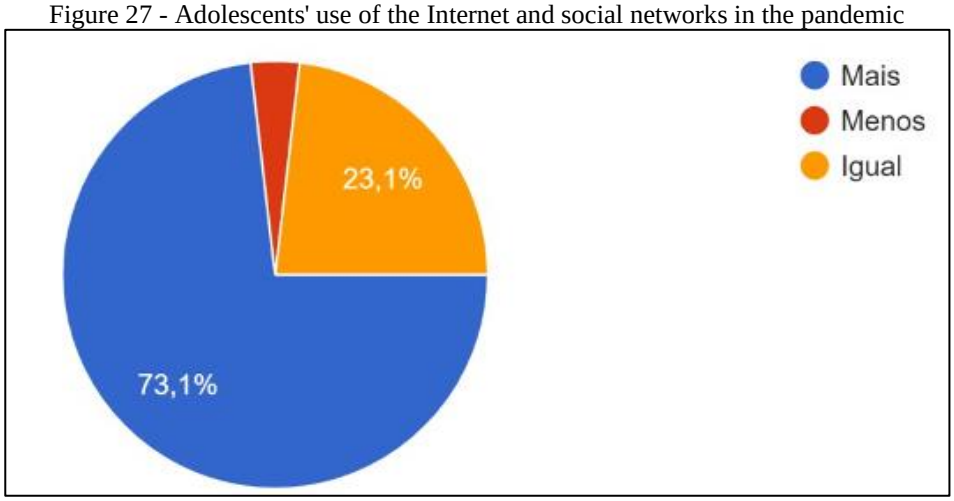


Figure 28- Feelings pointed out by adolescents during the pandemic nts pointed out by adolescents

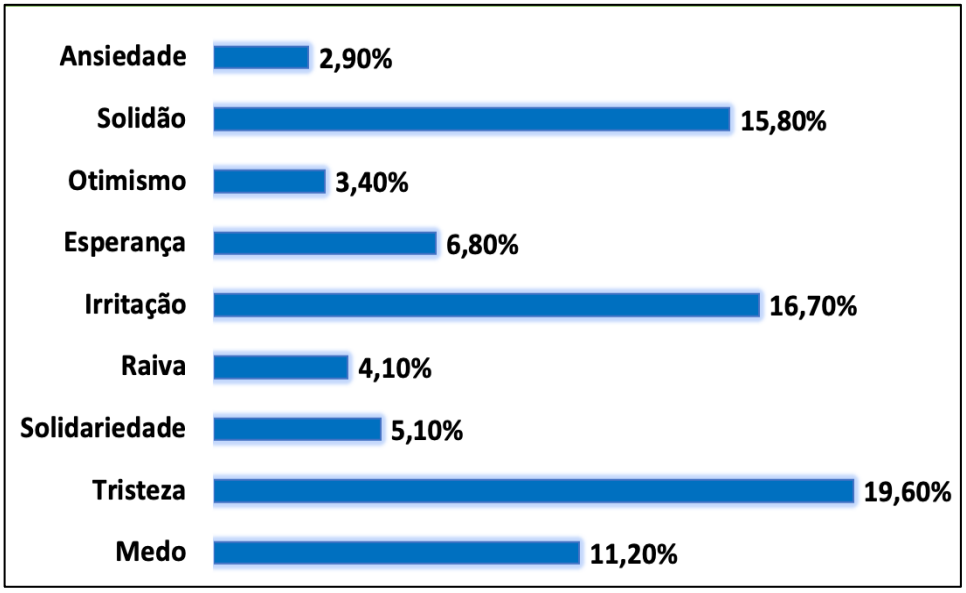


Figure 29 - Feelings associated with the pandemic by adolescents

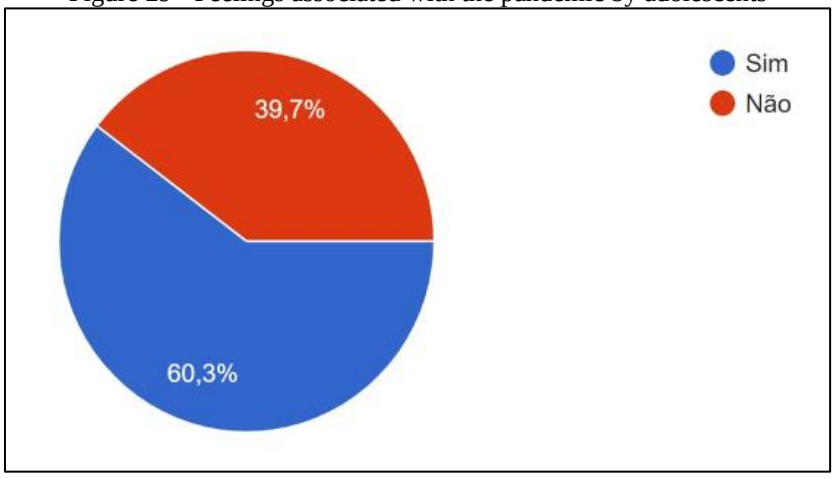
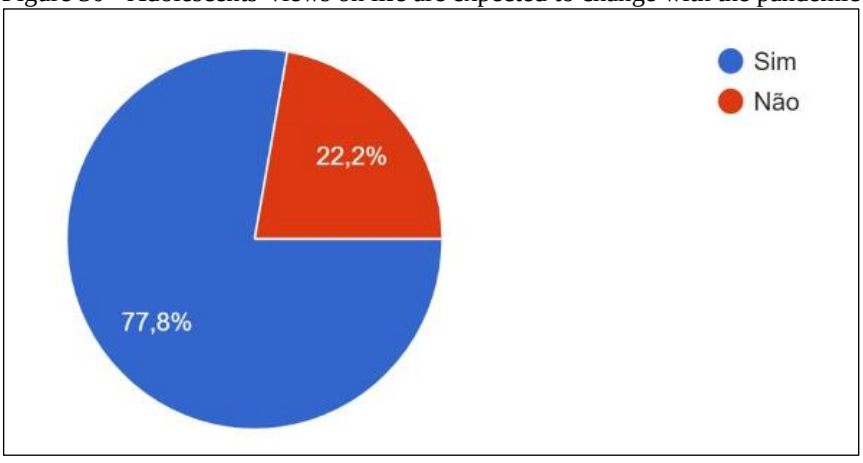


Figure 30 - Adolescents' views on life are expected to change with the pandemic



The absolute majority of **adult men** (79.5 %) agree with the isolation, and much less agree partially (17.7 %) with few responses against the protective measure (Figure 31). Most of the participants are in

home office and consider to be using social networks much more in this period than before (61.7 %) - (Figure 28), almost all on *Whatsapp* followed by *E-mail* and *Youtube, Facebook and Instagram.* This use refers more to talking with friends (89%), followed by watching the news (85%), talking with family members (76%), watching movies, playing games and work with less use.

In isolation, the vast majority of men said they were performing domestic activities (87%). Next comes reading (64%), leisure activities and playing (20%) and helping children with school activities (16%) are responses that come up in less intensity, followed by working, studying and other activities.

As for family coexistence, 46.5% of the male participants consider that they and their families are in harmony at the moment. On the other hand, although in a smaller number, they point to the presence of conflicts, 26.5% of which already existed before the pandemic, and 12.1% of which refer to some conflicts that are caused or worsened by the daily proximity to the isolation.

Regarding the focus of the research, the feelings pointed out by the male participants during the pandemic are presented, with more negative feelings such as: fear (49.40%), followed by irritation (43.19%), sadness (31.5%), overload (31.50%), loneliness (27%), and anxiety. And positive: solidarity (38%), hope (28.30%), optimism (20.90%), as shown in figure 36, where the sum is greater than 100%, since the participants could mark more than one feeling. Most men (75.4%) directly associate feelings with the pandemic (Figure 37).

More than half of the participants (66.4%) said they did physical activities before the pandemic, but only 37.8% maintained the same practice during the period. (Figures 34 and 35). Finally, most (80.6%) affirm that they consider that the pandemic will change their lives in some way (Figure 36). Figures 31 to 40 gather the main data regarding the answers of the male participants.

Figure 31 - Participants' views on isolation/distancing during the pandemic

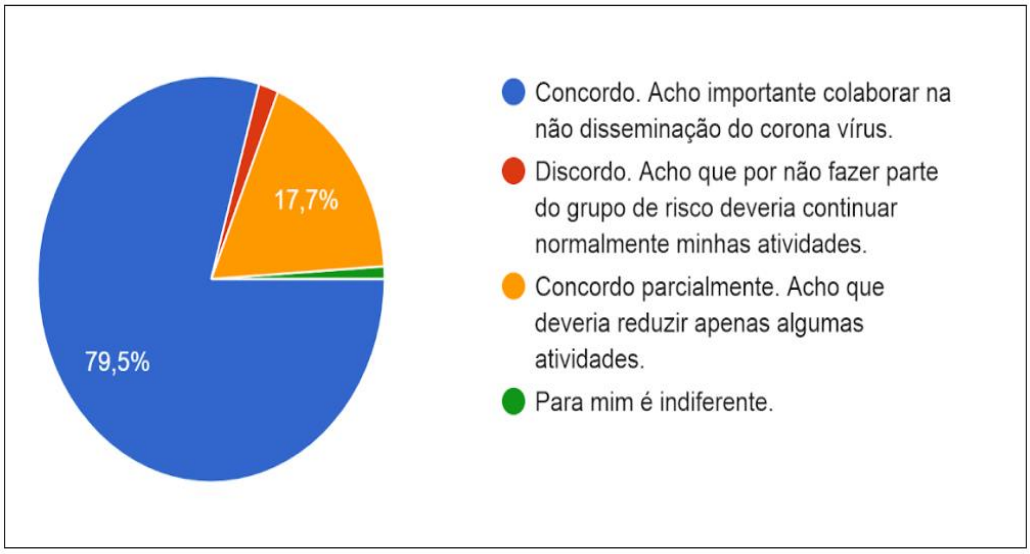


Figure 32 - Social network use by male participants - before and during the pandemic/isolation period

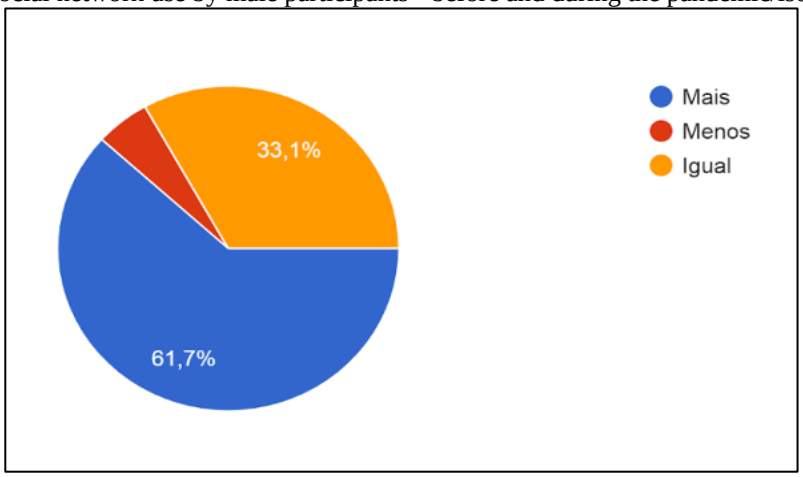


Figure 33 - Activities performed with the use of social networks by the male participants

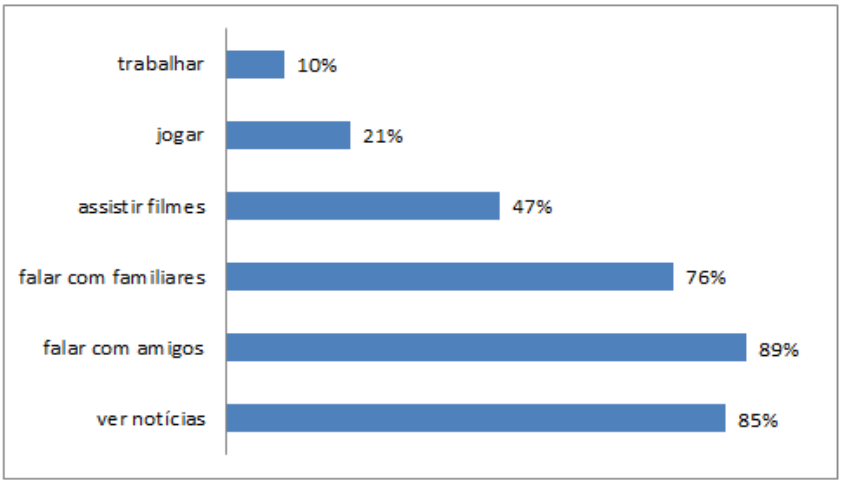


Figure 34 - Activities at home by male participants in isolation / detachment

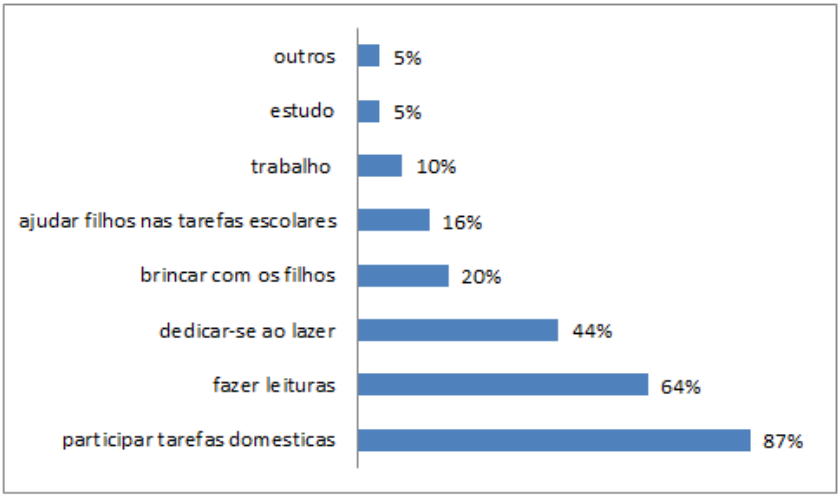


Figure 35 - Position of the male participants on family coexistence

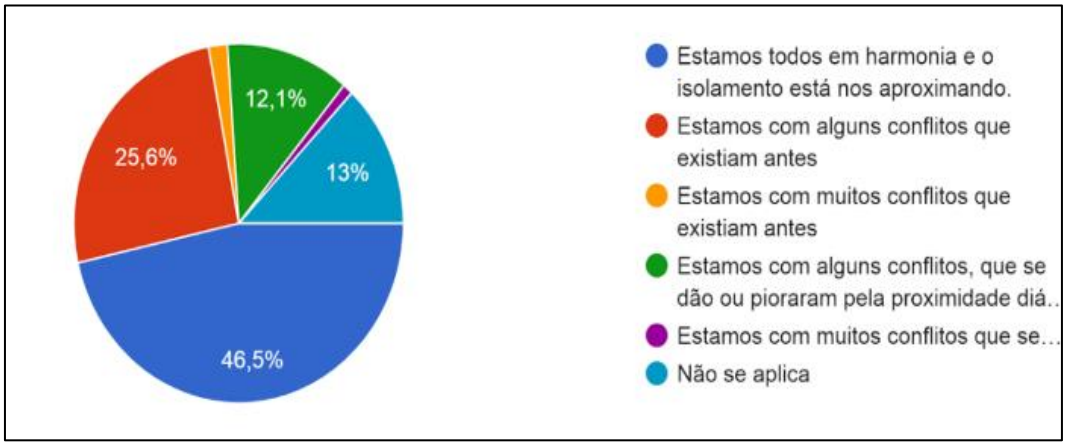


Figure 36 - Feelings expressed by male participants during the pandemic

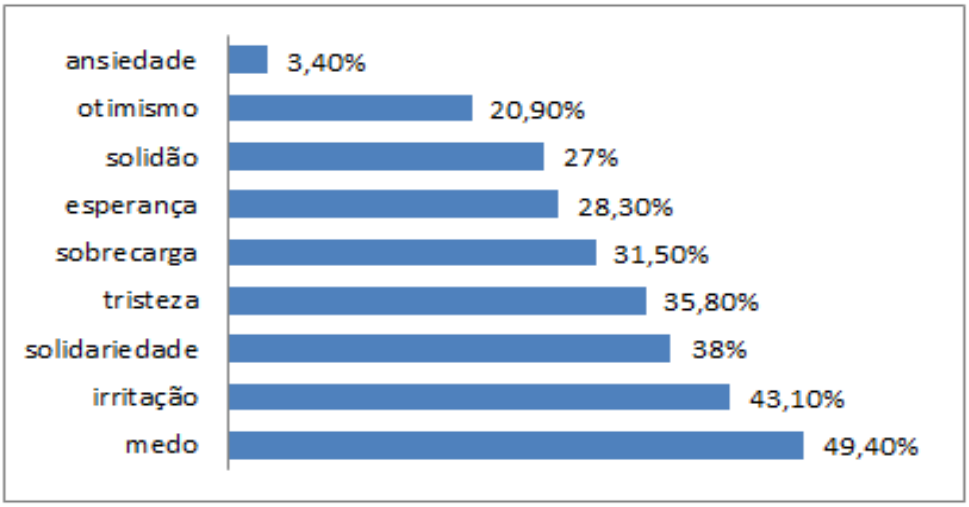


Figure 37 - Feelings expressed by male participants associated with the pandemic.

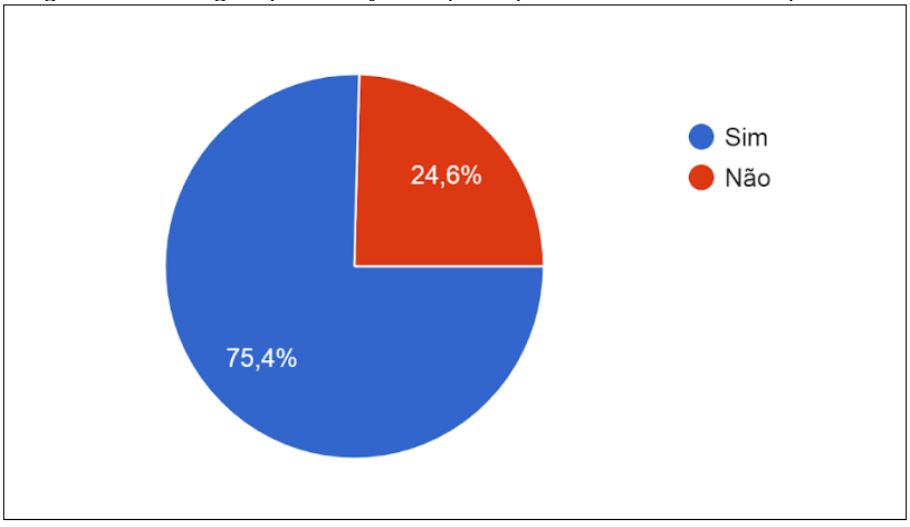


Figure 38- Participating men did physical activity before the pandemic

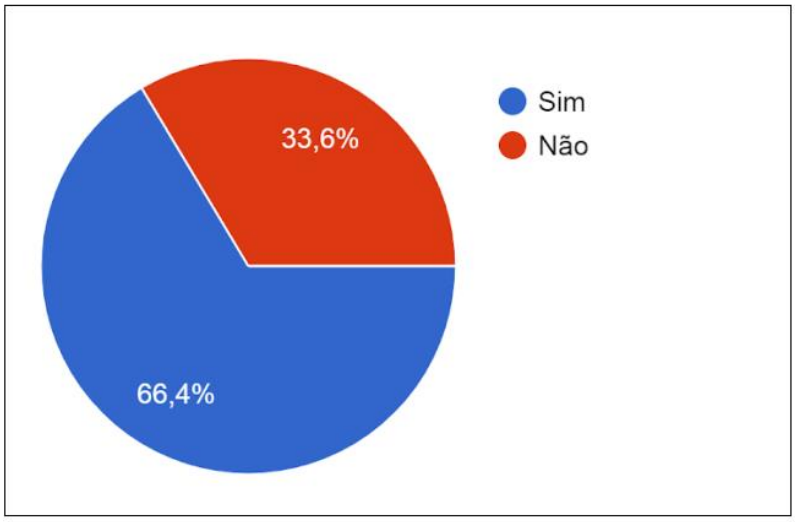


Figure 39- Participating men do physical activity during the pandemic

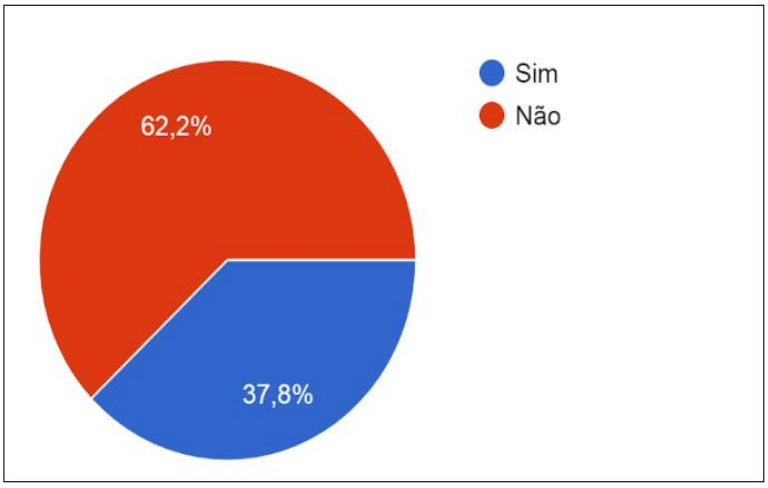
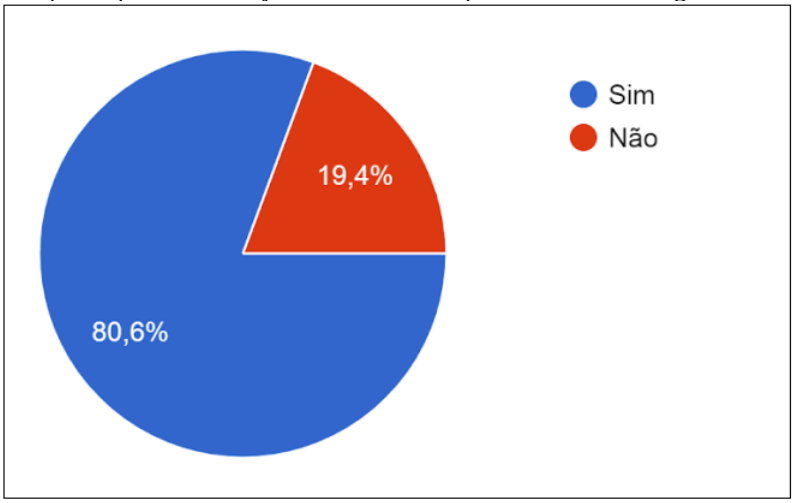


Figure 40 - Male participants - do they consider that the pandemic will change their lives in any way



The women who participated in the survey, who responded very intensively to the survey, shared the questionnaire, and there were a very large number of women participants: 5340.

Regarding isolation, the vast majority of the women participants (88.2%) agree with isolation, and far fewer (10.4%) partially agree, with no women against the measure, in figure 41. Most of the participants (66.1%) are in home office (figure 42). About the use of social networks, 70% of the women answered that they use them more in this period of pandemic and isolation than before (figure 43). Almost all use whatsapp followed by instagram and youtube. This use refers more to talking with friends (93.5%), followed by watching the news (84%), playing games (24%), and working with less use (figure 44).

In isolation, the great majority of women said they were performing domestic activities, such as cleaning the house (90.8%), cooking (87.5%), and washing and ironing clothes (75%). Next come leisure activities, (50.9%) and playing (24.6%), and helping the children in school activities (20.7%) appear in less intensity, as can be seen in figure 451.

In relation to family coexistence, 43.3% of the participating women consider that they are currently in harmony. On the other hand, a little more than 40% point to conflicts, 28% describe them as already existing before the pandemic, and 12.2% describe conflicts that have occurred or worsened during this period. As can be seen in figure 46.

Focusing on the feelings expressed during the isolation/pandemic, which is the main focus of the investigation, we have the data in figure 47. Women indicate negative feelings, predominantly fear (63.5%), followed by irritation (47.5%), overload (40.7%), and loneliness (27.9%). It does not appear written on the graph, but there are positive feelings such as hope by 46.1%; optimism by 19.8%, in figure 47. It is observed that the sum is greater than 100%, since the participants pointed out more than one feeling.

Most women (82.4%) associate these feelings directly with the pandemic (Figure 48). More than half of the participants said they did physical activities before the pandemic (66.3%), but only 38.3% of the women maintained physical activity during the period (figures 49 and 50).

Finally the absolute majority 90.8% of the women participants consider that the pandemic will change their lives in some way, figure 51.

Figures 41 to 51 depict the data described with respect to the responses of the women participating in the research.

Figure 41 - Position of the women participants on isolation/distancing during the pandemic

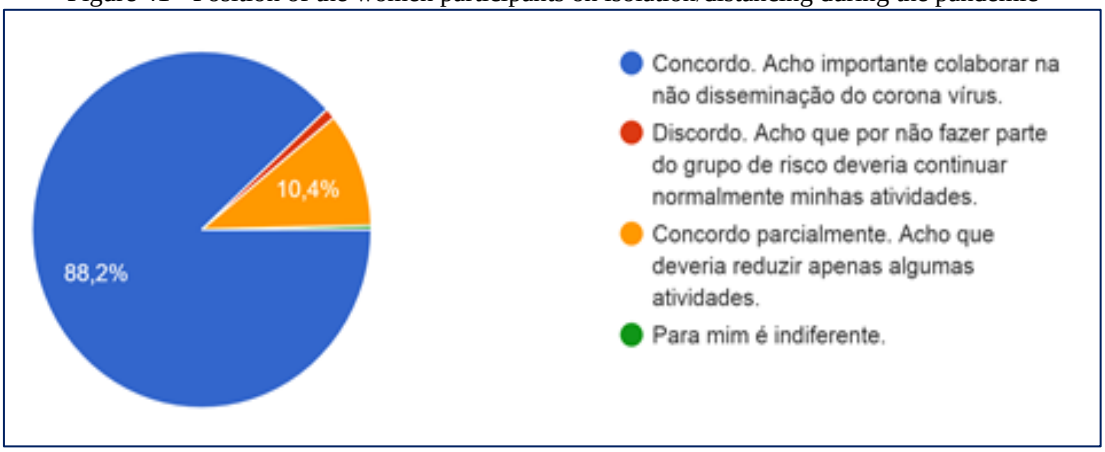


Figure 42 - Voluntary or paid activity in home office by the women participants

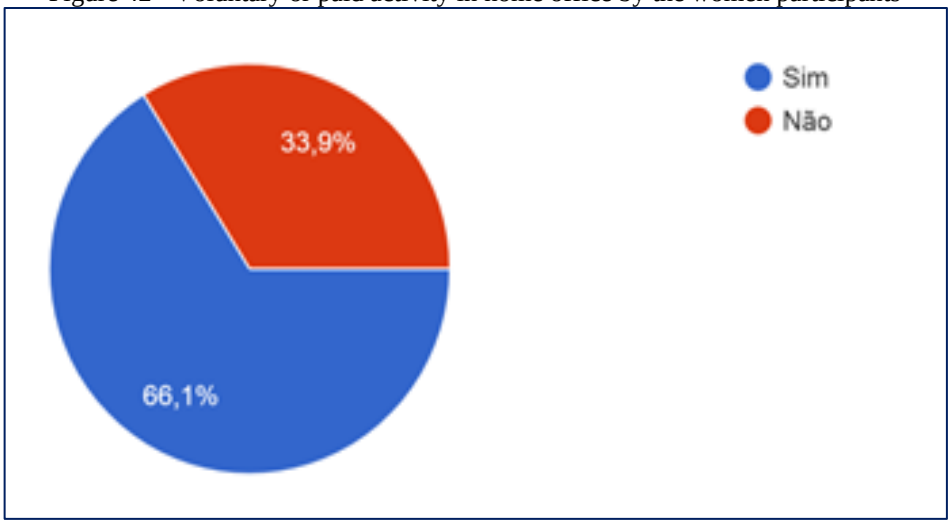


Figure 43 - Participating women's use of social media before and during the pandemic/isolation period

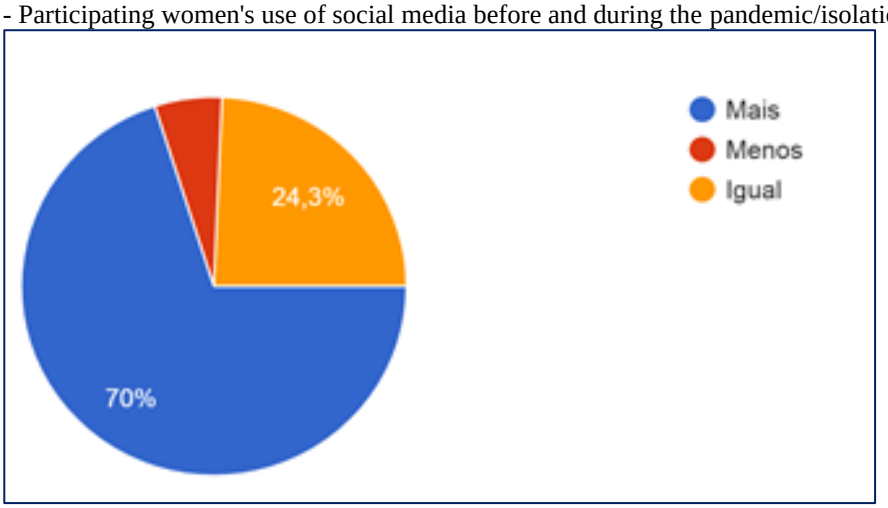


Figure 44- Activities performed using social networks by the women participants

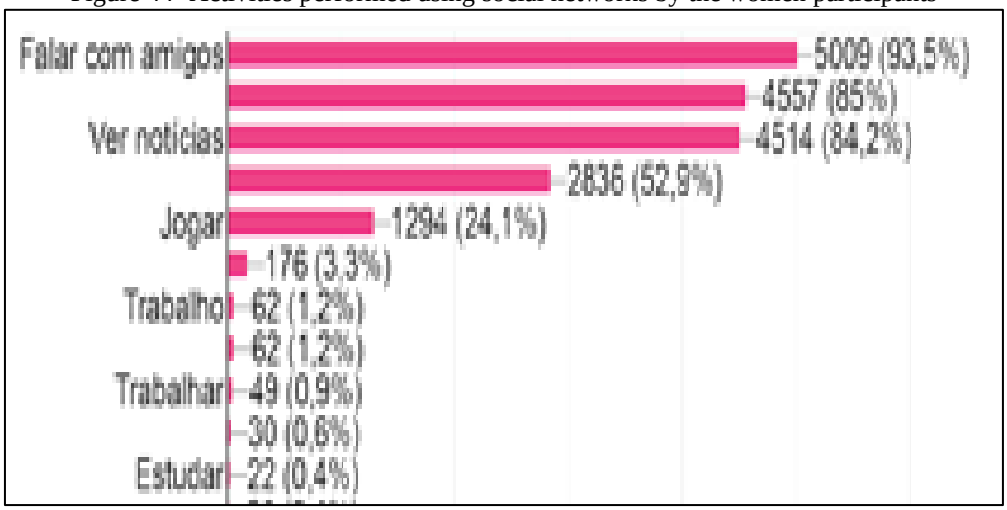


Figure 45 - Activities at home by the women participants in isolation / detachment

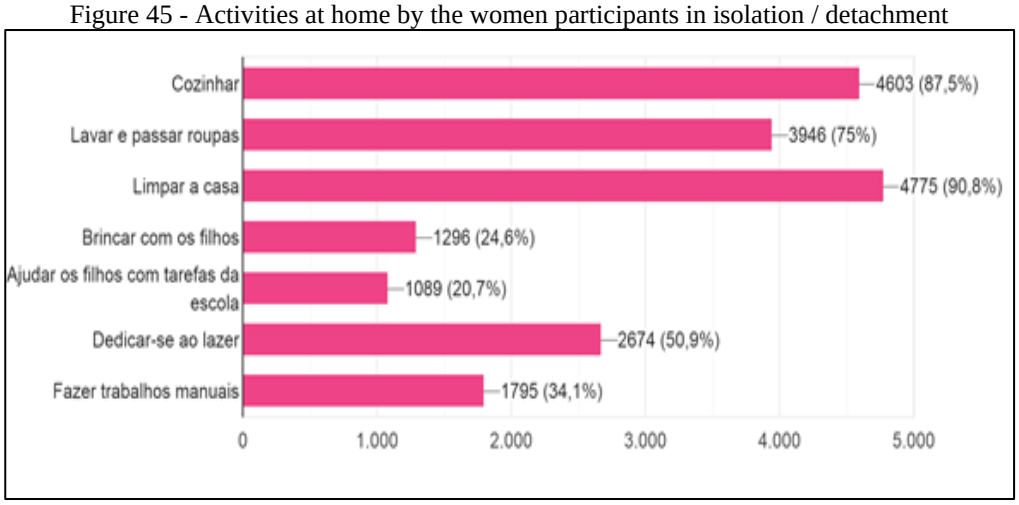


Figure 46 - Position of the women participants on family coexistence

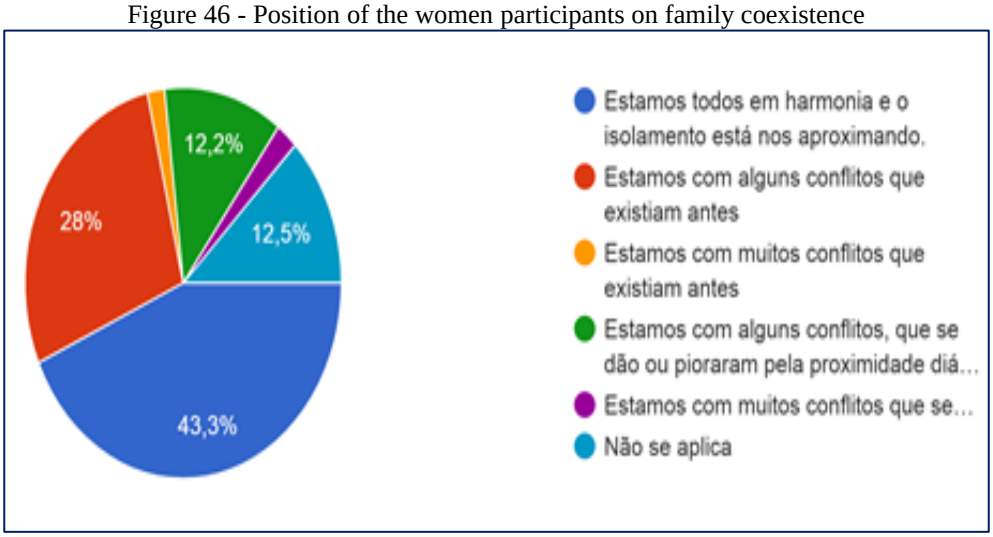


Figure 47 - Feelings pointed out by the women participants during the pandemic

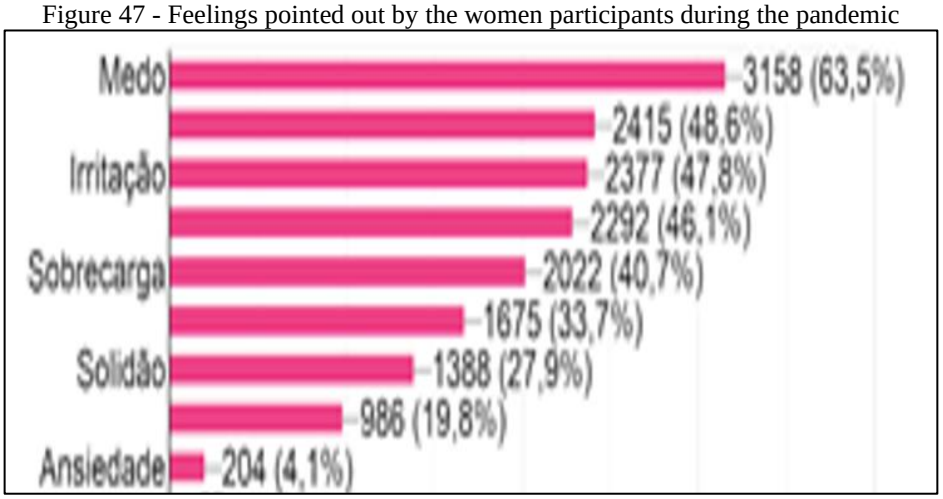


Figure 48 - Sentiments expressed by the women participants associated with the pandemic

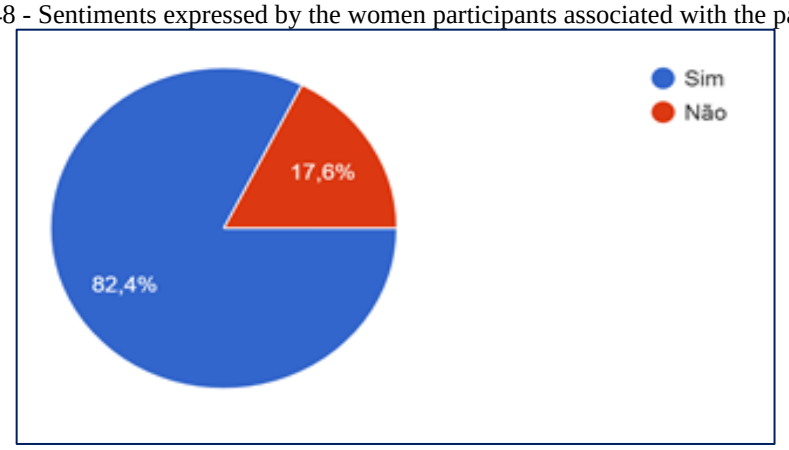


Figure 49- Participating women did physical activity before the pandemic

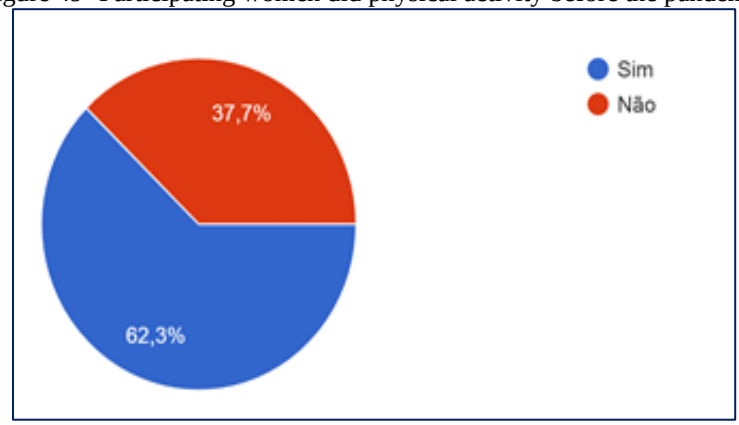


Figure 50 - Participating women do physical activity during the pandemic

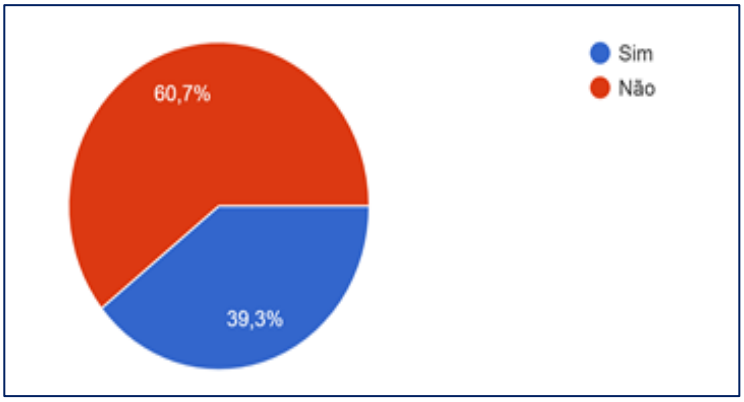
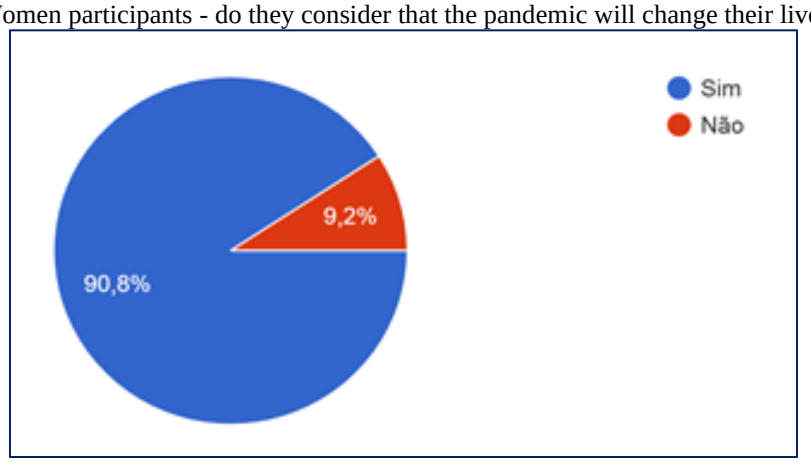


Figure 51 - Women participants - do they consider that the pandemic will change their lives in any way



The pregnant women expressed their feelings during the isolation/pandemic, the main objective of the investigation. It was observed that the pregnant women pointed out feelings related to suffering, predominating fear by 86.4% followed by irritation by 55.9%; sadness by 45.8%, overload by 39% and loneliness by 33.9%. However, there are feelings like hope by 27.1%, solidarity by 28%, and optimism by 15.3%, in the figure. It is observed that the sum is greater than 100%, once the participants pointed out more than one feeling (Figure 52).

Most pregnant women (86.4%) associate these feelings directly with the pandemic (Figure 53). In most cases, there was an ambivalence between positive and negative emotions.

The majority 66.1% of the participating pregnant women consider that the pandemic will change their lives in some way (Figure 54).

Figure 52 Feelings expressed by pregnant women during the pandemic/distancing

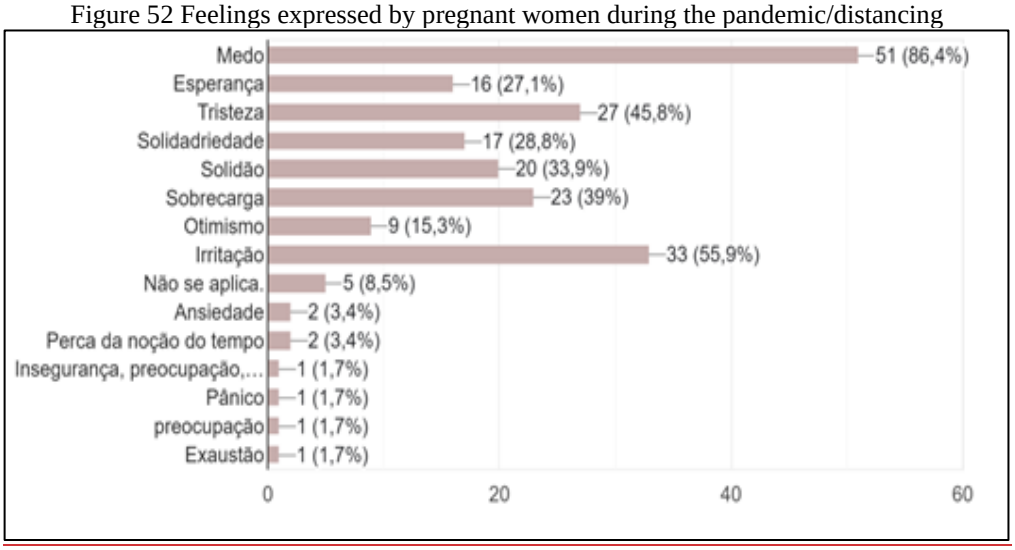


Figure 53 - Sentiments expressed by pregnant women associated with the pandemic

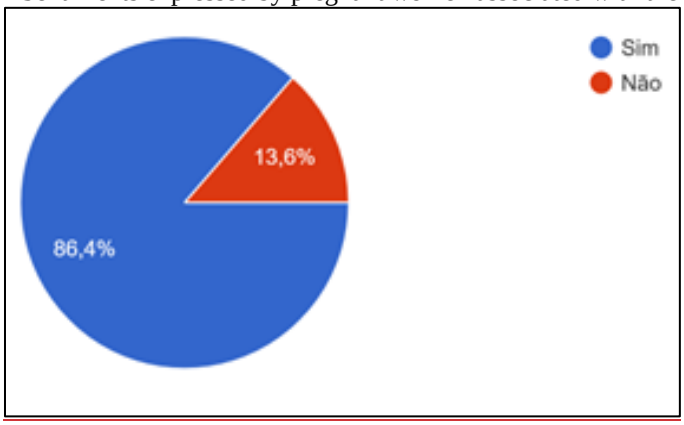
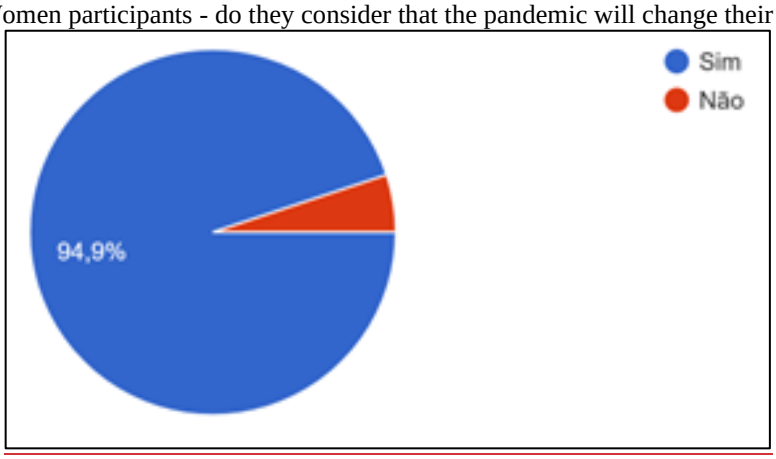


Figure 54 - Women participants - do they consider that the pandemic will change their life somehow



10 DISCUSSION

The results pointed out above confirm data from the literature regarding the effects of the pandemic and social isolation and estrangement. Before addressing the effects of the pandemic, the high number of women who responded to the survey (over 5000) is noteworthy. It is noticeable that women are also seeking

more help with regard to mental health. It is important to consider this when developing preventive measures (Santos, 2022).

With respect to the effects of the pandemic, as stated by Brooks et al, 2000 the **high** prevalence of negative psychological effects, especially lowered mood and irritability, alongside anger, fear, and insomnia, often of long duration. It is worth noting that the sample that answered the questionnaires was composed by convenience, as they were answered by those who were interested. There are a large number of adults with higher education, for example. However, fear predominates among men and women. This insecurity affected the entire population, and many sought psychological help, especially women and teenagers (at APOIAR). Oliveira et al. (2020) also pointed out this need for psychological attention to people who suffered and still suffer from the effects of the pandemic, the post-pandemic, and the social distancing. Other feelings such as overwhelm, especially of adult women, were indicated as signs of psychological distress.

The adolescents denote sadness, loneliness, and although they agreed with the distancing measures, they were resentful. They also show irritability and other signs of psychological distress, as pointed out by Pereira et al, 2020.

The children resented the lack of outdoor play, their friends, and their school teacher. On the other hand, they showed positive feelings. They were at home, and it was the first months of the pandemic. However, we know how much the period of separation also affected the learning and mental health of this group.

The pandemic of COVID-19 also affected the mental health of pregnant women with uncertainties about the risk of the illness of her health and the fetus, as found by López-Morales et al, 2020) and Ng at al,(2020).

It is considered that psychoeducational interventions are necessary to allow pregnant women to recognize the negative emotions derived from the pandemic and to control its harmful effects, both physical and psychological, over time. Thus, psychological support groups are prophylactic measures to avoid problems in the post-pandemic mother-infant relationship.

The majority of the entire population of adolescents, adult men and women responded that life was expected to change after the pandemic. And indeed, the effects continued after the pandemic period in several contexts.

11 CONCLUSION

The objectives were met. The results of the extensive research confirm the findings in the literature that there is psychological suffering caused by the pandemic and by the isolation and social distancing of all segments of the population. Learning about the skills of psychological crisis management developments

in the emergency situation of the pandemic should be part of action planning to reduce the suffering of the population, especially vulnerable groups, in crisis situations in the future. The data thus point to the need for mental health care for all.

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Chapter 46

Knowledge and attitudes of the elderly about genital and sexual health

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ABSTRACT
The aging of the world population is on the rise, making it necessary to look at the quality of life of this population and this includes issues related to sexuality. This study aimed to unveil the perception, with regard to knowledge and attitudes of the elderly about genital and sexual health, as well as to verify whether the fact of having sexual desire interferes with health care attitudes. The quantitative research was carried out in elderly groups in the city of Santa Maria - RS. Data collection occurred from September 2021 to March 2022. A questionnaire was used to know the perceptions that the elderly have about sexual health and the care needed to experience sexuality. The data were tabulated, and at the end, statistical analysis was performed. Eighteen elderly people participated in the study, 17 women and one man. Of these, 50% did not want to have sexual intercourse, 89% never used condoms after 60 years old, and 72% had frequent visits to a gynecologist/urologist. It was identified that the desire does not interfere in the fact of having sex, frequent visits, or in the use of condoms. The study allowed us to identify that sexuality in the elderly is a subject that brings with it several taboos and prejudices. Still, the issue regarding the prevention of Sexually Transmitted Infections is of precarious knowledge and that it is necessary to approach the subject.

Keywords: Sexuality. Aging. Sexual health.

1 INTRODUCTION

The aging of the world population is in high growth due, especially, to the fall in mortality and birth rates, added to the increase in life expectancy (LOPES; MISTURA, 2015). The United Nations Organization (UN); (2019), projected that from 2017 to 2050 there will be an increase of 1.1 million elderly people. Therefore, it is believed that it is necessary to look at the quality of life of this population, including health and well-being, which also refers to issues of sexuality, which is sometimes forgotten (UCHÔA *et al.* , 2016).

During the senescence process, the individual does not become asexual, contrary to popular belief. In many cases, it is during this phase of life that several changes and discoveries occur on how to fully experience sexuality. Living sexuality fully means not only maintaining sexual relations, but engaging in a relationship of affection, affection, care, which translates into a desire for companionship and companionship (UCHÔA *et al.* , 2016).

Although human aging is the natural cycle of life, the topic of sexuality is still shrouded in prejudice, both from society in general and among the elderly themselves, who grew up in the face of various taboos that they bring with them into old age (FRUGOLI; JÚNIOR, 2011). However, it is known that there is continuity of sexual activity of the elderly, however, there is no concern about the care and safety, a fact that is confirmed through the increasing number of cases of Sexually Transmitted Infections (STI) in the elderly (BASTOS *et al*., 2018). Coming from a more repressive education, the elderly have not developed the habit of using condoms to protect against diseases and are unaware of the risks of having unprotected sex even with fixed partners, which may have contributed to the increase in the number of elderly contaminated with the Human Immunodeficiency Virus (HIV) (MANSO, 2021).

According to the Ministry of Health, in Brazil, there was a 42.8% increase in the number of people aged 60 years or older infected with HIV between 1998 and 2010. One of the main risk factors for the elderly to acquire some type of STI is unsafe sex without the use of condoms. In addition to this issue, some physiological changes of aging also contribute to a higher risk of infection in this age group, such as the decrease in cellular immunity and antibody production, the fall of estrogen in women and a consequent decrease in lubrication, allowing the vaginal mucosa to become more susceptible to infections (NETO et al., 2015).

Several studies point to a greater concern with sexual health in young people, a fact that corroborates the misinformation and precariousness of knowledge of the elderly about the subject (MASCHIO et al. , 2011; AGUIAR; LEAL; MARQUES, 2020). Thus, this study aimed to unveil, primarily, the perception regarding the knowledge and attitudes of the elderly about genital and sexual health, as well as to verify whether the fact of having sexual desire interferes with their health care attitudes.

2 METHODS

This research is quantitative in nature and was conducted in groups of seniors in the city of Santa Maria - RS, belonging to the university project of the Physical Education and Sports Center (CEFD) entitled Integrated Center for Studies and Support for the Elderly (NIEATI), which reaches the elderly of Santa Maria and region, and encompasses various activities that seek to maintain cultural, social and political connections (UFSM, 2016). Data collection occurred from September 2021 to March 2022.

The project was approved by the Ethics and Research with Human Beings Committee (CEP) of the responsible institution, approved by CEP under opinion 2.472.098 (CAAE: 80587517.0.0000.5346). Data collection began after authorization from NIEATI. The researchers committed themselves to the confidentiality and anonymity of the data collected by signing the Confidentiality Agreement. Only those who freely accepted and agreed to sign the ICF participated in the study. The study included elderly men and women aged 60 years or more, participants of the senior citizens groups, with self-reported active sex

life and presenting preserved cognitive ability assessed by the Mini Mental State Examination (MMSE), and who agreed to participate in the study. Participants who did not complete all the evaluation instruments listed for the research were excluded.

For the collection, we chose three groups from different regions of Santa Maria (Bairros Nossa Senhora das Dores, Salgado Filho and Noal), which had recently returned to their activities and informed about a larger number of participants. Then, after the acceptance of the elderly, the interviews were scheduled at the meeting place of the groups, but they occurred in a reserved way, individually, with no time restriction for the conversation and with the maximum privacy in order to minimize possible embarrassment to the elderly person. Initially it was clarified about the research objectives, relevance of the theme, confidentiality of information, and the possibility of interrupting participation at any time without personal harm.

Regarding the perceptions that the elderly have (what we call knowledge and attitudes) about the theme Sexual Health and the care needed to experience sexuality, we used the questionnaire prepared by Matsuoka et al. (2008), with the necessary adaptations for the present research. Ten questions were added to the questionnaire, referring to sexuality, sexual experience and Sexually Transmitted Diseases. The age mentioned in the questions was also changed from 50 to 60 years old, in order to update the age according to the Brazilian Statute of the Elderly. The adapted instrument has 20 closed questions with objective and direct alternatives, but for the analysis the following questions were used: "Do you know what a sexually transmitted disease is?"Have you ever used any ways to avoid sexually transmitted diseases after the age of 60?" "Why have you not used ways to avoid sexually transmitted diseases after the age of 60? If yes, how often? If no, why?"

The data were tabulated using Microsoft Excel software during collection, and at the end of the collection the statistical analysis was started. Initially, the descriptive statistics of the sample were performed, where the scalar variables were presented as mean and standard deviation, and categorical variables as absolute (n) and relative (%) frequency. Normality was assessed by the Shapiro-Wilk test. Comparison analyses between groups, "Group A and Group B", for parametric scalar variables were performed by Student's t test for independent samples, while for non-parametric variables Mann Whitney's U test was used. In turn, for comparisons between categorical variables, the chi-square test (Chi-square^2) was used. The significance level for all analyses was 0.05.

3 RESULTS

Data collection occurred in three elderly groups in the city of Santa Maria, which together total 93 participants, 87 women and 6 men. From the total, 18 elderly accepted to participate in the research by

answering the instruments, 17 women and 1 man, with a mean age of 72.7±8.2. The sociodemographic variables that characterize the elderly participants are listed in Table 1.

Table 1. Sociodemographic variables of the elderly

Variables	N (18)	(%)
Sex		
Female	17	94
Male	1	6
Ethnicity		
Yellow	1	6
White	15	83
Indigenous	0	0
Brown	1	6
Black	1	6
Marital Status		
Single	1	6
Married	8	44
Separated	0	0
Divorced	1	6
Widow(er)	8	44
Education		
Incomplete Primary Education	7	39
Elementary School Complete	4	22
Incomplete High School	0	0
High School Complete	7	39
Incomplete Higher Education	0	0
Higher Education Complete	0	0

Source: Authors (2022).

Regarding the perception of the elderly, which refers to knowledge and attitudes towards sexual health, all of them replied that they know that sex can transmit diseases and know how to avoid them, and 50% of them have no desire to have sex.

The attitudes of the elderly in relation to sexual health care, 89% responded that they had never used condoms after the age of 60, of which 44% did not use them because they had a steady partner, 17% because they trusted their partner, 6% because they were ashamed, and 11% because they thought there was no need to use them. All of them stated that they had never contracted any disease transmitted through sex.

As for medical follow-up, 72% reported that they frequently visit the gynecologist/urologist, 56% once a year and 17% twice a year or more. Of the participants, 28% reported not having frequent visits with the following reasons: the uterus was removed (6%), there was no need for them (11%), they have recurrent exams and do not think it is necessary (6%), and another 6% do not have them because of the high cost of the consultations.

In view of the analysis of the variables studied, we also tried to verify if the fact that the elderly have sexual desire can interfere with the variables related to attitudes such as: maintaining sexual intercourse with a fixed partner, frequent visits to the gynecologist/urologist, and using condoms after the age of 60, which are presented in Table 2.

Table 2. Comparison of the attitudes of the elderly according to the presence of sexual desire.

Variable	With desire (n)	No desire (n)	p*
Have sex with a steady partner	9	9	
Frequent visits to the gynecologist/urologist	6	7	0,999
Have you ever used a condom after the age of 60	1	1	0,999

Source: Authors (2022).

4 DISCUSSION

Of all the members of the senior groups participating in the research, only 18 agreed to participate, which can be justified because there are still taboos rooted in the social environment when the topic involves sexuality in senescence. It was noticed that, during the invitation to participate in the research, some of the elderly walked away for possibly not understanding it as a relevant theme, or for not feeling comfortable to comment on the subject. It is also possible that the refusal may have occurred due to the difficulty in admitting that they no longer have an active sex life or the opposite (SANTOS *et al*., 2019).

Regarding the majority gender in the groups, there was a high number of elderly women participants compared to men. This fact may be associated with the greater health care in general provided by females, care that in its great majority is not performed by males, much as a result of thoughts that are still macho and that this makes them fragile and ends up hurting masculinity. In this sense, there are several studies stating that women have greater care and concern with their own health, being the public that uses the Unified Health System (SUS) the most, which explains the greater longevity of women, making the number of elderly women increase as the years go by (SANTOS, 2022; NARDELLI *et al.* , 2016; SANTOS *et al.*, 2020).

According to Valenzuela (2020), old age is female. The author brings some complications associated with the feminization of old age that is marked by gender stereotypes that sometimes implied in the workplace and working conditions leading to lower pay, including for retirement. However, the social role of women in the family and community gives them greater importance.

As for the elderly's knowledge about STIs, the totality of the sample said they knew that sexual intercourse can transmit diseases, but, contradictorily, 89% had never used condoms after the age of 60. Considering that most of the participant group are women, one can think that the non-use of condoms may be linked to the issue that, for men, it can reduce the pleasure of the relationship, leading to the imposition of not using them, since for them, sex is perceived as the preservation of sexuality as a couple. Moreover, there is the fact that when the woman requests the use may be related to the lack of trust in the partner (NARDELLI *et al*., 2016; GASPAR; BRITO; NASCIMENTO, 2020).

According to Laroque *et al*. (2011), a study conducted with the elderly in a Basic Health Unit of a medium-sized city in southern Rio Grande do Sul showed that another fact related to the non-use of condoms is that their use is still linked only to contraception, which no longer makes sense when women

have already gone through menopause. Even knowing that sex can transmit diseases, the knowledge about the care and prevention of these diseases is still very precarious in the elderly group, following the thought that only young people can get them or that they need to take care of themselves, or that it can be linked to the issue of poor personal hygiene.

Regarding the issue of appointments with gynecologists/urologists, the vast majority answered that they are often consulted (72%), but 28% of respondents do not think it is necessary to go to the doctor, on the grounds that they do not have symptoms. This may be one of the factors that often lead to undiagnosed or late diagnosis of diseases and that preventive measures are not thought of for the elderly.

In the study by Silva et al. (2022), it was investigated which factors prevent older women from performing routine gynecological exams, and among the main reasons are the lack of knowledge regarding the Pap smear, fear of pain and embarrassment or shame before health professionals, especially when males. It is also believed that the non-attendance of consultations is related to the distance from the fertile age, the arrival of menopause, and the low professional training, which concomitant to the little investment in health education, contribute to the vulnerability of the elderly women. However, it is of utmost importance that the prevention of diseases of the genital organs has continuity even after the end of the menstrual cycle.

Still, according to the research, 50% have no desire to have sexual intercourse, but even so, they claim to remain sexually active. Studies conducted by Santos *et al.* (2019) and Marques *et al*. (2015) showed that, even after 60 years old, there is still a personal interest, that in this phase of life, unlike youth, sexual intercourse happens less frequently, valuing more the quality, the touch, affection, and complicity. However, the reduction in desire may be related to taboo issues imposed by society, or due to some disease, the use of medications, or even due to the physiological changes that come with aging. According to Soares and Meneghel (2021), the difference in the perception and valuation of sexuality occurs according to gender. For men, sexuality is based on biological satisfaction and the sexual act itself, while for women it is related more to affection and affection with the partner.

Regarding the limitations of the study, it is noteworthy that data collection was carried out during the pandemic of COVID-19, a scenario that led to negative consequences in multiple ways. Considering that the audience of this research was made up only of elderly people (risk group), besides the fact that these elderly groups remained inactive for a long period of time, it is estimated that the number of samples collected suffered losses, since the initially estimated number was not reached. Another factor to be considered significant and difficult in the collections was the fact that the number of active participants in the groups has reduced, as well as the difficulty in voluntary acceptance of the elderly, who often did not want to stop participating in the recreational activities of the group to contribute to this study.

5 CONCLUSION

The present study identified that sexuality in the elderly is still a subject that brings with it several taboos and prejudices, even among the elderly. Still, the issue regarding the prevention of STIs is a theme that has shown to have a precarious knowledge and that it is necessary to approach the subject, exposing care and risks regarding these infections. This is due to the fact that the elderly, even when telling about their knowledge on the subject, still maintain attitudes that are not compatible with sexual health care.

It is necessary that the elderly be seen as a sexualized being and that health education strategies and public policies that include people over 60 and promote knowledge and prevention be thought of, thus ensuring a better quality of life. It is necessary that professionals are prepared for this approach, recognizing the aging processes and knowing the importance of sexuality even in this phase of life, thus avoiding late diagnosis of STIs in the elderly.

Therefore, it is necessary to carry out more studies on the subject addressed here in order to obtain more robust data and in-depth information about knowledge and sexual experiences in the elderly, so that public policies can be directed to include the theme in the elderly population, as well as so that health professionals, including physical therapists, can understand and address the subject more easily, thus helping in the prevention of STIs.

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Chapter 47

Diseases in poultry farming

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ABSTRACT
Over the years, poultry farming has undergone extraordinary transformations, making Brazil one of the world's largest poultry producers and exporters. The poultry industry has gone from the level of farm owner to a high scale economy, being possible, by the association of individual producers supplying birds for the same processing company. Like any agribusiness, it also faces production challenges, and in this context, the causative agents of poultry pathologies should be highlighted, with parasites being the main reasons why they cause so much damage to these animals. The major cause of economic losses to the productive sector of commercial poultry are protozoa.

1 INTRODUCTION

Over the years, poultry farming has undergone extraordinary transformations, making Brazil one of the world's largest poultry producers and exporters. The poultry industry has gone from the level of farm owner to a high scale economy, being possible, by the association of individual producers supplying birds for the same processing company. Like any agribusiness, it also faces production challenges, and in this context, the causative agents of poultry pathologies should be highlighted, with parasites being the main reasons why they cause so much damage to these animals. The major cause of economic losses to the productive sector of commercial poultry are protozoa.

Among the various health problems found in poultry farming, parasitic diseases stand out, which can cause from subclinical infections to death. When it comes to poultry production in high density and with a high number of animals in the same place, associated with poor sanitation and biosecurity practices, the rate of infection increases significantly. Thus, birds raised for production, whether eggs or meat, are more susceptible to infectious diseases. This leads to economic losses for the poultry industry, which suffers uncontrolled economic and productive internal and external production. The Brazilian poultry industry grows annually and becomes increasingly representative in the production and export of its products.

However, pathogens that affect the weight and quality of the carcass continue to cause great losses to poultry production.

When acquiring chickens, one must be sure of their origin to avoid the contamination of an entire farm. Poultry diseases have the most varied origins and causal agents such as viruses, bacteria, fungi, and parasites. Hence the importance of knowing the main diseases that cause losses in poultry farming.

2 RESPIRATORY ILLNESSES

2.1 NEWCASTLE

2.1.1 Definition Of The Disease:

Newcastle disease is caused by a virus (avian Paramyxovirus type 1 (APMV-1)). Particularly aggressive, the first widespread outbreak of Newcastle disease occurred in the United States, in southern California. In 1972, some infected exotic birds escaped from a breeder and transmitted the infection to chickens on neighboring farms. Before the outbreak was over, millions of chickens died or were killed in an effort to control the spread. This outbreak was directly responsible for the adoption of a quarantine system for imported birds in many parts of the world. Since then, no outbreak of similar severity has occurred.

2.1.2 Transmission:

The **virus is highly contagious** and is spread in feces and nasal secretions, through direct contact, through the air, or contaminated items such as shoe soles, cages, contaminated food or feeders. The virus can also penetrate eggshells that come into contact with infected food or tissue, and thus manage to infect the embryo. It can survive outside a host for several weeks. But it has to be in a warm and humid environment, and indefinitely in a frozen place.

2.1.3 Symptoms:

The incubation period (time from exposure to the development of disease symptoms) is 4 to 7 days. In general, symptoms can include conjunctivitis, nasal secretions, difficulty breathing (open beak), greenish stools (from the beginning to the end of the disease), difficulty standing, torticollis and paralysis. The symptoms can be milder or lead the bird to a sudden death. This will vary depending on the strain of the virus and the species of chicken affected.



FIGURE 1 - Chicken with Newcastle disease.

2.1.4 Prevention and control:

There is no treatment or **vaccine for Newcastle disease.** However, injections of hyper-immune serum have been used to protect exposed birds before they become symptomatic. When birds begin to show symptoms, this is ineffective. Unfortunately, the prognosis of this disease is terrible, with a mortality rate of almost 100% when the chicken is infected.

Once you follow the quarantine requirements, the incidence of Newcastle disease will find it very difficult to spread. This is why its numbers have been reduced around the world, but it has not yet been eradicated worldwide. Although they are abundant and able to survive in various environments, the virus is easily destroyed by rapid dehydration and ultraviolet rays.

There are several tips that can and should be used in your breeding. Decreasing the chances of having your entire flock decimated by the disease. Any newly acquired hen, especially if of unknown origin or from abroad, should preferably be quarantined. Separate shoes and clothing to be worn only in the quarantine area. Allow only workers and utensils essential in husbandry to access the area. Cleaning and disinfecting vehicles (including tires and undercarriage) entering and leaving the farm, avoiding visiting other farms, cleaning and disinfecting poultry houses between each batch of birds are some interesting precautions to avoid problems with Newcastle disease.

2.2 INFECTIOUS BRONCHITIS

2.2.1 Definition of the disease:

Infectious Bronchitis of chickens (IBR) is an acute, highly contagious disease caused by a Coronavirus that affects the species Gallusgallusdomesticus, infecting cells of the respiratory and genitourinary apparatus of chickens (KING & CAVANAGH, 1991; SANTOS et al., 2005). BIG was first

described by SHALK & HAWN (1931) in North Dakota City, USA, spreading rapidly throughout the country (COOK, 1997). In the 1940s the impact of BIG on egg production and quality was described and in the 1960s the nephritis-nephrosis syndrome was reported in Australia (KING & CAVANAGH, 1991).

In Brazil, BIG was first diagnosed in 1957 by Professor Hipólito in the state of Minas Gerais (HIPÓLITO et al., 1979). The economic importance of this disease is due to the decrease in production and internal and external quality of the eggs, decrease in hatchability, decrease in feed efficiency and weight gain and increase in mortality and condemnation of carcasses at slaughter, besides the expenses with medicines to debilitate secondary bacterial infections (HIPÓLITO et al., 1979; ROCHA, 2000; RESENDE, 2003).

2.2.2 Transmission:

The transmission of IGB on farms occurs mainly by the horizontal route, through respiratory aerosols and feces. The virus has a predilection to replicate in the epithelial tissue of the upper respiratory tract, regardless of the viral strain. The infected bird has the ability to transmit the virus for up to two weeks, and after cure, there is still the possibility of the same bird becoming infected with a different viral strain. Therefore, disinfection, biosecurity processes and adequate sanitary emptying are very important in controlling the disease.

2.2.3 Symptoms:

The **main symptoms of infectious bronchitis** are depression, the birds are huddled, loss of appetite, coughing, wheezing, shortness of breath, diarrhea, diuresis, and the chicken litter is usually wet. The provisional diagnosis is based on clinical signs, lesions, and serology. Definitive diagnosis is based on viral isolation in chicken embryos, typical lesions, positive immunofluorescence and ciliostasis in tracheal organ culture.

FIGURE 2 -Bird with Infectious Bronchitis.



2.2.4 Prevention and control:

There is no specific treatment for the disease. Some breeders usually administer antibiotics to avoid secondary infections, thus reducing losses in breeding. Many times this treatment can be very expensive. The best way to avoid/counter Infectious Bronchitis is still to prevent the disease through vaccination. You can choose between using live vaccines, which contain attenuated virus, or inactivated vaccines, with killed virus.

Infection of chicken occurs through the conjunctiva or upper respiratory tract, with an incubation period of 18 to 36 hours. The infection is highly contagious and spreads rapidly by contact, contaminated objects, or through the air. Some birds/viral strains can carry the disease for up to a year. The virus can survive 4 weeks in the environment, and is sensitive to solvents, heat above 56°C for at least 15 minutes, and 1% formalin-based disinfectants for 3 minutes. Inadequate ventilation of your chicken house and also high density are predisposing factors for this disease.

2.3 AVIATION BOUBA

2.3.1 Definition of the disease:

Avian Bouba is a viral disease of poultry, being of slow dissemination and characterized by the formation of proliferative skin lesions, discrete, nodular, in the regions devoid of feather on the bird's body (cutaneous form); or fibrio-necrotic and proliferative lesions on the mucous membrane of the upper respiratory tract, mouth and esophagus (diphtheric form). Normally, mortality is low, but can be high when in the diphtheric form or when complicated by secondary infections and/or poor management quality (BERCHIERI & MACARI, 2000). It is not a disease of public health interest and normally does not affect

mammals, but a poxvirus has been isolated from a rhinoceros and characterized as chicken poxvirus (BERCHIERI & MACARI, 2000).

2.3.1 Transmission:

There are two forms of the disease. The first is transmitted by biting insects, especially mosquitoes, and contaminated wounds, causing damage to the crest, dewlap, and beak. Birds affected by this form usually recover within a few weeks. The second form is transmitted by inhalation of the virus and causes diphtheria, forming membranes in the mouth, pharynx, larynx, and sometimes the trachea. The prognosis for this second form is usually not good.

2.3.2 Symptoms:

The clinical signs vary with the virulence and pathotype of the viral strain, mode of transmission and susceptibility of the host (RUPLEY, 1999). The sick bird is apathetic, shivering and feverish (BIER, 1970). The disease can occur in the cutaneous form: it is the most common presentation of the outbreaks, the birds present few symptoms, reduction in weight gain or loss in egg production (BERCHIERI & MACARI, 2000). In the diphtheric form there are lesions in the upper part of the respiratory and/or digestive tract, which can produce dyspnea and inappetence. The mortality can be high, but in general is low (BERCHIERI & MACARI, 2000).

FIGURE 3 - Bird with Avian Boube.



2.3.3 Prevention and control:

Control is done with biosecurity principles, in domestic environments with multiple birds includes isolation of infected birds, mosquito control, and disinfection of surfaces exposed to infected birds. Effective disinfectants include 1% potassium hydroxide (KOH), 2% sodium hydroxide (Na0H), and 5%

phenol. Vaccines are available for psittaciformes, canaries, pigeons and domestic birds and may be useful in high-risk populations such as imported birds, birds exposed to imported birds and birds in areas where a high density of mosquitoes occurs. Some deaths are associated with vaccine administration (RUPLEY, 1999).

The prevention of the chicken pox is done by systematic vaccination of the chicks starting from 10 days old. The type of vaccination that has been most used among us is the preparation with chicken virus attenuated by successive passages in the pigeon, which seems to have the best qualities of efficiency and innocuousness (BIER, 1970). Its use will be according to the regional need or the time of the year (more frequent rainy season that propitiates the multiplication of the transmission agent) (MACARI & GONZALES, 2003).

2.4 AVIAN CORIZATION

2.4.1 Definition of the disease:

A common disease among birds, especially when the breeding does not have shelter or adequate protection against climatic adversities, the avian coryza is characterized by the occurrence of secretion in the eyes and nasal orifices of the animals. The disease, caused by a hemophilic germ, frequent in humid and draughty environments, can be fatal if delayed to be treated.

2.4.2 Transmission:

It is highly contagious due to the fact that the virus spreads rapidly among birds; no vectors are needed for transmission, sick birds infect healthy ones by direct or indirect contact.

2.4.3 Symptoms:

The main **symptoms of avian coryza** include swelling around the face, thick and sticky discharge from the nostrils and eyes, difficulty breathing, showing agony. In addition, the eyelids of infected chickens may become irritated and end up "sticking" together. It can also cause diarrhea. Growing birds may become stunted. Infection can reduce egg production and increase the incidence and/or severity of secondary infections.

FIGURE 4 - Bird with symptoms of avian coryza.



2.4.3 Prevention and control:

Mortality can reach up to 50% of infected chickens. Most commonly, 20% of the animals do not resist the disease. Infectious coryza can last as little as a few days or as long as a few months, especially when secondary infections occur. **Treatment of avian coryza** is done with antibiotics, since it is caused by bacteria. It is important that you follow the instructions for using the medication. Antibiotics can be effective in reducing the clinical signs of illness, but will not completely remove the bacteria present in the infected chicken's body.

Good management, strict sanitation, and a comprehensive biosecurity plan are the best ways to prevent infectious coryza. Most outbreaks of the disease happen when new chickens are introduced to the farm. It is therefore worthwhile to quarantine such animals. **Vaccinations for avian infectious coryza** are available, but multiple vaccinations are required to be effective. If you buy chickens from a location that has already had the outbreak of the disease you will have to vaccinate all your chickens.

2.5 AVIAN INFLUENZA

2.5.1 Definition of the disease:

Avian influenza, also known as avian influ**enza**, is considered a high risk disease for birds when caused by highly pathogenic virus subtypes. In these cases, it is characterized as a serious disease, of mandatory notification to the national and international official agencies for animal health control, resulting in a sanitary barrier for the commercialization of poultry products in the domestic and foreign markets and in huge economic losses for commercial poultry farming.

2.5.2 Transmission:

The AI virus has horizontal transmission from bird to bird, directly from respiratory and digestive system secretions and indirectly through contaminated equipment, clothing, footwear, insects, birds and wild animals, food

and water. Migratory birds, especially waterfowl, have been a natural reservoir for thousands of years, and are considered the main reservoir of the virus in nature.

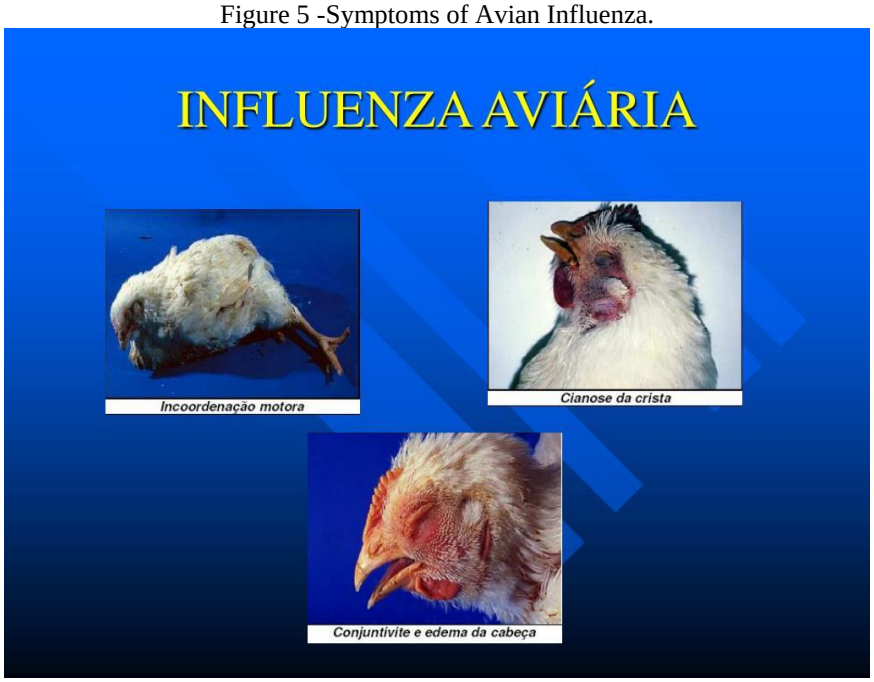
2.5.3 Symptoms:

Low Pathogenic Avian Influenza - Slight respiratory signs, aerosaculitis, diarrhea, low mortality, eggs with malformation, ovarian involution and presence of hemorrhage, drop in egg laying.

Avian Influenza of Medium Pathogenicity - Slight respiratory signs, aerosaculitis, diarrhea, low mortality, eggs with malformation, peritonitis due to ovary rupture, renal inflammation with the presence of urates, laying drop.

Highly Pathogenic Avian Influenza - Severe depression, inappetence, ruffled feathers, facial edema with swollen and cyanotic crest and dewlap, shins with hemorrhagic lesions, respiratory difficulty with nasal discharge, severe drop in posture, prostration, diarrhea, paralysis, and death, sudden death without the presence of clinical signs, mortality of up to 100% of the aviary.

Figure 5 -Symptoms of Avian Influenza.



2.5.4 Prevention and control:

OIE considers HPAI a disease to be placed on the list of pathogens affecting trade between countries. The definitions d of Animal, which aims to first define the disease status of zones of countries or areas and the requirements for trade between countries.

Vaccination: AI vaccines, when properly selected and properly administered, protect against clinical signs and mortality, reduce the levels and duration of virus excretion and increase host resistance to infection by raising the minimum dose of virus to infect a bird. Even so, infection of vaccinated birds can

occur, mainly by HPAI without clinical signs, resulting in delayed reporting and diagnosis culminating in the spread of the disease, which can produce an endemic situation.

and minimum health guarantees to be required to allow trade between two countries are listed in the International Health Code.

3 BACTERIAL DISEASES

3.1 SALMONELOSE

3.1.1 Definition of the disease:

The term salmonellosis refers to any bacterial infection caused by the ***Salmonellaspp. complex***, regardless of the species affected and the intensity of the clinical picture. In poultry, the microorganisms generally considered to be causal suspects are *Salmonellagallinarum* and *Salmonellapullorum.*

All bird species are susceptible to *Salmonella* infection. However, professional sources indicate that the prevalence of the disease is higher in winter, especially in gregarious seed-feeding species (*Passeriformes*). The vulnerability of each specimen will depend on its general health, its immune strength, and the potency of the causative serotype.

Salmonellosis is a *zoonotic disease,* meaning that it can be transmitted from poultry to humans without much difficulty. Most often the contagion occurs by **ingesting contaminated meat, eggs, or water,** but direct handling of sick or dead birds is also an important route of entry of pathogens into the body.

3.1.2 Transmission:

- **Infestation of small mammals:** Rodents, for example, can get sick and eliminate the bacteria in their feces. If a sick mouse defecates in a bird's water source, it can infect an entire population.
- **Vertical transmission:** an infected female can transmit the pathogen to her eggs before they hatch. The offspring will be born sick and therefore have infectious potential.
- **Accumulation of garbage:** As professional sources indicate, flies are carriers of the disease. The accumulation of waste will attract these and other invertebrate vectors of the bacteria, which will greatly favor the infection of poultry.
- **Accumulation of birds:** bacteria can be inhaled by breathing microparticles and stay off their host for a limited time. The more birds in a confined space, the more likely the disease will spread.

- **Stress:** Stress depresses the immune system of birds, which facilitates the occurrence of infections.
- The causality of salmonellosis in poultry is associated in almost all cases with improper care of the animals. Grouping specimens, not feeding them properly, keeping the premises dirty, or exposing them to extreme stress are clear predisposing factors in spreading this condition.

3.1.3 Symptoms:

The infection usually manifests itself at the pharyngeal and gastric levels, but it is not uncommon for bacteria to colonize the liver and spleen. For this reason, the clinical signs are usually general and shared with many other conditions. These are the most striking symptoms of salmonellosis in poultry:

- Yellowish-green diarrhea staining the feathers of the cloacal region.
- Generalized apathy
- Lack of appetite and weight loss.
- Constant excessive thirst derived from water loss through diarrhea.
- Raised plumage

.

Furthermore, it should be noted that this infection is considered to be very serious. The mortality rate without treatment in adult specimens is about 50%, but in chicks the mortality increases to 95%. The more fragile birds will die between 1 and 3 days after showing the first symptoms.

FIGURE 6 -Birds with symptoms of Salmonellosis.



3.1.4 Prevention and control:

Veterinary portals indicate that the treatment of choice in almost all cases is the antibiotic enrofloxacin (commercial product Seriflox), at a rate of 10 drops for every 40 milliliters of water in

the trough. This medication is also used to treat other concomitant infections. The total duration is 19 days: 7 of antibiotics, 5 of rest, and another 7 of antibiotics.

Another alternative is to administer chloramphenicol directly into the beak, especially if the bird is domestic and lives alone. Framycetin, sulfaquinoxaline, and B vitamins can be applied under veterinary care if other approaches do not work.

4 E.COLI

4.1 DEFINITION OF THE DISEASE:

Avian colibacillosis is an infection caused by the bacterium *Escherichia coli*, which can affect any species of bird, so colibacillosis is common in canaries, pigeons, parrots... Although it can be a primary infection (initially caused by this bacterium), it is usually a secondary infection that occurs as a complication of other respiratory processes in birds.

Colibacillosis in poultry can occur in an acute form, with a septicemic picture of high morbidity and mortality, or in a chronic form, with less severity and mortality.

4.2 TRANSMISSION:

- **Vertical**: it is the transmission that occurs from parents to their offspring. Infected mothers can contaminate the eggshell which, being semi-permeable, allows *E. coli to* enter the egg. Infection can also occur at the time of hatching or through the parents during the incubation phase.
- **Horizontal**: is the transmission that occurs between individuals other than mother and child. It is usually transmitted directly by the respiratory route (as aerosols formed from contaminated feces), although in some cases it can be transmitted by the digestive route.

4.3 SYMPTOMS:

The clinical signs of avian colibacillosis can vary depending on the situation:

- The particular strain of *E. coli* and its pathogenicity.
- The location of the infection.
- The immune status of infected birds.

The most important clinical feature of avian colibacillosis is the development of septicemia or colisepticemia (severe systemic response of the organism to a generalized infection), in which lesions such as perihepatitis, peritonitis, pericarditis, aerosacculitis, salpingitis, and omphalitis are observed. In very acute cases, the main sign observed in birds is increased mortality. In less acute cases, the following is observed:

- Typical clinical signs of sepsis: fever, ruffling of feathers, poor appearance, indifference, anorexia.
- Respiratory signs: aerosaculitis (inflammation of the air sacs) usually develops, accompanied by clinical signs such as dyspnea or breathing disorders and wheezing.
- Digestive signs: enteritis that can become hemorrhagic.
- Reproductive disorders: infection of the oviduct leads to a slight drop in egg-laying in the birds.
- In colibacillosis in canaries, cessation of singing is characteristic.

FIGURE 7 - Birds with symptoms of E.COLI.



5 TUMORAL DISEASE

5.1 5MARE

5.1.1 Definition of the disease:

Marek's Disease is an infection caused by a virus that attacks chickens in many parts of the world. Between the 1980s and 1990s highly virulent strains became a problem in North America and Europe. Many birds were affected by the disease. The **most common form of infection is through respiration**. The disease is highly contagious, spreading through dandruff from feather follicles and any other object capable of carrying the disease. Infected birds remain with the virus in their blood throughout their lives. Vertical transmission, i.e. transmission from hens to their chicks through laying and brooding eggs, is not considered important.

5.1.2 Transmission:

It is easily transmitted by direct or indirect contact between chickens by airborne route. The viruses are present in the feather pulp, which is the main source of environmental contamination and infection of chickens. The contaminated site remains potentially infectious for several months at 20°-25°C and for years at 4°C. Marek's disease occurs mainly in young birds (1-16 weeks). Early studies, based on contact

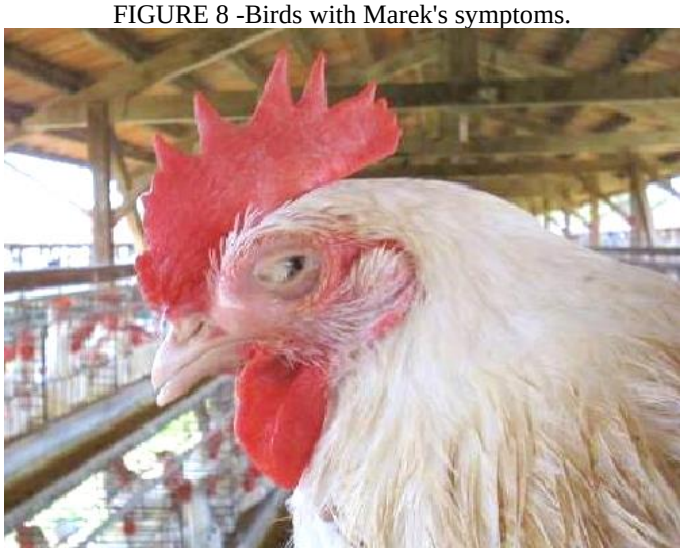
infection, showed that virus excretion starts about 2 weeks after infection and continues indefinitely. Transmission by rattlesnakes (Alphitobiusdiaperinus) has been reported, but in free-living birds.

5.1.3 Symptoms:

The main symptoms of Marek's Disease are paralysis of the legs, wings, and neck, weight loss, vision problems, rough skin on the follicles around the feathers, and irregular, gray pupils. Mortality in an affected chicken house will usually be moderate or high for several weeks. This disease may attack chickens as young as 40 weeks of age. Birds affected by Marek's disease are more susceptible to suffering from other diseases, both parasitic and bacterial.

This disease has several manifestations. It can cause neurological problems, acutely infiltrating the central nervous system, causing temporary paralysis of the legs or wings, and eye lesions. Visceral problems, such as tumors in the heart, ovary, testicles, muscles, and lungs, and finally skin problems, such as tumors in the feather follicles, making it a serious disease.

FIGURE 8 -Birds with Marek's symptoms.



5.1.4 Prevention and control:

It is only important to maintain complete house hygiene and to vaccinate the chicks at 1 day old. This vaccination will protect the birds against the disease, since so far there is no cure. It is important that this is done on the first day of the chick's life. It can not have any contact with other birds or environments that may be contaminated by the virus. Finally, it is worth remembering that the vaccination of an infected animal will not prevent it from contaminating other chickens.

The virus survives at room temperature for a long period of time, for more than 1 year when associated with cells. It is also resistant to ammonia and phenol based disinfectants. It is quickly destroyed by freezing and thawing.

5 PARASITIC DISEASES

5.1 COCCIDIOSIS

5.1.1 Definition of the disease:

Coccids are a microscopic parasite that infect the body of chickens when ingested. The parasites are found in bird feces or on the ground, adhering to the mucous membrane of the intestine, multiplying and turning into oocysts, staying in the digestive tract to draw blood. Once infected, the hen will spread the parasite through her times for a few days before symptoms appear.

Coccidiosis that infects chickens will not affect other animals, and vice versa. Different types of birds will be infected with different types of Coccidiosis. Coccidiosis **in poultry** is caused by 9 species of Eimeria protozoa, some are more serious than others. It is a fatal chicken disease, but if your chicken survives, it will be immune to future infections.

Some Coccidiosis infections are more serious than others. The more oocysts ingested by the hen, the greater the problem. The age of the bird is also related. Younger birds are more susceptible, but older hens can still get the disease. And feeding is also important, since a poorly fed bird will have more difficulty fighting the disease. Coccidiosis generally occurs more frequently in the warmer months of the year.

5.1.2 Transmission:

Coccidiosis is usually transmitted when birds ingest food or water contaminated with particles of feces containing the oocysts (eggs). Usually confined birds are the main targets of this disease, because they live together, feed together, besides other factors, such as high temperature and humidity, which favor the dissemination.

The transmission happens from the eggs eliminated in the secretions of the infected birds, both in the feces and in their saliva, besides staying in the environment, contaminating objects and food, and reaching the bed, which is an alternative for contagion.

5.1.3 Symptoms:

The bird looks dirty and unwell, as well as weak, listless, and pale. They do not eat or drink normally. It causes a serious infection, which causes the stools to become yellow and frothy, and even have blood in them. In some cases the chicken may show some symptoms today and die tomorrow.

FIGURE 9 -Bird with Coccidiosis symptoms.



5.1.4 Prevention and control:

Coccidiosis treatment will work effectively and quickly if you start as soon as you see the first signs of the disease. The treatment will be with medicines based on coccidiostatics, which will act on the development of the parasite, or with coccidicide, which kill the agent. These treatments must be followed up with stool tests before and after the medication, in order to analyze its effectiveness. You should monitor the treatment with stool tests and also by supplementing with vitamins, especially A and K.

Preventing Coccidiosis can be done through good sanitary management, vaccination of the chicks and cleaning the water and feed pots every time you change/complete them. Keeping your chickens in clean places, receiving good feed and clean water are a great way to prevent chickens from contracting the disease.

6 IMMUNOSUPPRESSIVE DISEASE

6.1 GUMBORO

6.1.1 Definition of the disease:

Gumboro disease is an infectious and contagious poultry disease that clinically affects chicks from 3 to 6 weeks of age, although it can also affect turkeys and ducks. It is mainly characterized by atrophy and necrosis of the bursa of Fabricius (a primary lymphoid organ of poultry, which is responsible for the production of B lymphocytes), causing immunosuppression in these birds.

It is a disease of great sanitary and economic importance that affects aviculture. It presents a high mortality rate and is capable of infecting between 50% and 90% of birds. Due to its great immunosuppressive action, it favors secondary infections and compromises the vaccination already carried

out. Contagion occurs through contact with the feces of infected chickens or through water, fomites (worms) and food contaminated by them.

6.1.2 Transmission:

The Birnavirus that causes IBV has a predilection for the lymphoid tissues present in the sac of Fabricius, which is directly responsible for the development of the immune system of birds. Infection is transmitted horizontally, via oral, respiratory, or ocular routes. After the virus enters the bird's body, it initially replicates in the Peyer's patches of the intestine, moves to the liver, reaches the bloodstream and reaches the pouch of Fabricius 24 hours after inoculation.

Infected birds transmit the virus during 10 to 14 days through their feces, being able to resist for long periods in organic matter. Vectors such as insects, birds, dogs, cats, rodents, and even humans are capable of carrying the virus from contaminated flocks to healthy flocks.

6.1.3 Symptoms:

The birds affected by IBV present lesions in the liver; petechial hemorrhages in the musculature; increase in intestinal mucus; swollen and whitish kidneys. They also present lesions in the sac of Fabricius, and in the first four days, there is an increase in size with hemorrhagic lesion, edema and fibrinous transudate. After the first four days of infection, the size of the sac begins to regress until it atrophies. The bird presents with diarrhea, prostration, inappetence, reduced growth, dehydration, and secondary infections are very common.

Figure 10 - Birds with symptoms of Gumboro.



6.1.4 Prevention and control:

Treatment of infectious bursitis is limited. Because of the damage to the kidneys, many drugs are contraindicated because of their kidney side effects. Therefore, antibiotics for secondary infections can no longer be used preventively today.

For all these reasons, there is no treatment for Gumboro disease in birds and the control of the disease must be done through preventive measures and biosecurity:

- Vaccination with live vaccines in growing animals 3 days before loss of maternal immunity, before these antibodies drop below 200; or inactivated vaccines in breeding and laying hens to increase maternal immunity for future chicks. Thus, there is a vaccine against Gumboro disease, not to fight it once the chick has been infected, but to prevent it from developing.
- Cleaning and disinfection of the farm or house.
- Access control to the farm**.**
- Control of insects that can transmit the virus in feed and bedding.
- Prevention of other debilitating diseases (infectious anemia, marek, nutritional deficiencies, stress...)
- The all-in-all-out measure, which consists of separating chicks from different locations into different spaces. For example, if an animal sanctuary rescues chicks from several farms, it is preferable to keep them separated until they are all healthy.
- Serological follow-up to assess vaccine responses and field virus exposure.

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Chapter 48

Geographical distribution and monitoring of dengue in 141 municipalities in the center-west of Brazil

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ABSTRACT
In fact, it appears that dengue is characterized as a disease that has relevance to public health in the country. For the year 2019, 1,544,987 cases of dengue could be reported, with the presence of 782 confirmed deaths. Regarding the interruption of dengue epidemic cycles, it was noted that measures associated with vector control have not been successful. This study aims to analyze the spatial distribution associated with dengue cases present in the municipalities of the state of Mato Grosso, from 2015 to 2018, in order to identify the municipalities that have the highest risk rates related to the presence of arbovirus. Gross and Smoothed Rates were used through the Local Empirical Bayesian method. In order to calculate these Bayesian rates, a neighborhood matrix was developed with the presence of the continuity criterion that removed the zero risk of dengue from this calculation, thus minimizing the effects associated with the random fluctuations present in the areas that were monitored. Of course, the SaTScan software was used to calculate the Relative Risk (RR), and it was found that in this spatial scan clusters of low, medium and high risks were identified, demonstrating statistically significant data. The use of statistical techniques and spatial analysis employed in the study expanded the more detailed examination of the risk of transmission in the monitored areas, contributing significantly to the formulation and planning of integrated prevention and control strategies aimed at monitoring the arbovirus present in the state of Mato Grosso.

Keywords: spatial analysis, bayesian rates, relative risk, collective health.

1 INTRODUCTION

The epidemiological setting concerning the dengue in Brazil has been distinguished by the concurrent circulation regarding the four serotypes of the dengue virus (DENV), which has been accompanied by an important number of serious cases and deaths. These are often preventable. The introduction of the Zika (ZIKV) and Chikungunya (CHIKV) viruses in Brazil, in 2014 and 2015, respectively, with wide dispersion throughout the country, has made the suspicion and differential clinical diagnosis of these three types of arboviruses very complex, turning this situation into more challenge. Thus, greater rigor on the part of health services and professionals is imperative, so that complications and occurrence are avoided (BRASIL, 2019).

Dengue has been considered the most important resurgent transmitted disease among the other viral diseases transmitted by biological vectors, and also shows in epidemic bouts, occurring mainly in urban areas (PIGNATTI et al, 2012).

In fact, it could be noted that the incidence concerning dengue has significantly grown throughout the world over the last few decades. The real number of cases of this disease is undernotified and many cases are wrongly classified. Recent estimates have put the incidence of dengue at around 390 million infections per year (consisting of a Confidence Interval (CI) of 95%, from 284 to 528 million), of which the total of 96 million (67 to 136 million) cases have clinical manifestations, whatever the severity of the disease. According to another study regarding the prevalence of dengue, it could be estimated that the total of 3.9 billion people, living in 128 countries, may be at some risk of infection by the Dengue Virus (DENV) (WHO, 2019; GUODOND et al, 2015; GUZMAN et al, 2016).

The DENV belongs to the genus Flavivirus and to the family Flaviviridae. The DENV is transmitted by arthropod vectors (mosquitoes) from the genus Aedes, the main transmitting mosquito being Ae. aegypti. At present, four different serotypes of the dengue virus are known: DENV-1, DENV-2, DENV-3 and DENV-4. However, cases of a fifth serotype, DENV-5, have been reported in Malaysia (MAROUN et al. 2008; CASTANHA et al, 2016).

In Brazil, in 2019 up to Epidemiological Week (SE) n.º 52 (30 December 2019), 1,544,987 possible cases with respect to the dengue could be reported (consisting of the Incidence Rate (IR) of 735.2 probable cases per 100 000 inhabitants). This means an increase of 545.4% in the number of cases, when compared to the same period of 2018, when 239,389 notified cases of dengue were reported. The number of dengue deaths in 2019 is 5.36% higher than that recorded in 2018. By SE 52, 782 deaths from dengue had been confirmed. The states with the greatest number of deaths under investigation are: São Paulo (265), Minas Gerais (172), Goiás (81), Distrito Federal (58), Espírito Santo (34) Bahia (32), Paraná (31) and Mato Grosso do Sul (29) (BRASIL, 2020).

The Midwest Region presented 1,349.1 probable cases per 100 000 inhabitants, followed by the Southeast (1,159.4 probable cases per 100 000 inhabitants), Northeast (376.7 probable cases per 100 000 inhabitants), North (195.8 cases per 100 000 inhabitants) and South (165.2 probable cases per 100 000 inhabitants). The states of Sao Paulo, Minas Gerais and Goiás stand out, which concentrated 66.2% of the probable cases in the country (BRASIL, 2020).

In MT between the years 2015 to 2018, 78,800 probable cases of dengue were reported, with confirmation of 24 deaths. The accumulated incidence in the study period in the state ranged from the minimum in 2018 of 197.2/100 thousand inhab., to the maximum incidence in 611.4/100 thousand inhab., in 2015, the same year with the record of 6 deaths, the largest of the period (BRASIL, 2020).

Indeed, it could be observed that the spatial distribution of diseases may be analyzed and mapped using the Geographical Information System (SIG), which is able to store geographical information, and establish correlations with table data, and which can be used for collection, storage, querying and presentation of spatial data, helping with the spatial location of the diseases and the graphic analysis of epidemiological indicators. According to the World Health Organization (WHO), this is an efficient tool for the administration of the Programa Nacional de Controle da Dengue (PNCD) (in English National Programme for Dengue Control) (ESRI, 2020; MS, 2002).

In fact, it is essential to use maps in the health area, in relation to the planning process and for the control of the disease (Lima et al., 2006). Spatial epidemiology allows one to acknowledge the distribution, importance and frequency concerning the distinct factors that may have a bearing on the increase of certain risks for health, as well as providing the identification of groups that share similar risks (BARCELOS et al, 2005).

Indeed, the characterization and identification of these areas may be performed by the spatial and temporal scanning window, which can be performed in the SaTScan software (KULLDORFF, 1997), in which this software may calculate the Relative Risk (RR) regarding the incident of an event present in a study area. This software is used worldwide by the epidemiologists in order to describe spatial clusters of chronic and infectious diseases, risk factors and disease vectors (SHERMAN et al, 2014).

As aforementioned, this research aimed to analyze the spatial distribution of probable dengue cases in the 141 municipalities in the state of MT between 2015 and 2018, in order to make a comparison between the spatial distribution regarding the Incidence Rates (IR) with Smoothed Rates by the local empirical Bayes method, thus possibly identifying the risk areas of transmission in the 16 health regions in the state of MT.

2 METHODS

2.1 STUDY DESIGN

This study was of the ecological type, where the unit of observation is associated with the community or population within a defined geographical area. In the study, we used data of notification of cases of dengue by municipality of abode, obtained through the Sistema Nacional de Agravos de Notificação (SINAN) (in English National System of Notifications of Disease) of the Ministry of Health (Brazil), between January 2015 and December 2018, comprising the 141 municipalities of the Mato Grosso state, in Midwestern Brazil.

2.2 TERRITORY OF THE STUDY

The Brazilian state of MT has a total area of 903,357.908 km2. It is the third largest state in Brazil, after Amazonas and Pará. The urban area of MT comes to 519.7 km2, which means that it is only 11th place in the league table of Brazilian states with largest urban sprawl. The state accounts for 1.59% of the total population of Brazil. In addition, 81.9% of the population live in the urban part of the state, compared to 18.1% in the rural part. The number of men is slightly more than the number of women: men account for 51.05% of the population and women for 48.95%. The rate related to the population growth for Mato Grosso state is 1.9% per annum (IBGE). The area covered in this study includes all 141 municipalities of MT, a state that lies in the Midwest Region of Brazil and has an estimated population of 3,035,122 inhabitants, according to the Insitituto Brasileiro de Geografia e Estatística (IBGE) (in English Brazilian Institute of Geography and Statistics) (IBGE, 2020) These municipalities are divided among five mesoregions of the State: Centre-South of MT; Northeast of MT; North of MT; Southeast of MT; and Southwest of MT. The 141 municipalities of the state are also divided into 16 regional health offices, which are the main object of risk analysis, namely: Alta Floresta; Água Boa; Cáceres; Barra do Garças; Cuiabá; Colíder; Juara; Pontes e Lacerda; Juína; Diamantino; Peixoto de Azevedo; Rondonópolis; Porto Alegre do Norte; Sinop; São Felix do Araguaia; and Tangará da Serra, representing the units analyzed in this work (Figure 1).

2.2.1 Population and study period

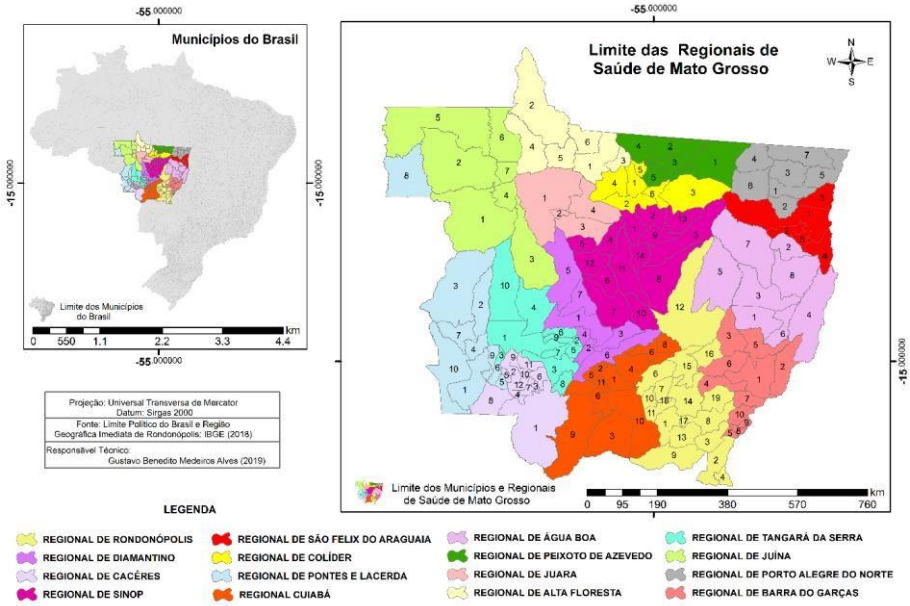
The population for this study comprised all cases of dengue, duly notified by municipality of abode at the SINAN in the 141 municipalities of the State of MT between 2015 and 2018. Throughout the study period, the annual population could be estimated by the IBGE was used to construct incidence rates and smoothed rates.

2.3 CHARACTERIZATION OF RISK AREAS FOR DENGUE

The regional health centers, with the municipalities they cover, have been categorized following the criteria set by the National Programme of Dengue Control (Programa Nacional de Controle de Dengue – PNCD), as follows: low incidence (up to 100 cases per 100 000 people); medium incidence (between 100 and 300 cases per 100 thousand inhabitants), high incidence (between 300 and 1,000 cases per 100 thousand people) and also the epidemic areas (consisting of more than 1,000 cases per 100 thousand people) (BRASIL, 2002; BOHM et al, 2016).

The classification of 141 municipalities in MT according to their size is related to their total inhabitants and obeys the following characterization: a) Small I, with up to 20,000 inhabitants - 104 (73.76%) municipalities; b) Small II, from 20,001 to 50,000 inhabitants – 26 (18.44%) municipalities; c) Medium, from 50,001 to 100,000 inhabitants - 6 (4.25%) municipalities; d) Large, 100,001 to 900,000 inhabitants - 5 (3.55%) (IBGE, 2019; SEPLAN, 2018).

Figure 1 - Location of the area studied in this paper



Legend: Numerical identification of the 141 municipalities in the Brazilian State of Mato Grosso (MT) as distributed among the 16 Regional Health Offices:

- Rondonópolis Regional Health Office: 1. Rondonópolis, 2. Alto Araguaia, 3. Alto Garças, 4. Alto Taquari, 5. Araguainha, 6. Campo Verde, 7. Dom Aquino, 8. Guiratinga, 9. Itiquira, 10. Jaciara, 11. Juscimeira, 12. Paranatinga, 13. Pedra Preta, 14. Poxoréo, 15. Primavera do Leste, 16. Santo Antônio do Leste, 17. São José do Povo, 18. São Pedro da Cipa, 19. Tesouro.
- Diamantino Regional Health Office: 1. Diamantino, 2. Alto Paraguai, 3. Nobres, 4. Nortelândia, 5. Nova Maringá, 6. Rosário Oeste, 7. São José do Rio Claro.

- Cáceres Regional Health Office: 1. Cáceres, 2. Araputanga, 3. Curvelândia, 4. Glória D'Oeste, 5. Indiavaí, 6. Lambari D'Oeste, 7. Mirassol d'Oeste, 8. Porto Esperidião, 9. Reserva do Cabaçal, 10. Rio Branco, 11. Salto do Céu, 12. São José dos Quatro Marcos.
- Sinop Regional Health Office: 1. Sinop, 2. Cláudia, 3. Feliz Natal, 4. Ipiranga do Norte, 5. Itanhangá, 6. Lucas do Rio Verde, 7. Nova Mutum, 8. Nova Ubiratã, 9. Santa Carmem, 10. Santa Rita do Trivelato, 11. Sorriso, 12. Tapurah, 13. União do Sul,

14. Vera.

- São Felix do Araguaia Regional Health Office: 1. São Félix do Araguaia, 2. Alto Boa Vista, 3. Luciara, 4. Novo Santo Antônio, 5. Serra Nova Dourada.
- Colíder Regional Health Office: 1. Colíder, 2. Itaúba, 3. Marcelândia, 4. Nova Canaã do Norte, 5. Nova Guarita, 6. Nova Santa Helena.
- Pontes e Lacerda Regional Health Office: 1. Pontes e Lacerda, 2. Campos de Júlio, 3. Comodoro, 4. Conquista D'Oeste, 5. Figueirópolis D'Oeste, 6. Jauru, 7. Nova Lacerda, 8. Rondolândia, 9. Vale de São Domingos, 10. Vila Bela da Santíssima Trindade.
- Água Boa Regional Health Office: 1. Água Boa, 2. Bom Jesus do Araguaia, 3. Canarana, 4. Cocalinho, 5. Gaúcha do Norte, 6. Nova Nazaré, 7. Querência, 8. Ribeirão Cascalheira.
- Peixoto de Azevedo Regional Health Office: 1. Peixoto de Azevedo, 2. Guarantã do Norte, 3. Matupá, 4. Novo Mundo, 5. Terra Nova do Norte.
- Juara Regional Health Office: 1. Juara, 2. Novo Horizonte do Norte, 3. Porto dos Gaúchos, 4. Tabaporã.
- Alta Floresta Regional Health Office: 1. Alta Floresta, 2. Apiacás, 3. Carlinda,

4. Nova Bandeirantes, 5. Nova Monte Verde, 6. Paranaíta.

- Tangará da Serra Regional Health Office: 1. Tangará da Serra, 2. Arenápolis, 3. Barra do Bugres, 4. Campo Novo do Parecis, 5. Denise, 6. Nova Marilândia, 7. Nova Olímpia, 8. Porto Estrela, 9. Santo Afonso, 10. Sapezal.
- Juína Regional Health Office: 1 Juína, 2. Aripuanã, 3. Brasnorte, 4. Castanheira,

5. Colniza, 6. Cotriguaçu, 7. Juruena.

- Porto Alegre do Norte Regional Health Office: 1. Porto Alegre do Norte, 2. Canabrava do Norte, 3. Confresa, 4. Santa Cruz do Xingu, 5. Santa Terezinha, 6. São José do Xingu, 7. Vila Rica.
- Barra do Garças Regional Health Office: 1. Barra do Garças, 2. Araguaiana, 3. Campinápolis, 4. General Carneiro, 5. Nova Xavantina, 6. Novo São Joaquim, 7. Pontal do Araguaia, 8. Ponte Branca, 9. Ribeirãozinho, 10. Torixoréu.

- Cuiabá Regional Health Office: 1. Cuiabá, 2. Acorizal, 3. Barão de Melgaço, 4. Chapada dos Guimarães, 5. Jangada, 6. Nossa Senhora do Livramento, 7. Nova Brasilândia, 8. Planalto da Serra, 9. Poconé, 10. Santo Antônio do Leverger, 11. Várzea Grande.

2.4 ANALYSIS OF DATA

For the demarcation of risk areas and visualization of the geographical distribution of cases of dengue, we used incidence rates. Indeed, the IR is associated with the easiest risk estimators as well as those most used for mapping occurrences of diseases and disorders; however, these rates normally generate significant instability on showing the risk of an event when it is rare and when the population related to the region of the occurrence is not relevant (CARVALHO et al, 2007).

The most usual form of rate mapping uses the so-called Incidence Rate, given by the expression:

$$Tbi = Yi / Pi \times 100{,}000,\ i = 1, \ldots, n$$

being, Yi the number of cases that could be observed, Pi is associated with the total population-at-risk and n is related to the number of geographical units (for instance, municipalities) contained in the map. Through this calculation, the observed number of events in each municipality i (i = 1, ..., n) is obtained in a base population of 100 thousand people (CARVALHO et al, 2011).

Considering that the state of MT has many small municipalities, it is necessary to flatten the incidence rates, because, as the denominators of these areas are low in value, the results obtained can be easily masked. Out of the available alternatives for flattening, we used the Local Bayesian Approach.

The Empirical Bayesian Estimators bring the incidence rates of small areas closer to the average rate of their neighbours (SOUZA et al, 2007). These corrected rates can be more stable, since according to their calculation, they may consider information about the neighbourhood associated with the area. In this way, maps based on these estimates are more informative. The Global Empirical Bayesian Estimator aims at approximating the average rate of the group of municipalities, while the Local Empirical Bayesian Estimator works with the mean incidence value found near the municipality (DRUCK et al, 2004).

To reduce the random variability of incidence rates, the Local Empirical Bayesian Estimator was used, which smoothes rates, which allows comparisons between different populations and also takes into consideration the regional variances (BARBOSA e SILVA, 2015; SILVA et al, 2015). Calculating the rate locally, using only the geographic neighbors of the area in which it is desired to estimate the rate, converging towards a local average (MARSHALL, 1991). The corrected rates are more stable, considering in their calculation not only the information of the area, but also the information of its neighbourhood. Thus,

the estimates become closer to the reality of the events (CARVALHO et al, 2011; CÂMARA et al, 2004). The local Bayesian estimate consists of a small change in the global Bayesian method proposed by Marshall (1991): instead of $\hat{m}$ and $\bar{n}, \hat{mi}, \bar{ni},$ are used, representing, respectively, the local rate in the vicinity of the area i and the average number of events in this area neighbourhood.

$$i = Ci\ ri + (1 - Ci)\hat{mi}$$

An essential procedure for the evaluation of spatial dependence is the preparation of a neighbourhood matrix, which shows the spatial relationship between each area and the others. It is possible to draw up a matrix based on the list of neighbours of each area, using the distance between the areas, or even based on the presence or absence of a border between two specific areas, weighted using the length associated with the common border. A value of one (1) is assigned to adjacent areas and a value of zero (0) to non-adjacent areas. Areas where there is a direct neighbourhood are known as first-order neighbours. Next, the self-correlation function compares the value of the indicator to the values of the same indicator in neighbouring areas (SOUZA et al, 2007).

For production of theme maps, we used the list of municipalities based on the IBGE. The free geoprocessing software, TerraView 4.2.2, could also be used to calculate the local empirical Bayesian estimates and for the preparation of thematic maps. The automatic process of the geocoding tool of the ArcGis10.5 programme was also performed.

2.5 ANALYSIS OF RISK RELATIVE (RR)

For RR calculation with a significance level of 99% and data analysis, it could be used the SaTScan software, which is available on the website www.satscan.org.

In this software, it may be observed that the area is related to a single point which is presented in a polygon, i.e., characterized by the centroid. Thus, it is noted that the RR may be calculated from the observed number of cases that will be divided by the respective expected number of cases. Then, RR > 1 shows that the observed number of cases may be more relevant than the expected value. In fact, the RRT is related to a relative measure of association which is founded on the force of combination that has been usually applied to epidemiological studies (KALE et al, 2009). The statistical significance can be expressed in terms of 999 replications and p value (0.05) (JONES e KULLDORF, 2012).

To calculate the RR, data on the population annual, number associated with the confirmed cases of a certain disease and plan coordinates were used (Lambert's Conical Projection: Central Meridian: W56.0; Latitude of Origin: S13.0, metric units) centroid of each municipality. In fact, it could be used the Poisson

probability model, that includes the analysis concerning the count data, that is, it considers the number of individuals that can be affected by a certain disease (MCCULLAGH e NELDER, 1989).

2.6 ETHICAL CONSIDERATIONS

The Research Ethics Committee of the Universidade Federal do Mato Grosso (UFMT) approved the present study, comprising the research project that introduces the general title of: “Prevention and control: viral analysis in Aedes aegypti (Linnaeus, 1762) for the identification of risk areas and factors that determine arboviruses” (CAAE No. 58645516.2.0000.5541), being in compliance with the requirements set out by Resolution No. 466 associated with the National Health Council, December 12, 2012.

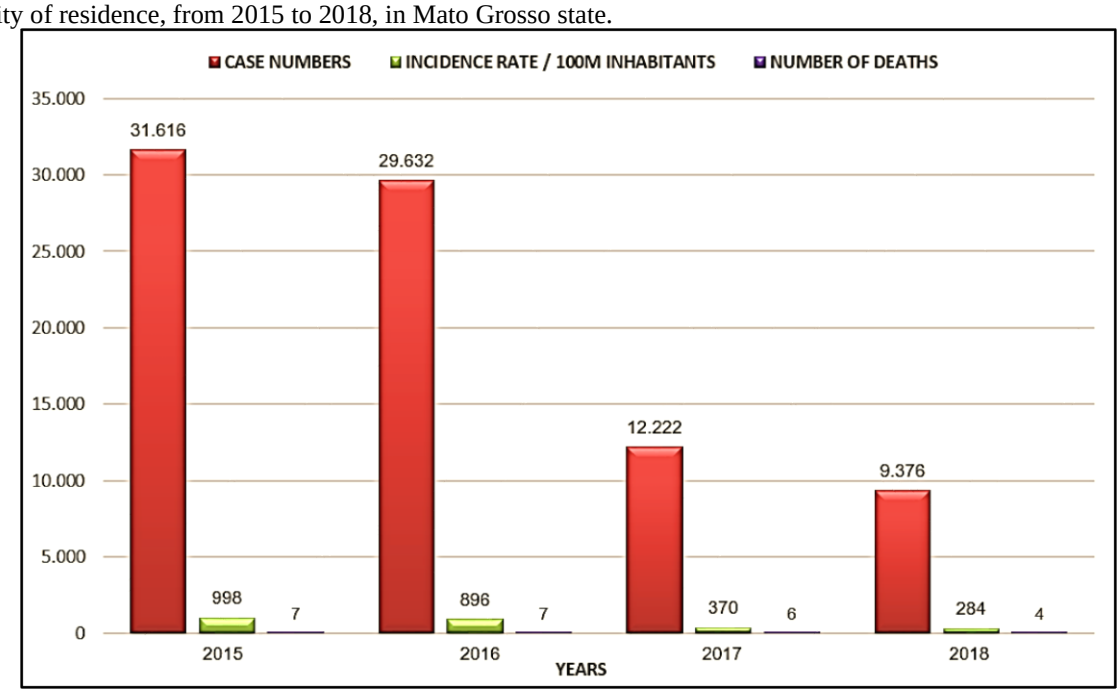
3 RESULTS

The grouped data of 2015 and 2016, for analysis (Figure 2), within the monitoring of cases of dengue in the state of (MT) up to epidemiological week (SE) N.º 50/2016 (up to 17 December 2016), considering cumulative incidence (consisting of the total number of cases that was informed in the period) considered the state of MT as being of high risk for the transmission of the disease, due to its high incidence of dengue (comprising 896 cases per 100 000 people). The number of probable cases of dengue in 2016 (29,632 cases) suggests a reduction of 6.3% in relation to the same period of 2015 (MINISTÉRIO DA SAÚDE, 2017a).

The grouped data from 2016 to 2017, with respect to analysis, includes the monitoring of cases of dengue in the state of (MT) up to epidemiological week (SE) n.º 52/2017 (up to 30 December 2017), considering accumulative incidence (representing the total number of cases that could be notified in the period) considered the state of MT as being of high risk for the transmission of the disease, due to its high incidence of dengue (370 cases per 100 thousand people). However, the number related to the probable dengue cases that was recorded in 2017 (12,222 cases) suggests a reduction of 59% in relation to the same period of 2016 (MINISTÉRIO DA SAÚDE, 2017b).

The grouped data for the analysis of the years 2017 and 2018 within the monitoring of cases of dengue in the state of Mato Grosso (MT) up to SE n. º 52/2018 (to 30/12/2018) and considering the total incidence, shows that the state of MT has a medium incidence of dengue (284/100 thousand people). In 2018, there were 9,376 recorded probable cases of dengue, which suggests a reduction of 23.3% in relation to the same period of 2017 (MINISTÉRIO DA SAÚDE, 2018).

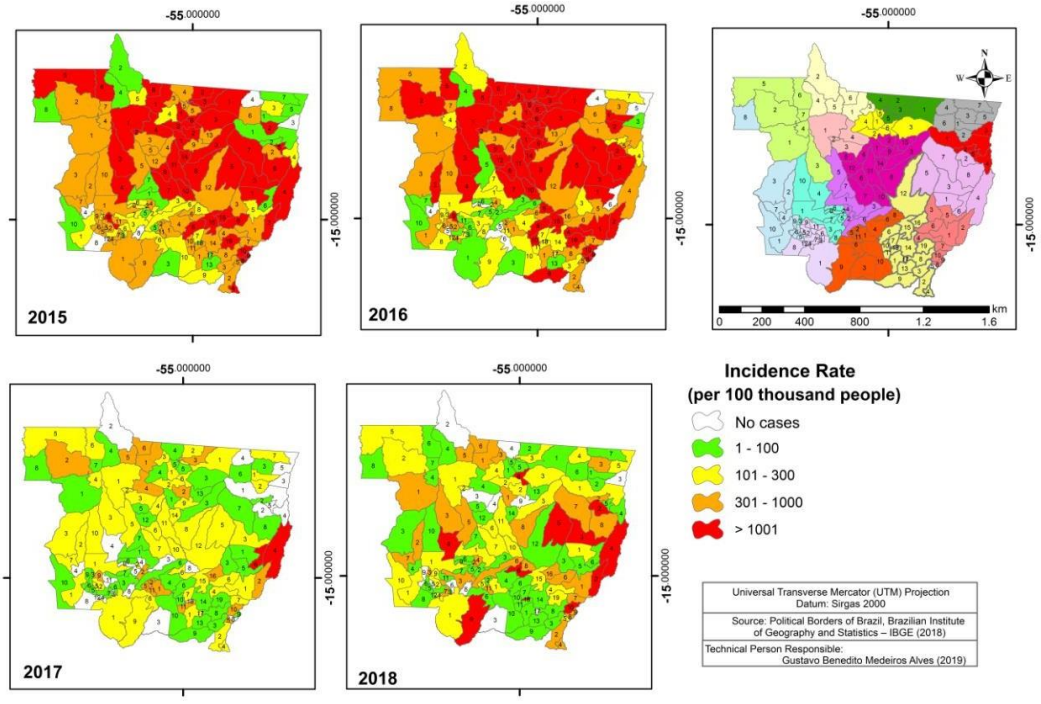
Figure 2 - Total number of probable dengue cases, incidence rate / 100 thousand inhabitants and confirmed deaths, by municipality of residence, from 2015 to 2018, in Mato Grosso state.



Source: Data obtained from SINAN (2015 - 2018).

The figure 3 shows the spatial distribution of incidence rates per 100 thousand inhabitants of probable dengue cases in the 141 municipalities regarding the Mato Grosso state with respect to their respective risk characterizations in the study period from 2015 to 2018.

Figure 3 - Shows the geographical distribution of the incidence rates for dengue, per 100 thousand people, in the 141 municipalities of MT, between 2015 and 2018.



According to the characterization of risk areas in geographic analysis, we see that in the year 2015 incidence of dengue was low in 24 municipalities, corresponding to 17.0% of the total for the state; 20 municipalities (14.2%) had medium incidence. 52 (36.9%) municipalities had high incidence, and 45 (31.9%) municipalities showed very high or epidemic incidence (defined as more than 1,000 cases/ 100 thousand people).

In the year 2015, the high risk of transmission of dengue was present in 68.79% of the municipalities of the state. All 16 Regional Health Offices of the state, in 2015, had at least one municipality with an incidence rate of 300 to 999/100 thousand people (high risk).

Stressing the critical point of the risk of transmission in the 16 Regional Health Offices, we see that 13 (81.25%) showed at least one municipality, in 2015, with an incidence rate over 1,000 cases/100 thousand people; consisting of a very significant or epidemic incidence, dependent on the number of municipalities covered by each Regional Health Office, we observed the following percentages of epidemic risk: Juara Regional Health Office (75%); Água Boa Regional Health Office (75%); Colíder Regional Health Office (66.66%); Sinop Regional Health Office (64.28%); Peixoto de Azevedo Regional Health Office (60%); Barra do Garças Regional Health Office (50%); Juína Regional Health Office (42.86%); Alta Floresta Regional Health Office (33.33%); Rondonópolis Regional Health Office (26.31%); São Félix do Araguaia Regional Health Office (20%); Cáceres Regional Health Office (16.66%); Porto Alegre do Norte Regional Health Office (14.28%); and Tangará da Serra Regional Health Office (10%). We also point out that the highest incidence for the annual year has been associated with the municipality of Santa Carmem (6,513.76 cases/100 thousand people), in the catchment area of the Sinop Regional Health Office.

In the year 2016, in geographic analysis, we see that 26 municipalities of MT (18.44% of the total) showed low incidence of the disease; 25 (17.73%) has shown a medium incidence of dengue; 36 municipalities (25.53%) had high incidence of dengue, and 54 municipalities had incidence of very high or epidemic proportions (over 1,000 cases/100 thousand people). All 16 Regional Health Offices of MT, in 2016, had at least one municipality with incidence rate between 300 and 999/100 thousand people (high risk).

Giving emphasis to the critical point of transmission, in the 16 Regional Health Offices, we see that 14 Regional Health Offices showed at least one municipality, in 2016, with an incidence rate over 1,000 cases/100 thousand people; with a very high incidence rate in proportion to the number of municipalities subject to each Regional Health Office, the following percentages of epidemic risk were recorded: Juara Regional Health Office (100%), Peixoto de Azevedo Regional Health Office (100%), Sinop Regional Health Office (78.57%),

Água Boa Regional Health Office (75%), Colíder Regional Health Office (75%), Alta Floresta Regional Health Office (66.66%), Barra do Garças Regional Health Office (60%), Juína Regional Health Office (42.85%), Porto Alegre do Norte Regional Health Office (28.57%), Rondonópolis Regional Health Office (21.05%), Cáceres Regional Health Office (16.66%) and Tangará da Serra Regional Health Office (10%). Here we mention that the highest total incidence was recorded in the municipality of Terra Nova do Norte (5,413.28/100 thousand people), which is subordinate to the Peixoto de Azevedo Regional Health Office.

The geographic analysis for 2017 shows us that 70 municipalities (49.64%) of MT presented low incidence of dengue; 52 (36.88%) had medium incidence; 17 (12.06%) had high incidence, and two municipalities (1.42%) had incidence of very high or epidemic proportions (more than 1,000 cases/100 thousand people).

In 2017, nine (47.36%) of the 16 Regional Health Offices of MT had at the minimum one municipality consisted of an incidence rate between 300 and 999/100 thousand people (high risk). In proportion to the number of municipalities covered by each Regional Health Office, in the period the following percentages of high risk of transmission of dengue were recorded: Alta Floresta Regional Health Office (50%), Cuiabá Regional Health Office (36.36%), Juara Regional Health Office(25%), Barra do Garças Regional Health Office (20%), Juína Regional Health Office (14.28%), Diamantino Regional Health Office (14.28%), Rondonópolis Regional Health Office (10.52%), Cáceres Regional Health Office (8.33%) and Sinop Regional Health Office (7.14%).

Emphasising the critical point of transmission in the year 2017 with an incidence rate over 1,000 cases/100 thousand people, we see that very high or epidemic incidence was recorded in only two municipalities, namely Nova Nazaré (1,942.54/100 thousand people) and Cocalinho (1,174.35/100 thousand people), both within the area of the Água Boa Regional Health Office, corresponding to 25% of the total area of the State.

In 2018, the geographical distribution of incidence rates for dengue show that 68 of the municipalities in MT (48.23% of the total) showed low incidence, 32 municipalities (22.69%) showed medium incidence, 30 municipalities (21.28%) showed high incidence and 11 municipalities (7.80%) showed incidence rates of more than 1,000 cases per 100 thousand people.

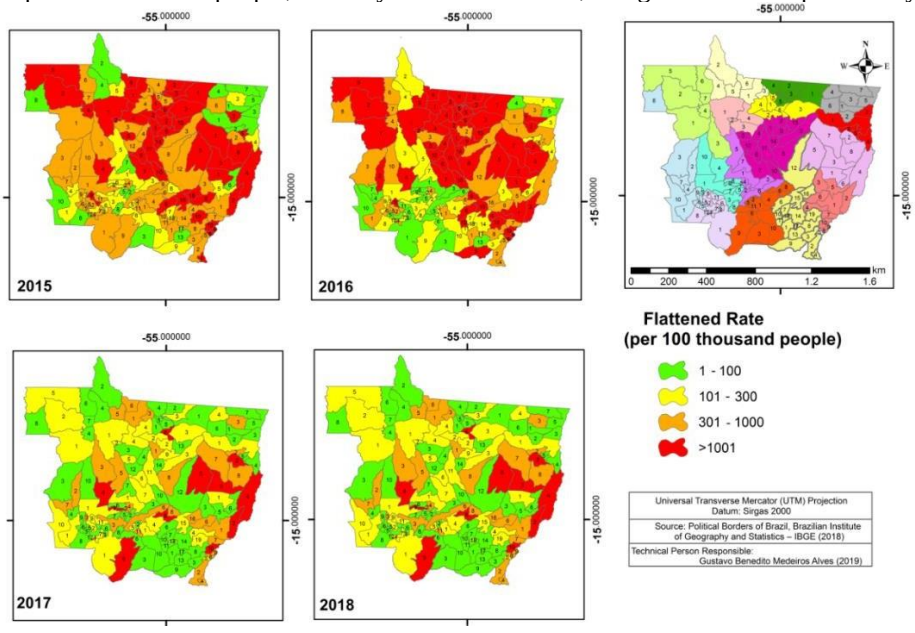
Out of the 16 Regional Health Offices of the state of MT in 2018, 13 of them (81.25%) had at least one municipality with an incidence rate between 300 and 999/100 thousand people, (high risk). In proportion to the number of municipalities covered by each Regional Health Office, the following percentages of high transmission risk were recorded in this period: Alta

Floresta Regional Health Office (66.66%), Barra do Garças Regional Health Office (50%), Regional de Diamantino (42.86%), Juara Regional Health Office(28.57%), Água Boa Regional Health Centre (25%), Tangará da Serra Regional Health Office (20%), Lacerda e Pontes Regional Health Office (20%), São Félix do Araguaia Regional Health Office (20%), Cuiabá Regional Health Office (18.18%), Rondonópolis Regional Health Office (15.78%), Porto Alegre do Norte Regional Health Office (14.28%), Sinop Regional Health Office (14.28%) and Cáceres Regional Health Office (8.33%).

Highlighting the critical point for transmission, in the 16 Regional Health Offices, in 2018, we see that 5 of these Regional Health Offices (31.25%) have demonstrated at the minimum one municipality recorded in 2016, with an incidence rate of more than 1,000 cases/100 thousand people, with a very high or epidemic incidence, in proportion to the number of municipalities covered by the respective Regional Health Office. The following percentages of epidemic risk were recorded: Água Boa Regional Health Office (50%), Barra do Garças Regional Health Office (20%), Tangará da Serra Regional Health Office (20%), Cuiabá Regional Health Office (18.18%) and the Colíder Regional Health Office (16,66%). Here we highlight that the highest accumulated incidence for 2018 was recorded in the municipality of Bom Jesus do Araguaia (3,606.77/100 thousand people), part of the Água Boa Regional Health Office.

The figure 4 the geographic analysis represents the flattened incidence rates per 100 thousand people, for the 141 municipalities of the Mato Grosso state, from 2015 to 2018.

Figure 4 - Flattened rates per 100 thousand people, for the years 2015 to 2018, using the Local Empirical Bayesian Method.



In 2015, comparing the maps of incidence rates with those generated by flattened rates, we see that the number of municipalities that presented zero risk passed from 5 to zero municipalities, while it could be noted an increase related to the total of municipalities with recorded low and medium incidence rates in

43 municipalities, distributed among the 16 Regional Health Offices of MT. The Regional Health Offices that showed very high incidence rates in 2015, in decreasing order of risk, were: Água Boa, Juara, Colíder, Sinop, Peixoto de Azevedo and Barra do Garças.

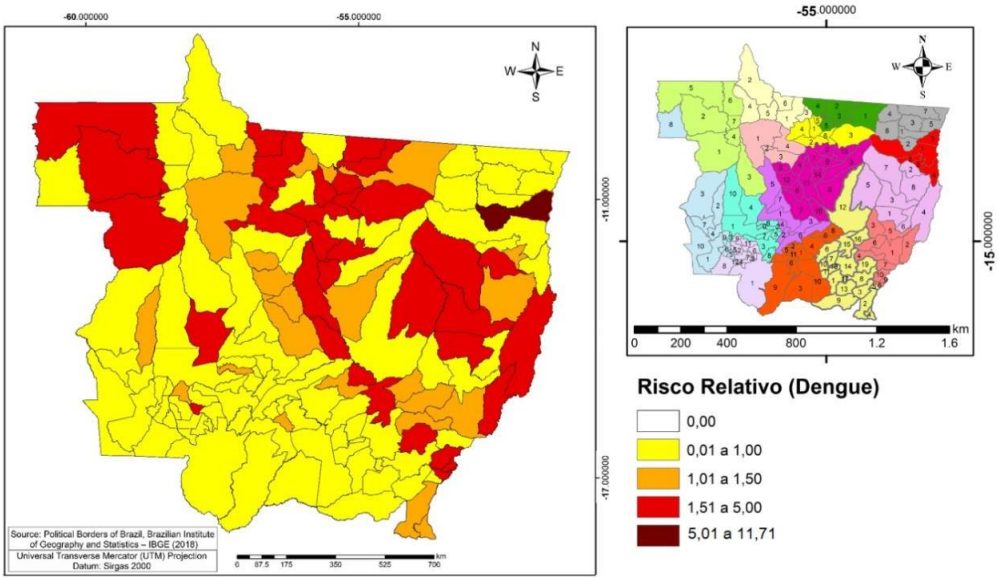
In 2016, the number of municipalities that presented zero risk fell from eight to zero, while this same year showed a rise from 43 to 52 in the number of municipalities reporting low incidence, also scattered among the 16 Regional Health Offices of MT. The Regional Health Offices with very high incidences in 2016, in descending order of risk, were: Porto Alegre do Norte, Juara, Sinop, Água Boa, Colíder, Alta Floresta and Barra do Garças).

In 2017, the number of municipalities that presented zero risk fell from 24 to zero, while this same year showed a rise from 98 to 124 in the number of municipalities reporting low incidence, also scattered among the 16 Regional Health Offices of MT. The Regional Health Offices with very high incidences in 2016, in descending order of risk, were Alta Floresta and Água Boa.

In 2018, the number of municipalities which presented zero risk fell from 14 to zero, while this same year showed a rise from 86 to 102 in the number of municipalities reporting low incidence, also scattered among the 16 Regional Health Offices of MT. The Regional Health Offices with high incidences were Alta Floresta and Barra do Garças, and the one with very high or epidemic incidence levels was the Água Boa Regional Health Office.

The figure 5 - Relative risk (RR) of the 141 municipalities distributed in the 16 health regions with respect to Mato Grosso state, in Brazil, 2015-2018 (Figure 5a). Analysis of the spatio-temporal scanning statistic in the identification of the statistically significant areas distributed in the clusters (Figure 5b).

Figure 5(a) - Relative risk (RR) of the 141 municipalities distributed in the 16 health regions in the state of Mato Grosso, Brazil, 2015-2018.



Organizer: Mário Ribeiro Alves (2020).

Figure 5(a) highlights the relative risk of 141 municipalities distributed in 16 health regions in the state of MT between 2015 and 2018. The purely spatial scanning methodology carried out by SaTScan found that 58.87% (N = 83) of the municipalities distributed in the 16 health regions, that have shown RR <1. The municipalities consisting of RRs values from 1.01 to 1.50 represented 16.31% (N = 23) distributed in 12 regional health regions in MT; the municipalities with RRs between 1.51 and 5.00 correspond to 23.40% (N = 33) also distributed in 12 health regions in the state. During the study period, the highest RR was registered in the municipality of Cana Brava do Norte belonging to the Regional Health of Porto Alegre do Norte and in the municipality of Luciara belonging to the Regional Health of São Felix do Araguaia, i.e., both municipalities with (RR = 11. 71) corresponding to 1.42% (N = 2).

Figure 5 (b) - Analysis of the spatio scanning statistic in the identification of the statistically significant areas distributed in the clusters.

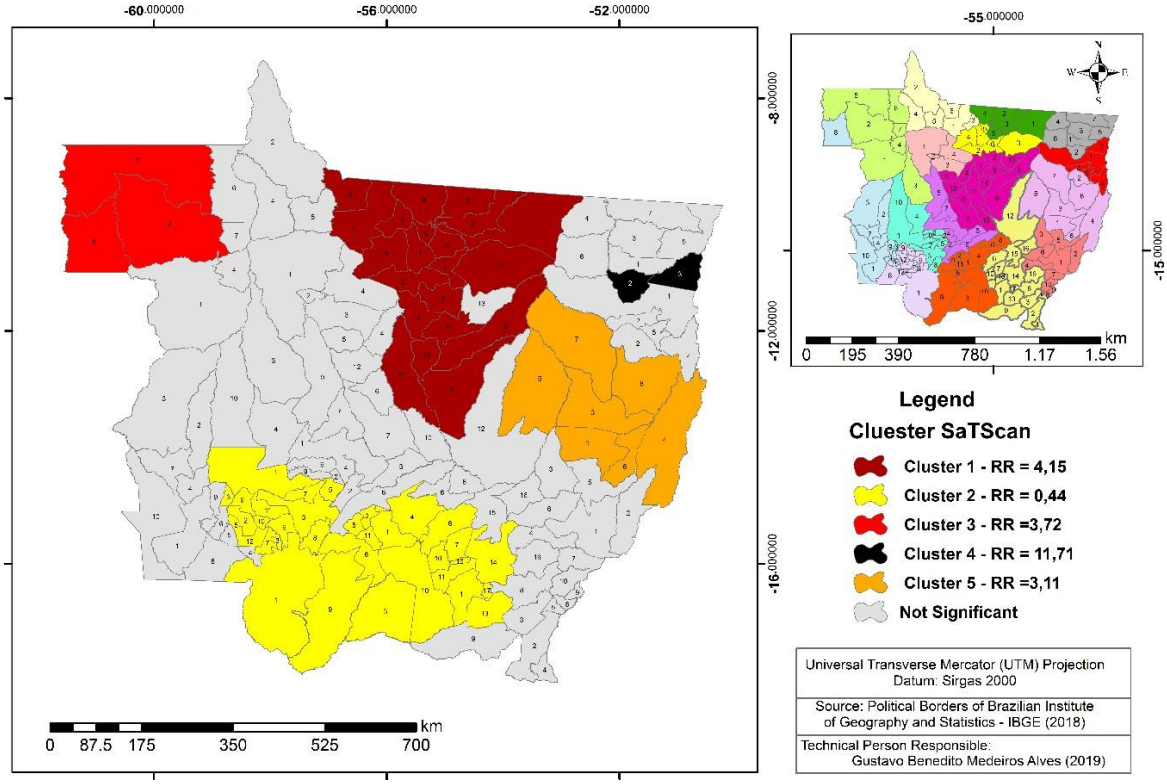


Figure 5(b) – The SaTScan aims to identify the statistically significant areas distributed in the clusters.

Cluster 1 Municipalities: Colíder, Itaúba, Nova Guarita, Nova Canaã do Norte, Nova Santa Helena, Carlinda, Terra Nova do Norte, Santa Carmem, Sinop, Novo Mundo, Vera, Cláudia, Alta Floresta, Guarantã do Norte, Feliz Natal, Peixoto de Azevedo, Matupá, Nova Ubiratã, Sorriso, Marcelândia and Paranaíta. Statistically significant cluster (p-value <0.01), with RR of 4.15.

Cluster 2 Municipalities: Várzea Grande, Santo Antônio do Leverger, Nossa Senhora do Livramento, Porto Estrela, Cuiabá, Jangada, Barão de Melgaço, Acorizal, São pedro da Cipa, Jaciara, Barra

do Bugres, Poconé, Chapada dos Guimarães, Juscimeira, Lambari D'Oeste, Rondonópolis, Rio Branco, Salto do Céu, Dom Aquino, Curvelândia, Campo Verde, Pedra Preta, Reserva do Cabaçal, São José do Povo, Nova Olímpia, Mirassol D'Oeste, São José dos Quatro Marcos, Araputanga, Denise, Cáceres, Poxoréu, Tangará da Serra and Indiavaí. Statistically significant cluster (p-value <0.01), with RR of 0.44.

Cluster 3 Municipalities: Rondolândia, Aripuanã and Colniza. Statistically significant cluster (p-value <0.01), with RR of 3.72.

Cluster 4 Municipalities: Luciara and Canabrava do Norte. Statistically significant cluster (p-value <0.01), with RR of 11.71.

Cluster 5 Municipalities: Cocalinho, Nova Nazaré, Canarana, Água Boa, Ribeirão Cascalheira, Querência and Gaúcha do Norte. Statistically significant cluster (p-value <0.01), with RR of 3.11.

4 DISCUSSION

The present study demonstrates that in the evaluated period (2015 - 2018) the thematic maps (Figure: 3, 4 and 5) in general showed that the occurrence of dengue is dispersed in the 16 health regions of the state of MT, being the regional health with the highest number of accumulated notifications in decreasing order: Cuiabá (17454) number of cases, Sinop (16178) cases, Rondonópolis (9762) cases, Juína (5109) cases, Tangará da Serra (4885) cases, Água Boa (4358) cases, Alta Floresta (4134) number of cases, Peixoto de Azevedo (4121) number of cases, Barra do Garças (2937) number of cases, Colíder (2699) cases, Cáceres (1840) cases, Porto Alegre do Norte (1786) cases, Juara (1471) cases, Bridges and Lacerda (1215) cases, Diamantino (707) cases, however, the region with the least notification was that of São Felix do Araguaia (199) cases.

It is believed that in this period the number of probable dengue cases was higher than that reported and that there may have been diagnostic confusion with the Zika virus outbreak in 2015 and Chikungunya in 2016. On the contrary, it is noted that many dengue cases are underestimated, albeit it is a notifiable disease in the country.

In Figure 3, it was observed that 51 (36.17%) municipalities in MT that, according to the incidence rate, would present zero risk for dengue, as it does not correspond to reality. 5 (3.55%) municipalities did not register the disease in 2015, 8 (5.67) in 2016, 24 (17.02%) in 2017 and 14 (9.93%) in 2018. The analysis of the spatial distribution a dengue proved to c regions of MT. It is possible to identify areas of high occurrence of arbovirus in all years analyzed. Thus identifying the priority areas for control programs according to their risk classification. In view of the relevance of data from the studied areas, the use of the incidence rate without any treatment was considered little indicated due to its high random variability, especially when part of the studied geographical units has very low populations. The Local Spatial

Empirical Bayesian Rate attributed greater influence to the geographically close municipalities, presenting more regionally consistent results, smoothing the extreme values presented in the sample.

The zero risk of the incidence rate was rectified by making a refinement making them safer for its evaluation. This method of spatial analysis proved to be viable for mapping large areas, and areas of risk detected were useful for directing public policies related to disease control.

In figure 4, with the smoothing of the dengue incidence rates seen, there was a reduction in the effects of fluctuations, revealing a trend of continuity of transmission to areas could be classified as very high, high and medium risk. The regional health centers that have the municipalities with the highest number of notifications and / or deaths from the disease are the regions of greatest concern for monitoring and formulating integrated risk analysis, control and prevention strategies by the public authorities.

In fact, it is observed that the Bayesian approaches applied for informing the dengue cases in Goiás for the flattening of indices as notified found similar results and reduced the random fluctuations of Gross Rates as calculated, showing that the Estimators minimize the influence of population size with respect to the municipalities of Goiás state. The Local Estimator reported a higher number of municipalities of Goiás as having medium to high incidence of dengue fever, compared to the values recorded through the incidence Rates (NUNES, 2013).

On studying the geographical pattern of distribution of incidence of dengue fever concerning Manaus, there was also the application of the Local Bayesian method, and smoothened incidence rates were obtained, in a study where the neighborhood's represent their values based on their neighbours, following the reasoning that closer neighborhood's tend to have similar patterns of behaviour, while the districts further afield tend to behave somewhat differently, allowing the identification of which districts have a greater number of cases of the disease (ARAÚJO, 2014).

Reinforcing the view that the Bayesian estimator "smooths" the rates and that the census sectors nearby tend to behave similarly, and the more distant ones differ, agreeing with the pattern found in a study put into effect in the state of Goiás (CARVALHO et al, 2017).

After application of the local empirical Bayesian estimator, a greater number regarding census sectors with high and medium incidence could be identified, which demonstrates that this method reduces the random fluctuation caused by the calculation of the incidence rate, corroborating the study that deals with the spatial distribution related to the dengue cases in Rio de Janeiro state (Carvalho et al., 2017). From the use of the Bayesian estimator, the smoothing of the incidence rates was observed, which clarifies the proximity of tones of the microregions, showing more groupings, highlighting the number of homogenization rates among neighboring census sectors. Another study carried out in Espírito Santo, which also used this method corroborated this finding (HONORATO et al., 2014).

In this context, geographical statistical analysis is a relevant factor in the identification of possible correlations of the event and the space, with the stratification of risk areas for transmission of the disease. However, other factors should be monitored with the type of virus in circulation at the moment of the epidemic, and its track record, and other social, economic and environmental factors of the municipalities that could be key at the moment of an increase in the number of cases as notified at this point in time. These conditions could be taken into consideration as part of the context, as they are made up of a system of objects and actions that interact and have a dynamic relationship, showing historical variations. As time goes by, they undergo transformations through human actions (ROJAS, 2008; SANTOS, 2002).

Given the above, we observed that the state of MT has a similar behavior associated with the transmission profile of dengue disease when this state is compared to the rest of the other Brazilian states, with cycles of peak illnesses in Brazil that may occur from three to five years, almost regularly. Thus, as Brazil had its highest peak of cases and the highest number of deaths in 2015, in the state of MT that same year was a year considered epidemic, a situation that continued in 2016, in the two subsequent years 2017 and 2018 there was a decrease the incidence of the disease throughout Brazil, which was also monitored in the state of MT

In the figure 5(a), it could be noted that RR, i.e.,, measure applied in this study, comprises the proportion between the total of disease occurrence in a determinate area and time and total of people exposed at the same point in time and location. To sum up, it is noted that this measure may be highly influenced by a reduced size or rare occurrences concerning the population exposed. Notwithstanding, in this study, regardless of these municipalities they may be considered small consisting of an indicator that could describe some random fluctuation as well as making comparisons weak with other municipalities, it is relevant to take into account the use of Bayesian rates, which may estimate the municipal rate, that considers the values related to the neighbor municipalities, thus making the interpretation associated with the municipal rates more trustworthy and also correcting this bias (SOUZA et al, 2018).

In the analysis of the results, the application of the spatial scanning technique in order to calculate the RR was suitable for the identification of municipalities at risk of dengue transmission.

In figure 5 (b), in decreasing order of RR values, we had the following distribution in the municipalities of the state of MT for the analysis of the spatio statistics of the clusters in SaTScan (66 municipalities with statistically significant areas). Thus distributed:

In cluster 4 registered the statistically significant value with (p-value <0.01) and the highest Relative Risk of the space-time analysis (RR of 11.71). Covering 2 (1.42%) municipalities distributed in 2 region health of MT. The municipality of Luciara belongs to the Regional Health Department of São Felix do Araguaia and the municipality of Canabrava do Norte belongs to the Regional Health Department of Porto Alegre do Norte.

In cluster 1, the value was statistically significant with (p-value <0.01) and RR of

4.15. Covering 21 (14.89%) municipalities distributed in 4 health regions of MT (Regional Health Department of: Alta Floresta, Colíder, Peixoto de Azevedo and Sinop).

In cluster 3, the value was statistically significant with (p-value <0.01) and RR of 3.72. Covering 3 (21.28%) municipalities distributed in 2 region health of MT. The municipalities of Aripuanã and Colniza belonging to Regional Health Department of Juína and the municipality of Rondolândia belonging to Regional Health Department of Pontes e Lacerda. In cluster 5, the statistically significant value was recorded with (p-value <0.01) and the

RR = 3.11. Where 7 (4.96%) municipalities are: Cocalinho, Nova Nazaré, Canarana, Água Boa, Ribeirão Cascalheira, Querência and Gaúcha do Norte all belonging to the Regional Health Department of Água Boa.

In cluster 2, the value was statistically significant with (p-value <0.01) and RR of 0.44. Covering 33 (23.40%) municipalities distributed in 4 health region of the state (Regional Health Department of: Cáceres, Cuiabá, Rondonópolis and Tangará da Serra).

Some limitations of this study regarding the possibility of underreporting and diagnostic confusion in the probable cases of dengue with zika and chikungunya, were also described in another study carried out in the state of Maranhão (Costa et al., 2018).

5 FINAL CONSIDERATIONS

Spatial analysis helps to identify the regions with the greatest risks for the incident regarding the arboviruses through their periodic epidemic cycles in the state, this analysis can contribute to the formulation of integrated monitoring strategies and significantly within the scope of practices aimed primarily at promotion, prevention of arboviruses in the population of these territories.

This study proposed to minimize the problem associated with the use of crude incidence rates and its high instability in demonstrating the risk of rare events associated with the regions of population situated in small areas, consisting of the use of the Local Empirical Bayes Method that uses information from the entire region or neighborhood to estimate the risk of the event occurring in each area.

The incidence rates that may be smoothed by this local empirical Bayes method corrected the eventual oscillations resulting from the problem of estimating small areas, that may contribute to reducing the variation, the random and the natural, present in the gross rates, eliminating the zero risk of dengue, reducing the effects of random fluctuations in the monitored areas improving the analysis of transmission risk in the territories.

The spatial analysis of local associations of incidence rates identified, through thematic maps, the priority areas in the 141 municipalities of the state of Mato Grosso for Health Surveillance performance,

identifying a heterogeneity in the incidence of reported cases, also pointing out the existence of epidemiological silence of the dengue notifications by some municipalities during the study period. The incidence rate maps showed that the high risk of transmission ranged from 12.76% to 68.79% in 2017 and 2015, respectively.

The use of the spatial scanning technique with the application of the SaTScan software has been used in order to calculate the RR, demonstrating statistically significant data in the identification of risk clusters for disease transmission in the study period.

Dengue control is a major challenge for global public health. In the search for integrated control, the use of spatial tools and the elaboration of risk maps that characterize the transmission areas can facilitate this assessment for decision-making in a timely manner, establishing priority areas for the development of control program actions.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Chapter 49

Crohn's disease -new technologies

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ABSTRACT

INTRODUCTION: Crohn's disease (CD) is an autoimmune inflammatory disease of the gas trointestinal tract (GIT), It is a multifactorial disease involving genetics, environment and intestinal microbiota, CD is related to an inflammation of the intestinal microbiota by the dominance of pro-inflammatory cytokines over anti-inflammatory drugs. The identification of genes involved in CD is done by two approaches, positional cloning and candidate gene approach, which allow identifying whether genetic polymorphisms are associated with the risk of developing the disease. The diagnosis is made through imaging tests, biopsy and tests for differential diagnosis. Treatment based on drugs and surgery is performed if there are complications of the clinical picture. The study aims to show new technologies related to CD. METHODS:The methodology was carried out from the descriptors Crohn Disease", "Treatment", "Diagnosis", "Gastrointestinal tract" searched in the Pubmed, Scielo and Google Scholar databases, where 31 articles were chosen for the production of this literature review. DISCUSSION:Crohn's disease is a chronic inflammatory bowel disease that affects any part of the gastrointestinal system, being more common between 15 and 35 years of age, among and with higher prevalence in industrialized countries. The pathophysiology of Crohn's disease is still not fully understood, it is specific and acquired genetic factors that are not yet complementary to the intestinal microbial and are still integral to the cytoplasmic microbial, the dominance of inflammation and the course of the disease that are a fundamental for the development of the disease. CONCLUSION:In

conclusion, medical education is extremely important for the management of Crohn's Disease, especially in the use of new technologies, such as biological therapy.

Keywords: Crohn's disease, gastrointestinal tract, diagnosis, treatment.

1 INTRODUCTION

Crohn's disease (CD) is an autoimmune inflammatory disease of the gastrointestinal tract (GI), which can affect any portion of the digestive tract, with the ileum, colon, and perianal region being the most common areas, and there may be extraintestinal manifestations.[1] It is a multifactorial disease involving genetics, environment, and intestinal microbiota.[3] It is estimated that there are approximately 4 million people with CD worldwide, and in Brazil, the southeastern region has the highest CD rate, showing the influence of industrialization, which contributes to CD with factors such as pollution, industrialized food, and a high number of GMOs.[1,4]

The etiopathogenesis of CD is related to an inflammation of the intestinal microbiota by a dominance of pro-inflammatory cytokines over anti-inflammatory ones by sensitization of cytotoxic cells of the intestinal tract by some infectious agents such as pseudomonas atypical mycobacteria, and even some viruses, which results in the production of chemokines, adhesion molecules, and recruitment of more inflammatory cells from the bloodstream, such as TLR2, TLR4, and cytokines like IL-12 and IL-6.[2]

Two main approaches have been used for the identification of genes involved in CD, the positional cloning approach and candidate gene approach.[2] These studies allow the identification of whether certain genetic polymorphisms are associated with a risk for developing the disease, such as the NOD2 and CARD15 genes and the TLR4 gene.[4]

The diagnosis of Crohn's Disease (CD) consists mainly of tests such as endoscopic capsule (EC).[5] Colonoscopy with ileoscopy enables observation and biopsy of intestinal mucosa.[8] Ultrasonography, magnetic resonance enterography, computed tomography enterography (entero-TC), conventional enteroclysis, and abdominal CT are also included as investigative methods. [10,12,13] Some noninvasive tests, such as IgA and interferon-γ release assay, are also used for differential diagnosis.[8]

The treatment seeks to maintain the intestinal physiological function, since the clinical picture oscillates between a state of remission and exacerbation.[15] To this end, aminosalicylates, antibiotics, corticosteroids, and immunosuppressants can be selected to improve the disease.[15,19] Nowadays even biological therapy is mentioned.[16] Surgery is often necessary to treat complications of the disease.[17]

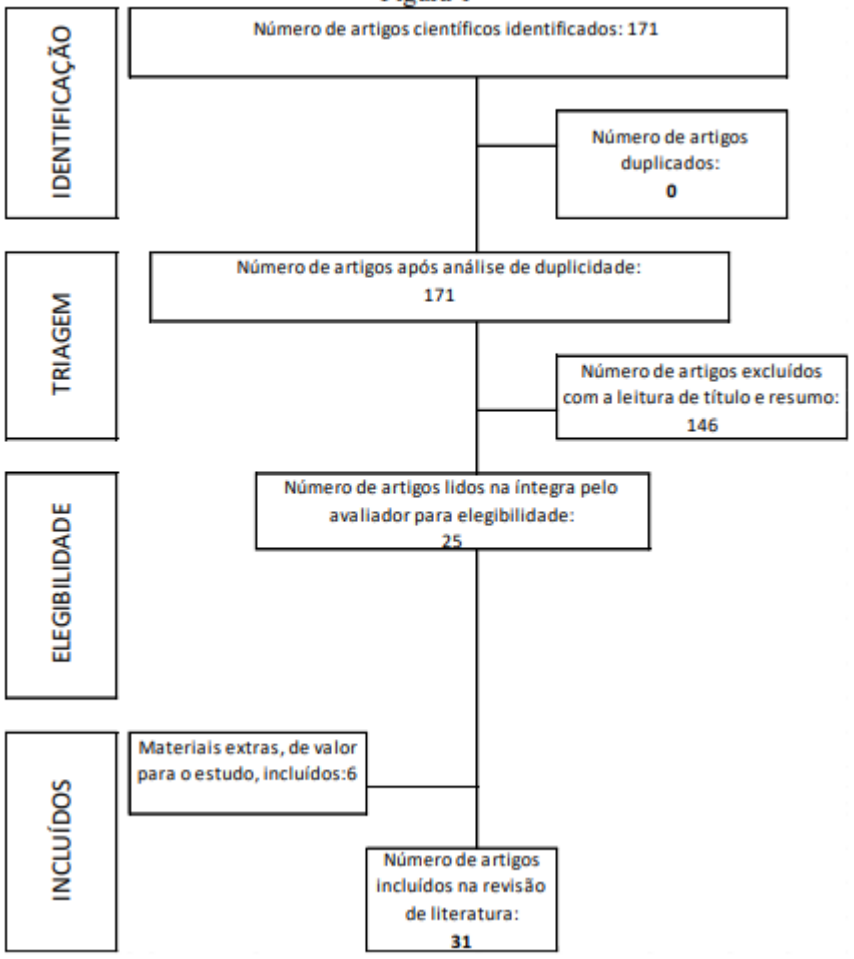
In summary, this study aims to report the literature findings that allow understanding and exposure of new technologies related to Crohn's Disease (CD) enabling the direction of better diagnosis and treatment of the disease.

2 METHODOLOGY

The present study is a literature review in which a search was conducted with emphasis on the study of Crohn's Disease. The search was conducted in the Medical Literature Analysis and Retrieval System Online (Pubmed/Medline), Scientific Electronic Library Online (SciELO), and Google Scholar databases through the use of the following Health Science Descriptors: "Crohn Disease", "Treatment", "Diagnosis", "Gastrointestinal tract". A total of 3,205 articles were found, of which, after filtering for Systematic Review, Randomized Clinical Trial and Meta-Analysis articles published in English and Portuguese in the last 10 years, 171 were found, of which 31 were chosen for this study. Next, we sought to understand and synthesize the main aspects of Crohn's disease and the main updates on its management.

3 RESULTS

Figura 1



4 DISCUSSION

4.1 EPIDEMIOLOGY

Crohn's disease (CD) can be considered of low incidence, because it is a disease of difficult diagnosis, due to the great variety of clinical forms and limitations of propaedeutic resources. [2] It is a prevalent disease in developed and industrialized countries, affecting 0.5 to 5 in 100,000 people, the age range being between 15-35 years.[1]

Currently, it is estimated that there are approximately 4 million people with CD worldwide, with the highest rates recorded in Europe, with 2.2 million people affected, followed by 1.4 million people affected in the United States.[4] In Brazil, the southeastern region has the highest rates of CD, and the northern region has the lowest. The influence of industrialization is evident, due to the increase in stress factors such as pollution, industrialized food, and the high number of GMOs, which trigger CD.[1] An interesting fact about the heritability of CD that many Brazilian studies cite is the higher incidence rate among siblings.[2]

4.2 PATHOPHYSIOLOGY

In the last years, many studies have been published about Crohn's disease, but without much news about the identification and development of the disease. Currently, CD is identified as a multifactorial disease, adding risk factors, genetic and immunological factors that trigger the onset of the disease. It is known that a pillar of the etiopathogenesis of CD is related to the sensitization of cytotoxic cells of the intestinal tract by some infectious agents such as pseudomonas, atypical mycobacteria, and even some viruses.[2] This inflammation of the intestinal microbiota is related to the dominance of pro-inflammatory cytokines over anti-inflammatory ones, which results in the production of Chemokines, adhesion molecules and recruitment of more inflammatory cells from the bloodstream. For example, macrophages and dendritic cells (DCs) that are not only increased in number in CD, but also markedly express TLR2 and TLR4, co-stimulatory molecules and produce more pro-inflammatory cytokines such as IL-12 and IL-6, with the consequent activation of Th1 cells.[4]

In addition to this inflammatory mechanism of the intestinal microbiota, the roles of innate and adaptive immunity, the impaired cell apoptosis process, Paneth cell dysfunction, and, above all, genetic susceptibility are also highlighted as probable foundations of the disease alterations. However, the order in which these events occur or whether they are all necessary for the onset, development, and maintenance of CD is still unclear.[3]

Because of this, studies of genetic markers related to inflammatory bowel diseases and, in particular, Crohn's disease are becoming increasingly necessary. Thus, despite significant progress on the etiopathology of these diseases in recent years, there is still much to be elucidated. Currently, two main approaches have been used for the identification of genes involved in Crohn's disease: positional cloning

approach and candidate gene approach. These studies are called GWAS (Genome-Wide Association Study) and allow the identification of whether certain genetic polymorphisms are associated with a risk for developing the disease.[2]

So far, several genes involved in different mechanisms have been identified. The main ones are the NOD2 and CARD15 genes and the TLR4 gene, being associated with innate immunity through recognition of standard receptors, genes related to epithelial barrier homeostasis, to molecular mimicry and autophagy, to lymphocyte differentiation, to the secondary immune response and to apoptosis.[2] The discovery of the first susceptibility locus for CD contributed to the important advance in the understanding of the genetic basis of the disease. The susceptibility locus for CD, termed IBD1 (Inflammatory Bowel Disease 1), is located in the pericentromeric region of chromosome 16 (16q12). Subsequently, an association was described between mutations in the CARD15 (caspase recruitment domain-containing protein 15) gene, which encodes the NOD-2 (nucleotide oligomerization domain 2) protein. NOD-2 is a recognition receptor of the innate immune system, which stimulates the expression of several molecules relevant for CD pathogenesis: IL-1, IL-6, IL-8, IL-12, IL-23, TNF-α, essential for the interaction between the various elements of the immune system, namely for T cell activation.[4]

4.3 DIAGNOSIS

The diagnosis of Crohn's Disease (CD) by the updated endoscopic capsule (EC) uses a device that records hundreds of mucosal photographs, following the natural transit of the small intestine, and thus this tool is considered accurate, non-invasive, and vital for the initial diagnosis. Whereas in radiology and colonoscopy the results obtained may be normal or inconclusive, EC is able to detect superficial lesions in the duodenum and terminal ileum that are inaccessible with conventional endoscopy. [5]

EC, magnetic resonance enterography (MRI), and contrast-enhanced ultrasonography are evaluated as similar diagnostics in determining CD and the risk of surgery. Still, EC is more indicated to establish the initial prognosis because it has a better evaluation of mucosal healing, as well as accurately detecting existing complications - such as active inflammation in the jejunum and/or proximal ileum detected in more than 50% of patients with this pathology - and establishing the prognosis, and is contraindicated in the presence of stenosis. [6]

Colonoscopy with ileoscopy allows visualization and biopsy of the mucosa of the colon, rectum, and terminal ileum, and is therefore considered fundamental in differentiating the diagnosis of ulcerative colitis (UC) from CD with efficacy of 90%. Likewise, EC is considered key in ratifying this difference and determining disease progression as well as treatment response. [7] On the efficacy of non-invasive tests, IgA is best rated to differentiate the diagnosis between CD and UC, while Interferon-γ release assay is proper to distinguish between CD and intestinal tuberculosis. Compared with ultrasonography and magnetic

resonance enterography, contrast-enhanced ultrasonography has high sensitivity to pathology activity, and fecal calprotectin is considered to have higher specificity in detecting CD.[8]

MRI is 61% effective in predicting the type (67.78%) or subtype (61.88%) of CD. With this model, with reference to T1- and T2-weighted images, it is possible to detect fibrotic stenoses, in inhomogeneous contrast. Furthermore, from T2-weighted images or echo-planar imaging techniques, obtained before the administration of the spasmolytic drug, it is feasible to identify the absence of intestinal motility in active or chronic CD. [9]

Crohn's disease can occur anywhere in the gastrointestinal tract, about 50% of patients with this disease will also have involvement of the small intestine and 30% will have involvement of the small intestine only.[10] Endoscopy is a risky and uncomfortable method for the patient, and about 10% of patients may have small bowel involvement that cannot be visualized by endoscopy, does not examine deeper layers of the bowel wall, and misses extra-intestinal complications. [10,14] These factors have made imaging methods for detecting inflammation in the bowel more relevant.[10]

Conventional enteroclysis and CT have good diagnostic accuracy, but are limited by exposure to ionizing radiation. Ultrasound contains no radiation, but is limited because the image quality depends on the technician's experience and has difficult access to some viewing areas. Several studies show high sensitivity and specificity in assessing small bowel activity in Crohn's disease with MRI. MRI has the advantage of high diagnostic accuracy, safety, and the ability to evaluate intra- and extra luminal complications, but also has disadvantages such as high cost and limited availability.[10]

The choice of the best method for monitoring Crohn's disease should take into consideration age, tolerability, disease phenotype, and availability of resources, since the tests have a high degree of agreement depending on what will be observed. When comparing CT enterography and colonoscopy, we observe greater agreement in abscesses and in the detection of lumen reduction. When comparing MRI enterography and colonoscopy we see great agreement in the detection of abscesses. When comparing magnetic resonance enterography and computed tomography enterography, there is greater agreement in the detection of lumen reduction/dilation. [11]

According to the research by dos Santos, Carlos Henrique Marques, *et al*, enterografia by Computed Tomografia (Entero-TC) shows good evaluation of intestinal involvement by CD, and the main findings in the patients analyzed were intestinal wall enhancement, vascular engorgement, perienteric fat densification, intestinal wall thickening, and lymph node enlargement.[12]

Techniques such as small bowel distention and administration of intravenous contrast agent differentiate CBCT from standard abdominal CT, making it the most appropriate means of diagnosing small bowel disorders. When we compare Entero-TC with MRI enterography, we see that the former has advantages in terms of speed of examination, lower risk of motion, better spatial resolution, less need for sedation, wide

availability, lower cost, and greater safety in patients with pacemakers or implanted MRI-sensitive devices. Its major disadvantage is the use of ionizing radiation, but with recent developments in the area it is possible that the use of Entero-TC will increase in the coming years. [13]

The advantages of MRI enterography over CT enterography include absence of ionizing radiation, possibility of dynamic imaging, possibility of evaluating luminal narrowing for long periods, possibility of repeating images in case of diagnostic limitations, and higher soft tissue contrast resolution. The disadvantages include lower spatial resolution, a slightly longer examination, greater difficulty of access, and higher cost. [13]

The main CT findings that indicate Crohn's Disease are intestinal wall thickening, mural hyperenhancement, mural stratification, comb sign caused by engorged *vasa recta*, and higher density perieneric fat. [13]

MRI is better on findings related to the perianal area due to the high soft tissue contrast. In active intestinal inflammation in CD, we find intestinal wall thickening, intestinal wall hyperintensity on T2-weighted images, and hyperenhancement on contrast-enhanced T1-weighted images.[13,14] Some biomarkers have been proposed as potential markers of CD, but there is still insufficient scientific evidence for them to be used in the management or monitoring of patients with CD. [14]

4.4 TREATMENT

Crohn's disease (CD) is a chronic disease that has a clinical course composed of periods of exacerbation and remission. Thus, the main goal in treatment is to preserve bowel function, improve quality of life, and ultimately use drugs that keep patients in clinical and endoscopic remission of the disease.[15] Surgery is often required to treat complications of the disease, putting patients at risk for operative morbidity, impaired bowel function, and postoperative recurrence.[17]

Aminosalicylates such as sulfasalazine and mesalazine are used for an initial clinical approach for mild cases. Sulfasalazine, when degraded by bacterial action, splits into sulfapyridine and 5-aminosalicylic acid, which has topical anti-inflammatory action. Regarding administration, sulfasalazine should be prescribed at a dose of 2 to 6 g/day, and with each use, folic acid of 2 to 5 mg/day should be used to prevent the risk of macrocytic anemia. Furthermore, mesalazine can be used orally or topically, and the recommended daily oral dose is 2 to 4 g/day. It is relevant to note that sulfasalazine is not recommended for maintaining remission in corticosteroid-induced CD. However, mesalazine has been shown to be effective in protecting against the onset of dysplasia and colorectal cancer in patients with colitis.[15]

Antibiotics are used to prevent complications resulting from CD. Thus, patients with CD have an altered intestinal microbiota that is closely related to the pathogenesis of the inflammatory process. Thus, antibiotics are used to prevent acute exacerbations with systemic repercussions triggered by toxic

megacolon, abscesses, fistulas, and sepsis. The two most commonly used antibiotics are ciprofloxacin (1g/day) and metronidazole (10-30 mg/kg) which can be given for up to three months, however, the use of metronidazole should not exceed 16 weeks because of the risk of side effects such as peripheral neuropathy.[15] However, in addition to these antibiotics, rifaximin and clarithromycin are the drugs of choice for the treatment of CD. Rifaximin is a minimally absorbed nonsystemic antimicrobial that has extended intestinal clearance and induces clinical remission with few adverse events in patients with moderately active CD. [19]

Corticosteroids can be used in cases of moderate and severe active CD. Oral prednisone or prednisolone can be given, while hydrocortisone can be given parenterally. Thus, prednisone at a dose of 0.75 to 1 mg/kg/day (maximum 60 mg/day) is indicated to induce clinical remission, which occurs 2 to 4 weeks after onset. This corticosteroid aims to reduce disease activity, but does not change the natural course of the disease. In addition, patients who do not respond to corticosteroids or who are corticosteroid-dependent should undergo staged treatment with the introduction of immunosuppressive or biologic therapy. This stepwise therapy is indicated in the following situations: clinical worsening within 6 weeks of steroid withdrawal; the need for more than two cycles of corticosteroids in a one-year period; and recurrence of symptoms whenever the dose is reduced below 15 mg.[15]

Immunosuppressants are indicated to maintain the remission achieved after corticosteroid use. Combined immunosuppressive and biologic therapy has excellent results. The immunosuppressants used are azathioprine and 6-mercaptopurine. These drugs have a slow onset of action, so it is necessary to wait 14 to 16 weeks for the full pharmacological effect. It is necessary to point out that immunosuppressants are indicated in cases of resistance or refractory to corticosteroids, in the maintenance of the remission achieved with corticosteroids, and in the prevention of postoperative recurrence.[15]

Biologic therapy, introduced in the treatment of CD two decades ago, has been shown to be effective in mucosal healing in addition to clinical response and remission. In addition, patients with severe CD and poor prognosis can benefit from the use of these antibodies. Monoclonal antibodies such as infliximab (INX) and adalimumab (ADA) are used. These drugs act by inhibiting tumor necrosis factors alpha and, consequently, inhibiting their pro-inflammatory actions. Infliximab is administered intravenously and adalimumab subcutaneously. [16]

ADA is the first-line biological agent for CD and can induce clinical remission in patients who are unresponsive or intolerant to INX. In addition, it is relevant to mention that the efficacy of ADA is closely related to the site of disease. These sites can be: ileum, colon, ileum and colon, and the upper GI tract. A meta-analysis, conducted by the China School of Biopharmacy, demonstrated that patients with CD in the ileum only who received ADA can achieve a greater clinical benefit when compared to patients, who also received ADA, but have Crohn's disease in the colon only. In addition, it was noted that patients with

colonic-only disease not only had worse efficacy, but also had the worst prognosis after treatment with ADA.[18] Therefore, it can be seen that the choice of drugs for patients with colonic disease should be more cautious. Patients with CD in the ileum and colon generally have a worse prognosis because of the variety of lesions. However, the study already mentioned pointed out that these patients treated with ADA had fewer relapses of the disease.[18] In addition, the severity of the disease before starting ADA appears to be a particularly important factor affecting the effectiveness of treatment. The studies involving patients with less severe disease reported higher efficacy rates than studies involving patients with more severe disease.[29]

The indication of biologic therapy is essential in cases of patients who do not respond to conventional therapy or develop adverse effects to these therapies. In addition, the concomitant use of immunosuppressants and infliximab is more effective than the use of infliximab alone in inducing steroid-free remission and intestinal mucosal healing. It is relevant to point out that up to 60% of patients lose response to anti-TNF agents over the years, generating "treatment failure". The presence of insufficient serum levels of the drug may be one of the causes of non-response. Thus, dose escalation is a strategy to regain response, either by increasing the dose or decreasing the interval between infusions. However, if therapeutic failure is not resolved, other monoclonal antibodies such as vedolizumab, natalizumab, and ustekinumab can be instituted. [16] However, the high cost of these drugs may become a hindrance to their use. In addition, a review by Mao *et al*.[31] reaffirmed that anti-TNF biologic therapy leads to a significant reduction in surgery and hospitalizations resulting from CD exacerbation. There was a 50% reduction in surgery and hospitalization with infliximab. [31]

A randomized controlled trial by Sandborn *et al*.[30] presented efficacy and safety data on the use of ustequinumab for 5 years of treatment. This study revealed that long-term ustequinumab therapy was well tolerated and effective in maintaining remission over 5 years in patients who were intolerant of the TNF antagonist or who did not respond well. The patients were separated into two groups, one group received therapy every 12 weeks and the other received the medication every 8 weeks. After 252 weeks, or 5 years of treatment 84.8% of the patients in the 12-week group and 90% of the patients in the 8-week group were in clinical remission of CD.[30]

VERSIFY is the first large-scale prospective study to evaluate the benefits of vedolizumab on endoscopic, radiological and histological outcomes in patients with Crohn's Disease. Vedolizumab is a humanized monoclonal antibody that blocks T-lymphocyte traffic in the gastrointestinal mucosa. The results demonstrate the efficacy of vedolizumab for endoscopic healing after 26 weeks of treatment in the 46 patients followed up. In the study, there was endoscopic remission in 11.9% of patients, complete mucosal healing in 14.9%, and endoscopic response in 24.8%.[17] These data have important inferences for clinical practice, as they demonstrate that the initial therapy should be carefully chosen since the probability of achieving endoscopic remission or cure after failure of the first biologic agent is low. [17]

The systematic review and meta-analysis by Ungaro *et al*.[23] demonstrated that early use of biologics in patients with moderate to severe CD leads to statistically and clinically better clinical remission. The highest rates of clinical remission between 26 and 52 weeks of treatment ranged from 48 to 78 % in early biologic treatment compared to 35 to 57 % in late or conventional treatment. In addition, early treatment compared to conventional treatment increased mucosal healing rates by 15.2 percent.[23] It is relevant to point out that this remission and healing rate is related to the duration of therapy. [18]

The use of biological therapy has effects on the patient's body composition. In the prospective study by Santos *et al.* [21]it was shown that 87% of patients had increased total body weight and 39.1% had increased BMI values above 24.9 indicating a picture of overweight. This occurs due to the inhibition of TNF-ᵅ, which tends to increase the number of adipocytes, favoring adipogenesis and, consequently, an increase in body fat. This can be explained by the improvement in the quantity and quality of food intake due to the remission of symptoms and reduction of inflammation. Thus, it becomes evident that weight gain when using this therapy is an important factor since it can have repercussions on health with metabolic and cardiovascular disorders. [21]

Thus, therapeutic options for Crohn's disease patients experienced with anti-TNF are constantly evolving. Finally, there are no recommendations regarding the duration of treatment with such drugs, but they can be administered for long periods, always assessing the risk of complications. However, in cases of patients with clinical and endoscopic remission for more than two years, treatment can be discontinued.[15]

The pharmacological treatment of inflammatory diseases aims to reduce the inflammatory process during relapses and increase the period of clinical remission. It is worth noting that the choice of therapy will depend on the balance between efficacy and side effects of the drugs used. This requires the demand for a long-term therapy with a combination of drugs to control the disease. [26]

Despite advances in pharmacological interventions for CD, many individuals continue to experience persistent symptoms, often including diarrhea, abdominal pain, and bleeding. And because it is an intestinal disease, diet becomes of great importance as a way to maintain the proper intestinal microenvironment. Therefore, dietary modification, specifically a change in the types of carbohydrates consumed daily, may be a welcome complementary therapy for those individuals suffering from CD who wish to restore bowel function.[20]

In this context, Exclusive Enteral Nutrition (EEN) was used in children with mild to moderate CD over a period of 06-08 weeks with a diet providing 100% of daily caloric intake. It was shown that NES has a strong efficacy in the child population, and is indicated as a first-line treatment to induce remission in recent onset mild to moderate CD. However, such success was not achieved in adult subjects because of the low motivation to complete the treatment and the poor taste acceptance of the formula.[22 /26]

Another way to reduce intestinal inflammation and thus reduce the criticality of CD would be stem cell transplantation. However, more high-quality randomized controlled trials are still needed to prove the efficiency of such a method, since during this treatment the patient's immunity is reduced and, as a consequence, the risk of opportunistic infections increases. In order to reduce adverse reactions, reasonable levels of medication should be administered during transplantation.[25]

However, when the patient does not improve with the use of drugs and individualized diet, there is the need to use other measures such as surgical treatment, recommended for severe cases of CD. There are several techniques that can be used in the surgical treatment. Among them are internal bypass surgery, intestinal resection, and stenoplasties. Laparoscopic surgeries in CD have evolved, and the criticism has been overcome by the positive results that are evidenced in a better postoperative recovery.[27]

With the increase in the incidence of CD worldwide, there is a need to develop treatments (clinical or surgical) focused on the quality of life of these patients, with methods that reduce intestinal inflammation and promote the healing of this mucosa. With this, the therapy will be as personalized as possible.[28]

5 CONCLUSION

In view of the above, it is evident that Crohn's disease is still a pathology of challenging diagnosis and treatment due to its multifactorial etiology and diverse clinical presentation. Being an inflammatory bowel disease, the diagnosis of CD must evaluate the intestinal mucosal involvement, as well as possible complications resulting from the disease. Thus, there are several diagnostic methods and tools that can be used, among them: endoscopic capsule, magnetic resonance imaging, contrast-enhanced ultrasonography, colonoscopy with ileoscopy, and CT enterography. Each of these methods assesses different aspects of disease presentation. Regarding treatment, biological therapy shows a good response if used early, can be combined with conventional therapy - aminosalicylates, antibiotics, corticosteroids, and immunosuppressants - or used in patients who do not respond to conventional therapy or have adverse effects. For this, the need for medical education for the early treatment of Crohn's disease through new technologies becomes irrefutable, as well as the importance of conducting future studies about the impacts and outcomes of the use of this therapy in patients with CD.

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Chapter 50

Pathologies of patients monitored by the Palliative Care service at the Maria Aparecida Pedrossian University Hospital

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ABSTRACT
OBJECTIVES:The present study aimed to evaluate the main pathologies of patients followed up in the palliative care service of a university hospital. METHODS:A retrospective cohort study involved 153 patients in palliative care, aged 4 months to 95 years, hospitalized from January 2020 to August 2021. Clinical, biochemical, and radiological data were collected from the patients' medical records. RESULTS: According to the data analyzed during hospitalization, the mean age is equal to 66.78 years, with about 2 distinct diagnoses or clinical conditions. Most patients (about 24.18%) had sexually transmitted diseases, followed by patients with neoplasms (22.22%), vascular diseases (16.99%), neurodegenerative diseases (4.57%), hepatopathies (3.26%), renal failure (9.80%), pulmonary diseases (16.99%) and malformations (0.65%). CONCLUSION: The present study is in accordance with the new WHO update, in which palliative care is offered to all patients with chronic diseases and oncology patients ranked second in pathological frequency.

Keywords: Palliative Care; Integrality in Care; Hospice.

1 INTRODUCTION

In 1990, the World Health Organization published for the first time the concept and principles of palliative care, recognizing and recommending them. This definition was aimed at people with cancer, advocating integral assistance in offering end-of-life care. Together with prevention, diagnosis, and treatment, palliative care is now considered one of the basic pillars of assistance to cancer patients[1] .

Over the years, the value of Palliative Care has been recognized, and in 2002, the concept was revised and expanded to include care for other diseases such as AIDS, heart and kidney disease, degenerative diseases, and neurological diseases. In 2004, a new document published by the WHO, *The*

solidfacts - PalliativeCare, reiterates the need to include palliative care as part of comprehensive health care in the treatment of all chronic diseases, including in care programs for the elderly[2] .

The most recent definition of Palliative Care was published in 2018 beingdetermined as "active holistic care provided to people of all ages who are in intense health-related suffering resulting from a serious illness, especially those at the end of life. The goal of Palliative Care is therefore to improve the quality of life of patients, their families and caregivers." .[3]

It is intended for any patient at any stage of a serious illness, and can take place in conjunction with curative treatment. This care is not prognosis dependent and includes *hospice* services. In most clinical conditions, it is provided by the same group of health professionals .[4]

According to the WorldwidePalliativeCare Alliance, although more than one hundred million people benefit from palliative care annually, less than 8% who need this type of assistance are guaranteed access to it[5] . Palliative care services can be provided in different models: exclusive hospitals (*hospices*), general hospital wards, inter-consultant teams, outpatient clinics, home care, hospices, and day hospitals. It **is considered** that there is not a unique and ideal model for care provision, which should be determined based on local needs and resources[1] .

With this, the study in question aims to characterize the patients seen by the Palliative Care services in a tertiary hospital in the city of Campo Grande - MS, in the period from January 2020 to August 2021, listing the underlying pathology of the patients.

2 METHOD

This study was conducted in accordance with the ethical standards as stated in the Declaration of Helsinki. It was approved by the Research Ethics Committee (CEP) of the Hospital Universitário Maria Aparecida Pedrossian - MS under number: 5.308.509/CAAE: 52439021.1.0000.0021.

A quantitative descriptivoretrospective study was conducted, based on the review of medical records of patients in palliative care, admitted from January 2020 to August 2021 at the Maria Aparecida Pedrossian University Hospital (HUMAP) of the Federal University of Mato Grosso do Sul, Campo Grande, Brazil.

A total of 153 patients with 4 months or more in palliative care were described. Demographic, clinical, biochemical and radiological data and results were collected from the patients' records.

Results are presented as mean ± standard deviation (SD) for data with normal distribution and as median and interquartile range for data with non-normal distribution. Data were presented descriptively in absolute frequency and relative frequency.

3 RESULTS

A total of 153 patients of both genders, ranging in age from 4 months to 95 years, were included in the study. About 1.30% of the patients have a history of only one disease (without associated comorbidities), the other 98.69% had 2 or more comorbidities associated with the underlying disease. This demonstrates the importance of Palliative Care integrated to other specialties, once it seeks to care for the individual in a holistic way, that is, in all aspects: physical, mental, spiritual and social[6] . It is an interdisciplinary approach to care that focuses on improving the quality of life of patients and their families. The goals of palliative care include alleviating pain and other distressing symptoms; integrating the medical, psychological, and spiritual aspects of care; and providing a support system to help families cope with illness and grief . [7]

Palliative care includes primary palliative care provided by a variety of health care professionals, as well as secondary palliative care provided by palliative care specialists[8] . The main limitations of professionals involve knowledge deficits between professionals and family members and lack of organization of the multidisciplinary team. Aiming to reduce the use of derisory measures, prolonging the suffering of the patient and his family[6] .

Most patients (about 24.18%) were carriers of sexually transmitted diseases, and all of them had HIV as the underlying pathology. In the first years of HIV emergence, hospital survival reported for patients admitted with this diagnosis was short, further reducing in patients who developed respiratory syndromes[9] . However, with improvements in intensive care and the introduction of highly active antiretroviral therapy in 1996, HIV has become a chronic disease, and infected patients are now living longer[10] . Although ICU survival has improved since the beginning of the HIV epidemic, the mortality of critically ill patients is still about 30% and remains higher than that of uninfected patients[11] . Demosntrating the importance of this patient being referred for palliative care follow-up.

In second place, regarding the need for palliative care, are patients with cancer (22.22%). Also in 2013, the current National Policy for Cancer Prevention and Control (PNPCC)[12] reaffirms that palliative care is part of the comprehensive care of cancer patients and ensures that every hospital qualified in oncology has the obligation to ensure this care, which may be given in the hospital structure itself or may be referred to the health care network[13] .

6.99% of patients were vascular disease patients, as vascular disease is a symptomatic disease with complex decision making and a relatively high risk of death throughout its course, Palliative Care should be integrated early and often into the care of these patients[14] . However, certain Palliative Care approaches may have greater applicability at different points in the illness and the overall intensity of palliative care needs tends to increase over time. Multiple practice guidelines and scientific statements recommend the use of palliative care in patients with vascular disease .[15]

The remaining patients (36.61%) were subdivided into neurodegenerative diseases (4.57%), liver diseases (3.26%), renal failure (9.80%), lung diseases (16.99% - among this number 53.84 were patients with COVID), malformation (0.65%) and unknown diagnosis (1.30%). Among the 153 patients evaluated 7.84% had Diabetes Mellitus and 14.37% had systemic arterial hypertension, which may have aggravated the patients' condition.

Regarding age, 57.51% of the patients were elderly (older than 65 years), and the pathologies presented are consistent with what is described in the literature, with the main causes of hospitalization of the elderly being associated with non-neoplastic conditions such as cardiovascular and respiratory diseases, in addition to dementia[16] .

Although one in four critically ill elderly patients admitted to geriatric wards are referred for palliative care, there is no consensus on how best to assess and communicate prognosis in geriatric populations. Establishing better clinical guidelines may contribute to the early identification of hospitalized patients who could benefit from palliative care and provide relevant information to patients and caregivers involved in the decision-making process[17] .

4 DISCUSSION

The relevance of multidisciplinary teams appears as fundamental with emphasis on the need for theoretical, scientific and technical knowledge and specific clinical skills in the domain of different professions so that the integrality of actions may occur in the process of offering Palliative Care, contemplating the physical, psychosocial and spiritual dimensions of patients and their families[18] .

From this perspective, care is provided by a multidisciplinary team during the period of diagnosis, illness, end of life, and bereavement. It is necessary to perceive individuals in all their integrity, including psychosocial and spiritual aspects in their care[19] .

Any event precipitating an intensive care unit (ICU) admission can lead to irreversible worsening of symptoms of a chronic disease or an acute event. The multidisciplinary ICU team must continually reassess the clinical evolution of their patients, which includes redefining treatment goals and considering the provision of Palliative Care when treatment no longer offers benefit[20] . In some cases, death is inevitable and delayed only with high psychological, social, and financial costs for all parties involved in these processes (patient, family, and healthcare professionals). In many cases, further treatment does not achieve the patient's treatment goals. These situations are becoming more frequent, since today 20% to 33% of patients die in the ICU .[21]

The results of other studies indicate that, in general, Palliative Care patients still die in hospital settings, such as the (ICU), despite the preference for the home environment. It also showed as barriers to Palliative Care the lack of knowledge and skills by health care professionals .[22]

Another relevant aspect is the importance of applying the offer of Palliative Care for all diseases and not only for cancer patients, as governed by the new definition. An international study conducted to investigate the referral of patients to Palliative Care concluded that they were generally cancer patients .[23] The World Health Organization has concluded that only 14% of patients worldwide who need palliative care receive it[24] . Many of them are treated in the ICU .[25]

In Brazil, legislation and codes of ethics have recently changed. The Brazilian constitution states that human dignity in death is a primary right, which aligns with the withdrawal of life support. The interpretation of the law assumes that no one, even in a life threatening situation, can be forced to accept medical treatment or surgery[26] . Resolution number 1.805/2006 of the Federal Council of Medicine (CFM) supports the suspension of futile treatments for incurable terminal illness, if accepted by the patient or his/her legal representative. Advance directive of will (CFM resolution 1,995/2012) is a legal and ethical document that allows health professionals to respect the will of a given person. This document allows someone to make their own choices regarding future treatments, such as receiving or refusing treatment if they are unable to communicate or express their will .[4]

5 CONCLUSION

The World Health Organization has already redefined the principles of Palliative Care including the care of all chronic diseases in its definition, which is in agreement with the results found in the study, and in the hospital in question the quantity of oncologic patients occupied the second place in relation to the pathologies of the individuals. However, the mortality rate in intensive care units remains high, and the ICU health professional teams are constantly facing complex situations, in which the treatment and the advanced life support measures do not reach the objectives of avoiding death, nor respect the will of the patients and their families. For us to be able to solve this problematic it is necessary to have more knowledge regarding Palliative Care to change the general vision of end-of-life care, since the issue goes from the family members' non-acceptance to the lack of adequate professionals for the function.

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Chapter 51

Perception of quality of life: view of patients victims of traumatic brain injury

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ABSTRACT
Introduction: Traumatic Brain Injury (TBI) is characterized as any injury resulting from an external trauma, resulting in anatomical alterations of the skull and/or impairment of meningeal, brain or vascular functions, resulting in cognitive or functional brain dysfunctions, transient or permanent. Objective: To analyze the perception of quality of life of patients with traumatic brain injury during rehabilitation. Method: non-experimental, descriptive, exploratory, cross-sectional, non-interventionist research, with a quantitative, primary approach; observational; uncontrolled, developed with the population of patients being followed up at the Associação de Assistência à Criança Deficiente (AACD), Ibirapuera Unit, São Paulo. A socio-demographic questionnaire was applied, and the "World Health Organization Quality of Life - WHOQOL-bref" questionnaire, divided into 26 questions, and 5 domains, in the form of an interview with 15 patients undergoing rehabilitation at the AACD, selected according to the inclusion criteria. Results and discussion: 46.7% of patients rated their quality of life as "Good" or "Very good". The "Environment" domain presented the highest average value, and the "Physical" domain, the lowest. Moderate correlations were found between age and psychological domain (r=0.316) and between schooling and physical domain (r=0.374). Only questions 4, 6, 10, 12 and 24 were statistically significant ($p<0.05$). Conclusion: environmental and housing barriers, such as security, pollution, transport, and housing seem to make it difficult for patients to perform day-to-day activities. Physical aspects, pain, locomotion and personal satisfaction seem to have less impact on patients' perception of quality of life.

Keywords: Quality of life; Rehabilitation; Craniocerebral injuries.

1 INTRODUCTION

Traumatic Brain Injury (TBI) is characterized as any injury resulting from an external trauma, resulting in anatomical changes of the skull and/or impairment of the function of the meninges, the brain, or its vessels, resulting in temporary or permanent cognitive or functional brain dysfunction (BRASIL, 2015). Among the types of trauma responsible for TBI, automobile accidents, falls, especially among the elderly, and violent causes, such as injuries from firearms and blunt weapons, stand out (RODRIGUES, 2014). Regarding the population, most of those affected by TBI refer to men between 21 and 49 years old,

which is in line with the fact that 71% of automobile accidents in Brazil are caused by men (SÃO PAULO, 2019) and that 94.6% of young people murdered are also male (IPEA, 2018).

The changes, or sequelae, resulting from moderate or severe TBI are very varied and can manifest themselves in the short and long term, most of them generating some degree of disability over time. The main fields that involve these changes are the physical, cognitive, emotional, behavioral, and communicative fields, which affect several social spheres of the individual, especially his learning, social, family, and professional relationships, and his independence, which can negatively interfere with the individual's quality of life (GIFRE *et al.* , 2015).

The first step to re-establish the well-being of a TBI victim is rehabilitation, which, in a broad sense, is understood as a process that aims to achieve the maximum potential of physical, sensory, mental, and social abilities, resulting in obtaining independence and self-determination. In the case of a TBI, rehabilitation is divided into five phases (BRASIL, 2015): pre-trauma phase (period before the trauma); acute phase (period between assistance by the rescue team, until hospital admission in Intensive Care Center or Intensive Care Unit (CTI/UTI); intensive phase (from CTI/UTI until hospital discharge, after diagnosis and treatment); recovery phase (involves the evaluation of the abilities and the present sequelae, in order to elaborate an adequate rehabilitation program), and the outpatient phase (adaptation to the new life style, in the personal, professional, and social spheres, making the necessary adjustments).

After the beginning of this rehabilitation process, in addition to physical changes, TBI patients have several personal aspects negatively affected, such as their social network, which results in a difficulty in maintaining a full integration into society (GIFRE *et al.* , 2014). These factors, in turn, interfere in the perception of quality of life of these people, which tends to be related to five main factors: family and friends; long-term psychological support; the type and severity of the injury; participation of the patient and his family in society; social "invisibility" of TBI (GIFRE *et al.* , 2014).

Given this scenario and the scarcity of scientific publications referring to psychosocial aspects of TBI (WEBER, 2016), we realize the need for a study that addresses the factors that relate to the quality of life in TBI patients, in order to demonstrate the health needs of this population portion, offer current and relevant information to patients, their families, favor more effective tools to health professionals for the treatment and guidance of these people.

It is believed that after a TBI, new physical, social and psychological states resulting from the injury, together with the biopsychosocial baggage and the rehabilitation process, may show indicators related to autonomy, family and social structure and environment, leading to manifestations in the perception of quality of life. Thus, the following research guiding question is raised: what is the perception of the quality of life of traumatic brain injury patients during rehabilitation? Finally, the aim of this research is: understanding the perception of quality of life of traumatic brain injury patients during rehabilitation.

2 METHODOLOGY

This is a non-experimental, descriptive exploratory, cross-sectional, non-interventionist research, with a quantitative approach, and qualitative, primary; observational; non-controlled (SAMPIERI; COLLADO; LUCIO, 2006) designed with the population of patients being monitored at the Associação de Assistência à Criança Deficiente (AACD), Ibirapuera Unit, São Paulo.

Quantitative research is characterized by the collection and analysis of quantitative data on certain variables, which makes it possible to identify the deep nature of realities, their system of relationships and their dynamic structure. It can also determine the strength of association or correlation between variables, the generalization and objectification of the results through a sample that makes inference to a population (ESPERÓN, 2017).

A field research was conducted, which is used to obtain information and/or knowledge about a problem, for which an answer is sought, and which is to be proved through the observation of facts and phenomena as they occur spontaneously, from the collection of data related to them and the recording of variables that are presumed relevant, in order to analyze them (LAKATOS; MARCONI, 2003).

Considering the resolutions of the National Health Council 466/12 and 510/16, the project was evaluated by the Research Ethics Committee (CEP) Involving Human Beings of the Faculdade de Medicina de Marília (Famema) and by the CEP of the AACD with opinions 3.520.967 and 3.668.598, respectively. Thus, the beginning of the collection was authorized by the approval of both. Before answering the questionnaire, the participants and their guardians must sign the Free and Informed Consent Form. The project will be evaluated by the Ethics Committees of Famema and AACD, through the Plataforma Brasil (BRASIL, 2013; 2016).

The data collection was carried out in the aquatic physiotherapy sector of the Associação de Assistência à Criança Deficiente (AACD), Ibirapuera Unit, São Paulo, and counted on the participation of 15 patients, of both genders, between 18 and 59 years old, TBI victims, in the rehabilitation process.

Patients with psychiatric comorbidities and/or taking any psychotropic medication in the past 6 months from the date of the interview were not considered.

The field research data began to be collected in January 2020, according to the availability of both parties. This process counted on the cooperation of the person responsible for the collection part at AACD, based on two instruments.

First, a socio-demographic questionnaire was applied to characterize the research population.

Next, the "World Health Organization Quality of Life - WHOQOL-bref" (THE WHOQOL GROUP, 1995) questionnaire was applied in the form of a direct interview with the patient under the supervision of the person responsible for the institution, Cristiane Dias dos Anjos de Souza, at the beginning or at the end of the treatment, after the patient had accepted and signed the Free and Informed Consent Form.

The questionnaire has 26 questions that evaluate four parameters: physical (7 questions), psychological (6 questions), social (3 questions), and environmental (8 questions). The answers follow a Likert scale, ranging from 1 to 5 points.

Although it was developed to be self-applicable, the high heterogeneity among the education and cognition levels of the patients seen at the hospital demands its application in the form of an interview.

Qualitative variables are described by the distribution of relative (%) and absolute (*f*) frequency. Quantitative variables are described by the mean, standard deviation (SD), range, minimum value, maximum value and coefficient of variation (CV%). To analyze the significant differences between the frequency distributions, the chi-square test for proportion was performed. To analyze the correlation between quality of life and sociodemographic variables Spearman's test was performed. For the classification of correlations (r), the following values were considered: ≥ 0.70 strong correlation; $0.30 < r < 0.70$ moderate correlation; $0.1 < r \leq 0.30$ weak correlation. SPSS version 19.0 for windows software was used for all analyses, and a significance level of 5% was adopted.

3 RESULTS

Table 1 displays the sociodemographic characteristics of the sample studied. There was a prevalence of males (80%) over females (20%); all participants were between 18 and 59 years old, with an age range of 34.07 years. A predominance (40%) of participants with complete MS was observed, followed by those with incomplete MS (33.3%). Regarding marital status, 73% are single, and only 6.7% are married. Regarding religiosity, more than half (60%) said they had some, without further specification. As for current occupation, the majority does not perform any activity, either because they are retired (20%), or unemployed (66.7%). Finally, a great predominance of an individual locomotion, represented by the use of the car (73.3%), in comparison with public transportation, such as buses (13.3%) and subway (6.7%), was noted.

From the answers obtained with the WHOQOL-bref questionnaire, using the Likert Scale (range 1 to 5), we obtained an overall average of 3.58 and individual averages per question, described in Table 2. Among these, the ones with lower scores were about financial resources (Q12), leisure opportunities (Q14), locomotion (Q15) and negative feelings (Q26) with 2.80, 2.93, 2.80 and 2.07 respectively. The highest scores were on medical treatment (Q4), meaning of life (Q6), daily energy (Q10) and means of transportation (Q25) with 4.93, 4.60, 4.53 and 4.33 respectively.

Table 1: Absolute (N) and relative (%) frequency distribution of sociodemographic characteristics of the sample

VARIABLE RATING		N	%	p-value
SEX	Male	12	80	0,020*
	Female	3	20	
SCHOOLING	Incomplete Elementary	1	6,7	0,119
	Incomplete HS	5	33,3	
	Full HS	6	40	
	Undergraduate incomplete	1	6,7	
	Post-graduation	2	13,3	
CIVIL STATUS	Single	11	73,3	<0,001*
	Married	1	6,7	
	Stable Union	1	6,7	
	Widower	2	13,3	
RELIGIOSITY	Yes	9	60	0,439
	No	6	40	
CURRENT OCCUPATION	Administration	1	6,7	0,002*
	Deliveries	1	6,7	
	Unemployed	10	66,7	
	Retired	3	20	
MOBILITY	Car	11	73,3	<0,001*
	Metro	1	6,7	
	Bus	2	13,3	
	Ambulance	1	6,7	

Note: * indicates significant difference in the distribution of responses by Chi-square test for proportion (p-value ≤ 0.05).

Table 2: Results by question on the WHOQOL- BREF

ISSUE	AVERAGE	STANDARD DEVIATION	COEFFICIENT OF VARIATION	MINIMUM VALUE	MAXIMUM VALUE	RANGE
Q1	3,4	1,18	34,8	1	5	4
Q2	3,53	1,25	35,26	1	5	4
Q3	3,2	1,42	44,51	1	5	4
Q4	4,93	0,26	5,23	4	5	1
Q5	3,47	1,46	42,04	1	5	4
Q6	4,6	1,06	22,95	1	5	4
Q7	3,4	1,35	39,77	1	5	4
Q8	3,67	1,35	36,69	1	5	4
Q9	4,07	1,03	25,4	2	5	3
Q10	4,53	0,74	16,39	3	5	2
Q11	3,73	1,44	38,51	1	5	4
Q12	2,8	1,08	38,65	1	5	4

Q13	3,93	1,1	27,96	1	5	4
Q14	2,93	1,44	49,01	1	5	4
Q15	2,8	1,26	45,18	1	5	4
Q16	3,47	1,41	40,6	1	5	4
Q17	3,73	1,22	32,75	1	5	4
Q18	3,33	1,5	44,88	1	5	4
Q19	3	1,46	48,8	1	5	4
Q20	3,27	1,58	48,36	1	5	4
Q21	3,2	1,37	42,91	1	5	4
Q22	3,33	1,63	48,99	1	5	4
Q23	4,2	1,01	24,15	2	5	3
Q24	4,27	1,1	25,78	2	5	3
Q25	4,33	0,72	16,7	3	5	2
Q26	2,07	1,1	53,22	1	4	3

Regarding the coefficient of variation of the answers, also described in Table 2, the highest numbers were found in the subjects related to leisure opportunities (Q14), personal satisfaction (Q19), support from friends (Q22) and negative feelings (Q26), with 49.01%, 48.80%, 48.99% and 53.22% respectively. The smallest variations are related to medical treatment (Q4), meaning of life (Q6), daily energy (Q10) and means of transportation (Q25) with 5.23%, 22.95%, 16.39% and 16.70% respectively.

Table 3: Results by domains of the WHOQOL-BREF

DOMAIN	AVERAGE	STANDARD DEVIATION	COEFFICIENT OF VARIATION	MINIMUM VALUE	MAXIMUM VALUE	AMPLITUDE
Physical	12,42	2,86	23,04	8	16,57	8,57
Psychological	14,76	3,56	24,14	8	19,33	11,33
Social Relations	13,07	4,97	38,02	4	20	16
Environment	15,1	1,83	12,15	13	18	5
QL Self-Assessment	13,87	4,1	29,59	6	20	14
TOTAL	13,97	2,41	17,27	10,62	17,38	6,77

When considering the averages per domain, shown in Table 3, we obtained a variation of 12.42 to 15.10. The physical domain presented the lowest result, with 12.42. It deals with pain, locomotion, and personal satisfaction. The second lowest result was in the social relations domain, with 13.07. This domain considers questions about satisfaction with friends and family, support, and sex life. The self-assessment

of QL domain had an average of 13.87 and the psychological one, 14.76, the latter addressing the meaning of life, concentration, acceptance, and negative feelings. The highest average is related to the environment domain, which reached 15.10, and deals with daily safety, pollution, transportation, health, access to information, and housing.

When analyzing the coefficients of variation of the domains, 17.27% was observed for the overall assessment. The domains of social relations, environment, physical, psychological, and the self-assessment of QL obtained a coefficient of variation of 38.02%, 12.15%, 23.04%, 24.14%, and 29.59%, respectively.

In the correlation between QL, by domains and total, and socio-demographic variables, shown in Table 4, the marital status, occupation, and mobility variables were excluded, since Spearman's parametric test is indicated only for ordinal qualitative variables or for dichotomous nominal qualitative variables.

There was no statistical significance between the domains and the sociodemographic variables. Only a moderate correlation was obtained between the Psychological domain and Age (r=0.316) and between the Physical domain and Schooling (r=0.374).

Table 5, in turn, expresses the distribution of the participants' answers, comparing them to each other by the Chi-square test. It can be seen that there was a significant difference in questions 4, 6, 10, 12, and 24, which address medical treatment, meaning of life, energy for daily life, financial stability, and access to health services, respectively. Regarding questions 4, 6, and 10, 93.3%, 80%, and 66.7% of "Extremely" answers were obtained by the participants, respectively. As for question 12, 66.7% of the answers were of the "Very Little" type. Finally, it can be noted that 60% of the answers to question 24 were of the "Very Satisfied" type.

Table 4: Analysis of the correlation between quality of life (domain and total) with sociodemographic variables

Variables	**Quality of Life**											
	Physical		Psychological		Social Relations		Environment		QL Self-Assessment		WHOQOL	
	r	p-value	r	p-value	r	p-value	r	p-value	r	p-value	r	p-value
AGE	0,102	0,719	0,316	0,251	-0,065	0,818	0,243	0,384	0,224	0,421	0,199	0,476
SEX	0,136	0,63	0,077	0,784	0,078	0,783	0,137	0,626	0	1	0,077	0,784
SCHOOLING	0,374	0,17	0,176	0,531	0,22	0,432	0,221	0,43	0,224	0,421	0,283	0,307
RELIGIOSITY	-0,079	0,78	-0,237	0,395	0,016	0,955	-0,272	0,327	-0,016	0,955	-0,111	0,695

Note: * indicates significant correlation by Spearman's non-parametric test; correlation coefficient (r); p-value calculated by Spearman's correlation test.
For the classification of correlations (r), thefollowing valueswere considered: $r \geq 0.70$ strong correlation; $0.30 < r < 0.70$ moderated correlation; $0.1 < r \leq 0.30$ weak correlation.

Table 5: Distribution of absolute (N) and relative (%) frequency of the WHOQOL answers by the participants

Question	Answer	N	%	p-value
P1	Very Bad	1	6,7	0,504
	Bad	2	13,3	
	Neither bad nor good	5	33,3	
	Good	4	26,7	
	Very good	3	20	
P2	Very dissatisfied	1	6,7	0,615
	Dissatisfied	2	13,3	
	Neither dissatisfied nor satisfied	4	26,7	
	Satisfied	4	26,7	
	Very satisfied	4	26,7	
P3	Nothing	3	20	0,172
	More or less	7	46,7	
	Quite	1	6,7	
	Extremely	4	26,7	
P4	Quite	1	6,7	0,001*
	Extremely	14	93,3	
P5	Nothing	2	13,3	0,736
	Very little	2	13,3	
	More or less	3	20	
	Quite	3	20	
	Extremely	5	33,3	
P6	Nothing	1	6,7	0,001*
	Quite	2	13,3	
	Extremely	12	80	
P7	Nothing	2	13,3	0,504
	Very little	1	6,7	
	More or less	5	33,3	
	Quite	3	20	
	Extremely	4	26,7	
P8	Nothing	2	13,3	0,737
	More or less	4	26,7	
	Quite	4	26,7	
	Extremely	5	33,3	
P9	Very little	1	6,7	0,172
	More or less	4	26,7	
	Quite	3	20	
	Extremely	7	46,7	
P10	More or less	2	13,3	0,022*
	Quite	3	20	
	Extremely	10	66,7	
P11	Nothing	1	6,7	0,119
	Very little	3	20	

	More or less	2	13,3	
	Quite	2	13,3	
	Extremely	7	46,7	
P12	Nothing	3	20	0,002*
	More or less	10	66,7	
	Quite	1	6,7	
	Extremely	1	6,7	
P13	Nothing	1	6,7	0,269
	More or less	3	20	
	Quite	6	40	
	Extremely	5	33,3	
P14	Nothing	3	20	0,955
	Very little	3	20	
	More or less	4	26,7	
	Quite	2	13,3	
	Extremely	3	20	
P15	Very Bad	2	13,3	0,615
	Bad	5	33,3	
	Neither bad nor good	4	26,7	
	Good	2	13,3	
	Very good	2	13,3	
P16	Very dissatisfied	2	13,3	0,323
	Dissatisfied	1	6,7	
	Neither dissatisfied nor satisfied	5	33,3	
	Satisfied	2	13,3	
	Very satisfied	5	33,3	
P17	Very dissatisfied	1	6,7	0,323
	Dissatisfied	1	6,7	
	Neither dissatisfied nor satisfied	4	26,7	
	Satisfied	4	26,7	
	Very satisfied	5	33,3	
P18	Very dissatisfied	2	13,3	0,736
	Dissatisfied	3	20	
	Neither dissatisfied nor satisfied	3	20	
	Satisfied	2	13,3	
	Very satisfied	5	33,3	
P19	Very dissatisfied	3	20	0,999
	Dissatisfied	3	20	
	Neither dissatisfied nor satisfied	3	20	
	Satisfied	3	20	
	Very satisfied	3	20	
P20	Very dissatisfied	4	26,7	0,978
	Neither dissatisfied nor satisfied	3	20	
	Satisfied	4	26,7	
	Very satisfied	4	26,7	

P21	Very dissatisfied	3	20	0,323
	Dissatisfied	1	6,7	
	Neither dissatisfied nor satisfied	3	20	
	Satisfied	6	40	
	Very satisfied	2	13,3	
P22	Very dissatisfied	4	26,7	0,865
	Neither dissatisfied nor satisfied	3	20	
	Satisfied	3	20	
	Very satisfied	5	33,3	
P23	Dissatisfied	1	6,7	0,068
	Neither dissatisfied nor satisfied	3	20	
	Satisfied	3	20	
	Very satisfied	8	53,3	
P24	Dissatisfied	2	13,3	0,016*
	Neither dissatisfied nor satisfied	1	6,7	
	Satisfied	3	20	
	Very satisfied	9	60	
P25	Neither dissatisfied nor satisfied	2	13,3	0,247
	Satisfied	6	40	
	Very satisfied	7	46,7	
P26	Never	6	40	0,506
	Sometimes	4	26,7	
	Often	3	20	
	Very often	2	13,3	

Note: * indicates significant difference in the distribution of responses by Chi-square test for proportion (p-value ≤ 0.05).

4 DISCUSSION

Initially, it can be stated that the sample of this study, although limited, is in line with data from previous larger Brazilian studies, in which it can be noted that most patients approached are young men and have at least completed high school (15,16). Males are at higher risk of having car accidents and being involved in violent events, since many use vehicles as a way of work and are potentially more aggressive (18). The fact that 73% of participants were single may indicate a relational difficulty, possibly linked to the sequelae of TBI.

Regarding Occupation, although the reasons for unemployment were not addressed in the questionnaire, the result of 66.7% not being occupied at the moment is significant, and may be related to physical and cognitive limitations arising from TBI, as shown in a 2018 retrospective study conducted in Germany with 43 patients, in which it was observed that 53% of them were unemployed due to TBI (17).

Regarding the means of transportation, the fact that most patients use cars may express the lack of preparation and efficiency of public transportation in ensuring safety and accessibility for people with certain limitations of locomotion.

Regarding the application of the WHOQOL-Bref, there is no cut-off point in the literature that classifies the values obtained. The physical domain obtained the lowest value, which is in line with an observational study carried out with 31 patients who were victims of traumatic brain injury in Japan, which showed that after 1 year of trauma, 25% of patients presented cognitive, behavioral and physical disorders ("Rehabilitation needs and participation restriction in patients with cognitive disorder in the chronic phase of traumatic brain injury"). It is observed that this domain has the second lowest coefficient of variation, which shows that there is less variability in the assessment of individuals on this domain.

The environment domain, on the other hand, reached the highest value, which may suggest greater accessibility to this population group in terms of transportation, housing, and access to information, although no data has been found in the literature to support this finding.

It was observed that in relation to the correlation between the domains and four of the sociodemographic variables (age, sex, education, and religiosity) there was no statistical significance at any point. However, it is noted that there was moderate correlation ($0.30<r<0.70$) between the psychological domain and age ($r=0.316$) and the physical domain and education ($r=0.374$). Regarding the former, the result found is in line with the findings of a similar study on predictors of quality of life after TBI, in which an $r=0.330$ was found (Predictors of quality of life after moderate to severe traumatic brain injury). Thus, we can see that the age of the individual TBI victim interferes in some way in his emotional and psychological states. Regarding the second, 86.7% of the patients do not have a complete college education, which can evidence this relationship. Besides, this data can justify in part a greater difficulty to be employed, which can be related to the findings of an American study (How Do Intensity and Duration of Rehabilitation Services Affect Outcomes From Severe Traumatic Brain Injury? A Natural Experiment Comparing Health Care Delivery Systems in 2 Developed Nations) done with 274 patients which evidenced that pre-injury employment status is one of the significant predictors of good functional status at 12 months after TBI.

Regarding the application of the WHOQOL-bref, in which there was a significant difference only in questions 4, 6, 10, 12 and 24, it can be pointed out, in relation to questions 4 and 24, the importance of a multidisciplinary follow-up for TBI patients, once it is not only about medical treatment, but a range of interconnected therapeutic options, besides the need of being minimally physically accessible, becoming indispensable in the view of the patients themselves. As for questions 6 and 10, they indicate a possible breakdown in common sense. This can be affirmed, since many believe that many patients stop seeing meaning in life or become depressed or anxious after a severe TBI. Although this is true in many cases,

most of the patients evaluated pointed to "Extremely" when asked if they feel energy in their daily lives and if they see meaning in their own lives. Finally, question 12 indicates the financial difficulty that many patients face: the arduous entry or return to the labor market, associated with a tiny or even absent remuneration, implying a very significant obstacle in the view of these people.

5 CONCLUSION

From the above, it can be concluded that environmental and housing barriers, such as safety, pollution, transportation, and housing seem to hinder the performance of daily activities by patients. On the other hand, physical aspects, pain, locomotion and personal satisfaction indicate a lower impact on the patients' perception of quality of life. Thus, the importance of further research in this area is pointed out, in order to build effective actions of support and assistance for the population that has suffered traumatic brain injury, with subsequent improvement in their quality of life.

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Chapter 52

Perception of remote teaching in children and adolescents diagnosed with ADHD, their parents and teachers

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ABSTRACT
The SARS-Cov-2, popularly known as Coronavirus, was identified in Wuhan, China, in December 2019. The accelerated contagious dissemination of COVID-19 lead the World Health Organization to declare Public Health Emergency of International Concern (PHEIC) in 2020. In order to contain the fast dissemination, social distancing measures were adopted, which caused challenges in different contexts. In the educational field, the Minister of Education decreed the substitution of in person classes for the emergency remote teaching. The ADHD is a neurobiological disorder characterized by a persistent pattern of inattention and/or hyperactivity-impulsivity, which interferes in the functioning, development and teaching-learning process of individuals in this condition. Previous studies pointed out the implications that new digital technologies can have in the learning/development of schoolers with ADHD. Likewise, it was highlighted that the didactic methodology used by teachers should favor the development and behavior of children with ADHD. In this context, a bibliographic review was done to describe the results of research that evaluate the perception of remote teaching in children diagnosed with ADHD, their parents and teachers, in order to know the easiness and difficulties in the use of virtual learning environments. Inconsistent results were observed about the impact of remote teaching on children and teenagers with ADHD, for some studies pointed out its benefits while others pointed out its harms. It is concluded that future research is needed to clarify the disparities and the factors that interfere in the results and facilitate or hinder the process of teaching-learning in students with ADHD.

Keywords: Attention Deficit Hyperactivity Disorder (ADHD); Remote-teaching; Apprenticeship; Pandemic; Coronavirus.

1 INTRODUCTION

Attention Deficit Disorder (ADHD) has undergone numerous definitions since its first references in the medical literature in the mid-nineteenth century to the conceptualization of the Diagnostic Manuals of Mental Disorders adopted today. The American Psychiatric Association (2014) defines ADHD as a persistent pattern of inattention and/or hyperactivity/impulsivity, which may present levels of mild, moderate, and severe severity, depending on the intensity of symptoms and clinically significant impairments in the child's development and global functioning. The Brazilian ADHD Association (2018) defines this condition as a neurobiological disorder, of genetic causes, that appears in childhood and persists into adulthood, being more common in children and adolescents referred to mental health services, and affecting about 3 to 5% of schoolchildren worldwide. In Brazil, 13% of children have ADHD.

From a neurobiological perspective, recent studies point to slower brain maturation in children with ADHD when compared to typical development, especially in the frontal region. These studies also find

abnormalities in the structure and functioning of the frontal-striatocerebellar brain areas, responsible for the clinical manifestation of the disorder: inattention, hyperactivity, impulsivity, disorganization, lack of planning and emotional/behavioral regulation, and forgetfulness (Araújo & Sales, 2020; Couto, et al., 2010; Neto, 2010; De Sousa, 2020). According to Merola (2004), ADHD, when not diagnosed and treated early, can interfere with the development and learning of people with this condition, increasing the incidence of alcohol/drug use, depression, anxiety and disruptive behavior disorder, compromising the overall functioning in the personal, social, academic and professional spheres.

According to the Brazilian Attention Deficit Disorder Association (ABDA), Bill 7.081/10, approved in 2019 in the House of Representatives, aims to provide a public policy focused on health care and education for students with dyslexia and ADHD, instituting in basic education a program of diagnosis and treatment, carried out by a multidisciplinary team and based on teaching resources suitable for the development and learning of students with this condition (https://tdah.org.br, retrieved August 18, 2022).

The teaching and learning process of students with ADHD presents several challenges and research in the area. Some studies have highlighted the role of the school and the teacher in the diagnosis and adoption of teaching strategies that contribute to the development, learning, and behavior of children with ADHD, favoring their school inclusion (Araújo & Sales, 2020; Reis & Camargo, 2006; Silva, 2015). In the systematic review published by Costa et al., (2021), in Research, Society and Development, it is seen that Brain-Computer Interfaces (BCI), generally associated with interactive digital games, have been used as an aid in the treatment of ADHD sufferers. According to the researchers, the use of these technologies has corroborated improvements in attention and social and behavioral skills, as well as in the reorganization of the brain's functional network of these patients.

In the current scenario, the Covid-19 pandemic has brought immense challenges to all sectors of society in Brazil and worldwide. In the educational field, the Ministry of Education (MEC), through Administrative Rule No. 544/2020, determined the closure of schools and the replacement of face-to-face classes by Emergency Remote Learning (ERE). This modality made it possible to continue classes in times of crisis through Digital Information and Communication Technologies (ICTs). Classes and other pedagogical activities moved to distance formats, through Virtual Learning Environments (VLEs), live online classes on social networks, and sending digital materials to students. It is important to note that remote learning differs from distance learning (DL), since the latter is a structured, planned and non-emergency learning modality (Costa & Do Nascimento, 2020).

In this context, this research aims to describe the results of studies that evaluate the perception of remote teaching in children diagnosed with ADHD, their parents and teachers, in the pandemic context. It also aims to analyze the impressions of students, parents and teachers about the influence of remote teaching on the behavior and learning of children with ADHD, as well as to point out the advantages, disadvantages

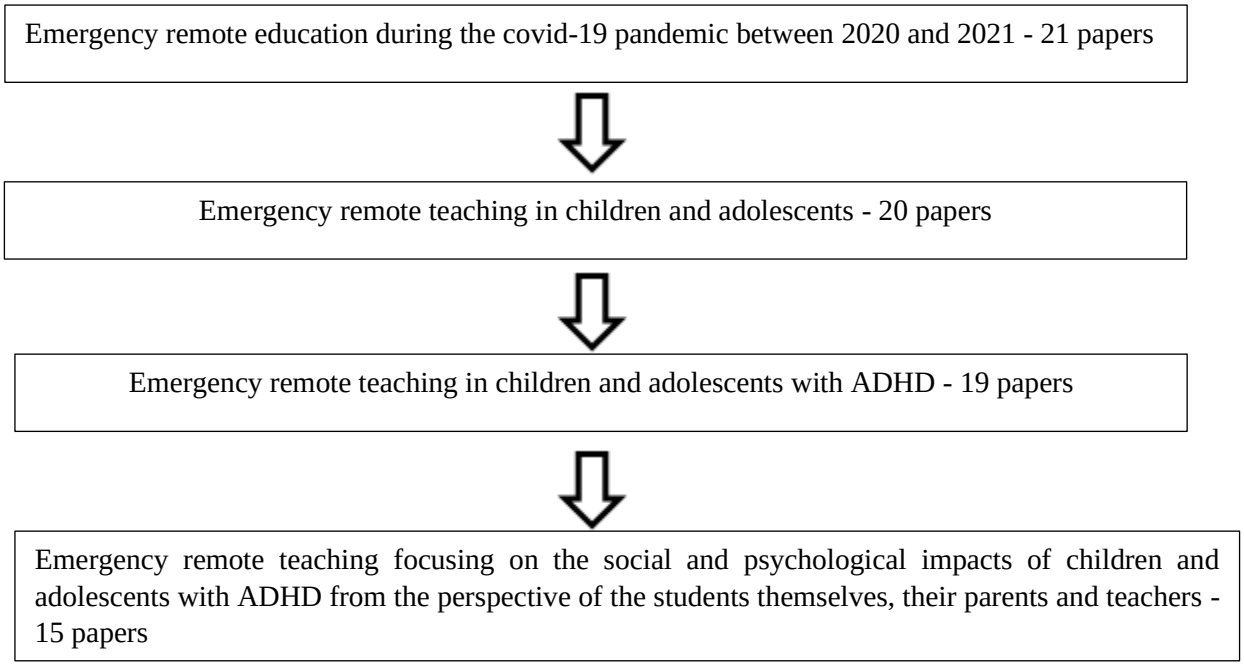
and challenges encountered by these individuals during social isolation. The results found may serve as a basis for further research in the area, to reinforce assertive actions and reformulate errors, with the development of intervention strategies that favor communication between students and teachers, positively impacting the teaching-learning process.

2 METHODOLOGY

This work is an integrative literature review, descriptive and qualitative, which aims to evaluate the perception of remote teaching in children diagnosed with ADHD, their parents and teachers. pFor Correia & Mesquita (https://guiadamonografia.com.br, retrieved August 18, 2022), integrative literature review is a method that aims to synthesize results obtained in research on a topic or issue, in a systematic, orderly and comprehensive manner. According to Souza (2010), this research method determines the current knowledge on a specific theme, since it is conducted in order to identify, analyze and synthesize results of independent studies on the same subject.

The studies contained in this review were searched and selected in the Scielo and Virtual Health Library (VHL) databases, using the descriptors: Attention Deficit Hyperactivity Disorder, ADHD, Teaching-remote, Learning, Pandemic, Coronavirus. The search was conducted from March 2020 to December 2021. Of the 21 titles initially selected, 15 papers were included in this paper. The inclusion criteria were: evaluation of emergency remote learning during the COVID-19 pandemic, during the years 2020 to 2021, by children and adolescents with ADHD, their parents and/or teachers. Publications that did not fit the criteria of ADHD diagnosis and age, or focusing on the social and psychological impacts of family members/caregivers of these students were excluded, as described in Figure 1.

The analysis of the information occurred through qualitative exploratory reading of the material found and the evaluation, classification, and interpretation of the data, relating them to the knowledge of research in the area.



Source: Authors (2022).

3 RESULTS

The articles were conducted in Brazil, Portugal, United States, France, Ireland, Singapore, India, Turkey, Italy, China, Switzerland, and Mexico, and were published between the years 2020 and 2021. The research focused on reports from family members and teachers who live with children and adolescents with ADHD, and addressed the impacts of social isolation imposed by COVID-19 on family dynamics and well-being, learning, behavioral symptoms, and adaptation to the new school reality of these students. Table 1 below summarizes the selected articles and describes the impact of emergency remote teaching on the learning of children and adolescents with ADHD.

Table 1.

Author/Year	Goal	Method	Results
Cherolt (2020); Brazil.	Analyze the teaching proposals for effective learning for students with ADHD in social isolation due to the pandemic of COVID 19.	Qualitative case study on the teaching and learning process of students with ADHD during the pandemic. Data were collected through an online questionnaire with open-ended questions to three female teachers from public and private schools.	Two private school teachers believe that despite some losses, students are learning through remote learning. The public school teacher does not believe in remote learning, due to the lack of interest and participation of family members in the activities made available and the unequal access to technologies. .
Pereira et al., (2020); Brazil.	To understand the relationship between students with ADHD and	Qualitative case study, carried out through the application of an online	Initially, the difficulties and disadvantages of online classes were very

	the teachers of the AEE during the period of suspension of classroom classes and to identify the educational damage caused by the Covid-19 Pandemic.	questionnaire to three municipal teachers who work in the AEE and monitor students with ADHD in Sobral, Ceará.	significant, both due to the inexperience of the teachers with the method and the family's rejection to accept and contribute to the process. Currently, there has been a daily improvement of this new dynamic, mainly due to the greater family participation.
Amorim et al., (2020); Portugal.	Explore how children with ADHD and their parents experience isolation in their homes during the closure of schools by the COVID-19 pandemic.	Observational, cross-sectional and analytical case-control study, carried out through a questionnaire applied to parents of children and adolescents with and without ADHD. Demographic and clinical characteristics of the children were addressed, as well as the impact of quarantine on different aspects of their and their parents' daily lives.	Most parents of students with ADHD agreed that their children had behavioral changes, especially anxiety and agitation. Most family members, of children with and without ADHD, pointed to the difficulty in keeping up with home schooling as the biggest challenge they face during quarantine.
Becker et al., (2020); USA.	To examine remote learning practices and difficulties during the period of social isolation due to the COVID-19 pandemic in adolescents with and without ADHD.	Study conducted with 238 adolescents (118 with ADHD) and their parents, who completed online questionnaires evaluating their current remote education.	Adolescents with ADHD had significantly greater difficulties with remote learning, mainly due to lack of routine, greater difficulty concentrating, and less family support.
Bobo et al., (2020); France.	To understand the well-being and overall living conditions of children and adolescents with ADHD during the COVID-19 outbreak from their parents' perceptions.	A descriptive, qualitative study done through an online survey with parents of children and adolescents with ADHD, based on questions about the mental health of caregivers and their children and family relationships since the beginning of confinement due to COVID-19.	Some parents judged the reduction in anxiety and improvement in their children's inattention as results of the absence of school constraints, light and flexible schedule, and more study-friendly home and family environment. Therefore, they believe that returning to school may be difficult. On the other hand, there were parents who described increased emotional disturbances and ADHD symptoms during isolation.
Mc Grath (2020); Ireland.	To evaluate, through the view of parents of youngsters with ADHD, the consequences of the interruption of treatment previously carried out by their children and possible alternatives for follow-up and therapeutic monitoring during social isolation resulting from COVID-19.	This article assesses the impact of the Covid-19 pandemic on the provision of mental health services for young people with ADHD and uses as a reference the difficulties experienced at ADMiRE, a specialist ADHD service in Dublin, during this period.	According to family members, youth with ADHD struggled with a lack of structure and routine, which reflected in increased irritability, opposition, and challenging behaviors. However, it was reported that several adolescents with ADHD had improved

			their behaviors and were respecting restrictions; this was attributed to their concern for vulnerable family members.
Shah et al., (2020); India.	Understanding the impact of social isolation on children with ADHD and their families.	Online questionnaire answered by parents registered at the Child and Adolescent Psychiatry Outpatient Clinic (CAP), to assess the behavior of children with ADHD and their families during the pandemic period.	Half of the children had worsening ADHD symptoms, such as anxiety and irritability, as well as increased digital media use, boredom, and distress. An increase in time spent studying was seen in about half of the children. Improved family and social relationships were observed in a quarter to a third of the children.
Zhang et al., (2020); China.	Investigate the mental health-related conditions of children with ADHD during the COVID-19 pandemic.	A cross-sectional study conducted with parents of children with ADHD using an online questionnaire that investigated about ADHD behavioral symptoms, children's responses to the pandemic, timing of children's activities, and mood of children and parents.	Most parents reported worsening in their children's ability to maintain focus and daily routine. On the other hand, more than half of the family members thought that the children's behaviors in other domains improved or stabilized. The results indicated that ADHD symptoms were reduced with increased study time.
Shorey et al., (2021); Singapore.	To identify the challenges faced by parents of children with neurodevelopmental disorders during the COVID-19 pandemic and consolidate interventions and guidelines aimed at family guidance.	Systematic search and analysis of articles published between December 2019 and November 2020 that addressed guidelines for interventions and guidance to families with children with neurodevelopmental disorders during the COVID-19 pandemic.	Certain ADHD behaviors worsened significantly during the pandemic, especially anger management, adherence to routines, and attention to tasks, which resulted in greater difficulty with remote learning. On the other hand, some parents reported improvement in their children's ability to listen to instructions.

Kara et al., (2021); Turkey.	Compare participation, support, and barriers encountered at home for children with ADHD before and during social isolation caused by COVID-19.	Study conducted through an online questionnaire in which parents of children with ADHD rated the barriers encountered at home, school, and community after 2 months of lockdown.	Most mothers reported that teacher attitudes affected their children's participation and learning during the pandemic. These findings show that children with ADHD need access to a face-to-face education system. 94% of the mothers were in favor of reopening the schools.
Melegari et al., (2021); Italy.	To examine the impact of social isolation due to Covid-19 on emotional and behavioral domains of children and adolescents with ADHD.	992 parents of children and adolescents with ADHD completed an online survey that investigated the degree of severity of six emotional and mood states and five behavioral problems, before and during Covid-19 isolation.	People with low-severity ADHD had their behaviors aggravated in almost all dimensions during lockdown, whereas patients with moderate and severe degrees showed major improvement in symptoms. It is suggested that isolation for some children was a protective condition from social stressors. There was a significant relationship between improvements when studying at home via the Internet with longer study time and a decrease in ADHD symptoms.
Shuai et al., (2021); China.	To explore the influences of digital media use on key symptoms, emotional state, life events, learning motivation, executive function, and family environment of children and adolescents diagnosed with ADHD during the Covid-19 pandemic.	A total of 192 children and adolescents participated in this study and were divided into two groups and compared afterwards: ADHD with problematic digital media use (PDMU) and ADHD without PDMU.	The group with PDMU had worsening symptoms of inattention, challenging opposition, behavior and emotional problems, more anxiety and depression, more severe FE deficits, more life event stress, and lower learning motivation.
Tessarollo et al., (2021); Italy.	To explore, through the views of parents, how children with ADHD coped with distance learning during the COVID-19 pandemic and what implications this teaching method had on their emotional and behavioral abilities.	A case-control study conducted by means of a questionnaire applied to mothers of schoolchildren with and without ADHD that compared the remote teaching and learning process and behavioral changes in these two groups of children.	Parents of children with and without ADHD observed attention deficit and hyperactivity during online classes on similar measures. Attention span was more limited in children with ADHD, as was engagement and autonomy in the remote classes. However, a significant percentage of mothers of students with

			ADHD reported that video classes captured their children's attention more than face-to-face school.
Werling et al., (2021); Switzerland.	To investigate the impact of social isolation on electronic media use by children with ADHD and possible associations between digital use and behavioral or emotional problems in these youth.	Online survey via a questionnaire administered to 126 parents of ADHD patients that assessed problematic internet use and related problems in children and adolescents before, during, and 2 months after social isolation.	High social media use was found in patients with high irritability, concentration problems, and worsening ADHD symptoms. However, a large number of parents reported an improvement in ADHD-related problems during lockdown, possibly due to reduced school stress during isolation.
Cardona-Reyes et al., (2021); Mexico.	To collect and evaluate information from children with ADHD regarding their use, satisfaction, and school performance when immersed in a new virtual reality model based on games and playful activities, during the COVID-19 pandemic.	Case study that proposes the development of a new VLE model for elementary school students with ADHD. Questionnaires were applied to the students in order to know their perception of using the application and evaluate their experiences.	The use of VLE was a key component to support learning activities for students with ADHD. The students were attracted to the new playful way of learning.

Source - Various authors.

According to the view of teachers, evaluated in the studies by Cherolt (2020), Pereira et al., (2020) and Cardona-Reyes et al., (2021), the beginning of remote classes was the period of greatest difficulty and damage in teaching. In Cherolt's (2020) publication, a difference in remote education in public and private schools was observed. In the words of private teachers, despite the losses that will occur, in face of the context experienced, they have managed to maintain adequate learning for the students. Public teachers, on the other hand, reported that inequalities in access to technologies and a great lack of interest on the part of some families prevent remote education from being feasible.

Currently, some professionals consider an improvement in the scenario of the quality of education offered, according to Pereira et al., (2020), due mainly to greater family participation and the adaptation of professionals in the development of dynamic and fun teaching techniques. According to Cardona-Reyes et al., (2021), in general, students were attracted to the new playful way of learning. However, this is only possible under the collaboration between different actors, such as technologists, teachers, parents, and students.

Of the 11 studies on parental opinion, in 5 of them the majority of caregivers were against remote teaching. According to Amorim et al., (2020), Becker et al., (2020), McGrath (2020), Shah et al., (2021) and Kara et al., (2021), the new model fails to achieve the expected learning goals for their children with

ADHD. In the survey conducted by Kara et al., (2021), 94% of mothers were in favor of reopening the schools.

However, the studies published by Bobo et al., (2020), Shorey et al., (2021), Tessarollo et al., (2021), Zhang et al., (2020), and Werling et al., (2021), received very different experiences and opinions from parents, in significantly similar proportions, not reaching a well-founded conclusion on the subject. The parents who judged their children's learning to be satisfactory related it to an improvement in the children's inattention symptoms. On the other hand, another large part of the parents considered the DL to be disorganized and unstable.

In the view of the children with ADHD themselves, seen in the publication by Shuai et al., (2021) the period of isolation and remote classes culminated in a worsening of their symptoms, among them severe executive function deficits and lower learning motivation.

Amorim et al., (2020), Becker et al., (2020), McGrath (2020), Shah et al., (2021), Kara et al., (2021) and Zhang et al., (2020) questioned parents about the influence that the new model had on the behavior and learning of their children with ADHD. According to them, a large proportion of the children and adolescents showed behavioral changes, anxiety and agitation, with negative impacts on learning. For McGrath et al., (2020), youngsters with ADHD were reported to struggle with a lack of structure and routine, and this was reflected in an increase in irritability, opposition, and challenging behaviors.

According to Melegari et al., (2021), parents of students with ADHD perceived fluctuations in their children's behaviors, and assumed they were the result of the sudden interruption of social relationships and leisure activities, with consequent adjustment problems. However, it is suggested that isolation might have represented, for some children, a protective condition from common social stressors such as bullying, victimization, and school time constraints, which could account for the significant improvement when studying at home, with longer study time and a decrease in ADHD symptoms.

For Bobo et al., (2020), Werling et al., (2021), and Shorey et al., (2021), improvement in children's inattention is also a result of a family and home environment that is more conducive to study (calmer and quieter environment, no distractions, adaptable schedules, family help). Some parents think that going back to school may be difficult, because they believe that the school environment and pace are the cause of learning difficulties. According to McGrath (2020), the behavioral improvement of children and adolescents has been attributed to their concern for vulnerable family members.

According to Tessarollo et al., (2021), a significantly higher percentage of mothers of students with ADHD reported that video lessons captured their children's attention more than face-to-face school.

Shuai et al., (2021), in comparing children with ADHD with and without problematic digital media use (PDMU), found that the group with PDMU had significantly worse symptoms of inattention,

challenging opposition, behavior and emotional problems, more anxiety and depression, more severe executive function deficits, more life event stress, and lower learning motivation.

According to Cherolt (2020), and in the view of teachers, it is not only access to electronic resources that enables distance learning, but the ability of teachers and students to adapt to new situations (quiet spaces, change of curriculum, flexibility in performing and presenting tasks, adequacy of activity time). However, the main difficulty faced by the professionals in this period was the low family collaboration and participation in the teaching-learning process of the children, either because of lack of time, physical and/or financial resources, or because they did not feel prepared to teach adequately.

In Becker et al.'s publication, (2020), lack of routine and impairment in concentration were also associated with greater educational difficulties, being significantly greater in students with ADHD. Adolescents from low-income families were more likely to not engage in remote/online learning, a situation that is likely to exacerbate existing inequalities in education. Added to this, according to Amorim et al., (2020), parents pointed to the difficulty in keeping up with home schooling as the biggest challenge they face during quarantine.

For Tessarollo et al., (2021), dispensatory and compensatory measures (fewer assignments, exemption from classes) were most often guaranteed to students with ADHD. Few and inadequate ADHD-specific strategies were used. Teachers were not considered reachable for 31.3% of the general population. Attention span was more limited (almost 20 minutes) in children with ADHD, as was engagement and autonomy in remote classes.

Pedagogical alternatives that enable students with ADHD to effectively develop learning was described by Cardona-Reyes et al., (2021), in a case study that proposed the development of a new Virtual Learning Environment model, with the goal of attracting attention and increasing the study concentration required for these students. According to the researcher, a new virtual environment can support learning activities and gameplay.

For Shorey et al., (2021), the use of telehealth may be a useful alternative to assist parents in managing and monitoring the symptoms of their child with ADHD at home. Healthcare professionals should guide parents in selecting appropriate activities that can be included in their child's daily schedule, such as assessment and psychiatric interventions, including pharmacotherapy, behavioral therapy, and psychotherapy. According to McGrath (2020), it will be important for future research to determine the effectiveness of telepsychiatry compared to face-to-face assessment and intervention for ADHD in specialized child mental health services.

4 DISCUSSION

According to the studies evaluated, the little time to do individualized didactic planning for each student, the lack of support from some families, the inattention/irritability of students, and the absence of specific professional training on the management of remote learning are real difficulties in the lives of teachers facing the current scenario. The great demand for the use of equipment and technological resources, necessary in this new educational model, is not the reality of all families. Educators believe that losses and difficulties will be inevitable during and after the pandemic we are going through, and that the absence of the school in the children's development may bring impacts that will worsen their lifestyles, especially in ADHD carriers. However, they believe that the formal system of classroom education, coupled with effective family monitoring, can offer significant returns on learning for individuals.

Some of the educators studied consider that the activities carried out in certain Virtual Learning Environments can improve students' learning experiences and interpersonal relationships during the period of social isolation. For this, multidisciplinary teams are needed to identify students' needs and adapt the teaching proposals of these platforms to the realities experienced.

Most parents of students with ADHD judge remote teaching insufficient to replace face-to-face teaching and ensure their children's learning. Even among children without specific difficulties, remote teaching has led to a deterioration in school efficiency and behavior, much like children with ADHD, particularly the younger ones. According to the families, the educational disruption caused by school closures, as well as social withdrawal and home confinement also had negative consequences on psychological and emotional well-being in children with ADHD. However, it is uncertain whether the emotional changes observed by parents are actually caused by ADHD and not by other factors such as confinement or the emotional state of the family members themselves.

For parents who are in favor of remote education, most of their children with ADHD did not experience worsening symptoms during confinement. Stability and improved well-being are related to decreased school anxiety, flexible scheduling, and increased parental awareness of the difficulties faced by their children. Therefore, the resumption of schooling should be carefully prepared and monitored. According to family members, the big challenge after the pandemic will be to deal with the after-effects of social isolation, considering also the risk of returning to the previous severe condition in patients who improved during lockdown.

5 FINAL CONSIDERATIONS

We conclude that the impact of remote teaching on the education of children with ADHD during the Covid-19 pandemic, in the views of their parents and teachers, is inconsistent. The divergent results are

due to the methodological differences used in the studies, such as the type and size of the samples, social context involved, different objectives and aspects evaluated.

We believe that it is of paramount importance to continue research in the area to find the real reasons why some studies have found favorable and others unfavorable results for learning during emergency remote tutoring. Further work should also map the harms and benefits caused by long-term remote teaching to children and adolescents with ADHD, examine the associations between environmental characteristics, parental well-being, and symptomatology of these children during isolation, and evaluate the strategies adopted by parents and teachers for appropriately addressing these children after returning to school.

It is important to provide psychoeducation to parents and teachers for the management of the disorder and to overcome the challenges faced in the education of these students. The difficulties of these students could be overcome with Psychopedagogical support, creating strategies to compensate for the difficulties associated with the teaching and learning process, helping them to overcome all the barriers they face.

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Chapter 53

Crisis management and health service co-production in the pandemic scenario: articulation between society, university and municipalities

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ABSTRACT
The COVID-19 pandemic and the magnitude of its health, social and economic consequences highlighted and projected the importance of public health, highlighting the need for intersectoral services to guarantee the desired integrality. In this way, the present research aims to report the articulation between municipal managers, civil society and the Federal University of Santa Maria (UFSM) in the organizational arrangement of the UFSM-DETECTA Project during the year 2020 in the North Region of the State of Rio de Janeiro. The project is part of the contribution to the management of the crisis in the face of the pandemic caused by the coronavirus. The structuring dimensions are based on the description of the actions taken, and the report was obtained from a dialogue with the reference and the theoretical bases of support of crisis management in health and co-production of public services. The research involved the technical procedures of bibliographic and documental research in the public domain used as sources of knowledge. This is a qualitative study of a descriptive nature. It was evident that the coordinated and articulated actions enabled quick and effective responses to contain the spread of the virus in the municipalities that are part of the project. The participation of civil society was crucial for the effective acquisition of equipment. It is verified in the present research that the co-production is representative and sustainable, which means that it is the one that is closest to the type of participation carried out.

Keywords: Crisis management; Public health; Co-production; Coordination

1 INTRODUCTION

Following the discovery of the disease COVID-19, caused by the coronavirus, in Wuhan, a city in China's Hubei province, the World Health Organization (WHO) declared the COVID-19 outbreak a public health emergency of international concern on January 30, 2020. This disease quickly spread worldwide, with an exponential increase in the number of cases and deaths. The first case in the Region of the Americas was confirmed in the United States on January 20, 2020, and Brazil notified the first case in Latin America and the Caribbean on February 26, 2020 (PAHO, 2020).

The pandemic presented itself as a multidimensional, simultaneous, biological, environmental and social phenomenon, with strong economic and political implications. Both the accelerated spread of the disease around the world and its side effects as well as the response strategies to the health and humanitarian crises indicated an overlapping of times and places in the human experience of facing powerful shocks (LIMA; BUSS; SOUZA, 2020).

Faced with the imminent risk of loss of life and the incalculable social and economic impacts resulting from the complex health crisis, strategic co-production actions were articulated so that, in a coordinated manner, it was possible to diagnose people to find out if they were carriers of the new coronavirus, thus detecting the largest number of cases. This action enabled effective decisions to be taken to combat the advance of the disease in the northern municipalities of the state of Rio Grande do Sul.

Salm, Menegasso, and Ribeiro (2007) define the coproduction of the public good as a strategy capable of providing goods and services under a new perspective of government and society. This strategy presupposes the direct involvement of citizens in the design and delivery of public services, together with professional civil servants. The State must be the protagonist of the appropriate management of the crisis, fulfilling its role as coordinator and articulator of actions, since, "[...] in most government systems, both specialization and coordination are necessary" (CHRISTENSEN *et al*., 2016, p. 2).

Moretto Neto, Salm and Souza (2014) point out that the phenomenon of co-production is identifiable in reality, since it is possible to verify, even empirically, the presence of third sector organizations, companies through social responsibility, communities and even citizens who, together with the bureaucratic apparatus of the State, produce public services. From the point of view of health crisis management and the co-production of public services, we sought to analyze the actions and results of the effort employed by several instances of public governance in the territory under study, with the effective participation of civil society and the voluntary work of professors from the UFSM - Palmeira das Missões Campus.

The main purpose of this study is to report the articulation between municipal managers, civil society and the Federal University of Santa Maria (UFSM) in the organizational arrangement of the UFSM-DETECTA Project during the year 2020 in the Northern Region of the State of Rio Grande do Sul as part of the contribution to crisis management in the face of the pandemic caused by the coronavirus, from a partnership between the Association of Municipalities of the Production Zone (AMZOP), SICREDI Alto Uruguai RS/SC/MG and SICREDI Região da Produção RS/SC/MG with the Federal University of Santa Maria (UFSM), Palmeira das Missões Campus, the Intermunicipal Health Consortium (CONSIM) and the Palmeira das Missões Trade School.

In an objective way, the manuscript reports how the health crisis management took place in order to control the dissemination through the timely identification of positive cases of coronavirus. Such initiative promoted the possibility of a fast and efficient decision making by the health teams of the municipalities, thus reinforcing the isolation and monitoring actions of the cases, which avoided the worsening of the disease and the accelerated contamination.

In this sense, this work is justified insofar as it dialogued with the theoretical framework of the coproduction of public services in line with the crisis management in the actions to face the pandemic of

the coronavirus, in the context of the *"locus" of* the research. In this logic, it is emphasized that the UFSM-DETECTA Project is an extension project of the Federal University of Santa Maria, Palmeira das Missões Campus, and has been an important ally for the prevention and confrontation of COVID-19 in more than 50 municipalities in the North of the State of Rio Grande do Sul. The institution has carried out, since April 2020, tests to detect the new coronavirus in patients with the symptoms of the disease, applying the RT-PCR exam.

Other reflexes of the diagnosis project are related to the positive impacts of the concentrated effort of prevention and control of the spread with the intention of mitigating the economic damages, reorganizing the offer of services, mainly in the hospital units, and, also, regulating the social coexistence to avoid contagions. In addition, the results of the tests performed in the project were faster compared to the tests performed in the Central Laboratory of the State of Rio Grande do Sul (LACEN).

2 METHODOLOGICAL PROCEDURES

As already mentioned, this research proposes to report the articulation between municipal managers, civil society and the Federal University of Santa Maria (UFSM) in the organizational arrangement of the UFSM-DETECTA Project during the year 2020 in the Northern Region of the State of Rio Grande do Sul as part of the contribution in the management of the crisis in facing the pandemic caused by the coronavirus, combined with the co-production of public goods and services. As for the nature, this research is characterized as descriptive, since it intends to portray the characteristics of events, phenomena and situations related to the co-production of public service (BIROCHI, 2015). The descriptive research has as main objective to accurately portray the characteristics of individuals, events, phenomena or situations, being used in both qualitative and quantitative approaches (BIROCHI, 2015).

In terms of technical procedures, the study was composed of a bibliographical survey and document analysis. For the purposes of this research, a qualitative approach was adopted. In this sense, this type of research values the detailed description of the phenomena and the elements that involve them (VIEIRA; ZOUAIN, 2005). The research strategy used was the case study, in which, after data collection, an analysis of the relationships between variables is performed for a subsequent determination of the resulting effects on a company, a production system or a product (PEROVANO, 2016).

The organization chosen for the development of the research was the UFSM-DETECTA Project, since this project includes among its participants representatives of the public sphere, the community, and local companies. The analysis of secondary data on the study occurred from data available on official institutional *sites*. From the data collected, it was verified, in the light of the referenced literature, the characteristics of co-production of public goods and services that are present in the case under study.

3 **UFSM-DETECTA PROJECT**

Considering these aspects, from a theoretical and practical approach to the study region, it was possible to observe that, after the confirmation of cases of COVID-19, the municipalities began to legislate on the definitions of actions that provided for regulation on economic activities and social life. Social isolation was adopted with the intention of controlling the circulation of the virus and mitigate the rate of contamination, while a better hospital structure for health care could be expanded and prepared (FAMURS, 2020).

In a regional articulation with the participation of several agencies concerned about the dissemination and the speed of transmission of the virus, a project entitled UFSM-DETECTA was created with the objective of having the results of the tests performed as soon as possible, so that the sanitary measures could be implemented in less time, avoiding uncontrolled contamination. UFSM-DETECTA is the project of early diagnosis of coronavirus by RT-PCR laboratory tests, articulated among several agents, The project's co-production network was formed by the Federal University of Santa Maria (UFSM), Palmeira das Missões Campus, the Association of Municipalities of the Production Zone (AMZOP), the Intermunicipal Health Consortium (CONSIM), the Cooperative Financial Institution (SICREDI), and the Escolinha do Comércio, formed by a group of people from Palmeira das Missões who provide social services. where more than 50 municipalities of the northern region of the state of Rio Grande do Sul, more than 358,000 inhabitants, were benefited.

The project conducted a process of strategic and operational alignment between public and private institutions in the fight against the pandemic, consolidating the teaching and research interlocution, innovating in the co-production of health services, and subsidizing the agents in the administrative decision making. More than 30 thousand RT-PCR tests were carried out, with a negligible financial cost for the municipalities, considering that the consortium procurement method enabled the rational use of public resources.

The project's articulation strategy was initially to expand testing in the population in order to reduce the speed of virus transmission; to identify infected people early; to apply home isolation protocols; to receive test results in a timely manner; to identify the incidence of COVID-19 in the region; to know the profile of cases and adopt specific strategies; to avoid the collapse of the health system in the hospital network; and to ensure the capacity of primary health care.

Thus, on April 22, 2020, tests for COVID-19 (coronavirus) were started. This work was performed by students and employees of the institution, members of the Laboratories of Evolutionary Genetics and Microbiology. The team performed in the laboratories the necessary procedures to verify the existence or absence of viral material in the patient's sample.

Moreover, Lima, Buss, and Souza (2020) reinforce that the quick, consistent, and sustainable response of political leaders was also fundamental in the countries that presented the best results in the fight against COVID-19. In this sense, it is identified that the model of representative coproduction with sustainability aligns with the new public service model of public administration.

> The characteristics of this model, according to the analysis categories, are: the bases of the model are democracy and public interest; dominant interest is the public interest and serving the citizen; objective of the organization is to produce public services for the community and the citizen; rationality is functional and substantive; ethics is that of responsibility and conviction; protagonism is that of the state and the community; freedom to act is broad, focused on the public interest; participation is necessary and broad; involvement is calculative / moral; power is remunerative / normative; transparency is given according to the law and the right of the community; accountability is to the legislative and accounting bodies and the community; responsiveness is to the community and the citizen; external involvement is continuous and permanent. (MORETTO NETO; SALM; SOUZA, 2014, p. 171)

The team was composed of teachers and administrative staff, undergraduate and graduate students who already worked in the laboratories, and graduates with experience in molecular biology and microbiology. The UFSM in Palmeira das Missões provided the laboratories, the physical space, the equipment, and its technical-scientific team.

According to information available on the institution's *website*, the UFSM-DETECTA Project is the largest extension project of UFSM-PM and has already involved more than 30 people, among students, technicians, and professors. "UFSM directly invested about R$700,000.00 in equipment, and the municipalities about R$1,500,000.00 in reagents for the tests, besides, about R$250,000.00 in equipment via Escola do Comércio/PM and Amzop/Sicredi," said Ângela Batista (UFSM, 2021). In order to carry out the activities, the laboratories were reorganized and readjusted, and the team was formed and trained, observing the biosafety standards recommended by the World Health Organization, and technical training.

The initial capacity of the project was to perform around 60 tests per day, however, with the articulation of the municipalities led by the president of the Association of Municipalities of the Production Zone (AMZOP), in the search for financial incentives, it was possible to acquire more equipment with resources offered by SICREDI and, thus, the testing capacity was expanded to 120 tests/day. The pandemic scenario has unveiled the deficiencies in the response of the public administration regarding the unified coordination in the country, amplified the traditional problems, and brought new challenges for society in general.

Regarding the challenges of the UFSM-DETECTA project, we mention the need for a quick adaptation to the work process when diagnosing a significant number of people. The information in the detection of SARS-CoV-2 (coronavirus) that is reliable and timely allows the positive outcome of the

infected people, preserving the medical conduct, ensuring the safety of professionals and avoiding the collapse of the health system; besides, the whole economic chain depended on assertive answers.

The work process required the qualification of the professionals involved, a short-term, low-scale routine of procedures, which was replaced by extensive, exhausting routines, handling of new equipment and new support proportions, technical training of the team, structuring of the laboratories, organization of workflows, in addition to the daily bureaucratic, political, and social involvement with the region.

Although there have been challenges, the UFSM-DETECTA Project did not suffer interruptions in the performance of diagnostic tests by RT-PCR, and the deadline for release of the reports observed the initial proposal, remaining within the planned schedule, i.e., 95% of the tests were released within a maximum of 24 hours.

3.1 HEALTHCARE CRISIS MANAGEMENT

Crises can be political, military or humanitarian in nature. The causes may be armed or political conflicts, technological incidents or natural disasters, and may be national or international in scope. The way to overcome a crisis depends on an analysis of the nature, size and severity of the crisis. It is important to note that these factors have influenced the decision making regarding the operations adopted in the crisis management. One must also consider the action in the various stages, before, during, and after, as well as its effects and impacts.

In McConnell and Drennan's (2006) definition, crises and disasters are low probability events, but allocate large demands on resources and have to compete with the frontline service, contingency planning requires ordering and coherence of possible threats, however, the crisis does not happen in such a predictable way. In addition, crisis planning requires integration and synergy between institutional networks, overcoming fragmentation between the public, private, and voluntary sectors. Robust planning requires active preparation through training and exercises, however, the level of readiness is symbolic and does not reflect operational realities.

The COVID-19 health crisis laid bare the pressing need for efficient crisis management, both in the strategic and operational fields. For Saraiva (2011), crisis management is a practice of managing non-routine phenomena and developments with disruptive effects and is characterized by threat, uncertainty, and urgency, making it necessary to elaborate a more specific and operational definition of crisis situations. Thus, crisis management refers to an activity of controlling the evolution of the political situation by the political authorities of a country.

Although it has not been an international consensus, the literature points out some characteristics that present themselves in crisis scenarios thus described: 1. There is a perception of threat, when the conflictual drives are higher than the willingness to cooperate; 2. Greater anxiety on the part of policy

makers; 3. Expectation of violent episodes occurring; 4. Important decisions that have to be taken in an environment of uncertainty and stress (SARAIVA, 2011).

> International crisis is a disruptive moment that translates into a tension above normal, a peak of turbulence in relations between states. International crisis management does not seek to eradicate conflict or prevent crises, because the notion of conflict is a conceptually very broad notion, reporting to a normal social condition not necessarily negative, crisis management seems to us an aspect or strategic mode and not a substitute for strategy. (SARAIVA, 2011, p. 16)

When crisis events happen, various arrangements are established to respond to them, especially when they are related to certain types of expertise, training, and knowledge. Cross-cutting network arrangements are often introduced to solve nationwide problems. However, crises also trigger a demand for transparent leadership and central direction, objective responsibilities, and chains of command through hierarchical structures (CHRISTENSEN *et al.* , 2016).

Considering that there are no universal rules, some variables can be observed in crisis planning and they can harmonize competing interests, which, according to McConnell and Drennan (2006), are: 1. focus on accurate knowledge of threats and likely human responses; 2. encourage appropriate action by crisis managers; 3. encourage flexibility in responses; 4. promote inter-organizational coordination; 5. integrate plans for each hazard into a risk approach; 6. involve training of personnel; 7. provide testing through exercises and simulations; 8. be adaptable as part of an ongoing process of adapting to new circumstances; 9. be adaptive as part of an ongoing process of adapting to new circumstances; 10. provide training of personnel Integrate plans for each hazard into a risk approach; 6. Involve staff training; 7. Provide testing through exercises and simulations; 8. Be adaptable as part of a continuous process adapting to new circumstances; 9. Be a strong advocate in the face of inevitable resistance to resource commitments for low probability events; and 10. Recognize the differences between crisis planning (preparation) and crisis management (implementation and performance).

The pandemic magnified the tearing tensions of the social organization of our time: globalized in economic exchanges but weakened as a global political project, digitally interconnected but steeped in misinformation, on the verge of environmental collapse but dominantly unsustainable, lacking political ideals but so averse to politics and common projects. The pandemic has put us in front of the mirror, revealing a world crossed by many crises and in need of change, it has evidenced a world vulnerable to the occurrence and global dissemination of both known and new diseases. The integration of globalized economies allowed a large increase in the movement of people and goods, promoted the intensive and unsustainable use of natural resources and accentuated social changes favorable to the contagion of infectious diseases (LIMA; BUSS; SOUZA, 2020).

The impacts of the pandemic crisis on the population are uneven, the virus may infect everyone, but it does not affect everyone in the same way. The pandemic is certainly "democratic" in that it reaches all states and elements of society. However, it differs its effects especially when it comes to the most vulnerable groups in societies, such as the poorest, refugees and migrants, or victims of armed conflicts (RODRIGUES, C. 2020; TELES, 2020). Nicknamed one of the most dangerous threats to humanity since World War II, COVID-19 has attacked, and continues to attack, mainly, the most susceptible. The coronavirus respected no borders, but it did respect international classes and hierarchies. This was a reality hidden in plain sight, and COVID-19 revealed it in apocalyptic fashion (CRAVO, 2020).

National strategies need to be inclusive, which requires the understanding and involvement of civil society. In this context, the challenge was to define policies and strategies to respond to the pandemic that do not (re)produce dynamics of exclusion and vulnerability of particular groups, the responses and actions must respect humanistic principles, requiring a greater responsive capacity to the causes and origins of the crises, aggravated by a global threat that, not choosing victims, inevitably affects much more those who are already more vulnerable and dependent on help and protection (NASCIMENTO, 2020; RODRIGUES, F. 2020).

The international centrality of states has been strengthened. The globalized markets, so praised, have been weakened: not only have they been shaken by the decisions of states, but they have demonstrated, once again, that they are not adequate to manage or respond to humanitarian emergencies or social problems in an effectively dignified and sustainable manner (LOPES, 2020).

COVID-19 was a disease with a transforming factor of movements and trends. Some were already perceptible, and the pandemic worked as a huge particle accelerator, whose effects could not yet be fully anticipated. The virus came to reinforce the role of the state as regulator and protector (GOMES, 2020). It became evident that the bureaucratic state, acting alone, could not meet the demands of societies. Therefore, it was necessary to establish connections with the living forces of society through possibilities, and, in this context, co-production was the alternative.

3.2 TERRITORIAL ORGANIZATION OF RIO GRANDE DO SUL AND CRISIS MANAGEMENT STRATEGIES

The concept of health region refers to the continuous geographic space constituted by groups of bordering municipalities, delimited based on cultural, economic, and social identities and shared communication networks and transportation infrastructure, with the purpose of integrating the organization, planning, and execution of health actions and services (SES, 2019).

Understanding this perspective is of great relevance, since there is the process of regionalization of services, which is the attempt to organize them as a way to make them more efficient and effective, or in

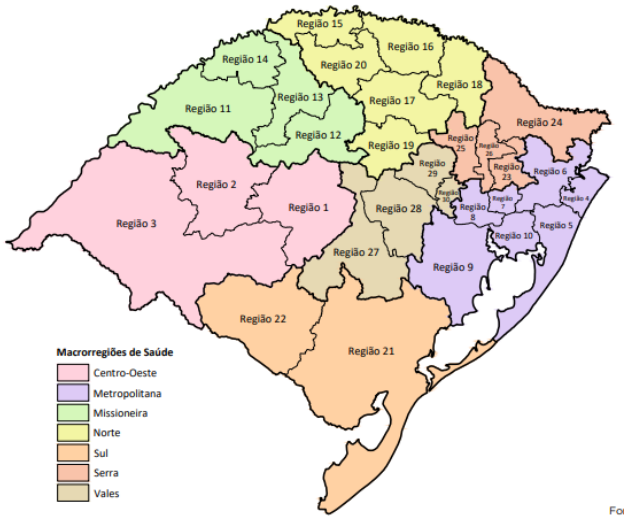
other terms, it means achieving the goals of the SUS of universalization, integrality and equity with higher quality and lower financial cost. And there is, yet, another implicit process of regionalization, which is delimited from the creation of health regions, observing a look that contemplates the epidemiological characteristics of a population living in certain spaces and time (DUARTE *et al*., 2015).

Although there are legal determinations that guide the assumptions for the organization of the SUS in its regional sphere, this process does not occur in a peaceful or neutral way. It is necessary to consider the regional inequalities that have marked the legacy of use, occupation, political and economic conformation of Brazil (ALBUQUERQUE *et al.*, 2017; ALLEBRANDT *et al.* , 2020).

It is important to highlight the factual situation that each territory is composed of disputes, social relations, power spaces, hegemonic actors, and specific characteristics that can differentiate it from the neighboring territory. Thus, its analysis should not ignore the political and economic relations that are established in the model, in the gaucho territory the regionalization of health, whether in terms of its division of macro-regions or regions, does not coincide with the regionalization of the Associations of Municipalities and the Regional Development Councils, which implies huge challenges for regional planning and the organization of production actions (ALLEBRANDT *et al*., 2020).

Rio Grande do Sul has 30 health regions and they are the basis for health planning. In the political-administrative sphere, the state is divided into 18 Regional Health Coordinators (CRS), which are responsible for planning, monitoring, and managing health actions and services in a given territory. These coordinators, when grouped together, form seven health macro-regions, which aim to ensure an organization for protection actions, diagnostic support, outpatient and hospital care (RIO GRANDE DO SUL, 2016).

Figure 1 - Map of Health Regions and Macro-regions, RS.



Source: SES (2019)

In the sphere of public health policy, the existing inequalities between municipalities due to geographical, demographic, political, technical-administrative, socioeconomic, financial conditions and the structure of the care network present challenges that go beyond the municipal territory, since the integrality of care depends on the articulation of municipal care systems organized into regional networks. It is imperative that a new governance model capable of combining decentralization with the need for solidary integration be thought of (SANTOS; GIOVANELLA, 2014; ALLEBRANDT *et al*. , 2020).

3.3 CO-PRODUCTION OF THE SERVICE IN PUBLIC HEALTH

The model of public administration defined as new public service, according to Moretto Neto, Salm, and Souza (2014), is an emerging model and has a normative character, besides being configured as an ideal model, considering that it emerges by the network that co-produces public services, following the principles that constitute it. Among these premises, it is worth mentioning: serve the citizen, not consumers or customers; excel in the public interest; always value citizenship over entrepreneurship; think strategically and act democratically; serve, rather than direct society, and value people, not just productivity.

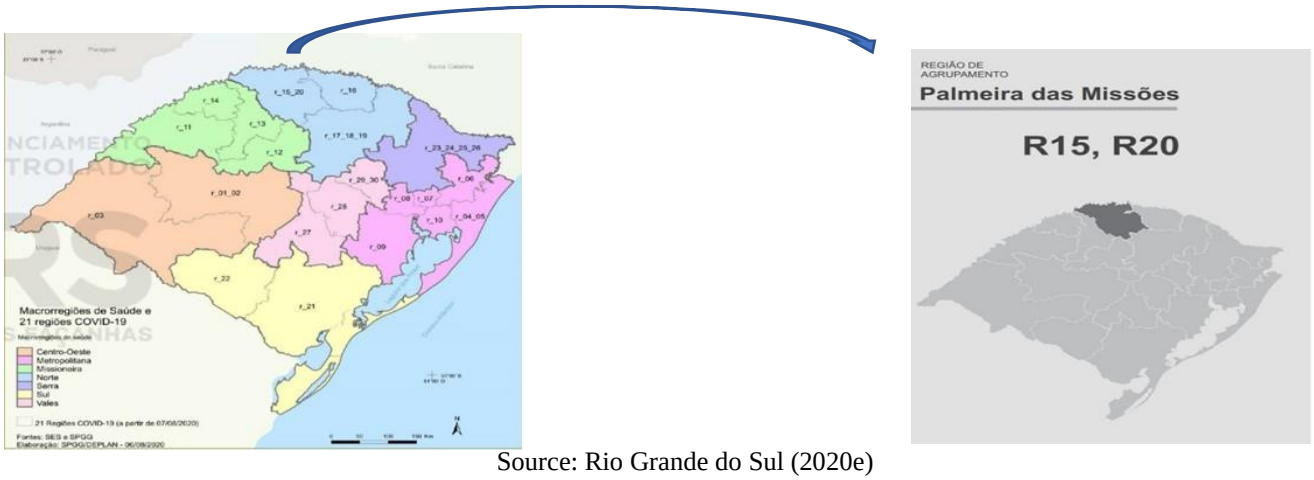
Without the active participation of society, the performance of the Public Entity in the production and execution of the public good is compromised. Co-production can bring a number of benefits, especially in the construction and strengthening of democracy. Policies and programs that meet public needs can be effectively and responsively achieved through collective efforts and collaborative processes (SALM; MENEGASSO; RIBEIRO, 2007).

According to Cheng (2020), information from the China Watch Institute's report on China's Fight against COVID-19 highlighted the relevance of social participation to the government's call to action, self-discipline, and community-based management. According to the experts, participation with social harmony was considered one of the four tools China used in tackling the coronavirus.

As a response to the pandemic in the gaucho territory, the municipalities started to adopt preventive and restrictive measures, through calamity decrees, the creation of municipal COEs and crisis committees composed of several social actors. In addition, the inspection and monitoring actions were expanded, including in some cases with the support of the security forces to ensure that the protocols were followed.

In early April 2020, the RS State Government established new rules for the operation of commerce and services not considered essential and, throughout the same month, presented its controlled distancing plan to be implemented as of May 2020. This controlled distancing model of Rio Grande do Sul was built based on health and economic activity criteria. A flag system was created, with mandatory protocols and specific criteria to be followed by the different economic sectors. Figure 3 illustrates the geographical division of the regions according to the RS organization model.

Figure 3 - Division of health regions in the Controlled Distance Model



Source: Rio Grande do Sul (2020e)

The characterization of the region is relevant in terms of the different scenarios and the impacts caused by the pandemic, considering the characteristics of the municipalities, it was realized that the public service, especially in the area of health, needed quick and effective responses under penalty of generating catastrophic results for the population. Figure 4 lists the municipalities that make up the region that is the object of this study.

The data presented in the Rio Grande do Sul State Health Plan 2016-2019 show that the two regions unified by the Controlled Distancing Model have high rates of social vulnerability, low population density, high illiteracy rate, expressive presence of rural and indigenous population, in addition to the characteristic of small-sized municipalities and hospitals (RIO GRANDE DO SUL, 2016).

In the pandemic context, the organization of health regions was used, with adjustments, as a parameter for the construction of the Controlled Distancing Model in Rio Grande do Sul. The need to reorganize and unite some territories in a crisis context revealed structural problems from the point of view of regional inequities in the health care network, such as the number of ICU beds, low hospital capacity and the lack of professionals.

It is in this scenario that the project of early diagnosis of coronavirus by RT-PCR entitled UFSM-DETECTA, articulated between UFSM, Palmeira das Missões Campus, CONSIM, AMZOP, Escola do Comércio, and SICREDI, which served more than 50 municipalities in the Northern Region of the State of RS, around 358,000 inhabitants, brought the perspective of coordination and articulation in a systemic way, since it created a conjunction of several actors and agents and several actions that complemented each other during the process.

All involved worked cooperatively, highlighting the complexity of the situation and the quick response. Thus, it is highlighted that cooperation is born from the existence of common problems, which, in the perception of the network participants, can be better solved jointly (MALMEGRIN, 2014, p. 37). Health networks are important tools and are used to achieve integrated actions, they seek to account for this

coproduction between the care network and the territory. However, the territory is not only a space of demand or depository of needs and resources for the care network, it is also produced to the extent that the location of points of the care network changes the lived space (RIGHI, 2010; ALLEBRANDT *et al.* , 2020).

Thus, the co-production of public services, when performed through a network, brings together public, private, non-governmental organizations, community arrangements and citizens who interact for the production of services. In these cases, the absolute protagonism of the State does not happen, but a sharing of responsibilities and power among the network participants (MORETTO NETO; SALM; SOUZA, 2014). Through networks and collaborative partnerships between public and private entities, as an important arrangement to deal with the effects of the crisis that transcend traditional sectors of public administration, and thus increase autonomy contingent coordination, collaborative governance and network approaches, as was the case of the UFSM-DETECTA project.

4 CONCLUDING REMARKS

The pandemic crisis revealed an antagonistic context: on the one hand, denial of the seriousness of the picture, unrealizable technological promises, culture of fear, mysticism of immunity and cure, commodification of care, exhortation for an avoidable sacrifice of others, ineptitude in the management of the available means of combat; on the other hand, organized social responses with cumulative aspects of learning to face diseases, use of technologies developed throughout history, quarantine measures, modern hospitals, and antiviral drugs added to technologies such as Reverse Transcription Polymerase Chain Reaction (RT-PCR), *smartphones*, genomic biotechnology, *big data*, artificial intelligence, monitoring cameras, geolocation, drones, and telemedicine.

The intention of this study was to report the articulation between municipal managers, civil society and the Federal University of Santa Maria (UFSM) in the organizational arrangement of the UFSM-DETECTA Project during the year 2020 in the Northern Region of the State of Rio Grande do Sul as part of the contribution to the crisis management in facing the pandemic caused by the coronavirus, combined with the coproduction of public goods and services. To this end, the theoretical elements of crisis and crisis management and the coproduction of public services, applied to the object of investigation, were discussed. To this end, the theoretical basis that supported the arguments developed throughout this work was identified.

The report showed the importance of the project in the co-production of public services, as well as demonstrating that the pandemic affected the way to manage the crisis in the territory under study. It is noteworthy that the coping actions carried out showed the occurrence of articulated work between UFSM, AMZOP, CONSIM, SICREDI and the School of Commerce in the occurrence of co-production of public services.

Therefore, the crisis caused by the coronavirus demanded innovative arrangements. Considering the dimension of its impacts, the fragmented actions or those offered exclusively by the public administration would not reach the satisfactory results that the moment demanded. Thus, it became imperative that articulated and coordinated actions, integrating the living forces of society, were adopted as an alternative to efficiently coproduce the care for the population.

We do not know for sure what the post-COVID-19 world will be like, but what we can say is that it will be different. The crisis caused by the pandemic, far beyond the economic and health sphere, has also become a behavioral crisis, significantly influencing the trajectory of humanity. A more sustainable future will have to be based on priorities in the international system, supported by existing regional, national, and international organizations, promoting a participatory, responsive, and accountable governance model, with a productive, innovative, and environmentally and socially sustainable economy, and a more inclusive, humanitarian, just, and resilient society.

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Chapter 54

State health plan and the judicialization of public policy

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ABSTRACT
Objective: The present study seeks to analyze the aspects of the massification of judicial claims for health treatments, to present information regarding the phenomenon in the State of Rio Grande do Sul and its development, to discuss how this phenomenon is used as a basis for the formulation of public policies by the state entity in the State Health Plans. Methodologically, this is a qualitative study and initially carried out based on bibliographic research on the subject and data collection, with the aim of contextualizing judicialization, its relevance in the state scenario and aspects related to public health management. Conclusion: it was found that the relationship between the judicialization of public health and the guiding document of state public management in this policy has been a constant since 2009, undergoing improvement and being a reflection of the reality that is experienced.

Keywords: Health's Judicialization ; Health Planning; Health Policy

1 INTRODUCTION

The right to health is encompassed by the Universal Declaration of Human Rights (1948) as a condition for a dignified life, thus surpassing the biomedical model of health-disease. In Brazil, the Unified Health System, organized by Law 8080/1990 and provided for in the Federal Constitution of 1988, assumes importance as a model for implementing public policies aimed at meeting social needs for universal and equal access to public health services.

In this aspect, the purpose established by the constitutional text faces obstacles in its administrative implementation due to several factors. This impossibility, stimulated by the popular interpretation, and not infrequently by the Judiciary, of unrestricted access to any and all means capable of implementing the rights outlined in the Federal Constitution has the power to generate an increase in the numbers of lawsuits dealing with the provision of treatments against the government.

The incapacity of the State to fully realize the right to health has been the motto of social dissatisfaction and in the Brazilian territory diverse realities present themselves. While technologies are

implemented for outstanding treatments in certain areas, such as the one achieved for HIV carriers, on the other hand there is the insufficiency of the system to reach basic care to a large part of the population (SHULZE; GEBRAN NETO, 2019).

Under the justification of filling gaps in administrative management, judicial decisions in health matters have been approached from a variety of approaches.

It is clear that, not infrequently, the judgments of various Brazilian courts elevate the recognized fundamental rights, especially health, as an absolute right and to which no restriction is applicable (LEITE, 2014).

The concern with the application of constitutional and legal dictates, interpretations, and the absence of established limits when it comes to the judiciary's enforcement of public health policies has been the object of confrontation.

In this sense, the need for balance between judicial activity and administrative management is considered a prerequisite for a better realization of this right. Thus, the institutions that act in court cases, notably regarding the right that underlies the study, can be field for the development of dialogue by enabling communication between those who make up the formulation, management and supervision of public health policies (MARQUES; ROCHA ASENSI; MONNERAT, 2019).

Thirty years after the regulation of the Unified Health System by Law 8.080/90, the global pandemic has revealed the relevance of public health and the need to implement mechanisms that reflect on the best use of budgetary and human resources.

In this context, intrinsically linked to health management, judicialization and its unfoldings have been the object of debate and monitoring by the legal and political system considering the reflexes of judicial decisions on the organization of the Unified Health System.

Tangentiating the two vertices cited, judicialization and management, the objective is to analyze the aspects of the massification of judicial postulations for health treatments in the State of Rio Grande do Sul and the occurrence of the use of this phenomenon as a basis for the formulation of public policies by the state entity, either for the qualification or aiming at the reduction of discussions that are submitted to the scrutiny of the Judiciary. To this end, the study starts with the following question: how is the judicialization of public health policy dealt with by the State Health Plans in Rio Grande do Sul?

As for the scope of analysis of the State Health Plans, as management instruments for the Unified Health System, we chose the period ranging from 2009 to 2023, given the public access granted by the State Health Secretariat through its official website.

It is important to mention that the work is organized in two parts, in addition to the introduction and conclusion. At first, it discusses aspects related to the judicialization of public health and presents public data that provides an overview of its impact in the State of Rio Grande do Sul. After that, it is directed to

the observation of the State Health Plans from 2009 to 2023, in their respective periods of competence, establishing then a progressive line and its relation with the subject initially discussed.

2 METHODOLOGY

Methodologically, this is a qualitative, descriptive, and comparative study of the State Health Plans, as public management instruments, in effect in the respective periods between the years 2009 and 2023.

It began based on bibliographic research, in order to contextualize judicialization, the relevance in the state scenario, and aspects related to public health management. Furthermore, public data was used to obtain information regarding the expenses incurred with judicial sentences to illustrate the impact and presence of the subject in the collective environment.

In the sequence, the aspects related to the State Health Plans for the years 2009-2011, 2012-2015, 2016-2019, and 2020-2023 were analyzed, aiming at analyzing the treatment given to the theme by the documents that define the public health policy in the State of Rio Grande do Sul.

3 RESULTS AND DISCUSSION

3.1 JUDICIALIZATION OF HEALTH CARE

The burden assigned to the State for the realization of fundamental rights, specifically with regard to the right to health, is proving to have a great impact on national judicialization. The terms of the affirmative go through aspects linked to the public budget, to the management and organization of the public policies foreseen in the Federal Constitution, to the intervention of the Judiciary in the choices made by the State and the need to choose alternatives so that the effectiveness of public health as a human right can be achieved.

The diversity of legal relationships that present themselves in the current social context has contributed to the multiplication of lawsuits of the most varied kinds. It is not difficult to admit that the search for the implementation of rights by judicial means is at a higher level than the Judiciary's ability to adequately settle situations (SHULZE; GEBRAN NETO, 2019).

Transporting it to the judicialization of health claims, it can be said that it is undoubtedly a recurring theme that has been in evidence in several areas of study, and, along with the relevance of the substantive law and the significant number of lawsuits that aim to realize the fundamental right, the analysis of the theme under the aspect of public policy management is not found in the same proportion (BARREIRO, FURTADO, 2015).

Over this impasse, the Judiciary adopts a posture focused on the concretization of fundamental rights, aiming to guarantee their effectiveness, intervening directly or indirectly in public policies. It is noteworthy that the Courts have contributed to the formation of a jurisprudence with not only technical

errors, but often overlapping emotion to reason, ignoring the norms related to the Unified Health System and the legitimate meaning of the applicable constitutional and legal norms (FLUMINHAN, 2014).

The debate on the topic was addressed with a focus on effective resolution and specific contours in Public Hearing No. 9 (STF, 2009), held by the Supreme Court and later in the judgment of Suspension of Injunctive Relief 175 (STF, 2010). The moments highlighted represented an important step forward and demonstrated the recognition of the concern with the growing search for judicial implementation of health-related claims.

In the same field, the National Council of Justice has constantly acted in the search for the implementation of parameters and guidelines capable of establishing guidelines for jurisdictional action, recognizing the leading role of that Power and the interference of its action in other areas, especially in areas where this intervention becomes continuous and capable of sensitively influencing public policies in its various aspects (CNJ, 2015). It is extracted from the performance of the CNJ the intention to strengthen the jurisdictional performance with the stimulus to the creation and implementation of state committees of judicialization which are governed by the cooperation of the agencies involved (OLIVEIRA, 2020).

With a direct focus on procedural conduct, the Superior Courts have addressed the issue and established criteria for stabilizing jurisprudence and defining competencies for the purpose of providing treatments that are not part of the public policies in force. RESP 1.657.156/RJ (STJ, 2018) and RE 855178/SE (STF, 2020) stand out on this point as precedents set on the matter.

Once the Judiciary itself recognizes the need to establish boundaries for action in the judicial sphere, under penalty of collapse of the system itself, it is important to analyze the judicial postulation for health care before the state government in Rio Grande do Sul as a mechanism for the elaboration of public policies capable of advocating for the benefit of efficient and effective administrative management and that can promote greater dialogue among the various sectors involved.

Corroborating what has been described, one cannot ignore the fact that judicialization sensitively impacts the administrative organization, and there is an urgent need for effective practices that can lead to the resolution or qualification of these issues without the intervention of the Judiciary:

> [...] the strengthening of the administrative culture, which would allow the realization of the Law without judicial intervention, is also a challenge worthy of being faced. There is, among us, a consolidated understanding that the only way to enforce rights is through the Judiciary. It is necessary to overcome the systematic denial of widely recognized rights, allowing the realization of the Law to take place, if possible, without judicial intervention.(MENDES, 2019).

The need for balance between judicial activity and administrative management is considered a prerequisite for a better realization of this right by different authors. In this sense, the institutions that act in judicial proceedings, notably regarding the right that underlies the study, can be field for the development

of dialogue by enabling communication between those who make up the formulation, management and supervision of public health policies (MARQUES, ROCHA ASENSI and MONNERAT, 2019).

In a research involving five Brazilian states on the impacts of the filing of lawsuits for the provision of health care, it was found that in view of the significant number of expenses, there was a provision in the Annual Budget Law regarding the resources to be used for the payment of expenses resulting from court decisions, during the years that were the object of the study (VASCONCELOS, 2018).

The impact of the implementation of public health policies through the Judiciary can be directly felt through its budgetary impact. For example, according to the Secretary of Health of the State of Rio Grande do Sul, in 2017, due to judicial sentences, an amount of R$ 213,374,556.46 was applied. In the year 2021, the budget was even more compromised for compliance, totaling, according to the Transparency Portal, the amount of R$ 749,547,961.53 (RIO GRANDE DO SUL, 2022).

The expressive number of amounts used to comply with court decisions denotes the massification of judicialization. Still, it is referred that generally the decision-making bodies lack specific training in health law to combine the specificities of concrete cases to the principles and guidelines of the Unified Health System. (NAUNDORF; DE CARLI, 2019). From the procedural practice, one can refer that the assertion is reinforced by the diversity of decision-making acts involving very similar situations, leading not infrequently to an offense to the equity that should permeate the realization of this fundamental right, whether in the administrative or judicial sphere. Still, the highlight emerges from the decisions of the Superior Courts cited throughout the content, and several others handed down, aiming to unify the procedural treatment and establish parameters and criteria that frame the decisional act.

Public policies are compromised by the use of a significant portion of the budget to comply with judicial decisions. The problem does not lie in the exercise of the right through the aforementioned means, but in the excess in relation to the resolution capacity of the issue. With the increase in judicial intervention, a second form of access to SUS is created, distorting the administrative process and disregarding the previously thought out and organized public policy. It is not rare that the administrative access is not even sought by the user. Furthermore, different weights and measures are created, notably by the preference established for complying with the judicial decision, and higher expenses are encouraged for meeting judicial demands to the detriment of what is administratively applied for collective care. Thus, there is a range of situations that compromise the management and make the manager responsible for the system's inaccuracies (OLIVEIRA, 2020).

Thus, from the challenges imposed by the medicalization of justice, the concern of the State of Rio Grande do Sul emerges, evidencing, among other aspects, the search for the implementation of projects in the theme aiming at the reduction of judicialization, such as the Project SER Saúde (SES) in which there is a partnership between the State government, Federation of Associations of Municipalities (FAMURS),

Council of Municipal Health Secretaries (COSEMS/RS) and the Public Defender's Office of the State with the goal of reducing judicialization with the implementation of out-of-court practices for the supply of medicines (SES, 2020).

Still at the state level, from the management point of view, the Inova RS Program has also highlighted health as one of the relevant themes for discussion and implementation of strategic partnerships among the government, business, academic, and social areas. The organization in eight representative regions of the state, called Innovation Ecosystems, aims that the articulation between the members of the quadruple helix can contribute to social and economic development, using as a basis the promotion of innovation in traditional sectors (SICT, 2020).

In parallel to the aforementioned initiatives, as an illustration of those adopted at the state level to solve judicial conflicts, it is worth mentioning that the existence of significant bottlenecks and imbalances demand the construction of alternatives that are suitable for the adequate use of resources, whether economic, technological, or human.

3.2 THE STATE HEALTH PLAN AND JUDICIALIZATION

The amplitude of the right to health and the mechanisms necessary for its implementation, among them access to the Judiciary, brings with it the potential to destructure the public system and the management organized to achieve the established constitutional purposes.

From the scenario presented, it is possible to verify that aspects that can be considered positive emerge from the growing debate about the consequences, especially the economic and managerial ones that emerge from judicialization. It is possible, from the context analyzed, to verify that the justice system contributes to the correction of possible failures in the health system, such as the influence on the incorporation of treatments, the need for greater articulation and coordination of public actions that result in the provision of the service and the constant need for evaluation of the performance of the organs responsible for judicialization without causing damage to the execution of public policies established under the collective x individual bias (OLIVEIRA, 2020).

From the perspective of policy organization, an important instrument emerges, which is periodically elaborated and aims to define, in the field of public health, guidelines, objectives, and goals for a certain period. Based on the identification of local and regional needs, the state health plan establishes the basis for promotion, protection, and prevention in the 30 health regions of the State of Rio Grande do Sul (SES, 2020).

The constitutional and legal norms establish the principles and guidelines for the functioning and development of the Unified Health System, and provide for community participation in its management. The laws 8080/90 and 8142/90 provide the legal subsidies and outline the relevant aspects for the manager

to be guided in the construction and direction of municipal and state policies. The elaboration and updating of the health plan are part of the federated entities' attributions. Similarly, the promotion of the articulation of health plans and the preparation of the budget proposal in line with the planning (BRASIL, 1990).

It is important to note that the health plan is established as a requirement for federated entities to receive resources from the National Health Fund (FNS) (BRASIL, 1990). Hence its importance and essentiality for the management and organization in the scope of its administrative attributions.

Having introduced the point, it is appropriate to inquire about the relationship of the State Health Plans with the theme initially addressed regarding judicialization. We dare to anticipate that the connection not only exists, but is direct and even essential.

For this, it is necessary to go back to the elaboration of health plans prior to the current one, considering that the phenomenon of growing judicial demand for health services does not date back to the last period.

In this sense, being available for analysis the 2009-2011, 2012-2015, 2016-2019 state health plans, it can be noted that the theme is recurrent and its treatment focused on analysis from the managerial point of view reflects the growing concern with the directions of the reality being experienced.

The State Health Plan 2009-2011, when dealing with the Pharmaceutical Assistance Policy, dealt with judicialization in order to establish some advances achieved in previous years, such as the use of the Medication Management System - AME and the contracting of a company to allow greater agility in complying with judicial determinations and avoid discontinuity in the care of its beneficiaries. It also presents, with concern, data relative to pharmaceutical presentations supplied due to judicial decisions. As stated in the document, at the time, approximately 2,800 different drug presentations were being judicially supplied, while the administrative distribution list totaled about 500 presentations. Due to this plurality, the document points out that the impact resulting from judicial demands ends up harming the management of Pharmaceutical Assistance of the list supplied administratively, since the budget resources are displaced (SES, 2009).

As a specific goal related to the judicialization of Pharmaceutical Assistance, this plan foresaw the accreditation of companies to prepare technical opinions to provide subsidies to the procedural defense conducted by the Attorney General of the State (SES, 2009).

For the 2012-2015 four-year period, the planning begins the subject presenting the growing judicial demand for treatments aiming at the promotion and recovery of patients with multiple and severe disabilities. It goes on to address the recurrent judicial demands for the dispensation of materials for users in the ostomy area, reporting the scenario to the lack of regulation of access to specialized care, ending up burdening the state entity even more financially (SES, 2011).

It continues, when dealing with pharmaceutical assistance, outlining the relationship between the plurality of judicial understandings and the constitutional principles of universality and integrality, in counterpoint to evidence-based medicine and the analysis of cost-effectiveness that guides the state action in front of health technologies. It highlights the need for efficient management of pharmaceutical assistance, stamped in the regularity of administrative dispensation of the Basic Pharmacy list and in ensuring access to drugs provided for in the RENAME, as ways to avoid and reduce judicialization. Finally, from the analysis of the guidelines, objectives and goals outlined for the period, it was not identified the elaboration of specific points related to judicialization, although several aspects addressed reflect directly, exemplified by the forecast of the search for strengthening primary care and the expansion and qualification of pharmaceutical care (SES, 2011).

Presented in 2016, the State Health Plan was edited to establish the guidelines, goals, and objectives aiming to establish the north to guide the conduct of managers in the face of the constant need to pursue the improvement of health care in the state territory. To this end, the planning brought an overview of the judicialization, showing a relative stagnation as to the entry of new demands between the years 2014 - 66,496 requests - and 2015 - 67,026, showing an increase of approximately 1%. Still, it reflects that the judicialization presents itself as a problematic situation for the public health manager, to the extent that at the time Rio Grande do Sul had the highest rate in the country in the implementation of treatments through the courts. It differentiated the origin of the expenses made by the judicial route between judicial deposits, in cases of impossibility of administrative supply; constrictions in public accounts, for the cases of occurrence of judicial blockades in the face of noncompliance with determinations and, finally, the acquisition of medicines by the state manager to supply a demand after a sentence (SES, 2016).

We can also see that the plan highlights the concern with public health management and the enforcement of the right to health through the Judiciary. This is because there is a recurrent imbalance between those who have greater access to justice and those who are on the margins of this postulation. Still, the possibility of the influence of the pharmaceutical industry for the supply of treatments without the proof of scientific evidence or approval by responsible technical agencies. In the same sense, he describes the judicialization of components that integrate the basic network (at the time indicated in 16% of the requests submitted to the Judiciary), denoting failure in the administration of the pharmaceutical assistance policy. The analysis ends by stating that, given the situation faced by the state entity, there is an urgent need to build joint strategies between the sectors involved, especially health and the judiciary, in order to overcome the problems experienced (SES, 2016).

It is noteworthy that the State Health Plan for the 2016-2019 quadrennium provided as one of its goals the Optimization of spending arising from judicial claims, inserted in Goal 8 - Qualify the

management of financing according to health needs - in Guideline 2 - Consolidation of the governance of the Health Care Network in SUS Management (SES, 2016).

The year 2020, marked by the beginning of the pandemic in Brazil, was the scenario for the edition of the State Health Plan 2020-2023.

As in previous plans, in order to illustrate the reality in which the state public health is inserted and to establish the bases on which the proposal is based, it presents data related to judicial demands. It begins by indicating the expressive number of 5,265 pharmaceutical supplies judicially claimed, highlighting that about 12% of the total is related to the Basic Pharmaceutical Care Component, 23% to the Specialized Pharmaceutical Care Component. The referred data are related to the possibility of stock failure for momentary dispensation or postulation of treatments in disagreement with the Clinical Protocols and Therapeutic Guidelines of the Ministry of Health (SES, 2020).

Resuming and reinforcing the data and arguments outlined in previous plans, by outlining an updated overview of the judicialization of public health policy, the 2020-2023 plan offers space to highlight the issue, which will be addressed in detail in a specific item. Once again, the concern with the interference of judicial decisions in the management emerges and the solution of the judicialization panorama is raised as a priority in the health area of the current administration (SES, 2020).

An interesting aspect verified in the judicialization area is the recurrence of judicial blockades against the state entity, even though other federal entities are part of the passive pole of the lawsuits. It also inaugurates the idea of the need for closer relations between the administrative agencies responsible for complying with court orders and the State Attorney General's Office for the supply of information and technical data to support procedural instruction, especially in view of the space that judicialization occupies (SES, 2020).

In the search for the qualification of health services provision, the elaboration of the State Policy for Pharmaceutical Assistance (PEAF), planned for the year 2022, has five guiding axes, one of which deals with the judicial demands involving pharmaceutical assistance in the state territory (SES, 2020).

The space of importance is also verified by the judicialization forecast in the Strategic Map of the State Health Secretariat of the State of Rio Grande do Sul, prepared in 2019 and which served as a basis for the conception of the State Health Plan. In it, the financial perspective highlights as a goal the need to *"Improve mechanisms aimed at reducing the judicialization process"* (SES, 2020).

Defined the guideline of the plan currently in force, as a goal related to the improvement of governance mechanisms in SUS, it was established the goal of "*instituting mechanisms for monitoring and reducing judicialization in health*" (SES, 2020).

Thus, the main characteristics between the management of the public health system at the state level are synthesized, with the State of Rio Grande do Sul as the locus:

Chart 1 - Description of the aspects related to judicialization

State Health Plan 2009/2011	Highlight for the concern with the growing judicial demand and the plurality of drug presentations object of the requests in comparison with the lists provided by the Single Health System. It showed the advances that have occurred with the implantation of the Medication Management System - AME in the state territory; in hiring a private company to fulfill the judicial determinations, aiming at greater agility and in an accredited team of experts with the purpose of providing subsidies to the procedural manifestations.
State Health Plan 2012/2015	It points to the growing judicial demand for treatments aimed at the promotion and recovery of patients with multiple and severe disabilities. It shows the occurrence of failures in specialized care. It discusses evidence-based medicine and its relationship with the analysis of cost-effectiveness that underlies the state's actions regarding health technologies. It highlights the need for efficient pharmaceutical assistance management as a way to avoid and reduce judicialization.
State Health Plan 2016/2019	It shows the recurrence of lawsuits aiming at the supply of medicines foreseen in the basic component, denoting a failure in the management of the pharmaceutical policy and administrative organization. It establishes as a GOAL the "*Optimization of expenses resulting from judicial lawsuits*". It explains the urgency of building joint strategies between those involved in legal claims, notably the health and judicial sectors, to avoid an increase in the number of claims.
State Health Plan 2020/2023	It identifies the significant increase in judicial blockages solely on the budget of the State of Rio Grande do Sul, even though other public entities figure in the passive pole of the lawsuits. It highlights the need for closer relations between the State Health Secretariat (SES) and the State Attorney General's Office (PGE/RS) in order to qualify the performance. Prediction of judicialization as one of the guiding axes for the elaboration of the State Policy of Pharmaceutical Care. Prioritization of issues related to the judicialization of health, making it a government priority.

It is important to mention, based on what has been reported and the summary presented, that the plans, as management instruments, are elaborated based on elements and diagnoses made in previous years to guide future actions at the state level.

Based on this logic, it was verified that the State Health Plans studied begin their approach focused on the budgetary issue, fundamentally concerned with the financial reflexes resulting from the growing number of new judicial requests. Subsequently, there was engagement in identifying the gaps in the system that contribute to the problem and highlighting the relevance of an administration focused on this confrontation and effective resolution. In the following stages, it is necessary to point out, there was the highlighting of the theme, as the judicialization, besides occupying a larger space for reflection, is related to the establishment of goals regarding the use of public funds necessary to comply with the judicial decisions. Although lacking indicators that allow the analysis as to the accomplishment of the established goal, a growing confrontation was present.

4 CONCLUSION

The judicialization of public health policy, based on unrestricted access to judicial postulation in conjunction with the constitutional dictates, contributes to a vision of unlimited rights when it comes to the subject. Intrinsically linked to life, the right to health has contributed to an accumulation of lawsuits that not only overload the Judiciary, but also impose important obligations to the public manager, notably due to the need to reallocate public funds for the satisfactory fulfillment of judicial orders, without neglecting the responsibility for the implementation of administrative responsibilities foreseen and derived from the competence of each entity.

Focused on this phenomenon, the State of Rio Grande do Sul has been paying attention to the intricacies that result from judicialization and has sought to outline mechanisms for the qualification and reduction of judicial demands, such as the SER Saúde Project.

Based on this perspective, we sought to examine the State Health Plans, the scope of judicialization and the treatment given in the documents to this phenomenon, considering that these are documents that guide the actions of the public manager, to solve the main question of the study. In advance, during the textual description, it was presented the indication as to the existing relation between the documents and the theme that initiates the work.

It was verified, therefore, that the relationship between judicialization and the State Health Plans is close and necessary, having been presented in different formats in each of the documents analyzed, but with a constant bias of uneasiness as to the reflexes of the judicial orders in relation to public spending and the finite possibilities of the manager in meeting all the individual and collective demands that present themselves.

The research also revealed that, as planning instruments over time, given the period under study, the insertion of judicialization in the State Health Plans resulted from the massification of demands and the difficulty faced in managing and facing the theme in face of the administrative and budgetary limitations that are imposed. Possibly due to the maturation of the subject, the emphasis on management and the need to establish strategies and alignments to qualify the provision of public health in the administrative sphere as a mechanism to reduce the growing judicial demand was verified.

Also, in alignment with reality, the plans dealt with important aspects that, from the procedural experience, are essential in the resolution of judicialized issues, such as the strengthening of primary care and the qualification of pharmaceutical assistance management.

It is also mentioned that, despite the fact that the documents lack specific indicators that allow the analysis as to the achievement of the objectives set specifically on judicialization, the State Health Plans analyzed present an improvement in the treatment of the theme and translate into relevant foundations for the development of a qualified management that, in the conception derived from the reality experienced daily, could lead to the reduction of mass judicialization.

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Chapter 55

Cognitive benefits of dual-task training in people with Parkinson's Disease: a systematic review

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ABSTRACT
Parkinson's disease is the second most common neurodegenerative disorder and the most common movement disorder after the sixth decade of life. It affects 100 to 200 people per 100,000, causes severe disability after 10 to 15 years, and its prevalence is on the rise. However, dopamine loss is not unique to the substantia nigra; therefore, the parkinsonian may present other symptoms in addition to the motor ones, such as cognitive decline and dementia, with impairment of executive functions, attention, visuospatial skills and memory, which is often more debilitating than the motor symptoms themselves. Therefore, because it is low cost, because it works in prevention and is present in most ADLs, dual-task training stands out. The present study aims to understand what are and how the cognitive domains are benefited through dual-task training in people with PD. A systematic review was conducted with the following eligibility criteria: (1) randomized and non-randomized clinical trials; (2) published between 2010 and 2022; (3) in English or Portuguese; (4) with participants diagnosed with PD; (5) intervention carried out through DT; (6) with cognitive outcomes. 6 studies fit the chosen criteria. The results showed that DT training can be beneficial for patients with PD, with benefits in attention, executive functions and test execution time such as the Trial Making Test. However, in some studies, no or brief superiority of DT over single-task training was observed. Future research with larger samples and whose primary objective is cognitive performance are convenient.

Keywords: Parkinson's disease, Cognition, Dual task, Exercise, Systematic review.

1 INTRODUCTION

First described in 1917 by James Parkinson, and with a prevalence of 100 to 200 people per 100,000, Parkinson's Disease (PD) is considered the second most common neurodegenerative and progressive disorder, characterized by the death of approximately 80% of the dopaminergic neurons present in the substantia nigra, along with the formation of Lewy Bodies. (BEAR, 2017; BRAZIL, 2017; PANG et al., 2019).

However, since neuronal degeneration does not occur exclusively in the substantia nigra, the symptomatology goes beyond bradykinesia, rigidity, rest tremor, and postural instability. People with PD can also present cognitive impairments and dementia (BRASIL, 2017). Cognitive symptoms manifest mainly in executive functions, attention and with visuospatial impairments, while dementia manifests in approximately 80% of cases. (MUELLER et al., 2018; PENNINGTON; DUNCAN; RITCHIE, 2020; SEZGIN et al., 2019).

The manifestations described have an impact on the quality of life (QoL) of the patients themselves

and their caregivers, as well as on the performance of activities of daily living (ADLs). (ORGETA et al., 2020; PENNINGTON; DUNCAN; RITCHIE, 2020).

In this context, considering that most ADLs require the simultaneous performance of two or more tasks, that is, the performance in dual-task, such as walking and talking to someone, sending messages or remembering a shopping list, this can be one of the physiotherapeutic approaches used during the follow-up of the patient with PD. (DEBLOCK-BELLAMY; LAMONTAGNE; BLANCHETTE, 2020; FREITAS et al., 2020; SOUSA; MACEDO; BRUCKI, 2021).

Still regarding dual tasking, the literature explains that human behavior is controlled by two information processing systems. The first, called automatic processing, is fast and autonomous, activated by triggers. The other, controlled processing, is slow, depends on the storage of information and the activation of operational memory, in addition to attentional control (MOREIRA et al., 2021).

Thus, considering the rise of the elderly population, which corresponds to 13% of the country's total population, and the relationship between aging and the development of neurodegenerative diseases such as PD, it is worth seeking alternatives to minimize the aforementioned cognitive impairments, which are often more debilitating than the motor manifestations of the disease. (ROHEGER; KALBE; LIEPELT-SCARFONE, 2018; IBGE, 2019).

The literature has studies that address the effects of DT training on gait, balance, and motor symptoms in people with PD, such as the one by Freitas et al., (2018). However, there is still no systematic review addressing what the cognitive benefits of the mentioned intervention are in people with PD.

In order to fill the gaps present in the literature, the purpose of this systematic review is to understand what and how cognitive domains benefit through dual-task training in people with Parkinson's Disease.

2 MATERIALS AND METHODS

The study design is characterized as a systematic review and was prepared according to PRISMA guidelines. The protocol was registered in the PROSPERO database under the following registration number: CRD42021288413.

2.1 ELIGIBILITY CRITERIA

2.1.1 Types of studies

Studies were included according to the following criteria:

- Randomized and non-randomized clinical trials;
- Whose publication date was from 2010 to 2022;
- In English or Portuguese;
- Whose population was made up of people diagnosed with PD, with no gender restriction;

- Whose intervention was carried out through DT training;
- The outcomes of which refer to cognitive benefits such as memory, divided attention, logical reasoning, or executive functions, among others.

Studies with the following characteristics were excluded:

- Cohort studies, case reports, case-control studies, literature reviews, integrative or systematic reviews with meta-analysis;
- Studies whose population consists of people with Alzheimer's disease, frontotemporal dementia, vascular dementia, and Pick's dementia;
- Studies whose intervention is done through computerized cognitive training;
- Studies whose outcomes refer to motor benefits;
- Studies whose access is not available in full or which are duplicates.

2.2 RESEARCH METHODOLOGY FOR THE IDENTIFICATION OF STUDIES

A systematized electronic literature search was conducted using the PubMed database. The search strategy was done using the descriptors "parkinson disease and dual-task or dual task and cognition and visuospatial and executive functions and memory and attention".

During the search, only clinical trials and randomized controlled trials dated from 2010 to 2022 were considered.

2.3 DATA COLLECTION AND ANALYSIS

2.3.1 Study selection

Screening was performed by title and abstract, followed by full-text screening, performed by two independent reviewers. During collection, the previously established eligibility criteria were taken into consideration, and the justification for exclusion of each study was recorded in tabular form.

2.3.2 Data Extraction

Once the screening was completed, information was extracted regarding the authorship, year of publication, outcomes, intervention applied, and results of each study.

2.3.3 Risk of bias assessment of included studies

The Revised Cochrane risk-of-bias tool for Randomized Trials (RoB2) was used to assess the methodological quality of the included studies. With this, five domains were analyzed: bias due to the randomization process, bias due to deviations from the intended interventions, bias due to omission of results, bias in the measurement of results, and bias in the selection of reported results.

For each domain, the study was rated as "low" when it had low risk of bias; "high" when there was high risk of bias and "some concerns" when the reported information was insufficient.

3 RESULTS

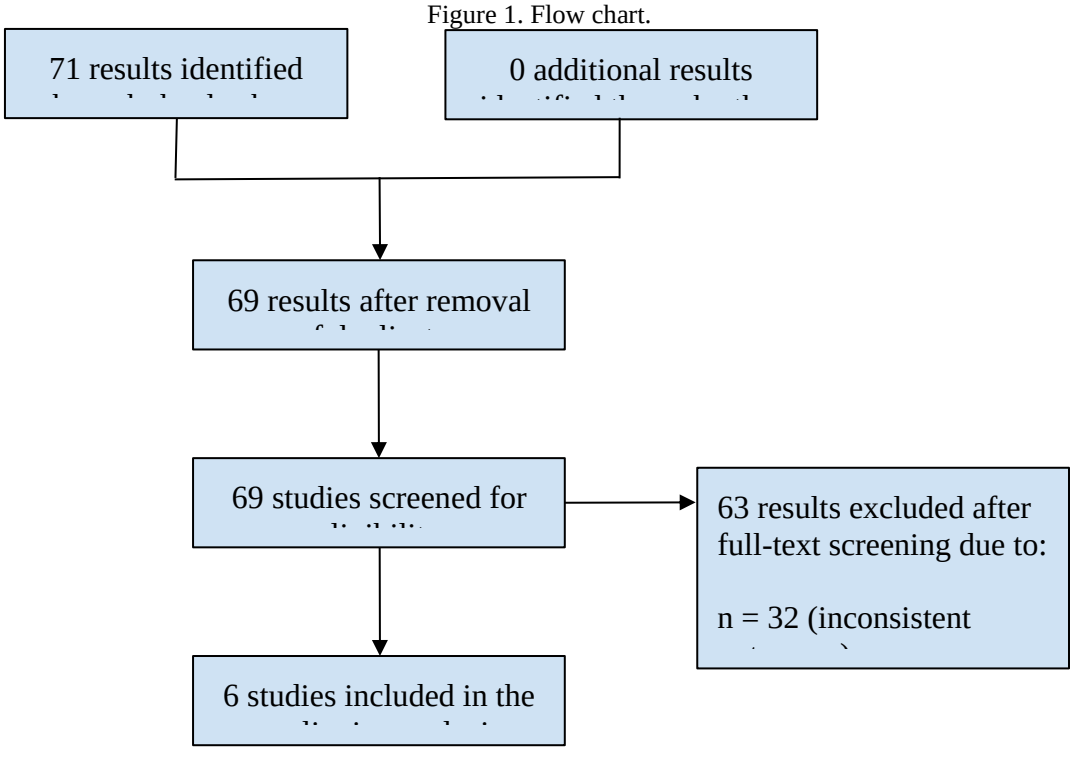
3.1.1 Survey results

A total of 71 studies were found. After removal of duplicates, 69 results remained, of these, 63 were excluded. Finally, a total of 6 studies were included in the quantitative synthesis (Figure 1).

3.1.2 Excluded studies

After full-text screening, 63 studies were excluded. Thirty-two due to inconsistent outcomes, twenty-six because of the application of interventions other than DT training, one for including a population inconsistent with the objective of the present study, and four whose access was not fully available (Figure 1).

Figure 1. Flow chart.



3.1.3 Included studies

Of the 6 studies included in the research, all are classified as randomized clinical trials, with a total of 298 participants. One study was conducted in Valencia, Spain, one in Portugal, one in Switzerland, and one in Belgium and the Netherlands. The last two studies did not mention the setting where the intervention was conducted. The other characteristics of the included studies are present in Table 1.

3.2 RISK OF BIAS OF THE INCLUDED STUDIES

The risk of bias of the included studies is shown in Figure 2. In the domains of: randomization process (selection bias), intervention bias (performance bias), omission of results (detection bias), and measurement of results (attrition bias), all studies were judged to have a low risk of bias.

As for the domain concerning the selection of reported results (reporting bias), the studies by Valenzuela et al. (2020), Silva et al. (2021), Johansson et al. (2021), and Strouwen et al. (2017) were judged to have a low risk of bias. The study by Fernandes et al. (2015), on the other hand, was qualified with some concerns. Finally, the study by Park and Kim (2021) was judged with high risk of bias.

Figure 2. Risk of bias of the included studies.

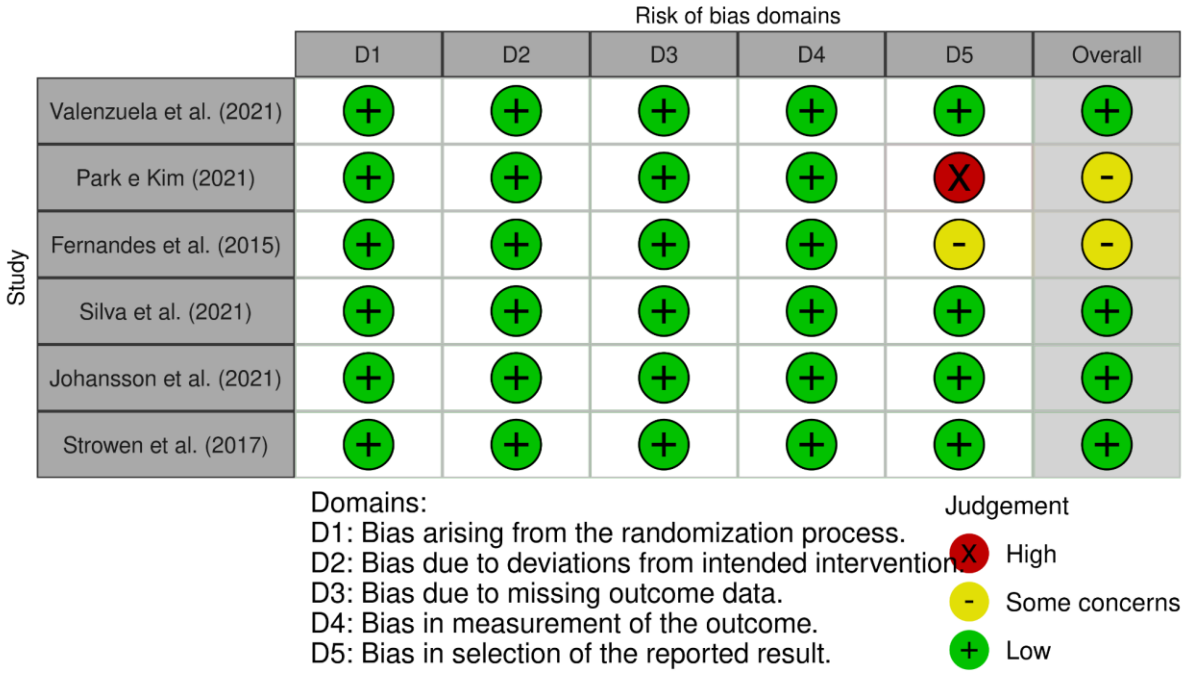


Table 1. Characteristics of the included studies. MDS-UPDRS: The Movement Disorder Society-Sponsored Revision of the Unified Parkinson's Disease Rating Scale; TUG-Cog: Time Up and Go Cognitive; ASBCS: Activities-specific Balance Confidence Scale; PDQ-39: Parkinson Disease Questionnaire-39; MoCA: Montreal Cognitive Assessment; TMT: Trail Making Test; BVMT-R: Brief Visuospatial Memory Test-Revised; DT: Dual-Task; CCL: Mild Cognitive Impairment; NHPT: Nine Hole Peg Test; K-TMT-e: Korean Trail Making Test for the Elderly; BPM: beats per minute; H&Y: Hoehn and Yahr; TC6M: 6-Minute Walk Test; CG: Control Group; DTG: Dual-Task Group; FES: Fall Efficacy Scale; QL: Quality of Life; FAB: Frontal Assessment Battery; PD: Parkinson's Disease; BMI: Body Mass Index; IM: Lower Limbs; TUG: Time Up and Go; UPDRS-III: Unified Parkinson's Disease Rating Scale-III; RSCardsT: Rule Shift Cards Test.

Author	Year of publication	Outcomes	Intervention applied	Results
Johansson et al. (2021)	2021	Mini-BESTest, MDS-UPDRS, TUG-Cog ASBCS, Walk-12, EuroQoL 5 Dimensions, PDQ-39, Hospital Anxiety and Depression scale, MoCA, The Color-Word Interference Test, Digit Span, TMT, Rey Auditory Verbal Learning Test, Brief Visuospatial Memory Test-Revised, Copy condition of BVMT-R.	Participants were asked to walk under the GAITRite system, the Stroop Test was then introduced, in which participants, wearing headphones, heard high and low words in incongruent tones. They were to answer which tone the word was presented in as quickly as possible, and were instructed to pay attention to both tasks and only start walking after responding to the first stimulus.	Significant increase in reaction times in the DT group compared to the single task group (1.10 and 0.99, respectively), as well as cost of DT on cognition, intraindividual variability of reaction times during DT also increased. The cost of DT on cognition was negative in both groups, but the difference between groups was not significant. The group without CCL prioritized gait speed over cognitive task, while the group with CCL prioritized cognitive activity, with significant differences between cognition and gait speed.
Park and Kim (2021)	2021	NHPT, K-TMT-e and Korean Stroop Test.	3 sessions of 50 minutes per week, for a total of 12 weeks. The CG performed the gait rehabilitation and speech therapy, while the experimental group performed the drum tapping task with digital interface, with and without cues. First, the	No significant differences were observed between the groups with respect to demographic characteristics. Significant temporal effects were observed in the motor control measures regarding the latency time to 105 bpm, also in the sustained time on the 45th beat and in the left hand execution time,

			participants played the drums with both hands and at a given tempo for 15 seconds, then they were given rhythmic cues with regular intervals of 45 to 105 beats per minute for 15 seconds and were instructed to beat the drum at intervals as similar as possible. Afterwards, there was a change in tempo and rhythm, which were to be followed by the participants.	indicating that the changes in the measures were significant over time. Both groups showed improvements in the post-intervention assessment. However, regarding the sustained time on the 45th beat, only the experimental group showed improvements after the intervention. There were significant differences in the temporal effects on the timing of execution in the NHPT for the left hand. Significant effects were also observed in the post test and pre test evaluation regarding motor control.
Silva et al. (2021)	2021	6MWT, TMT, Katz Index and Falls Efficacy Scale.	8 weeks, with 2 sessions per week, lasting 60 minutes, for a total of 16 training sessions. The two groups were separated into 2 stages of 4-week progression. The DT group received training based on part A of the TMT. In the first stage, a sequence of numbers from 1 to 10 with and without the presence of distractors was also used, in which patients were guided to walk between the figures in ascending and descending order. Then, geometric figures were added. The CG patients received global kinesiotherapy.	In the TMT, no significant differences were observed between pre and post intervention data for the two groups, but with significant differences for the DT group in terms of initial and final data (shorter times), i.e., there was no difference in pre- and post-intervention assessment for the CG and GDT if assessed individually, but in comparison between them, the DT group stood out.
Valenzuela et al. (2020)	2020	PDQ-39, FAB and TMT.	20 sessions, lasting 1 hour each, twice a week, for 10 weeks. The sessions were composed of 10 minutes of warm-up, with specific exercises for PD, 45 minutes of gait training under TD and under task-simple, according to the group, and finally 5 minutes of relaxation through active-assisted stretching.	No significant differences were observed between the groups regarding demographic characteristics. Regarding executive functions and QoL, the interaction of rehabilitation and group factors were significant in part A of the TMT. Even though the single task group increased the test execution time after training, no changes were observed in the DT group. In part B of the TMT, only the group factor had a significant effect.
Strouwen et	2017	Auditory	Both interventions were done	It was possible to observe that the

al. (2017)		Stroop Test, Digit Span backwards and forwards when using a cell phone.	in a home setting by a physical therapist from each center. Supervised training was 2 times a week for 6 weeks, with 40 minutes of active exercises. Participants were instructed to perform unsupervised exercises 2 times per week for 30 minutes. In the consecutive task training group, participants performed 15 minutes of gait training, 15 minutes of cognitive exercises, and 10 minutes of functional practice. In the integrated dual-task training group, patients performed 30 minutes of gait training and cognitive exercises at the same time and 10 minutes of functional training.	consecutive task group stood out compared to the integrated task group. No interaction effect between time and group was observed, indicating that the two interventions obtained similar results. No interaction effect between time and group was observed for the cognitive outcomes. Reaction time on the DT with Stroop remained stable between assessments 1 and 2, improved after training and remained better at follow-up, the percentage of correct responses on the Stroop showed the same pattern, in contrast to the DT with cell phone, which showed no improvement after training. Reaction time on Digit Span remained stable between the initial assessment and worsened after training, however, although the percentage of correct responses remained stable, this improved significantly after training, which continued at follow-up. The cognitive outcome of simple task followed the same pattern as DT.
Fernandes et al. (2015)	2015	TUG, UPDRS-III, RSCardsT and TMT.	Sessions of 60 minutes each, twice a week, for 6 weeks. Each session was structured into 4 intervention stations. Both groups performed the same tasks; however, the DT group performed the cognitive activities concurrently. Each patient received guidance for 12 to 15 minutes at each station, and between each station, participants performed a transition exercise of sitting and getting up from a chair for 15 times.	No significant differences were observed between the groups regarding demographic characteristics. There were no differences between the groups at baseline in RSCardsT and TMT. No significant differences were observed between the two groups with respect to the executive functions performed. However, part B of the TMT obtained high effect size, the RSCardsT obtained medium effect size, and part A of the TMT obtained small effect size.

4 DISCUSSION

The present study aimed to understand what and how cognitive domains benefit through dual-task training in people with Parkinson's Disease.

In the study by Valenzuela et al. (2020), conducted with a sample of 40 adults previously diagnosed with PD, randomized into the dual-task or single-task groups for a total of 20 sessions, it could be seen that the second group required more running time in the TMT, in contrast to the DT group, which showed no significant changes.

In part A of the TMT, the participant is instructed to draw a line that correctly connects 26 numbers, in an orderly fashion and as quickly as possible. In the second part of the test, the participant must connect a series of 26 circles with either a number or a letter in an alternating numerical and alphabetical sequence. The test score is evaluated according to the time taken to perform the test and also takes into account the number of errors made by the assessed (FELLOWS et al., 2017).

There is no consensus among authors about which domains are most worked on when performing the TMT. However, Llinàs-Reglà et al. (2016) explain that cognitive skills such as graphomotor speed and visual scanning play an important role during the execution of parts A and B of the TMT, while, specifically in part B of the test, there is greater activation of executive functions: inhibitory control, working memory, and switching skills.

Fellows et al., (2017), meanwhile, suggest that part B of the TMT involves more complex cognitive processes than part A, with the former activating working memory and the ability to switch between tasks.

Varjacic et al., (2018), corroborate with Fellows et al. in that part B of the TMT requires greater visual search demands, considering that it involves greater distances between the elements present in the paper compared to part A of the TMT.

Also regarding the study by Valenzuela et al. (2020), the perception of QL of the TD group was higher after the intervention, possibly because the context of the program was similar to everyday situations.

Park and Kim (2021), in a study conducted with 12 participants with PD for a period of 36 weeks, through an intervention based on rhythmic movements of drum playing associated with TD, observed that the program promoted changes in attentional control, through inhibitory control during cognitive processing, improving the performance of TD with cognitive demand. The performance of the bimanual task according to auditory commands requires attentional focus from the participant, since each auditory cue was given with a different alternation of time, besides requiring high demand of cognitive resources and important performance of executive functions, which can enhance cognitive performance.

Executive functions are important abilities for physical and mental health, essential for cognitive, social, and psychological development (ALMEIDA; HAMDAN, 2019). Considered as an umbrella term, they refer to the planning, monitoring, and execution of complex actions and reflect the way the organism reacts to a series of stimuli and processes external and internal excitations (CHRISTOFOLETTI et al., 2014). Furthermore, executive functions encompass domains that are essential for decision-making in daily

life and that are impaired in people with PD due to the impairment of the fronto-striatal dopaminergic connections (LUCA et al., 2018).

Fernandes et al. (2015), in a trial conducted with 15 people diagnosed with PD, during 12 weeks, observed no significant differences between the groups regarding cognitive performance and executive functions, evaluated through the RSCardsT and the TMT parts A and B. However, TMT part B obtained high effect magnitude and RSCardsT showed medium effect size. The two parameters showed a trend of improvement in both training programs, - DT group and single task group -, with no discrepancy between them.

The RSCardsT is a tool used to measure cognitive flexibility and the ability of the assessed to switch from one pattern to another in two tests presented consecutively, taking into account the test execution time and the number of errors made. (CORTESE et al., 2022; FERNANDES et al., 2015).

Silva et al. (2021) conducted a trial with 10 individuals, during 8 weeks, through the application of TMT. Effectiveness was observed in the execution time of the TMT in people with PD, however, no superiority of the DT training over conventional training was found. The brief difference in execution time of the test can be explained through a concept of transference of learning between different tasks, which, besides improving cognitive aspects, also brings improvements in the execution of DLAs.

Rivière et al., (2019) define transfer of learning as the application of acquired competence in new contexts, it is the purpose of any learning process. It can be called "near transfer" if it covers two situations within one domain, or "far transfer" if it occurs between different domains.

Learning transfer occurs when learning a task results in better performance on an untrained task or less time spent performing it (LEACH; KOLOKOTRONI; WILSON, 2021), as observed in the study by Silva and colleagues (2021).

Johansson et al. (2021), in a study with 93 people diagnosed with PD, observed a negative cost on cognition in both groups, demonstrated by an increase in reaction times and intra-individual variability, but without significant differences. Also, the group with mild cognitive impairment prioritized cognitive activity, showing significant differences. In turn, the group without mild cognitive impairment prioritized the execution of the motor task (walking) rather than the cognitive task.

A similar result was observed in another study that compared the effects of consecutive training with concurrent training - DT - in healthy adults, with improved motor performance in the DT group, but not in cognitive performance. (BEURSKENS, et al., 2021).

The prioritization of the motor task presented by the second group goes in line with Task Prioritization Theory, in which, in more challenging environments, it is common to prioritize the motor task over the cognitive task.(VERVOORT et al., 2019).

The prioritization of one task over the other is due to the process of task interference, in which the execution of two activities simultaneously requires too much attention. This causes the execution of one task to be prioritized, with worsening in the performance of the other (JANSEN; EGMOND; RIDDER, 2016).

Finally, Strowen et al. (2017), through a study with 121 participants for 6 weeks, observed no interaction effect between time and group for the cognitive outcomes. Reaction time in DT with the Stroop Test remained stable between the first and second assessment, after training and also during follow-up, and so did the percentage of correct answers in the Stroop Test. In contrast, the DT done with a cell phone did not show the same effect. The slightly discrepant results between the groups can be explained by the presence of the same components in both groups, as well as the individualization of the training.

The Stroop Test is a tool frequently used in neuropsychological assessment. It measures the speed with which the subject can read colored words and name the color of the ink blocks, as well as name the color of the written word, which does not match the word itself (e.g., the word "blue" written with the color red) (SISCO et al., 2016).

The literature explains that the effect of the test comes about through the bringing together of a series of excitations within the processing system itself, on account of the target word, on account of inhibition to distraction, and also on account of previous stimuli. The neuroanatomical structures involved in this process are mainly the anterior cingulate cortex and the dorsolateral prefrontal cortex (SISCO et al., 2016).

Although cognitive decline is common in PD, and can evolve to mild cognitive impairment and consequently dementia (GARCIA-DIAZ et al., 2018), the cognitive benefits of DT training were not the main focus of the studies included in the present systematic review. But rather, cognitive performance was analyzed as a secondary objective, associated with motor benefits, which, in turn, were extensively analyzed in several studies.

This can be justified by the absence or brief discrepancy present between the results of DT and single-task training, as observed in the trials of Fernandes et al. (2015) and Silva et al. (2021).

On the other hand, some authors advocate the superiority of concurrent over consecutive training. DT proposes an integrative approach, in which a new task is created that includes two sub-tasks, which would improve performance in everyday situations that require the execution of two simultaneous tasks. (BEURSKENS et al., 2021).

In a randomized clinical trial with 45 healthy young adults, Beurskens et al., (2021), observed that concurrent task practice is not best suited for motor or cognitive performance.

Similarly, Silsupadol et al., (2010), in a randomized clinical trial conducted with older adults with balance impairment, also observed no superiority of TD training over single task training in relation to

balance and gait performance outcomes. However, the former group did perform better when walking during TD contexts, such as in gait speed. Outcomes exclusive to cognitive function were not analyzed.

5 LIMITATIONS OF THE STUDY

However, the present systematic review has some limitations. The first point to be considered is the number of studies included, which, after a complete screening, was reduced to only 6 clinical trials.

Another limitation of the study is that, although the included studies established cognitive performance as an objective, it was secondary, associated with motor performance, and little explored in the studies.

Finally, one should also consider the risk of bias in the papers by Park and Kim (2021) and Fernandes et al. (2015), qualified as having "some concerns," which could influence the results of the present review.

6 CONCLUSION

The present study aimed to understand what and how cognitive domains benefit through dual-task training in people with Parkinson's Disease.

It was possible to observe that the TD training is beneficial in the physical therapy follow-up of the patient with PD, with benefits in attention, executive functions and in the execution time of tests such as the Trial Making Test. However, perhaps because it shows no or brief superiority over single task training, the included studies did not score on both cognitive and motor performance. Therefore, additional studies on the subject are desirable, preferably with larger samples and whose primary objective is cognitive performance.

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Chapter 56

Pests and diseases found in beekeeping

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ABSTRACT
In the last years, beekeeping has been consolidated as one of the activities of great importance in the rural environment, especially in the family farming environment, causing positive impacts, both social and economical, besides contributing to the preservation of the ecosystems.

Keywords: Health's Judicialization ; Health Planning; Health Policy

1 INTRODUCTION

In the last years, beekeeping has been consolidated as one of the activities of great importance in the rural environment, especially in the family farming environment, causing positive impacts, both social and economical, besides contributing to the preservation of the ecosystems.

Bees, like other insects, can also be damaged by diseases and natural enemies. Bacteria, fungi, and viruses cause diseases that mainly affect the larvae. Adult bees are often attacked by protozoa, viruses, mites, and insects. In Brazil, in general, the occurrence and damage caused by diseases and certain pests are lower, mainly due to the greater tolerance of Africanized bees and the climatic conditions, which are less favorable to the spread of diseases.

Thus, until now, most beekeepers do not need to use antibiotics or pesticides in their hives, which has guaranteed the obtainment of products free of chemical residues. This fact favors the commercialization, especially to other countries that do not accept medicines or pesticides residues in bee products.

However, for Brazilian products to continue to have this advantage, beekeepers must be attentive to the sanitary situation of the hives, knowing how to recognize the abnormalities that indicate the presence of diseases and natural enemies.

In general, the occurrence of diseases and natural enemies in beehives has not been a limiting factor for beekeeping activity in Brazil, mainly due to the greater tolerance of Africanized bees and climatic conditions less favorable to the dissemination of diseases. However, due to the risks of introduction of new diseases in the country that can cause serious damage to the activity, it is important to make beekeepers

aware of the need to pay attention to the health situation of the hives, knowing how to recognize symptoms that indicate the occurrence of problems of this nature.

1.1 OFFSPRING DISEASES

Diseases in brood usually cause more damage than in adult bees. In order for the beekeeper to recognize the symptoms of diseases it is important to know the different stages of brood development and the appearance of a comb with healthy brood.

2 EUROPEAN PUTRID CREATURE (EPC)

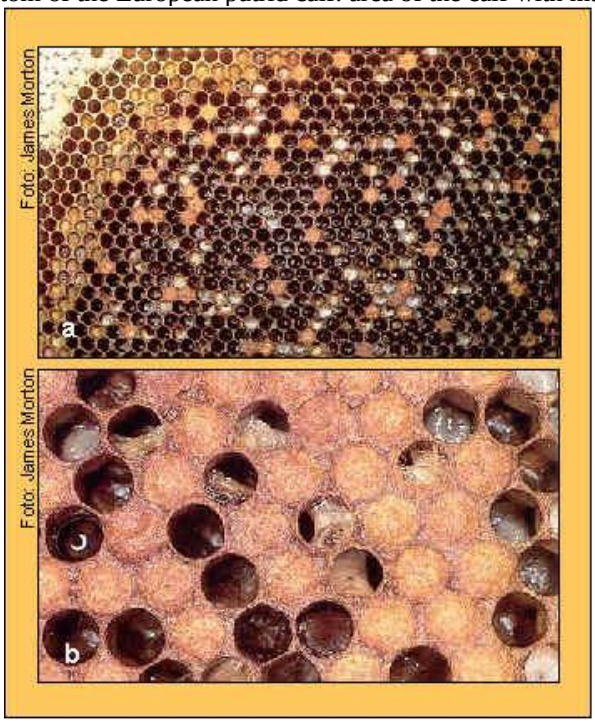
Causing agent: The disease is caused by the bacterium Melissococuspluron. The young become infected when they eat contaminated food.

Occurrence and damage: can occur throughout the country, but usually does not cause serious damage.

2.1 SYMPTOMS:

- The symptoms usually appear at the beginning of a nectar flow.
- Favors with many flaws and perforated or sunken operons (Fig.1).
- Death usually occurs at the larval stage, when the body is in a "C" shape at the bottom of the cell, before the alveoli are operculated.
- The sick larvae can also die at a later stage, when they are weaving the cocoon. In this case, instead of being at the bottom of the cell, they appear contorted, on the walls of the alveoli.
- Larvae without characteristic turgidity, i.e. wilted.
- They can have a putrid smell (of rotting, decomposing material) or not.

FIGURE 1 -Symptom of the European putrid calf: area of the calf with many faults



2.2 PREVENTION AND CONTROL:

- Remove the frames with sick cubs.
- Change the queen to a more disease-tolerant one.
- Avoid using contaminated equipment when handling healthy hives.

3 AMERICAN PUTRID CREEP (ARC)

Causing agent: The disease is caused by the bacterium Paenibacilluslarvaesubsp. larvae. The larvae become infected when they eat contaminated food.

Occurrence and damages: in Brazil, spores of this bacterium were isolated in bees and honey from hives without symptoms in Rio Grande do Sul state (Schuchet al., 2003). The contamination may have occurred by the feeding of bees with imported honey and pollen contaminated with the bacteria, or even by the collection, by honey bees, of contaminated food in a warehouse. In this case, the Brazilian government took immediate measures to eradicate this pathogen in that region (Gonçalves, 2004).

This disease can cause serious damage, because its control is very difficult. The bacterium produces spores that survive on larval food1 and the remains of dead bee larvae (scales) for many years. These spores are highly resistant to heat, dehydration, direct sunlight and disinfection by various chemicals (White, 1920; Rose, 1969; Máchová, 1993; Miyagiet al., 2000; Evans, 2003).

3.1 SYMPTOMS:

- Failed brood combs (Fig. 2a) with perforated opercula (Fig. 2b). blackened and sunken.

- The pupa dies at the larval (prepupa) or pupal stage, when the body is in an upright position in the cell.
- Larvae change color from pearly white to yellow to dark brown.
- Putrid smell of the offspring (pre-pupa or pupa).
- Dead larvae have a viscous consistency, especially when they are dark brown in color. To check for this symptom, one can perform the toothpick test, which consists of inserting a wooden stick (such as a matchstick or similar) into the pupa, crushing it and pulling the stick slowly, observing if a long viscous thread of 2.5cm or more is formed (Fig. 3a).
- When death occurs in the pupal stage, one usually observes the pupal tongue extended from one side of the alveolus to the other.
- In the final stage of the disease, the offspring become dark and dry and form thin, flattened scales, usually brown or black, which adhere to the walls of the alveolus and are difficult to remove (Fig. 3b). To observe the scales it is important to have good lighting.

FIGURE 2 -Symptoms of putrid American brood: collapsed combs (a) and perforated operons (b)

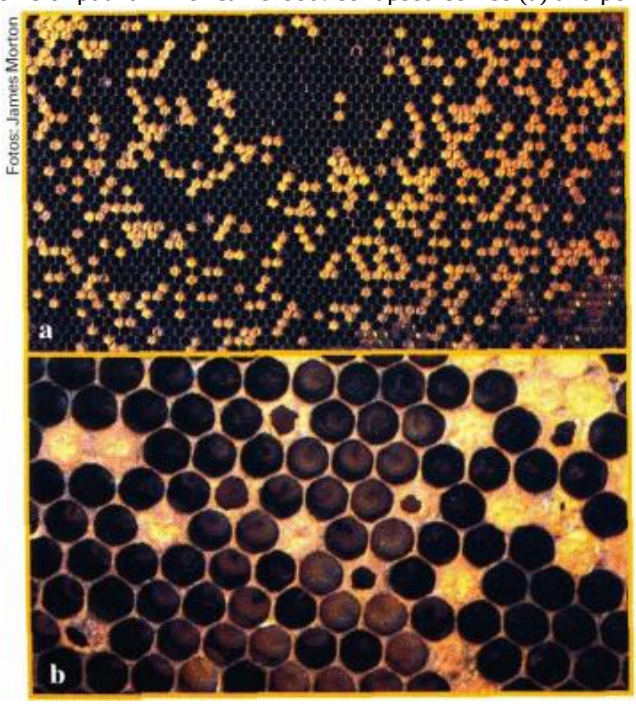
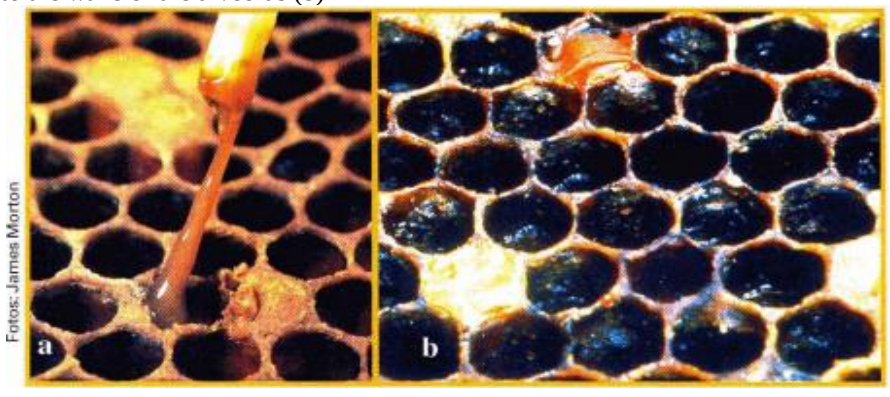


FIGURE 3 - Symptoms of putrid American brood: viscous consistency of the toothpick test brood (a) and remains of dead and dried out brood stuck to the walls of the alveolus (b)



3.2 PREVENTION AND CONTROL:

Do not use antibiotics for preventive or curative treatment, because this can lead to resistance of the bacteria and contaminate the products in the hive, besides being an additional expense for the beekeeper. Preventive treatment can also "hide" the symptoms of the disease.

When the beekeeper suspects the occurrence of ARC in his apiary he should take the following steps:

- Mark the colonies with symptoms of ARC.
- Make notes about the affected colonies and report the occurrence to your association and competent institutions, such as: education and research institutions that work with Apiculture, Brazilian Apiculture Confederation (CBA), Federal Superintendence of Agriculture, National Health Surveillance Agency (ANVISA).
- Send samples of the combs with symptoms to laboratories specialized in the diagnosis of bee diseases. Clean handling equipment (gloves, chisel, fumigator etc.) and do not use them in healthy colonies. Sterilization of equipment can be done with sodium hypochlorite (bleach).
- Once the disease has been confirmed by the results of laboratory analysis, destroy the affected colonies. For this, you can either burn the entire hive or, if the beekeeper wants to preserve the boxes, kill the adult bees and then burn them together with the combs. If you want to reuse the boxes, they must be sterilized.
- Sterilization of the boxes can be done in two ways: by soaking the pieces in paraffin at 160°C for 10 minutes or in 0.5% sodium hypochlorite solution for 20 minutes.

To avoid the spread of this serious disease in Brazil, beekeepers must be very careful never to use imported honey or pollen to feed their bees in the off-season, because they may be contaminated and, consequently, will contaminate the hives.

These products (imported honey and pollen) may be sold at low prices, and it seems advantageous to use them to avoid losing swarms. However, this could cause serious damage in the future if the disease is introduced and spread in the region.

4 BAGGED BROOD

Causative agent: in several countries the disease is caused by the "SacBroodVirus" (SBV). In Brazil, this virus has not been officially detected. However, the disease that occurs with similar symptoms is caused by the pollen of the barbatimáo plant (Stryphnodendronsp.) and has therefore come to be called Brazilian bagged calf.

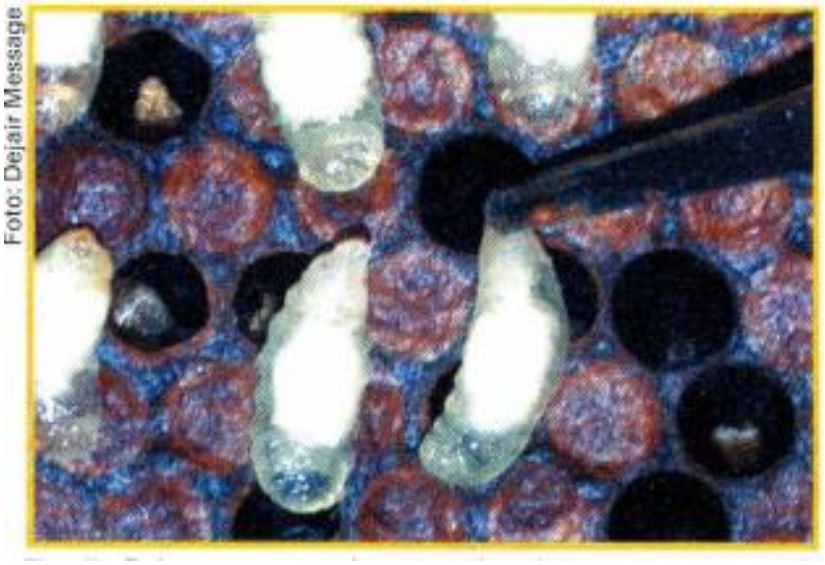
Occurrence and damage: The disease occurs in cerrado areas where the barbatimão plant is found and has caused damage in several regions, mainly in southeastern Brazil. In some cases, it can cause 100% mortality of offspring, destroying a strong colony in less than two months (Message. 2002).

4.1 SYMPTOMS:

- Faulty brood combs and opercula usually punctured or completely removed.
- Death occurs in the pre-pupa stage, when the cells are already operculated and the larva presents the body in a straight (vertical) position in the cell.
- The sick offspring do not have a putrid smell.
- Coloration of the young: light gray, brown or dark gray (Fig. 4).

Fluid forms between the integument/epidermis of the larva and pupa in formation. When the sick pupa is carefully removed from the alveolus with the help of tweezers attached to the head region, it has a sac-like shape (Fig. 5). Accumulation of liquid is observed in the lower part and a white mass in the upper part, which corresponds to the body of the pupa that was in formation.

FIGURE 4 -Prepupae with symptoms of Brazilian bagged brood.



4.2 CONTROL:

- Avoid installing the apiaries in places with incidence of the barbatimão plant.
- Offer artificial feeding (pollen substitute) to the hives at the time of flowering, in order to reduce mortality. This feeding should be started 30 days before the beginning of flowering.
- Transport the hives to other locations with good availability of blooms (migratory beekeeping) during the upwelling of the barbatimão.
- Some beekeepers recommend avoiding handling affected hives as a way to reduce swarm loss.

Create Chalk

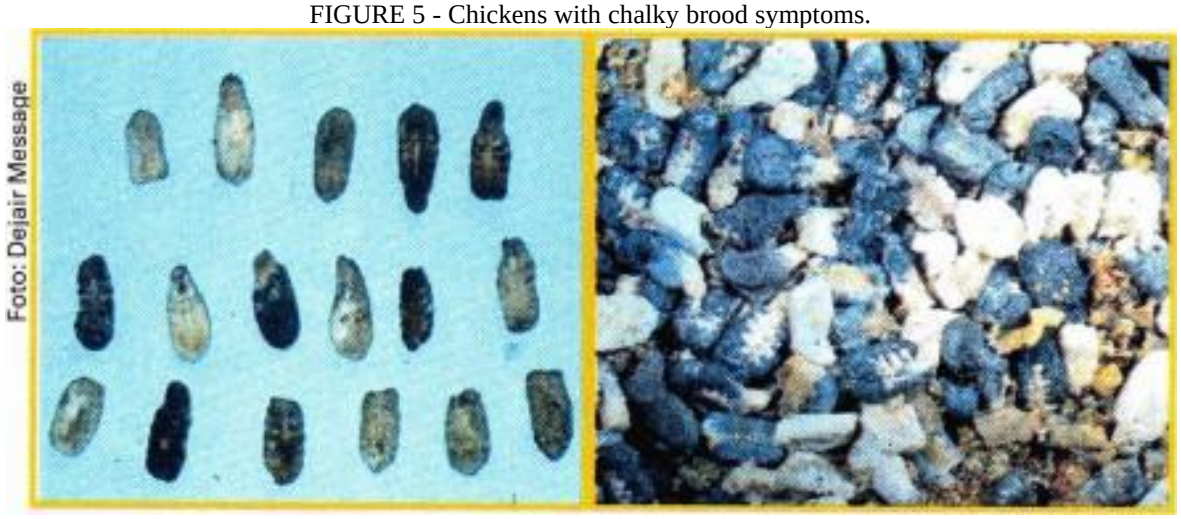
Causative agent: Chalky mildew is caused by the Ascosphaeraapis fungus.

Occurrence and damages: The incidence of this disease in Brazil has been low, with reports of few cases in Rio Grande do Sul, São Paulo and Minas Gerais. There is a possibility that it can be introduced by feeding contaminated imported pollen to the hives.

4.3 SYMPTOMS

- Brood combs with gaps and usually perforated opercula.
- Death occurs at the pre-pupa or pupa stage.
- It does not have a putrid smell.
- The dead calf has a white or dark gray coloration and a mummified appearance (stiff and dry) (Fig. 5).

FIGURE 5 - Chickens with chalky brood symptoms.



4.4 PREVENTION AND CONTROL:

- As a preventive measure, it is recommended not to use imported pollen for feeding the hives.
- Replace the queen with one of a more resistant strain, especially a more hygienic one. i.e. one with a greater capacity to detect and remove sick broods before the disease is spread in the hive.
- Avoid installing the beehives in places with excessive humidity.

Diseases and parasitoses of adult bees

Diseases in adult bees are more difficult to diagnose in the field because they often have similar symptoms. Therefore, for confirmation of diseases or endoparasitosis, samples should be sent to specialized laboratories, following the recommendations indicated in the item "how to send samples of bees with symptoms of diseases for laboratory analysis".

The general symptom of disease occurrence in adult bees is the presence of dead or dying bees crawling around in front of the hive. However, these symptoms also occur when bees are poisoned by insecticides.

5 NOSMOSIS

The causative agent: the protozoan Nosemaapis.

Occurrence and damages: In Brazil, it occurred with some frequency until the 1970s, and in recent years it has not been detected. The protozoan mainly affects the ventricle (bee stomach) causing problems in the digestion of food and can cause dysentery. The disease decreases the longevity of the bees, causing a decrease in the population and, consequently, in the productivity of the hives. The disease usually manifests itself in bees that are confined, for example during long distance transport of hives.

Symptoms:

- Dead bees in the foraging phase, usually when they try to fly out of the hive and fall to the ground in front of the comb. In some cases, droppings are found on the bottom of the hive, in the comb and on the combs.
- Dying bees with tremors and with difficulty in locomotion in front of the alvado. (Fig. 6).
- By removing and examining the intestines (ventricles) of a sick bee, you can see that they are milky white and break easily. The intestine of a healthy bee is straw-brown.

FIGURE 6. - Bees with Nosmosis.



5.1 PREVENTION AND CONTROL:

- Choose a suitable place to install the apiary, with clean (drinking) water.
- Exchange the combs with sick broods for new ones.
- Sanitize beekeeping materials that have been used in contaminated hives.

Acariosis

The causative agent: the endoparasitic mite Acarapiswoodi.

Occurrence and damages: like nosemosis, acariosis was more frequent until the 1970s, and is no longer considered a problem in Brazilian apiaries. The mite lodges in the thoracic aestrophea, perforating them and feeding on the hemolymph (blood of the bees). It is transmitted from older bees to younger ones. The mite attack can decrease the longevity of the bees and consequently reduce the hive population, causing production losses.

5.2 SYMPTOMS:

- Bees crawling in front of the hive and in the alvado, with their wings separated, unable to fly.

Figure 7. Acarapiswoodi.



6 NATURAL ENEMIES OF BEES

6.1 VARROADESTRUCTOR MITE

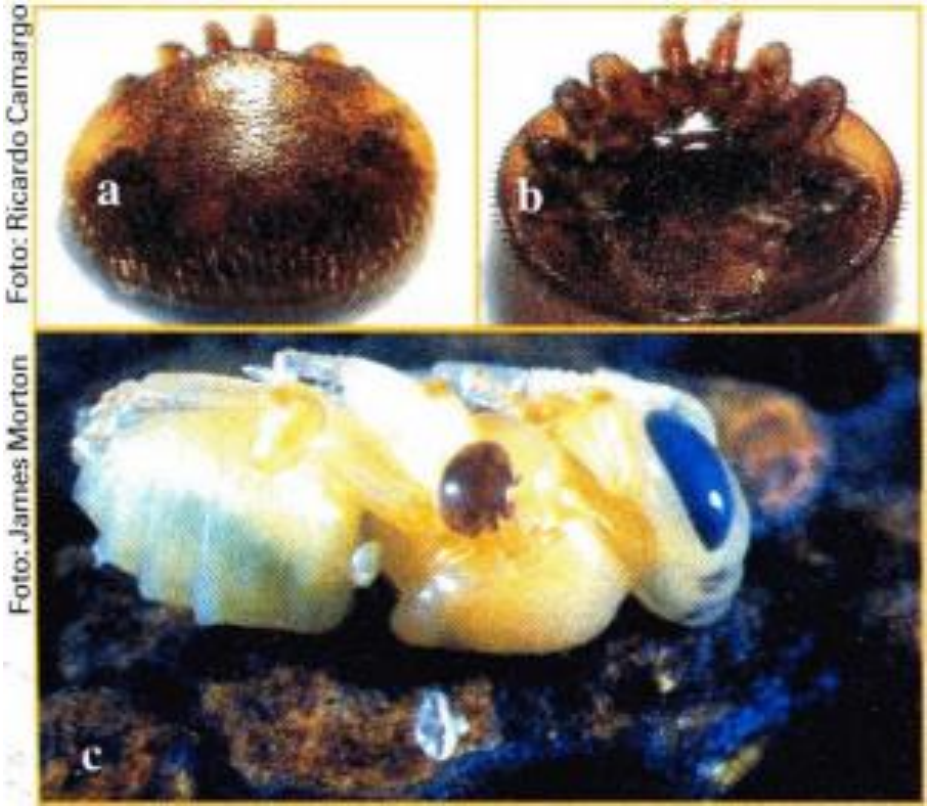
This is a mite, brown in color, that attacks both brood and adult bees (Fig. 8). Females of the mite live on workers and drones and on the young (mainly drones), where they breed. In adults, they are mainly attached to the thorax, near the base of the wings. They feed by sucking the hemolymph, which can cause reduced weight and longevity of bees and deformities in the wings and legs.

This mite, observed in Brazil since 1978, can now be found almost everywhere in the country. Fortunately, it has been found in low populations, because of the greater tolerance of Africanized bees, not causing significant damage to production. Thus, the use of chemicals for its control is not recommended.

6.2 CONTROL:

- Hives with frequent infestations of the mite should have their queens replaced with queens from more tolerant colonies.
-

FIGURE 8 - Varoa destructoc mite seen dorsally (a), ventrally (b), adult female and immature forms in worker pupa (c).



6.3 WAX MOTHS

- They are insects of two species: *Galleriamellonela* (the larger moth) and *Achroiagrisella* (the smaller moth). The adults of both species lay their eggs in small gaps in the frames and boxes, especially in weak hives. The larvae feed on wax, building galleries in the combs where they deposit silk threads. The frames become covered with large amounts of silk threads and droppings (Fig 9). Sometimes they directly affect the brood. They also cause significant damage to the combs during the off-season.

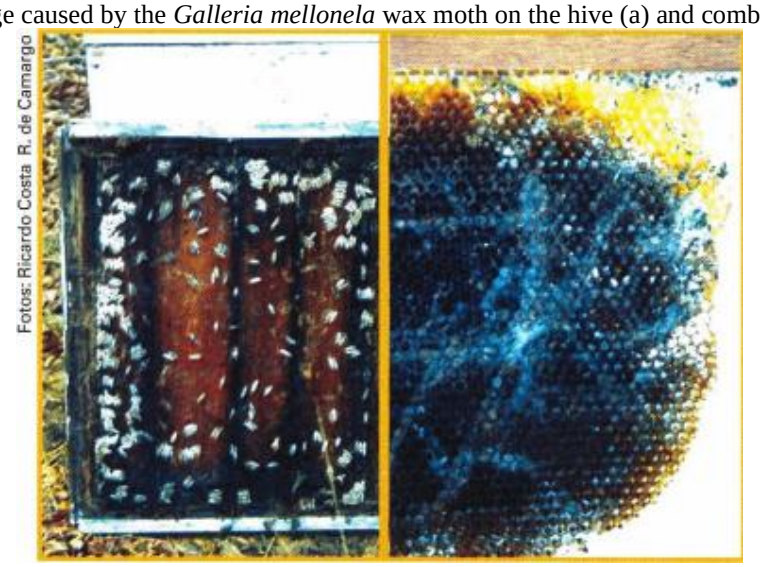
6.5 PREVENTION AND CONTROL:

Chemical control is not recommended, since the products used can leave residues in the wax, which can be transferred to the honey. Therefore, preventive management measures are recommended.

- Always keep strong hives in the apiary, since weak ones are more easily attacked.
- Reduce the hives' shades in off-season and cold seasons.

- Do not leave empty (uninhabited) hives or wax residue in the apiary.
- If you find an infestation focus in the hives, kill the larvae and pupae and remove the attacked wax and propolis with the help of a chisel, to prevent the spread of the moth in the apiary.
- Periodically replace the frames with old wax from the beehives.
- Store combs or sheets of wax in well-ventilated, bright places and, if possible, protected with a screen. Avoid storing old combs, which are preferred by moths.
- If they are observed to frequently have high moth infestation, queen replacement should be carried out to increase tolerance.

FIGURE 9 -Damage caused by the *Galleria mellonela* wax moth on the hive (a) and comb (b).



7 ANTS AND TERMITES

Ants can cause great damage, especially when they attack weak hives. They can consume the food (honey and pollen) ecrias, besides causing great wear and mortality of adult bees in an attempt to defend the colony. In severe attacks, they can cause the abandonment of the hive.

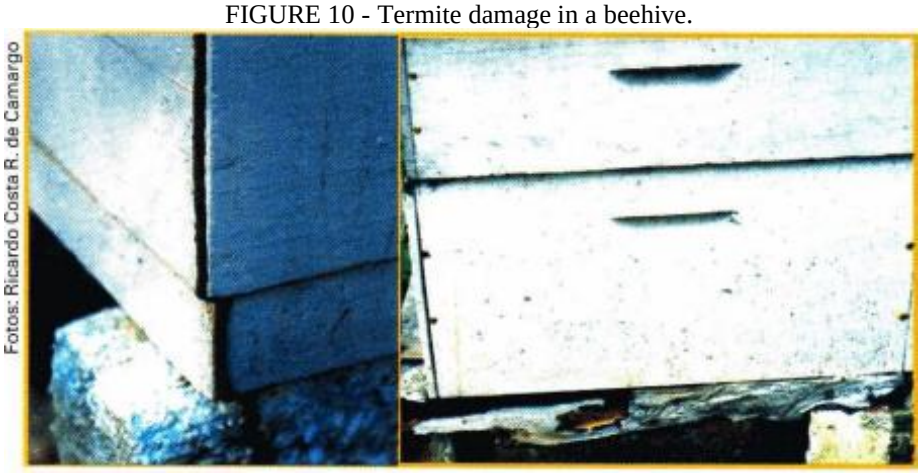
The termites damage the wood of the boxes and racks, reducing their useful life and favoring the entrance of other natural enemies (Fig. 10).

7.1 PREVENTION AND CONTROL:

As preventive and control measures against ant and termite attacks, we recommend the following

- Do not place the hives directly on the ground.
- Destroy ant and termite nests found near the apiaries.
- Perform frequent weeding in the apiary, since the existence of plants near the hives can facilitate the access of natural enemies.
- Use racks with ant-protectors.

FIGURE 10 - Termite damage in a beehive.



8 CONCLUDING REMARKS

Unfortunately, bees often suffer from various pests and diseases. Some of them are minor and can be managed even after they have spread. Therefore, they will not threaten the survival of the colony. Others are devastating if they go unnoticed and can decimate hundreds of colonies in a region. It is essential that all beekeepers create a pest and disease control strategy, which can vary significantly between countries, legal issues, personal philosophy, means of production, the market for which the product is intended, etc. Exactly as with almost every other aspect of beekeeping, the management of bee diseases and pests differs significantly from place to place and a beekeeper should consult with local experts, local beekeepers' unions and associations, and of course state authorities in order to form a pest control and disease management strategy. You can do some local research and observe how and when other experienced beekeepers manage the pests and diseases of their colonies (from prevention to intervention and from chemical to non-chemical methods). However, always keep in mind that you must be very cautious when administering antibiotics or other medications. Most beekeepers stop the administration of all medications before about 2 months of the large honey production flow; otherwise they run the risk of the honey harvest being contaminated.

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Chapter 57

Genetic testing for hereditary cancers and nutritional genomics

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Maria Aderuza Horst

ABSTRACT

The sequencing of the human genome has allowed an unprecedented scientific and technological advance, enabling the genetic mapping of individuals in order to predict the risk of developing some diseases, and even direct the best treatment, personalized according to the individual genotype. Studies in this area have been contributing to the advancement of precision medicine and, consequently, to better prevention or more effective treatments. In this context, cancer has been the focus of study for many researchers .1

Keywords: Genetic Testing, Nutritional Genomics.

1 INTRODUCTION

The sequencing of the human genome has allowed an unprecedented scientific and technological advance, enabling the genetic mapping of individuals in order to predict the risk of developing some diseases, and even direct the best treatment, personalized according to the individual genotype. Studies in this area have been contributing to the advancement of precision medicine and, consequently, to better prevention or more effective treatments. In this context, cancer has been the focus of study for many researchers .[1]

Despite the advances in oncology and the dissemination of knowledge about the pathophysiology and biological aspects of carcinogenesis, the prevention, treatment, and prognosis of different types of cancer still pose many challenges. Most of the available treatments are still unspecific and sometimes ineffective, besides resulting in serious adverse effects[2] . In this sense, the preventive approach or more assertive treatment, especially when based on genetic and molecular data, emerges as one of the greatest advances in modern medicine.

Genetic testing is capable of early detection of the risk for several types of cancer, both hereditary associated with high-penetrance mutations in specific genes, and sporadic associated with polymorphisms in several genes. Thus, individuals who have a higher chance of developing cancer can optimize preventive measures, as well as detect the disease early if they develop it. Genetic diagnosis can also contribute to a more effective treatment of neoplasms[1] .

The human genome is composed of approximately 21,000 to 25,000 genes, and the basic principles of Mendelian genetics provide the foundation for understanding the inheritance patterns of these genes. When different versions of a gene (the alleles) occur in germ cell lines (i.e., in the egg and/or sperm), these alleles can be passed on to offspring. Not all variant alleles are harmful, with most being clinically

insignificant. However, some characteristics of metabolism can be altered by these variations. Most traits are influenced by several genes, but some traits can be altered by a single gene. In the case of cancer risk, genetic variations or mutations in a single gene can result in important changes in both translated protein and the regulation of expression and activity of important genes[3] .

It is estimated that between 5% and 10% of all cancers have their origin associated with germ cell mutations and are attributable to an inherited cancer predisposition syndrome. Identifying individuals with mutations associated with the development of inherited cancer syndromes is therefore a relevant strategy in the post-genome era. This identification makes it possible to provide preventive care and early treatment to patients based on their genetic *status*[4] . All this enables short- and long-term management of cancer patients. For example, in the short term, genetic testing for *BRCA1* and/or *BRCA2* mutations related to breast cancer development can influence surgical decisions and impact treatment options. Already in the long term, cancer patient survival plans can be adapted to incorporate surveillance and prevention strategies for second tumors. In addition, predictive genetic testing can be performed on patients' family members, enabling more accurate risk assessment and appropriate prevention strategies .[3,5]

The mutations that determine hereditary cancer predisposition syndromes occur in germ cells, and therefore all cells in the individual's body carry the genetic mutation, even when they are healthy. Thus the inherited mutation itself triggers the formation of defective cells, increasing the risk of tumors. When a non-hereditary cancer develops, the genetic mutations are usually seen only in the tumor cells. In this case the increased risk of cancer development is mostly due to the interaction between genetic and environmental factors. The interaction between these two factors favors the appearance of mutations and initiating cells, which proliferate and give rise to preneoplastic lesions, with consequent evolution to cancer. Environmental factors are capable of causing genetic and epigenetic changes in the DNA sequence, with consequent changes in gene transcription patterns. Thus, the interest in understanding the relationships between genetic aspects and different types of cancer, as well as the impact of external factors on the development of the disease has grown[6] .

In this sense, it is already known that diet and lifestyle modulate the risk for several types of cancer. However, studies have evolved and now bring not only physiological and epidemiological responses, but also the influence of diet at the molecular level[7] . Thus, the current scientific knowledge allows elucidating the mechanisms by which nutrition could modulate gene expression and epigenetic events capable of reducing the risk of developing cancer, and other diseases[8] .

In this aspect, nutritional genomics emerges as a promising tool for the prevention and treatment of cancer, contributing significantly to precision medicine. Through nutritional genomics studies, researchers seek to understand how genetic variations influence the expression of certain genes, and also to identify disease-related variants that can be modulated by dietary intake. Thus, it becomes possible to identify the

ability of nutrients and bioactive compounds to modulate the metabolism of carcinogens and carcinogenesis. It is worth noting that the relationship between diet and cancer is ambiguous, and diet can trigger both protective and carcinogenic and/or mutagenic effects . [2,6,7,9]

In this chapter, some examples of hereditary cancers that are associated with high-penetrance mutations and are addressed in genetic testing are described. Also described are some specific relationships between genetic polymorphisms and the risk of developing some types of cancer, as well as the role of nutritional genomics in this process.

2 NUTRITIONAL GENOMICS AND CANCER

Long-standing studies have shown that not all individuals respond in the same way to one type of diet[7] . One of the goals of precision cancer medicine is to identify interactions between diet and cancer development on an individual basis, according to genome-specific genetic variations[6] . The term Nutritional Genomics encompasses the subdisciplines Nutrigenomics, Nutrigenetics and Nutritional Epigenomics, which refer to how nutrients and genes interact, and how they are expressed to reveal phenotypic outcomes, including metabolic endpoints and the risk of developing diseases such as cancer[10] .

There is already a consensus in the literature that a dietary pattern rich in *natural* foods, including polyunsaturated lipids and complex carbohydrates, rich in fiber, vitamins, minerals and bioactive compounds, and with low amounts of ultra-processed foods, has a protective effect against the development of cancer. However, more recent proposals suggest that specific nutrients and bioactive compounds may act more directly at the molecular level, inhibiting the growth of tumor cells[6] .

The most studied hypotheses on the relationship between food and cancer development include the action of nutrients and bioactive compounds in modulating the expression of genes involved in cell division processes, altering the progression of neoplastic cells; in DNA repair, correcting errors and DNA adducts; and in apoptosis, influencing the death of cancer cells[9] . Some nutrients and bioactive compounds may also act in molecular pathways that are able to interrupt tumor genesis, contribute to the effectiveness of chemotherapy and reduce the adverse effects of treatment .[6]

For this, the relationships between nutrients or bioactive compounds in food and DNA are studied, in an attempt to elucidate the interaction between diet and gene expression and epigenetic processes, such as the pattern of DNA methylation, post-translational modifications in histones, and the expression of microRNAs. Such responses at the molecular level help in the understanding of how nutrition influences individual health status, in reducing the risk of developing neoplasms, and also in the prognosis of cancer patients . [6,7,9]

Irimie et al.[6] describe cancer as the result of successive genetic and epigenetic alterations, with consequent changes in gene transcription patterns. Epigenetic events are processes that influence gene

expression without altering the nucleotide sequence of DNA, i.e., without the involvement of mutations. These are, for example, changes in chromatin conformation, most often by DNA methylation or by modifications of histones, causing compaction or unpumping, which result in lower or higher gene expression activity, respectively. The magnitude of these reactions is influenced by environmental lifestyle factors, including diet. Epigenetic modifications are transmitted between human generations via DNA and can result in an increased risk of developing diseases, including cancer. Epigenetic reactions can activate proto-oncogenes or inhibit the expression of tumor suppressor genes and thereby initiate carcinogenesis .[7,9]

Deficiency of specific nutrients can negatively regulate epigenetic reactions and silence tumor suppressor genes, allowing cancer cells to proliferate rapidly. On the other hand, the positive actions that adequate intake of nutrients and bioactive compounds exerts on health are already well established in the literature[7] . Every individual can benefit from a diet that helps prevent cancer, however, special attention should be given to patients at increased risk for this disease. Therefore, some nutrients act in the regulation of mechanisms involved in carcinogenesis, and this knowledge can be applied in conducts to reduce the risk of developing the disease or even to aid in treatment.

In general, nutrients and bioactive compounds act on carcinogenic metabolism by regulating the expression of genes that encode DNA repair enzymes, genes involved in cell proliferation, apoptosis, cell differentiation, inflammation, angiogenesis, and antioxidant balance. The most studied nutrients and compounds already related to cancer metabolism are curcumin, genistein, resveratrol, ursolic acid, lycopene, capsaicin, silymarin, catechins, isoflavones, indole-3-carbinol, saponins, phytosterols, lutein, vitamin C, folate, beta carotene, vitamin E, flavonoids, selenium, and dietary fiber[11] . In this chapter, the role of nutritional genomics is described in a timely manner along with the topics specific to each cancer type.

3 HEREDITARY CANCER AND NUTRITIONAL GENOMICS

3.1 GENETIC TESTING AND HEREDITARY CANCER SYNDROMES

The hereditary cancer syndrome is a genetic predisposition to several types of cancer, usually with onset at an early age and caused by pathogenic variants in one or more genes in germ cells. It accounts for 5-10% of all cancers and has peculiar clinical features, such as early age onset, high lifetime risk for multiple primary tumors, and cancer occurring in successive generations of the family. While a mutation (or variant) is defined as any change in the DNA sequence, a deleterious mutation (or pathogenic variant) means a change that results in an individual's increased predisposition to a particular disease or disorder. Often, these pathogenic variants result in an increased predisposition to develop cancer and can be passed on between generations in the same family. The most common hereditary cancer syndromes include

hereditary breast and ovarian cancer, Lynch syndrome, Li-Fraumeni syndrome, Cowden syndrome, Peutz-Jeghers syndrome, and hereditary diffuse gastric cancer . [12]

Most inherited cancer syndromes exhibit autosomal dominant inheritance involving genes that primarily control the cell cycle or DNA repair[3] . For example, the *BRCA1* and *BRCA2* genes are involved in maintaining genome stability, specifically DNA repair, and are considered tumor suppressor genes. Mutations in these two genes confer a 45 to 75% chance of developing breast cancer and an 18 to 40% chance of developing ovarian cancer over a lifetime[13,14] . Another example is that approximately 80% of individuals with Lynch syndrome have variants in at least one of the DNA *mismatch repair* (MMR) genes: *MSH2*, *MLH1*, *MSH6*, *EPCAM*, and *PMS1*[15] . In individuals with hereditary diffuse gastric cancer, mutations in the *CDH1* gene, which codes for a tumor suppressor protein, are detected in 30 to 46 percent of cases .[16]

With the knowledge of the specific relationships between genetic mutations and the type of hereditary cancer to which they are linked, genetic testing for a single gene or for a limited number of genes has emerged. These tests were at first performed on patients already diagnosed, and later the possibility emerged of testing family members for early diagnosis or preventive interventions. For a long time, single gene analyses were used for the detection of the genetic cause of hereditary cancers. However, with recent advances in *next generation sequencing* (NGS) techniques, multigene or multi-panel tests have become more widely available and affordable, allowing their application in clinical practice. These panels allow the evaluation of several genes simultaneously, increasing the speed of obtaining results with relatively lower costs compared to single-gene sequencing. In addition to its fast, efficient and cost-effective approach to testing multiple cancer susceptibility genes, this type of analysis enhances the discovery of new risk genes and contributes to the individualized care of cancer patients[12,17,18] .

With these advances, associations and *guidelines in* the area have begun to include genetic testing in their recommendations. The objective is to use the genetic panel, that is, the analysis of several genes simultaneously, to evaluate the risk of an individual developing certain types of cancer. However, the information obtained so far is limited and this type of diagnosis should be made with extreme caution . [19]

In Brazil, the Brazilian Society of Medical Genetics and Genomics (SBGM) issued in 2020[18] a technical opinion that points out that the evolution of studies in genomics has elucidated the relationship between causal factors and the diseases developed, but that from the moment it started to be applied in clinical practice it promoted a revolution in modern medicine. It is a new technology, capable of providing a more specific diagnosis for a number of diseases, including cancer. However, it brought with it a series of concerns and technical and ethical difficulties. SBGM points out that, despite the availability of several genetic panels in the market, a panel with a higher number of genes does not always mean a more resolutive

panel or a panel with greater clinical relevance. Thus, the health professional who is evaluating these panels needs to have technical knowledge about which genes are relevant for each case studied . [18]

Complete panels, with high sensitivity and specificity to evaluate the risk for a given type of cancer are not yet available, because there is not enough evidence to base this type of decision. Therefore, the selection of genes to be sequenced, as well as the phenotypic effects of the genotype, are limited to the relationships already observed in the studies performed so far. Similarly, the establishment of criteria to refer a patient for genetic testing is a challenge of current medicine . [3,19]

Prior to genetic testing, hereditary cancer risk assessment starts from the patient's medical history and is key to identifying families that may be at higher risk for developing certain types of cancer. The *American College of Obstetricians and Gynecologists*[12] has highlighted some situations that suggest the possibility of a hereditary cancer syndrome:

a) Diagnosis of breast, ovarian, or colon cancer at a very young age, or under 50;
b) Occurrence of different types of cancer in the same individual;
c) Multiple primary tumors, especially in the same organ (such as breast or colon), in the same individual;
d) Several close relatives presenting with the same type of cancer (for example, a mother, daughter and sisters with breast cancer);
e) Unusual diagnosis of a specific type of cancer (for example, breast cancer in a man);
f) The presence of specific benign conditions, such as skin growths or skeletal abnormalities, which are known to be associated with hereditary cancer syndromes;
g) Occurrence of certain types of cancer that are related to the diagnosis of hereditary cancer syndrome:
    - Triple-negative breast cancer with no estrogen and progesterone receptor expression and lack of HER2 over-expression (suggesting hereditary breast and ovarian cancer syndrome);
    - Epithelial ovarian cancer, cancer of the uterine tubes, or peritoneal cancer, especially those with serous histology (suggestive of hereditary breast and ovarian cancer syndrome);
    - Colorectal cancer with deficiency of DNA mismatch repair enzymes (suggesting Lynch syndrome);
    - Endometrial cancer with deficiency of DNA mismatch repair enzymes (suggesting Lynch syndrome).

The *National Comprehensive Cancer Network* (NCCN) has published *guidelines* containing the criteria for conducting genetic panels in individuals who are predisposed to developing breast, ovarian, pancreatic, and colorectal cancer. Laduca et al.[19] pointed out the need to review these pre-established criteria. The authors observed that even patients who did not meet the criteria for the test ended up developing cancer. With this, it was suggested that these criteria are not sensitive enough to detect the risk of developing cancer in some patients and interfere with the benefit of preventive strategies for these individuals[19] .

Besides the need to improve the criteria pre-established worldwide for genetic testing, national studies are still needed. Most cancer genomic studies are carried out in North America and Western Europe, populations that do not fully represent the Brazilian genetic base, which is considered to be mixed. Currently, the Brazilian heritability of cancer risk has been widely explored, seeking to allow the development of more reliable surveillance approaches and medical guidelines to guide the management of individuals carrying pathogenic germline mutations.

In this context, Vidal et al.[20] built a custom panel for detection of hereditary cancer mutations. This panel included 16 high- and moderate-penetrance genes previously associated with hereditary cancer syndromes (*APC, BRCA1, BRCA2, CDH1, CDKN2A, CHEK2, MSH2, MSH6, MUTYH, PTEN, RB1, RET, TP53, VHL, XPA*, and *XPC*). For panel validation, 71 individuals diagnosed with or with a family history of hereditary cancer syndromes were selected and subjected to genetic testing. The researchers identified a total of eight pathogenic variants in 12 individuals (16.9%). Among the mutated individuals, 50 percent were diagnosed with breast cancer and had mutations in *BRCA1*, *CDH1*, and *MUTYH*. Another 33.3% were individuals diagnosed with polyposis or had family cases and carried pathogenic mutations in *APC* and *MUTYH*. The remaining individuals (16.7%) were gastric cancer patients with pathogenic variants in *CDH1* and *MSH2*. In total, 54 (76.05%) individuals had at least one variant *of uncertain significance* (VUS). Out of a total of 81 VUS, seven were suggested to have the potential to cause disease .[20]

Despite the need for new studies and guidelines, current information already makes some genetic testing possible. Thus, if a health assessment suggests an increased risk of hereditary cancer syndrome, referral to a cancer genetics specialist or a health professional with expertise in genetics is recommended. This allows for expanded family history information collection and specific risk assessment. This information can lead to genetic testing for cancer screening, counseling for risk reduction measures, or both. The following describes the major genes involved in the most common hereditary cancer syndromes in commercially available genetic panels.

3.2 HEREDITARY BREAST AND OVARIAN CANCER

Hereditary breast and ovarian cancer syndrome is characterized by the occurrence of breast cancer, ovarian cancer, or both in several individuals in the same family. It is most commonly caused by pathogenic germ cell variants in the DNA repair genes *BRCA1* and *BRCA2*. However, mutations in *ATM, BARD1, BRIP1, CDH1, CDKN2A, CHEK2, MSH6, NBN, NF1, PALB2, RAD51C, RAD51D,* and *TP53 genes* have also been detected in patients diagnosed with these cancers[19,21] . According to the NCCN *Guideline*[22] , mutations in *BARD1, CDH1, CHEK2, NF1, PTEN* and *TP53 genes* are associated with increased risk of breast cancer, but there is insufficient evidence for increased risk of ovarian cancer. *BRIP1, MSH2, MLH1, MSH6, NBN, PMS2, EPCAM, RAD51C,* and *RAD51D genes, on the* other hand, have limited evidence to be associated with breast cancer, but are strongly associated with ovarian cancer. The *ATM, BRCA1, BRCA2, PALB2* and *STK11* genes have evidence of association with both types of cancer and the *CDKN2A* gene has not shown sufficient evidence to be associated with either cancer[22] .

Although pathogenic variants in *BRCA2* are classically associated with breast and ovarian cancers, they can also be associated with pancreatic cancer and melanoma. In men, pathogenic variants in *BRCA2* are associated with breast and prostate cancer. Therefore, at the time of the family history survey, it is important to investigate about relatives of both sexes and of maternal, and paternal ancestry . [23]

Hereditary breast and ovarian cancer syndrome, as well as many of the other hereditary cancer syndromes, exhibit incomplete penetrance, meaning that not all people with the mutation will develop cancer. Women with a genetic diagnosis of predisposition to hereditary breast and ovarian cancer syndrome have a 65 to 74 percent lifetime risk of developing the disease. When considered alone, mutations in *BRCA1* and *BRCA2* are associated with a 39 to 46 percent and 12 to 20 percent risk of developing the disease, respectively . [24]

Another issue to consider is ethnicity, the frequency of carriers of the hereditary breast and ovarian cancer syndrome is approximately 1 in 500 individuals in the general population. However, the prevalence is higher in the Ashkenazi Jewish population, in which it has a prevalence of 1 in 40 individuals[25] . The results of the testing of these genes can lead to an increase in the frequency of mammography, other preventive exams and even surgical interventions to reduce the risk of developing breast and/or ovarian cancer .[5]

With regard to nutritional genomics, some relationships have been established. In the study by Kim et al. [26]women who used any folic acid supplement had a significantly reduced risk of breast cancer compared with women who never used a folic acid supplement. Such an association was significant only for *BRCA1* mutation carriers[26] . On the other hand, evidence suggests that the use of high doses of folic acid, reflecting high plasma concentrations of folate, may increase the risk of breast cancer. Such a hypothesis was evaluated in a prospective study involving 164 women with a *BRCA1/2* mutation, in which

high plasma folate concentrations were associated with an increased risk of breast cancer. The authors point out that additional studies with a larger sample size and longer follow-up periods are needed to clarify the relationship between folate status and breast cancer risk in women at increased risk for this disease. Thus, careful evaluation from biochemical tests is recommended before recommending folic acid supplementation as a preventive measure for breast cancer risk in women with *BRCA1/2* mutation .[27]

In an interesting review on nutrigenomics and breast cancer, it is highlighted that women with *BRCA1* mutations seem to benefit from an increased consumption of coffee, which has a protective effect against cellular DNA damage, and represents a potential anticancer agent. Other studies, with individuals carrying *BRCA1* mutations have also observed protective effects of genistein (soy), selenium, folate, cobalamin, iron, fruits, and vegetables in general. Additionally, they describe protective effects of soy, genistein, fruit and vegetable consumption for *BRCA2* mutation carriers .[28]

The association between breast cancer and diet is complex, multifactorial, and nonlinear. Classic nutritional epidemiological surveys have shown conflicting results, showing a modest association between diet and breast cancer risk. This may be as a result of the complexity of the disease, which is multifaceted and highly heterogeneous. Histological and, recently, molecular classifications have helped support the theories of a very complex picture. From molecular details and studies of nutrigenetics and nutrigenomics, there will be advances in knowledge, illuminating the molecular context of breast carcinogenesis and paving the way for personalized treatments[29] .

3.4 LYNCH SYNDROME

Lynch syndrome is caused by mutations in DNA repair genes and is characterized by an increased risk of developing colorectal and endometrial cancer. Approximately 3% of patients with colorectal cancer and 2% of patients with endometrial cancer are diagnosed with Lynch syndrome. These patients should also be screened for cancers of the ovaries, stomach, urinary tract, bowel, biliary tract, and skin, as they may be at increased risk for these types[30] .

Currently, investigation for the diagnosis of Lynch syndrome is already recommended for patients with colorectal or endometrial cancer, especially in the presence of deficiency of DNA repair proteins. The main genes involved with increased risk for this syndrome are *PMS2*, *MLH1*, *EPCAM*, *MSH2* and *MSH6* .[12,30]

Although the recommendations related to the screening for Lynch Syndrome through genetic tests are still limited, the result of the genetic test can guide preventive measures, such as increasing the frequency of imaging exams (colonoscopy, uterus and ovaries ultrasonography) and even preventive surgical measures (oopherectomy, hysterectomy). In the United States, there is a recommendation to perform colonoscopy every 1 or 2 years, in these cases, starting at the age of 20 to 25 years in individuals

with mutations that determine high risk for Lynch Syndrome. However, this type of recommendation remains controversial because of the discomfort caused by these tests and the inconsistent results of studies on the benefits of performing them more frequently .[30]

Specific studies of nutritional genomics and Lynch Syndrome are scarce in the literature. An interesting example is the GEOLynch cohort study, which included 486 people with mutations in genes associated with Lynch Syndrome, assessed food intake. Information was collected using a food frequency questionnaire and four dietary patterns were established by principal component analysis: "Prudent": high consumption of fruits and vegetables, whole grains, low-fat cheeses and yogurt, poultry, fish, green and herbal tea, and added sweets; "Meat" high consumption of poultry, beef and pork, processed meats and coffee and low consumption of whole grains, peanut butter, cakes and cookies, vegetarian products and soy-based desserts; "Snack": high consumption of French fries, fried snacks, fast food snacks, spring rolls, mayonnaise-based, fat and butter-based sauces and cooking sauces, peanut sauce, ketchup, candy and diet soda; and the "Cosmopolitan" pattern: high consumption of leafy vegetables, tomatoes and garlic, refined grains, fish, sauces, tomato sauce, cream, low-fat margarine, sandwiches and wine[31] .

During an average follow-up of 20 months, 58 people were diagnosed with colorectal cancer and individuals classified in the highest tercile of the "Prudent" dietary pattern had a lower risk of cancer compared to the lowest tercile. In contrast, individuals with high scores for the "Meat," "Snack," and "Cosmopolitan" patterns had an increased risk of colorectal adenomas: These findings suggest that dietary patterns may be associated with the development of colorectal adenoma in patients with Lynch syndrome, but the authors do not describe the mechanisms involved[31] . Also in the GEOLynch study, the authors found no association between the use of dietary supplements and the occurrence of colorectal adenomas[32] .

3.5 LI-FRAUMENI SYNDROME

Li Fraumeni Syndrome is characterized by mutations in the *TP53* gene and, among hereditary cancer syndromes, represents one of the most aggressive. Individuals with this syndrome have an increased risk of developing brain tumors, adrenocortical carcinoma, soft tissue sarcoma, bone tumors, hematologic cancers, breast cancer, lung cancer, skin cancer, gastrointestinal cancer, kidney cancer, thyroid cancer, and neuroblastoma[12,33] .

In 1990 the *TP53* gene mutation in germ cells was identified as the sole cause of Li-Fraumeni Syndrome. There appears to be a cumulative incidence of cancer in patients with Li-Fraumeni Syndrome of close to 100% by the age of 80. However, many develop malignant tumors in childhood. Therefore, individuals who develop before the age of 45 one of the four main cancers linked to the syndrome (brain, breast, sarcomas, and adenocarcinoma), are indicated to undergo the genetic test. Another criterion for indicating the test is that another family member also presents some type of cancer linked to Li-Fraumeni

Syndrome. If the individual presents some type of rare tumor linked to the syndrome, the family history is dispensable, and they are: adenocarcinoma, choroid plexus carcinoma, rhabdomyosarcoma or breast cancer before the age of 31[33] .

The *TP53* gene is a tumor suppressor gene encoding the so-called "guardian of the genome" protein, which consists of a transcription factor that is activated in response to stressors and regulates cellular defense activity culminating in the tumor suppression process. More than 250 pathogenic mutations in germ cell *TP53* have been identified .[33]

Based on the Toronto protocol, some preventive measures are recommended for individuals with *TP53* mutation and increased risk for Li-Fraumeni Syndrome, such as imaging, blood tests and a complete physical examination every 3 or 4 months. There are still no direct studies on nutritional genomics and Li-Fraumeni Syndrome. However, some authors are dedicated to studying the influence of nutrients and bioactive compounds on *TP53* regulation. For example, in a study with prostate cancer cell cultures with different known mutations in *TP53*, it was identified that phenyl isothiocyanate (PEITC), a bioactive compound found in cruciferous vegetables, shows chemopreventive action dependent on the type of mutation[34] .

3.6 FAMILIAL MELANOMA

Familial atypical multiple melanoma syndrome is characterized by a clinical picture in which there are multiple nevi (spots and moles) on the skin, a family history of melanoma, with possible associated pancreatic cancer, and occurrence at a young age. Approximately 7-15% of patients with melanoma have a family history of the disease, and of these, on average 45% are related to autosomal dominant mutations in germ cell *CDKN2A* genes. The other 55% may be related to several factors, such as the sun exposure habits of a family with skin susceptible to cancer. Thus, the main melanoma susceptibility gene is *CDKN2A*, which transcribes two distinct mRNAs that translate the p16 cyclin-dependent kinase inhibitor protein^{INK4} and the p14 tumor suppressor^{ARF} that participates in the activation of p53[35] .

Mutations in germ cell *CDKN2A* have been found in approximately 20 to 40% of melanoma-prone families (≥3 cases of melanoma in the family), but in only 0.2 to 3% of individuals with non-familial melanoma. Other high-risk but extremely rare germline mutations include the cyclin-dependent kinase 4 (*CDK4*) and *BRCA1-associated* protein 1 (*BAP1*) genes[36] . Inherited mutations in *BAP1* predispose people to hypopigmented skin melanoma, uveal melanoma, mesothelioma, renal cell carcinoma, and other cancers[37] . Other genes associated with high to moderate risk of melanoma include *ACD, BAP1, CDK4, CDKN2A, MITF, POT1, TERF2IP* and *TERT* . [38,39]

There are also reports of an increased risk of melanoma in carriers of germline mutations that cause other types of inherited cancer syndromes, including hereditary breast and ovarian cancer (*BRCA1/2*),

retinoblastoma (*RB1*), or xeroderma pigmentosum (*XPs*). The identification of individuals carrying germline mutations in melanoma predisposition genes allows their personalized surveillance, with early detection of melanoma and other associated tumors, and with genetic counseling for their relatives[35] .

Patients at increased risk for melanoma, especially those carrying mutations in *CDKN2A* or *CDK4*, should undergo periodic (every six months) and more thorough dermatologic evaluations since adolescence. These evaluations should also include mucous membranes, scalp, genital areas, and nails. These patients should be encouraged to perform periodic self-exams and to use adequate sun protection[35] . No studies were found relating this type of hereditary cancer to diet.

3.7 HEREDITARY DIFFUSE GASTRIC CANCER

Hereditary diffuse gastric cancer is a syndrome with susceptibility caused by an autosomal dominant mutation in the *CDH1* gene. This mutation also increases the risk of invasive breast cancer and colorectal cancer[12,40] . Approximately 1 to 3% of patients with gastric cancer have an inherited cause of the disease. In addition, individuals with a *CDH1 mutation* have a 70% chance of developing diffuse gastric cancer by the age of 80[40] .

The *International Gastric Cancer Linkage Consortium* (IGCLC) established criteria for *CDH1* mutation investigation in 2015. These include the occurrence of gastric cancer in two first- or second-degree relatives, one of them being diffuse gastric cancer; medical history of diffuse gastric cancer before the age of 40; family history of gastric cancer or invasive lobular (breast) carcinoma, with at least one diagnosed before the age of 50. Additional criteria include family members with a history of bilateral lobular (breast) carcinoma or multiple cases diagnosed before age 50 years; family members with diffuse gastric cancer and cleft palate or cleft lip, or any patient diagnosed with signet ring cell carcinoma and/or pagetoid (upward) spread of signet ring cells[40,41] .

In addition, an endoscopic scan is recommended for first-degree relatives of patients with the mutation in *CHD1*, even if these persons are not carriers of the mutation[40] . Gastrectomy, mastectomy and increased frequency of imaging and biopsies are much discussed prophylactic methods for these individuals[41] .

Some studies have investigated mutations in other genes and their relationship to hereditary diffuse gastric cancer. Some candidate genes to show this association are *CTNNA1*, *PALB2*, *BRCA2*, *RAD51C* and *ATM* and therefore should be considered in genetic panels for investigation of hereditary diffuse gastric cancer[40] .

With regard to nutritional aspects, there is consensus that there is a need for dietary monitoring of patients undergoing gastrectomy, whether prophylactic or as a treatment modality, especially to prevent nutritional deficiencies[42,43] . In a review of the literature followed by meta-analysis, the relative risk (RR)

of gastric cancer in the group with the highest intake of vitamins was compared to that of the group with the lowest intake. In 9 studies in which subjects received doses at least 4 times above the maximum tolerable intake (UL) of vitamins, the RR was 1.20 times. However, in 17 studies in which individuals received doses below the UL, the RR was 0.76. A dose-response meta-analysis conducted for different doses of vitamin intake showed that low-dose supplementation (vitamin A: 1.5 mg/day, vitamin C: 100 mg/day, vitamin E: 10 mg/day) is associated with a significant reduction in gastric cancer risk (29% for vitamin A, 26% for vitamin C, and 24% for vitamin E)[44] . However, there are still no nutritional genomics studies in this type of hereditary cancer.

4 SPORADIC CANCERS AND NUTRITIONAL GENOMICS

Most cases of cancer have a multifactorial and polygenic etiology, emerging from the interaction between the environment and genetic predisposition. With regard to the genetic contribution to the development of sporadic cancers, that is, cancers that are not associated with high-penetrance mutations, it is known that several polymorphisms (DNA variations that are frequent in the population - > 1%) that have a low impact on the phenotype, have an additive effect in determining the risk of developing the disease. Thus, *polygenic risk scores* (PRS) are currently suggested in an attempt to provide an approximate risk of developing cancer or other diseases[45] . PRS aggregates the effects of genetic variants in the human genome into a single score, and has recently been shown to have predictive value for several common diseases. Among the proposed included genes proposed in such models are those that code for xenobiotic metabolizing enzymes.

As part of our metabolism, our body needs to constantly eliminate the toxins produced or ingested in order to prevent the development of diseases. This process consists of transforming toxic, water-insoluble, and difficult-to-excrete products into products that can be eliminated through urine or feces. For this to happen, phase 1 or phase 2 xenobiotic-metabolizing enzymes are needed . [9]

Phase I enzymes are represented mainly by cytochrome P450 oxidases (CYP450), which add one or more hydroxyl groups to toxins to make them more soluble. However, this hydroxylation can enable binding to a DNA molecule and the promotion of carcinogenesis, making CYP450 an enzyme with oncogenic activity. Phase 2 enzymes, on the other hand, are responsible for removing toxins from the body by binding to molecules such as glutathione, glutamine, and others. Among these enzymes are glutathione-S-transferase, N-acetyltransferase, and UDP-glucoronosyltransferase. Polymorphisms in genes encoding phase 1 and phase 2 enzymes can increase or reduce the risk of developing cancer, depending on the activity of the enzyme involved and the substrates it uses[9] .

In Nutrigenomics and cancer studies, some bioactive compounds have been related to modulation of the expression of genes that encode proteins involved in cancer development. For example, sulforaphane,

an isothiocyanate that is a product of the hydrolysis of glucoraphanin found in crucifers, is able to induce the activity of genes that encode phase II enzymes and thus contribute to the detoxification process. Sulforaphane also appears to inhibit the activity of phase 1 CYP450 enzymes, reducing the activation of pro-carcinogens. In addition to the interaction with phase 1 and 2 enzymes, sulforaphane appears to act by inhibiting cancer cell proliferation, inducing cell apoptosis, and inhibiting metastasis. However, there is still insufficient evidence for the safe use of sulforaphane supplements or extracts of the plants that contain it. But it is estimated that consuming three to five servings of broccoli per week is sufficient to reduce the risk of developing cancer by 30 to 40 percent[46] .

One of the dietary components that has been extensively studied in Nutrigenetics with regard to its role in cancer is vitamin D. The most relevant biological events mediated by this vitamin occur through the interaction of its active form, 1,25 dihydroxyvitamin D_3 [$1,25(OH)_2 D_3$] with its receptor, the VDR (*vitamin D receptor)* in target tissues[47] . The binding between the active form of vitamin D and the VDR culminates in the formation of a complex with the retinoid X receptor (RXR), capable of inducing the expression of several genes, among which many related to cancer, by modulating processes such as cell differentiation and apoptosis.

Briefly, one can highlight a meta-analysis of 77 independent studies, which evaluated the association of the Fok1 SNP [the nucleotide exchange that characterizes this polymorphism is from a cytosine (C) to a thymine (T) *start codon in* the gene (Met1Thr) in the *VDR*] with the risk of developing several types of cancer among Caucasian individuals. A higher risk of developing cancer was identified in individuals carrying the TT genotype relative to the CC. The authors estimated that approximately 4,000 cases of ovarian cancer and more than 50,000 cases of skin cancer are related to the presence of the TT genotype annually worldwide[48] .

Other polymorphisms in the *VDR* have also been associated with the risk of developing cancer, mainly breast (Bsm1, Fok1), prostate and melanoma (Fok1), as well as with the prognosis of the disease, especially prostate cancer (Fok1), breast cancer (Bsm1 and Taq1), melanoma (Bsm1) and renal cell carcinoma (Taq1)[49] . However, the interactions between SNPs and other lifestyle and biological factors, such as calcium and vitamin D intake, energy intake, blood concentrations of vitamin D, level of exposure to sunlight, presence of obesity, smoking, among others, are of great importance in the relationship with the risk of developing cancer.

Finally, regarding vitamin D supplementation as a possible cancer risk reducer, it is interesting to highlight the study by Tuohimaa et al.[50] that evaluated the concentrations of 25-hydroxycholecalciferol [$25(OH)D_3$] in Norwegian, Finnish and Swedish men, and found that both low (< 19 nmol/L) and high (> 80 nmol/L) serum concentrations of vitamin D were associated with increased risk of developing prostate cancer. Therefore, the indication for supplementation should be cautiously evaluated, considering various

aspects of diet, physiological, family and behavioral history, and Nutrigenetics. Also, the impact of several other genetic variations associated with risk or protection from cancer development must be considered, which makes the study of the interaction between Nutrigenetics and cancer an intricate and fascinating challenge.

5 CONCLUDING REMARKS

The use of NGS-based multigenic test panels targeted to provide a comprehensive analysis of genes that indicate susceptibility to cancer is available from several laboratories in Brazil. Such genes are selected from studies on the prevalence of mutations in cancer patients and characteristics that determine heritability in population dimensions. While there has been much scientific advancement in genomics and its role in providing personalized care, its transition into everyday clinical care is still limited. Many barriers have been identified for clinicians to incorporate genetics into routine practice, including knowledge of available tests, clinical utility and interpretation, and the application of genetic test results. It is also worth remembering that before genetic testing is performed, the patient should be informed of the reason for the test, the impact on medical decisions, and the psychosocial impact on the individual and his or her family. There is also the need for genetic counseling before and after the test.

In addition, it is critical to take a thorough personal and family history regarding the development of cancer to determine if patients meet the criteria to be considered high risk as well as targeted for genetic testing. To do this, the *National Society of Genetic Counselors* indicates obtaining a third- or fourth-degree family history as the gold standard, which can require a great deal of work, preparation, and time. To assist in this process, the *Centers for Disease Control and Prevention* provides a free *online* tool (*My Family Health Portrait*) that can be used by patients and the information shared with their physicians .[51]

As for Nutrition, with the evolution of genomic studies, there is an increasing tendency to work with an individualized diet rather than dietary patterns for an entire population. It is hoped that precision nutrition will be able to more specifically target individual needs and contribute to the advancement of cancer treatment. For although nutrition alone cannot prevent or treat cancer, it is an indispensable component in these processes and can contribute significantly to favorable outcomes. However, some obstacles have been encountered in the development of this area of science, such as the difficulty of accepting volunteers to participate in this type of research, the high cost of genetic testing, and flaws in the instruments that estimate individual food consumption[1,9] .

Nutritional genomics is a young and expanding science, but it still exposes inconclusive results and many questions to be elucidated[8] . The precision approach in oncology seeks to provide personalized cancer treatment by considering the patient's genetic individuality, clinical, environmental, social, and lifestyle information, including diet. The challenges include voluminous, heterogeneous, and disparate data

generated by different technologies with multiple modalities, such as omics sciences (genomics, transcriptomics, proteomics, and metabolomics), electronic health records, clinical registries and repositories, medical imaging, and demographic data. Statistical methods and machine learning algorithms have continuously adapted to the increasing size and complexity of data . [52]

Precision oncology also seeks to identify target patient populations based on genetic alterations that are sensitive or resistant to conventional or experimental treatments. Predictive models have been developed for cancer progression and survival, drug sensitivity and resistance, and identification of the most appropriate combination treatments for individual patient scenarios. In the future, clinical decision support systems need to be revamped to better incorporate advancing knowledge, enabling health care professionals to deliver precision oncology care, which includes nutrition.

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Chapter 58

Relationship of COVID-19 in pediatric patients with Down syndrome: literature review

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ABSTRACT
Objective: to evaluate the relationship between down syndrome, risk factors for infection and severity of COVID-19 in pediatric patients. Methods: narrative review Results: In Covid-19's pathology, it is seen that mortality and morbidity resulting from the infection is closely related to the exacerbated immune response. In Down syndrome (DS) there is a tripling of genes encoded by chromosome 21, promoting deregulation of gene transcription throughout the DNA, especially with the production of interferons IFNAR1, IFNAR2, IFNGR2 and IL10RB, contributing to the increase of the immune response, influencing the viral response of Sars-Cov-2 and cell signaling of the inflammatory process. Conclusion: Patients with DS, due to several factors, including immune dysregulation, have an increased risk of infection by Covid-19, which, in turn, leads to a higher incidence of morbidity and mortality. There is a need to seek, therefore, different solutions for the prevention and management for patients with Trisomy 21 infected by Sars-CoV-2.

Keywords: Down syndrome, Coronavirus infections, Pediatrics, Cytokines.

1 INTRODUCTION

COVID-19 is a disease that emerged in Wuhan city in 2019, considered a pandemic by the World Health Organization (WHO) on March 11, 2020, and is the fifth documented pandemic after the Spanish flu in the year 1918 (GUAN WJ, et al., 2020; MOUSAVIZADEH L and GHASEMI S, 2020; LIU YC, et al, 2020). The pathology is caused by the "Severe Acute Respiratory Syndrome Coronavirus 2" (Sars-CoV-

2), which belongs to the subfamily Coronavirinae, family Coronavirdiae, and order Nidovirales. Furthermore, it is a ribonucleic acid (RNA) virus, single-stranded and positive-sense (LIU YC, et al., 2020). The disease can course with severe pneumonia, causing a state of emergency in the world health system (RUSSO GC, et al., 2020; CALLEA M, et al., 2020).

Down syndrome (DS) is a chromosomal alteration, defined by total or partial trisomy of chromosome 21, being the most frequent chromosomal abnormality in live births (COLVIN KL and YEAGER ME, 2017). Moreover, DS presents comorbidities that may be associated with the incidence of unfavorable evolution of COVID-19 in carriers of the syndrome (CALLEA M, et al., 2020). Among these comorbidities, the most commonly reported are: obesity, heart disease, immunodeficiency and diabetes. Children with DS are also more susceptible to respiratory infections. Therefore, although the infant age group in general proves to be less affected by COVID-19, children with DS present situations that negatively alter their prognosis in the face of SARS-CoV-2 infection (CALLEA M, et al., 2020; RUSSO GC, et al., 2020).

Therefore, the objective of this study is to evaluate the relationship between Down syndrome as a risk factor for infection and severity of COVID-19 in pediatric patients. Furthermore, this narrative review aims to propose a survey of the national literature on the subject, in order to disseminate knowledge on the subject among health professionals and academics, leading them to a more effective care of patients with Down syndrome in the pandemic caused by SARS-CoV-2.

2 DISCUSSION

2.1 COVID-19

In December 2019, the first case of the Coronavirus disease (COVID-19) was confirmed in Wuhan, China, and from this a new pandemic was unleashed that has already infected 170 million people and is responsible for 3.5 million deaths worldwide (5/31/2021; https://covid19.who.int/). Due to unknowns in its characteristics, the rapid transmission became alarming and began to show a tropism for its severe form in the elderly and with chronic medical conditions (examples: hypertension, diabetes mellitus, heart disease, chronic lung disease, or immunosuppression). However, it has not been assumed to be a rule of thumb, since patients of all age groups can progress to the more severe form (Toma I and Dierssen M; 2021).

In general, the severe acute respiratory syndrome coronavirus 2 (SARS- CoV-2) is the etiologic agent of the disease, and is part of the Coronaviridae (CoV) family. This family has a zoonotic origin, which, for the most part, does not present a greater degree of risk to public health, because it has characteristics of mild respiratory diseases, with the exception of SARS-CoV, MERS-CoV and SARS-CoV-2, which present a more relevant medical importance (Brito SBP, et al; 2020).

Transmission occurs through infected secretions (saliva, respiratory secretions or respiratory droplets), which are ejected through coughing, sneezing or speaking by the contaminated agent. Transmission can also be effected by aerosols or fomites (contaminated surfaces) (PAHO; 2020).

In the pathology of the disease, it is seen that mortality and morbidity from infection are closely related to the exacerbated immune response, with direct involvement of the activation of a cascade of events, including cytokine storm, severe acute respiratory syndrome, and systemic organ damage. Cytokines are released from the presence of the virus in lung tissue, which drives the first wave of cytokines, within which interferons are included. Thus, the magnitude of hypercytokines becomes one of the protagonists of the severity level of COVID-19, with several inflammatory markers involved in the poor prognosis of the disease, such as the cytokines themselves, interleukins (IL-2, IL-6, IL-7, IL-10), interferon γ-, tumor necrosis factor α (TNF-α), among other chemokines (Espinosa JM; 2020).

The onset of clinical presentation, begins within 4-7 days of incubation. SARS-Cov-2 infection can manifest itself in three different clinical forms: asymptomatic, patients with mild acute respiratory illness, or individuals with pneumonia in varying degrees of severity. The symptomatic clinical picture of the disease may be presented by fever and cough, associated with myalgia, fatigue, anosmia, aging sickness, headache, gastroenterological manifestations (mainly diarrhea and vomiting), dyspnea, tachypnea, and odynophagia. It is noteworthy that in children, generally, this clinical course is milder (Bezerra, TC, et al; 2020).

Definitive diagnosis can be made by laboratory findings, RT-PCR technique and serological tests. Laboratory changes are increased C-reactive protein (CRP), decreased serum albumin, lymphopenia, decreased hemoglobin, increased erythrocyte sedimentation rate (ESR), alanine aminotransferase (ALT), aspartate aminotransferase (AST), procalcitonin (PCT), D-dimer, and other markers of inflammation such as ferritin. The RT-PCR technique is used for the detection of viral nucleic acid and is considered the gold standard in the identification of the etiologic agent, and should be performed between 3-9 days after the onset of symptoms. Immunological tests are used for serological detection and have a useful predictive value starting on the 7th day of symptoms (Xavier AR, et al; 2020).

2.2 DOWN SYNDROME

Down Syndrome (DS) is a genetic condition known for the existence of an extra chromosome in the chromosomal constitution. The global clinical picture is explained by an imbalance in the chromosome constitution, in this case, the presence of an extra chromosome 21, characterizing a simple trisomy. Among the phenotypic characteristics of this chromosomopathy are brachycephaly, palpebral fissures with superior inclination, epicanthal folds, flattened nasal base, hypoplasia of the medial region of the face, short neck, protruding and hypotonic tongue, clinodactyly of the 5th finger and increased distance between the 1st and

2nd toes. In addition, they present muscular hypotonia, somnolence, delay in the development of some reflexes of the infant, and soon after birth they present difficulty in sucking and swallowing (SILVA NLP, et al., 2002).

In this syndrome, health problems can occur as: congenital heart disease (40%), hypotonia (100%), hearing problems (50-70%), vision problems (15-50%), changes in the cervical spine (1-10%), thyroid disorders (15%), neurological problems (5-10%), obesity and premature aging (MOREIRA LMA, et al., 2000). People with DS show some signs of chronic immune dysregulation, including higher prevalence of autoimmune disease, increased hospitalization rates during viral respiratory infections, and higher mortality rates from pneumonia and sepsis. At molecular levels, there are markers of chronic auto inflammation and changes in immune cell types even in the absence of any infections (ESPINOSA, 2020).

These patients present a unique profile of cardiovascular and pulmonary diseases. Approximately 50% of newborns with DS have some congenital heart disease, which in some cases requires surgical intervention. If the disease is not repaired, the patient will be at greater risk for infection and development of the severe form of coronavirus. Also in patients with trisomy 21, upper airway anatomical abnormalities are considered one of the main risk factors for respiratory infections (ESPINOSA, 2020).

2.3 RELATIONSHIP BETWEEN COVID-19 AND SD

The exacerbated inflammatory response and cytokine storm present in the pathophysiology of COVID-19, are directly related to the severity of the patient's clinical picture. C-reactive protein, interleukins (IL-6, IL-2, IL-7, IL-10), granulocyte colony-stimulating factor (G-CSF), gamma interferon-induced protein 10 (IP-10), monocyte chemoattractant protein 1 (MCP-1), macrophage inflammatory protein-1α (MIP-1α) and tumor necrosis factor α (TNF-α). They are all related to a worse prognosis of the infection (ESPINOSA, 2020).

The mechanism of immune dysregulation in Down Syndrome patients still needs to be clarified, but there is a genetic relationship with the overexpression of chromosome 21 which has a genetic code for the production of the following interferon receptors (IFN): IFNAR1, IFNAR2, IFNGR2, and IL10RB (ESPINOSA, 2020). This triplication of genes encoded by chromosome 21 (HSA2), despite the higher percentage of differentiation, promotes a deregulation of gene transcription throughout the DNA (TOMA, et. al. 2021). IL-6 AND TNF-α levels are elevated throughout life, except in early childhood, when they show relative immunodeficiency, associated with frequent infections that decrease as the child grows (ATLTABLE, 2020). It is demonstrated in older children up to the age of 16 years, the elevated persistence of cytokines, pro and anti-inflammatory, Il-1β, TNF-α, IFN-γ and neopterin, reaffirming the immune dysfunction present in DS (HUGGARD, 2020).

In this context, carriers of this pathology present hyperactivity due to the triplicate quantity of IFN receptors, responsible for the viral response and cellular signaling of the inflammatory process (ESPINOSA, 2020). Despite this, SARS- CoV-2 presents escape strategies from this defense mechanism and can benefit from the inflammatory picture already present in DS and cause more severe manifestations. (ESPINOSA, 2020) Thus, the vulnerability to infection of COVID-19 in DS carriers is unquestionable, due to this immune dysregulation. Even after the patient's recovery, the altered immune system may not promote prolonged immunity, which would increase the risk of reinfection, and consequent greater caution with vaccination (DE CAUWER, 2020).

Patients with DS and those with congenital heart disease or pulmonary hypertension have an even greater risk factor for developing disease associated with high morbidity and mortality (KRISHNAN, et. Al 2020) (CLIFT, et. al 2020). Children with DS are more susceptible to acquiring COVID-19 and adults with this comorbidity are at high risk due to the severity of the infection and the inflammatory storm (ATLTABLE, 2020).

The inflammatory cytokines are also associated with a state of hypercoagulability, increasing the risk of thromboembolism during childhood in DS carriers, including the pulmonary form (TEP) (KANTAR, et. al 2020). In summary, the large number of comorbidities and the anatomical differences in the upper respiratory tract in DS carriers represent risk factors for respiratory infections of poor prognosis (VITA, et. al 2021).

The frequent clinical manifestations of COVID-19 in patients with DS are of rapid evolution with the presence of dyspnea, fever, cough, muscle pain, acute respiratory distress syndromes, myocardial dysfunction and high risk of secondary bacterial infection (ESPINOSA, 2020) (EMAMI, et. al 2021). It is important to emphasize the known correlation of secondary pulmonary bacterial infection post COVID-19 and the higher risk of developing these by DS patients. In this regard, genetic factors involved in chromosome 21 may favor the survival and dissemination of Staphylococcus pneumoniae. The development of pneumonia is also related to the hyperactivity of IFN I and the increase of IL-10, which favor the susceptibility of people with DS (ESPINOSA, 2020).

2.4 ACTIONS AGAINST COVID-19 IN THE PEDIATRIC POPULATION WITH DS

As mentioned above, there are populations with a higher risk of vulnerability, as for example individuals with disabilities, and within this group is Down Syndrome (DS). People with DS present with comorbidities, associated with a worse prognosis. Thus, there is a need to determine preventive measures, since currently the most accepted ways to contain the infection are through vaccines, and to avoid exposure to the virus. Social isolation is recommended to separate healthy people from those infected, and this is a great challenge for society in general (Russo GC, et al, 2020). Particularly for people with DS, socialization

is a factor that aids in the quality of life and autonomy of these individuals, so this distancing becomes even more challenging. In this case, it is imperative that the conducts have an interdisciplinary character, in order to cover all dimensions of the individual. The guidance for such children must take into account their comprehension skills, using simple language and, if necessary, the use of visual support to convey the correct information about the health measures. The pandemic itself generates a state of stress, thus, this impact must be reduced for people with DS, such as following the daily routine normally, without much exposure to TV news. Other attitudes that may be necessary are: maintaining a balanced diet and avoiding sedentary behavior, since they are closely related to obesity, a risk factor in DS and in COVID-19 (SBP, 2020).

3 CONCLUSION

In this context, children with Down Syndrome (DS), besides having anatomical abnormalities of the upper airways, which naturally facilitate respiratory infections, also present a hyperactivity of IFN and pro and anti-inflammatory cytokines, responsible for viral response and cell signaling of the inflammatory process. Thus, such hyperactivity reaffirms an immune dysfunction present in DS, and may be indicative of more severe manifestations of COVID-19, representing a greater vulnerability of this group to a worse prognosis.

On the other hand, such immune dysregulation leads, in DS patients, to a higher risk of reinfection by COVID-19, due to the poverty of long-term protective response, also responsible for susceptibility to opportunistic bacterial infections, especially by staphylococci. The exacerbated inflammatory cytokines in the circulation, in turn, also lead more easily to states of hypercoagulability, which is associated with increased morbidity and mortality and rapid deterioration of the clinical picture to dyspnea, acute respiratory distress syndromes and myocardial dysfunction. That said, in relation to the general population, DS patients infected by COVID-19 have a high risk for hospitalization and, for this reason, they must be strictly socially isolated in order to avoid coronavirus infection, taking care to promote in the family environment, recreational activities, and dietary reorientation in order to prevent obesity and its fatal sequelae.

Finally, the public carrying trisomy 21 should receive more medical attention when infected with COVID-19, always paying attention to the main clinical and laboratory abnormalities that indicate the worsening of the disease, with rapid evolution.

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Chapter 59

On the Transsexualization Process by SUS: Depathologizing, Deconstructing, and Decolonizing Bodies and Gender

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ABSTRACT
This chapter aims to reflect on the context in which sexual reassignment surgeries began to be performed in Brazil. It seeks to argue that not all transsexual people have discomfort with their own bodies. The article describes the time line of the transsexualizing process, going through the period when it was considered illegal because it was seen as mutilation, up to the current days, regulated by the Unified Health System. The text shows that the transsexualizing process is complex and involves all the dimensions of the gender order, and the work of transition is not only about sexuality or identity. The text is part of one of the chapters of the doctoral thesis "Beyond the skin: the body before and what is fabricated every day. Memories, weft of desires and practices. Conclusions: Trans men are in a situation of deep vulnerability because the society in which we live has as the constitution foundation of social relations the idea of sexual differences as founding - whoever has a penis is a man, whoever has a vagina is a woman. Humanity is divided in this subjectivation of genitality, and if it does not conform to the genital sex, it needs treatment, therefore it must be tutored. Trans gender identities follow pathologized and placed in a position of "abnormality" in relation to the standard that is cisgender. Despite the impositions on colonized and hierarchized bodies based on class, race, ethnicity, and gender, not all people with transgender experiences feel discomfort, a sense of not belonging, discomfort with their own bodies, or even gender dysphoria. Moreover, not all trans* people - women or men - want to undergo body transformation surgery. Many even question the effectiveness of the surgery for their lives, arguing that the access and the exercise of masculinity or femininity will not be guaranteed by the existence of a penis or a vagina.

Keywords: sexual reassignment surgeries.

1 INTRODUCTION

This chapter aims to reflect on the context in which sexual reassignment surgeries began to be performed in Brazil. These surgeries were forbidden because they were considered mutilation until the nineties and, at the end of the decade, authorized by the Federal Council of Medicine (CFM), first on an experimental basis and then regulated by protocols and resolutions. Even today, the CFM uses the word transsexualism, which is identified as a permanent psychological deviation of sexual identity, which still places trans* people in the field of pathology. In the text, we try to argue that not all trans* people have discomfort with their own bodies and that trans gender identities are still pathologized and placed in a

position of "abnormality", thanks to the cisgender standard. The term cisgender has been used to designate those people who are not transgender, that is, those whose self-identified gender is in the 'position beyond' that compulsorily assigned at birth by virtue of external morphology. Like 'transgender', 'cisgender' often functions as determinations to the words 'man' and 'woman'. (Bagagli, 2018, p.13-14).

The text is part of one of the chapters of the doctoral thesis in clinical psychology from the Catholic University of Pernambuco, "Beyond the skin: the body of before and what is fabricated every day. Memories, weft of desires and practices".

2 CONTEXT OF SEXUAL REASSIGNMENT SURGERIES IN BRAZIL

In Brazil, until 1997, the Federal Council of Medicine prohibited sex reassignment surgeries for transsexual people*[1] although in 1979, the 9th version of the International Classification of Diseases (ICD-9) regarding the definition and treatment of mental disorders, edited by the World Health Organization (WHO), for the first time included the definition of transsexualism as a gender identity disorder and already indicated the surgical procedure as a form of treatment, which allowed doctors to perform the intervention without being accused of committing bodily harm, although since that decade trans* people were already pathologized.

The transsexualizing process considers surgeries to be performed after 21 years of age and after two (2) years of follow-up with a multi-professional team. Later on we will see that a resolution from the Federal Medicine Council recognizes the possibility of surgeries being performed at the age of 18 after one year of follow-up. The surgical services that do not perform the multiprofessional follow-up for this minimum time, need to receive reports from other professionals - the reports - that describe the follow-up time, the presence of comorbidities, mental health evaluation and other relevant information for the surgical procedure.

Transgenitalization surgery was then recognized in 1997 when the Federal Council of Medicine (CFM) published a resolution authorizing university hospitals to perform this type of surgery on an experimental basis. Before the resolution, physicians were tried for the crime of mutilation - a typification attributed to transgenitalization surgeries (Bento, 2006). Resolution 1.482 of September 10, 1997 of the Federal Council of Medicine authorizes the performance of transgenitalization surgeries in transsexual patients, using as argument the therapeutic character.

[1] The term trans* people, transsexual* people, with an asterisk, covers a series of non-cisgender identities: transsexuals, transgender women, transgender men, transmasculines, non-binary people, transsexual women and transgender women and other gender identities outside the male-female binary. Several authors understand that transvestites would also be included there, being, therefore, part of the term trans*, but they choose to leave outside the umbrella term, assuming a political stance of affirmation of transvestite identities, as suggested by Nascimento (2021).

With the improvement of surgical techniques and the evolution of therapeutic protocols, the CFM has updated its resolutions, and the most current one is Resolution CFM n. 1,955/2010, which deals with transgenitalization surgery and revokes Resolution CFM n. 1,652/02. The Resolution authorizes public and private hospitals, regardless of research activity, to perform neocolpovulvuloplasty-type transgenitalization surgery (to adapt the phenotype from male to female) and/or complementary procedures on gonads and secondary characters as treatment for cases of transsexualism. The institutions must obey some basic criteria, such as having a Medical Ethics Committee (CEM) and practice the surgery with the patient's free and informed consent. The same Resolution also authorizes, still experimentally, the performance of neophaloplasty (to adapt the female phenotype to the male one), which means that it can only be practiced in university hospitals or public hospitals suitable for research.

For the CFM, in its three resolutions (Resolution 1.482/1997; Resolution 1.652/2002 and Resolution 1.955/2010), transsexualism (word used by the Council in its resolutions) is identified as a permanent psychological deviation of sexual identity, according to which it meets the following criteria: discomfort with the natural anatomical sex; expressed desire to eliminate the genitals, to lose the characteristics of one's own sex and gain those of the opposite sex; permanence of these disorders continuously and consistently for at least two years; and absence of other mental disorders. The selection of patients for transgenitalism surgery obeys the evaluation of a multidisciplinary team made up of a psychiatrist, a surgeon, an endocrinologist, a psychologist and a social worker, who accompany the case jointly for at least two years.

In 2008, the Ministry of Health (MH) incorporated transgenitalization procedures for transsexual women in the Unified Health System through Ordinance 1707/2008. In 2013, the Ministry of Health expanded the transsexualization process of the SUS through Ordinance 2803, to include transvestites and transsexual men in the health services offered.

In Brazil, the Unified Health System (SUS) was established by the Federal Constitution of 1988, in Article 196, as a way to implement the constitutional mandate of the right to health as a right of all and a duty of the State, and is regulated by Law 8.080/1990, which operationalizes public health care. SUS principles are: universality; integrality; equity; regionalization and hierarchy of the network, actions, and health services; and participation and social control. At SUS, for a transsexual* person to be guaranteed integral health care and, more precisely, to be part of the group of people who will undergo the transsexualization process, he or she needs a psychiatric diagnosis so that he or she can have access to the sexual reassignment surgeries and hormone therapy offered by the State.

According to the National Association of Transvestites and Transsexuals (ANTRA), access to issues related to the transsexualization process (flow and care) takes place in two ways: by the Basic Attention, network through which the user gets in touch with the system, for medical evaluations and referrals to more

specific and individualized treatments and medical areas; and, by the Specialized Attention, divided for this service in two modalities, the outpatient (psychotherapeutic accompaniment and hormonization) and the inpatient (performance of body modification surgeries and pre- and post-operative accompaniment). For all people, the minimum age for hospital procedures is 18. For hospital procedures, it increases to 21.

The services that provide assistance to transsexual people* seeking treatment to carry out the transsexualizing process in Brazil were organized from the regulation of this practice, after the aforementioned resolution according to which "the transsexual patient is a carrier of permanent psychological deviation of sexual identity, with rejection of the phenotype and a tendency to self-mutilation or self-extermination". In the Dossier Queer Theory - Sexual gender under discussion, from Cult magazine (2014), Bento says that:

> "It is mental health operators (mainly psychologists) who have the power to authorize or not authorize transgenitalization surgery. How can you diagnose if a person is trans? By a set of practices (the way they dress, how they practically demonstrate their feelings, what toys they liked as a child). And how can you define that a person is not trans? By practice. It is my daily acts that lead the other to recognize me socially as a man or a woman." (BENTO, 2014, p. 44).

The transgenitalization surgery has been regulated since then, but the patient has to meet the necessary criteria for the procedure, that is, to be submitted to a multidisciplinary team evaluation, as described above, in hospitals authorized by the Ministry of Health, in addition to a psychiatric follow-up for at least two years for confirmation of the transsexualism diagnosis - terminology that we have not adopted in this article.

In trans women, a vagina is constructed - vaginoplasty and in men, a penis - phalloplasty (Avila, 2014). About gender reassignment Raewyn Connell (2016) teaches us that there is no need to euphemize them as body modification or glamorize them as an aesthetic adventure, because their effects are limited, medically assisted transition is a slow process, parts of the procedures are very painful and have a broad impact on the body, in addition to local effects:

> "Redesignation, while slow, has something of the character of emergency medicine: handling critical situations well enough to allow life, including social life, to continue. And while the media and academic attention have focused obsessively on surgery, it's important to remember that surgery is only part of the transition, basically a facilitating part. A great deal of other work needs to be done." (Connell, R. 2016, p. 243-244).

Therefore, there are demands beyond gender (re)adjustment surgeries sought by transgender people. In relation to trans men, this involves issues such as psychological and endocrinological treatment and the demand for orthoses - which are orthopedic appliances or devices of temporary or non-temporary use,

intended to align, prevent or correct deformities or to improve functions of the moving parts of the body, such as *binder*, *packer/play*, *pump* and STP. [2]

With the advent of the covid-19 pandemic, elective surgeries were suspended in several states and municipalities, and consequently, sex reassignment surgeries, since they are not considered emergency surgeries because they are elective, have almost stopped in the country. In 2019, the year before covid-19 arrived, 224 sexual reassignment surgeries were performed by SUS in Brazil. According to data from the Ministry of Health[3] , by October 2020, only 31 of these surgeries were performed.

In Pernambuco, the Trans Reception and Care Space of the Hospital das Clínicas (HC), suffered an increase in the waiting list for surgery and, according to the space's coordination, the waiting list currently exceeds 700 people. In eight years of existence, the project has performed 57 surgeries, with an average of one procedure per month. The stoppages caused by the worsening of the pandemic and difficulties imposed in 2021 meant that only nine procedures were completed[4] . According to Keila Simpson, president of the National Association of Transvestites and Transsexuals (ANTRA), the services for the trans* population were not seen as a priority before the pandemic and with it the situation got much worse.

The transsexualizing process is complex and involves all dimensions of the gender order and the work of transition is not only about sexuality or identity, as Raewyn Connell (2016) teaches us:

> "It is structured by the inequalities of the gender order; the process is not equal for transgender women and transgender men. Transgender women are taking the patriarchal dividends they derive from men as a group, in labor markets, financial (e.g., housing), family *status*, professional authority, and so on." (Connell, 2016, p. 244).

In the Unified Health System (SUS), the transsexualization process was instituted in 2008 through Ordinance GM/MS No. 1,707 of August 2008 and Ordinance SAS/MS No. 457 of August 19, 2008 (BRASIL, 2008), which establish technical and ethical guidelines for this process in the Unified Health System (SUS). These ordinances were based on the qualification of services in university hospitals and the performance of hospital procedures. Ordinance 1,707 of the Ministry of Health instituted the transsexualizing process within the SUS by considering:

> "The orientation and gender identity as determinants and conditioning factors of the health situation, not only because they imply specific sexual and social practices, but also because

[2] *Binder* is a kind of compression vest that, like the chest band and tape, is used to hide the breasts. *Packer/play* is the penis-shaped orthosis that in the flaccid model serves to give volume and hardness, for sexual purposes. *Pump is a pump to* enlarge the clitoris. STP (*stand up*) is a device used to urinate standing up (NERY & MARANHÃO FILHO, 2015).

[3] More information: https://www1.folha.uol.com.br/cotidiano/2021/01/cirurgias-de-readequacao-sexual-desabam-na-pandemia-e-espera-da-populacao-trans-se-agrava.shtml

[4] For more information about the service in Pernambuco: https://www.leiaja.com/noticias/2022/01/29/espaco-trans-do-recife-700-pessoas-esperam-por-cirurgia/

> they expose the GLBTT population (gays, lesbians, bisexuals, transvestites, and transsexuals) to problems resulting from stigma, discriminatory processes, and exclusion that violate their human rights, among which are the rights to health, dignity, non-discrimination, autonomy, and free development of personality. (BRAZIL, 2008).

This ordinance considers transsexuality as a desire to live and be accepted as a person of the opposite sex that, in general, is accompanied by a malaise or a feeling of maladaptation to one's own anatomical sex (Almeida, Murta, and Lionço, 2013). By adopting the expanded concept of health, they do not limit care to the procedures of surgical intervention of transgenitalization, ensuring humanized care and combating discriminatory attitudes by health teams (BRASIL, 2008). According to the Ministry of Health, through these ordinances, guidelines were established for the regulation of outpatient and surgical procedures for genital reassignment in transsexuals. However, until then such procedures were only for transsexual women. In 2009, the Ministry of Health launched the campaign for the right to use the social name by SUS.

The Ministry announced that transgender* and transvestite people could use their social name on the SUS Card, with the aim of recognizing the legitimacy of their identity and promoting greater access to the public health system. The social name is the name by which these people prefer to be called instead of the name on their birth certificates, which does not correspond to the gender they identify with. Decree No. 8727[5] , of the Presidency of the Republic, regulated the use of the social name by organs and entities of the direct federal public administration.

The use of the social name in health services is guaranteed by an ordinance that describes that the user must be identified by first and last name in all documentation, regardless of civil registration, being assured the name of preference, and cannot be identified by number, name or disease code or any other disrespectful or prejudiced forms. (BRASIL, 2009). There was a claim by the LGBT movements about the use of the social name, even being debated in meetings of the National Health Council and the LGBT Health Technical Committee, considering that discrimination and prejudice against trans* and transvestites lead to social exclusion and, consequently, distance this population from the health service. If SUS is for all people and has universality among its basic principles, it is fundamental to enable access to health services and actions for the entire population.

The use of the social name was ensured since 2007, in a way, in the Charter of Rights of Users of the SUS, which in its third principle, already included the field for filling in the social name in the identification documents of the health system (SUS Card), vetoing the use of prejudiced and disrespectful forms in care (BRASIL, 2007). The person's name carries a history, a choice made by someone else, usually the father and mother, which in most cases is linked to a gender identity - male or female. The new name -

[5] Decree No. 8727. www.planalto.gov.br. Accessed December 27, 2021.

the social name, as well as the pronoun (he/she) is also part of the gender readjustment process and must be respected by all people and recognized by this instrument of identification of SUS users.

In December 2011, Ordinance No. 2836 of the Ministry of Health established the National Policy on Integral Health of Lesbians, Gays, Bisexuals, Transvestites, and Transsexuals in the context of the Unified Health System (SUS), in order to promote the fight against inequities and discrimination, expanding access to quality actions and services. The construction of the Policy followed the government guidelines expressed in the Brazil Without Homophobia Program, which was coordinated by the Secretariat of Human Rights and is an initiative for the construction of more equity in SUS and one of its goals is to ensure access to the transsexualization process in this network (Brazil, 2011).

Also according to the Ministry of Health, considering the demands of the LGBT movements for the expansion of specialized care for transsexuals* and transvestites and for welcoming them without discrimination, both in primary and specialized care, on July 30, 2013, Ordinance No. 859 was published with the aim of revising the "logic of care" by structuring a line of care organizing health care from primary care to specialized care, the latter being focused not only on surgical and hospital procedures, but also on the structuring and expansion of outpatient care services.

This Ordinance would expand the guidelines for the transsexualization process by SUS and would care for young people as of 16 years of age and provide surgery as of 18 years of age. However, in view of the need to define clinical protocols for the transsexualization process, Ordinance No. 1. 579 was published on July 31, 2013, suspending the effects of SAS Ordinance No. 859 until such protocols were defined[6] . In a note, the Ministry of Health claimed that it "suspended the effects of the ordinance until the clinical and care protocols for the transsexualization process are defined" (RABAHIE, Julia, 2013).

On November 19, 2013, Ordinance GM/MS No. 2,803 was published, which redefined and expanded the Transsexualization Process in the Unified Health System. This Ordinance is part of the National Integral Lesbian, Gay, Bisexual, Transvestite, and Transsexual Health Policy and establishes guidelines for assistance to users with a demand for the Transsexualization Process in the Unified Health System: the integrality of care to transsexuals and transvestites, seeking to structure a line of care from primary care to specialized care; multidisciplinary and interdisciplinary team work; integration with other points of care in the health network, with primary care as the gateway, including the reception and humanization of care free of discrimination, through the sensitization of workers and other users of the health unit to respect the differences at all levels of care. (Brazil, 2013)

This ordinance also determines the Ministry of Health to fully comply, within 30 days, with the necessary measures to enable the implementation, in the Brazilian Public Health System, of all medical

[6] http://www.saude.gov.br/atencao-especializada-e-hospitalar/especialidades/processo-transexualizador-no-sus

procedures to ensure transgenitalization and sexual reassignment surgery in the transsexualization process (Brazil, 2013). For some authors, Ordinance No. 2,803/2013 brought significant advances for trans men, since it expanded and qualified the care by including the actions of attention to trans* people in the perspective of the line of care, by reinforcing the importance of the qualification of care and the use of the entire SUS network, from primary to specialized care, among other sectors of the SUS network and by enabling the outpatient and inpatient modality, also including surgical procedures such as hysterectomy and mastectomy, and clinical, such as care with and without hormone therapy.

However, we emphasize that transgender men complain that this Ordinance could have advanced more on the issue of hormone therapy, allowing what is already guaranteed by the opinion of the Federal Council of Medicine No. 8/13, which deals with hormone therapy for transvestite and transsexual adolescents, i.e., allowing the start of hormone therapy at 16 years old, including the distribution of testosterone in the pharmacies of SUS (Sousa, Viana, and Vale, 2015). With the changes introduced by the new ordinance, it was necessary to re-register the centers where the transsexualization process was already being done, which were the centers in Goiânia, Rio de Janeiro, São Paulo, and Porto Alegre. One of the advances of this ordinance is that it works with trans women and trans men (mastectomy and hysterectomy for trans men), as well as transvestites, regarding psychological and endocrine treatment. As we will see later, in 2019 the CFM sought to update the rules to improve medical care for trans* people.

The Hospital das Clínicas de São Paulo is the first in the country to perform hormone treatment for transgender adolescents. The Gender Identity and Sexual Orientation Disorder Outpatient Clinic (AMTIGOS) since July 2013 has been authorized to use blockers starting at age 12, hormonization at age 16, and surgery at age 18. The Federal Council of Medicine has recommended since March 2013[7] that hormone therapy be applied starting at age 12, when the first signs of puberty begin to appear. The initial treatment would therefore block birth gender puberty (Rabahie, 2013).

According to the CFM, starting at age 16, hormones that induce the appearance of the characteristics of the desired gender can begin to be used by young people of that age. More recently, Decree No. 8,727 of April 28, 2016 was signed by the General Secretariat of the Presidency of the Republic (BRASIL, 2016), which provides for the use of the social name and the recognition of the gender identity of transvestites and transgender persons within the scope of the direct federal, autarchic and foundational public administration. It is also important to highlight Resolution No. 10 of March 27, 2018 of the Federal Council of Psychology that provides for the inclusion of the Social Name in the Professional Identity Card of Psychologists and Psychologists and makes other provisions.

[7] The approval of resolution 1,482 in 1997, by the Federal Council of Medicine, boosted the regulation of the surgery by the Unified Health System, which only started to be done in 2007.

More recently, and still regarding hormone therapy, new parameters for the care of the trans* population have been updated by means of CFM Resolution 2.265/2019 and, according to this Council, with the concern of collaborating with the improvement of health care for people with gender incongruence. The text approved by the CFM plenary is the result of a long process of debate and analysis that lasted two years. Besides the ethical and legal aspects, different clinical studies on the subject were analyzed in order to formulate a document with solid technical criteria. The Resolution provides for the expansion of access to care for the trans* population in the public network and establishes criteria for greater safety in the performance of procedures with hormone therapy and sexual adjustment surgeries (Federal Council of Medicine,2019).

According to the Resolution, comprehensive health care for transgender* people should contemplate all their needs, ensuring their access without any kind of discrimination at the levels of specialized primary care and urgency and emergency care. The text also establishes that medical assistance to transgender* people should promote comprehensive and specialized care in the phases of reception, outpatient follow-up, hormone therapy, and clinical, surgical, and post-surgical procedures.

We highlight a fundamental difference between the new Resolution (No. 2265) and the previous one (No. 1955), is that the updated text contemplates issues such as the performance of pubertal block, which is still considered experimental (subject to the rules of research protocols approved by the CEP/Conep System) and cross-hormonotherapy, which were not foreseen before. The CEP/Conep System is formed by the Conep (National Commission on Ethics and Research in Human Beings, national authority of the National Health Council) and by the CEP (Ethics Research Committees, institutional authority). It is a decentralized system in which the RECs have autonomy in ethical analysis, except for protocols from special thematic areas (Brazil, 2017).

Pubertal blockade is the interruption of the production of sex hormones, preventing the development of secondary sex characters of the biological sex by the use of gonadotropin-releasing hormone (GnRH) analogues. Cross-hormonotherapy is the form of hormone replacement in which sex hormones and other medications are administered to the transgender person for feminization or masculinization, according to their gender identity. Regarding surgical adjustment procedures to serve people with gender incongruence, Resolution No. 2,265/2019 established that they can be performed only after the age of 18, and it is required that the person has previously undergone at least one year of follow-up by a multidisciplinary and multiprofessional team (Federal Council of Medicine, 2019).

Other conquests achieved in the field of social rights by LGBT people have been highlighted by a portion of the movement as of fundamental importance, such as the inclusion of male and female companions in health plans (National Supplementary Health Agency, Diário Oficial da União, May 04, 2010); civil marriage after Resolution No. 175/2013 of the National Council of Justice (CNJ) and rights

such as the adoption of children by homosexual couples, without age restriction (Extraordinary Appeal 846.102, STF, March 05, 2015), among others.

For a better condition of life, therefore, trans people need civil name changes, full recognition of their citizenship, and hormonal and surgical interventions - if they so desire. For many trans men, hormone therapy is the first major body modification in search of adequacy, and many even consider it more important than surgical procedures. There are various forms of testosterone use - injections, gel, pills, oral patches, aerosol inhaler, and micro-diffusion implants.

In Brazil, besides the gel and the cream, injectable forms of the hormone are marketed. But trans men are not always able to acquire the hormones for their adequacy and many still resort to self-medication and buy hormones illegally. Many groups are created for this purpose on social networks such as Facebook and WhatsApp. It is estimated that a good part of the testosterone circulating in Brazil is done through the parallel sports market, especially in gyms and bodybuilding sites. This often leads to inadequate treatment, incorrect dosages and physical sequelae (Nery and Maranhão Filho, 2015).

Among the possible effects of testosterone, there are reports of increased or increased appetite, acne, sweating, fluid retention, muscle and bone mass, liver enzymes, increased libido, cholesterol, body hair and beard, polycythemia (increased red blood cells), and clitoral hypertrophy. There are reports of voice modification, with a prominent larynx - also known as "Adam's apple", body odor, and skin that becomes rougher and oily, and occurrence of body redistribution. There is interruption of menstruation and hair loss, often leading to baldness (Nery and Maranhão Filho, 2015).

For trans men, the first surgical procedure is often the removal of the breasts, whose correct name is masculinizing mastectomy, which is a reconstructive plastic surgery that transforms, proportionally, the tissues and shape of a female breast into a male one[8] . There are several techniques and they vary according to the size of the breast. This surgery is defined as of secondary sexual character. The surgery for sexual reassignment performed in trans men in Brazil is still experimental and the hysterosalpingooforectomy, colpectomy and neophaloplasty are used as surgical techniques for transgenitalization. Hysterosalpingoophorectomy is the surgical removal of one or both ovaries and fallopian tubes along with the uterus. Colpectomy is the surgical removal of the vagina. Neophaloplasty refers to surgery to construct a penis or implant a penile prosthesis.

The services that provide assistance to transsexuals who wish to undergo sexual reassignment procedures are considered highly complex and most of the services are located in public university hospitals and the teams, in general, include a genital reconstructive surgeon - urologist and/or gynecologist, psychiatrist, psychologist, plastic surgeon, nurse and social worker and the number of professionals varies

[8] More information at Antra's website: https://antrabrasil.org/2020/07/27/como-acessar-o-sus-para-questoes-de-transicao/

according to each institution. According to Márcia Arán and Daniela Murta, some of these services have an agreement with legal counseling for civil name change, which until recently was conditioned to the performance of transgenitalization surgery (Arán and Murta, 2009, p.17).

In Brazil, since March 1, 2018, the Supreme Court has recognized that trans people can change their name and gender in the civil register without having to undergo surgery[9] . In these services, the person will be informed that they can go directly to a registry office to request the name change and will not need to prove their gender identity, which must be attested by self-declaration. The professionals from other specialties that participate in these services, such as geneticists, general surgeons, anesthesiologists, mastologists, otorhinolaryngologists and speech and hearing therapists, usually attend on demand.

Some studies show that trans people arrive at health services without basic information about their rights and their condition. Nowadays there is a lot of information on the internet, on social networks, private groups on some of these networks with basic information about where to look for help, the ways to get to the public health network, the main services in each city, or at least in some big cities and capitals. Many of these people who seek health care or help on the Internet find themselves in a situation of psychological, physical, and social vulnerability, sometimes without family support, resorting to friends from their social networks.

But unfortunately, access to the internet in Brazil, although ample, is still unequal. A survey conducted by the Brazilian Internet Steering Committee showed that in 2020 the country reached 152 million users, a 7% increase over 2019, which means that 81% of the population over 10 years old has internet at home. The growth in the total number of households with internet access occurred in all segments analyzed. Class C homes with internet access jumped from 80% to 91% in one year. Users from classes D and E with internet at home jumped from 50% to 64% in the pandemic. The research coordinator, Fábio Storino, however, explains that this internet access is unequal, since about 90% of the D and E class homes connect to the net exclusively via cell phone. This inequality is also reflected in basic education. The 2020 school census showed that only 32% of public elementary schools have internet access for students, a percentage that reaches 65% in the case of public high schools. [10]

Fabiana Moraes (2015)[11] , a journalist from Recife, tells the story of Joicy, a real pilgrimage of a trans woman who lived in the district of Alagoinha, in the caatinga, in Pernambuco, 225 kilometers from the capital, and who had sexual reassignment surgery through SUS at the Hospital das Clínicas, in Recife. Joicy wanted to know how she could change her sex and went by motorcycle to the Health Secretariat of

[9] For more details: https://www.conjur.com.br/2018-mar-01/stf-autoriza-trans-mudar-nome-cirurgia-ou-decisao-judicial
[10] Brazil has 152 million people with internet access. Article published on 08/21/2021. https://agenciabrasil.ebc.com.br/geral/noticia/2021-08/brasil-tem-152-milhoes-de-pessoas-com-acesso-internet
[11] Moraes, Fabiana. The birth of Joicy. Transsexuality, journalism and the limits between reporter and character. Porto Alegre, Arquipélago Editorial, 2015.

Alagoinha. The year was 2004 and nobody at the Health Secretariat knew how to give this information to Joicy. After a lot of searching, she found the number of the Health Ministry's Ombudsman and says that she stayed on the phone for almost an hour. But she was not satisfied with the answer and wrote a letter to the President of the Republic at the time, Luiz Inácio Lula da Silva, telling in three pages her story.

Months later she learned that a letter had arrived from Brasilia at the Health Secretariat of the municipality telling about her case. Joicy spent two years going every two months to Caruaru, in the state of Pernambuco, depending on the car of the Health Secretariat of Alagoinha, to try to understand if she would really have the surgery. The bureaucracy and the indifference were so great that Joicy had to wait all this time until she was referred to the Hospital das Clínicas, which had been performing the surgery for sexual reassignment since 2001. It took Joicy three years, and not two, to undergo the mandatory therapy for those who are going to undergo sex reassignment. Besides the bureaucracy and neglect already mentioned, Joicy did not follow the liturgy considered necessary to be a woman and did not compose her body with the signs and trappings of a female body, which generated (generates) mistrust in health operators, responsible for the diagnosis of gender dysphoria. Finally, in November 2010, Joicy had her surgery.

According to the Preliminary Report on the Services that provide assistance to transsexuals in the public health network in Brazil, after two years, if the user is considered transsexual and has clinical conditions, he or she can then be referred for the surgical procedure (Arán and Murta, 2009). Also according to the report, due to the difficulty in scheduling surgeries, transsexual users have been waiting longer for the surgery to be performed. It should be noted, however, that the research did not include any of the services in Pernambuco, probably because during the study, the services then existing were not accredited as reference.

The technical standard about the transsexualization process in SUS is, in part, celebrated by the movement as an important achievement of their claims and struggle, but unfortunately the transsexualizing programs in public service still have many barriers that prevent the universal access of trans* people in the regulatory norms and in the operation of services. There is also a bureaucratization linked to a conception of public policy based on the pathologization of transsexuality and diagnoses based on social conceptions and gender stereotypes that prevent the agility of the service, in addition to the need for specialized professionals (Bento, 2008, 2012; Lionço, 2009).

The case reported about Joicy is an example of how these barriers are also linked to class, race, education, region and lack of financial resources. Joicy depended on transportation from the city hall to get to the capital to continue the treatment, didn't have access to the internet, didn't have basic information about the transsexualizing process, the post-surgery period and the knowledge about the existence of the surgery until it was performed. Joicy waited seven years until she was able to access the information, follow

the necessary protocols and perform the sexual adjustment surgery. Since she didn't use the vaginal mold properly after the vaginoplasty surgery - a surgical procedure characterized by the creation of an artificial vaginal cavity - for a number of reasons (poverty, needs, lack of information, lack of support from family and friends), she developed vaginal stenosis, i.e., the walls of her vaginal canal were stuck together. She had to have another surgery to reopen the canal.

3 BY WAY OF CONCLUSION

Trans men are in a situation of profound vulnerability because the society in which we live has as the foundation of the constitution of social relations the idea of sexual differences as founding - whoever has a penis is a man, whoever has a vagina is a woman. Humanity is divided in this subjectivation of genitality, and if it does not conform to the genital sex, it needs treatment, therefore it must be tutored. Viviane Vergueiro (2016) teaches us that we need to look with decolonial lenses at this medical biopower that determines the genders of the person. A medical system that comes from the Eurocentric rationality, of cataloging abnormalities, in terms of health and behavior.

Trans gender identities continue to be pathologized and placed in a position of "abnormality" in relation to the standard that is cisgender. According to Letícia Nascimento (2021), the colonial concept of gender is anchored in a bioessentialist basis for defining our experiences, imposing an exclusively binary standard of correspondence between sex (supposedly biological) and gender (cultural). Thus, the process of pathologizing, criminalizing, and subalternizing trans* identities is part of the interests of the modern gender colonial cistema (Nascimento, p.100-101, 2021). Here we use cistema as a corruption of system, emphasizing the structural and institutional character of cis perspectives, inspired by Vergueiro (2016).

Despite the impositions to colonized and hierarchized bodies based on class, race, ethnicity and gender, not all people with transsexual experiences feel discomfort, a sense of not belonging, discomfort with their own body or even gender dysphoria. However, anyone can be affected by a dysphoria related to mental health, to mood disorders, to psychological distress, a fact that is very much related to social issues linked to cis-white-heteronormative standards. Corporalities that deviate from this standard and are often victims of capacitism, fatphobia, racism, and LGBTphobia can be affected by dysphoria.

Moreover, not all trans* people - women or men - want to undergo body transformation surgery. Many even question the effectiveness of the surgery for their lives, arguing that the access and the exercise of masculinity or femininity will not be guaranteed by the existence of a penis or a vagina. In these cases, the claim is the legal right to gender identity (BENTO, 2008, p. 65). On the other hand, many trans people place a high expectation on body transformation surgeries, facing a long waiting time for gender transition. Therefore, one cannot diminish or secondaryize the importance of surgery for many people living the trans experience (Bento, 2008).

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Chapter 60

Sizing of speech therapists in the public service of piauí: a historical series

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ABSTRACT
To analyze the distribution of speech therapists inserted in the SUS in the state of Piauí, in the years 2011 to 2020. This is a cross-sectional, descriptive study in which the unit of analysis was the state of Piauí. Data secondary public data from DATASUS were used. Information was collected regarding the number of higher-level speech therapists working in the Unified Health System (SUS), by health macro-regions, as well as their distributions in health facilities. There was an increase in the number of speech therapists in approximately half of the health facilities, and a 53.93% increase in the number of fonoaudiologists in the state. The semi-arid and northern middle macro-regions had the highest average of speech therapists per 10^3 inhabitants (0.92/10,000) and the Cerrado and Coastal regions, the worst, 0.62 and 0.67/10,000. This mobility occurred during the global pandemic by COVID-19. It was observed redevelopment of professionals from secondary care to tertiary care, leaving mental health coverage without professional reference. The average number of professionals distributed throughout the state does not reach the proportion of $1/10^3$ inhabitants. There is a discrepancy in relation to the professional distribution in the health macroregions of the state of Piauí as well as between the levels of care.

Keywords: Speech Therapy, Unified Health System, Universalization of Health, Integrality in Health.

1 INTRODUCTION

The Unified Health System (SUS) is recognized as one of the most inclusive public policies practiced in Brazil. Before, Brazilians were unevenly divided among those who disbursed to pay for their own health care, those who had formal jobs and accessed the health services offered by the public pension, and the indigent, those who lived on the margins of the formal labor market, went on pilgrimage in search of health care through selective public health programs1.

In the 1980s, it can be said that approximately half of the population did not have access to health services, and a small fraction was eventually served by the charity of Santas Casas2.

The SUS was established as a public health policy in the 1988 Constitution, with the objective of ensuring comprehensive health care for all citizens3. For its effective implementation, the "Organic Health Laws" (Law No. 8,080/90 and 8,142/90) were elaborated and approved); the first, in chapter II, discusses the principles and guidelines of the SUS, providing for the decentralization of services to municipalities, regionalization and hierarchy as organizational principles, guaranteeing the fundamental right to life; and as doctrinal principles: universality, equity and integrality4.

With the implementation of the SUS (based on the principles of universality and equity and the organizational guideline of decentralization), the expansion of services and the expansion of users' rights, there was a need to reorient speech therapy practice, expanding their actions beyond rehabilitation. According to these principles, Speech Therapy began to act at the three levels of care: primary, secondary and tertiary, from health promotion, through prevention to rehabilitation 5 6.

During the 1980s, speech therapists, with the standardization of their insertion in other health services and therefore elaborate proposals for actions to be practiced with other programs in conjunction with pediatrics, childcare, health of the adolescent, women's health, worker and elderly. Since then, speech therapy assistance has become a determinant of general health conditions, and must be guaranteed in all its areas: hearing, voice, language, orofacial motricity and swallowing7. This Contribution Booklet of the System of Federal and Regional Councils of Speech Therapy, suggests that the professional should be inserted in social projects, having participation in interdisciplinary discussions.

Speech therapy is inserted in public health since primary care, in the medium and high complexity. Public Policies were guaranteed by law/bill, such as the test of the hearing (Federal Law No. 12,303, of August 2, 2010) and the promotion of the teacher's vocal health (Federal Bill No. 1,128, 2003). In addition to the Linguinha test (Bill 13.002/14) – called the Protocol for evaluation of the Frenulum of the Language in Babies8.

The presence of the speech therapist in the SUS has provided the population with care with regard to the various areas of competence of the professional, this fact becomes even more relevant since the demographic and epidemiological transition of the population has been characterized by the aging of the population, in addition to diseases of the circulatory system, external causes and neoplasms, which allow several areas of speech therapyto9.

On the other hand, the distribution of health professionals has been discussed in some studies; in Speech Therapy, studies point to a lack of professionals compared to demand, although there is an increase in the number of public tenders for the category, still with few vacancies10.

In this context, regulations on the adequate dimensioning of speech therapists in the SUS are also fundamental to legitimize the space for professional performance, aiming at an adequate offer of professionals to meet the needs of the population 11

Given the need for studies on the insertion of the speech therapist in the SUS, and starting from the hypothesis that its dimensioning is still insufficient12, the question arises regarding the distribution of speech therapy professionals in the public service in the Piaui.

Thus, this research aims to analyze the distribution of speech therapists inserted in the SUS in the state of Piauí, in the years 2011 to 2020, pointing out their distribution by health facilities and macro-

regions of the state, in addition to measuring the proportionality of the speech therapy professional for the population of the state.

2 METHODOLOGY

This study was conducted in a cross-sectional, descriptive way, in which the federative unit of Brazil for analysis was the state of Piauí. Public secondary data were used, carried out through consultation with the National Registry of Health Establishments (CNES), available datasus e-mail address.

As the logical methodological design contemplated only the collection of secondary data from the public domain, it was not necessary to submit the study to the review of the ethics committee, with the protection of the right of public access to information registered by DATASUS.

In the CNES information system, information was collected regarding the number of speech therapists working in the SUS, by health macroregions, as well as their distributions by health establishments. Data collection was performed in the second half of 2021 (September to December) and the reference period between January 2011 and December 2020 was selected for the analysis

Data were analyzed for the 224 municipalities of the State of Piauí, identifying the distribution of speech therapists working in the SUS, considering their evolution in the years 2011 to 2020; verification of the types of health facilities and the number of professionals working in these places; the coverage of speech therapists in macroregions and the rate of speech therapists per 10,000 inhabitants.

According to information collected on the DATASUS website, health facilities are categorized as follows: Health Academy - public spaces in Brazilian municipalities that promote bodypractices and physical activity; Psychosocial Care Center (CAPS) - mental health care devices, offering clinical care and social reintegration of the assisted population; Basic Health Unit - Unit for performing primary and comprehensive care to a population; Specialized Clinic/Specialized Outpatient Clinic - intended for outpatient care in only one specialty/care area; Specialized hospital - intended for the provision of health care in a single specialty/area; General Hospital - intended for the provision of care in basic specialties, by specialists and/ or other medical specialties; Polyclinic - provision of outpatient care in various specialties, including or not basic specialties; Diagnosis and Therapy Support Service Unit - activities are performed that assist the determination of diagnosis and/or complement the treatment and rehabilitation of the patient.

The analysis ofthe distribution of health professionals was also analyzed, considering the state's health territories (macro-regions), since there are significant regional differences regarding socioeconomic and demographic aspects, which may also influencethe provision of health services to the population and available human resources/ Needed.

According to the updated state law of No. 6,967/2017, the state is divided into four (04) macro-regions (Litoral, Mid-norte, Semiarid and Cerrado) where the limits are defined by their socio-environmental characteristics. These regions are subdivided into twelve (12) Development Territories (TDs) and 28 Clusters. Other criteria have guided this division such as geographical proximity, forms of transaction such as trade, location of federal and state public services, proximity to the cities of reference in the territory, and also the existence of ease of displacement among the populations of the municipalities in the territory.

For the analysis, the following calculations were used: sum of the total number of speech therapists in the state of Piauí, in health facilities and in macroregions; proportional percentage variation regarding the average number of professionals in 2020 compared to 2011 in the state; mean speech therapists (MF) per year studied; MF per 10,000 inhabitants for each health macro-region , calculating the number of speech therapists by macro-region/population (population estimate for each year studied, obtained from the Brazilian Institute of Geography and Statistics - IBGE). Considering the differences in size between populations, this measure allows comparing the supply between regions over time;

After data collection, you created sand a specific database for this study in Microsoft Office Excel. The data were analyzed descriptively and presented in tables and graphs .

3 RESULTS AND DISCUSSION

Data analysis revealed the total presence of 264 speech therapists working in the public service in the state of Piauí in 2020. There was a 53.93% increase in the number of speech therapists in the state. This value was obtained by proportional variationreferring to the average number of professionals in 2020 compared to 2011.

The number of municipalities with the presence of the speech therapy professional in the SUS network increased from 47 (20%) in 2011 to 85 (38%) in 2020.

Table 1 shows the average number of Speech Therapists distributed by type of health facilities. In these years , there is an increase in the number of speech therapists in 43% (n= 6) of the types of establishments, with emphasis on the health center/basic health unit, from an average of 37 professionals in 2011 to 107 in 2020.

TABLE 1

Tabela 1 - Fonoaudiólogos no serviço público do Piauí por tipo de estabelecimento de saúde, 2011 a 2020 (média aritmética calculada considerando os 12 meses de cada ano)

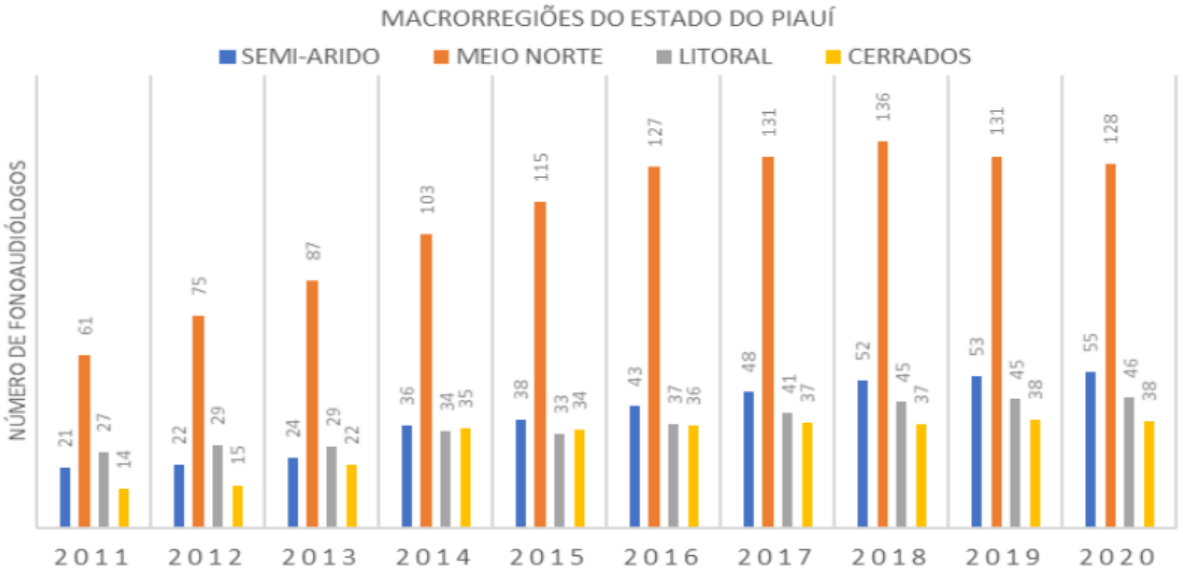
TIPO DE ESTABELECIMENTO	MÉDIA 2011	MÉDIA 2012	MÉDIA 2013	MÉDIA 2014	MÉDIA 2015	MÉDIA 2016	MÉDIA 2017	MÉDIA 2018	MÉDIA 2019	MÉDIA 2020
ACADEMIA DA SAÚDE	0	0	0	0	0	0	0	2	3	2
CENTRO DE APOIO A SAÚDE DA FAMÍLIA - CASF	1	1	3	4	4	4	6	5	4	4
CENTRO DE ATENÇÃO PSICOSSOCIAL - CAPS	4	4	2	2	2	2	2	1	1	1
CENTRO DE SAUDE/UNIDADE BASICA DE SAUDE	37	47	65	101	104	99	108	111	111	107
CENTRAL DE NOTIF. CAPTAÇÃO E DISTR. ÓRGÃOS ESTADUAL	0	0	0	0	1	1	1	2	2	0
CLINICA ESPECIALIZADA/AMBULATORIO ESPECIALIZADO	36	43	43	45	51	67	68	74	71	73
CONSULTORIO	0	0	0	0	0	0	0	0	0	0
HOSPITAL ESPECIALIZADO	13	16	19	20	21	24	24	26	26	26
HOSPITAL GERAL	19	20	20	25	26	31	31	33	37	41
POLICLINICA	8	8	8	8	8	9	10	8	9	8
POSTO DE SAUDE	0	0	0	2	3	2	1	1	1	0
PRONTO ANTEDIMENTO	0	0	0	0	0	0	0	0	0	0
UNIDADE DE SERVICO DE APOIO DE DIAGNOSE E TERAPIA	4	3	1	1	1	2	4	3	4	4
UNIDADE MISTA	0	0	0	0	1	1	2	2	1	0
TOTAL	123	141	162	208	221	243	256	269	268	267

Fonte: CNES/DATASUS, Ministério da Saúde (2021).

In the specialized clinic/specialized outpatient clinic and specialized hospital, the average number of professionals doubled in this time range. However, at the Psychosocial Care Center – CAPS, the number of registered professionals decreased (average from 4 in 2011 to 1 in 2020). The average number of speech therapists for years in health macroregions can be seen in graph 1.

GRAPH 1

Gráfico 1 - Média de fonoaudiólogos/SUS entre os anos de 2011 a 2020, no estado do Piauí, segundo as macrorregiões de saúde.



Fonte: CNES/DATASUS, Ministério da Saúde (2021).

It was observed that among the four macroregions of the state, the semi-arid and middle north presented the best average of speech therapists per 10,000 inhabitants (0.92) and the cerrado and coastal regions, the worst, 0.62 and 0.67, respectively (Table 2). However, one ofthe macroregions reached the average number of speech therapists 1/10³ inhabitants. An increase in the average number of professionals is observed in the state of Piauí, from 0.38 in 2011 to 0.81 in 2020. It is important to highlight that in the Middle North region there was an average fallbetween the years 2018 (0.98) to 2020 (0.92).

Table 2

Tabela 2 – Distribuição dos fonoaudiólogos/SUS no estado do Piauí por habitante entre os anos de 2011 a 2020, segundo as macrorregiões de saúde.

Macrorregião de saúde	MF por 10^3/hab 2011	MF por 10^3/hab 2012	MF por 10^3/hab 2013	MF por 10^3/hab 2014	MF por 10^3/hab 2015	MF por 10^3/hab 2016	MF por 10^3/hab 2017	MF por 10^3/hab 2018	MF por 10^3/hab 2019	MF por 10^3/hab 2020
Semiárido	0,36	0,37	0,42	0,61	0,65	0,73	0,81	0,88	0,90	0,92
Meio Norte	0,45	0,55	0,64	0,75	0,83	0,92	0,94	0,98	0,94	0,92
Litoral	0,40	0,44	0,42	0,50	0,49	0,54	0,60	0,66	0,66	0,67
Cerrados	0,23	0,25	0,37	0,59	0,58	0,60	0,62	0,61	0,63	0,62
Piauí	0,38	0,44	0,50	0,64	0,68	0,75	0,79	0,82	0,82	0,81

MF: Média de fonoaudiólogos.
Fonte: DATASUS/SVS/DASNT/CGIAE, Ministério da Saúde (2021).

The results found here point to an increase in the supply of Speech Therapists working in the SUS between 2011 and 2020. However, there are important inequalities in this evolution among the health macro-regions of the state of Piauí, and the data indicated that supply was still insufficient in 2020.

It was considered insufficient from the observation of the professional competence of the speech therapist, its distribution in the state of Piauí and the data regarding the Hospital Admission Authorization (AIH) obtained on the DATASUS website in the effective decade 2011-2020. A number of 113,828 patients (0 to 14 years) were admitted to the SUS network due to pathologies that interfere with the normal acquisition and/or development of hearing, oral/written language, swallowing, stomatoglossogatic functions, which are related tomorbidities considered by the Ministry of Health (MS) - such as: congenital malformations, hearing loss, neoplasms/changes in the central nervous system, among others 13.

For adults/elderly, considering the same period, there were 288,000 hospitalized due to senility, dementia, neurodegenerative diseases, head and neck neoplasms, stroke , head injury (TBI) and diseases of the respiratory tract. Conditions that are considered comorbidities by the MS and have repercussions on communication, cognition, as well as on the stomatoglossognathic functions of these patients.

From the data regarding the quantity of speech therapists versus the quantity of AIH, a large gap and unmet needs of services in Speech Therapy are observed in the public network revealed in the state of Piauí.

The findings are consistent with a study on the offer of speech therapy professionals in the municipal public health network of the capitals of the Northeast region of Brazil. The authors observed a significant deficit in the supply of speech therapists and an insuficiente and unequal number of professionals in the capitals, which restricts, or even makes it impossible for the population to access speech therapy services 14.

It is important to highlight that there has been anevolution in the indexes of the number of speech therapists per 10.00 inhabitants in the decade 2011-2020. This increase shows the growth of the professional's offer. In 2020, the average found was 0.81 per 10,000 inhabitants.

On the other hand, this number still falls below what is considered as parameters. The authors suggest one speech therapist for every 10,000 inhabitants in primary care, one for every 50,000 inhabitants at secondary level and one per 100,000 in tertiary health care.

In fact, primary care should be a priority, and should guarantee problem-solving capacity, since it is an indispensable component of primary care for integral health. In astudy on clinical evaluation of swallowing in the Intensive Care Unit (ICU) 15, a high prevalence was observed dysphagia (63% of dysphagia detected). It is understoodthat and every 10 beds, 6.3 had indication of speech therapy.

In view of the facts, it is inferable that tertiary care has a demand for speech therapy, but still repressed. It is necessary to highlight that the demand of the professional in the health care of the population should also take into account epidemiological and care indicators in the field of human communication 16.

The health facilities in which the speech therapist is in the largest distribution are: Primary Care, followed by Specialized Care and Hospital Care. This significant evolution of the allocation of professionals in Primary Care coincides with the period of marked growth in the provision of services at this level of care and the definition of the Family Health Strategy as a priority, throughout the national territory 14.

Studies show that there have been, on the part of governments, mainly federal and municipal, important actions aimed at expanding the problem-law capacity of primary health care (PHC) in the last two decades, as per example: Requalifies UBS, Information System (E-SUS AB), National Program for Improving Access and Quality of Primary Care (PMAQ-AB); creation of the Family Health Support Centers (NASF), with GM Ordinance No. 154 of 200817.

In this sense, speech therapists came from a strictly clinical perspective to assume an important role in the organization of the health system and in the transformation of practices in health services, in which Primary Care has become a space for expressive insertion of these professionals in SUS6.

Taking into account the expansion of speech therapists identified in Hospital Care, there was a contribution by GM Ordinance No. 2,809 of 2012, which organizes the Long Care for The Emergency Care Network and the other Thematic Health Care Networks , GM Ordinance No. 930 of 2012, which organizes integral and humanized care to the newborn , severe or potentially severe, the criteria for classification and qualification of beds of neonatal unit within the SUS, as well as Ordinance No . 665 of 2012 on the qualification of hospital establishments as emergency care centers for patients with ave, and that provide for the speech therapist as part of the multidisciplinary team. The 2010 Resolution of the Collegiate Board of Directors (DrC) of the National Health Surveillance Agency (ANVISA) provides for the minimum requirements for the operation of an Intensive Care Unit (ICU), and the Speech Therapist is cited as part of the bedside assistance team 18. 19th 20th

Regarding hospital speech therapy , with the adult /elderly, it is known that its purpose is to reduce the time of use of alternative feeding routes, assist the improvement of the pulmonary condition, prevent communicative complications and reduce the hospitalization time, that is, it can contribute to avoid or mini losses and damage caused by hospitalization as well as hospital costs 21.

The process of hospitalization for stroke generates the need for hospital care, usually begins through emergency care, followed by diagnostic confirmation. Among the complications acquired after the fright, still in the hospitalization period, are muscle sagging, arreflexia, hemiplegia, hemianesthesia and cognitive alterations. From the speech-language pathology point of view, the most common sequelae are associated with communication and swallowing 22

In a search on the DATASUS website, there was the occurrence of 805 hospital admissions due to a VESin in 2020 in the municipality of Teresina, of which 15.4 hospitalizations by speech therapists work in hospital establishments. It is important to consider that, in practice, the speech therapist who works in the hospital does not provide care only to the user with sequelae of a VES. Therefore, it is likely that the number of speech therapists who provide assistance to users hospitalized for a VES is even lower.

It is important to stacar also, that in March 2020 the COVID-19 pandemic was declared in Brazil. It is known that the prevalence of cases affected by severe acute respiratory coronavirus syndrome (SARS-Cov 2) requiring ICU, with the use of invasive mechanical ventilation, is around 12.2% to 44% in studies23 24.

The presence of the speech therapy professional is imperative in this context, because among its various contributions are effective communication, reintroduction of oral route safely, removal of the alternative feeding route, besidesaccelerating the decannulation process25 26.

A study on swallowing 77 patients with COVID-19 hospitalized in the ICU revealed that almost 20% (n=14) of patients do not have minimum conditions of safe feeding, and approximately 29% (n=22)of these patients require compensatory strategies and/or restrictions in the oral diet for swallowing function to be performed. The data also indicate that the vast majority of patients (72.8%; N=56), need up to 3 speech therapy interventions to recu perswallowation 27.

Considering the above-mentioned information obtained in the literature, it is possible to understand why there was an increase of 6% (n=4) in the average number of the professional in hospital care in Piaui,making a comparison and ntre the years 2019 and 2020. This fact is certainly related to the greater number of hospitalizations that the pandemic caused in 2020.

The Regional Council of Speech-Language Pathology and Audiology of the 8th Region (CREFONO 8), which comprises the states of Ceará, Piauí and Rio Grande do Norte, and Maranhão, issued an opinion - n°0001 of 2011 - that significantly assife the presence of at least one Speech Therapist

for every ten ICU beds, such as other higher-level professionals, being ratified by the CFFa in 2022, maintaining the same care dimensioning11.

In this sense, it should be verified how speech therapy professionals are intervening in the hospital environment, especially icu patients who are in critical condition, so that better performance parameters can be defined 12. Although there was a prediction of action in the legal device, it was not possible to obtain information of prophyssionals working in intensive care. This is because the professional does not yet compose the exclusive and minimal clinical staff for the operation, as guided by the RDC of ANVISA 07/2010.

From the same point of view, this research found a significant reduction in the supply of speech therapists at the Psychosocial Care Center - CAPS. The literature indicates that people with mental disorders present, among other symptoms, significant difficulties in communication, from the presence of ex disconnected oral pressure or without direction of speech to the other to the absolute absence of orality 28.

Speech therapy has more effectively been in the universe of psychiatric institutions since 1992, with the implementation of Ordinance 224/92 that brings as one of its multiprofessional guidelines in the provision of services to patients with mental disorders. However, it is in Ordinance No. 336/GM of February 19, 2002 - which regulated the model of mental health care for children and adolescents (CAPSi) and included it in the Unified Health System (SUS) - that the speech therapist is referred to as part of the caps infantojuvenil29 30 teams.

In this direction, the speech-language intervention in Mental Health in all life cycles is based on issues related to the functioning and dysfunctions of language, in a way that to understand and intervene in the processes that hinder/prevent the communication of the subjects attended, with emphasis on the relations between language and subjectivity. A study referring to the work process developed by the Speech Therapy Service of a CAPSi observed that health practices developed by speech therapists allowed qualitative and quantitative gains in relation to the children attended, who began to have greater access to this professional to from its insertion in welcoming and interdisciplinary groups.

Regarding the distribution of macro-region speech therapists, the data of this study show that these professionals are mostly in the northern regionof the state. It is important to highlight that this may be related to the fact that the macro-region concentrates about 42% of the state's population and the capital Teresina centralizes most health facilities, about 50% of the total in state of Piauí, according to DATASUS, in 202028 31.

In a research aimed at verifying the distribution of speech therapists in the public service of the state of Paraíba, it was found that the growth in the distribution of professionals was significant in a five-year period, however, there was a discrepancy regarding the distribution of this professional in the state 10.

Comparatively, a discrepancy was observed in the distribution of the piauiense professional in the macro-regions, in which the wrong Cobtained the lowest percentage (14%; n=38) and the Middle North region (48%; n=128).

It is noteworthy that this difference in the distribution of the professional may also be related to the level of care offered, with the capital Teresina (Middle North) with more professionals in the terciary care and the interior in primary care. This can be understood by the concept of health regions, where several smaller municipalities gather revenue for payment of professionals, leaving a professional responsible for several municipalities, reducing access to the specialist. Despite the advances, the results found here show a growing and unequal evolution and distribution in access to the speech therapist onal profissiin the SUS in the state of Piauí.

As limitations to this study, it is mainly recorded to underreporting, impairing the quality of information obtained from secondary databases. However, it stands out that these dataof the official information systems of the Ministry of Health, such as those of the CNES, are important for conducting academic studies and the production of evidence that contribute to the planning, implementation and improvement services and actions inherent to public health.

This research allowed the elaboration of hypotheses. These hypotheses should be confirmed with the realization of new studies focused on this problem, which have the purpose of relating the distribution of the professional with the effective demand of care, in order to produce and discuss about the consolidation and quality of speech therapy services in the SUS and, with ensure improved access to health.

4 CONCLUSION

The growth in the supply of Speech Therapy professionals working in the SUS in the state of Piauí between 2011 and 2020 was significant. However, the supply of speech therapists is still insufficient and unequal among macro-regions. There is a poor distribution in care. This fact restricts, or even makes impossible the population access to speech therapy services, a reality that requires reflection and discussion.

Efforts are needed to insert more professionals into the public health network. The universality of access is a principle of the SUS that must be ensured. For this to happen, care needs to be within reach of everyone who needs it. And speech therapymust be guaranteed , being a right of all and duty of the State.

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Chapter 61

Epidemiological profile of women victims of sexual violence in a specialized center for infectious-parasitic diseases in Cascavel, Paraná, Brazil

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ABSTRACT
This article aims to establish the epidemiological profile of women victims of sexual violence attended in a center specialized in infectious-parasitic diseases of Cascavel/PR. To accomplish this objective, an exploratory and descriptive, retrospective, cross-sectional study was carried out through the analysis of medical records of patient's victims of sexual violence, from April 2018 to December 2019, in the municipality of Cascavel/Paraná. The medical records were made available by the Health Department of Cascavel/PR. The sample consisted of 69 cases of women, of all ages, who suffered proven sexual violence through medical records, attended at the Center for Infectious-Parasitic Diseases (CEDIP). The criteria analyzed were: age group, self-declared color, schooling, if a police report, marital status, occupation, sexual orientation, if there was a repetition of violence, means used to effect violence, type of abuse, number of aggressors, physical conditions of the victim, HIV prophylaxis, STIs and contraception, reactive tests, post-violence pregnancy, aggressor's sex, age group of the aggressor and degree of knowledge of the aggressor. The data found were analyzed using the Microsoft ® Excel® 365.V16, organized, tabulated and transformed into tables and graphs. After that, content analysis and association were made with the texts presented in the theoretical framework. Through the knowledge generated by this research, it is possible to establish preventive actions to abuse, which address the reality of the population studied, in addition to establishing primary care actions in the specialized center.

Keywords: Epidemiological profile; Sexual violence; Infectious-parasitic diseases.

1 INTRODUCTION

Violence against women is, by concept, any gender act that causes death, harm, or physical, sexual, or psychological suffering to women, whether in the public or private sphere (KRUG et al. , 2002). In turn, Abrahams et al. (2014) conceptualize sexual violence as any sexual act, attempt to obtain sexual act, unwanted sexual comment or advances, or acts of trafficking, or otherwise performed, against a person's sexuality, using coercion, by anyone, regardless of their relationship to the victim, in any setting, including but not limited to home and work.

Sexual violence against women, by exposing victims to sexually transmitted infections, unwanted pregnancy and short or long term emotional problems (for example, suicide and depression), is a public health problem. The lack of official data and studies that present such data, in addition to the difficulties imposed by the underreporting of cases, are detrimental to the establishment of preventive actions to sexual violence that address the reality of the population studied, in addition to the adequacy of primary care actions in specialized centers.

Understanding this context, through scientific research - such as that conducted by this study and brought in this article - and reliable data, is the first step to act against an absurd reality: the large number of cases of sexual violence against women, because it is through knowledge that assertive actions can be developed to prevent sexual violence and, if violence occurs, to welcome the victim with the primary care possible in specialized centers. Directing the gaze of health professionals to details of the clinical history of patients who are victims of sexual violence is always necessary, since they are often marginalized due to cultural and social structural issues.

Thus, the study intends to draw a comparative parameter in relation to the reports of the victims, providing more knowledge about the various peculiarities of the acts of abuse. Moreover, it is through this knowledge that preventive action plans for abuse are drawn and that aspects that must be addressed during the consultation with these patients are identified. This reality justifies the research presented in this article, which answers the question: what is the epidemiological profile of women victims of sexual violence seen at the Center for Infectious and Parasitic Diseases (CEDIP) in Cascavel, Paraná

The general objective of the article was to establish the epidemiological profile of women victims of sexual violence assisted in a specialized center for infectious-parasitic diseases in Cascavel/PR . The specific objectives were: to stratify the victims by their social conformations, such as: age range, self-reported color, education, marital status, occupation, sexual orientation; profile the aggressors (sex of the aggressor, age range of the aggressor and degree of knowledge/intimacy of/with the aggressor); establish the type of injury (whether there was repetition of the violence, means used to effect the violence, type of abuse, number of aggressors, physical conditions of the victim); verify if a police report was filed; establish if there was prophylaxis of HIV, STI and contraception, reagent tests; and, identify which were the main outcomes of the sexual abuse (such as pregnancy, HIV infection and STI).

It is clarified that the International Code of Diseases (ICD-10) is T74.2 - Sexual Abuse and Y05 - Sexual Assault by means of physical force. The Health Sciences Descriptors (DeCS/MeSH), in Portuguese, are Sexual Offenses, Sexual Abuse, Sexual Assault, Sexual Assault, Assault on Prudence, Attempts on Prudence, Sexual Crimes, Sex Discrimination Offenses, Sexual Offense, Sexual Offenses, Sexual Violence - I01.198.240.748, SP2.006.087.091.007, SP3.001.005.030.060.010.010.

2 METHODOLOGY

This study is characterized, as to its nature, as an applied research. As for the objectives, the study is exploratory and descriptive. According to Gil (2008), the exploratory research provides greater familiarity with the problem to be researched, and may take the form of case study. For the author, descriptive research seeks to describe the characteristics of a given population or phenomenon. Furthermore, the research is retrospective, cross-sectional, carried out through the analysis of medical

records of patients who are victims of sexual violence. The main characteristic of cross-sectional studies is that data observation is carried out at a single point in time (GIL, 2008).

The medical records were made available by the Health Department of Cascavel/PR. The sample included 69 cases of women, of all ages, who suffered sexual violence proven by medical records, seen at the Center for Infectious and Parasitic Diseases (CEDIP), in the period from April 2018 to December 2019, in the municipality of Cascavel/Paraná.

As inclusion criteria, we cite: female patients, older and younger than 18 years old, victims of proven sexual violence through medical records who were seen at CEDIP in the municipality of Cascavel, located in Paraná, between the period from April 2018 to December 2019. As exclusion criteria, we cite: male patients, female patients who were not victims of proven violence, and medical records outside the period from April 2018 to December 2019.

It should be noted that, since this was a medical record analysis, there was no need for an Informed Consent Form (ICF), but the Consent Form for Data Use (TCUD), provided by the Health Department of the Municipality of Cascavel, was used. The data taken from the medical records were: age range, self-reported color, education, whether a police report was filed, marital status, occupation, sexual orientation, whether there was repetition of the violence, means used to perpetrate the violence, type of abuse, number of aggressors, physical conditions of the victim, HIV, STI and contraception prophylaxis, reagent tests, pregnancy after violence, sex of the aggressor, age range of the aggressor, and degree of knowledge of the aggressor. The data found were analyzed using the Microsoft® Excel® 365.V16 tool, organized, tabulated and transformed into tables and graphs.

Since this is a research that will use medical records, the risks involved were very low, limited to a possible exposure of the patients' data. To minimize these risks, the researchers committed themselves to use only what is pertinent to the research, as well as to maintain medical and research confidentiality. No data that could identify the patients will be collected. The researchers performed the data analysis in a reserved room at CEDIP, under the supervision of the person responsible for the sector.

It should be clarified that there was the possibility of suspending this research, at any time, by request of the researchers or the Municipal Health Secretariat of Cascavel, Paraná, without harming any of the parties. Furthermore, because this was a medical record research, the present study complies with Resolution 196/96 of the National Health Council. Thus, it was evaluated by the Research Ethics Committee of the Assis Gurgacz Foundation University Center and the researchers declared that the research only began after its approval by the committee.

The Assis Gurgacz Foundation Medical School student Laura Truylio and her Master Alexandre Daronco are responsible for the study. The study has no promoters or sponsors. The proponent institution is the Fundação Assis Gurcaz and the data collection agency is CEDIP. The data collected during the

research will remain under the responsibility of the researchers for a minimum period of 5 (five) years and will be used for scientific dissemination.

3 THEORETICAL FRAMEWORK

Gender definitions have been present since biology codified different chromosomes for man and woman. However, society has created its own stigmas and definitions regarding gender and sexuality based on its discoveries, basic aspects of the foundation of a given social reality, structuring of its own culture and identity, and more recently, globalization. In Ancient Egypt, Masculine and Feminine were not categories in opposition, but complementary forces, with the Feminine considered essential for the survival of society (SILVA, 2012). When studying early civilizations, one has the "[...] full proof that women could and can be in a situation, if not equal, superior to that of men." (SILVA, 2012, p. 77).

Using Ancient Egypt as an ancestor society for the analysis of the process of building patriarchal societies, Lesko (1996) argues that both men and women had an identical legal status in ancient Egypt, as the law allowed women to own and acquire property and dispose of their properties. Noblecourt (1994) cites that equality of the sexes seems to have been considered, from the beginning, as a natural fact. In this way, one wonders when these relations underwent drastic pattern changes.

According to Stearns (2007, p. 31), it was "[...] the displacement from hunting and gathering to agriculture [that] gradually put an end to a system of considerable equality between men and women" in the classical period and that led to the gradual constitution of a patriarchal system of sociocultural domination, in which the division of sexual roles in society, attributing greater value to the masculine ones, would represent a part of its functioning. And, with the growing birth of a patriarchal system, also grew the inferiorization that subjugates women and is linked to the exorbitant numbers of sexual violence against the gender .

As mentioned, historically, the construction of dichotomous models between what is feminine and what is masculine have been instituted throughout civilizations. However, what is currently being questioned is the extreme inequality that these models have caused. The inferiorization and objectification of the female body permeates the acts of sexual violence that add up and multiply in today's society.

It is important to introduce the concept of violence, violence against women and sexual violence. Violence is considered a social pathology to be treated. The World Health Organization (WHO) (WORLD HEALTH ORGANIZATION, 1996) defines this offense as the intentional use of physical force or power, real or under threat, against oneself, another person, a group or a community and that results, or has great possibility of resulting, in injury, death, psychological damage, developmental disabilities and deprivation. For Krug et al. (2002), violence against women is, by concept, any gendered act that causes death, harm, or physical, sexual, or psychological suffering to women, whether in the public or private sphere. Abrahams

et al. (2014) conceptualize sexual violence as any sexual act, attempt to obtain sexual act, unwanted sexual comment or advances, or acts of trafficking, or otherwise performed, against a person's sexuality, using coercion, by anyone, regardless of their relationship to the victim, in any setting, including, but not limited to, the home and work.

Leite et al. (2017) presents alarming data. According to the authors, the Map of Violence shows that Brazil ranked fifth among the countries with the highest homicide rate per 100,000 women in 2013. In justifying this reality, Leite et al. (2017) state that the frightening number of cases of violence against women could be correlated with the number of the most diverse abuses suffered by the female gender within society and the most diverse particularities of Brazilian women, since aspects linked to gender issues have great influence, and are linked to the unequal position of women in relationships, and the male "right" to control over goods and behaviors.

Several disorders have been associated with sexual violence and may arise at different stages of the victim's life. The prevalence of symptoms or signs suggestive of a psychiatric illness is 33% in women with a history of sexual abuse as adults, 15% in women with a history of physical violence by their partner, and 6% in women who have not suffered any abuse (KRUG et al., 2002). In addition, a study of French adolescents revealed that there is a relationship between having been raped and developing difficulty sleeping, depressive symptoms, somatic complaints, tobacco use, and behavioral disorders such as stealing and dropping out of school (KRUG et al., 2002).

In addition, studies warn of post-traumatic stress in rape victims, as well as the consequences of this psychiatric illness in the victims' lives. A review study evaluated 633 women, aged 17 to 49 years, and concluded that women who were abused in adulthood and childhood have a higher rate of post-traumatic stress disorder than those who were abused only in childhood (CIVIDANES & MELLO & MELLO, 2019). In addition, post-traumatic stress caused by rape is more common if there are injuries caused during the act and a history of depression or alcohol abuse by the victim (KRUG et al., 2002). Thus, if performed a clinical history accounting for the entire past of the victim of sexual violence, as well as a physical examination looking for injuries, one can "predict" mental pathology and perform the necessary referral and follow-up to women.

In an overview of the Brazilian situation on sexual violence, Cerqueira and Coelho (2014) present data from the Ministry of Health: regarding the total number of notifications in 2011, 88.5% of the victims were female, more than half were under 13 years old, 46% had not completed elementary school (among the victims with known education, this rate rises to 67%), 51% of the individuals were black or brown-skinned, and only 12% were or had been previously married. Finally, more than 70% of the rapes victimized children and adolescents.

When the aggressor is analyzed, some aspects of behavioral and cultural relevance can be noted. More sexually violent men have been shown to be more likely to hold rape victims responsible and are less informed about the impact of rape on the victims. In addition, they have coercive sexual fantasies, often encouraged by access to pornography, have impulsive and antisocial tendencies, and an exaggerated sense of masculinity (KRUG et al., 2002).

Epidemiologically, when a systematic review of studies is done, it is noted that male abusers are found between the ages of 25 and 30. In addition, husbands between the ages of 30 and 49 are four times more verbally abusive than younger men, while those over 40 are twice as likely to physically abuse their wives. It is also known that violence against the intimate partner may be related to the low education of the abuser, incomplete elementary school or less than seven years of study (SILVA & COELHO & MORETTI-PIRES, 2014).

Cerqueira and Coelho (2014), signed a Technical Note (NT), No. 11, with a preliminary version of a study that presented an overview of rapes in Brazil, according to health data. Such NT was released by the Institute for Applied Economic Research (IPEA) and it states that 70% of rapes in Brazil are committed by relatives, boyfriends, friends, or acquaintances of the victim. Pincolini and Hutz (2014), in a study on sexual abuse lawsuits in Porto Alegre/RS, which analyzed 229 cases, state that 53.7% of the victims described situations in which the abusers had kinship and/or responsibility relationships, in 43.7% of the cases there was no kinship/responsibility between victims and abusers, and 2.6% of the cases described sexual abuse simultaneously intra- and extrafamilially. The studies, vary in rate according to region, but all agree that most sex offenders, are intradomiciliary.

Sexual violence has a profound impact on both the physical and mental health of the victim (PINCOLINI & HUTZ, 2014). Just as it causes physical harm, sexual violence is associated with higher risks of sexual and reproductive problems, with immediate as well as long-term consequences (KRUG et al., 2002).

A study conducted in a reference center in Rio Grande do Sul showed that the age group most affected by sexual violence is the average age of 24.4 years and that those younger than 19 years old are at greater risk of not using contraception at the time of abuse (SANTAREM, et al., 2020). Santarem et al. (2020), when characterizing the sociodemographic profile of women victims of sexual violence assisted in a hospital in Porto Alegre, concluded that the mean age of patients was 24.4 (-10) years (range 11 to 69 years) and most victims were white (77.4%), single (75.9%) and sought care in the unit within 72 hours after the occurrence (80.7%). In most cases, the violence was carried out by a single aggressor (87.1%), unknown in 67.2% of the cases. By cross-referencing the data through descriptive statistical analysis (chi-square), the authors were able to state that the victims under the age of 19 had a higher risk of not using contraceptives and knowing the abuser.

According to the Ministry of Health, the chance of a victim of violence acquiring STD after sexual abuse is 16 to 58%, depending on the type of penetration, number of aggressors, frequency of aggression, age and susceptibility of the woman (CERQUEIRA & COELHO, 2014). This proves that abuse permeates women's lives for years, leading to psychological damage such as those already mentioned, but also to more permanent physical damage, such as lacerations, sexually transmitted disease infections, infertility and pregnancy.

Once the theoretical framework is established, the data from the research conducted to establish the epidemiological profile of women victims of sexual violence assisted at CEDIP in Cascavel/PR are presented and analyzed.

4 PRESENTATION OF THE RESEARCH DATA

4.1 VICTIMS' DATA

In the 69 medical records analyzed CEDIP, all patients were female, older and younger than 18 years old, included in the category of Sexual Abuse classified by the institution itself.

The age range showed a marked prevalence between 11 and 20 years of age, i.e., the adolescent period of the victims. This was followed by the 21 to 30 age group. In last place, tied were the age range of 0 to 10 years and that of more than 30 years, which shows lower incidence in the extremes of age (table 1).

Table 1 - Age range of the victims

Age range	n	%
0 - 10 years	12	17%
11 - 20 years old	25	36%
21 - 30 years old	20	29%
More than 30 years	12	17%

Source: Prepared by the researchers (2021).

Regarding the self-reported color of the patients, the percentages of white and brown were similar. However, 36% were not reported in the medical records (Table 2).

Table 2 - Self-reported color of victims

Self-declared color	n	%
White	21	30%
Brown	23	33%
Not stated/informed	25	36%

Source: Prepared by the researchers (2021).

Most of the victims had not completed elementary school (46%), whether or not they were attending school at the time of the violence. On the other hand, 22% of the women had completed high school and 10% are attending or have attended college (Table 3).

Table 3 - Victims' education

Education	n	%
Not Informed	2	3%
Child	3	4%
Incomplete Primary Education	32	46%
Elementary School Complete	2	3%
Incomplete High School	8	12%
High School Complete	15	22%
Incomplete Higher Education	2	3%
Higher Education Complete	5	7%

Source: Prepared by the researchers (2021).

When investigating the correlation between education, age, and whether or not an occurrence report was filed, it can be seen that there was no statistical significance and it is not possible to state that older and more educated people are more likely to file an occurrence report (table 4).

Table 4 - Correlation between age, education and filing a police report

Filed a police report	n	%
Yes	42	61%
No	26	38%
None	1	1%
Variable	p-value - Did police report	
Age	0,292	
Level of education	0,336	

Source: Prepared by the researchers (2021).

Table 5 presents the data related to marital status. It is observed that ¾ of the sample declared to be single, while 10% declared to be married.

Table 5 - Marital status of the victims

Marital Status	n	%
Not Informed	6	9%
Single	52	75%
Dating	2	3%
Married	7	10%
Divorced	1	1%
Widow	1	1%

Source: Prepared by the researchers (2021).

The occupation of the victims drew a lot of attention within the sample, as their majority belong to the classification of Student or Intern. In addition, 12% of the victims were either unemployed or cared for the home (table 6).

Table 6 - Victims' occupation

Occupation	n	%
Student/Intern	37	54%
Unemployed/household	8	12%
Child/Baby	2	3%
Other	15	22%
Not Informed	7	10%

Source: Prepared by the researchers (2021).

Regarding sexual orientation, it is noteworthy the 68% of patients who preferred not to inform, and the 1% of homosexuals. And regarding gender identity, almost all the victims identified with their biological gender with the exception of one (table 7).

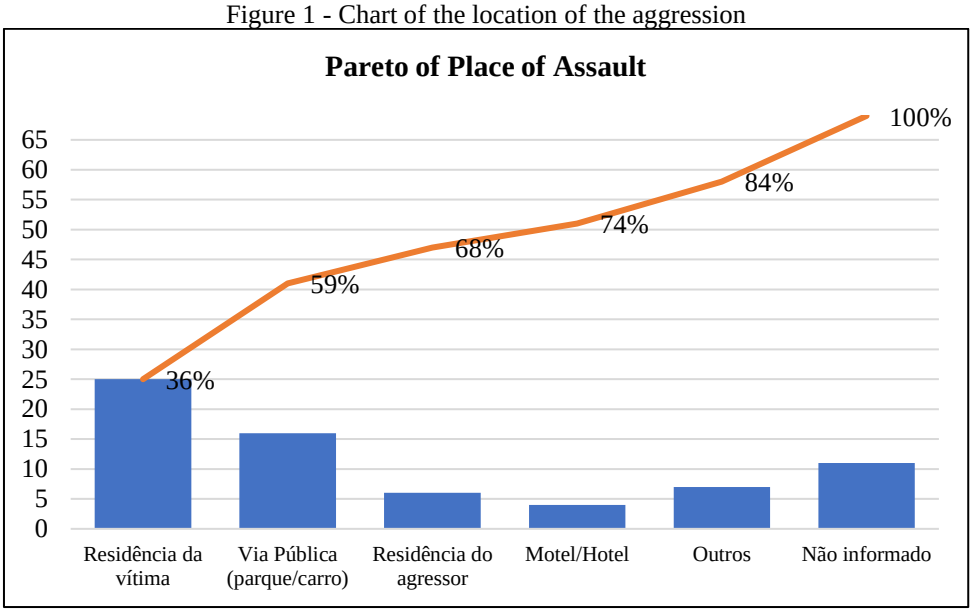
Table 7 - Sexual orientation and gender identity

Sexual orientation	n	%
Heterosexual	21	30%
Homosexual	1	1%
Not Informed	47	68%
Gender Identity		
Female	64	93%
Male	1	1%
Not stated/informed	4	6%

Source: Prepared by the researchers (2021).

When the data on the place of the aggression are analyzed, 36%, more than 1/3, of the victims were assaulted in their own homes, followed by public roads, which totaled 59%. Approximately 20 assaults occurred in the aggressor's own home and some occurred in hotels and motels (figure 1).

Figure 1 - Chart of the location of the aggression



Source: Prepared by the researchers (2021).

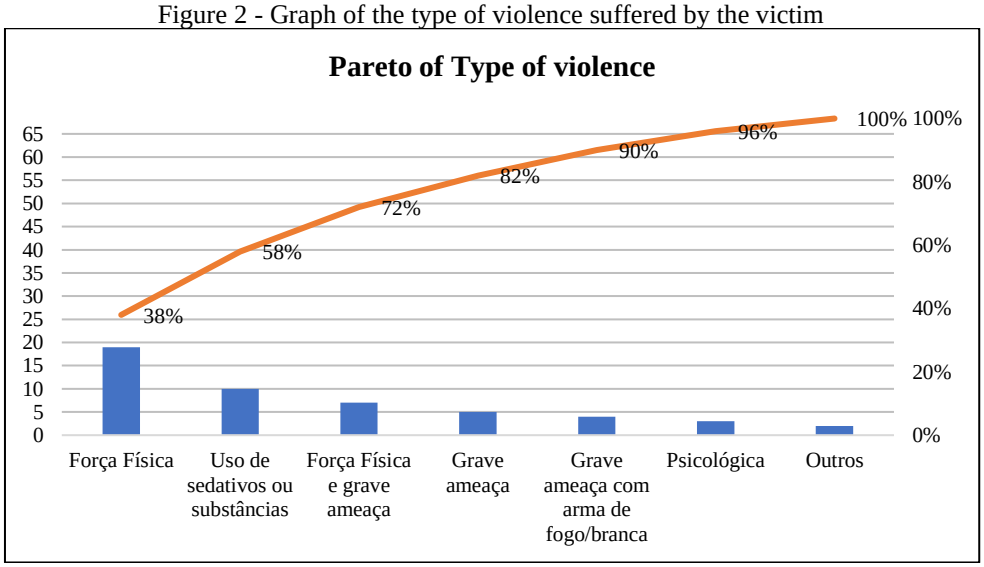
When the act of violence suffered by the victim is analyzed, 67% were not repeat rapes and 16% happened frequently (table 8). In addition, most were raped by means of physical force, sedatives or substances, and use of serious threat, adding up to more than 80% of the total reported in the survey (figure 2).

Table 8 - Repetition of violence

Repeat Violence	n	%
Yes	11	16%
No	46	67%
Not stated/informed	12	17%

Source: Prepared by the researchers (2021).

Figure 2 - Graph of the type of violence suffered by the victim



Source: Prepared by the researchers (2021).

For the type of abuse, considering only those reported and segregating by type, regardless of having more than one route, there is a majority via vaginal route with 71%. It should be noted that the occurrence can often involve more than one type of abuse on the same victim. In this way, 14% of oral abuse, 10% of anal abuse, and 5% of intimate contact were also reported (table 9).

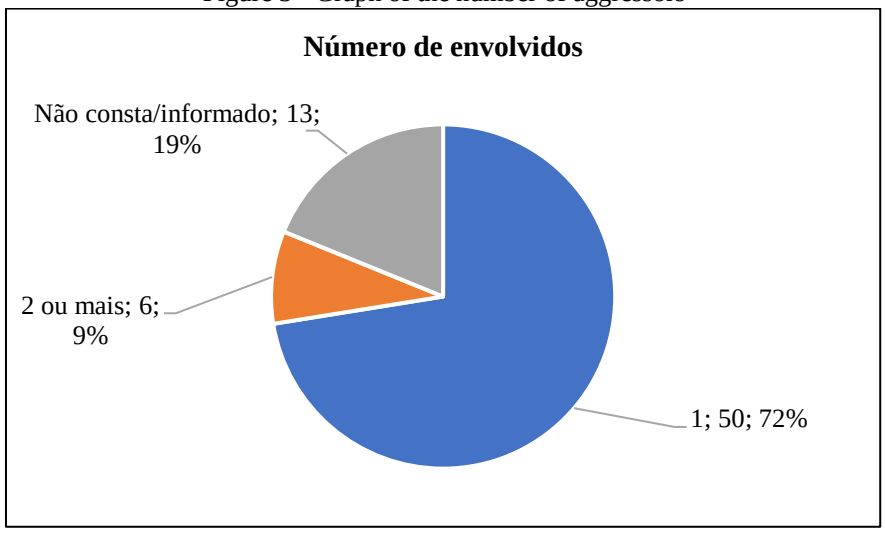
Table 9 - Type of abuse

Type of abuse	n	%
Vaginal	45	71%
Oral	9	14%
Anal	6	10%
Intimate Contact	3	5%

Source: Prepared by the researchers (2021).

As for the number of aggressors at the time of the abuse to the victim, 72% had only 1 aggressor, 9% had 2 or more aggressors, and 19% were not informed. It is worth mentioning the presence of one case of violence with 4 aggressors (figure 3).

Figure 3 - Graph of the number of aggressors



Source: Prepared by the researchers (2021).

Regarding the victim's conditions, it was revealed that most of them were not using contraceptive methods, had no comorbidities, did not use drugs or medications frequently. Only 10% had already contracted some STI previously, and 23% were under the effect of drugs, either by choice or forced. In addition, the most commonly ingested drug was alcohol (6 occurrences), followed by sedatives (3) and cocaine (1) (Table 10).

Table 10 - Victim's conditions

Victim's conditions as to:	Yes	No	Not informed
Contraceptive use	23%	74%	3%
Comorbidities	17%	74%	9%
Drug Use	9%	83%	9%
Medications	19%	72%	9%
Previous IST	10%	65%	25%
Under the influence of drugs?	23%	59%	17%

Source: Prepared by the researchers (2021).

As for the data found in the specialized medical care of the victims, 12% had an altered general physical exam and only 3% had alterations in the breast exam. In the genital examination, 23% had alterations and 14% had specular alterations. The bimanual touch was not performed in 90% of the patients (table 11).

Table 11 - Examinations of the victim's condition

Exams	Normal	Changed	Not informed/performed
Physical	48%	12%	41%
Tits	52%	3%	45%
Genital Organs Ext.	33%	23%	43%
Speculate	19%	14%	67%
Two-hand Touch	9%	1%	90%

Source: Prepared by the researchers (2021).

Regarding prophylaxis for STIs done in the reference center, 86% of the patients were prophylaxis for Syphilis, Gonorrhea, Chlamydia and Trichomoniasis. In the case of prophylaxis for HIV, this value is 64%, and of the 25 cases in which there was no prophylaxis, 15 were due to a late search (more than 72 hours after the aggression). Regarding the rapid tests performed for screening STIs, four tests for syphilis and one for hepatitis were positive. However, one patient had already been diagnosed with syphilis, which may have made the test positive.

Table 12 - Prophylaxes for STIs

Prophylaxis		n	%
IST	Yes	59	86%
	No	10	14%
	Patient Refusal	2	
	Not mentioned/informed	4	
	Child/Infant	2	
	Hymen intact/without penetration	2	
HIV	Yes	44	64%
	No	25	36%

> 72 hours	15
Not stated/informed	5
Hymen intact/without penetration	2
Patient Refusal	1
Baby	1
Repeat Violence	1

Quick Tests	NR	Reagent	%
HIV	69	0	0%
Syphilis	65	4	6%
Hepatitis B	68	1	1%
Hepatitis C	69	0	0%

Source: Prepared by the researchers (2021).

About the emergency contraception performed with Levonogestrel 0.75mg (2 pills 12/12h or single dose) it was shown that 52% of the victims performed it and 48% did not. The reasons why contraception was not performed were mostly due to a late search for the reference center (more than 72 hours) or because the victim was a baby, a child, or had not reached menarche (Table 13).

Table 13 - Emergency Contraception

Emergency Contraception	n	%
Yes	36	52%
No	33	48%
> 72 hours	11	33%
Child/Baby/Non-menarche	11	33%
Patient Refusal	3	9%
Pregnancy	2	6%
Already performed some method	2	6%
Without penetration	2	6%
Hysterectomized	1	3%
Not Informed	1	3%

Source: Prepared by the researchers (2021).

Evaluating the numbers of pregnancy after sexual violence, we observe 5 cases in which the pregnancy was confirmed, but, still, 15 cases in which it was not confirmed. Of those confirmed, 3 cases were in persons under 18 years of age (table 14).

Table 14 - Pregnancy after sexual violence

Post-Event Pregnancy	n	%
Yes	5	7%
No	49	71%
Child	3	-

Not performed	15	22%

Source: Prepared by the researchers (2021).

4.2 DATA FROM THE ABUSERS

Regarding the data on the abusers, there is a significant lack of information in the analyzed medical records. The absence of information about the abusers is often due to threats that make the victims unwilling to identify the abuser or to the victim's difficulty in recognizing the abuser, due to being under the effect of substances. In addition, psychological factors of the victim may prevent her from recalling the abuser.

In all of the rapes male individuals were present, and only one was carried out by a woman and a man. However, 30% of the reports did not indicate the sex of the aggressor. As for the age range, there were only 6 medical records in which this information was included, identifying the aggressors at the ages of 12, 14, 17, 21, 23 and 26.

The most striking data about the aggressor is the extreme prevalence of family ties between the victim and the abuser, representing more than half of the cases. In addition, friends and colleagues represent 45% of the cases when added together.

Table 15 - Relationship with the aggressor

Family relationship	n	%
Family	17	52%
Friend	9	27%
Colleague/acquaintance	6	18%
None	1	3%

Source: Prepared by the researchers (2021).

Having presented the data about the victims and offenders, collected from the medical records, we move on to the discussion and analysis of the memos.

5 DISCUSSION

When analyzing the age of the victims, the data call attention to the highest incidence among victims aged 11-20 years (n = 25; 36%), which points to the problem of child and adolescent sexual abuse. The problem is aggravated because this age group is a period that coincides with the patients' menarche, which is reflected in a possibility of pregnancy and a traumatic sexual debut. Comparing the data, a divergence is observed, since, according to the IPEA institute, half of rapes occur in girls under 13 years of age (CERQUEIRA & COELHO, 2014). Santarem et al. (2020) state that the age profile of victims of sexual violence treated in a hospital in Porto Alegre is, on average, 24.4 years old (range 11 to 69 years).

It is important, at this point in the analysis, to deepen the discussion about the data found on sexual violence against children aged 0-10 years. Although this is not the majority of the cases, it is important to note that 5 of the victims were infants. This is problematic, since children, if they have suffered anal or vaginal penetration, are more vulnerable to STDs due to the anatomical and physiological immaturity of the vaginal mucosa (CERQUEIRA & COELHO, 2014). In addition, the recommendation of the Ministry of Health, followed by CEDIP, is not to perform prophylaxis for STIs and HIV when the victim suffers continuous abuse, which happens mostly within this age group (because, usually, the abuser has family ties with the victims, as will be presented later in the text). Thus, the vulnerability of the exposed age group lies in the contraction of sexually transmitted diseases and in the difficulty in performing prophylaxis.

The fact that the vast majority of rape victims are of reproductive age entails a possible pregnancy, which intensifies the problem of sexual violence. In this study, 7% of rape victims had their pregnancy confirmed by the specialized center. This can demonstrate the current trend of the use of continuous contraceptive methods by women, the almost null chance of pregnancy outside ovulatory periods and also the effective health policy regarding the use of emergency contraceptive method. When compared to IPEA data that reports a post-sexual abuse pregnancy rate of 7.1%, a statistic similar to that collected in the municipality of Cascavel is observed (CERQUEIRA & COELHO, 2014). There is the possibility, given by Law 2.848, art. 128, of abortion in case of rape; however, when the victim is a minor, authorization is required from her legal guardian who, as will be addressed later in the text, is often the abuser, which exacerbates the problem of unwanted pregnancy in victims of sexual violence.

As for self-reported color, there is a prevalence of browns (n = 23; 33%), followed by whites (n = 21; 30%), but in 36% of the cases (n = 25) there is no record of this data. Cerqueira and Coelho (2014) state that in Brazil, 41.8% of victims were brown, 38.6% of victims were white, 9.4% of victims were black, and in 8.7% of cases this information was ignored. In turn, differently, Santarem et al. (2020), in a study conducted in Porto Alegre, state that most victims were white (77.4%), while in only 1% of cases this information was ignored.

Regarding education, the great majority of the victims in this study stated that they had incomplete elementary school education, whether or not they were in school (n = 32; 46%). Thus, it can be stated that low education is linked to higher rates of sexual violence. This can be related to the lack of information, the naivety of the victims, the aggressor's choice for a profile with greater chances of psychological abuse for a later sexual abuse, and it is also related to the high incidence of abuse in minors. Due to the preponderant age range, according to Cerqueira and Coelho (2014), 46% of victims of sexual violence in Brazil did not have complete elementary school education.

When investigating whether there is any correlation between education, age, and whether one has filed a police report, it is not possible to say that people who are older and more educated are more likely

to file a police report. This may be related to the fact that, even in educational settings, victims do not have access to what procedures to follow when they suffer sexual abuse.

Regarding the completion of the police report, most (61%) presented the document when seen at the referral center. The ideal would be that every woman should officially register the violence and the Ministry of Health instructs all doctors to refer the victim to register the document. However, there are several reasons why this action is discouraged. One of them would be the victim's minority and the abuse by a family member, besides serious threats by the aggressor and the psychological factor of having to reconstitute what happened for the police.

According to Cerqueira and Coelho (2014) there are several public agencies able to assist a victim of sexual violence, such as, when it comes to child/youth victims: guardianship council, vara da infância/juventude, shelter home, police station for the protection of children and adolescents, Social Assistance reference center; adult: police station for women, public ministry, women's reference center, IML.

The occupation of the victims drew much attention within the sample, since most of them belong to the classification of Student or Intern, revealing how power hierarchies can give location to sexual abuse. Since the concept of patriarchy is understood as a hierarchical sexual organization of society, in which, according to Stearns (2007), there is a division of sexual roles in society, attributing greater value to male acts and the inferiorization subjugates women, the connection between patriarchy and the exorbitant numbers of sexual violence against the female gender is justified, especially when the woman is financially dependent on the man. It can be stated that the use of this domination through the minimization of students and interns, who occupy places considered inferior in society, has facilitated avenues for their sexual exploitation and abuse. In addition, 12% of the victims were unemployed or housewives at the time of the act, revealing yet another social stigma of financial dependence that can become a method of abuse of power by, especially, partners.

Regarding the place of aggression, there is another confirmatory factor about the violence suffered at home, since, according to the survey, more than 1/3 of the victims were raped at home. Still, according to IPEA, this data is even more true when the abuser is known (CERQUEIRA & COELHO, 2014). According to the data collected, it is also possible to see a pattern of repetition of violence when it occurs at home.

When analyzing the type of violence most suffered by the sample, one notices a high incidence of physical force. But what draws attention in this study is the recurrent use of sedatives and substances by the aggressor to abuse the victim. This is a particularity of the study that can become an instrument for local prevention policies.

Moving on to the physical examination findings of the victims, in only 23% of the victims the external genital examination was altered. This is a major barrier in the care of victims of sexual abuse, since there are few cases in which lesions representing sexual intercourse are found. However, the physical examination is essential for the stratification of diagnosis of sexually transmitted diseases that may have been acquired during the abuse.

When a woman is a rape victim, she has 74 hours to get to the reference center to be able to perform the necessary prophylaxis. The first prophylaxis to be done is the one for STIs, which include Syphilis, Gonorrhea, Chlamydia and Trichomoniasis. Prophylaxis for HIV, however, has a particularity: it can only be performed 72 hours after the occurrence. It is because of this that prophylaxis for STIs has a higher realization rate, 86%, compared to HIV, 64%. These data are very positive and demonstrate a good health care in the municipality of Cascavel, since, according to data from IPEA, prophylaxis for STIs is done in 21.4% of children, 46.1% of adolescents, and 63.8% of adults, and for HIV it is done in 18.4% of children, 44.5% of adolescents, and 61.5% of adults.

In addition, rapid tests for HIV, Syphilis and Hepatitis B and C are performed to screen patients with the possibility of being positive. Regarding the results, these proved positive when we noted only 4 reagents for syphilis and 1 for hepatitis B. Once again exposing the efficient care methods of the health team responsible for the first care of the victims.

Finally, when analyzing data on abusers, there is a huge lack of details. According to Silva, Coelho and Moretti-Pires (2014), a possible explanation for this panorama may be linked to the number of studies that address the problem of marital violence based on data from the Specialized Police Stations for Women (DEAM). In this case, according to the authors, the main research subject is the woman, which contributes to the greater visibility of the data reported by this group. In addition, the fear of revealing the aggressor's face is still real for most victims. The lack of data on this issue gives protagonism to the victim and anonymity to the aggressor, who remains unpunished, impossible to be located, profiled, and prevents public policies to act directly on who should be blamed for this social evil.

6 CONCLUDING REMARKS

The first consideration to be made is that the age profile of the victims of sexual violence confirmed by medical records, seen at CEDIP, is different from the national profile published by IPEA. The possible occurrence of underreporting of cases of sexual violence against children and adolescents in the Cascavel region is a warning. Actions should be taken to investigate the situation experienced by the age group disclosed by IPEA as being the one with the highest frequency of victims.

An aggravating factor of sexual violence against women is the unwanted pregnancy perpetrated by an act of violence - which intensifies the problem of sexual violence. On this bias, this research concludes

that there is the current trend of the use of continuous contraceptive methods by women, and there is also the effective health policy regarding the use of emergency contraceptive method, because in only 7% of the cases the pregnancy was confirmed. It should be instituted a norm that informs patients who are victims of sexual violence that there is, in federal legislation, the woman's right to abortion in case of pregnancy resulting from rape (Law 2.848, from December 7, 1940, Art. 128, that states that it is not punished the abortion practiced by a doctor in case of pregnancy that results from rape).

Regarding the self-declared color, the study should be deepened by investigating whether there is really no sexual violence against black women in the Cascavel region, whether black women who suffer sexual violence do not have access to the CEPID, whether there is underreporting in cases of sexual violence against black women or whether the cases in which this information is missing refer, in full or to some degree, to the number of victims of black women. Such actions must guarantee access to reporting, treatment, protection, and justice for all women.

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Chapter 62

Is there room for egregorian in nursing and healthcare?

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ABSTRACT
The purpose of this reflection is to propose, analyze and weigh whether there is room for the practice of the egregorian in interpersonal relationships and in nursing and health care. Methodologically, it is a reflective theoretical essay. This is a text in which a new concept is inserted in the practice of nursing and other health activities, as an additional form if technical and scientific knowledge. It is concluded that the egregore and its covalent aspects, in the evaluation of the authors, can benefit health workers, users and family members, by creating proactive relationships, generating comfort and well-being among people who cohabit in positively energized places.

Keywords: Egregorian; positive energies; health team, user of health services.

1 INTRODUCTION

Being a nurse is multiple and complex, reason that comprises a series of precepts. In addition to technical knowledge, important and indispensable for an exercise committed to the well-being of people, groups, and populations, there are also other principles to be observed, such as the ethical and aesthetic, education, management, and especially, the commitment identified with actions that respect and value people in their entirety, in a respectful, affective, relational manner, and above all, based on humanization. In nursing and health, because of the multidimensionality of the human being, which transcends technical care, by including religiosity/spirituality, the therapeutic touch, and the egregore. It is along these little trodden paths in health care that we reflexively dare to travel.

In general, the term 'o' or 'a' egrégora/egregore comes from the Greek '*egrêgorein*', which means to watch over, care for, watch over, and refers to the gregarious energies. Its constitution is generated by the sum of the power of thoughts coming from the interaction between two or more people, which may generate collective energies, consecutively, the power of thought and/or prayers of a group of people with specific

goals and singular purposes will compose an egregore. Situation in which, in a certain place and time, the coming together of people imbued with the creation of energy sources from the sum of mental, spiritual, and even physical forces coming from a group with the same intentions, effectively will be producing egregores (SILVA, 2020).

Unlike other areas of knowledge, in which one can physically evidence the object, experience it, describe it in a tangible way, even use it to exercise a practice. The egregore is located in a more abstract area, such as belief, passion, religiosity, faith, in which it is not possible to measure, to weigh, to define with the measuring instruments available. However, for sensitive, credulous people, egregorians can be sensed (SILVA, 2020).

When people get together with adjusted thoughts or when they congregate through prayers, spiritual exercises, they will be forming egregores, which will surely be positive, since they come from the action of their creators, generating to their creators more balance in their tasks, peace in their lives, and also happiness in their relationships, whether they are family, social, or professional (SILVA, 2020).

Knowing the egregore means consciously making changes that impact the lives of oneself and all of its participants, which is why it demands from its creators appropriate relationships, with discourse consigned with truth, responsibility with oneself, with others, and with the group to which one belongs. One can have and experience different spaces for the creation of positive energies, whether at home, in a club, or more precisely in religious temples, since these places are impregnated with good energies that are deposited by fellow believers. Unfortunately, there are places saturated with negative forces, which come from thoughts and attitudes not consistent with the good and lead their authors to exposure to evil, a fact these attitudes are linked to bitterness and depression (SILVA, 2020).

In summary: good thoughts, good attitudes, true relationships, faith, resilience, fraternity, the power of forgiveness and the affective memory, good relationships, faith, convergent thoughts consigned with the good, are amalgam that unite beings that inhabit the same spaces and scintillate with productive energies. Thus, knowing the precepts that govern the egregore is essential, given that many people committed to the good, will be composing it, or yet, by ignorance, may be generating negative forces, even if they do not have this intention (SILVA, 2020).

The egregore has in its principles, precepts consigned with spirituality and are important in the promotion, prevention of diseases and injuries and health recovery, given that the production of good energy is a form of care. The inclusion of actions that promote spirituality to users and family members in health services is an important addition to the integrality of care (SANTOS; NAVARINE; COSTA, 2018). Spirituality is an indispensable element for patients' family members at all times, especially in critical life situations in which there is the prospect of loss (LIMA; MACHADO, 2018). The beliefs and values of patients and family members need to be understood and accepted by professionals, reason that religiosity

and spirituality corroborate in facing the disease and possible losses, therefore, the spiritual support provides social and emotional support, providing comfort, motivation and hope and in a special way, restore the energies and give encouragement in facing the disease. Faith and spirituality, undoubtedly, contribute to the coping of situations arising from illness (ARRIEIRA, 2017).

Studies with caregivers of patients with chronic diseases show that spirituality constitutes one of the most important coping strategies in situations of fragility in the face of illness. For the caregivers, spirituality can be an addendum to support the adversity and stress of daily life. Therefore, spirituality contributes, for patients and caregivers, the moment they reciprocally offer support and comfort (MACHADO; DAHDAHB; KLEBBE, 2018). The spirituality of professionals can influence care, while integralized care contributes to the improvement of interpersonal relationships, among caregivers, patients, and family members (DE LA LONGUINIERE; YARID; SILVA, 2018). Religiosity and spirituality, in a study with nursing students, highlights the importance of this with the capacity for self-reflection, self-knowledge, synthesis of values, beliefs of each person, in coping skills in situations and difficult times. In the relationship between caregivers and patients the relationship can be mediated by spirituality and expressed by feelings, beliefs, values and customs (FERRO-RIVERA; RODRÍGUEZ-JIMÉNEZ; CÁRDENAS-JIMÉNEZ, 2018).

Another factor to consider refers to the therapeutic touch, which using the technique of laying on of hands corroborates the completeness of patient care, thus transcending the imminently biological care, which is why they use another element that is the energy field (ARRIEIRA, 2017). This energy stems from energy therapy in which, through the hands, energy is transferred to the patient. Thus, the blocked energy can be released, promoting physical, mental and spiritual balance, reason that the therapeutic touch the rebalancing and harmony of the energy system of people (MOTTA; BARROS; 2015).

As mentioned, the therapeutic touch seeks to restructure and harmonize the energy fields, to sequentially reduce anxiety, as well as to help reduce pain, signs and symptoms of various pathologies, improving the quality of sleep and, thus, promoting physical and emotional well-being (MEDEIROS; et al, 2019). The use of alternative care practices do not replace conventional techniques, however, complementarily constitute an important strategy for the relief of pain, overcoming the physical, emotional and spiritual impacts that may arise from a disease process, the fact that health problems deliberately affect patients and families intensely, depending on the time, level of severity and circumstances, however, regardless of the health situation, it is in the chronic conditions of and palliative care that these alternative practices are most valued.

Therefore, the purpose of this brief compilation is to propose, analyze, and consider whether there is room for the practice of egregiousness in interpersonal relationships and in nursing and health care.

Methodologically, this is a reflective theoretical essay, in which we try to consider the possibility of integrating the technical-scientific precepts, with the gregarious energies produced by the power of thought, prayers, among people with the purpose of constituting propitious environments for the well-being of all the people involved.

2 IS THERE ROOM FOR EGREGIOUSNESS IN NURSING AND HEALTHCARE?

After all, what is an egregore? In general, the term 'o' or 'a' Egrégora/Egregore comes from the Latin 'egrêgorein' that means to watch over, to watch over, to care for, or from the Greek 'Egregoroi' that refers to gregarious energies. This energy is generated by the interaction between two or more people who will generate/congregate physical, mental, and spiritual energies, igniting a group mentalization power with singular purposes. Therefore, when two or more people get together for specific purposes of mentalization, prayers, and positive thoughts around something or someone, an egregore will be created (SILVA, 2020).

The number of people and the interaction between the harmonically proactive participants strengthen and give consistency to the egregores. The egregor, therefore, accumulates the energy of several people, which is why the more energy that is expended, the stronger the egregor will be. This, created with beneficial intentions, will harmonically induce its participants to remain healthy. The egregore, therefore, accumulates energy from various people, retroactively strengthening its participants. The more mentally robust its participants are, the greater the energy generated and accumulated.

The egregores are forms of thoughts, feelings and beliefs created and nurtured by mentalizations and prayers that produce energies. Positive egregores attract, constitute, and transmit good energies, because a proactive egregore is based on generous attitudes, on the power of good for good, and the greater the number of participants, the greater the energy. Better saying, mentally balanced people, with positive thoughts and faith, will tend to create positive egregores. An egregore created with feelings of good, positive thoughts, will tend to intensify more and more, and induce its creators to be happy and healthy.

Seen in another way, it is recognized that different temples have powerful egregores, formed by the faith and mentalizations of their members, which accumulate the psychic energies of their believers/participants, and when people manage to channel the energies for themselves and for others, prodigious results can occur. A situation where, at a certain place and time, a mental/spiritual energy is created from the sum of mental, physical, and spiritual forces of a certain group of people with the same positive intentions. The egregore, therefore, is constituted by a common feeling existing in a group of people with reciprocal objectives and thoughts, who direct their senses and energies toward a common good.

As far as you are concerned, unbalanced, mentally negative people of doubtful intentions will tend to create a negative egregore. They are people who are part of a context that could be defined as 'toxic people', people with unhealthy behaviors, with serious deviations in conduct and attitudes that produce

negative energies. The bad attitudes/conduct adopted in these cases are evidenced by the complainers, the envious, the proud, the 'cheaters', the manipulators, the intriguers, the mediocre and the authoritarian (STEMATEAS, 2012)

The egregore results from the accumulation of energies coming from various frequencies. It may be perceptible or not, it depends on the sensibility of each one of us. The egregore takes shape through the participation of several people in a certain psychological environment. The production of intense thoughts, when united, can produce powerful egregors. It will be present and strengthened in an environment of harmony, togetherness, warmth, open friendship, recognition and respect. Thus, it can be said that the environment is in balance, which means that the egregore is strengthened.

As the egregor also comes from prayers and prayers, the attention to patients in palliative care, the integrality of care, includes physical, psychological, social, and spiritual actions. Spirituality strengthens and promotes comfort, collaborating in the confrontation with the disease and making it possible to improve the condition of life. Among the actions of comfort are included prayers, listening, dialogue, words of comfort (EVANGELISTA; *et al*, 2022). These adopted measures are very close to the precept of the egregor, which are concatenated actions to create positive energies, as strategies for coping with complex situations that transcend physical care. Emphasizing, the egregor is not a form of subjection to critical situations, but rather, a way to create good energies consigned with the strengthening, which can be congregated among patients, family members, and workers.

Spiritual and religious beliefs and practices are used by health professionals as a way to deal with illness and stressful factors. More spiritual people are thought to have better mental health than those less capable of this exercise. Spirituality can also influence well-being, alter physiological conditions, and affect physical health and a greater risk of developing diseases (MONIQUE SÁ, 2022).

The energy created by a group of people in communities helps to face unfavorable moments in life. The expression of spirituality and religiosity can occur in different spaces and are crucial in transcending the problems of everyday life, including health setbacks (CAMATTA, 2022). The genesis of good energies is anointed from its creation, anointed with beneficial intentions, harmonically will induce its participants to continue being healthy.

Good, clean, organized environments, with pleasant smells, soft and pleasant sounds, faith, contemplation, consonant emotional state, mystical chants associated with positive thoughts, prayers, faith, and emotional balance are some of the factors that impregnate the environment and facilitate the formation of an egregore. For this reason, religious temples and those of orders committed to fraternity, religiosity, and the improvement of people are spaces that facilitate its formation, because these places are impregnated with good energies and facilitate its development.

Egregores believe that the energies produced are shared among people with the same purposes, creating an environment of strengthening (positive energies) or weakening (negative energies) among those who live together, and that these energies can be impregnated on the walls of homes, times, hospitals, and that these positive energies will benefit people, giving them encouragement to overcome adversities and weaknesses in the process of illness and recovery.

3 CONCLUSION

It is possible to understand that the egregore and its covalent aspects, of positive mentalization, of the creation of proactive thoughts committed to good and articulated with religious principles, independent of creeds, can generate a powerful force that contributes to the individual and collective strengthening. The egregore is governed by the law of attraction, if the thought is assertive, positive fluids will be obtained. Enlightened beings, of good, have a commitment to try to shine for beings who are in darkness.

Counterproductive egregores are known to be represented by people with negative thoughts and attitudes such as selfishness, usury, lies, slander, falsehood, antipathy, malice, envy, and many others. These behaviors/attitudes are like the seeds of evil, which diminish the individual subjects and groups, weaken the collectivity, and result in a negative egregore. On the other hand, proactive thoughts, feelings, and behaviors such as altruism, generosity, compassion, tolerance, humility, frankness, loyalty, and empathy strengthen us individually and reinvigorate us collectively.

Finally, in the authors' evaluation, there is room for the egregorian in nursing, but beyond this, it can benefit the multidisciplinary team and, with special attention to users and their families, as well as create an energized environmental atmosphere that can generate well-being and comfort to all people who live in and around these environments.

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Chapter 63

Family and therapeutic singular project: mechanisms for deconstruction of a manicomial culture

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ABSTRACT
The aim of this study was to analyze the process of family inclusion in the construction of the Unique Therapeutic Project (PTS) of the users of the Center for Psychosocial Care Alcohol and Drugs (CAPS AD) Resumption of the city of Senador Canedo-GO as mechanism of deconstruction of a manicomial culture . A descriptive, exploratory research was carried out using quantitative and qualitative approaches. For that, the institution offered the documentary source of the research. Data were collected from 195 patients' charts from January to October 2018, which allowed the construction of frequency tables and graphs that gave visibility to four categories for discussion, namely: profile of users, initial demand, demand motive by CAPS AD and level of family membership. Of the users surveyed, 88% had a profile for open treatment; 63% seek follow-up in CAPS AD, 25% appeal for hospitalization; 34% of the demand is made up of spontaneous demand from users, followed by demand from households representing a 32% figure. There was a shortage of information at the source researched regarding the level of adherence of families to care; however, from what can be seen, the adhesion surpasses the resistance by a margin of 2%. It was verified the existence of predisposition and demand for the help in the user population; and this needs to be worked out effectively by the actors of the Psychosocial Attention Network (RAPS) that needs to be strengthened.

Key-words: PTS and family. CAPS ad and family. Drug users and hospitalization.

1 INTRODUCTION

In the view of Carvalho, Moreira, Rézio, and Teixeira (2012) the asylum model loses its hegemony as the SUS (Sistema Único de Saúde - Unified Health System) environment invests in the consolidation of a new way to care for people with mental suffering, which refers to a psychosocial aegis endorsed by the Psychiatric Reform movement.

It is important to know that in the structure of substitutive services brought by the mentioned Reform, the CAPS (Psychosocial Care Center) emerges as the main space where the psychosocial model is created, which aims to rescue the autonomy of the user who presents a compromise in his or her mental health and provokes his or her re-socialization. The treatment there is a production of care by a multiprofessional team that acts in interdisciplinarity by considering the integrality of the human being and the multiple dimensions of the problem-situation that assails him/her.

Among the most efficient tools in this task is the construction of the STP (Singular Therapeutic Project) of the service users aiming at the effectiveness of therapy, which, in turn, will only be successful if there is adherence to the participation of their family/support network, because *"for the effectiveness of*

treatment, it is essential that the user and family participate in the process". (Carvalho, Moreira, Rézio, and Teixeira; 2012, p. 523)

It is common to notice in the daily life of CAPS AD (Centro de Atenção Psicossocial Álcool e Drogas) Recomeço, located in the city of Senador Canedo-GO, families that approach it driven by the situation of violence to which they are subjected due to a member who is sickened by the abuse of alcohol or other narcotics and consequently making the entire family system sick. They seek an emergency solution in the institution for the conflicts produced in their midst, demanding internment, many times in the form of compulsory internment for the referred family member. This first request can be summarized in the search for a medical report as a much-desired entry to "confine", in the form of a hospitalization, their sick member in the illusion of treating him/her within a short period of time allowed by the clinic or therapeutic community, as well as being able to enjoy some tranquility during their absence.

Given this scenario, the question about the object of this study arises: Why do families from Canoedo mistakenly seek a solution for their sick members in CAPS AD Recomeço, as a result of the use/abuse of alcohol and other drugs, preferring treatment under the application of the asylum model to the detriment of the offer of care to the user in an open environment?

It was initially hypothesized that the high demand of families for involuntary/compulsory psychiatric hospitalization of their members suffering from mental illness due to the use/abuse of chemical and psychoactive substances comes from their lack of knowledge and resistance to treatment adherence in its indispensable form of co-participation.

Thus, the present study is justified in that it aims to analyze the process of including these families in the construction of the SEP of users of CAPS AD Recomeço as a mechanism for deconstructing this asylum culture.

2 METHODOLOGY

The bibliographical, descriptive and exploratory research was used as methodology, since according to Gil (1989) exploratory research requires bibliographic and documental survey and along with the descriptive is generally used by those who investigate concerned with practice. The quantitative research was enriched by the use of the qualitative approach, for between both approaches Minayo, Deslandes, Neto and Gomes (1994, p. 22) exclude any opposition and emphasize the existence of a complementarity, since the former brings to light quantified data and the latter *"delves into the world of the meanings of human actions and relationships."*

The starting point for the investigative process did not require as a prerequisite the passage through the ethics committee since the instrument used was limited only to a search in documents, in this case, in the medical records of patients of CAPS AD Recomeço in the city of Senador Canedo-GO who were

received there between January and October 2018. As soon as the need for data collection was presented in the unit's files as a request to the equipment manager and once her agreement with the demand was declared, the exploration of 195 medical records began, which constituted the research universe.

Regarding the election and application of the quantitative method, the choice made was based on the principle of the law of statistical regularity, which according to Gil (1989, p. 92)

"indicates that a set of n units taken at random from a set N is likely to have the characteristics of the larger group."

As for the type of sampling, it was probabilistic; however, it was necessary to use cluster sampling, since the researched institution that was willing to provide the documental source was in the process of reorganizing its archives.

The organization of the collected material was possible from the reading of the medical records, which, in turn, focused on essential points that served as a guiding basis for the construction of categories. For Iani (1986) it is this construction that enables the unveiling of a certain reality in order to explain it scientifically. This step was followed by the analysis of the findings in the light of the theory explored in texts of scientific articles in Portuguese researched in LILACS, as well as in readings of articles of modules offered during the course of the Mental Health course itself.

3 RESULTS AND DISCUSSION

The universe of those surveyed was composed, in good part, of a teenager and adult public, mostly males, and of a smaller number of elderly people. This universe is characterized by a low-income socioeconomic situation, and almost all of them are outside the formal labor market.

Data collection required careful reading of each medical record in order to explore the phase of welcoming the user to the institution: how, with whom, through whom, and for what reason he arrived there; what his expectations of the institution were. It was also verified through the records the evaluation and conduct of the professional who received the patient and introduced him to the care service, as well as the process that started from that first visit and the participation of the family during the treatment. It was noticed that many of the patients arrived at CAPS AD Recomeço for the first time conducted or accompanied by a family member, or the intake interview was sometimes anticipated by the person who sought help for his ill member, often induced by the situation no longer bearable within the home generated by conflicts due to the chemical abuse/dependence of the referred member.

Moved by such great suffering, these families usually seek an apparent solution by requesting to CAPS AD Recomeço the involuntary hospitalization of the chemical dependent family member, and most of this request also refers to the compulsory psychiatric hospitalization (CPI) for him, thus allowing the

State to intervene in his privacy, an attitude revealed and analyzed by scholars of Foucauldian Biopolitics, according to Ramos, P. F. and Brito, C.M.D., 2016.

Bartolomei and Rezende (2016) talk about the Judicialization of health care in the municipality of Pinhal in Espírito Santo when it comes to the effectiveness of PCIs for young drug users at the request of their families, and analyze the burden that falls on the municipal manager because of this, since there was an increasing spread of these every year (except 2009) exceeding the transfer of federal funds received, while there was no budgetary participation of the state for this purpose.

Borges; Santos and Porto (2018) criticize mental health professionals who allow themselves to be formatted by a media culture; who reject police repression while replacing it with health violence, not distinguishing themselves in reality from their practices of the asylum model. Here we highlight the counterpoint of the paradigms of those who operate based on the Psychiatric Reform law (Law 10216/2001), which in turn feeds the policy of the Ministry of Health versus those care actors who conform to the National Policy on Drugs (PNAD) as well as the Law 11.343/2006 (the Drug Law) and Decree 7.179/2010 from which the "Crack It's Possible to Win" Program originated. If the first legal apparatus, supportive of the policy developed by the Ministry of Health, legitimizes a kind of care from the perspective of harm reduction and resocialization of drug addicts, the latter refer to a praxis of combating drugs, based on criminalization/stigmatization/culpabilization of the drug user considered worthy of compulsory psychiatric hospitalization (CPI), because according to their reading of the problem situation of this user, he no longer has the strength to overcome and the ability to decide in favor of his own life.

Such analysis raises the need for mental health care services for people with psychological suffering due to the use of chemical and psychoactive substances to rethink their work, exorcising from their teams the vision of fatality and the inability to bet on the human being as a being capable of transcendence.

Vasconcelos; Paiva and Vecchia (2018) corroborate the aforementioned ideas by formulating categories of certain forms of care in force in some spaces of the Psychosocial Care Network (RAPS); namely: Institution as a space for the standardization of care and Individualization of care as a denial of the subject's autonomy (2018, p. 363). The first category refers to the offer of care in the form of control, of an attempt to adapt the personalities of those who present behaviors considered deviant and dysfunctional to the social fabric and the norm imposed by the system; in the second category, the intervention is based on a perspective of adjustment of the user, already socially stigmatized, to a societal system that is in place, regardless of the limits that he presents. The reading of the reality of suffering in this way tends to be somewhat narrowing, since it detaches the user from the context in which he is inserted and consequently reinforces the stigma and the guilt that already falls upon him.

It follows that the help of a mental health service that is based on an adjustment perspective individualizes the user's treatment, concentrates its efforts on confronting drugs, and denies the real

interdependence that exists between the subjectivities involved in the situation and the objective conditions in which they are submerged; thus naturalizing a constant violation of rights.

The research data pointed to the real capacity of those who arrive at CAPS AD in search of an answer to their problem situation. They are sick people who initially bring diverse demands and expectations. If they knock on the door of the institution, even if bringing a demand that is sometimes incompatible with their real needs, the team is already responsible for working on this understanding so that it can be rectified and provide them with an opening to receive the care that is most appropriate for them.

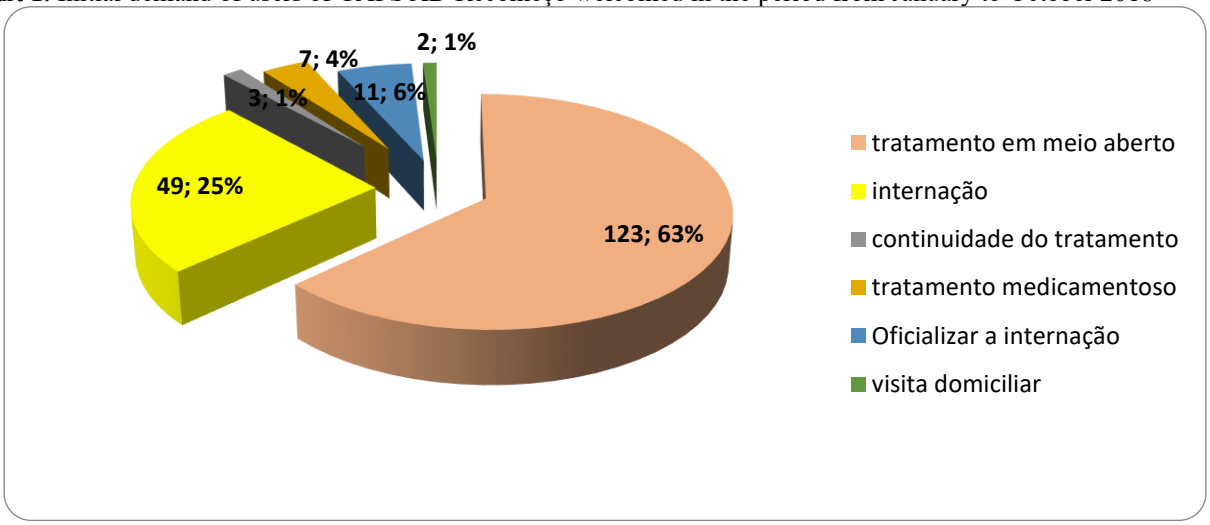
It was perceived that the demand for mental health among this public who use alcohol and other drugs exists in various forms, with the largest portion (63%) seeking open treatment and less than half (25%) preferring to be treated in a hospital setting. These data, in turn, are systematized in Table 1, followed by Graph 1, both offering a visualization of the phenomenon of the initial demand of the public studied.

Table 1:Initial demand and frequencies of users of CAPS AD Recomeço received in the period from January to October 2018

Initial Demand	**Frequencies**	
	Absolute	**Relative %**
open treatment	123	63%
Hospitalization	49	25%
continuity of care	3	1%
drug treatment	7	4%
Make the hospitalization official	11	6%
household visit	2	1%
TOTAL	195	100%

Source: CAPS AD Recomeço

Chart 1: Initial demand of users of CAPS AD Recomeço welcomed in the period from January to October 2018



Source: CAPS AD Recomeço

The initial response of the institution to the families' demand for hospitalization consists of welcoming the user, at which time his or her profile as a patient is evaluated.

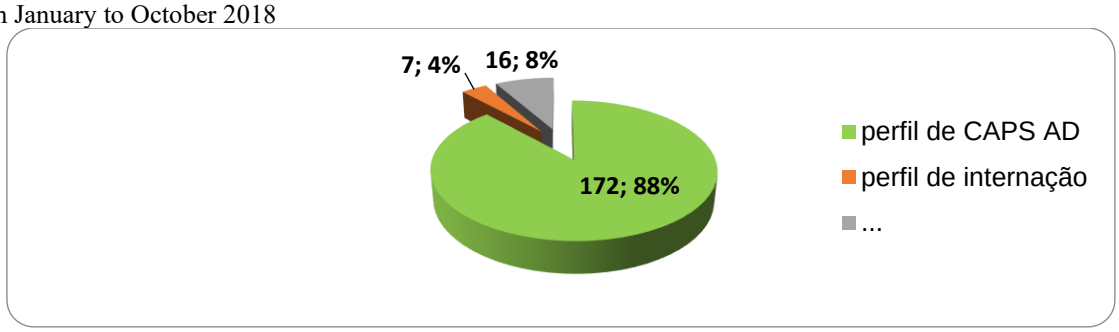
. Table 2 and graph 2 below show statistically that the majority of users admitted to the service (88%) have a profile, not for internment, but for open treatment, namely:

Table 2: Profile of users of CAPS AD Recomeço and occurrence frequencies of this phenomenon among those admitted in the period from January to October 2018

User Profile	Frequencies	
	Absolute	Relative %
profile of CAPS AD *	172	88%
inpatient profile	7	4%
...	16	8%
TOTAL	195	100%

Source: CAPS AD Recomeço
Note: * Center for Psychosocial Care Alcohol and Drugs

Chart 2: Profile of users of CAPS AD Recomeço and occurrence frequencies of this phenomenon among those admitted in the period from January to October 2018



Source: CAPS AD Recomeço

Given the results it is proven that most of those who come to CAPS AD do not need treatment under the hospitalization regime. After many years of the Psychiatric Reform, the work of the researched institution is currently focused on a daily movement of not retreating from the advances of the referred reform before these families that understand the therapy only from the manicomial point of view.

In the post-war period, the hospital-centric model was questioned. Several movements emerged worldwide in favor of the deinstitutionalization of people under psychic suffering, among which stands out Franco Basaglia's experience in the Italian cities of Goriza and Trieste. This experience inspired the Brazilian Psychiatric Reform - a socio-political mobilization that emerged in the late 1970s and criticized the asylum model. This is a struggle that consolidates in the 90s and has a notable advance with the sanctioning of the Federal Law 10.2016/2001. This legal apparatus has provided a reconfiguration of the therapeutic approach to people with mental suffering and allows the creation of a substitutive network to psychiatric hospitalizations. The law also provides for the rights of these people. The CAPS is the main

equipment among the devices of this substitutive network to the mental institutions (ANTUNES, 2007; SILVEIRA, 2005).

And under the aegis of this new paradigm, the Psychiatric Reform is taking place. On December 23, 2011, Decree 7,508 was issued to guarantee health care under the SUS to the population and established the Health Care Network (RAS), which offers, among other gateways to health services, psychosocial care as one of them. The psychosocial model, in turn, is concretized in favor of people suffering from chemical dependency from another network - the Psychosocial Care Network (RAPS), a network established by Administrative Rule 3088 of December 23, 2011.

An allusion can be made between the hypothesis formulated in the present work and a study that problematized the entrance of young people in a mental health service of Porto Alegre-RS by means of compulsory internment. The authors initially outlined the profile of those who were introduced there by analyzing the mechanism used as a gateway under the paradigm of biopolitics conceptualized by Foucauld (Guareschi; Lara and Eker, 2016, p. 2); for in his perspective, "Biopolitics is inserted as a technology of power that invests in life aiming to seek maximum effectiveness of government action through intervention in the population." (Foucalt, 2004, cited by Guareschi; Lara and Eker, 2016, p. 2).

The researched context evidenced the existence of a close relationship that is made in the contemporaneity of procedures that call themselves mental health care with the maximization of the efficiency of a policy of essentially neoliberal matrix.

The aforementioned authors, in contact with the medical records, noticed that a large part of the adolescents who were compulsorily inmates were taken from risk situations, street situations, excluded from society, marked by poverty and social vulnerability, and that the discharge procedure only referred them to a future filled by the medicalization of their lives and the return to the same context from which they came under the mental health service, which in practice did not envision any construction of a life project for young people; this fact, in a way, transformed them into strong candidates for successive readmissions.

For Guareschi; Lara and Eker, 2016, p. 6; Reis and Guareschi, 2016, p.5 "(...) *psychiatric hospitalization and the judicialization of mental health care are part of a political field and assume certain functions within it. Thus, it is up to us to question in the service of what these intervention strategies have been placed".*

. The issue becomes crueler when in dealing with the suffering of those unprotected by society all the effort of the care actors consists in individualizing the treatment of the users as if their lives could unfold in a detached way, oblivious to the conditions of inequality prevailing in the country.

> In this process, we see that care practices end up directing adolescents to certain life paths that are governed according to economic needs and not according to the realization of

> constitutional rights. These paths make their existence productive when they are inserted in certain sectors that move capital. These sectors sell their services supported by the argument of care. (Guareschi; Lara and Eker, 2016, p. 9)
> Many of the interned adolescents come from contexts of misery, where the rights foreseen by the Statute of the Child and Adolescent (Law nº 8.069 of 13 July 1990) are neglected. Education, health, housing, food, transportation, among others are not close to their realities regarding the access to these rights also foreseen in Federal Constitution. (Constitution of the Federative Republic of Brazil of 1998) (Guareschi; Lara and Eker, 2016, p. 5).

In this way, the aforementioned research analyzes the current political conjuncture of the Brazilian state committed to the dictates of neoliberalism that gains space under the lens of Mental Health. It uses all this CPI apparatus to fill the void produced by itself in its duty to guarantee the rights to the population foreseen in the Magna Carta. And in the course of the process, the lives of these young interns make them productive for the capital that heats up through the medicalization of their lives added to their recurrent internments.

By showing the inverted state practice in the provision of care directed to the daily life of the population that seeks a solution to their conflicts, Ramos and Brito (2016) reinforce that the path to effective intervention points to the urgent need for the formulation and implementation of public policies by the state that are in turn operationalized within an intersectoral network of services in order to provide comprehensive care to the user population regarding the realization of their citizenship rights.

This study confirmed the existence in the city of Senador Canedo of players that make up this network of services and that, by the way, guide families or even people affected by chemical dependency to seek the care offered by mental health through CAPS AD. The largest portion of those who seek this service is constituted by the spontaneous demand of the users themselves in a quantity of 34% and in second place come the families with a percentage of 32%, followed in descending order by other organizations in the network. The visualization of this reality is systematized in table 3 and in graph 3 below:

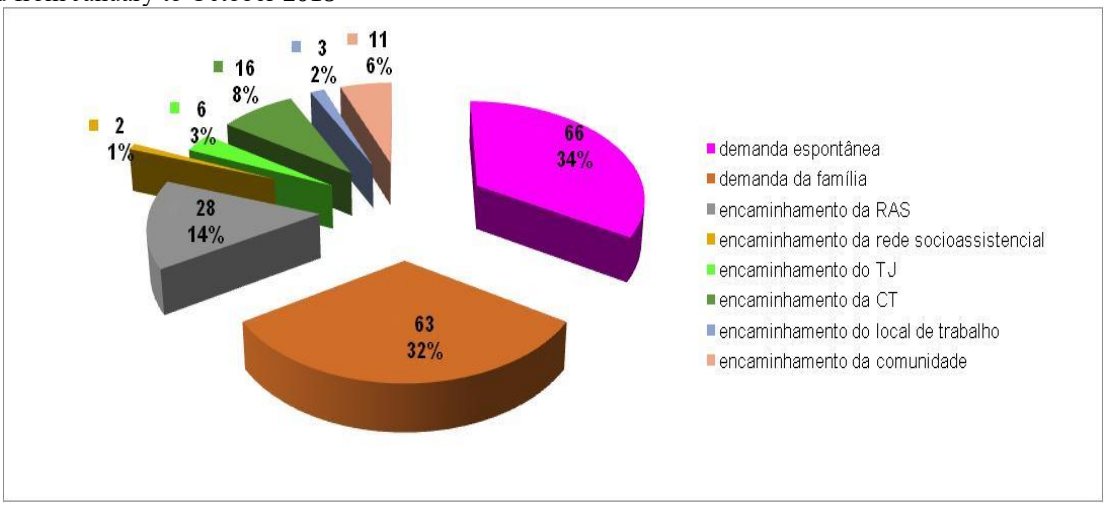
Table 3: Reason for seeking users at CAPS AD Recomeço and frequencies occurring of this phenomenon among those received in the period from January to October 2018

Reason for seeking CAPS AD	**Frequencies**	
	Absolute	**Relative %**
spontaneous demand	66	34%
family demand	63	32%
routing of the SAN	28	14%
referral from the social assistance network	2	1%
referral from the TJ	6	3%
CT referral	16	8%
workplace referral	3	2%
community referral	11	6%
TOTAL	195	100%

Source: CAPS AD Recomeço

Note: ** Health Care Network
***Court of Justice
****Therapeutic Community

Chart 3: Reason for users' demand for CAPS AD Recomeço and frequencies occurring of this phenomenon among those received in the period from January to October 2018



Source: CAPS AD Recomeço

The above statistically systematized data bring hope, since they signal that the population is willing to receive help from health care, while calling on managers, health care teams, and the entire service network to improve the quality of articulation and commitment in the organization of the care to be offered.

Upon verifying the increase in the users' families' demand for hospitalization, the CAPS AD Recomeço in the city of Senador Canedo-GO began to rethink its practice in the light of the parameters of the Psychiatric Reform, with emphasis on law 10,216/2001, which determines that hospitalization is the last resort used as therapy and in the case when all attempts at open treatment have been exhausted.

Within this vision he began to invest his efforts in care technologies directed to the family group and to consider it as a stronger ally in the treatment of its member sickened by alcohol and/or drug abuse.

The team has encountered a lot of resistance. Not always the proposal of this type of care has receptivity by the user public. This is what can be seen in the following example extracted from the document source researched:

> Patient was referred by the guardianship council, arrived in the company of his mother, and was received. During the initial interview he reported that he has no interest in receiving treatment for chemical dependency, because he claims not to have problems with drug use (marijuana). I offer treatment at the CAPS ad with resources, and offer the possibility of other extra CAPS ad activities in partnerships with other sectors, such as sports, courses, or apprenticeships, without any interest from the mother. Later, I welcome the mother of the user and offer group services directed to the family, but she says she cannot participate and thanks me for the support offered.
> CD: I orient the user and the family about the function of CAPS ad and the form of care. I offer support groups for the family and the user; and I leave the service available. (Prontuário do CAPS AD Recomeço, Senador Canedo, 2018).

Between the adhesions and resistance of the users' families and still under a tenuous advance in this work, the service's multidisciplinary team did not allow itself to be paralyzed by the sometimes unsuccessful attempts at the beginning, and continued to make an effort to include these families in the construction of their patient's family member's PTS.

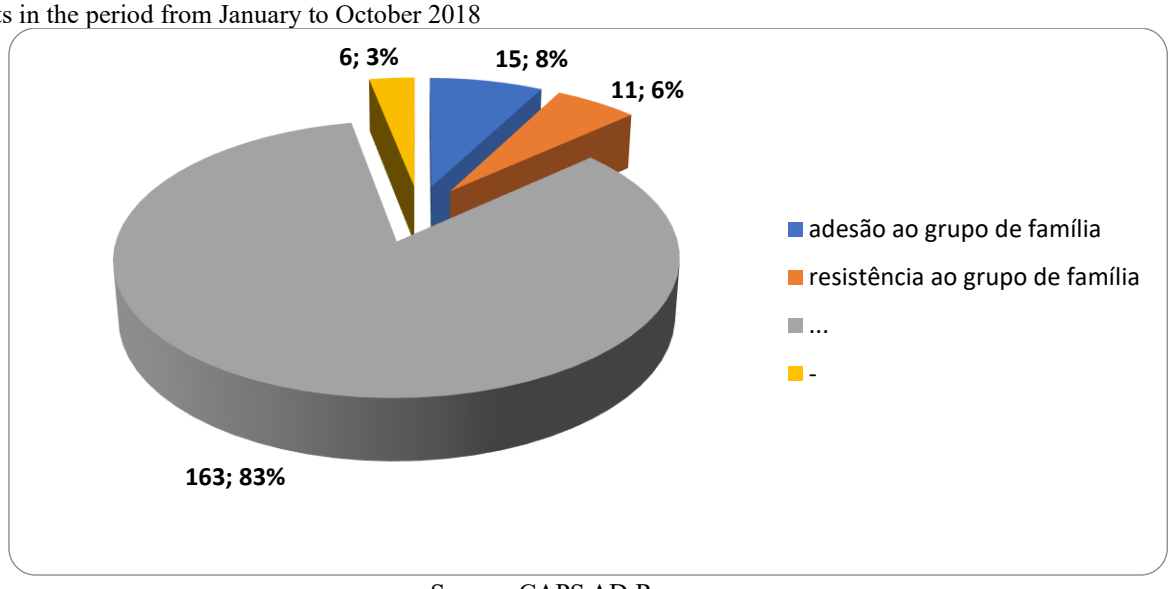
This experience is systematized in Table 4 and Graph 4. Note that both are shown below. Despite the low family adherence to the support offered by the mental health service, the data prove that it overcomes resistance by a margin of 2%.

Table 4: Level of family adherence of users of CAPS AD Recomeço and frequencies occurred of this phenomenon among the inpatients in the period from January to October 2018

Family membership level	Frequencies	
	Absolute	Relative %
family group membership	15	8%
resistance to the family group	11	6%
...	163	83%
-	6	3%
TOTAL	195	100%

Source: CAPS AD Recomeço

Chart 4: Level of family adherence of users of CAPS AD Recomeço and frequencies occurring of this phenomenon among the inpatients in the period from January to October 2018



Source: CAPS AD Recomeço

Alvarez, Gomes, Oliveira, and Xavier (2012) corroborate the above-mentioned experience when, in an investigation of a similar situation in a CAPS AD in the extreme south of the country, they realize that the work with a family support group works as an alternative to the hospitalization of users, since it enables

the professional monitoring of the problem situation, helping families to overcome the crisis of the chemical dependent and to effect his or her social reintegration.

The effectiveness of the experience with the support/support groups is presented by the authors in these terms:

> Through this care tool, assistance can be humanized, stimulating the chemical dependent and his family to face difficulties and maintain psychosocial functioning, according to each person's needs, in order to make him/her build a new life project and stay healthy.
> (...) It is a form of care that favors the interaction and integration of its participants, contributing to the learning process and personal growth. (Alvarez, Gomes, Oliveira and Xavier, 2012, p.7)

Within this type of choice it was noted in CAPS AD Recomeço that among the care strategies the following were emphasized:

- The welcoming of the user extended to his or her family, pointing out the need for their partnership in view of the therapeutic success; for both parties need treatment;
- Strengthening of family groups with weekly realization under two modalities that in turn alternate every other week, namely:
  - ✓ A group directed to the families of adolescent drug users and associated with other comorbidities;
  - ✓ Another group targets the family members of adult alcohol and/or chemical dependency users.

  Such groups work in a line of care that aims to provide for these family members:
  - ✓ overcoming codependency;
  - ✓ the help in the process of understanding alcoholism and chemical dependency as a disease that, despite being incurable, can be treated and controlled, as well as in favor of a quality of life;
  - ✓ the opportunity for an active and empathetic listening in what concerns their doubts and anguishes, as well as the information providing them with the construction of the new;
  - ✓ the sharing and analysis of their experiences, as well as the acquisition of skills in managing the relationship with their sick member.

Finally, these support groups for families produce a consequent strengthening of its participants to face the battles of their daily lives, a source that favors personal growth, which comes to work as a lever to reinforce the journey.

4 CONCLUDING REMARKS

From the study carried out, it was possible to confirm the hypothesis that the high demand of families from Canoe for psychiatric treatment for their members who suffer from alcoholism and chemical dependency is due to their lack of knowledge about them as ill people, as well as to their resistance as families to adhere to treatment as an indispensable form of co-participation.

It was also perceived in the midst of the phenomenon of chemical dependency that affects the city on a large scale the existence of demand for treatment presenting itself in various forms, sometimes implicitly or not so adequately due to ignorance. It is believed that this predisposition needs to be interpreted and worked on by the actors of mental health care, who in turn need to strengthen themselves as RAPS through government support, articulation, and matricial

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Chapter 64

Life skills training in the school environment: the role of the operative group with adolescents from the public high school network in a Brazilian capital

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ABSTRACT
The present work consists of exposing experiences of an operative group among adolescents in the school context, starting from the experience with psychological interventions in a public school in a Brazilian capital, which aims to develop Life Skills among students in the first grade of High School. In this perspective, the work aimed to present and analyze contents and results of psychological interventions, based on descriptions of the methods applied, to improve interpersonal relationships, to present the Life Skills Training model as a means of preventing risky behaviors and promoting health in the school context. To this end, the interventions were carried out in a group setting, consisting of twelve weekly meetings, each lasting fifty minutes, and 10 life skills were worked on during the psychological intervention. It was concluded that the use of life skills training reflects in the reduction of risk behaviors, health promotion, self-reflection, improvement of interpersonal relationships and increases the repertoire of assertive behaviors.

Keywords: life skills training; adolescence; social relationships.

1 INTRODUCTION

Adolescence is a stage of human development that encompasses psychological, emotional, and social vulnerabilities. It is characterized by a transitional period between childhood and adulthood that involves physical, cognitive, emotional, social, and sexual changes. It takes on variable configurations in social, cultural, and economic contexts. It is marked by the onset of puberty, the process by which it leads a person to sexual maturation (PAPALIA; FELDMAN, 2013). It is during this period that cognitive skills are developed that make them capable of thinking abstractly. According to Minto *et al.* (2006) adolescence is a period of development where the subject establishes in a definite way the identity, behavior patterns, and lifestyle. The set of changes in this phase of life can lead to future consequences, which generates an impact of great proportions. Because of this, a program was developed that sought to implement actions aimed at health promotion, based on the Life Skills Training. According to Minto *et al.* (2006), life skills refer to the emotional, social, and cognitive abilities that the individual possesses, which help in dealing with everyday situations and conflict situations. The school is a space to promote the development of preventive actions, as is the case of Life Skills Training, because the school plays a relevant role in the lives of adolescents, since they spend much of their time in the school environment (PAIVA; RODRIGUES, 2008). The goal of Life Skills Training is to develop strategies that reduce risk behaviors and increase health care, which generates great positive impact for the young person and the social/interpersonal contexts in

which they are inserted. The main theoretical basis for the construction of this scientific project was the article developed by Minto *et al.* which describes "The teaching of life skills in the school context with adolescents".

2 MATERIAL AND METHODS

The method used in this study was action research, since the study sought to identify risk behaviors presented by adolescents, create an action plan to solve the problem based on the article developed by Minto *et al.* Then, the changes that the interventions brought to the adolescents were analyzed in order to develop strategies to reduce risk behaviors and promote health care. The psychological intervention was carried out in a group context, in a public school in a Brazilian capital, the meetings took place in the schoolyard with approximately 17 students. It consisted of twelve meetings, one per week, lasting fifty minutes, in which ten life skills were applied during the psychological intervention (Table 1 shows the life skills, dynamics, and objectives of the group dynamics worked in each meeting). For the development of each skill, group work techniques were used, as well as oral and visual presentations of the concept, which led to debates and discussions around the subject. The structure of the meetings consisted of: application of techniques for group warm-up, introduction, presentation of the concept of the skill by oral presentation, and group dynamics (constituting the main activity, as it opened space for debates and discussions about the skill, and the reflection on the theme, which characterizes the closing of the discussion). Table 2 shows the outline of each meeting.

Table1. Life skills, group dynamics, and goals of the dynamics.

SKILL	DYNAMIC	PURPOSE OF THE DYNAMIC
Initial Meeting	Presentations	*Rapport*
Self-knowledge	Scrap Box	Encourage the process of self-observation, the recognition of our strengths and weaknesses.
Interpersonal Relationship	Boat ride	Relate to an individual's ability to effectively and constructively make, maintain, deepen, and end relationships.
Empathy	What would you do?	To understand people, to put yourself in the other's shoes, to try to understand, not to judge, to issue actions of solidarity and acceptance.
Dealing with feelings	Beliefs and feelings	Become aware of how much emotions influence behavior and identify the best way to express and manage them appropriately.
Dealing with stress	Jumping rope	Identify rope speed as a stressful event, recognizing and evaluating possible sources of stress. Identify possible actions to reduce or eliminate them.
Effective communication	Fitting the shapes	Discuss forms of communication and the importance of expressing yourself assertively.
Critical Thinking	Debate	Analyze situations and behaviors from different points of view. Recognize internal and external, positive and negative factors in how we behave.
Assertive behavior	Interpersonal Styles	Discuss scenes in which they depict situations of interactions between individuals and how they communicate when faced with a problem. Defend their rights without violating the rights of others and express their feelings assertively.
Decision Making	Criteria	To allow you to evaluate and outline the benefits, risks, and consequences that a situation will present.

Troubleshooting	Problem-letter	Enable to realize the importance of dealing with feelings, being skillful in communication, and respecting the principles that foster interpersonal relationships.
Closing	From the mirror	To resume what was worked on in the first meeting, which aims at self-perception, the recognition of the "I" in order to start recognizing the "you".

Table 2. Intervention scheme.

START	MEIO	END
05 to 10 minutes	30 to 40 minutes	05 to 10 minutes
Rapport/warming up	Carrying out the procedure	Closing

3 RESULTS AND DISCUSSION

The observations made in the interventions with adolescents in the school context showed the comprehensive diversity present in the group system, the web woven by conscious and unconscious choices and how they face them, raising possibilities for discussion about the behavioral responses. According to Diehl and Figlie (2014, apud MELO *et al*, 2016), Life Skills Training can be carried out in different contexts, but the school environment has been standing out as a suitable and pertinent context for this type of intervention model, because it is during the school phase that adolescents are most exposed to risk factors. The first meeting indicated the main demands among the group of adolescents, which showed a great predominance of relational conflicts, as well as a tendency to suicidal ideation. The analysis of the results verified the positive effects of the intervention on the adolescents. The class assumed a respectful posture towards each other, a growth in the possibilities of relationships that allowed the resolution of conflicts, among other expressions of positive and potential results verbalized by the students themselves. Since each individual in a group process plays a role, the positions taken by each member were verified, and even the one who was a "non-participant" in about 80% of the meetings, showed himself to be actively participating in one of the meetings, when a skill was discussed (decision making) in which the student showed great identification, narrating his non-assertive behaviors, which brought up his speech, from the awareness of what he judged as ineffective in his behavioral repertoire. The Life Skills training showed implications with experiences that the students verbalized with ease, relating to the social contexts inserted, everyday situations. According to Paiva and Rodrigues (2008) the life skills model aims to develop the implementation of actions aimed at health promotion. It consists of a set of psychosocial skills, which are capacities for positive adaptive behaviors. According to Spoth *et al.* (2008, apud MELO *et al*., 2016), a research conducted in the United States verified the long-term results of an intervention based on Life Skills Training, conducted in the school setting. From the analysis of the results, it was seen that over the course of five years, students who had been subjected to the intervention had lower rates of drug use compared to those who had not participated in the program. Life skill training is an approach present in the development

of interpersonal relationships, it was inferred the importance of self-reflection on the relationship with oneself, since it was evidenced the sphere of perception of the other, which only occurs functionally from the perception of oneself. It was then seen that the group in general showed affinity and/or free expression to talk about the skills directly or indirectly. It was observed throughout the contact with the group, besides the roles played, aspects of shyness and withdrawal by the vast majority, which were being redefined as the activity developed and the group members engaged themselves to perform the task. According to Pichon-Rivière (1988), the task is the fundamental element of the group process, it is the group's march toward its objective. It is in this phase that the group focuses on the task and begins to elaborate and overcome the basic fears that disrupt learning. Subjective projections occurred and were visualized as essential for the understanding of their acting positions in the relationships; there were also potential modifications in the behavioral repertoire demonstrated in the group situation, regarding the contact with the colleagues. In a creative way, they sought, by themselves, to get away from the accommodation caused by the resistances, consisting of a group primarily full of emotions and active, since the others were provoked by the participation of the leader and the spokesperson. Therefore, one must be aware that as in any kind of group, each member contributes to the consistency of that system, at school each student is a contributor to the formation of a unique and volatile group system, that each verbal and non-verbal expression infers on one's perception of the world. These perceptions and forms of communication influence their actions towards the social environment, as well as what they recognize and understand as empowering in relationships, and what is taken as a challenge to be developed that will produce healthy interactions, assertive behaviors, expressions and recognition of themselves and the other acting in the world around them. The experience of life skills with the group of adolescents proved to be potentially effective in relation to the development of learning about each of the skills experienced. Self-reflection was promoted and creative potentialities were verified, as well as an improvement in the interpersonal relationship of the class.

4 CONCLUSION

The results obtained revealed that the intervention was very promising both for the school context (system with its methods and relationships among the class) and for the other interpersonal relationships that the student has. It was possible to notice changes in the behavior presented by the students, which can be affirmed that they became aware of their behavior, as well as the consequences that such behavior can provoke, pondering the skills learned in the school context, communication and verbal and non-verbal communication towards others. This work was also seen as strongly empowering through the postures of gratitude and space in which they verbalized conflicting issues towards the trainees and the group itself. It was noticed that many students, in specific social situations, acted without considering the reactions and consequences that their attitudes could have, and that during the group process they showed understanding

and appreciation of reason before acting emotionally. It also provided a more sensitive and systemic look, understanding the influential variables in their repertoires and life perspectives, and how the posture of an individual influences the ways of the group in which he/she is inserted. Thus, it is of utmost importance to emphasize that the contact and the human gaze on the phenomena for their singularities excels any applied technique, any theoretical planning; it is a means in which each person experiences sensations, their being in the world, perceiving themselves and the other; and that each individual expresses and experiences intersubjectivities according to how he or she functions, that it is necessary to promote spaces for qualified listening and to value the power of being in adjusting oneself creatively, through the knowledge of oneself and of the other, of the differentiation in this space that exists among the subjects that interrelate. Therefore, the present work is extremely relevant, since it is during adolescence that young people have greater possibilities to experience new situations, which makes them vulnerable to issue behaviors that put their health at risk. Through life skills training it was found that adolescents increased the emission of assertive behaviors and decreased the frequency of impulsive behaviors, taking a critical stance about their actions. This allows them to face the challenges of life in a constructive and assertive way.

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Chapter 65

Telehealth: a proposed protocol for telemonitoring in the context of the Covid-19 pandemic

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ABSTRACT

Introduction: facing COVID-19 pandemic, alternative measures were adopted to reduce community transmission and prevent the collapse of the health system. Objective: This paper was motivated by the authors' professional experience during the COVID-19 pandemic. The study aims to improve a guide protocol of telemonitoring in the city of Contagem-MG, which could ensuring standardization of care for confirmed and/ or suspected patients of COVID-19, in residential isolation. Method: documentary evidence, descriptive estudy based on a literature review, followed by the elaboration of a protocol presented as a flowchart. The study evaluated the data from telemonitoring in the city of Count from July 2020 to May 2021, and it was approved by the Ethics Committee. Results: 25,498 consultations were carried out by telemonitoring, and most patients had symptoms (80.5%) and were discharged by telecare (97.54%). Conclusion: The number of calls and the risk of worsening in people who have had symptoms are elements that demand rigor in the follow-up by call center. Therefore, they reinforce the need for a clinical protocol. The protocol was developed specifically for the city of count, it was made based on internal documents of the helth system of the city and also in empirical aspects. It is suggested to update with new discoveries about the disease..

Keywords: Telemedicine; COVID-19; Protocols; Primary health care; Epidemiological monitoring.

1 INTRODUCTION

First reported in December 2019 in China[1,2], COVID-19, a disease caused by SARS-CoV-2 (Acute Respiratory Syndrome Coronavirus 2), has spread rapidly worldwide. The escalation of the COVID-19 epidemic on the global stage led the World Health Organization (WHO) to declare it a public health emergency situation of international importance in January 2020. Due to the large number of affected countries in various regions of the planet, it was officially recognized as a pandemic in March 2020[3].

On January 22, 2021, 96,267,473 cases of COVID-19 and 2,082,745 deaths[were confirmed worldwide 4]. In Brazil, the Ministry of Health (MS) confirmed the first case at the end of February/2020[5] and until January 24, 2021, 8,844,577 cases and 217,037 confirmed deaths were recorded, indicating lethality of 2.5% and mortality of 103.3/100,000 inhabitants[6]. For the same period, Minas Gerais (MG), whose first confirmed case dates from March 7, recorded 690,853 cases and 14,279 confirmed deaths by COVID-19, which means mortality of 67.5/100,000 inhabitants[8].

The pandemic imposes challenges on science and society, requiring changes in the way of living and acting, as well as adaptations in health institutions. In view of the emerging situation, and with the evidence of the great virulent potential that the disease presented, recommended alternative measures were adopted to reduce community transmission.

One of the alternatives found to maintain patient care and follow-up during the pandemic was telehealth - also referred to as telemedicine - which is part of Information and Communication Technologies (ICTs). This modality of care allows the care of patients at a distance, seeking to welcome them, confirm their conditions and symptoms and guide them on the necessary care, procedures of home isolation or referral to the most appropriate health service for each[situation 9,10,11].

Even before COVID-19, in 2019, the Ministry of Health published Decree No. 9,795, specifying that it is up to the Department of Digital Health, the fields of activity of Telehealth that includes telemonitoring, defined as:

> Remote monitoring of health parameters and/or disease of patients through information and communication technologies. Monitoring may include clinical data collection, transmission, processing and management by a healthcare professional using an electronic system[12]

Thus, it was possible to reduce the flows of users in health services, optimizing care and reducing the possibilities of contamination, without disproviding the population of health care[13,14].

Due to the transmissibility of the disease and the imminent overload of health systems, measures were adopted to prevent or reduce contagion. There are patients at home (suspected or confirmed) who demand remote care from health teams through THE STI so that health services do not collapse.

In the municipality of Contagem, MG, the first case of COVID-19 was reported on March 23, 2020[7]. The municipality also instituted the telessaúde "avoiding the exposure of the population and identifying the right time for inventions indicated according tothe disease phase of COVID-19"[15].

The municipality published Technical Note 002/2020[16] that deals with the reorganization of services in Specialized Care, formalizing that "primary care will telemonitor patients with Influenza Syndrome with clinical conditions of Risk for complications of COVID-19, who are attended in the Basic Health Units", in addition to offering other basic information about the group to be monitored. In August 2021, there was an update, publishing Technical Note 001/2021[17 that] increases the follow-up of all patients with Influenza Syndrome registered in addition to the Basic Health Units, including the Emergency Units in the municipality of Contagem, through the "Monitor covid" system18.

In this period (March 2020) the municipality of Contagem launches the campaign "Contagem contra a Covid: Pacto pela vida", through which the Covid-19 Pandemic Coping Committee implemented the telemonitoring project, to "monitor the evolution of the epidemiological picture of the new coronavirus, in addition to adopting and establishing public health measures necessary for the prevention and control of contagion and treatment of affected people"[19].

In April 2021, this committee elaborated the guidelines for the insertion of users (assisted in the emergency units of Contagem) in the monitoring center for Covid-19, and, in July 2021, these guidelines

were updated for the inclusion of symptomatic respiratory patients, to offer an instructional document with the step-by-step registration, facilitating the use of the system by[professionals 20].

There are several benefits of telemonitoring in a pandemic, such as reducing the time needed to obtain care, confirming diagnosis and starting treatment, allowing monitoring and referral of cases with aggravated symptoms, and protecting health professionals from direct contact with patients. "This strategy assists primary health care with the home management of users' health conditions, maintaining longitudinal and continuous care"[11,15].

Some countries have already had the initiative to create protocols to standardize care. China, for example, has presented a guide for interventions in patients with COVID-19 and indicates the possibility of other countries adapting or building their protocols according to "[...] the characteristics of their respective populations, culture and *modus operandi* of their health professionals"[21].

Considering that the protocols for face-to-face care are recognized relevant and important instruments that effectively improve the results with patients, as stated by Dieneret al.,[22 2], Werneck, Faria e Campos (2009)[23 and] Brasil, Silva and Moura (2018)[2] this study aims to expand this practice for distance care, contributing to the improvement of the quality of care to the population in home isolation, from the creation of a protocol for teleservice in the municipality of Contagem.

The protocols standardize care conducts, promoting greater safety for both the professional and the patient's health. According to Diener et al., (2006)[22], the protocols define strategies and present detailed and objective instructions, removing doubts about how the professional should proceed.

Establishing a clinical protocol is important for coping with problems in service care and management and "are based on scientific evidence, involve the incorporation of new technologies and [...] focuses on the standardization of clinical conducts"[23]. Clinical protocols can be used both for prevention and for health promotion and education and, according to Brazil, Silva and Moura (2018)[24], contribute to:

> [...] qualification of the service; organization and optimisation of assistance; time savings, avoiding duplication of tasks; rationalization of care, procedures, conducts and materials; adaptation of scientific evidence to local reality and user satisfaction[24]

The motivation for this study arises from the professional practice of the authors and their participation since the beginning of the telemonitoring work in the municipality of Contagem-MG, April 2020, when this care was still performed in the health department. The written records, still incipient, were made in the form of a spreadsheet, shared with the basic units, from where the attendants took the data to make contact with the patient. In this spreadsheet, they had spaces to put the evolution of the query, which each one put in its own way. This experience aroused interest in deepening the theme, from the observation of the difference in the visits performed by the various types of professionals.

Over time, in April 2021, telemonitoring began to be carried out in Iria Diniz, in addition to the documents mentioned above, the municipality of Contagem also prepared another document (exclusively internal use) with some basic points, in *the form of a check-list*, to guide health professionals in the stages of telemonitoring . It contains the questions that should be asked for screening of the patient who presents warning signs for disease, and thus be referred to medium complexity with the support of Samu. As Brazil, Silva and Moura (2018)[24] the development of these instruments should be done rigorously, observing aspects such as clearly articulated objectives and coherent structures. Also according to the authors, its implementation should be programmed and evaluated, to ensure good quality and health care at the best cost-effectiveness.

In this context, we identified the need to improve the standardization of health care by telemonitoring to guide health professionals on how to develop these practices and how to apply them. Considering that the professionals involved are from different backgrounds (psychologists, speech therapists, nurses, physicians, occupational therapists), the establishment of protocols will provide the same information for all, enabling them to follow the same flow and that patients have the same quality of care.

Therefore, the objective of this work is to improve the Telemonitoring Protocol, through a detailed flowchart, with a view to ensuring standardization and quality of care to patients confirmed and/or suspected of COVID-19, in home isolation, in the city of Contagem, MG.

2 METHOD

This is a documentary and descriptive study, with a scientific bibliographic survey on the PANDEMIC of COVID-19 and Telemonitoring, carried out during the pandemic period through a literature review, followed by the proposal to organize a protocol that will complement the guidelines of the Municipal Health Department of Contagem (SMS)/ Minas Gerais - Brazil.

We collected the regulatory documents in force in Brazil and international documents related to COVID-19, as well as the internal forms and reports that directed the care, used by the municipality for telemonitoring in the context of the COVID-19 pandemic, as well as the collection of descriptive data of these visits, in the documents made available by the CONTAGEM SMS, considering the sample by convenience.

A search was carried out for the construction of the bibliographic framework in the VHL - Virtual Health Library, a specific basis for the health area that returns papers published in bases such as Lilacs and Medline, for example, through the key words: telemedicine, COVID-19, protocols, primary health care and epidemiological monitoring.

The present study was approved by the Ethics and Research Committee (CEP) under the number CAAE 39977620.9.0000.5119. Also with regard to ethical aspects, the Letter of Consent of the Specialized

Consultation Center Iria Diniz, the Letter of Consent of the Counting SMS, and waiver of the Free and Informed Consent Form (TCLE), according to Resolution 466/12, were requested.

The protocol created will be sent to the Counting SMS for analysis and possible validation of the responsible Superintendence.

3 FINDINGS

From the data provided by the Contagem SMS, it was identified that during the period from July o/2020 to May/2021, 25,498 telemonitoring visits were performed to suspected and confirmed patients of COVID-19. Although the data were limited, it was possible to consolidate the results in the sociodemographic data and clinical conditions of the care of telemonitored patients, as shown in tables 1 and 2, respectively.

Table 1 - Sociodemographic data of visits: Contagem, MG, Brazil.

VARIABLES	CLASS	N	%
Age	0 to 17 years	1774	6,97%
	18 to 30 years	7816	30,71%
	31 to 59 years old	12268	48,20%
	60 years or older	3593	14,12%
District	Eldorado	9718	38,11%
	Ressaca	5215	20,45%
	Sede	1698	6,66%
	Nacional	3623	14,21%
	Vargem das Flores	1250	4,90%
	Petrolândia	1242	4,87%
	Industrial	1824	7,15%
	Riacho	804	3,15%
Total:		25.498	

Source: Survey data, 2020-2021.

Table 2 - Clinical conditions of care: Contagem, MG, Brazil.

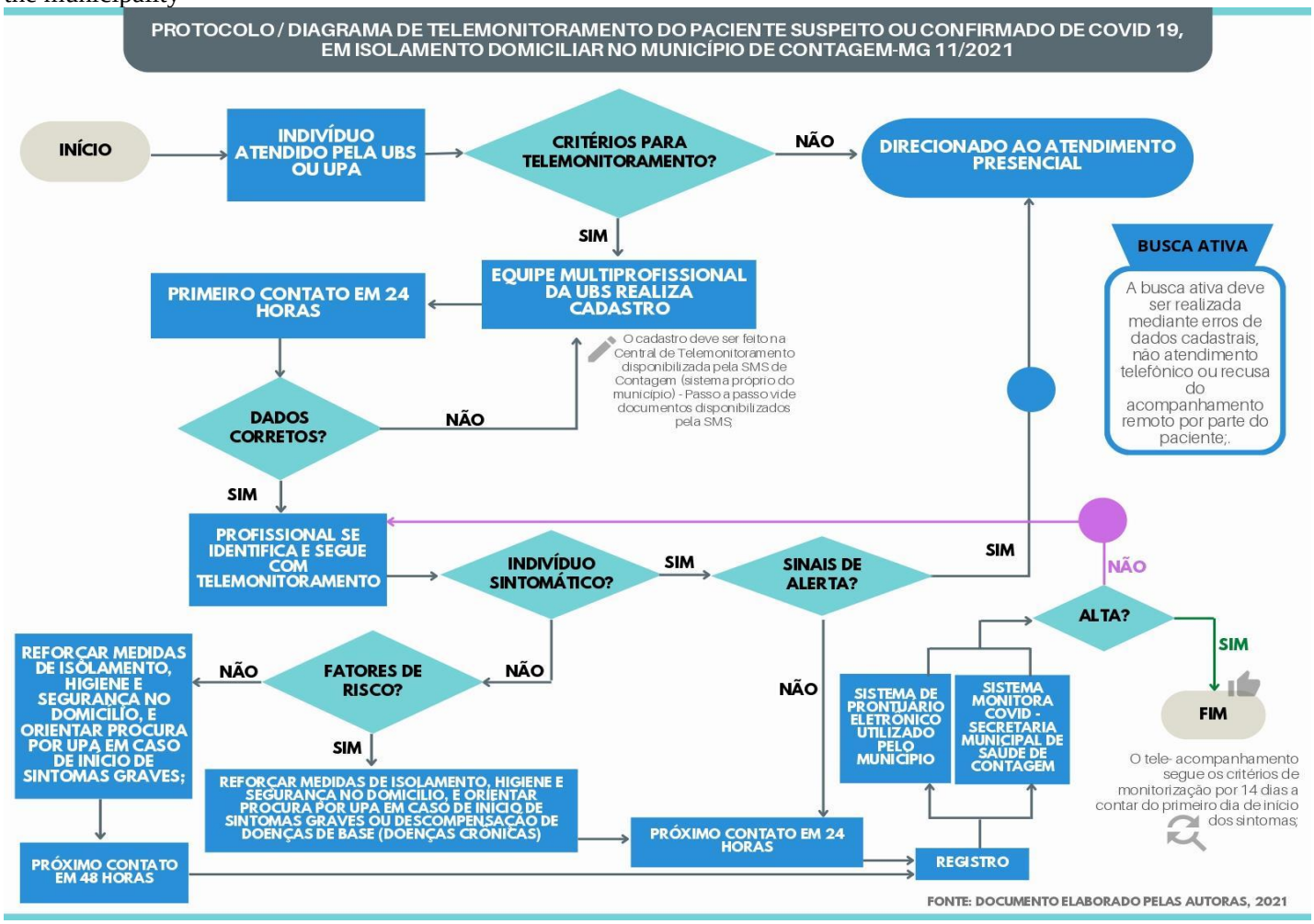
VARIABLES	CLASS	N	%
Comorbidities	Hypertension	2494	43,60%
	Respiratory disease	1776	31,05%
	Cardiovascular disease	573	10,02%
	Diabetes Mellitus	726	12,69%
	2 Comorbcombined ages	126	2,20%
	3 Combined comorbidities	25	0,44%
Presence of symptoms	Yes	20526	80,50%
	No	4972	19,50%
Type of Symptoms	Cough	2196	10,70%
	Breathing difficulty	1156	5,63%
	Fever	1025	4,99%
	Sore throat	988	4,81%
	Runny	707	3,44%
	Nasal Obstruction	144	0,70%
	Combined symptoms	14310	69,72%
Outcome - High	True	24872	97,54%

	False	626	2,46%

Source: Survey data, 2020-2021.

The proposal of a protocol, developed as a result of this research, for telemonitoring to patients confirmed and/or suspected by COVID-19, in home isolation in the municipality of Contagem MG, is presented in Figure 1.

Figure 1 - Protocol/telemonitoring diagram of the suspected or confirmed patient of COVID-19, in home isolation in the municipality



4 DISCUSSION

The data show the large volume of people who sought care related to COVID-19. More than 25,000 teleservices were performed in 11 months and most patients who were in home isolation presented less severe symptoms and demonstrated improvement in the condition. The rate of 97.54% of patients (24,872) was discharged via teleservice. These results show that the care remotely met the objectives of monitoring the evolution of suspected and confirmed cases of COVID-19 in the municipality of Contagem. Considering the high demand for care, the prevalence of symptoms and the presence of significant comorbidities, it is inferable that telemonitoring was of great importance. Several authors, such as Ena (2020)[25], Quispe-Juli

(2021)[26], Martínez-García and collaborators. (2020)27 reinforce the good results of teleservice and demonstrate that it is an efficient tool. "There is sufficient evidence on the efficacy and tangible benefits of telemedicine and telehealth."

From the data collected (Table 1) it is noticed that the vast majority of visits (12,268) occurred in patients aged 31 to 59 years (48.2%). Considering that telemonitoring occurs in patients who are at home, it is understood that their symptoms are not severe to the point of hospitalization. According to Martínez-Garcia et al. (2020)[27] "approximately 80% of patients with COVID-19 have a mild or moderate clinical course, requiring generally symptomatic treatment". The authors also point out that 20% of patients, especially those with advanced age or comorbidities, are more likely to be hospitalized.

The elderly public (60 years or older) represented only 14.12% of the visits in home telemonitoring (3,593), which is curious, since the propensity of this group is to be more susceptible to the severe form of the disease, presenting a tendency for greater hospitalization and, therefore, this rate of home follow-up could reflect a greater worsening of this public[28] . Studies have found that deaths related to the disease occur mainly among older people and individuals with polymorbidities, such as hypertension, diabetes and cardiovascular diseases, may have higher risks of complications due to the disease, accelerating the progress of symptoms with a worse prognosis [8,11,12].

Regarding the location of the patients attended, the vast majority (9718) are located in the Eldorado district (38.11%), followed by the Ressaca district (20.45%) with 5,215 visits. These data may be related to the population number, considering that the eldorado regional region is the most populous region of Contagem (equivalent to 19% of the total population), followed by the regional Ressaca (equivalent to 15.8% of the total population)[29]. In addition, it is noteworthy that a possibility of greater involvement of the disease in these regions refers to the living conditions of these people, living in subnormal clusters "characterized by an irregular urban pattern, lack of essential public services and location in areas that have restrictions on occupation"[30].

Analyzing table 2, it is identified that, among the comorbidities reported by patients, the highest incidence was hypertension in 2,494 patients (43.6%). Then, respiratory disease was identified as comorbidity in 1,776 patients (31.05%). In a much smaller range of involvement, diabetes mellitus (12.69%) and cardiovascular diseases (10.02%) appear. Patients with combined comorbidities were also identified, however, in a much lower incidence range. These data are of paramount importance for monitoring, since several authors report the presence of comorbidities as a risk factor for the worsening of the disease [11,8,12].

The vast majority of patients (20,526) in telemonitoring presented symptoms (80.5%), among them, cough, which is a mild symptom, was the most observed, confirming what is found in the literature regarding the prevalence of mild symptoms[27]. Symptoms that can technically identify the evolution of the

disease to the severe form are respiratory difficulty and fever, which represent a major concern of the team[8]. These symptoms were observed on a smaller scale (5.63% and 4.99% respectively) and are presented in detail in the protocol (Figure 1). The high rate of patients who report combined symptoms is highlighted, reaching 69.72% of the visits.

Despite the good results obtained by telemonitoring, the protocols can add even more value to this type of care and health care of populations, being "useful to standardize and optimize processes"[21]. According to the authors:

> In the field of health, protocols are specific guidelines, instructions and/or procedures to be followed by specialists to conduct a process of investigation or intervention with patients, with the objective of guiding decisions and on how to use scientific technical[criteria 21,]

Other Brazilian states and cities such as Maranhão (2020)[31], Rio Grande do Sul (2021)[32], São Paulo (2020)[33] and the city of Belo Horizonte (2020)[34], and even in other countries, such as Dand El Salvador (Ministerio de Salud, 2020)[35] they also had initiatives to create manuals and protocols to guide the conduct of teleservice of suspected and confirmed patients of Covid-19.

From the data collected in the literature and in the documents accessed, it is inferable that the creation of a protocol for telemonitoring of these patients can represent a gain in the results, since in addition to being an effective tool, the protocol helps both in the establishment of a flow and organization of the levels of care in the Unified Health System (SUS), as well as in the establishment of improvements in the quality of health care of the population, as already described in several[studies 21,22,2 3,24].

The protocol (Figure 1) was developed based on other protocols and public and internal documents of the Municipal Health Department, and it is an original work complementary to the guidelines for monitoring COVID-19 patients in the municipality of Contagem. It was constructed in diagram/flowchart format, as a graphical representation that demonstrates the simplified scheme of the multiprofessional team's work process in telemonitoring. Therefore, a technical-scientific material is configured that helps in the direction of health care processes and actions, related to COVID-19, in order to minimize unnecessary demand for face-to-face care in secondary or tertiary care, avoiding collapse in public health.

As described in the internal documents of the Counting SMS, the flow begins with the patient who has his/her entry into Primary Health Care (PHC) - Basic Health Units (UBSs) or secondary care units (UPAs). The individual who goes to the UPAs goes through the screening and can be referred to the care provided in the unit itself - depending on its classification - or is oriented regarding care in home isolation, and directed to the home. If it is oriented to isolation, it is also oriented to seek its reference UBS, with consequent monitoring by PHC. One of the limitations and challenges of this flow is the individual who

does not seek his reference UBS or the UPA, not being identified by the network, which makes it impossible for health teams to follow up. A strategy adopted refers to the active search performed by PHC.

The continuation of the individual assisted by PHC is due to the reception and identification of a suspected case of COVID-19, with Influenza Syndrome (GS). The team follows with measures to prevent contagion in the unit and performs the stratification of the severity of The GS and the notification is immediate. If the frame is considered severe, it will be directed to the reference UPA. For moderate and mild conditions, care is followed in PHC, with community prevention measures, support for active surveillance, therapeutic management and guidelines for home isolation. The individual then enters the telemonitoring, according to the record made by the professional responsible for his face-to-face care.

The telemonitoring is performed by the multidisciplinary health team of the UBS and continues for 14 days from the first day of symptoms mentioned by the patient. When making the telephone contact - see number registered in registration - the professional will identify himself and perform the remote care with record of all information in electronic medical records standardized by the municipality. It is also necessary to register in the system made available by the Counting SMS for telemonitoring (COVID Monitoring System), according to protocol (Appendix A). The direction for the use of the electronic system is provided in the documents made available on the digital platform of the Municipality of Contagem[16.17].

To know the frequency of the connections to be made, one should consider the signs and symptoms that the patient presents and/or if the patient has risk factors for severe forms of the disease. If you present mild or moderate signs/symptoms for flu-like syndrome or risk factors, calls should be made daily, until the 14 days of follow-up are completed; otherwise, connections should be made every 48 hours.

If the monitored individual mentions warning signs , the telemonitor should refer him to face-to-face care, whether considering a home visit - contacting the health unit - or providing support for referral to the Emergency Care Unit, with activation of the Mobile Emergency Care Service (SAMU). The direction of PHC actions in the care of individuals with flu-like syndrome is evidenced in the document "Instructional guidelines on clinical management of influenza syndrome/COVID 19 in Primary Health Care" (2021)[36].

An identified difficulty refers to patients with onset of symptoms who do not seek the first care, because they are not notified, and, therefore, are not followed up remotely, and may evolve with worsening of the condition. The protocol is limited to patients who have their first care in person and are directed to remain in home isolation. Another difficulty presented is related to the quality of the information recorded in the patient's register, and if the registration is made erroneously, the process for effective telemonitoring is not concluded, and it is necessary to actively search the individual who was notified, delaying the process.

Understanding the health work process from a perspective of continuity of care, monitoring, prevention and health promotion throughout the coverage territory, it can be considered the prolongation

of remote activities. Several authors support the continuity of telemedicine after the end of the pandemic, extending to post-Covid care, as well as to other areas of health and to other diseases[11].

The Multiprofessional Residency in Health became relevant for bringing to the practical field, theoretical knowledge, based on scientific evidence, resulting in the creation of a product - protocol - that can positively influence the quality of patient care with COVID-19 isolated at home.

5 CONCLUSION

In the Covid-19 pandemic scenario, the demand for care of sick patients increased considerably. To avoid the collapse of the health system, one of the alternatives was to use technical health, through remote care, to monitor these patients. The teleservice helped both in reducing the volume of face-to-face care in health units and emergency care, as well as in reducing the spread of the disease, through the permanence of the patient in his/her residence.

The large volume of follow-ups, the characteristics of the disease, and the risk of worsening, are elements that require rigor in teleservice follow-up, and, therefore, reinforce the justification for the improvement of the clinical protocol for this type of care.

The objective of improving this process, proposing a more didactic protocol, in the form of a flowchart, was achieved, complementing the guidelines of the Contagem SMS, enabling all professionals to follow the same flow and maintaining the quality control of teleservices. The Telemonitoring Protocol ensures the improvement and standardization of care for patients confirmed and/or suspected of COVID-19 (as well as for "Post-Covid" or even for other diseases), in home isolation, in the municipality of Contagem, MG and represents an important contribution to the health area, since it can serve as a reference for other municipalities and other types of diseases.

The effectiveness of the teleservice was demonstrated in the results presented, through the data recorded during the first 11 months, reaching more than 25,000 remote calls, supporting citizens who did not need to address the service in person, with a 97.54% high rate.

The Protocol for monitoring patients COVID-19, aimed at the municipality of Contagem, aims to assist in the organization and foundation of care actions for patients isolated at home due to suspicion or confirmation of the disease. After its validation and implementation, the protocol should be reevaluated to identify necessary adjustments and adjustments.

It is emphasized that the development of this protocol considered the local reality of the study environment, which is positive for the expected impact, while being a reference for other health units. On the other hand, this same factor reflects the limitation of the possibility of generalization of the study. It is expected that the document can assist in the creation of new protocols, aimed at the same objective of

remote monitoring. It is also emphasized the need for constant updating of the protocol as new discoveries about the new coronavirus are published, since it is a new disease.

It is suggested that future studies be conducted considering remote telemonitoring after improved discharge to monitor post-COVID complications, as well as its possible application in the context of other diseases.

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Chapter 66

Ecological aspects of artibeus lituratus e artibeus planirostris (Chiroptera, Phyllostomidae) in Cerrado environments, Mato Grosso - Brazil

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ABSTRACT
The present study analyzed the ecological and biological aspects of Artibeus lituratus and Artibeus planirostris captured in the municipality of Nova Xavantina, Mato Grosso, Brazil. The samplings occurred from January/2010 to December/2010 and from August/2012 to July/2013, in three areas of Cerradão and three of Cerrado stricto sensu. A total of 286 specimens of Artibeus lituratus (183 females and 103 males) and 103 of Artibeus planirostris (59 females and 44 males) were captured. Among the environments, greater abundance was recorded in the Cerrado stricto sensu. For both species, there was a significant relationship when analyzing the abundance between seasons, and in the rainy season, there was greater abundance. There was also a correlation between the activity schedule of the individuals and the abundance that was verified by the Rayleigh test. The correlation test between temperature and abundance variations showed significant values. The forearm and weight measurements showed positive results with the performance of the correlation test. This work contributed to expanding the knowledge of bats in the eastern region of Mato Grosso itself, there is little information regarding the ecological and biological aspects of Artibeus lituratus and A. planirostris in the region.

Keywords: Seasons; Reproductive Stages; Activity hours; Bats; Temperature.

1 INTRODUCTION

The Subfamily Stenodermatinae is the most diverse subfamily of phyllostomids, being represented in this account by 14 genera and at least 60 species in South America (Gardner 2008). The genus *Artibeus* Leach, 1821 is composed of 22 species, occurring throughout the tropical and subtropical range of the New World, from Mexico to the southern coast of Argentina (Simmons, 2005). Plink minus 14 species are in South America and Brazil, five species are recorded (Nogueira et al. 2014, Pereira et al. 2017). *Artibeus species* have outstanding ecological importance due to the provision of ecosystem services due to seed dispersal. In addition, *Artibeus* is among the most abundant in the surveys of the fauna of quirópteros (Passos & Passamani 2003; Reis et al. 2013). *Artibeus lituratus* is the largest species and the largest of its kind and presents several divergent aspects in its characteristics (Miranda et al. 2009), such as body size, which ranges from 93.0 to 113.0 mm, forearm from 65.0 to 78.0 mm and weight from 65.0 to 82.0 g. The species has white and well-visible facial stripes, the ventral hairs do not have a clear end, and their coat is uniform (Reis et al. 2013; Pereira et al. 2017).

The Brazilian regions and biomes have records of *lituratus*, having already been cited by the states (Reis et al. 2013; Barros et al. 2017). The reproductive pattern of this species varies geographically, with

seasonal polystria being the most frequently observed, with two pregnancies per year. Usually, a puppy is born per pregnancy (Peracchi et al. 2010; Pereira et al. 2017).

Artibeus planirostris has a body size ranging from 75.0 to 110.0 mm, a forearm from 56.0 to 66.7 mm, and a weight from 40.0 to 69.0 g (Peracchi et al. 2010; Pereira et al. 2017). It features narrow and unpronounced facial stripes. The forearms are bare or recovers with short and rough hair (Reis et al. 2009). This species is also distributed by the different Brazilian biomes (Reis et al. 2013). The available reproductive data indicate seasonal polystria, with two pregnancies per year (Peracchi et al. 2010).

The taxonomic classification and Chiroptera, in specific of the *genus Artibeus*, widely analyzed morphological and metric characteristics, primarily measured of skull and body size, body size and weight, which hinders the identification of phylogenetic relationships (Reis et al. 2007; Bordignon et al. 2017). *Artibeus lituratus* and *A. planirostris* have wide overlaps in their distribution, being symbolic, phylogenetically close, and with great morphological similarity (Lim & Engstron 2001; Redondo et al. 2008). However, these species present dissimilarity in the functional morphology of the skull and diet, which may mean evidence of competitive exclusion (Amaral et al. 2016).

Considering the ecological importance of both species. We analyzed the bionomic aspects of *Artibeus lituratus* and *Artibeus planirostris* in two cerrado phytophysiognomies. Our goals include understanding (1) the variation in abundance between environments and seasons; (2) hourly activity patterns; (3) how temperature variation affects foraging; (4) comparing morphological aspects for forearm and weight measurements, (5) the reproductive stage according to the capture months.

2 MATERIAL AND METHODS

2.1 AREA AND ALL

The survey of the present study was conducted in Nova Xavantina, Mato Grosso. The municipality is located 635 km away from the capital Cuiabá and has a territorial extension of 903,357 km² (Ferreira 2001). The climate of the region is *Aw* type, according to the Köppen classification, with two well-defined seasons: drought (From April to September) and rain (From October to March). The annual precipitation ranges from 1,300 mm to 1,500 mm with maximum intensity from December to February, with an average monthly temperature of 25°C (Marimon et al. 2003). The captures were carried out in three areas of Cerradão 1: 14º38'14"S and 52º21'49"O, 2: 14º40'23"S and 52º19'31"O, e 3: 14°42'6"S and 052°21'5"O and in three areas of Cerrado *stricto sensu* 4: 14º40'12"S and 52º21'52"O, 5: 14º40'48"S and 52º19'31"O and 6: 14°42'5" S and 052° 21'0" O (Fig. 1).

TheMischieline C is a type of forest phytophysiognomy proper to the Brazilian Central Plateau, in which the treetops are close and the plant community denotes a closed appearance but has a spacing between

the trees that allows the penetration of the sun. The average height of the trees ranges from 10 to 15 m (Rizzini 1997).

The wrong *C stricto sensu* is a sanamal phytophysiognomy and consists of more spaced, smaller, more twisted trees, which provide the appearance of grasses and rural subshrubs, prevailing the low vegetation (Rizzini 1997). These trees are usually 3 to 6 m high and can reach up to 10 m (Ribeiro & Walter 2008).

2.2 BAT SAMPLING

Data were obtained from samplings carried out between January and December 2010 and between August 2012 and July 2013. Four nights of captures per month were performed, totaling 96 nights, and 48 phytophysiognomy (Cerradão and Cerrado *stricto sensu*). The bats were captured with mist nets (9 × 3 m, 16 mm mesh) armed just before sunset (≅ 18:00h) and closed at dawn (≅ 06:00 h) in places with possible routes of bat flights, being inspected every 30 minutes. Five mist nets were set up per night, maintaining an average distance of twenty meters from each other. A total sampling effort of 118,832 m².h was performed, following the calculation proposed by Straube & Bianconi (2002).

The animals were recorded and identified in specific (Vizotto & Taddei 1973, Gardner 2008; Reis et al. 2013; Nogueira et al. 2014) still in the field and released at the same capture site after the closing of the nets. The information regarding the captured individuals (e.g., sex, body mass, reproductive stage, body measurements, capture time, temperature, and capture environment) was noted in field records. The animals not identified in the field as well as testimony specimens were deposited in the Scientific Collection of the Laboratory of Genetics of the University of the State of Mato Grosso, Nova Xavantina *campus*, with the following bat records (RM) and tipping numbers: *Artibeus lituratus* (RM: 30, 125, 259, 292, 293, 294, 299, 388, 390, 391, 473) and *Artibeus planirostris* (RM: 126, 199, 200, 258, 298, 301, 331). All field activities were authorized by IBAMA/SISBIO/MT (licença nº 18276-1).

2.3 DATA ANALYSIS

The Chi-Square statistical test (χ^2) was used to test the significance of the variation of abundance between the sexes of the specimens concerning the sampled environments. Posteriormente, the same test was performed to test the significance of the abundance variation among the studied phytophysiognomies. Student's Teste *t* was used to compare the abundance between the seasons and *the Rayleygh* circular correlation test was used to verify if there was a trend in bat activity time analyzing the relationship between time and abundance of individuals. In addition, the linear correlation test was applied to verify the relationships (i) between abundance and temperature and (ii) between body mass and forearm length.

3 FINDINGS

During the fieldwork, 286 individuals of *Artibeus lituratus*(183 females and 103 males) and 103 of *A were captured. planirostris* (59 females and 44 males). There was a difference in the capture rate of males and females for *A. lituratus* (χ^2 = 3574. 443; gl = 285; p < 0. 001) and for *A. planirostris* (χ^2 = 2073. 779; gl = 102; p < 0. 001).

Hears significant variation in the abundances of *A. lituratus* (χ^2 = 3429. 722; gl = 285; p < 0. 005) and *A. planirostris* (χ^2 = 2105. 623; gl = 102p < 0. 005) among cerrado phytophysiognomies, being Cerrado *s. s*. which had the highest catch rate. In addition, a higher abundance of females of both species was observed in both phytophysiognomies (Fig.2).

A. lituratus was captured in all months during the collection periods and *A. planirostris* was not captured only in August (Fig. 3). In the rainy months, there was greater abundance in the catches of *A. lituratus* and *A. planirostris* (N = 216 and N = 92 respectively) when compared with the dry months (N = 70 for *A. lituratus* and N = 11 for *A. planisrostris*) (Table 1). When analyzing the rate of captures between the stations, *the t-test* revealed a significant difference for both species (t = 3936. 173; gl = 285; p < 0. 001) and (t = 3273. Forty-nine; gl = 102; p < 0. 05).

For *A. lituratus*, the activity schedule was good at 18:00 hours, although it is the time with the fewest records. Between 21:00 and 23:00 the highest abundances were recorded for the species. For *A. planirostris* the recorded activity time was from 19:00 hours. The highest abundances occurred between the hours of 20:00 and 23:00 hours. During the entire night time, individuals were captured, except for 4:00 a.m., where there was no capture *of A. planirostris. Rayleygh's* circular test showed significant results between the time and abundance of *A lituratus* (r = 0.9827; gl = 23; p < 0. 01) as well as for *A. planirostris* (r = 0. 6116; gl = 23; p < 0. 01) (Fig. 4).

During the capture nights, the temperature was between 14 and 29°C. The Mayr activity occurs between the temperatures of 20 to 26ºC *for A. lituratus* and between 21 and 25°C for *A. lanirostris p.* The correlations were positive between abundance and temperature for the two species (*A. lituratus*: r^2 = 0. 63380 gl = 16; p < 0. 05, *A. planirostris*: r^2 = 0. 4451; gl = 15; p < 0. 05) (Fig. 5).

About the breeding rate of *A. lituratus*, 21 pregnant females were captured, 13 in the Cerrado *stricto sensu* and eight in Cerradão. Among the captured females, 42 were lactating, 24 in the Cerrado *stricto sensu*, and 18 in Cerradão. Among the males, 13 scummed specimens were captured, seven collected in the wrong C *stricto sensu* and six in Cerradão. Of the 10 cubs captured, seven occurred in Cerradão and three in the Cerrado *stricto sensu*. The reproductive stages of the captured specimens varied according to the months of the year (Table 2).

For *A. planirostris*, two pregnant females were collected, one in each phytophysiognomy; nine lactating females were recorded, three in Cerradão and six in cerrado *stricto sensu*. The cub was captured

in November in the Cerrado *stricto sensu.* Six sced males were recorded, four in the Cerrado *stricto sensu* and two in Cerradão (Table 2).

Measurements of forearm length and body mass varied for the two species, tanto for *A. lituratus* as for *A. planirostris*. F-emes presented mean forearm length and body mass higher than males (Table 3). The correlation applied to verify the magnitude and meaning of the association that exists between the weight value and the variation obtained in forearm measurements showed a high correlation in *A. lituratus* (r^2 = 0.5107; gl = 284; p = < 0.001), and *in A. planirostris* (r^2 = 0.4602; gl = 102; p = < 0.001) (Fig 6)

4 DISCUSSION

In a survey conducted in the municipality of Nova Xavantina, Silva & Anacleto (2011) observed *that A. planirostris* and *A. lituratus* were the most abundant. Similar results were found in Cerrado environments in Mato Grosso do Sul, by Ferreira et al. (2010) and Martins et al. (2014).

In studies conducted in different localities in Brazil *A. lituratus* is the most abundant (Trajan 1984; Passos & Passamani 2003; Passos & Graciolli 2004; Bianconi et al. 2006; Brusco & Tozato 2009; Araújo & Langguth 2010; Luz et al. 2011; Bernardi & Steps 2012; Sato et al .2015). *A. planirostris* is considered a common species and maybe the dominant species in some localities (Gregorin et al. 2011; Alho et al. 2011; Martins et al. 2011; Castro & Michalski 2015; Barros et al. 2017).

In Cerrado environments, some authors mention that a greater abundance of females is found (Ferreira et al. 2010; Cunha et al. 2011). The data of the present study follows these studies. In general, the variation in sex ratio can be expected, with a predominance of females in long-term systematized surveys. This finding can be explained by the fact that there is a tendency for males to form harems and, with this, the colonies have higher numbers of females (Mello & FernanDez 2000; Costa et al. 2010).

The high abundance of *A. lituratus and A. planirostris* is also expected, as they are frugivorous species. Passos & Passamani (2003)states that the abundance of frugivorous species in bat survey is higher due to the large number of plant species that produce fruit at different times of the year. Thus, the high abundance of bats occurs due to the great availability of food found in the areas of forests or natural vegetation. Meanwhile, Ferreira et al. (2010), in a study conducted in urban areas, point out that the difference in the high abundance of both studied species can be explained by urban expansion and environmental degradation since both species are generalists and occur in environments with different levels of preservation.

The Cerrado Biome has been suffering from urban sprawl and one of its main characteristics is the spacing between its trees. This attribute can influence occupation and *A. Lituratus* and *A. planirostris*, due to the ease of flight and the adaptability of the species s regarding the use of habitat (Silveira et al. 2012). Araújo & Langguth (2010), describe *that A. lituratus* was the only species that occurred in all 12 sampling

points surveyed by them, 10 in the Cerrado *stricto sensu* and two in Mata de Galeria. The data of the present study show the influence of the vegetation characteristics of Cerradão and Cerrado *stricto sensu* on the abundance of the two studied species.

The time of activity can also influence the abundance of the species, and the results of the present study corroborate with studies previously conducted by Marques (1985), Reis & Peracchi (1987), Sipinski & Reis (1995), Zanon & Reis (2007) and Silva & Anacleto (2011), who observed peak activity in the first hours of capture followed by a decrease in activity in the following hours. Oliveira et al. (2010) observed similar results reporting that *A. lituratus* and *A. planirostris* were the most active species in the first three hours after sunset, a period in which both species are most active.

Abundance is directly related to temperature, as it is one of the environmental factors that can influence bat activity. At temperatures below 21ºC bats tend to reduce their activities (O'Donnel 2002; Filho et al. 2007) and, according to Fleming et al. (1972), bats have a preference for intermediate temperatures. In the present study, the highest abundances *of A. lituratus and A. planirostris* occurred between 21 and 25ºC, with a positive correlation between abundance and temperature. Navarro & Leon-Paniagua (1995),Patterson et al. (1996), Diaz et al. (2002), and McCain (2007) obtained similar results, reporting that at low temperatures bat activity tends to decrease.

Studies conducted by Passos & Passamani (2003), Ortêncio-Filho et al. (2007), and Martins et al. (2006) believe that seasonality influences the number of catches. This is due to the availability of resources during the rainy season (Passos & Graciolli 2004; Brusco & Tozato 2009).

Zortéa et al. (2010) and Sato et al. (2015) observed a high abundance of *the species of A. lituratus* and *A. planirostris* at the end of the dry season and the beginning of the rainy season, being observed for this period of females' in lactation and pregnancy. Bordignon (2006), Ortêncio-Filho et al. (2007), and Castillo-Navarro et al. (2017) recorded the occurrence *of females of A. lituratus* lactating only in the rainy season. Ortêncio-Filho et al. (2007), Sato et al. (2015), and Castillo-Navarro et al. (2017) state that the reproductive period suffers a decline at the end of the rainy season, demonstrating that the wet season favors the reproduction of the species.

In the studies conducted by Passos & Passamani (2003), Menezes et al. (2008), Miranda et al. (2009), and Reis et al. (2009), the forearm means and weight of *A. lituratus* and *A. planirostris* recorded were concordant with the data of the present study in which there was a positive correlation between weight and forearm for both species.

When analyzed together, it is noted that there is a separation of the species in two groups of individuals, revealing a low occurrence of overlap between weight and forearm for both. Rui et al. (1999) highlight that even if there is variation between species, there are no significant differences in external

morphometry between males and females to characterize sexual dimorphism for *A. lituratus* and *A. planirostris*.

5 CONCLUSIONS

The data presented expands the knowledge about bats in the eastern region of Mato Grosso, as well as the knowledge about the biology of the genus *Artibeus*. Also possible is better knowledge about the abundance of the species that vary in the face of seasonality with higher frequency in the rainy months. As for the time of activity, peaks were recorded in the first hours after sunset. In addition, the rainy season is the preferred period for the reproductive activity of the species.

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Table 1: Number of bats caught in the rainy and dry periods, in the environments of Cerradão and Cerrado *stricto sensu*.

Species	**Cerradão**		***Cerrado stricto Sensu***		
	Rain	**Drought**	**Rain**	**Drought**	**Total**
Artibeus Lituratus	94	44	122	26	286
Gnares	34	6	58	5	103
Total	128	50	180	31	389

Table 2: Months of capture and abundance *of Artibeus lituratus and Artibeus planirostris* according to the reproductive stage of the captured individuals.

Speciess	Months											
Artibeus Lituratus	Jan	Feb	Sea	Apr	Mai	Jun	Jul	Aug	Set	Out	Nov	Ten
♀ Pregnant	1	-	-	-	-	-	-	3	5	5	4	3
♀ Lactating	1	4	2	-	-	-	-	-	1	17	12	5
♂ Scummed up	-	-	-	-	-	-	-	-	1	3	8	1
Puppies	-	-	-	-	-	1	-	-	-	-	5	4
Gnares												
♀ Pregnant	-	-	-	-	-	1	-	-	-	-	1	-
♀ Lactating	-	-	1	-	-	-	-	-	-	2	5	1
♂ Scummed up	-	-	-	-	-	-	-	-	-	2	4	-
Cub	-	-	-	-	-	-	-	-	-	-	1	-

Table 3: Mean (minimum and maximum) of forearm length, expressed in millimeters (mm) and body mass expressed in grams (g), for *the species Artibeus lituratus* and *Artibeus planirostris*, distinguishing females and males.

Measures	*A. Lituratus* ♀	*A. Lituratus* ♂	*A. planirostris* ♀	*A. planirostris* ♂
Length ofthe arm	Seventy-one. 5th (47. 5 - 77. 8)	Seventy of them. 9th (48. 0 - 81. 0)	Six-one. 0 (46. 4 - 74. 5)	Six of them. 9th (52. 6 - 72. 0)
Body mass	Seventy of them. 9th (20. 8 - 94. 8)	Seventy of them. 8th (27. 0 - 81. 4)	Forty-four. 0 (27. 1 - 77. 8)	Forty-two. 5th (31. 0 - 66. 0)

Figure 1: Municippio of Nova Xavantina, State of Mato Grosso. Points 1 , 2 and 3 indicate the areas of Cerradão and points 4, 5 and 6 indicate areas of Cerrado *stricto sensu*.

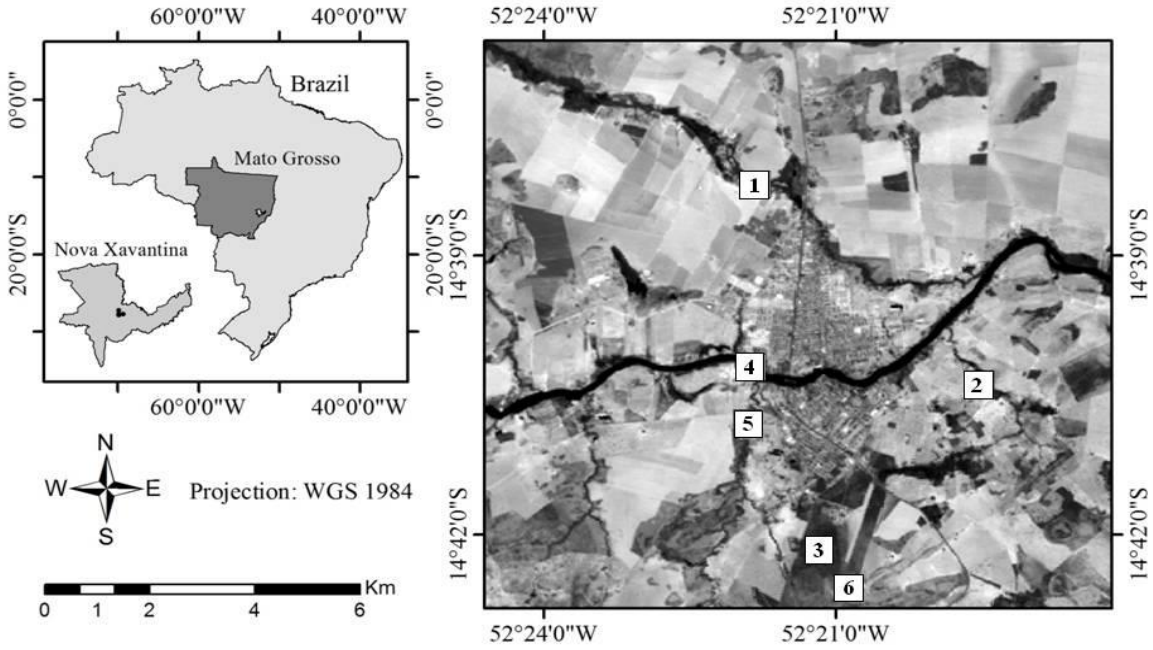


Figure 2: Abundance of ■ Females and ■ *Males of Artibeus lituratus and Artibeus planirostris* captured during field work (January/2010 and December/2010 and between August/2012 and July/2013) in cerrado *stricto sensu* and Cerradão environments.

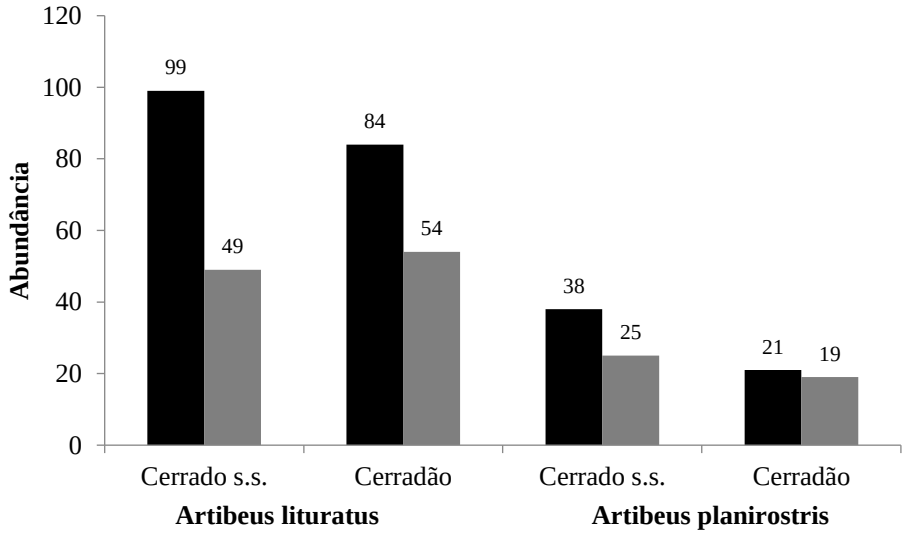


Figure 3: Number of bat catches of the species ■ *A. lituratus* and ■ *A. planirostris* to longthe período from January/2010 to December/2010 and between August/2012 and July/2013.

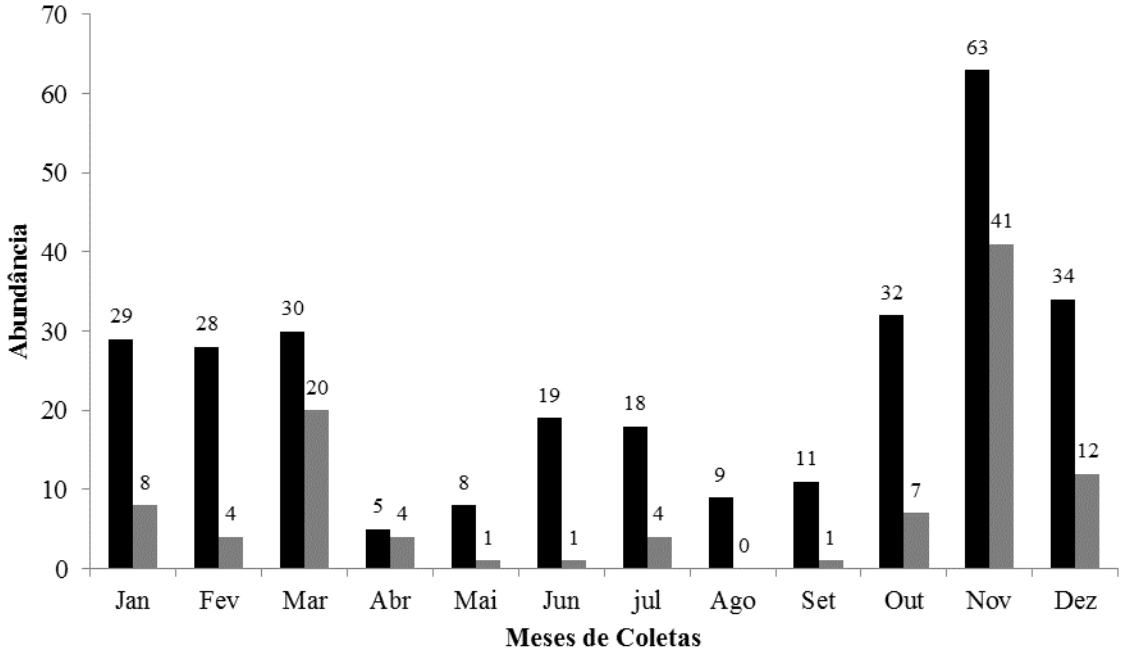


Figure 4: Abundance *of A. lituratus* and *A. planirostris* (respectively) for each capture time, the arc indicates the preferred trend by the times between 21:00 and 23:00 *hours for A. lituratus* and the preferred trend by the times between 20:00 and 23:00 hours for *A. planirostris*

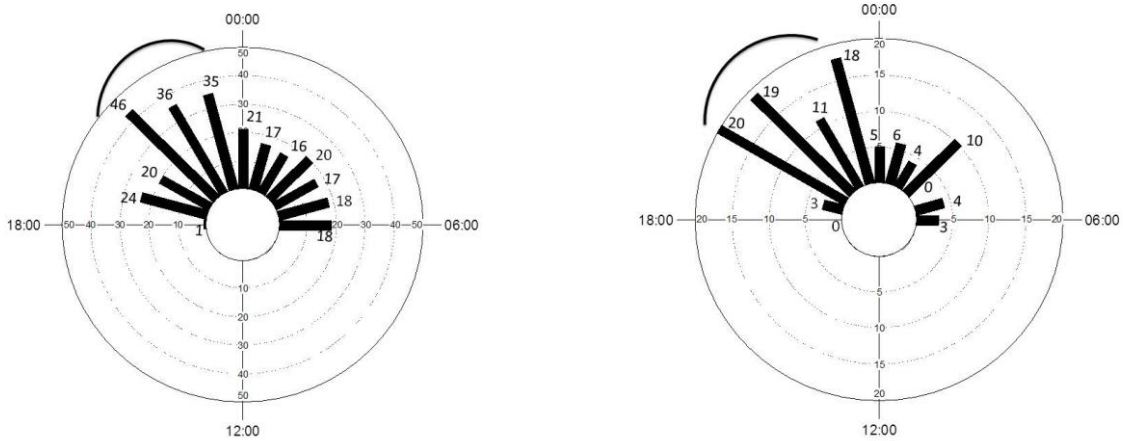


Figure 5: Plenty of ■ *A. lituratus* and ■ *A. planirostris* for each of the temperatures recorded in the capture period (janeiro/2010 and December/2010 and between August/2012 and July/2013).

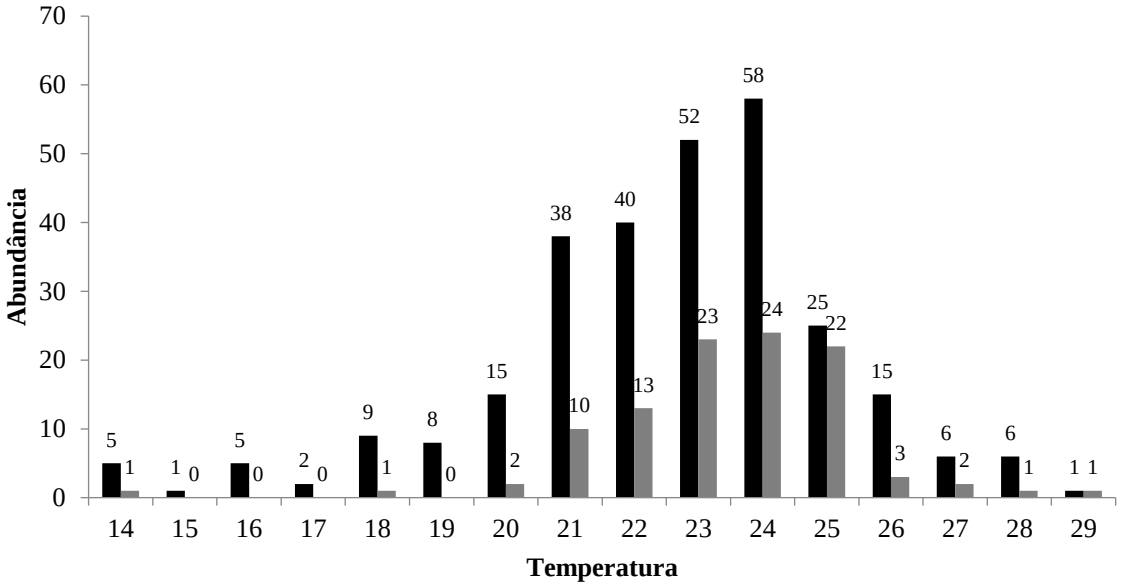
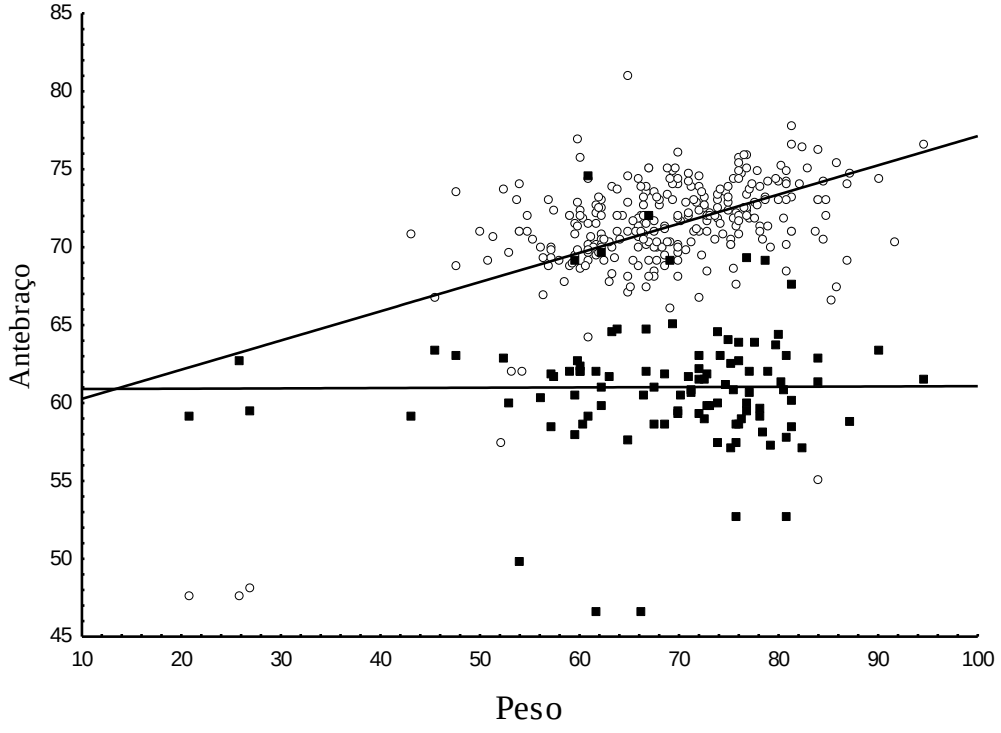


Figure 6: Correlation between forearm length and mass corporal *of A. lituratus* ○ and *A. planirostris* ■ in the Municipality of Nova Xavantina, Mato Grosso, Brazil.



Chapter 67

The evolution of HIV/AIDS knowledge

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1 INTRODUCTION

The origin of human immunodeficiency syndrome pandemic occurred in mid-1981, with its first case reported in the United States of America when a significant number of homosexual adolescents were observed with unusual infections for their age, it was a retrovirus of the subfamily Lentivirinae, whose function is to directly attack the immune system, specifically, CD4+ T lymphocyte cells (SHARP, HAHN, 2010; SHARP, HAHN, 2011).

Its first reports came from non-human primates that were infected by a virus, called the simian immunodeficiency virus (SIV), identified in chimpanzees and old world monkeys (Mangabey sooty), which in the future generated the strains of HIV-1 and HIV -2 and its subtypes. The virus reached humans through the feeding of infected monkeys and contact through the secretions of these animals, which were often treated as domestic animals, a common practice on the African continent (ARMSTRONG, CALABRESS, TAEGE, 2005).

The signs and symptoms for the prognosis of HIV initially occurred through the appearance of pneumonia (pneumocystis carinii), Kaposi's sarcoma, herpes-zoster, and recurrent simple and pelvic inflammatory diseases, with other clinical manifestations: fever, weight loss, aphthous ulcers, and diarrhea (the most common symptom for advanced cases of HIV). In addition to clinical manifestations, it was possible to make a prognosis of communities: homosexuals, injecting drug users, hemophiliacs, and patients receiving blood transfusions (SANTOS, 2005).

The diagnosis of anti-HIV-1 in humans was created in the mid-1980s, with a test performed using blood material, which used the Western Blot test and immunofluorescence as a confirmatory test, and detected only IgG with an immunological window of negative antibodies 6 weeks or even longer. False-positive results were quite evident because they were highly sensitive tests that ended up being positive for carriers of immune diseases and other types of infections and pregnancy. Only in the second generation tests, were able to begin to have more veracity in the results including the detection of IgM along with its reliability (ALEXANDER, 2016).

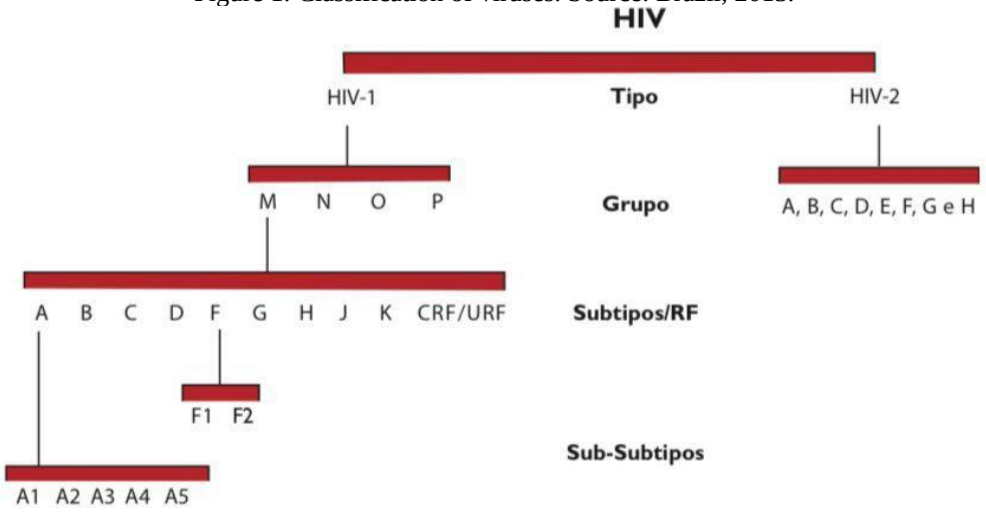
Only in 1987 was there a pharmacological therapeutic form for HIV – the use of zidovudine (AZT) was approved by the US Food and Drug Administration (FDA) and the drug, initially created for the treatment of cancer, started to be used as the first antiretroviral (ARV) available for the treatment of people living with HIV. Although AZT helped control the virus, it was still a high-cost drug, making drug difficult to access. In addition, the drug caused several side effects, which prevented its use by patients. Only in 1995 did AZT gain the association of more drugs for its composition: 1 reverse transcriptase inhibitor and 2 nucleotides, generating the first antiretroviral therapy (ART) and bringing more hope to people with the infection (NUNES JÚNIOR, CIOSAK, 2018).

The human immunodeficiency virus HIV is divided into two types: HIV-1 and HIV-2. HIV-1 is

divided into groups of M (majority), N (new), O (outlier), and P (putative), its highest incidence in the world population is HIV-1 M which is divided into subtypes and sub-subtypes, being subtypes A, B, C, D, F, G, H, J, K, and subsubtypes A1 to A5 and F1 and F2. There is the possibility of the same individual being infected with two subtypes and, therefore, new recombinations may occur. When its incidence of recombinant material is reported in many individuals, it is called circulating recombinant form (CRF) and in cases of undefined recombinations, it is called unique recombinant form (URF) – (BRASIL, 2013; Monteiro, 2011).

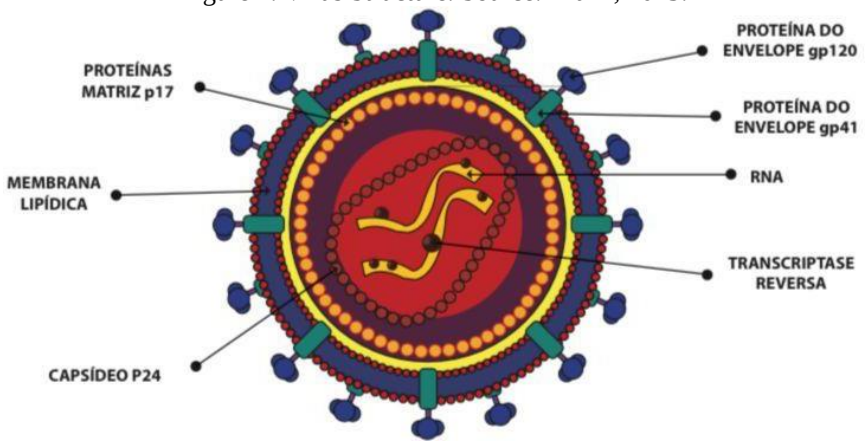
HIV-2 infection has been reported in about 2 million people, the majority in West Africa where it is considered an epidemic. The transmission rate of HIV-2 is significantly lower than that of HIV-1 and, for this reason, it is not considered a pandemic. HIV-2 is divided into groups of A, B, C, D, E, F, G, and H containing no subtypes or recombinations (GOTTLIEB et al, 2006; GOTTLIEB et al, 2008; HAWES et al, 2008; BRASIL, 2013).

Figure 1. Classification of viruses. Source: Brazil, 2013.



The genetic material of retroviral is composed of 2 single strands of identical RNA molecules, which contain the env, pol, and gag genes. The genomes are responsible for encoding proteins, the gag gene encodes P6, P9, P17, and P24 proteins through the P55 precursor protein, the pol gene encodes viral enzymes such as P66, P51, P31 and P10, and the env genomes encode host glycoproteins for the entry of viruses such as GP120 and GP41 through the precursor GP160. There are also regulatory or accessory genomes, which are tat, rev, nef, vpu, vpr, and vif (FANALES-BELASIO, 2010; CLSI, 2011).

Figure 2. Virus Structure. Source: Brazil, 2013.



2 THE ACQUIRED IMMUNODEFICIENCY VIRUS

HIV is capable of infecting cells that have CD4-type receptors on their surface, such as T helper lymphocytes (T helper), macrophages, and dendritic cells. To insert its genetic material into the host cell, it uses the gp160 protein, which is composed of the gp120 and gp41 subunits. gp120 is responsible for binding the virus to the CD4 receptor and the co-receptors CXCR4 and CCR5 inducing conformational changes that expose the gp41 protein which folds and drives the formation of pores that allow the entry of nucleic material into the host cell (CUNICO, GOMES, VELASCO JUNIOR, 2008; FERREIRA, RIFFEL, SANT'ANNA, 2010; BRASIL, 2013).

Within the host cell, the viral capsid loosens and, by the action of reverse transcriptase, the viral RNA is transformed into a double-stranded DNA that binds to integrase to migrate to the cell nucleus where the virus controls cell synthesis for the production of copies of viral RNA. Messenger RNAs are produced that migrate to the cell cytoplasm where they synthesize Cag, Gag-Pol, and Env proteins (PINTO & STRUCHINER, 2006; BRASIL, 2013).

The budding of HIV occurs in the plasma membrane and is driven by the Gag gene that encodes glycoproteins that give rise to a matrix (MA or p17), capsid (CA or p24), nucleocapsid (NC or p7), and p6 proteins. After cleavage of Gag, spacer proteins (P1 and P2) are formed. The Pol gene generates the enzymes reverse transcriptase, integrase, and protease. The Env gene is responsible for encoding the precursor polyprotein of gp160, which is subsequently cleaved into gp120 and gp41 (MONTERO, 2011).

3 CLINICAL ASPECTS

HIV is divided into 3 clinical cycles: acute phase, latency phase, and early symptomatic phase evolving into the AIDS stage (DIAS et al, 2020).

In the acute or primary phase of infection by the virus, it is noted that the estimated time for the appearance of symptoms is 5 to 30 days after exposure, in these cases, it can be compared even with the strong flu or even mononucleosis-like disease. Its symptoms range from fever, headache, fatigue, rashes,

night sweats, and pharyngitis. In the most severe cases, due to the high rate of viremia, clinical symptoms of arthralgia, nausea and vomiting, oral and genital ulcers, aseptic meningitis, and lymphopenia, among other manifestations, can be seen. In this phase, there is a sudden drop in CD4 T lymphocyte cells, causing CD8 T cells to be disposed of in circulation as a cytotoxic immune response. At the end of the acute phase, the organism enters into virus stabilization, called SET POINTS, evolving the infection towards the last stage (BRASIL, 2002; DIAS et al, 2020).

In the asymptomatic phase, the patient may persistently present only generalized lymphadenopathy, more common in the mandibular region or armpits. In the natural history of the disease, this period is characterized by the exponential growth of the virus and can last from 2 to 8 years, or even longer, it all depends on how the virus evolves into AIDS. The patient can often only be detected through changes eventually observed in the blood count such as thrombocytopenia or pathologies linked to immunodeficiency or serological screening (VILAR, SANTANA, 2008; LAZZAROTTO, DERESZ, SPRINZ, 2010).

In the early symptomatic phase, the patient arrives with classic symptoms such as watery diarrhea, night sweats, persistent fatigue, weight loss, herpes simplex or zoster, ulcers, and oral and/or vaginal candidiasis, among other clinical appearances linked to infection by other viruses, bacteria or fungi (BRASIL, 2002).

The AIDS phase is the last clinical phase where the patient presents opportunistic diseases, such as pneumonia, tuberculosis, cerebral toxoplasmosis, HPV, gastroenteritis, oral and esophageal candidiasis, and syphilis (DELFINO et al, 2021). The immune imbalance can be verified by the CD4 cell count lower than 200 cells/mm3, showing that there are more replicated viruses than immune system command cells (VILAR, SANTANA, 2008; BOWA et al 2016).

4 TREATMENT EVOLUTION

HIV or HTLV III tests (as it was called at first) were developed just two years after their discovery, in 1983, and since then 5 generations of enzyme immunoassay (EIA) tests have been generated, each one with an improvement until reaching the tests that we know today (PAREKH, 2018).

First Generation: The first generation of HIV testing used viral antigens obtained from cell culture lysates. It was a test with hypersensitivity, often generating false positive results and it was only possible to detect anti-HIV1 IgG, the diagnoses only began to be true as soon as they were confirmed by Western Blot HIV-1 (WB) or immunofluorescence tests (IFA) and obtained an immunological window of 8 to 10 weeks (ALEXANDER, 2016; PAREKH, 2018).

Second Generation: The second generation of tests, created in mid-1987, used recombinant antigens and synthetic peptides that originated in specific regions of the virus, which increased the sensitivity and

specificity of the tests. At this time, the glycoprotein gp36, present in HIV-2, was also introduced. These changes allowed the reduction of false negative results, but still require confirmatory tests such as Western Blot (WB) / Immunodeficiency (IFA) for HIV-1 and Western Blot (WB) / ELISA for HIV-2, in this second generation the immunological window decreased to 4 to 6 weeks (SCHUSTER, LISE, HOERLLE, 2013; ALEXANDER, 2016; PAREKH, 2018).

Third Generation: The third generation of tests was generated in the early 1990s and used the sandwich ELISA or immunometric technique. This generation brought great advances to the range of detection, as it had recombinant and synthetic peptides as a source of antigen, which included protein 24 (p24) in recombinant form, precursor glycoprotein 160 (gp160), both of which belong to the HIV-type M group. 1 and a group O synthetic peptide, as well as an HIV-2 peptide. At this stage, in addition to IgG detection, IgM was included. Thus, the results became increasingly specific and sensitive and the immunological window was reduced to 2 to 3 weeks (FEARON, 2005; SCHUSTER, LISE, HOERLLE, 2013; ALEXANDER, 2016; PAREKH, 2018).

Fourth Generation: test developed at the end of the 90s, its source of antigen remained as recombinant and synthetic peptides, but now it could identify the M, N, and O group of the HIV-1 type and the tests had the uptake of proteins 24 (p24) of HIV-1 had an uptake of IgM and IgG anti-HIV-1 and anti-HIV-2, at this stage the confirmation tests were generated through the differentiation of HIV-1 and 2 through qualitative RNA PCR, and its immunological window is shortened to up to 2 weeks. In this phase, rapid tests were also introduced, where it is possible to obtain a result in up to 30 minutes, facilitating the diagnosis and the entry of antiretrovirals in cases of positivity (SCHUSTER, LISE, HOERLLE, 2013; ALEXANDER, 2016; PAREKH, 2018).

Fifth Generation: The last test was generated in 2015, it maintained the same settings as the fourth generation, but now with a greater scope for identifying proteins 24 (p24). that the entry with ART was early. Due to the high sensitivity and specificity of the tests at this stage, no further confirmation test was needed (SCHUSTER, LISE, HOERLLE, 2013; ALEXANDER, 2016; PAREKH, 2018).

Supplementary Tests: These tests, better known as rapid tests (RT) require a confirmatory Western Blot (WB) test where lysed HIV cells were placed on nitrocellulose strips containing Ag reactive to protein 24 (p24) and glycoproteins present in the viral envelope of both HIV-1 and 2 (SCHUSTER, LISE, HOERLLE, 2013; PAREKH, 2018).

In 1997, the Testing and Counseling Centers (CTA) were created, with the objective of both universalizing the diagnosis and equitable access to services among the entire population. During this period, Brazil had high HIV prevalence rates and health authorities understood that it would be necessary to invest in rapid tests in CTAs and the campaigns "Quero Saber" and "Fique Sabendo" (SILVA, OLIVEIRA, SANCHO, 2013)

5 POST-EXPOSURE PROPHYLAXIS

Post-exposure prophylaxis is currently used to prevent HIV infection after exposure to body fluids or sharps. In mid-1994, PEP was already being used to reduce vertical contagion. PEP today must be taken within 72 hours after exposure, preferably being administered within 4 hours after exposure for better response (REY, 2011).

In Brazil, PEP has been available since 1999, through the SUS, and is aimed at a key population of gay men, men who have sex with men (MSM), transvestites and transgender people, sex workers, people deprived of liberty and people who use alcohol and alcohol. other drugs, in addition to being destined for accidents with sharp punctures and people who have suffered sexual violence. Before prescribing the use of PEP, a clinical assessment should be made with the patient to clarify doubts about the treatment, privately. The treatment consists of the use of 28 uninterrupted days of the drug (BRASIL, 2021).

According to Law No. 7498 of June 25, 1986, art. 11, II, c, which has the professional practice of nursing, shows that nurses can prescribe medications as long as they are established in health programs, thus, the clinical protocol and therapeutic guidelines for pre-exposure prophylaxis to the risk of HIV, grant the prescription of medicines exclusively to doctors and nurses.

6 PRE-EXPOSURE PROPHYLAXIS

In studies developed by Castel, Magnus, and Greenberg (2014), antiretroviral drugs have been developed since mid-1995, where drug tests were carried out on animals to find out about their drug interaction, dosage, and effectiveness. The first research carried out showed the great efficacy of tenofovir disoproxil fumarate (TDF) together with emtricitabine (FTC) administered orally or topically (anal/vaginal). The effectiveness of TDF was tested in non-human primates for 4 weeks, and then the exposure of these animals to SIV. The results showed 100% protection for primates exposed to the virus and subsequently resulted in improvement for use in humans.

After the scientific evidence of the results obtained in animals, the tests were applied to human primates and showed great effectiveness in their 3 research phases. The oral intake of the medicine was initially intended for a key population to avoid contagion by the virus, among them: men who have sex with men (MSM), people more vulnerable to contracting the virus, and injecting drug users (IUDs), medications showed positive results in the daily intake of medications (EAKLE, VENTER, REES, 2018).

PrEP is a method of pre-exposure prophylaxis to HIV, recommended by the World Health Organization (WHO) and offered by SUS since 2017, which markedly reduces the rate of infection. This prophylactic strategy consists of the daily use of antiretroviral drugs in vulnerable populations that are at risk of infection (POLIDORO et. al., 2020).

In Brazil, PrEP is made available free of charge by the Unified Health System (SUS), its key

population is gay men and men, who have sex with men (MSM), transsexuals, sex workers, and serodiscordant couples, being a criterion for indicating sexual intercourse anal or vaginal intercourse without using a condom, frequent episodes of sexually transmitted infections (STIs) and/or patients with frequent use of post-exposure prophylaxis (PEP). For the indication of PrEP, an initial assessment must be carried out to know the patient's need to undergo preventive treatment, which consists of the frequent use of medications. The effectiveness of the drug can occur from one week to 20 days after the start of use (BRASIL, 2018).

The World Health Organization (WHO) has indicated PrEP since 2012 for the population most exposed to the virus, but it was only in 2017 that the drug began to be made available by the Unified Health System (SUS) in Brazil. Until 2018, only 36 treatment centers in 11 Brazilian states provided PrEP (SILVA, CUETO, 2018).

Amid so many recent setbacks, Brazil took a step forward in HIV prevention policy with the adoption of the so-called PrEP (Pre-Exposure Prophylaxis), which since December 2017 has been present in 36 treatment centers in 11 Brazilian states. It has been indicated by the World Health Organization since 2012 for populations most exposed to infection, such as men who have sex with men, the trans population, and sex workers. PrEP is based on the use of antiretroviral drugs, in this case, Truvada – alone or associated with others – by uninfected people who make up the mentioned segments (SILVA, CUETO, 2018).

According to Sousa et al (2021), knowledge about PEP and PrEP among people living with HIV/AIDS in Brazil is still low, which undermines secondary prevention and makes clear the need for investments in health education for both the healthcare team and health and patients.

With the advancement of ART (antiretroviral therapy), it is currently possible for Sero different couples to be able to have affective-sexual relationships even though they are living with HIV/AIDS with an undetectable viral load, even allowing unprotected sex because there is no transmissibility of the virus, however, despite advances, biotechnological agents still exist serophobia due to the stigmatizing effects of HIV that persist (SILVA, DUARTE, LIMA, 2020).

Patients who use ART, and have had viral suppression for more than 6 months, are called undetectable, therefore, equal to non-transmissible, that is, the patient does not transmit the virus, for this to occur, the patient, in addition to not having adverse drug reactions for more than 6 months, your tests should show < 200 copies/ml blood according to the US Centers for Disease Control and Prevention (CDC) (GIV, 2011).

7 EPIDEMIOLOGY

The world has 38.4 million people living with HIV and since 2005 the rates of new infections have been falling. Only in 2020 and 2021 was the newly infected rate of 1.5 million per year maintained. Although for two consecutive years, the newly infected rates have remained the same, the number of people who are having access to antiretroviral therapies is increasing year after year. In the year 2000, 26 million people were living with HIV and only 560 thousand had access to ART, approximately 2.15% of the population had access to medication already in 2021, and in 2021 this level ended up changing for the better, maintaining 28.7 million from people with access to ART to 38.7 million people infected, approximately 74% of the population with access to medication, an increase of more than 71% of people with access to antiretrovirals (UNAIDS, 2022).

With increased access to medications, AIDS mortality rates have also been falling, from 2 million deaths in 2005 to 650,000 deaths from the virus in 2021, showing the great effectiveness of medications and better quality of life for people living with HIV. The African continent still leads the rates of the highest number of people living with HIV globally, with 20.1 million people infected, while Latin America has 1.5 million people living with HIV, with approximately 382,000 in Brazil alone in the year 2021 (UNAIDS, 2022; BRASIL, 2021).

According to the latest HIV/AIDS epidemiological bulletin released by the Ministry of Health, 2021, Brazil has 381,793 cases notified from 2007-2021 by the Information and Notifiable Diseases System (SINAN), with the state of São Paulo being the most populous do Brasil, is in first place in the ranking of notifications with 95,113 cases.

HIV cases in Brazil were on the rise until 2018 when the country recorded 45,691 newly infected cases in the year. As of 2019, HIV rates have drastically decreased, reaching only 15,220 reported cases in 2021, this decrease in reported cases may be linked to the coronavirus pandemic, where the population remained in social isolation and the health system focused more on notifications of SARS-COV-2, bringing a deficit in the range of detection of people infected by the HIV (BRASIL, 2021).

HIV cases in pregnant women have been increasing since 2010, going from 2.1% to 2.7%, this may be related to the growth of rapid HIV tests as soon as the woman enters her prenatal care (BRASIL, 2021). AIDS cases have also been decreasing since 2013, falling from 43,493 cases notified in the same year, to 13,501 cases notified in the year 2021 (BRASIL, 2021).

According to UNAIDS (2015), there are goals to be met by every sphere of government in the world to end AIDS by the year 2030. The goal called 90-90-90 is divided into 3 goals: 90% of people infected are diagnosed with HIV, showing the need for health education and expansion of HIV diagnostic tests; 90% guaranteed treatment for those people who have been diagnosed, using ART and 90% with viral suppression, making the patient undetectable.

8 CONCLUDING REMARKS

Although the numbers of people infected with HIV are notified in Brazil and the world every year, the rates are accompanied by a lot of development on the part of diagnoses, treatment (medications), and better knowledge of the population of its forms of prevention.

The diagnoses had a significant evolution since its first test, which was a test that had many failures causing doubt in the population due to its high rate of erroneous results, in addition to identifying only IgG and anti-HIV1, in the future, approximately 3 Decades after the first generation of tests, they are proven to be true, bringing reliability in their performance, being able to identify anti-HIV1 and anti-HIV2 in addition to searching for IgM and IgG, the immunological window drops from 8 weeks to just 2 weeks.

The evolution of treatments offered worldwide has also changed, and with that, the Unified Health System has been a pioneer in the quality it has been offering its users since the end of the 20th century, until the present day. In the past, when it came to the subject of HIV, patients were already waiting slowly for a complicated death and the drugs available, in addition to being difficult to access, caused many side effects due to their drug interactions, there are reports that patients took 18 to 30 drugs a day, often not bringing satisfactory results in its treatment, today it has changed its panorama, using only 3 drugs a day for the treatment of HIV, which brings greater resolution and less pharmacological interactions, which can make the patient have a better quality of life, even capable of not transmitting the virus when it has been undetectable for more than 6 months.

World, despite being developing day after day when it comes to HIV, it is still necessary to expand health education for the population and even training and improvement of public and private health professionals, for knowledge of pre- and post-exposure prophylaxis to HIV.

Studies show that although PEP has been on the market since the 1990s, there is still a lack of knowledge about it, causing patients to end up becoming infected with the virus. greater dissemination and greater decentralization of medicines so that the community is easily accessible, while PrEP has been on the market since 2017, a more recent type of prophylaxis still generates a lot of ignorance even among the health professional class, where there should be training in these categories to prevent the HIV numbers from rising.

According to UNAIDS, Joint United Nations Program on HIV/AIDS, by the year 2030 we will have a reduction in HIV cases, through the 90-90-90 target, where 90% of infected people are diagnosed with HIV, 90 % guaranteed treatment for those people who were diagnosed, and 90% of cases diagnosed with viral suppression, bringing a new vision and greater knowledge about the human immunodeficiency virus.

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Chapter 68

Increase in tuberculosis cases during the Covid-19 pandemic with emphasis on the difficulty of diagnosing and treating the disease

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ABSTRACT
Tuberculosis (TB) is an infectious disease caused by Mycobacterium Tuberculosis. Also called Bacillus Koch, this pathogenic bacterium is highly resistant and aerobic and preferentially affects the lungs. TB has rapid contamination through the inhalation of aerosols disseminated by the speech, coughing, or sneezing of an infected individual. During the COVID-19 pandemic, a considerable increase in TB cases was recorded, as the diagnosis and treatment of the disease were hampered by the scenario. The objective of the study was to identify the increase in the number of cases of tuberculosis in different Brazilian regions during the COVID-19 pandemic, highlighting the greatest difficulties encountered in diagnosing the disease and investigating the number of infected people who abandoned tuberculosis treatment between 2017 and 2021. Data from this study were extracted from the Department of Informatics System of the Ministry of Health (DATASUS). In the evaluated period, 452,336 cases of tuberculosis (TB) were registered in Brazil, with an annual average of 90±4.72 cases/year. The southeast and northeast regions were the most notified, with 205,212 and 118,106 cases, respectively. In all regions, an increase in Directly Observed Treatment (DOT) was observed between 2017 and 2019, but with the onset of the COVID-19 pandemic in 2020, a reduction in the number of individuals undergoing treatment was

observed. It was observed that, in the analyzed period, there were 55,900 cases of treatment abandonment, divided into 52,318 (93.60%) due to non-compliance and 3,582 (6.40%) due to primary abandonment. Individuals with untreated TB, in addition to transmitting the bacillus, may have a clinical evolution of the disease to more severe forms. Those who abandon treatment may still have multidrug resistance to available drugs. Thus, epidemiological research and active searches, generally managed by the nursing team, are crucial for tuberculosis control.

Keywords: Mycobacterium tuberculosis. Treatment abandonment. Multiresistant.

1 INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by Mycobacterium Tuberculosis, popularly known as Koch's Bacillus, a highly resistant and aerobic pathogenic bacterium that preferentially affects the lungs. The rapid contamination of the disease occurs due to its means of air transmission, that is, the bacteria settle in the body from the inhalation of aerosols with bacilli commonly proliferated by talking, sneezing, and coughing of infected individuals. The diagnosis of TB is performed by direct bacilloscopy and sputum culture. It is a disease that can be prevented and cured, but even so, the high incidence of cases still makes it a public health problem. (SILVA, SILVA, 2016).

Tuberculosis (TB), one of the oldest diseases in the world, affects mainly the lungs, but due to hematogenous spread, it can extend to various tissues, characterizing extrapulmonary TB. The Koch Bacillus, the causative agent of the disease, has aerobic metabolism and is characterized by the absence of mobility and capsule, the inability to sporulate, and its hydrophobic barrier, which makes it an extremely resistant microorganism (KOZAKEVICH et al., 2015).

The German Robert Koch, pathologist, and bacteriologist, isolated and cultivated the Koch Bacillus in 1882 and was the forerunner of the isolation of the bacterium outside the human body. By isolating them in pure culture, he was able to inoculate the bacteria in animals and produce the signs and symptoms of the disease in them, analogous to the clinical manifestations observed in humans (GUIMARÃES et al., 2018). In 1921, an effective vaccine for TB was created at the Pasteur Institute, based on the attenuated Mycobacterium Bovis. This vaccine is called Bacillus Calmette and Guérin, BCG, currently established as a preventive protocol against tuberculosis in neonates (KOZAKEVICH et al., 2015).

According to Silva et. al. (2020), the diagnosis of TB must be carried out early, and, commonly, it is possible to diagnose the disease in 4 ways: clinical diagnosis, bacteriological diagnosis, histopathological diagnosis, and radiological diagnosis.

The clinical diagnosis occurs by identifying the manifestations of the disease, taking into account the most common signs and symptoms. The bacteriological diagnosis is based on sputum smear microscopy, culture, and molecular tests. The histopathological diagnosis is performed by analyzing tissue fragments infected by the bacteria that cause the disease. The radiological diagnosis is made by analyzing the results of chest X-ray and computed tomography (SILVA et. al., 2020).

The WHO established a strategy, offered by the Unified Health System (SUS) to ensure adherence and continuity in TB treatment, which advocates directly observed treatment (DOT). The DOT consists of the observation of TB patients by health professionals, mainly when taking medication. This observation should take place every day during the attack phase against Koch's bacilli and once a week during treatment maintenance. The main objective of this strategy is to reduce dropout rates and the incidence of increased resistance to bacterial strains due to the indiscriminate administration of prescribed medications (JUNGES et. al., 2020).

One of the greatest difficulties in the treatment of tuberculosis is the existence of multidrug-resistant strains, which oppose the action of the antibiotics used in chemotherapy for TB. The therapy has 4 associated drugs for two months and in the subsequent four months, 2 antibiotics are used, namely isoniazid (INH), rifampicin (or other rifamycins), pyrazinamide, ethambutol, and streptomycin. Treatment time varies according to the clinical picture and can range from 6 to 12 months. This resistance is an alert to the patient's fidelity to the treatment, as it induces the improvement of a condition in a short time, causing the patient to stop drug treatment believing in a quick improvement. When you stop taking the medication, the resistant strains multiply in the body and become more aggressive (GUIMARÃES et al., 2018).

There are factors associated with the abandonment of drug treatment for TB and according to Ferreira et. al. (2018), the major causes are divided into sociodemographic factors, clinical aspects, and factors related to treatment. The prevalent sociodemographic factors in the abandonment of TB treatment are the use of illicit and/or licit drugs, age, male gender, and low education. Regarding clinical aspects, co-infection with TB and HIV prevails, re-entry to treatment after previous abandonment, and patients with extrapulmonary TB. In terms of treatment-related factors, abandonment in the initial phase (first 3 months), adverse drug effects, and rapid improvement in clinical signs stand out (FERREIRA et. al., 2018).

Tuberculosis (TB) is currently one of the main causes of death in the world and, according to the Ministry of Health, Brazil has a high incidence rate, especially in the Northeast and Southeast regions, and is the leader in the number of deaths in the Americas (KOZAKEVICH et al. al., 2015). In 2020, for example, the case coefficient in Brazil was 31.6 cases per 100,000 inhabitants, registering 66,819 new cases in that period (Epidemiological Bulletin, 2021).

In 2014, the World Health Organization approved a global strategy to tackle tuberculosis, seeking to eradicate the disease from 2015 to 2035. The main objective of this strategy is to reduce mortality by 95% and the incidence of the disease by 90%. The General Coordination of the National Tuberculosis Control Program (CGPNCT), of the Ministry of Health, developed the National Plan for the End of Tuberculosis to support the planning and development of actions that improve the worrying epidemiological situation of tuberculosis in Brazil (BRASIL, 2017).

In 2015, TB overtook HIV infection in Brazil and became the leading cause of mortality from infectious diseases. With the COVID-19 pandemic, declared on March 11, 2020, by the World Health Organization, TB cases continued to grow, but priorities in public health care changed. This simultaneous growth of TB and COVID-19 cases made the differential diagnosis difficult since both diseases have similar signs and symptoms. There is also a great similarity in clinical management where both diseases require the supply of oxygen and ventilation (SILVA, 2021).

All global progress in the fight against tuberculosis was undermined during the pandemic and there was a considerable increase in deaths from the disease, according to the World Health Organization. In 2020, in addition to the increase in the number of deaths, there was also a decrease in the number of infected people diagnosed and treated concerning the 2019 report. This regression can be explained by the difficulty in accessing health services, caused by the great demand of patients with COVID-19 and the preventive measures introduced during the pandemic, such as social isolation (PAHO, 2021).

Tuberculosis carriers are vulnerable to the COVID-19 scenario due to prior lung impairment. Co-infection may jeopardize Brazil's target of reaching 10 infected people and less than 1 death per 100,000 inhabitants by 2035. The risk factors associated with tuberculosis, such as precarious hygiene, health, and work conditions, were intensified during the pandemic, which required a reorganization of health services and cares for those infected. It is also relevant to mention the unavailability of medicines and supplies, together with the impossibility of performing the directly observed treatment periodically (HINO et al, 2021).

Thus, the difficulty in accessing the health service resulted, in 2020, in 408 cases of TB notified only after death. There was a 16% drop in the notification of new cases since during this period, only 31.7% of the cases of pulmonary TB had access to the sputum culture test and only 50.2% of those detected followed the flowchart according to the recommended protocol (Epidemiological bulletin, 2021).

Therefore, identifying the epidemiological situation of TB provides an understanding of the difficulties to improve early diagnosis and avoid treatment abandonment.

2 METHODOLOGY

This is an ecological descriptive observational study. Data from this study were extracted from the Department of Informatics System of the Ministry of Health (DATASUS), through the TabNet platform. Because they are aggregated data, it will not be possible to identify the research subjects individually. The object of study was the information recorded in the period from 2017 to 2021 in DATASUS regarding cases of tuberculosis (TB) in the different macro-regions of Brazil.

This work is exempt from appreciation by the CEP/CONEP system as it complies with article 1 of resolution number 510 issued by CONEP on April 7, 2016. According to the resolution, this study was not registered and evaluated by the CEP system /CONEP for using public domain information.

Data recorded in DATASUS were extracted and stored in an Excel version 16.0.1 database. For the analysis of the data obtained, simple descriptive statistics were used and the results were expressed in bar graphs and tables.

3 RESULT AND DISCUSSION

During the period studied, 452,336 cases of tuberculosis (TB) were reported in the period studied in Brazilian macro-regions, with an annual average of 90±4.72 cases per year. Between 2017 and 2021, 21,255 (4.70%) cases of tuberculosis were registered in the Midwest region. In the North macro-region, there are 53,180 (11.76%) cases of TB and in the South region, there are 54,762 (12.10%) cases registered. In this study, the Northeast and Southeast regions stand out with the highest number of cases, with 118,106 (26.11%) and 205,012 (45.33%), respectively.

Between 2017 and 2018, there was an increase in the number of cases registered in the country. In total, 2018 registered 3,671 (4.05%) more cases compared to the previous year. In the Midwest region, there was a slight increase of 388, which is similar to the North region with 234, and the South region, with 488. The increase, in this period, was more pronounced in the Northeast and Southeast regions, which showed a difference of 1,319 and 1,262 new cases, respectively.

It is clear that, in 2019, all macro-regions stood out in the number of registered cases. In the national scenario, observing the sum of the total numbers of all regions per year, there is an increase of 1,688 (1.80%) registered cases from 2018 to 2019 and a decline of 9,648 (10.06%) from 2019 to 2019. 2020. In some macro-regions, the increase in the number of cases reported from 2018 to 2019 is less significant than the decline from 2019 to 2020. In the Midwest region, there was an increase of 51 (1.12%) and, later, a decline of 431 (9.37%) in 2020. The same can be observed in the Southeast region with an increase of 9 (0.02%) and a decrease of 3,767 (8.82%); and in the South Region with 446 (3.90%) cases from 2018 to 2019, followed by a reduction of 1,436 (12.09%) in 2020.

According to Harzheim (2020), in 2019 Previne Brasil was created, a new policy for financing primary care in the country. The Ministry of Health, from its creation, aimed to balance financial values with the performance of health care teams, placing the population at the center of care and, consequently, establishing goals for receiving financial resources.

The creation of the new funding proposal was based on the inefficiency of primary healthcare services and the low valuation of team performance. The calculation of the financial coverage for the units

did not guarantee assistance, so the release of the financial resource from the establishment of goals was established, to optimize the service (SETA et. al, 2021).

The Northeast region showed a decrease in both periods, with a reduction of 113 (0.45%) confirmed cases from 2018 to 2019 and 2,824 (11.29%) from 2019 to 2020. The North region was the only one that presented a rate of growth greater than the rate of reduction. In this region, it is observed that 1,294 (12.44%) confirmed cases increased from 2018 to 2019 and reduced only 1,189 (10.17%) afterward.

In the year 2021, the Brazilian macro-regions are divided between an increase and a reduction in the number of confirmed cases per year of notification. In the Midwest region, for example, it is possible to assess that 403 (9.67%) fewer cases were registered compared to the previous year. The same can be observed in the Northeast, which had 258 (1.17%); in the North, with a 90 (0.86%) reduction; and in the South region, which presented 391 (3.75%). In the Southeast, there is a small increase of 56 (0.14%).

The table below (table 1) shows the distribution of confirmed cases, according to the year of notification.

Table 1: number of confirmed TB cases by reporting region, according to the reporting year.

	2017	2018	2019	2020	2021	TOTAL
CENTRO OESTE	4.163	4.551	4.602	4.171	3.768	21.225
NORDESTE	23.815	25.134	25.021	22.197	21.939	118.106
NORTE	10.166	10.400	11.694	10.505	10.415	53.180
SUDESTE	41.483	42.745	42.754	38.987	39.043	205.212
SUL	10.947	11.435	11.881	10.445	10.054	54.762
IGNORADO/EXTERIOR	20	0	1	0	0	21
Total geral	**90.594**	**94.265**	**95.953**	**86.305**	**85.219**	**452.336**

Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

In a cross-sectional study on the epidemiological profile of tuberculosis in Brazil, it was found that of the 85,219 cases of TB registered in 2021, 67,292 (78.9%) are new cases, and 8,668 are readmissions after treatment abandonment (10.1%). , 5,741 (6.7%) relapses, 2,537 (2.9%) are transference, 591 (0.7%) were not specified and are classified as "don't know", 388 (0.4%) were confirmed post-mortem, and 2 (0.002%) were ignored/blank (MACEDO et al., 2022).

According to Alves et al., (2022) from a descriptive and observational ecological study, in the period from 2015 to 2020, 25,415 cases of TB were confirmed in the Midwest of Brazil, with an annual average of $\bar{x}$ = 5,083 cases. In this study, one of the highest incidences of tuberculosis was recorded in 2018, and the lowest in 2021. These data corroborate the present study, since the results were similar since 2018 had the second highest record, and 2020, as well as in the cited study, presented the smallest during the analyzed chronological window.

The Northeast region of the country, according to a retrospective cross-sectional assessment of the epidemiological profile of tuberculosis between the years 2010 to 2019, is the second region with the most notification of TB cases in the country, where 235,861 were registered (26, 76%) cases in the analyzed

period. The only region that stood out in incidence compared to the Northeast was the Southeast with 397,817 (45.13%) records. These data, compared to those of the present study, validate the data obtained, since from 2017 to 2021 the prevalence of both states in the incidence of the disease is still observed. It is worth noting that in the period studied, the Northeast is still behind the Southeast, followed by the South, North, and Midwest, in that order (BARROS et al., 2021).

In Recife (PE), the second most populous state in the Northeast region of Brazil, a descriptive study with a quantitative approach was carried out regarding the epidemiological profile of tuberculosis in the period from 2015 to 2020. In total, 15,181 cases of TB were reported, an average of μ= 2,530.16 cases per evaluated year. In the distribution of cases during the period, the year 2017 stands out, which recorded 2,666 (17.6%) confirmed cases. The year 2020 registered the lowest number of cases registered in Recife, with 2,365 (15.6%) notifications (LIMA FILHO et al., 2022).

A comparative epidemiological study analyzed incident TB cases in the State of Tocantins and the North region, from 2009 to 2019. In the region, 102,362 cases were registered during the period, with 11,463 in the year 2019. The State of Tocantins, in turn, obtained 2,333 registrations equivalent to 2.28% of the total presented in the State. This analysis demonstrated a growth over the years that is evident in the present study, since from 2017 to 2019 there was also a considerable increase in this region (SILVA et al., 2020).

According to Matos et al. (2022), there were 68,271 new cases in Brazil in 2021. It should be noted that the Southeast region, the second smallest region in terms of land area and the most populous in the country according to the IBGE (Brazilian Institute of Geography and Statistics), had the highest rate of new confirmed cases in this period, with 46.27% and, on the other hand, the Midwest region had the lowest, with 4.44%.

Directly Observed Treatment (DOT) consists of observing the patient, by a health professional, while taking medication for tuberculosis (TB) and guarantees the continuity of treatment and its effectiveness, given the high mortality rate due to the disease. Graph 1 shows the number of confirmed cases according to the DOT performed and the number of infected people who underwent treatment from 2017 to 2021.

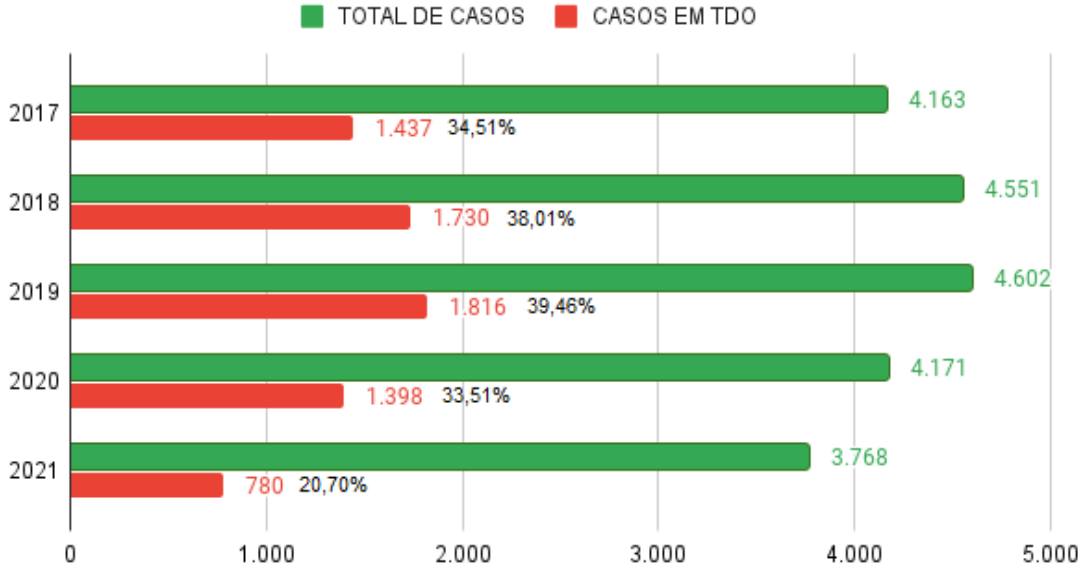
In 2017, in this classification, of the 4,163 cases confirmed by the disease, only 1,437 (34.51%) underwent treatment. In 2018, with an increase of 388 cases, it was found that in 4,551 confirmed cases, there were 1,730 (38.01%) people with DOT performed. The sharp growth remained until 2019 and subsequently, there was a sharp drop in both. In 2019, out of 4,602 cases, 1,816 (39.46%) underwent DOT, the highest rate recorded during the study period.

The COVID-19 pandemic was decreed in Brazil on March 11, 2020, and from that period it is possible to observe a significant drop in the amount of directly observed treatment performed in the

Midwest. In 2020, 4,171 confirmed cases were registered according to the DOT performed, with 1,398 (33.51%) being treated, a reduction of 418 (5.95%) compared to the previous year. In 2021, the decrease was more abrupt and the numbers reached 780 (20.70%) people with DOT performed for 3,768 cases.

When comparing the year 2019, which had the highest rate, with the year 2021, which recorded the lowest, there is a drop of 834 cases and 1,036 with DOT performed. This decrease of 18.76% of cases in DOT can be explained by the scenario that the country was facing in the face of the COVID-19 pandemic, by the security measures carried out during the period, and by the difficulty of accessing the health system.

Graph 1: Confirmed cases in the Midwest region according to the TDO performed.



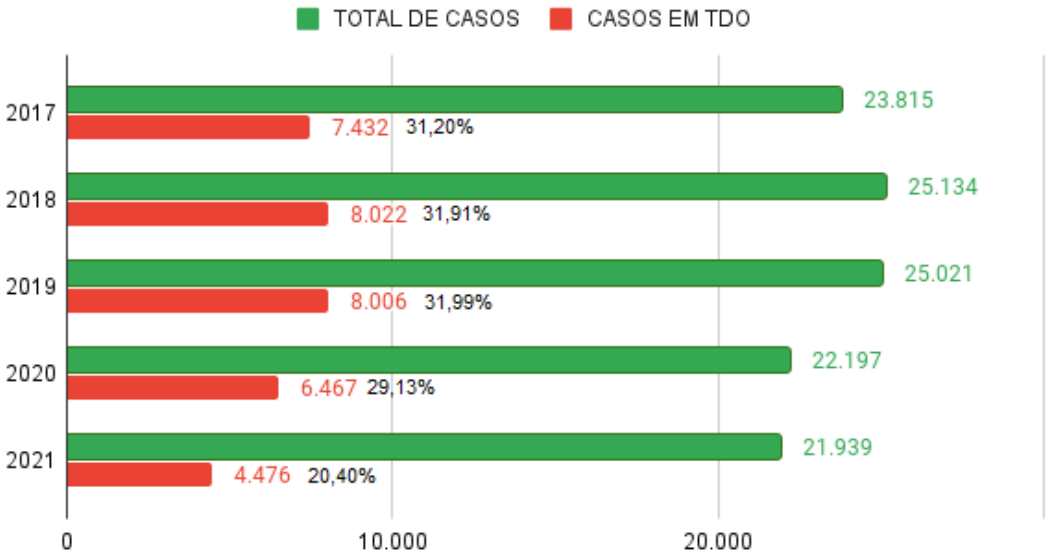
Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

Graph 2 shows data referring to cases confirmed by DOT performed in the Northeast, between 2017 and 2021. In this region, from 2017 to 2019, there was a brief increase in the rate (%) of people with DOT performed, where 2017 had 23,815 confirmed with 7,432 (31.20%) with treatment; 2018 presented 25,134 with 8,022 (31.91%); and 2019 had 25,021 with 8,006 (31.99%).

In the last two years, like the Midwest region, the Northeast was also directly influenced by the pandemic. In 2020, the number of confirmed TDO performed dropped to 22,197, 2,824 less than the previous year. Regarding the number of cases with DOT performed, 6,467 (29.13%) were registered, which means a decrease of 1,539 in one year. The year 2021, the last analysis period of the study, showed 21,939 confirmed for 4,476 (20.40%) with DOT.

The year with the highest rate was again 2019, with 31.99% of confirmed cases with directly observed treatment performed. The lowest rate was expressed in 2021, with 20.40%. When comparing the two years, there is a reduction of 11.59%, lower than in the Midwest.

Graph 2: Confirmed cases in the Northeast region according to TDO performed.



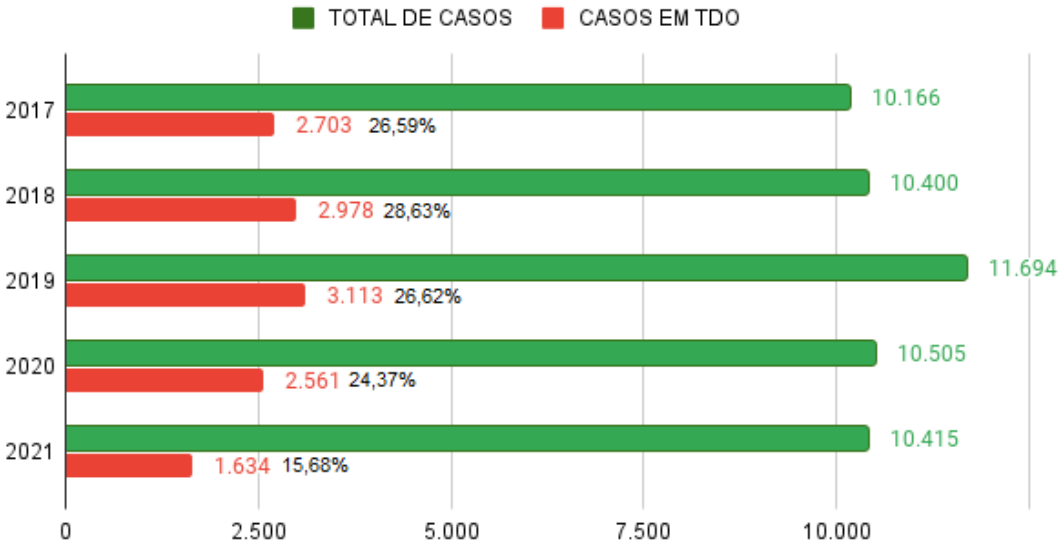
Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

Graph 3 illustrates the total number of confirmed cases in the North region according to the DOT performed. In 2017, cases in the region reached 10,166 with 2,703 (26.59%) people receiving treatment. The following year there was a succinct increase to 10,400 with 2,978 (28.63%). Unlike the Midwest and Northeast, which continue to increase in 2019, the North begins its reduction this year, where despite registering the highest number of cases with 11,694, the rate has been reduced to 26.62%, with 3,113 people in TDO, compared to 2018.

In 2020, there is a reduction in both situations. The number of confirmed cases went to 10,505 with 2,561 (24.37%) cases with DOT performed. Once again, 2021 had the lowest rate in the study, with 10,415 confirmed cases and only 1,634 (15.68%).

The year with the highest rate was 2018 with 28.63% and the lowest, again, was 2021 with 15.68%. During this period, the number of confirmed cases according to the DOT performed remained practically the same, but the reduction was notable in the amount of treatment performed, with a decrease of 12.95%. It is worth mentioning that, among the three regions already analyzed, the North ranks 2nd in terms of the decrease in DOT performed during the pandemic.

Graph 3: Confirmed cases in the North region according to TDO performed.



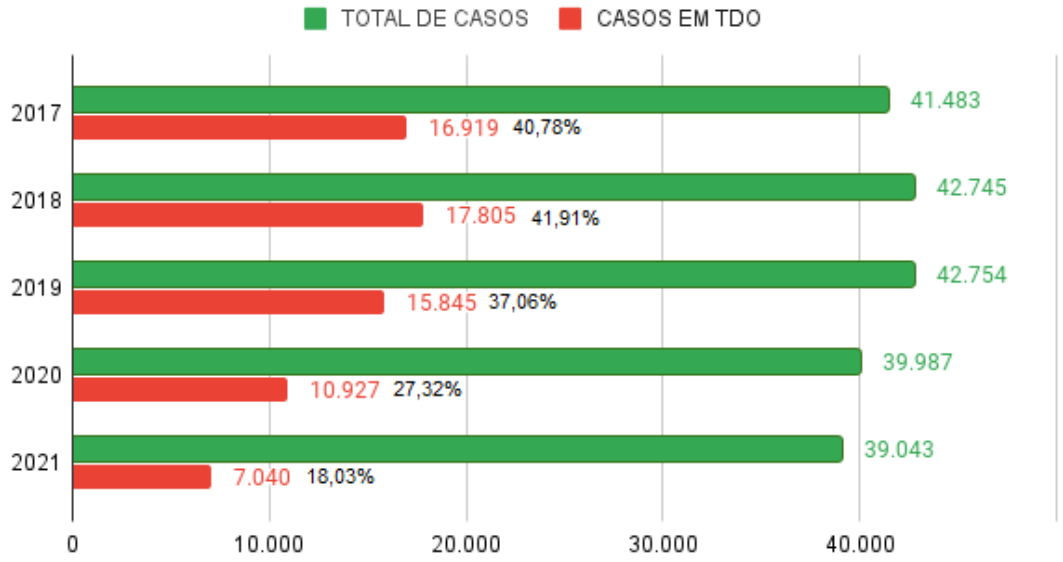
Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

Graph 4 represents the performance of directly observed treatment, according to confirmed cases in the Southeast region, the most populous macro-region in Brazil with approximately 80 million inhabitants. In this graph, it is evident that this region is similar to the Northeast, where they have considerable growth until the year 2018 and a sharp drop in the following years.

In 2017, out of a total of 41,483 confirmed cases, 16,919 (40.78%) underwent DOT. The following year, in 2018, it increased by 1,262 cases and treatment rates rose to 41.91%, equivalent to 17,805 cases in DOT, 886 more than the previous year. As previously mentioned, in 2019 it is possible to observe the reduction of individuals undergoing directly observed treatment, since in this period, despite having the highest number of confirmed cases with 42,754 notifications, the number of treatments performed dropped to 15,845 (37.06%). The decrease is accentuated in 2020 and 2021, with 10,927 (27.32%) and 7,040 (18.03%), respectively.

The highlights of this region were the years 2018 and 2021, the first being the record of the highest treatment rate and the second, being the lowest. When comparing them, the greatest difference is observed between all regions, since the reduction rate is 23.88% in the period mentioned.

Graph 4: Confirmed cases in the Southeast region according to TDO performed.

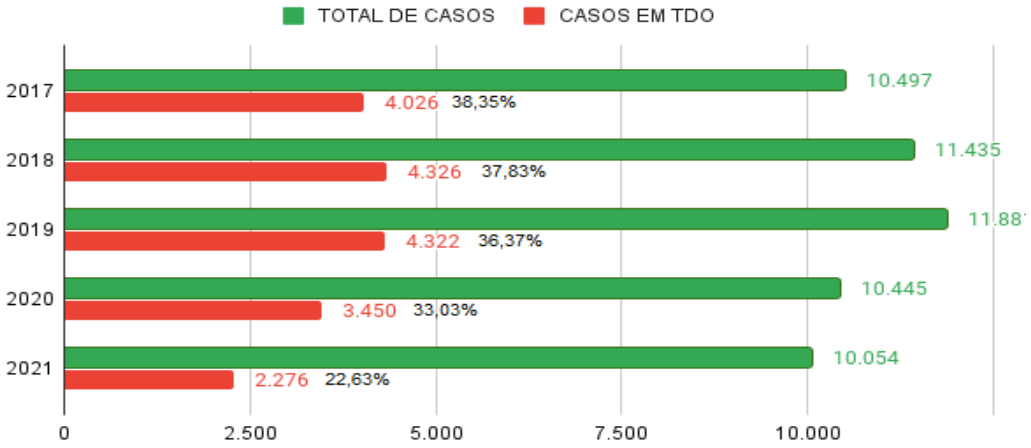


Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

Graph 5 illustrates the DOT performed according to confirmed cases in the South, in the period from 2017 to 2021. Unlike other macro-regions, the South shows a progressive decrease since 2017. In the first year surveyed, of the 10,497 cases notified, there were 4,026 (38, 35%) in treatment. In 2018, there was an increase in cases concomitantly with a reduction in the treatment rate, since of the 11,435 records, 4,326 (37.83%) were in DOT, 0.52% less than the previous year. In the year 2019, the annual decrease was 1.46% with 4,322 (36.37%) of 11,881. The biggest drops are expressed in the years 2020 and 2021 with, in that order, 3,450 (33.03%) and 2,276 (22.63%).

During the study period, there was a reduction of 15.72% in 5 years. Regarding the performance of directly observed treatment of confirmed cases by year of notification, among all regions, the South ranks after the Southeast and Midwest, occupying the third position, followed by the North and Northeast.

Graph 5: Confirmed cases in the South region according to TDO performed.



Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

Individuals with untreated TB, in addition to transmitting the bacillus, may have a clinical evolution of the disease to more severe forms. Those who abandon treatment may still have multidrug resistance to available drugs (SOEIRO, 2022). In the period studied, from 2017 to 2021, 55,900 cases of tuberculosis treatment abandonment were observed, distributed across the 5 Brazilian macro-regions. Of the registered cases, 3,582 (6.40%) correspond to primary abandonment, and 52,318 (93.60%) to abandonment.

In table 2, it is observed that the region that most stood out in treatment abandonment was the Southeast, which presented 26,777 (47.90%), where 25,457 are due to abandonment and 1,320 for primary abandonment; in second place is the Northeast, with 12,487 (22.34%), between 12,011 dropouts and 476 primary dropouts; the South, with 7,522 (13.46%) cases in total, presented 6,201 due to abandonment and 1,321 due to primary abandonment; later, come the North with 6,481 (11.59%) records, with only 278 primary; in last place is the Midwest, with 2,633 (4.71%) cases, including 2,446 due to noncompliance and 187 due to primary noncompliance.

It is worth mentioning that, regarding abandonment, the Southeast recorded the highest number in the period 2017-2021, with 25,457. On the other hand, the South recorded the lowest, with 6,201. Regarding primary abandonment, the South and Southeast had only 1 case of difference, with 1,321 and 1,320, respectively. The macro-region that recorded the least cases of primary abandonment in these five years was the Midwest, with 187 cases.

Table 2: Confirmed cases by Notification Region according to Closed Situation in the period: 2017-2021.

	CENTRO OESTE	NORDESTE	NORTE	SUDESTE	SUL	TOTAL
Abandono	2.446	12.011	6.203	25.457	6.201	52.318
Abandono primário	187	476	278	1.320	1.321	3.582
Total geral	**2633**	**12487**	**6481**	**26.777**	**7.522**	**55900**

Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

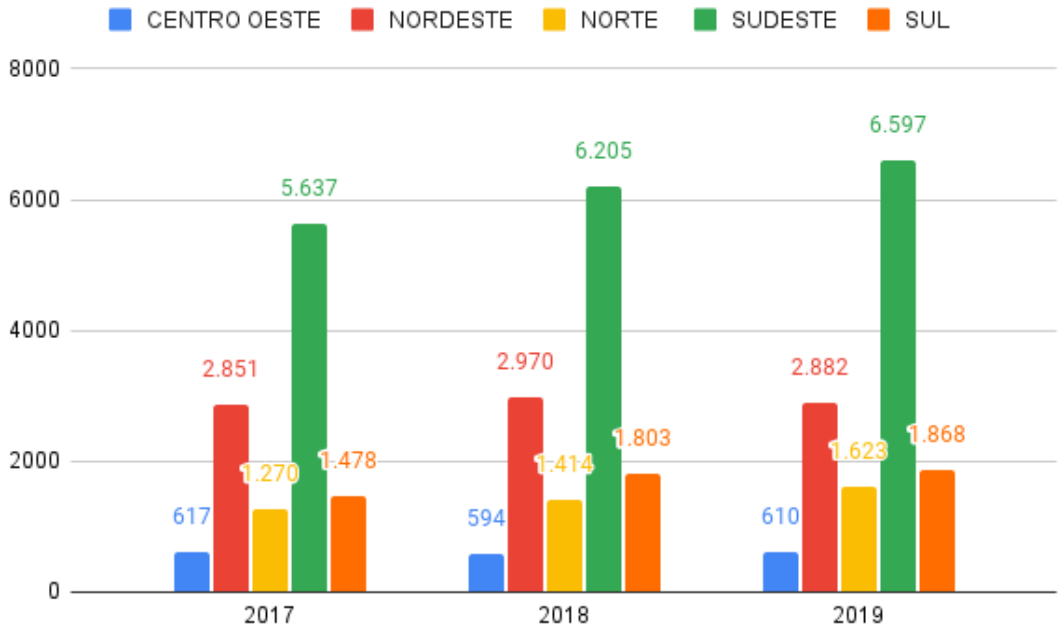
Of the 496,764 TB cases registered in the country from 2012 to 2018, 52,249 (10.51%) were terminated due to treatment abandonment. When analyzing the distribution of cases among the regions of Brazil, the Southeast region stands out with an average of 10.78 ± 1.38, the South region with 10.70 ± 2.94, and the North region with 10.35 ± 1.13 (SOEIRO et al., 2022).

Graph 6 shows the cases of abandonment of treatment for tuberculosis in the Brazilian macro-regions, from 2017 to 2019. It is important to note that these data are the sum of abandonment and primary abandonment. In the first three years of the study, except for the Midwest and Northeast, a gradual increase is observed in most regions. The North registered 1,270 dropouts in 2017, 1,414 in 2018, and 1,623 in 2019, with an annual average of $\mu = 1,435.66$; the Southeast had 5,637 dropout notifications in 2017, 6,205 in 2018, and 6,597 in 2019, with the highest annual average of all macro-regions, $\bar{x} = 6,146.33$; and the South had 1,478 in 2017, 1,803 in 2018 and 1,868 in 2019, with $\bar{x} = 1,716.33$.

The Midwest recorded a decrease from 617 in 2017 to 594 in 2018 and increased again in 2019, a year that recorded 610 cases of abandonment. It should be noted that this macro-region had the lowest annual average from 2017 to 2019, with $\bar{x}$ = 607.

The Northeast, in turn, reported 2,851 TB treatment abandonment in 2017, with a succinct increase in 2018 that reported 2,970, 119 more cases compared to the previous year. In 2019, there was a reduction in this region, with 2,882 cases, 2.97% less than in 2019. The annual average for the Northeast is $\bar{x}$ = 2,901.

Graph 6: Confirmed cases by notification region according to the closed situation, using the sum of abandonment and primary abandonment criteria, in the period 2017-2019.

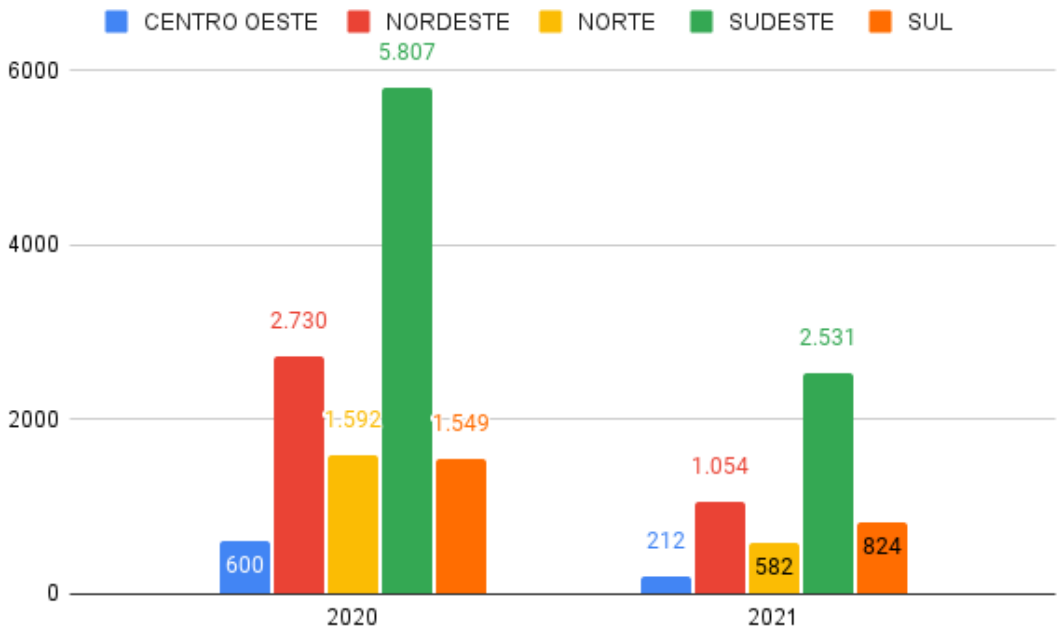


Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

From 2019 to 2020 (graph 7), a reduction in treatment abandonment can already be observed in most Brazilian regions, but it is in the period from 2020 to 2021 that this reduction becomes significant for the present study.

The Midwest, in one year, went from 600 cases to 212, with a rate of decrease of 35.33%; the Northeast reduced from 2,730 to 1,054, with 38.60%; the North from 1,592 to 582, with 33.16%, the lowest recorded in the period; the Southeast from 5,807 in 2020 to 2,531 in 2022, with a rate of 43.58%; and the South, from 1,549 to 824, with 53.19%, the highest registered in the period.

Graph 7: Confirmed cases by notification region according to the closed situation, using the sum of the abandonment and primary abandonment criteria, in the period 2020-2021.



*

Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

A quantitative descriptive study evaluated the epidemiological profile of TB cases from 2017 to 2020, in the state of Maranhão. Of the 10,265 confirmed cases during this period, 1,029 (10.02%) abandoned treatment during its implementation and 71 (0.69%) due to primary abandonment, with a total of 1,100 (10.71%) cases terminated due to interruption in treatment (MARTINS et al., 2021). These data corroborate those obtained by the study, since the Northeast from 2017 to 2020, presented 11,433 records of abandonment including the primary ones, that is, the state of Maranhão maintained similar rates to its macro-region and notified 9.62% of these cases.

Barboza and Ferrer (2019) analyzed the epidemiological profile of the abandonment of tuberculosis treatment in the Northeast region of Brazil, from 2015 to 2017, through a descriptive and exploratory ecological study. During the study period, 68,509 cases of TB were registered in the region, with 7,861 (11.47%) cases of treatment abandonment.

The risk factors for the patient to abandon the treatment for tuberculosis (TB) are derived from the sociodemographic profile, the clinical aspects of the patient, and the treatment itself. When analyzing published articles, it was found that the sociodemographic aspects that predominate are the use of illicit drugs, the male gender, low education, residents of rural areas or without fixed housing, illiterates, and patients with a lack of knowledge about the disease. The clinical aspects that increase the chance of abandonment are co-infection of TB with HIV, primary abandonment and re-entry to treatment, patients with extrapulmonary TB, comorbidities associated with the disease, and patients who present positive bacteriological tests after 2 months undergoing treatment. Regarding treatment, it was found that most

patients who drop out show improvement in signs and symptoms, are in the initial phase, and have adverse drug effects (FERREIRA et al., 2018).

In a cross-sectional descriptive study, carried out with 15 patients who were re-entering treatment after abandonment in the basic health units of Belém (PA), it was observed that 14 (93.3%) were men and 12 (79.99%) had low education. The most outstanding causes of abandonment were those related to the patient, such as, for example, the use of illicit and/or licit drugs, in which 5 participants claimed the use, and those related to the treatment, which corresponds to 8 (19.4%) people with rapid clinical improvement at the beginning of treatment and adverse effects of the drug (SÁ et. al, 2017).

4 CONCLUSION

Among the Brazilian macro-regions, the Southeast and Northeast stand out in the incidence of tuberculosis (TB) cases in Brazil and together are responsible for 328,118 (71.44%) of 452,336 cases in the country, in the period from 2017 to 2021. The prevalence of cases in both regions can be explained by the population that currently inhabits both territories, since the Southeast is the most populous region in Brazil with more than 89 million inhabitants, followed by the Northeast with more than 57 million, according to the IBGE.

Regarding the increase in the number of cases of tuberculosis in the macro-regions, a considerable increase from 2017 to 2019 stands out. confirmed cases by year of notification. This data is understandable in the scenario that the country found itself in, since access to the health system, for diagnosis and treatment of TB, was limited due to the security measures implemented in the prevention and fight against COVID-19, a disease of rapid proliferation and high mortality rate.

Before the pandemic, directly observed treatment (DOT) grew steadily over the years. After 2019, the decline in all macro-regions is evident, with emphasis on the Southeast, which sharply reduced the rate by 23.88%. This data is particularly important, as individuals with untreated TB, in addition to transmitting the bacillus, may have a clinical evolution of the disease to more severe forms.

Individuals who abandon treatment may have multidrug resistance to available drugs. From 2019 to 2021, 55,900 infected people abandoned treatment for tuberculosis, with exceptions for the year 2019, which had the highest abandonment rate, and for 2021, which had the lowest rate in the analyzed period. In the distribution by region, once again the Southeast and Northeast stand out.

Nursing has a fundamental role in the active search, diagnosis, and DOT of tuberculosis. Nurses are constantly in contact with the population and act directly to ensure health promotion and equal care for TB patients, through knowledge of the population and control programs. In direct care, their participation in biosafety measures, preventive vaccination, comprehensive care, observation of treatment to ensure its

implementation and effectiveness, social reintegration and popular education are evident. Nursing also integrates the management of care and available resources (OBLITAS et al., 2010).

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Chapter 69

Application and evaluation of the creative framework for customer retention business model

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ABSTRACT
In every business, the acquisition and maintenance of customers are strategic factors and of great value for any company. Not only to increase profit, but also for the company to increase the added value of its products. In this context, creativity being a tool for solving problems and important for the innovation process, collaborates for the development of customer retention strategies. Thus, this work has as main focus the application of an ideation framework as an enhancer of a customer retention model in health plan operators. The results point to a considerable potentialization of this business model based on the application of a creative framework.

Keywords: retention, health operators, framework, creativity

1 INTRODUCTION

Creative processes and creativity triggers, which for many times have been understood as magical abilities or inherent t o very rare elected individuals, are actually conditioned as intrinsic potentials of every human being, as Ostrower (1977) reports in 'Creativity and the Creation Process'. Another important point, highlighted by the author, refers to the fact that creativity and creative processes are not restricted to specific sectors such as the arts or other humanistic areas, but are linked to all existing segments.

Therefore, as mentioned in the previous paragraph, one can observe the application of creativity mechanisms in the most different segments of society. Silva (2018), in 'Comics as a trigger for creative thinking in business administration students', through a teaching experiment, demonstrates the use of comics in the development of the creative process of students. In this direction, the author concludes that creativity is fundamental in the formation of an administrator, in the process of solving problems quickly, as well as understanding different contexts.

Within the context of creativity triggers as enhancers for different marketing scenarios is the present research, which uses creativity triggers, methodologies, and creative frameworks as enhancers of a business model, a case study focused on Data Mining for Customer Retention in Health Insurance Companies.

2 REVIEW OF LITERATURE

2.1 CREATIVE APPROACHES, METHODOLOGIES AND TOOLS

The following sections describe the methodological approaches and creation tools that will be used as the conceptual framework for this research.

2.1.1 Creation Approaches

From the definition "Approach is the term used to characterize a type of approach, either between people or things", it is understood that approach is the term used when trying to approach the problem that is being used as the object of study (SIGNIFICADOS, 2020).

Oliveira (2018) in "Comparative and relational analysis between Blue Ocean strategy and Design Thinking for innovation management", in a first moment, offers an exercise to the reader for understanding about the Blue Ocean methodology.

> "To understand what Blue Ocean is, it is necessary to imagine the existence of a market divided into two parts: red ocean and blue ocean. The red ocean is the existing and known market, while the blue ocean is the unexplored markets or those that do not exist yet. The red ocean represents the "bloody war, where companies seek to outdo the competition by all means, reducing profit and its capacity to grow. In Blue Ocean, competition becomes irrelevant, you have a demand creation market, without defined rules and more profitable.

In a second step, the author (2018) offers a simple comparison on design Thinking and the Blue Ocean Strategy (EOA).

> "EOA presents itself as a set of analytical tools in some moments, and in others as a roadmap to create new markets, Design Thinking presents itself as a new way of thinking based on the designers' thinking model. This difference becomes more evident when we notice the importance given by Design Thinking to human needs, creative and inspiring environments that are also mentioned in the EOA, but with less emphasis in detriment of the analytical tools. The main point in common of the approaches is the need to create something of perceptible value the users/consumers through innovation."

Carvalho (2017) makes a comparison in relation to the DFMA (Design for Manufacturing and Assembly) approach. Design Thinking has stood out as a management methodology. In terms of design, it is worth highlighting its low focus on manufacturing and cost aspects, which often becomes an obstacle within companies when it comes to the construction of the developed project. On the other hand, DFMA seeks to balance user and manufacturing, considering that its principles aim to create projects that optimize the manufacturing and assembly process, collaborating in the activity performed by users who have a direct interface with the development process.

Thus, based on the mentioned analyses we conclude that different approaches have been effective within different contexts with the common point of focusing on innovation, but one cannot forget that each one of them has different approaches for obtaining results, while the Blue Ocean methodology has its

focus on understanding the market and extrapolating it through the discovery of the "Blue Ocean", Design Thinking has its focus on understanding the user experience and obtaining the improvement of this user experience process. Finally, DFMA seeks a balance between user and manufacturing since its focus is on production.

2.1.2 Creation Methodologies

From the definition "Methodology can be defined as a word derived from "method", from the Latin "methodus" whose meaning is "path or the way to accomplish something", method is the process to achieve a certain end or to reach knowledge. Methodology is the field in which one studies the best methods practiced in a certain area for the production of knowledge (SIGNIFICADOS, 2020). Thus, it is understood that the term methodology is related to a way of solving a problem through empirical or scientific knowledge.

The SCRUM methodology is an agile process for managing and controlling project development, a process that controls chaos resulting from conflicting needs and interests, is scalable from small projects to large enterprise-wide projects, is a development process iterative and incremental (FERREIRA, 2005).

About Lean Startup, Ries (2012) defines the methodology in 5 basic principles: (i) The entrepreneur can be in a company or in a startup, as long as he is creating products and services under conditions of extreme uncertainty; (ii) A startup is an institution that requires specific management for its context of extreme uncertainty; (iii) Startups must first of all learn. That is, the startup's objective is not simply to make money, it is to learn how to develop a sustainable business model; (iv) The Lean Startup methodology is based on the build-measure-learn cycle, so when creating new products, the startup must measure how customers react and decide whether to maintain the strategy or pivot; (v) To measure progress, traditional metrics should not be used.

Finally, in a more detailed analysis of the Kickbox, Santos (2015) defines it as a process to encourage creativity in corporations through a closed box that should be opened whenever the co-worker has an idea, when he opens the box he will find post-its, a chocolate bar and the most important $ 1000, to implement his idea, so the company besides encouraging creativity internally in your company it is willing to partially fund ideas with development potential.

In this brief review, it is possible to verify three different methodological proposals. While Lean startup is used for entrepreneurs who are developing a product amidst several uncertainties, Kickbox presents itself as an incentive for projects with higher risks, presenting itself as a proposal for calculated risks, Scrum presents itself as a methodology for different and varied projects based on an iterative and incremental approach. Thus, these methodologies are understood as extremely important tools to enhance services and products.

2.1.3. Creation Tools

A tool can be understood as any instrument that is used to carry out a job. Thus, it is understood that the term tool refers to the instrument used to implement an approach or methodology.

In a more detailed investigation about the tools of creation, the Mind Map is listed (Figure 1). It is identified as a structure of multiple connections that facilitates the registration of various elements that arise in the mind in an unusual way. In this way, mind maps allow overcoming the difficulties of organizing a lot of information and some blockages of linear writing through a set of images, words, colors and arrows that articulate thinking (CORREIA, 2010).

Figure 1 - Mind Map Structure



Source:Okada (2004)

Another tool widely used in ideation processes is the Brainstorm which, according to Monica (2017), for a brainstorming session to be effective, that is, for a large amount of ideas to be generated in the face of a theme or a question asked, it is important that certain rules are followed:

i. withholding criticism and pre-judgments: at the beginning of the session, while ideas are being expressed, none of the participants should make criticisms or pre-judgments, even though some idea may be inaccurate or even absurd. The evaluation of the ideas listed should be carried out only in a second stage of the session .

ii. fly and dream: this means that the participants must put aside restrictions on free thinking i n order to try to overcome common sense and preconceived ideas. This is even more important in the case of tasks that involve creativity or problem-solving.

iii. put emphasis on quantity: the greater the number of ideas, the better. This makes it easier and richer to select and sort ideas.

iv. document all ideas: everything that is said in the session should be recorded and exposed

to the participants. Even ideas that seem trivial or redundant.

v. combine and refine ideas: right after listening to all the participants, it is important to give them the opportunity to complete or clarify some of the ideas presented, if they think it necessary.

Finally, there is the PMI(Plus, Minus, Interesting) tool that, For Portmann (1992), is intended to direct the thinker's attention to those aspects that might otherwise be ignored." Doing a PMI consists of looking in the direction of Plus, Minus, and Interesting, and devoting roughly equal time to exploring each of these directions. PMI "is always from the point of view of the thinker who applies it (Portman, 1992)."

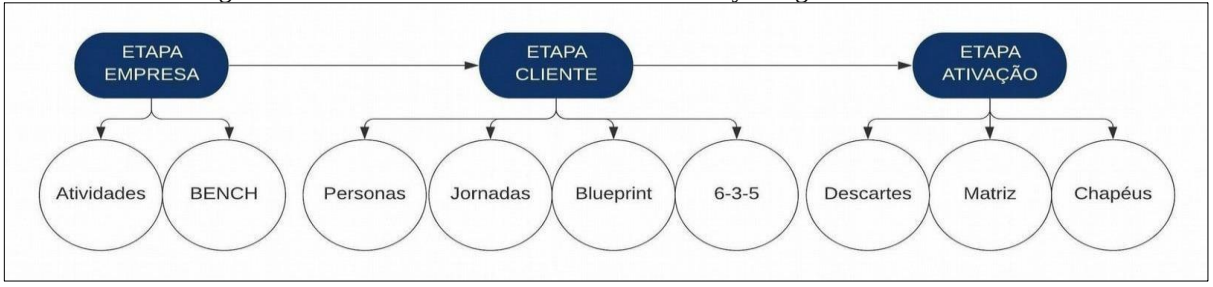
It is possible to notice that the tools addressed intend to innovate and look at other aspects of the problems commonly addressed. Mind maps as a tool to facilitate the understanding of projects, while Brainstorming is characterized as a tool for exploring creativity through the exposure of ideas, and finally PMI is characterized by having an overview of the project with different views in areas of the project that would not commonly be observed.

2.2 CREATIVE FRAMEWORK

The Creative Framework used in this research was developed by Designer Cristiano Alves from the Federal University of Santa Catarina and can be seen in Figure 2. It can be seen that the framework has as main focuses and activities the following topics: understanding the company and its business segment and domain (Company Stage), Perspective of the client who uses the company's products or services (Client Stage) and management:mechanics for the activation of applicable ideas (Activation Stage).

The Framework for its application requires 5 components, which will have the mission to act as a team with the objective of obtaining the best results. It is important to note that the components that will be applying the framework together do not need any prior knowledge, nor do they know each other. The application of the framework occurs in timed steps in times of 5, 10, 15 or 20 minutes according to the needs of the step that is being executed.

Figure 2: Illustration of the Creative Framework by designer Cristiano Alves



Source: Alves (2020)

2.2.1 Stage Company

The first step in applying the framework is to understand the company and its business domain by identifying its core activities. To do this, the following questions must be asked: What is the company's business? What is the goal of this business for the customer? What is the main value proposition to deliver value to the customer? What are the vital activities that the company performs well? What are the vital activities that the company invests time and money in to provide value? Through these central questions we understand more broadly the context to which the company presents itself and can define the four core activities of the company.

To complete the first stage of the framework there is the Benchmarking activity. For Cima (1996) it means the establishment of a practice, data collection, objectives and buyers, with which it is possible to identify certain levels of performance. Through the adoption of the best practices identified it is supposed to improve the performance of certain areas of the company.

2.2.2 Client Step

The second stage of the framework's application is the customer- focused stage, in which customer profiles that would be the company's target audience must be identified and understood.

The activity of defining personas related to the company is characterized as the initial activity of this stage, in which fictional characters that would be the company's target audience must be created. When starting the creation, the following guidelines must be defined: Who are the company's customers? How do they interact with the company? Describe them as people and make them real with such characteristics as gender, age and profession.

As a subsequent activity of the framework there is the definition of the user journey, in this activity you should create a schedule for the personas created in the previous activity, when creating this schedule for a day you should raise the following questions: How does he get in touch with the company in his routine? What are the pains of this persona? What are their emotions? What are their joys?

Lovelock (2011) defines Blueprint as another form of detailing processes and a way to visualize their stages. It consists of a schematic and detailed visualization, allowing the deepening of the processes through which a particular service passes, ensuring greater visibility, which leads to facilitate improvements and perception of failures or gaps in the service delivery process. The third activity of this stage focuses on the mapping of process interactions through the Blueprint tool, mapping the service delivery processes, finding gaps and determining value propositions.

Paldês (2017) defines the 6-3-5 as a technique in which it is possible to have everyone giving their opinion freely and without intimidation from leaders. Therefore, through this technique, it is possible to have a cooperative of ideas free of judgments in an extremely dynamic way through temporizations.

2.2.3 Activation Step

The activation stage is characterized by being a stage in which the ideas generated in the previous stage have to be filtered and the value that these ideas add to the business analyzed. Through discussions and analysis the best results are obtained.

Thus, there is the discarding activity, in which the group must discard the ideas that do not make sense within the context, on average 40 to 50% of the ideas generated in the previous step must be cut. Subsequently, the matrix Ideas x Pains must be made. In the matrix generated should analyze the chosen ideas and evaluate what benefit impact each idea would have on the journey of the personas created and thus evaluate the most effective ideas according to the matrix score.

Finally Bono's 6 Hat Technique is applied. The problem is divided into its different aspects (hats). At each moment, the group "wears" the hat chosen by the facilitator and directs their thinking according to the point of view determined by the color of the hat.

3 METHODOLOGY

To perform the scientific and technological mapping of this study, the Google Scholar search base was consulted. The queries were conducted from August 2 to August 4, 2020. The expressions used were "Creative Approaches", "Comparison between Design Thinking", "Creation Methodologies", "KickBox", "Scrum", "Lean Startup", "Creation Tools", "PMI", "Mind Maps" and "Brainstorming" as shown in Table 1 below. For the research we did not use restrictions as to the date of publication.

Table 1. Expressions used to perform the database queries.

Database	Expression
Google Scholar	"Creative Approaches" "Comparison between Design Thinking" "Creation Methodologies" "KickBox" "Scrum" "Lean Startup" "Creation Tools" "PMI" "Mind-maps" "Brainstorming"

Source: Authors (2020).

Additionally, the Creative Framework was applied, described in section 2.2, developed by the designer Cristiano Alves from the Federal University of Santa Catarina. The application of the framework

had 5 components from different areas of knowledge, namely: Biomedical Engineering, Biology, Information Technology , Design and Management. The components interacted in a mechanism of cooperation and in timed steps with an average of 5, 10, 15, and 20 minutes with the objective of obtaining the best results for the potentialization of the study.

4 RESULTS AND DISCUSSION

With the support of a multidisciplinary team, the Creative Framework was applied to a customer retention business model.

4.1 CUSTOMER RETENTION BUSINESS MODEL - CASE STUDY

In every business, acquiring and maintaining customers is a strategic and valuable factor for any company, not only to increase profit, but also to increase the added value of its products. This business model has as its main focus the study of a customer maintenance model, by reducing the churn rate. According to Campomar (2006), churn is the act of a customer abandoning a company's service, usually in favor of a competitor, ending the relationship with the previous company.

This business model aims to build a tool, entitled "ChurnAnalytcs", which should model the probability of customers leaving the relationship with an organization using customer/company relationship history data and deep data analysis and AI (Artificial Intelligence) mechanisms.

Monard (2003) defines Machine Learning as an area of AI whose goal is the development of computational techniques on learning as well as the construction of systems capable of acquiring knowledge automatically. A learning system is a computer program that makes decisions based on experiences accumulated through the successful solution of previous problems.

The tool built will work through a deep data analysis with the help of data mining and machine learning mechanisms, thus being able to predict which customers are about to leave the company.

The vast majority of health insurance companies are located in this context, which aims to retain and build customer loyalty. These operators use databases to store information about their routines, services, and internal processes, but the vast majority of this data is not used or is used incompletely, thus losing its potential to generate value and decisive strategies in favor of the company.

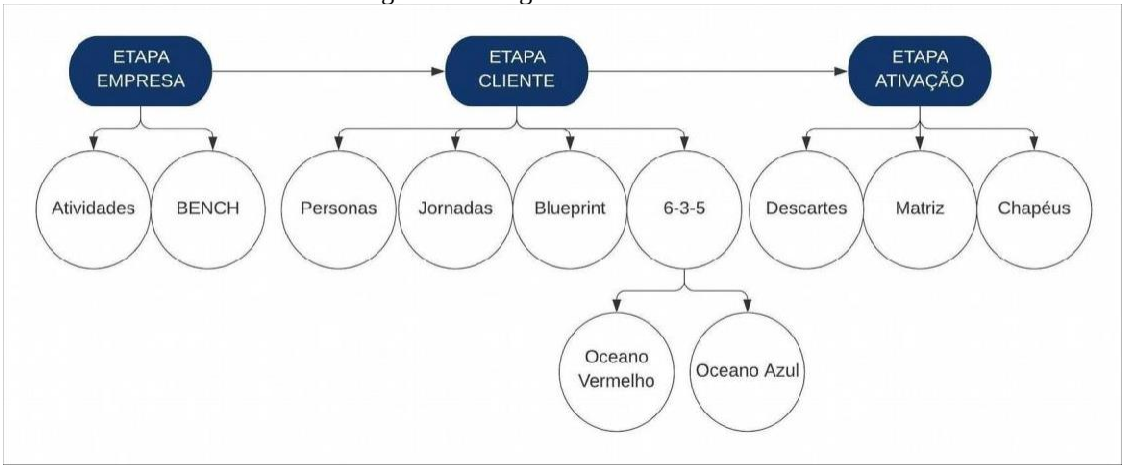
The proposed tool is aimed at companies that work with customer loyalty, as long as the company has a database with relevant information so that the tool can survey the company's customer profile, as well as a possible prediction of evasion.

4.2 FRAMEWORK APPLICATION AND ENHANCEMENTS

With the wide range of different approaches to the creation and conception of products, projects, and services it is understood that several contributions can be made to the framework addressed. The application of the Creative Framework resulted in the addition of 12 ideas that can be absorbed by the business model, case study.

Additionally, improvements were made to the Creative Framework, described in section 2.2: the addition of the EOA (Blue Ocean Strategy) approach. The addition of this approach in particular within the Customer Stage in activity 6-3-5 has the potential to add a gain to the framework, since when thinking about idea activation one must think not only about the target audience to which the product W W or service is included but also about new oceans new markets to which the product or service can reach, Figure 3 illustrates in a flowchart what this change would look like.

Figure 3: Changed framework scheme



Source: Authors

At first, from the application the modified framework, one can observe the immense contribution that can be given when there are different points of view of people from different contexts to those who were in the original conception of the project. Therefore, the application of the framework validates its fostering of creativity and innovation in projects. Gun (2019), offers the following parallel:

> "Creativity arises from the diverse repertoire. It is unlikely that someone who has the same inputs will make different outputs."

Another important point, verified in the experiment of both the original and the modified Creative Framework, is the fact that all 5 participants attest to the validity of the proposal and its innovative content. It is also interesting to mention the fact that one of the participants in the experiment has worked actively

with customer retention in a call center environment and reported that he was not aware of any market tool with the completeness of ChurnAnalitycs.

After the application of the 6-3-5 technique, a technique that allowed a cooperative approach of ideas free of judgments in an extremely dynamic way, through temporizations, with the collaborators of the experiment, a total of 20 distinct contributions to the project were obtained. From this vast range of contributions we can classify 13 contributions identified within the "Red Ocean" in which there are already many similar initiatives and a lot of competition, and 7 contributions in other contexts related to the proposal. characterized as "Blue Ocean" contributions, which can be widely studied and applied.

At a later moment, within the dynamics of the framework, the Bono Hat technique was applied to the project and important feedbacks were obtained, according to different visions and interpretations in which the problem is involved. In general, the technical part of the solution was well received by all participants. However, it is important to mention that the different viewpoints caused other problems related to evasion of health insurance customers to be exposed and, in this way, it is possible to reflect on the beyond predictions and diagnoses, reaching the resolution of deep problems related to this segment.

5 CONCLUSION

We conclude the validity of this work, where we had as main points the survey of approaches, methodologies and creativity tools, in a second moment we study the Creative Framework that is applied and propose improvements, within the case study a customer retention model for health insurance carriers.

We emphasize the validity of the experiment because through the application of the Creative Framework and its modified version, we obtained different points of view organized in a systematic and timed manner in order to enhance the business model, case study.

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Chapter 70

Mobile: the danger is in your hands

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ABSTRACT
The insertion of smart mobile phones (smartphones) brought changes in people's routine and the importance of these machines lies in the impact they have on human beings. Objective: to identify the harmful effects of excessive use of smartphones in the hospital work environment. Method: This is a series of cross-sectional cases with a descriptive/exploratory approach. Results: In the hospital environment, excessive smartphone use can interfere with professional productivity, cause repetitive strain injuries, lead to infections and generate serious errors due to negligence.

Keywords: cell, hospital environment, nursing, technology.

1 INTRODUCTION

Throughout history, man's life has changed due to the great revolutions experienced by humanity, many of them driven by new technologies. There is a huge chasm between a generation that not long ago thought in a linear and completely mechanized way, giving way to a digital generation characterized by flexibility and agility of thinking. (ZAREMBA, 2014).

In an era of great technological advances, a generation grows up in a digital world, familiar with mobile devices and real-time communication. The insertion of smart mobile phones (smartphones) brought

changes in people's routine and the importance of these machines lies in the impact they have on human beings. (DUARTE e ALFREDO, 2018).

The use of smartphones has expanded in the most diverse actions of everyday life. In addition to making day-to-day life easier, saving time and resources on various tasks, it provides permanent contact with people, even virtually. All this, added to the ease of updating at every click, as well as the possibility of enjoying various forms of virtual entertainment, make smartphones friends inseparable. So inseparable that we often don't realize that at the same time their usefulness is as beneficial as it is dangerous. (ZAREMBA, 2014).

When talking about its use in the hospital environment, Caveião et al, 2014, in their research, showed that our digital friends can be great enemies when it comes to contamination. They are true walking microbiological sources. As if the consequences on the body itself were not enough, they can have an impact on the results of our activities.

Musculoskeletal problems arising from poor body positioning while using devices, several hours a day, have increasingly caused injuries to professionals, as in an attempt to compensate for physical absence and direct contact with family and friends, they view virtual connection as a solution. In this way, the hours on duty become less boring and tiring when we have the ability to abstract a little from this exhausting routine. (DUARTE and ALFREDO, 2018).

Andrews, 2003, brought the concept of cybernetic stress associated with the use of smartphones as a syndrome caused by overstimulation to which people are exposed daily, where each subject responds physiologically in a unique way. It's as if the time we spend on our routines wasn't enough to handle so many activities and smart mobile phones have arrived to reduce physical and temporal barriers with just a few clicks.

Giving each individual the possibility of taking the world into their own hands opens up a range of opportunities in all spheres of their existence (political, economic and social), added to this ease comes the immediacy in solving problems that can sometimes frustrate and compromising people's quality of life, generating anxiety disorders, depression, feelings of loss, restlessness, feeling that something is missing. (SALES, SILVA and LIMA, 2018).

Since the emergence of the Internet on smartphones, issues related to the possible harm that the new medium could have on the individual began to emerge. The alert was given and since then studies on topics such as dependence and isolation have been discussed.

Internet addiction is a symptom that is difficult to measure and diagnose. However, we can compare it to the dependence that comes from a chemical factor. And this is the key point of research involving the Internet. (SÁ, 2012)

Then comes the addiction (compulsion) for the internet, which is nothing more than a disproportionate and maladaptive use of the tool. According to Pujiol et al, 2009, it took psychiatry a few years to assume Internet addiction as a disorder, as it was understood that, scientifically, it was complicated to relate addiction to non-chemical factors.

Another disorder that has become a major concern in the 21st century is nomophobia, derived from the English no mobile phone phobia, which is defined as the disproportionate fear felt by the individual when seeing the possibility of not connecting to the virtual world, and this absence it can cause physical symptoms such as shortness of breath, anxiety, tremors, sweating and even panic attacks. (SOUZA and CUNHA, 2017).

Internet addiction can be compared to the use of alcohol and other drugs. According to Young (1997), internet addicts tend to have depression, anxiety and emotional problems, therefore, they use the internet to meet unmet needs.

Bragazzi and del Puente, 2014, state that people who suffer from nomophobia feel terrified when they imagine leaving for work without their cell phone, or when they lose their mobile device, or when it runs out of battery. They reach a critical level of anxiety because they feel isolated from the world due to the need to be connected all the time.

In the workplace this association is dangerous and in the hospital environment it is no different. The study on the subject is justified by the fact that health professionals are increasingly absorbed in a strenuous routine where they allow the use of smartphones, sometimes excessively without realizing that their actions put them at risk. their physical and mental health, and may also affect and endanger the health of patients. Given the above, the study aimed to identify the harm caused by the excessive use of smartphones in the workplace.

2 DEVELOPMENT

2.1 METHODOLOGY

This is a series of cross-sectional cases with a descriptive/exploratory approach.

2.2 RESULTS

The research had the participation of 20 (twenty) nursing professionals (07 Nurses and 13 Nursing Technicians), aged between 25 and 40 years, in an emergency from April to June 2020. study, all professionals had to affirm the use of a mobile phone during working hours and accept to participate in the research with their own collection instrument after filling out the Free and Informed Consent Form (TCLE).

Of the higher education professionals, 01 (one) was male and 06 (six) female. When questioned about the use of smartphones during working hours, all professionals stated that at some time of the day

they took out their phones to make private calls or for their own entertainment, whether in social networking applications or virtual games. All justified the use of the telephone as the fastest way to solve problems and relieve day-to-day tensions. Of these, 57% do not establish criteria for its use, as they did not associate the use of the instrument as something harmful during the workday. When questioning the average time these devices are used, 14.5% spend between 10 and 20 hours a day connected, on the other hand, 28.5% who spend between 1 and 5 hours a day are part of the group that establishes certain criteria for your use.

When asked about answering calls before or after procedures, all of them said answering calls, as everyone considered that simple procedures would not be impacted by a more important call, but in procedures with a greater degree of complexity or matters that can be dealt with later, calls are left for later. When questioning whether the professional has ever found themselves stretching their necks after using their smartphones, 85.5% said they stretch frequently, especially those who spend more time fixed on their phones and when asked about osteoarticular pain, all said they felt pain in the spine , mainly cervical and thoracic, shoulders and hands, one professional even reported that she was diagnosed with tenosynovitis due to cell phone abuse.

They were also asked if they used any type of protection on the devices and if they did some type of disinfection when leaving work, all denied any care in this regard and admitted that it amounted to a lack of attention with the device and with their own health. .

Among mid-level professionals, the results were not so different. Among nursing technicians, 02 (two) were male and 11 (eleven) were female. All of them use smartphones during working hours, but none reported establishing criteria for their use. As for the time spent using the devices, 77% spend between 6 and 10 hours a day and 23% spend between 10 and 20 hours connected, even if intermittently. Similar to higher-level professionals, they all receive calls before or after procedures and invariably had similar feelings in thinking that receiving calls before simple procedures does not generate impacts or affect patients' lives in any way.

When asked about stretching after prolonged use of the device, 84.6% said they felt this need and when asked about feeling osteoarticular pain, all said they felt some kind of pain, spine and hands were once again identified as the most fragile. None of the professionals interviewed uses protections on their cell phones, or disinfection at the end of the day, one professional stated that he did not think it was necessary and two others said not to do so as not to damage their devices.

3 FINAL CONSIDERATIONS

The lack of criteria for the use of cell phones in the work environment is frequent and, given these facts, seeking in this universe of circumstances what directly affects the health of the worker is aggravated

by the fact that it is not an occupational risk, it is ourselves who we produce these risks, and consequently we are directly responsible for their effects.

Neck, hands and shoulders pointed out as the most fragile body parts by the abusive use of cell phones shows that there is a harmful relationship for the professional.

In the hospital environment, excessive smartphone use can interfere with the professional's productivity, cause repetitive strain injuries, lead to infections and generate serious errors due to negligence.

Establishing criteria for the use of smartphones is a challenge, as first of all it is necessary to make professionals aware of the harmful effects of abusive use of these devices**.**

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Chapter 71

Chemotherapy ambulatory during the covid-19 pandemic – an experience report

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ABSTRACT
In 2020, the world experienced a pandemic outbreak, caused by the new coronavirus, called SARS-CoV-2. The COVID-19 pandemic has ravaged the world with unpredictable speed and intensity. The subsequent weeks proved to be challenging in the care of the cancer patient. The objective of this work is to describe the scenario of assistance during the pandemic in the chemotherapy. This is a descriptive study based on changes in the care flows for cancer patients. With changes, adapting them to the new context and maintaining the quality of care for patients, communication through guidelines has become one of the best tools.

Keywords: COVID-19, oncology, pandemic, chemoterapy.

1 INTRODUCTION

In 2020, the world experienced a pandemic outbreak, caused by the new coronavirus, called SARS-CoV-2, which can cause the disease COVID-19. This with devastating power had not been experienced in the recent past. The COVID-19 pandemic ravaged the world at unpredictable speed and intensity, Teixeira (2021).

The subsequent weeks proved to be challenging for all the routine actions undertaken in the care of cancer patients, whether they are in the diagnostic phase, undergoing treatment, in follow-up or at the end

of life. Action plans were drawn up and, as in any extreme situation, a new order emerged driven by urgency, Trehan (2020).

In the context of the Covid-19 pandemic, in a technical note released on March 30, 2020, the National Cancer Institute José Alencar Gomes da Silva (INCA) recommended that health professionals guide people not to seek health services to cancer screening at the time, reschedule the Pap smear collections and screening mammograms, postponing consultations and exams until when the restrictions are reduced.

According to data from the WHO - World Health Organization, the people most vulnerable to contracting the disease are those aged over 60 years, with chronic diseases such as hypertension, diabetes, asthma, heart disease, neoplasms, in addition to immunosuppressed people. Therefore, cancer patients are a high-risk group in the Covid-19 pandemic, since, in addition to being already vulnerable to infection due to their underlying disease, they are still in an immunosuppressed state, increasing the risk of developing serious biological complications from the virus.

Social isolation was a measure adopted worldwide to prevent the spread of the virus. However, cancer treatment demands interaction with different areas of health, involves contact with different professionals in hospitals, laboratories, reflecting that social isolation cannot be fully applied to these patients, as they need to continue the treatment. This means that social isolation, if fully applied to cancer patients, will result in damage to treatment. (CORRÊA, OLIVEIRA AND TAETS, 2020)

Therefore, the pandemic scenario and the social isolation caused by Covid-19 directly affected adherence to treatment by cancer patients. In this context, the objective of this work is to describe the scenario of the oncology outpatient clinic during the COVID-19 pandemic, pointing out the changes in the care flows to maintain the quality of care in chemotherapy and adherence to the treatment of cancer patients.

2 DEVELOPMENT

2.1 METHODOLOGY

This is an experience report, described by professionals from the Oncology Unit of the University Hospital Professor Alberto Antunes - HUPAA of the Federal University of Alagoas - UFAL. The report refers to the years 2020 and 2021, the period corresponding to the COVID-19 pandemic.

The chemotherapy clinic is part of the Center for High Complexity in Oncology –CACON. Among the antineoplastic therapy performed in the service is the application of classic antineoplastic drugs, hormone therapy, biological therapy, molecular target therapy (monoclonal antibodies), immunotherapy, hematopoietic growth factors, in addition to clinical support medications, when necessary.

2.2 EXPERIENCE REPORT

With the emergence of the new coronavirus pandemic, health spaces needed to adapt their service offer and change the flow of patients with daily actions in order to prevent the spread of the various viruses, based on the contingency plan prepared in March 2020 (FONSECA, 2022).

Thus, the outpatient chemotherapy service of the UONC of the HUPAA needed to specify preventive guidelines against COVID-19, given its peculiarity as a disease with a rapidly evolving respiratory course, and as an oncological treatment service, a contingency plan was necessary in order to of cautious measures being taken without interfering in institutional processes, maintaining the safety of both patients and employees.

Key management strategies for treating cancer patients during the COVID-19 pandemic included clear communication and education about hand hygiene, infection control measures, high-risk exposure, and the signs and symptoms of COVID-19, in addition to the use of masks and screening. (FONSECA, 2022). In this context, communication became an ally of nurses with patients and family members so that adherence to chemotherapy treatment was maintained during the critical periods of the pandemic. In addition to the verbal communication used in the conversation circles in the chemotherapy room and in the instructions given over the telephone, guidance leaflets were made and distributed when scheduling chemotherapy appointments.

In partnership with non-governmental organizations, we carried out an intense campaign to donate fabric masks, which also included hospital employees and several other people aware of the period. The campaign had great reach with the use of technology and dissemination on social networks.

As we are an essential service, our technical and assistance team was maintained, with no redeployment of professionals to serve those seriously ill due to the COVID-19 infection. All remained in the sector of origin and remote work was allowed only for pregnant employees. As a result, first-time oncology appointments and treatments did not have to be cancelled.

We redesigned oncology care to mitigate the potential negative effects of COVID-19 infection on patients undergoing treatment, such as screening symptomatic patients, identifying any suspected symptoms of COVID-19 infection, and in case of symptoms the patient was promptly referred to the respiratory isolation room while awaiting medical evaluation for therapeutic adjustments. In order to reduce the flow of patients in the service, we make available to patients the scheduling of medical appointments and chemotherapy sessions by telephone, guided by a professional nurse specialist in oncology.

As well as the availability of conditions for hand hygiene at the entrance, temperature measurement, and essential wearing a mask throughout the stay in the sector. Then, the patient and companion were directed to another environment, respecting the minimum distance of one meter between people, which led to structural modifications and the resizing of chairs and distancing between them, combined with more

frequent cleaning.

3 FINAL CONSIDERATIONS

With the change in the flow of patients, the objective of protecting professionals and users who sought the oncology outpatient clinic was achieved. Communication was an essential tool to guide patients and staff to the new context, considering the seriousness of the situation and maintaining the quality of care for cancer patients. In view of this, the institutional protocol addressed clear recommendations following reference institutions, taking into account the safety of patients and professionals without suppressing the quality of care provided.

The crisis caused by COVID-19 led to changes, causing some of the recommendations of the contingency plan from the time of the pandemic to remain. Oncology centers have updated to the new imposed reality and the new forms of conduct that prioritize the best patient care, ensuring their safety, were maintained.

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Chapter 74

Non Ionizing Radiation in Urban Areas: Modeling of Electric Field Intensity from TV Broadcasting Using Multivariate Statistics Regression

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ABSTRACT
The Electric Field Intensity is one of the fundamental parameters to assess the exposure of human beings to Non-Ionizing Radiation (NIR). Although the major concern of environmental control bodies is with mobile telecommunication systems, this work highlights the attention which should also be given to the radiation emitted by television broadcast towers, which utilize higher power levels with continuous emissions.Measurements of downlink far electric field intensity with frequency ranging from 30 MHz to 3 GHz were made in a survey of 160outdoor points spread across all the 170 km2 area of Natal (a city of about 853.000inhabitants in northeast Brazil). The results obtained indicate that in 73.6% of the sampled outdoor points, the highest downlink electric field intensitiesmeasured were originated from TV broadcasting services, compared to 20.1% from Mobile SystemsTowers, 6.3% from Frequency Modulated Broadcasting and 0% from WLAN (IEEE 802.11bg). Based on these findings, a model is presented to estimate the intensity of the mean electric field at any given point of the city's urban area generated by TV radiation emissions at VHF and UHF bands. Four distinct areas of the city were considered, basically adjusted to the azimuths related to the main tower concentration place. The modeling was done using the Statistical Multivariate Regressiontechnique, the Electric Field Strength was the dependent variable, the independent variables were the Distances of points to the transmission towers. Database was used with samples of measured values of Electric Field and their Distances to the TV transmission towers. The solution reached to estimate the electric field can be adapted for use in other cities. Detailed mapping of the electric field intensitiesmayensurebetter preventive conditions to monitor the degree of NIR exposurein each area and simplify evaluation procedures for the licensing of telecommunication stations.

Keywords: Non-Ionizing Radiation, Statistical Multivariate Regression Technique, Health.Impacts , TV Broadcasting; Measurement of Radio Frequency Radiation.

1 INTRODUCTION

In Brazil, the Federal Law 11.934/2009 sets the limits of human exposure to electric, magnetic and electro-magnetic fields, associated with the functioning of radiocommunication transmitting stations, user terminals, and electric power systems at frequency bands ranging from 9 KHz to 300 GHz, seeking to ensure protection of human and environmental health (ANATEL,2002). The Brazilian norms follow the recommendations of the ICNIRP (InternationalComission on Non-IonizingRadiation), an organization recognized by the WHO (World Health Organisation). The major concern of environmental control bodies with regard to Non-Ionizing Radiation has been translated into the requirement of previous licensing for

the establishment of Mobile Systems Base Stations, but there are other relevant sources of NIR (Non-Ionizing Radiation). Other services, such as TV and Radio Broadcasting, also contribute to the exposure to NIR (WHO, 2002).

In December 2019, there were 226.6 million mobile accesses functioning (not including iPads and similar gadgets), which correspond to 107.4 accesses in operation for every 100 inhabitants (TELECO, 2020). According to the data provided by ANATEL, the city of Natal (the capital of the state of Rio Grande do Norte), in November 2015, possessed a total of 882 Mobile Systems Radio Base Stations, 18 open TV Stations, 17 FM Radio Stations, 6 MW (MediumWave) AM Radio Stations. Experiments designed to study the interaction of electromagnetic fields and radiation with biological systems and the possible effects of such fields on the system can be divided into three categories: (1) in vitro biological experiments, (2) in vivo animal experiments, and (3) laboratory or epidemiological studies on humans (LIN, J.C., 2016).

The scientific knowledge about the effects on human health of the exposure to electro-magnetic fields is considerable and based on a vast number of epidemiological studies (FRIEDMAN, J.K. et al., 2004). Heating is the main biological effect caused by the non-ionizing radiation. The levels of exposure due to the fields generated by radio stations normally are below the limits that could cause significant heat. The present debate is centred on whether long-term, low level exposure below the exposure limits can cause adverse health effects or influence people's well being (WHO, 2002, AESS, 2020).

Many health outcomes ranging from reproductive defects to cardiovascular and neurodegenerative diseases have been examined, but the most consistent evidence to date concerns childhood leukemia on low frequency (ELF-EMF) fields exposition. On the basis of statistical associations observed in epidemiology, the International Agency for Research on Cancer (IARC) in 2002 ranked the ELF-EMF in category 2B: possible carcinogen for humans (IARC, 2020).

Studies demonstrated that microwaves emitted from the cell phone, i.e. RF-EMW, do not produce thermal effect at specific absorption rate (SAR) of 1.6 Watts/kg. However, researchers have demonstrated that RF-EMW from commercially available cell phones have non-thermal effects. The literature contains controversial reports on the effects of RF-EMW on mitochondria, apoptosis pathway, heat shock proteins, free radical metabolism, cell differentiation, DNA damage and the plasma membrane (IARC, 2020). Capri et al. (2004), demonstrated that exposure at a frequency of 900 MHz was associated with a significant growth in annexin-positive human lynphocytes. Friedman et al (2004) proved that NIR may lead to carcinogenesis. This work aims to highlight the attention which should also be given to the radiation emitted by television (TV) broadcast towers, which utilize higher power levels with continuous emissions.

2 METHODS AND MATERIALS

2.1 MODELLING OF THE ELECTRIC FIELD GENERATED BY TVS

Considering the finding that the greatest contribution to electromagnetic pollution in the city of Natal stems from the radiation emitted by the TV stations, and that, unlike the radiation emitted by the cellular stations, and that, there is a considerable variation in the intensity resulting from the stations TV in different areas of the city, a model was developed to better characterize the variation of this intensity. The main objective of this modeling is to allow the extrapolation of probable average values of Electric Field Intensity anywhere in the urban area of Natal. The logic flowchart in Figure 1 illustrates the sequence to be adopted, where the four equations can be applied to estimate the Electric Field Intensity in relation to the area where the point is located.

The modelling for the calculation of the Electric Field Intensities using the Multivariable Regression technique is an instrument that can be useful for mapping the electromagnetic non-ionizing radiation in urban areas. Possession of this tool may allow better preventive conditions forenvironmental control bodies to monitor the degree of radiation to which the population is exposed so as to authorize or limit new developments in each part of the city.

The identification of the areas with the highest intensities of radiation also allows for the rational implementation of more frequent monitoring, thus ensuring more reliable preventive data. In an open space propagation environment, the Electric Field Intensity (farfield) generated by the radiation emitted by a transmitter is related to the Power RF received using the equation 1 (LIN, J.C., 2016).

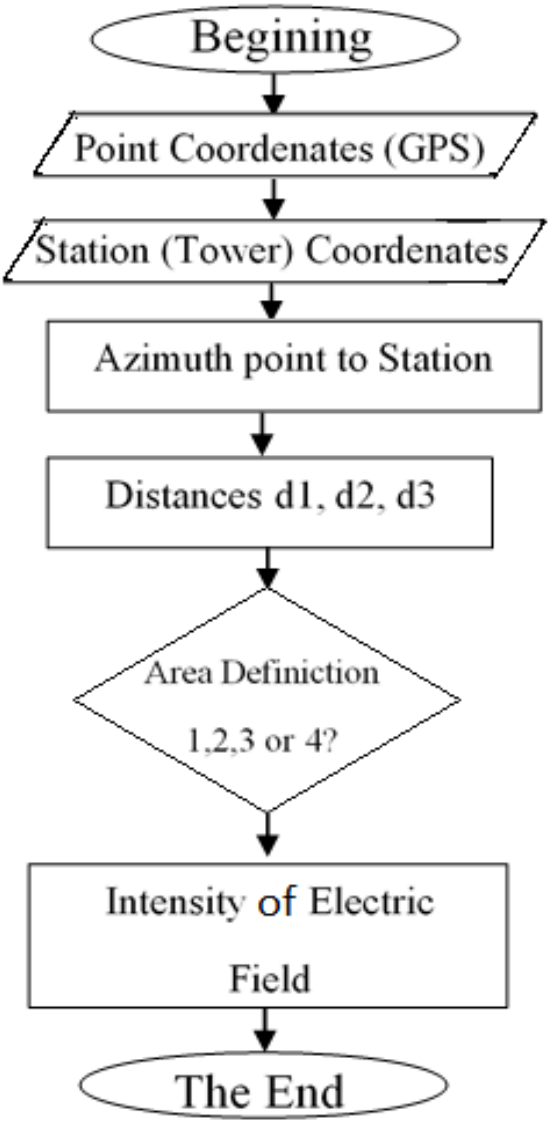
$$P_r(d) = \frac{|E|^2 G_r \lambda^2}{480\pi^2}\ W \quad (1)$$

E: Electric Field Intensity
Pr: RF Power received.
Gr: Gain of the receiving antenna.
λ: Wave Length.

The mean RF Power in environments with obstruction can be represented by the equation 2 (CAPRI. M. et al, 2004).

$$\frac{P_r}{P_t} = \frac{\gamma}{d^n} \text{ (2)}$$

Figure 01 – Logic flowchart for the estimate of the Electric Field generated by TV stations.



Source: created by the authors.

In an open space propagation environment, the Electric Field Intensity (farfield) generated by the radiation emitted by a transmitter is related to the Power RF received using the equation 1 (RAPPAPORT, 2008).

$$P_r(d) = \frac{|E|^2 G_r \lambda^2}{480\pi^2} W \text{ (1)}$$

E: Electric Field Intensity
Pr: RF Power received.
Gr: Gain of the receiving antenna.
λ: Wave Length.

The mean RF Power in environments with obstruction can be represented by the equation 2 (HAYKIN, S., MICHAEL M., 2008).

$$\frac{P_r}{P_t} = \frac{\gamma}{d^n} (2)$$

In equation 2, γ represents the loss in relation to the frequency, the height of the antenna and other factors. The exponent n is the mean attenuation factor in the path. Pt is the output power effectively radiated by the transmitter in a given direction. In relation to equations (1) and (2), and considering Gr=1 (Electric Field Intensity in a given point without the influence of the receiving antenna). The Tabel 1 shows the Patth loss exponent n for different environments (HAYKIN, S., MICHAEL M., 2008)

$$|E| = \frac{21.9}{d^{\frac{n}{2}}} \sqrt{\gamma P_t} (3)$$

Table 1 – Path loss exponent n for different environments

Environment Path loss exponent	**n**
Free Space	2
Rural Area(plain)	3
Rural Área (mountainous)	3.5
SuburbanÁrea (plain)	4 to 6
Dense Urban Área (tall buildings)	4.5

Source: Haykin and Michael (2008)

The intensity of the eletro-magnetic field generated by TVs in any given point in the city will be the result of the vectorial sum of the fields generated from the 3 locations that concentrate all TV transmittors in town (figure 2). The Electric Field Intensity generated by 18 TVs anywhere in the city will be the result of the vectorial sum of the fields generated from the 3 Sites, where all TV transmitters in the city are concentrated. The 18 TV Broadcasting Towers in Natal are found in 3 areas (Sites 1, 2 and 3) located in the East side of the city. The Electric Field Intensity generated by TVs at any given point in the city is the result of the vector sumof the generated fields of the 3 Sites, as shown in Figure 2. This calculation, strictly following the Theory of Electromagnetism, becomes difficult due to the difficulty in finding precise data on buildings, trees, variations of terrain relief, automobile traffic, circulation of people and powers effectively radiated along each RF propagation line.

The Total Electric Field Intensity at any given point in Figure 2 is obtained from the equation (3).

$$|E|_t = \sum_{i=1}^{3} \frac{21.9\sqrt{\gamma P}_{ti}}{{d_i}^{n/2}} \quad (3)$$

|E|_t: Total electricfiel data given point (V/m), Pti: Effectively Radiated Power by transmitter from Site i towardsthe point locatedat a distancedi. The Powers Ptidepend mainly on the effective power of each transmitter and on the radiation pattern of each antenna. The calculation of the Electric Field Intensity directly using equation (3) at a given point of an urban area is quite imprecise due to the difficulty in obtaining correct data on the characteristics of the obstacles, terrain relief, presence of automobiles and RF powers effectively transmitted in each direction by each antenna. These factors influence the values of n and Ptiin each direction of propagation.

Figure 2 – Location of the TV Broadcasting Towers in the city of Natal (Sites 1, 2 e 3) and illustration of the incidence of the Electric Field Intensity produced by TVs at a given point in the urban area.

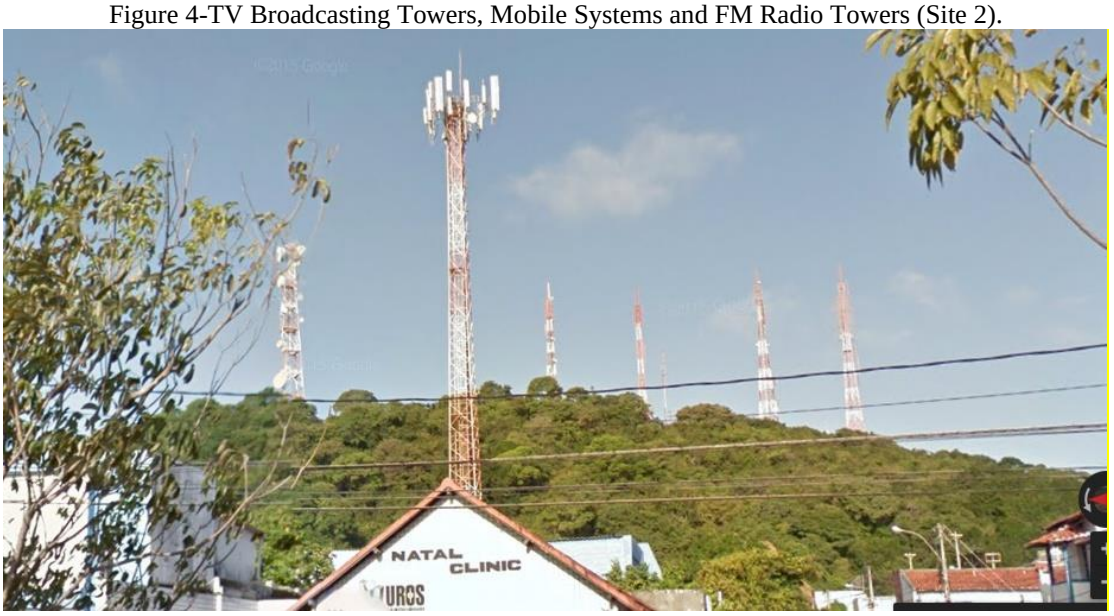


Figure 3A-Towers in MãeLuíza Hill. (Site 1) Figure 3B–Tower in Parque das Dunas (Site3)



Source: Authors

Figure 4-TV Broadcasting Towers, Mobile Systems and FM Radio Towers (Site 2).



Source: Authors

For the modelling of the equationwhich gives us the Electric Field Strenth, the following general expression was used (4)

$$|E|_t = \beta_0 + \beta_1 d_1^{\frac{-n}{2}} + \beta_2 d_2^{\frac{-n}{2}} + \beta_3 d_3^{\frac{-n}{2}} + \beta_4 d_4^{\frac{-n}{2}} + \cdots + \beta_k d_k^{\frac{-n}{2}} \quad (4)$$

There are 20 TV Broadcasting Stations in Natal. 12 of the transmitters are located in the same area of dunes called Morro do Tirol in the East side of the city. The 8 other transmitters are grouped in 2 other areas also in the East portion of the city. Thus, although there are 20 transmitters, it is possible to simplify equation (4) and make k=3. Equation 5 illustrates this simplification.

$$|E|_t = \beta_0 + \beta_1 d_1^{\frac{-n}{2}} + \beta_2 d_2^{\frac{-n}{2}} + \beta_3 d_3^{\frac{-n}{2}} \quad (5)$$

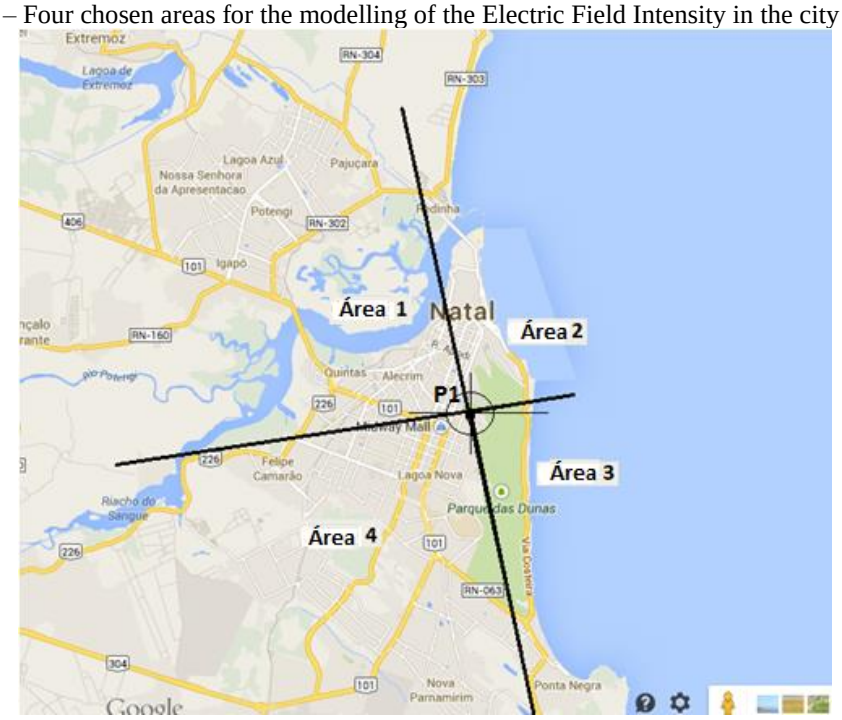
For the application of the Regression technique, the independent multivariables are the distances of each point from the radiation transmitting stations. The identification and location of these were done according to ANATEL's official records. The coefficients $\boldsymbol{\beta}$i were obtained using the Multivariable Regression technique considering 160 samples of electric field intensity measurements (V/m) at several points in the urban area of Natal-RN.

A database was created from the coordinates of each point, the Electric Field Intensity measurements, and the distances to the TV Broadcasting Towers. The estimated coeficients generate the lowest mean squared error of the equation (5) in relation to the measurements performed. The quality analysis of the adjustment was made using the coefficient of determination R2 and p-value. The evaluation

of the results took into consideration the statistical collinearity and made sure that the errors showed a distribution near the Normal Curve (ARANGO, H.G., 2009).

In order to minimize the differences in urbanization and terrain relief, the modelling process was applied separately forthe four distinct areas of the city. These areas were defined according to their azimuths in relation to the main TV tower concentration site, as shown in Figure 5. Thus, each area may present distinct ERPiand attenuation exponent n values. The Table 2 shows delimitation of the four areas for the application of statistical modelling criatede based on information on emitted power was estimated based on the antennas radiation diagrams registered at ANATEL. The point (P1) of highest concentration of TV Towers in the city, the dunes in Morro do Tirol, has the following geographic coordinates: Lattitude (05`0 46` 00``S) and Longitude (350 12`00``W).

Figure 5 – Four chosen areas for the modelling of the Electric Field Intensity in the city of Natal.



Source: created by the author using Google Maps

Table 2 – Delimitation of the four areas for the application of statistical modelling

AREA	AZIMUTHS	% RF POWEREMITTED IN DIRECTION
Area1	252 to 342 degrees	28
Area2	342 to 72 degrees	24
Area3	72 to 162 degrees	18
Area4	162 to 252 degrees	29

Source: created by the authors

2.2 PROCEDURES FOR FIELD MEASUREMENTS

In order to measure the intensity of the electric field emitted by the existing towers and projected onto the population (downlinks), the Services and Frequency Bands object of this study were established according to Table 3. Thus, the measurements were carried out in four distinct groups: Mobile Telecommunication Systems, Television, FM Radio, and IEEE 802.11 Systems (WLANs - Wireless Local Area Networks). In each of the groups, the readings were performed with measurements that captured all the different sources (packages) operating simultaneously in their respective global frequency bands. During the period comprising the execution of the measurements, 882Mobile Systems Base Stations, 23 stations operating in Frequency Modulation (FM) and 18 TV broadcasting transmitters were registered, a total of 939 stations (ANATEL, 2019).

Table 3 – Frequencies and Services measured

Frequency Band (MHz)	**Service**
88-108 MHz	Rádio FM Broadcast
54-72 (VHF Channels 2-4)	TV Broadcast
76-88 (VHF Channels5-6)	
174-216 (VHF Channels7-13)	
470-890 (UHF Channels14-69)	
824-960	Mobile Systems (2G e 3G)
1805-1890	
1975-2165	
ISM 2400 MHz band (*non- overlapping channels 1,6 and 11*)	WLAN (IEE 802.11bg)

Source: created by the authors

The measurements of Electric Field Intensity were performed using the following equipment and accessories: an isotropicprobewith a frequency range from 30MHz to3GHz (directivity close tounity in linear scale), a woodentripod (1.65m), a Rohde& Schwarz FSH6 spectrumanalyzer; a GPS and a notebook computer. The notebook ran proprietary software by R&S to communicate with the Spectrum Analizer. Table 4 summarises the settings of the measurement packages.The features adopted in the measurements are : composition in quadratic fields; polarization through three-axis probe, with measurement in three axes. Short-length cable set, Trace Mode / Detector: Max Hold / RMS. The measurements were performed between 10:00 a.m.and 12:30 a.m. and 3:00 a.m. and 7:30 p.m., in far-field zone in 160 outdoor points covering all districts. Only the downlink emissions were measured.

Table 4 – Settings adopted in the measurement packages

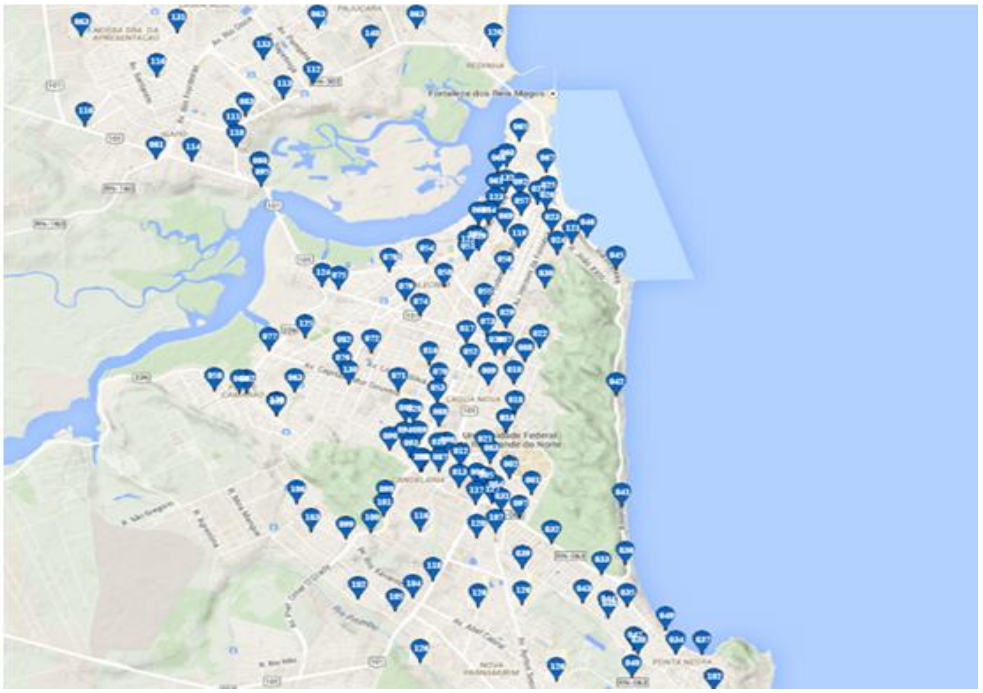
Services / Parameters	**FM Radio**	**IEEE 802.11 b/g**	**TV**	**2G Mobile (GSM)**	**3G Mobile (UMTS)**
Video BW	-	-	Auto	-	-
Dwell time	50 ms	5000 ms	50 ms	1000 ms	50 ms

BW for each central frequence	200 kHz	22 MHz	6 MHz	200 kHz	5MHz

Source: created by theauthors

The Figure 6 show the distribution of the points where the measurements took place. In some uninhabited areas of dunes and mangroves, access for the measurements was not possible. At each point, the Total and PerServiceElectric Field Intensities were measured and recorded. Using a GPS, it was also possible to verify the geographic coordinates which allowed the identification of the Distances in relation to the transmitting towers.

Figure 6 – Location of the 160 points where the measuments of Electric Field Intensities were carried out in the city of Natal-RN.



Source: created by the author using Google Maps

The measurement packets of the software were adjusted according to Rhode &Schwartz User-Manual Instructions: dwell time was adjusted in 50 milliseconds for TV and FM radio, 1 second cyclically over 6 minutes, 13 times each point for GSM /UMTS, and 5 seconds for IEEE 802.11b/g. The RMS mean was computed automatically by the instrument considering all loops. The radio broadcasting services normally present little variation, as opposed to mobile telecommunication systems. The Figure 7 A and B shows the instruments used in the measurements.

Figure 7A–FSH6 Spectrum Analyzer and antenna used Figure 7B–Measurement in a public square.



Source: Rohde& Schwarz (7A) and Athors (7B)

The measurements of Electric Field Intensity indicated that the service with the greatest contribution in the urban area of the city of Natal is the TV. Table 5 shows a comparative summary of the measurements obtained. In 77.2% of the measured points, the NIR from TV Towers were higher than the other services tested.

Table 5- Summary of Electric Field Intensity measurements

Service	Mean (V/m)	Highestvalues (V/m)	% ofhighestvalues
TV Broadcasting	5.14E-01	4.18E+00	77.2
Mobile Systems (2G / 3G)	3.79E-01	4.19E+00	13.0
FMRadio	2.15E-01	1.35E+00	9.8
WLAN (IEE 802.11bg)	1.85E-01	2.24E-01	0.0

Source: created by the author

3 RESULTS

The application of equation 5 to several points in an urban area in which measurements were made resulted in characteristic error equations that relate the values actually measured with those calculated based on the model developed, as explained in (PINHEIRO, 2015). Multivariate regression processes the above model in search of parameters β0, β1, β2 and β3 that enable the minimum square error. This processing is done from the partial derivatives of the quadratic errors. The quality analysis of the adjustment was made based on the determination coefficient R2 (Hair et al., 2005), the critical evaluation of the results took into account aspects of statistical collinearity, and it was also verified that the errors had a distribution close to the Curve Normal.

The Table 6 indicates the best results obtained for the***β***icoeficientsusing the software R (R Development Core Team, 2015). For each area, attenuation exponents of propagation (n) between 2.2 and 3.0 were tested. The table shows the values of n that provided the best R2values. In all cases, the values of $p<0.02$ were excluded: 1 outlier point in area 3 and 2 outlier points in area 1.

Table 6 – Summary of Results Obtained for the Coeficients using Regression Method and the Multivariable Data Analysis (Best results)

Area	β0	β1	β2	β3	n	R2
1	0.1771	1.4838	0.3869	0	2.6	0.998
2	0.1323	0.9714	0.5095	0.4280	3.4	0.999
3	0.0279	2.0840	0	0	3.8	0.997
4	0.179	1.7327	0.3743	0	3.0	0.923

Souce: created by the authors.

Figura 08 – Residual analysis for the best result in area 1.

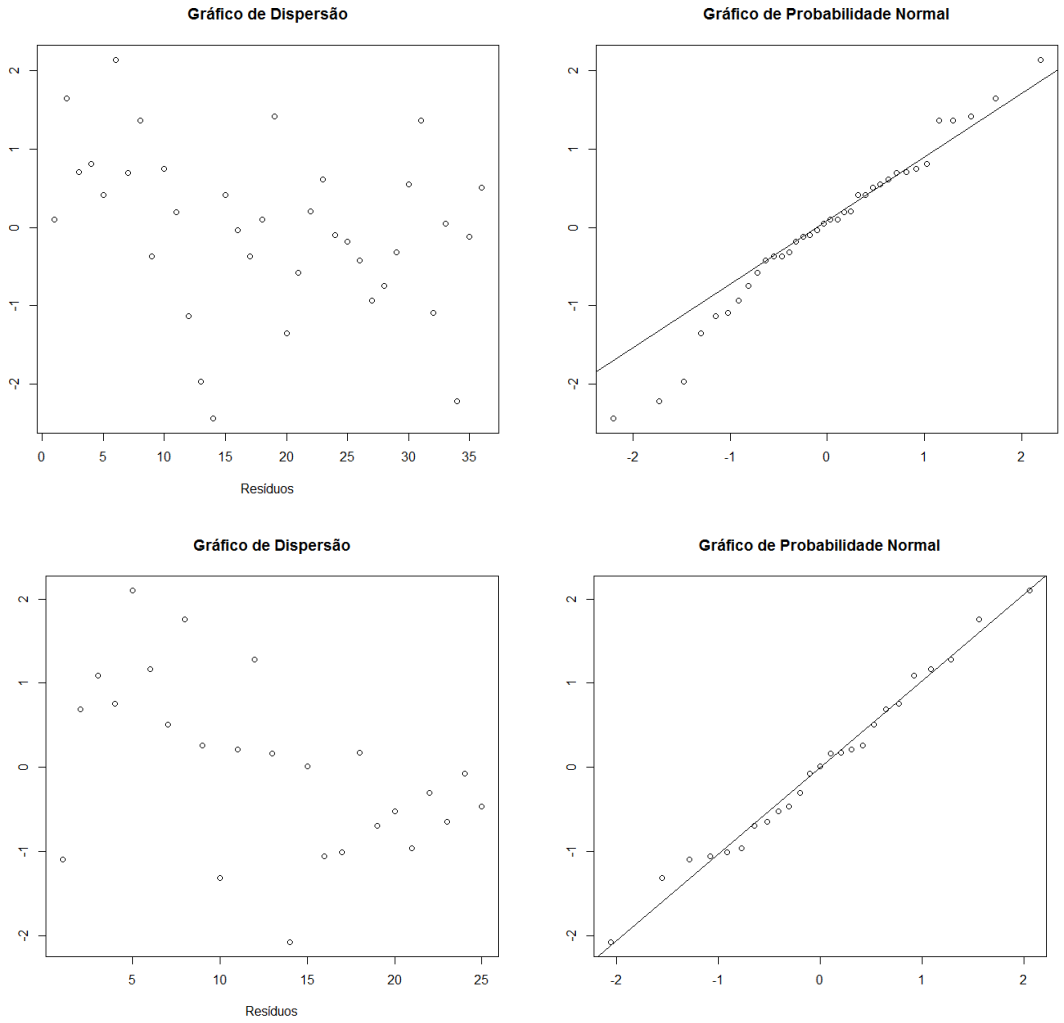


Figure 09 – Residual analysis for the best result in area 2.

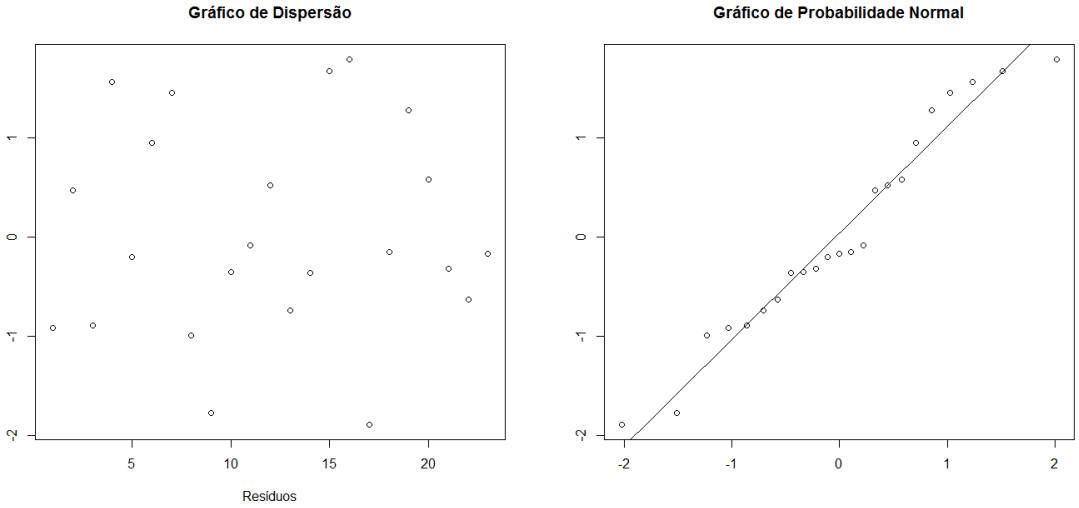


Figure 10 – Residual Analysis for the best result in area 3.

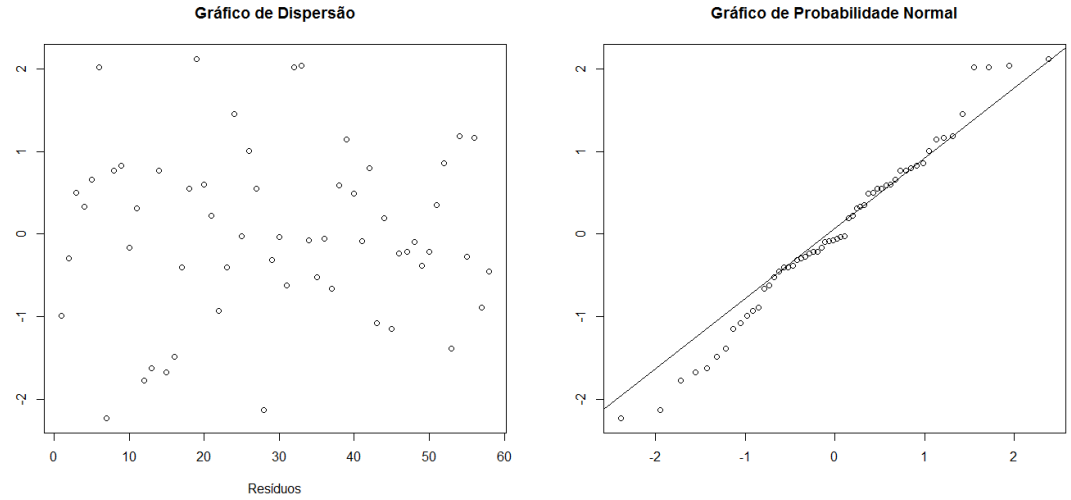
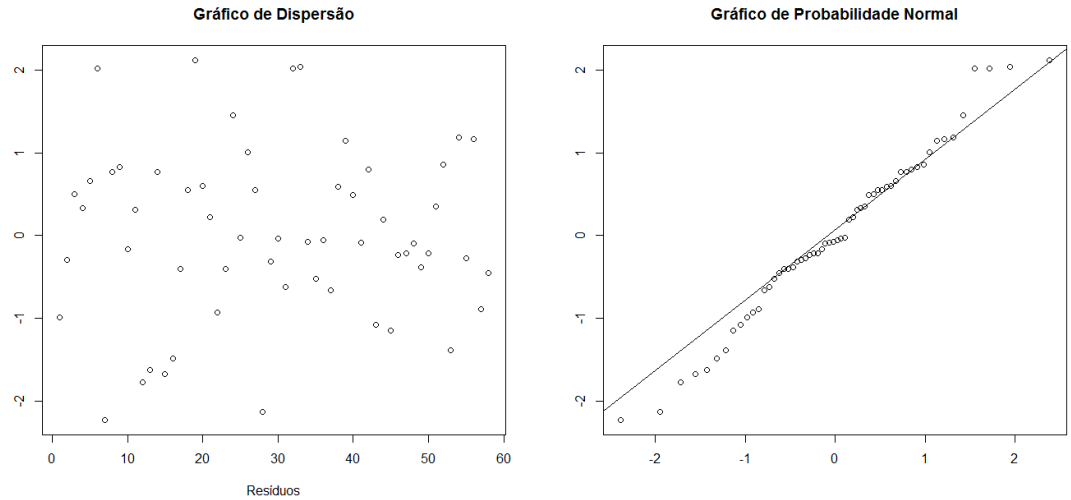
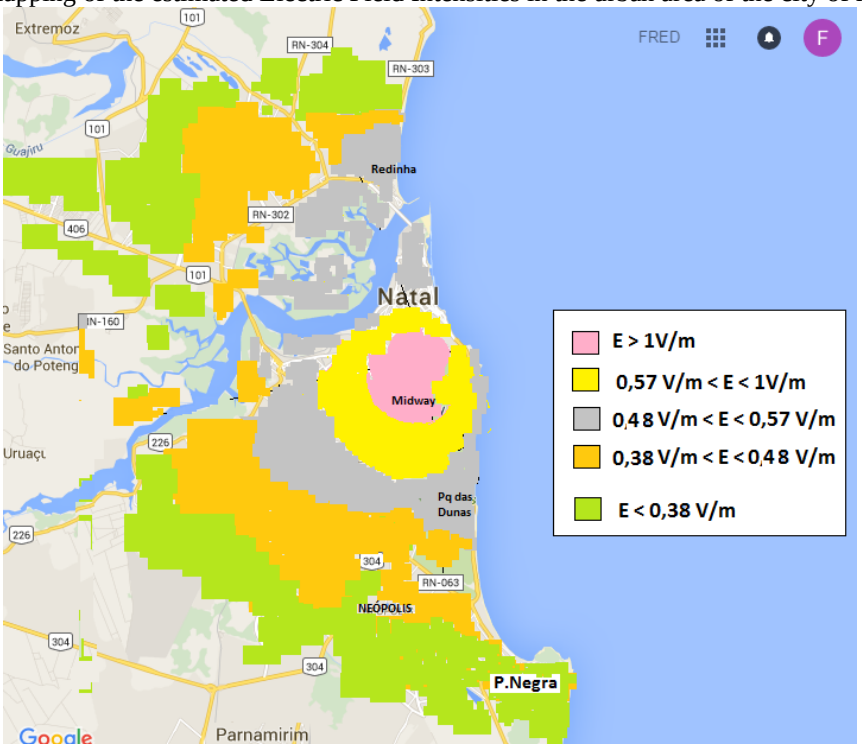


Figure 11 – Residual analysis for the best result in area 4.



In most cases, the open TV stations have fixed power, some exception occur with power reduction during the night time. The use of equation 5 with the parameters estimated in Table 2 made it possible, from the coordinates of any given point located in the city of Natal, to obtain an estimate of the Electric Field Intensity generated by TV stations. The Figure 12 shows the estimated Electric Field Intisity bands based on the results obtained.

Figure 12 – Mapping of the estimated Electric Field Intensities in the urban area of the city of Natal (Brazil).



Source: created by the author using Google Maps

4 CONCLUSIONS

The research produced modeling using the multiple multiple regression technique to define equations whose results allow the calculation of the field generated by the totality of TV transmitters anywhere in the city, with a comparison of the INRs emitted in the city with the exposure limits officially established. The RNI levels measured in the city of Natal are below the safety reference levels established in the legislation. The electromagnetic radiation generated by TV transmitters represented almost half of the total electromagnetic exposure (48.48%) in the city, being also responsible, punctually, for most of the peak values (maximum). Open TV services dominate the composition of the ER even for some points closer to the mobile phone towers.

The model for the calculation of the Electric Field Intensities using the Multivariable Regression technique is an instrument that can be useful for mapping the electromagnetic non-ionizing radiation in urban areas. Possession of this tool may allow better preventive conditions forenvironmental control bodies to monitor the degree of radiation to which the population is exposed so as to authorize or limit new

developments in each part of the city. The identification of the areas with the highest intensities of radiation also allows for the rational implementation of more frequent monitoring, thus saving precius resources.

The application of the model must be fundamentedon the rigorous identification of the coordinates of existing stations and accurate measurement campaigns of the electric field intensity which lead to predictions according to statistical requirement. Some other aspects must be considered in the measurements: the choice of transversal streets, special attention given to areas near schools, kindergartens, hospitals, shopping centers, football stadiums and other points with higher people density. In more dense urban areas with more relevant vertical growth rates, it is recommended that the measurement process be updated more frequently.

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Chapter 75

The influence of manual lymphatic drainage on serum of estrone and progesterone, and in quality of life in women after menopause

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ABSTRACT
Introduction: The period after menopause represents in women's life, a time of big health injuries, bringing a low quality of life. The function of this scientific study was find in manual lymphatic drainage an assistance on improvement of women's life quality and in serum concentrations of progesterone and estrone. Materials and Methods: A sample of four women was used to perform this study, two in hormone replacement hormonal replacement therapy (HRT) and two without HRT, all of them answered a questionnaire on quality of life (SF-36) and were also done laboratory exams on them, one of each subgroup was subjected to manual lymphatic drainage. Results: There was an increase in serum levels of estrone in the women who were donet manual lymphatic drainage, mainly the one that was in HRT, like in some areas of SF-36. Discussion: The two women that had an increase in serum levels of estrone was the same that presented better results on the scores on the questionnaire applied to them, what can be explained by a decrease of symptoms caused by the increase of hormone levels and/or of release of endorphins during massage therapy. Closing Remarks: The women of this study that submitted to sessions of manual lymphatic drainage had an improved in serum levels of estrone and in scores of SF-36.

Keywords: Nursing Care, Hemodialysis Solutions, Nephrology nursing, Kidney.

1 INTRODUCTION

The word menopause was created in 1816, by the French physician Gardanne, to designate the interruption of menstruation that occurs as a result of physiological ovarian failure. Strictly speaking, it would only mean the date of the last menstrual period, which occurs around the age of 50, and can only be retrospectively determined by the absence of bleeding for at least one year. Climacteric is the period immediately before menopause and the years that follow it.1

During the climacteric period, the woman undergoes an endocrine disorder that is expressed by a deficiency of sex steroid hormones resulting from ovarian insufficiency, which leads to pathological consequences in a considerable proportion, also accelerating the aging process.2

The first ovarian hormone whose production decreases is progesterone, with which menstrual cycles become irregular, and there may also be hyperplasia of the endometrium, which leads to a more abundant menstrual flow. Although there is no ovulation, estrogen production still takes place, which explains why many times, in this phase, the only observed change is the modification of the menstrual pattern. The only

necessary treatment at this time is progesterone replacement, to promote the regularity of menstrual cycles and prevent excessive stimulation of the endometrium.1

The two types of ovarian sex hormones are estrogens and progestins. Arguably the most important of the estrogens is the hormone estradiol, while the most important progestin is progesterone. Only three estrogens are present in significant quantities in a woman's plasma: B-estradiol, estrone, and estriol. The main estrogen secreted by the ovaries is B-estradiol. Small amounts of estrone are also secreted, but most of it is formed from peripheral tissues, such as adipose tissue. Estriol is a weak estrogen; it is an oxidative product derived from estradiol and estrone, and its conversion occurs mainly in the liver.3

Estrogen replacement should begin when the woman presents complaints of hypoestrogenism. Usually its first clinical manifestations are hot flashes, heat waves that rise from the trunk to the head, usually accompanied by sweating and flushing, with great discomfort for the patient.1

Hormone replacement therapy (HRT) can offer both benefits and harms to women's health. Among the benefits are the possibility of reducing the risk of developing colorectal cancer and Alzheimer's disease, subjective improvement of cognition and memory (which may be a consequence of improved sleep quality with a reduction in hot flashes), and decreased risk of dyslipidemia, hypertension, and glucose intolerance.1

The fact that TRHM may or may not be harmful to health makes it necessary to look for new forms of therapy to increase the serum levels of these hormones from autologous substances, which could be formed from the human fat itself. A defense mechanism that women have lies in their adipose tissue's ability to effect the peripheral conversion of androstenedione (a steroid hormone that is a precursor of testosterone and estradiol) into estrone.4 The aromatase P450 activity in adipose tissue is important for the production of estrogens, thus, estrone is the second predominant estrogen in the circulation of premenopausal women and the predominant one after menopause.4

According to Guyton (1997), the lymphatic system represents an accessory route by which fluid can flow from the interstitial spaces into the blood. More importantly, lymphatics can transport proteins and high molecular weight material, such as metabolites, proteins, and hormones, out of tissue spaces, none of which can be removed by direct absorption by blood capillaries. It consists of lymphatic pathways (capillaries, vessels, and trunks), lymph nodes (ganglia), and the lymph. The lymphatic system is also one of the main routes for the absorption of nutrients from the gastrointestinal tract, and is mainly responsible for the absorption of fats.3

The lymph has basically the same composition as the interstitial fluid, with the location being the major difference between them. This system has three basic functions: drainage of the interstitial fluid; transport of lipids and fat-soluble vitamins (A, D, E, and K); and facilitate immune responses.5

Manual lymphatic drainage (DLM) is a highly specialized massage method performed with gentle, slow, intermittent, and relaxing pressures that follow the path of the lymphatic system, mobilizing the lymph to the lymph nodes. It drains the fluid accumulated in certain regions, improving circulation and indirectly influencing hormone distribution and tissue oxygenation.6

Oxygen, nutrients, and hormones are delivered to the cells through the blood vessels. The lymphatic system returns plasma (a fluid rich in hormones) to the bloodstream, improves tissue nutrition, including skin nutrition, and prevents fluid retention, among other benefits. These considerations, and many others reported in this project on the subject in question, lead us to evaluate Manual Lymphatic Drainage as an auxiliary therapy to TRHM in order to mitigate and even prevent postmenopausal disorders, improving the quality of life of women who experience these disorders.7

Traditionally, the concept of quality of life was delegated to philosophers and poets; however, currently there is a growing interest among physicians and researchers in transforming it into a quantitative measure that can be used in clinical trials.8 Several studies in Brazil and around the world discuss this concept, which transits in a polysemic semantic field: on one hand, it is related to the way of life, its conditions and styles; on the other, it includes ideas about sustainable development and about human and social rights.9

The Short Form-36 (SF-36) is a quality of life measurement instrument developed in the late 1980s in the USA, translated and validated in Brazil to assess quality of life in scientific studies..9

2 MATERIALS AND METHODS

This is a case study that will evaluate the influence of lymphatic drainage on serum concentrations of the hormones estrone and progesterone and on the quality of life of postmenopausal women.

For this study a sample of four women randomly chosen from the community of Divinópolis was used, two using TRHM and two without TRHM. The control group, made up of one woman with and one without HRTM, did not undergo sessions of DLM, and these women underwent hormone dosage pre and post ten-day period, while the other group, also made up of one woman with and one without HRTM, underwent ten sessions of DLM each, with fifty minutes each session, held daily for ten days, and the laboratory test for hormone dosage was performed pre and post therapeutic intervention. The four women answered a quality of life questionnaire (SF-36), before and after the ten-day period and therapeutic intervention with the DLM. The inclusion criteria were: post-menopausal women, aged between 50 and 60 years; two women in HRT and two not in HRT; no contraindications to the DLM; agree to participate in the research and sign the informed consent form.

The exclusion criteria were: missing the lymphatic drainage session for two days; not fitting into the inclusion criteria; beginning TRHM during the study, participating in the group without the therapy.

For the collection of some data a form produced by the researchers was used with the following topics: name, age, weight, height, age at menopause, associated diseases, and other health information.

To evaluate the impact of DLM on the quality of life of the women the SF-36 quality of life questionnaire was used, applied before and after the laboratory tests.

The serum dosage of the investigated hormones, in the four women, was performed in the same laboratory.

3 RESULTS

Women were eligible to participate in the study if they were between 50 and 60 years old, had been through menopause for at least a year, two were not undergoing HRT and two had been undergoing oral HRT for at least a year.

The two women who underwent the ten sessions of DLM had an increase in the serum levels of estrone, which did not happen with progesterone or with the women who did not undergo DLM, as we can see in the following graphs, the biggest change in the hormone level occurred in the estrone levels of the woman who was in TRHM and underwent the 10 sessions of DLM.

As for quality of life, the two women who did not undergo the DLM had no major changes in the scores of the questionnaire applied.

The women who underwent the DLM therapy had significant changes in their scores, especially in some domains such as Emotional Aspect for both, and Vitality and Social Aspect for the woman who was undergoing TRHM. The results are described in the table.

Table 1 - Initial and final scores of the Quality of Life Questionnaire (SF-36) of the four women who participated in the study.

		With DLM Without TRHM	No DLM No TRHM	With DLM With TRHM	Without DLM With TRHM
Functional Capability	Initial	85	85	65	95
	Final	85	95	85	95
Physical Aspect	Initial	50	100	100	100
	Final	50	100	100	100
Pain	Initial	50	70	50	70
	Final	60	70	80	100
General Health Status	Initial	65	100	70	95
	Final	70	100	85	90
Vitality	Initial	70	100	65	80
	Final	75	100	85	85
Social Aspect	Initial	87,5	100	37,5	100
	Final	87,5	100	87,5	87,5
Emotional Aspect	Initial	0	100	33,3	100
	Final	66	100	100	100
Mental Health	Initial	96	96	72	84
	Final	96	72	92	88

4 DISCUSSION

After menopause, estrone becomes the most important estrogen in the female organism, as it is

produced by the adipose tissue. The estradiol and progesterone, on the other hand, are no longer produced at the desirable level justified by ovarian failure.4 The lymphatic system drains the interstitial fluid rich in macromolecules (hormones, nutrients, among others) and returns it to the bloodstream, which is why the group subjected to DLM had high serum levels of estrone, and the same did not happen with the levels of progesterone.5

During the climacteric period and after menopause, due to the decrease in hormone serum levels, women present symptoms (hot flashes, insomnia, dyslipdemia, decrease in vaginal lubrication, among others) that can bring about a decrease in their quality of life.1, 2 Through the bibliographic research done to prepare this article, it became evident that there are few studies that seek auxiliary therapeutic forms to the TRHM in an attempt to revert these damages or minimize them.

As can be seen in the results, the two women who had an increase in the serum levels of estrone, were the ones who presented the most relevant improvements in the scores of the questionnaire applied, which can be explained by the decrease in symptoms due to the increase in hormone levels and/or by the release of endorphins (neurotransmitter that awakens a feeling of euphoria and well-being) during massage therapy.10 The fact that the scores of the women who did not undergo DLM did not undergo major changes may have been a consequence of the fact that the scores already had good values at the beginning.

We cannot forget the great hormonal variation that occurs from individual to individual, and the infinity of emotional, physiological, and even psychological factors that influence these variations. This makes studies that use serum hormone levels as a variable quite oscillating.11

Despite the evidence, we cannot state that the DLM was the only determining factor in the results obtained in this study, because it had a limited number of subjects, with the questioning suggesting a wider investigation.

5 FINAL CONSIDERATIONS

The women in the study who underwent DLM had increased estrone serum levels and had relative improvement in Quality of Life, which leads us to believe that DLM was the main factor influencing this result; however, the study suggests an investigation from a larger N, which ensures a greater margin of safety, since the variables are quite unstable and subject to change under the influence of various aspects.

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