LUMEN ET VIRTUS

OSTEOMYELITIS IN BRAZIL: AN EPIDEMIOLOGICAL ANALYSIS OF 2019-2023

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ABSTRACT

Introduction Osteomyelitis is a bone infection characterized by the progressive destruction of cortical bone and medullary cavity, and is a relevant disease due to its probable deleterious consequences for patients. Objective: The study aims to investigate the epidemiology of osteomyelitis in Brazil, focusing on hospitalizations by the SUS (Unified Health System) and deaths between 2019 and 2023, to understand regional disparities. Methodology: A cross-sectional descriptive study, with a quantitative approach to the data, through secondary data collected in the Department of Computer Science of the SUS (DATASUS). The data refer to hospital morbidity due to osteomyelitis during the years from 2019 to 2023, with the period evaluated being from January 2019 to December 2023. Results: There were 71,817 hospitalizations for osteomyelitis in Brazil. The Southeast region had the highest prevalence of cases (40.59%) and reached a higher mortality rate than the other regions. It was noted that the ages most affected by the disease are between 40 and 49 years old. Finally, it was verified that in all regions the male sex is more affected than the female sex. Conclusion: Some risk groups were identified in the study; among them, the male sex, age between 40-49 years and the Southeast region due to the high

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mortality rate from the disease. The high prevalence of the disease and its high morbidity and mortality reinforce the need for early diagnosis and appropriate treatment.

Keywords: Osteomyelitis, Epidemiology, Infection, Public Health.

INTRODUCTION

Osteomyelitis is a painful and debilitating condition that occurs when bacteria, fungi, or other pathogens invade the bone, causing an intense inflammatory response with tissue damage. It is important to note that osteomyelitis can present itself in two different ways: acute or chronic. The acute form is characterized by more intense and sudden symptoms, while the chronic form may develop over time, presenting more subtle symptoms.[Acts 1, 2]

The evaluation of risk factors should be of utmost importance to determine the follow-up and prognosis of the disease. In most cases, patients with systemic diseases that drastically affect the immune system, such as diabetes mellitus, AIDS, or patients who have immunosuppressive treatments, are more susceptible. Chronic alcoholism, intravenous drug use, and long-term corticosteroid use also contribute to an increased risk of infectivity. It should also be noted that patients with a history of traumatic injuries continue to be the most frequent cause of chronic osteomyelitis.[Acts 1, 3]

Osteomyelitis can cause several physical and functional limitations to affected individuals. Severe, persistent pain in the areas affected by the infection can make it difficult to perform everyday activities, such as walking, lifting, or moving joints. In addition, the presence of abscesses and bone destruction can lead to deformities and loss of function in the affected areas. Limitation of movement and difficulty performing basic tasks can negatively impact patients' quality of life, leading to a reduction in autonomy and independence. Prolonged treatment and potential complications, such as the need for surgeries and amputations, can also result in long-lasting physical and functional limitations.[4]

The diagnosis of osteomyelitis is made through clinical and laboratory tests. Imaging tests, such as X-rays, MRIs, and CT scans, are frequently used to aid in diagnosis, allowing visualization of the bone alterations characteristic of the disease. In addition, laboratory tests, such as blood count, bone culture, and serological tests, are essential to identify the causative agent of the infection. [Acts 1:5-7]

Adequate and timely treatment is essential to prevent serious complications derived from osteomyelitis. Early identification of signs and symptoms, followed by a medical evaluation and accurate diagnosis, is essential to ensure accurate and effective treatment. The use of antibiotics is necessary to fight the infection. In some cases, surgery may be indicated for the drainage of abscesses or debridement of necrotic tissues.[Verses 1, 6, 9-12]

Complications of treatment include the need for long-term use of antibiotics, the risk of recurrence of the infection, and the possibility of sequelae, such as bone deformities and functional limitations.[4,5,8]

METHOD

This is a cross-sectional descriptive study with a quantitative data approach. The research was conducted in May 2024, based on secondary data obtained from the Hospital Information System of the Unified Health System (SIH/SUS), available in the Department of Informatics of the SUS (DATASUS), which is fed by filling out the Hospital Hospitalization Authorization (AIH).

The variables used in the extraction and tabulation of the data were: hospitalizations according to region, sex, age group and deaths. The data was gathered in a Microsoft Office Excel® spreadsheet (2019 version). The results were presented in tables containing absolute numbers and percentages.

The search for the CID-10 list revealed data related to morbidity that were made available on the platform, and for the conduct of the research, data were selected based on inclusion and exclusion criteria, which are cited below. Inclusion criteria were secondary morbidity data for the period from January 2019 to December 2023; data on the profile of the disease, including sex, age group and affectation by hospitalization region; number of hospitalizations and number of deaths from the disease. Exclusion criteria were available data that were not collected due to hospitalizations for CID-10 M86 and all years prior to 2019.

The data obtained in the research were selected according to the criteria cited in the study and were schematized in tables to allow the comparison of hospitalizations and deaths by region, by gender, age group and also hospitalizations by region. After the schematization in tables, it was possible to quantitatively and descriptively analyze the data, defining the epidemiological profile of the Brazilian population in terms of osteomyelitis.

Considering that these are secondary data in the public domain, it was not necessary to obtain the approval of the Research Ethics Committee, as stipulated in Article 1 of Resolution No. 510, of April 7, 2016.

RESULTS

Figure 1 - Number of interactions for Osteomyelitis by region (2019-2023)

Region	International	Percentage
Northern Region	3.719	5,17%
Northeast Region	21.211	29,52%
Southeast Region	29.156	40,59%
Sul Region	9.792	13,63%
Central-West Region	7.951	11,06%
Total	71.829	Percentage

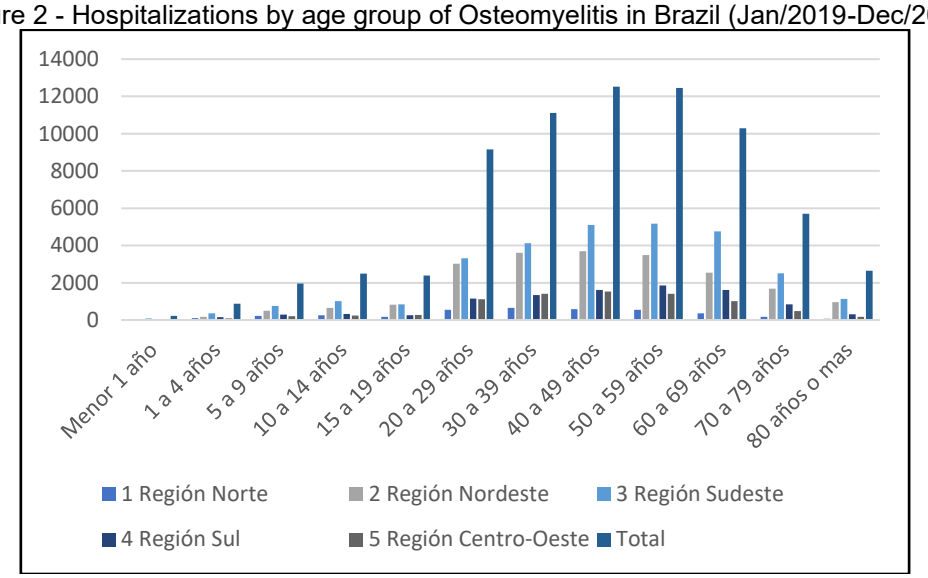
Source: Ministry of Health - SUS Hospital Information System (SIH/SUS)

In this study, we analyzed the distribution of osteomyelitis-related hospitalizations in Brazil, covering the period from 2019 to 2023. The quantitative analysis revealed a total of 71,829 hospitalizations attributed to this condition throughout the country, distributed unevenly among the different geographical regions.

The Southeast Region presented the highest number of hospitalizations, totaling 29,156 cases, which represents 40.59% of the total hospitalizations analyzed. This predominance can be attributed to the higher population density and availability of medical resources in the region. Next, the Northeast Region registered 21,211 hospitalizations, corresponding to 29.52% of the total, also standing out as a significant area of incidence.

On the other hand, the Northern Region had the lowest number of cases, with 3,719 hospitalizations, which is equivalent to only 5.18% of the total, potentially reflecting both differences in health structure and population density compared to other regions. The South Region and the Central-West Region registered, respectively, 9,792 (13.63%) and 7,951 (11.06%) hospitalizations, thus contributing to the understanding of the geographical distribution of osteomyelitis in Brazil.

Figure 2 - Hospitalizations by age group of Osteomyelitis in Brazil (Jan/2019-Dec/2023)



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

In the Northern Region, 3,719 hospitalizations for osteomyelitis were registered during the period from 2019 to 2023. The most affected ages were 30 to 39 years old and 40 to 49 years old, with 650 and 587 hospitalizations, respectively. Cases in younger groups, such as children under 1 year of age and children aged 1 to 4 years, were significantly lower, with 24 and 99 hospitalizations. From the age of 50, the number of hospitalizations begins to gradually decrease.

The Northeast accumulated a total of 21,211 hospitalizations in the same period. The groups of 30 to 39 years old and 40 to 49 years old concentrated the majority of cases, with 3,602 and 3,696 hospitalizations, respectively. High numbers were also observed in the 50 to 59 and 60 to 69 age groups. Although children under 1 year of age and children aged 1 to 4 years had fewer hospitalizations, these ages still accounted for a significant portion of cases in the region.

In the Southeast, 29,156 hospitalizations were counted, with a notable concentration in the ages of 40 to 49 years and 50 to 59 years, which totaled 5,099 and 5,166 cases, respectively. The 60 to 69 age group also had a high number of hospitalizations. Although children under 1 year of age had fewer cases, their relevance in the regional analysis is still significant.

The Southern Region registered 9,792 hospitalizations, with the 50 to 59 and 40 to 49 age groups being the most affected, reaching 1,855 and 1,622 hospitalizations, respectively. The ages of 30 to 39 years and 60 to 69 years also showed considerable numbers, indicating a fairly even distribution of cases in productive ages. On the other hand, younger groups, such as children under 1 year of age and children from 1 to 4 years of age, had the lowest numbers of hospitalizations.

In the Midwest, 7,951 hospitalizations were documented. The groups of 40 to 49 years old and 30 to 39 years old were the most impacted, with 1,523 and 1,403 hospitalizations. A significant number of cases were also observed in the ages of 50 to 59 years and 20 to 29 years. Children under 1 year of age and children between 1 and 4 years of age had considerably fewer hospitalizations, following a pattern similar to that of other regions.

Figure 3 - Hospitalizations for Osteomyelitis by sex by region (Jan/2019-Dec/2023)

Region	Male Total	Male Percentage	Total Women	Female Percentage	Total Number
North	2727	73,32	992	26,67	3719
Northeast	15121	71,28	6090	28,71	21211
Southeast	20747	71,15	8409	28,84	29156
On	6839	69,84	2953	30,15	9792
Central-West	5586	70,25	2365	29,74	7951
Total	51020	71,02	20809	28,97	71829

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

The bar graph reveals a clear predominance of hospitalizations for osteomyelitis in men in all regions of Brazil between 2019 and 2023, showing significant differences between the sexes.

In the Northern Region, 3,719 hospitalizations were registered, with men representing the vast majority, totaling 2,727 cases, while women accounted for only 992 hospitalizations. This disparity, where approximately three-quarters of patients are male, stands out as the largest among all the regions analyzed.

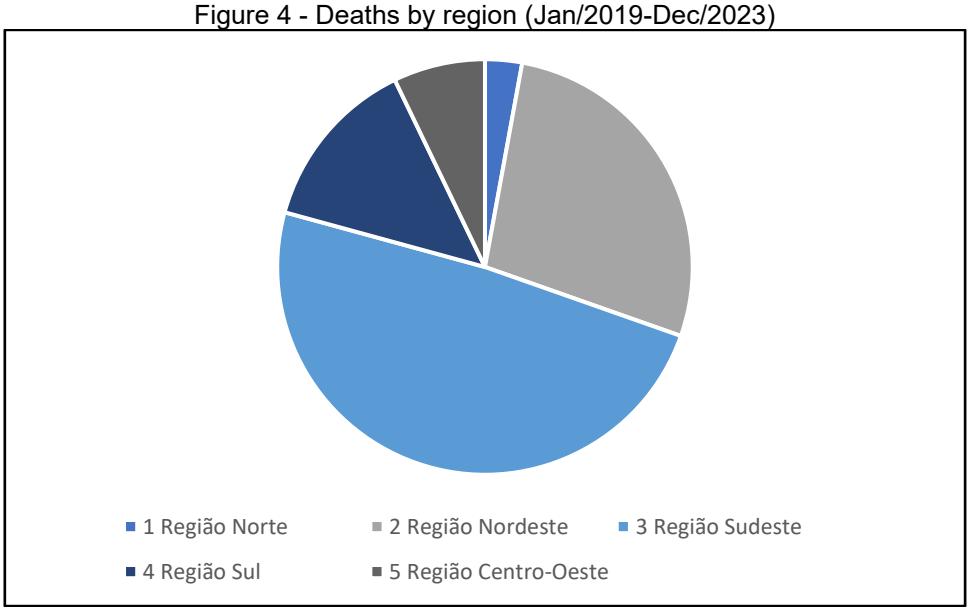
In the Northeast, the scenario follows a similar trend. Of the 21,211 hospitalizations that occurred, 15,121 were men, which corresponds to just over 70% of the total. Despite a significant number of female cases, with 6,090 records, male predominance is still evident.

The Southeast Region, which concentrates the highest absolute number of hospitalizations, with 29,156 cases, also reflects this same dynamic. Men accounted for 71% of hospitalizations, totaling 20,747 cases, while women accounted for 8,409 hospitalizations. Here, although the number of cases is the highest in the country, the sex ratio remains close to that observed in other regions.

In the south of the country, 9,792 hospitalizations were documented, with men totaling 6,839 cases. The difference between the sexes is a little smaller in this region, where 30% of hospitalizations correspond to women, although men continue to be the majority.

Finally, in the Central-West Region, 7,951 hospitalizations were registered. Again, male predominance is evident, with 5,586 cases, compared to 2,365 female cases. Despite following the pattern of the other regions, the distribution here shows a less pronounced difference between the sexes.

Figure 4 - Deaths by region (Jan/2019-Dec/2023)



The analysis of osteomyelitis-related deaths in Brazil, covering the period from 2019 to 2023, reveals important data on the incidence of fatal cases in different geographical

regions. In the North, a total of 29 deaths were recorded, representing the lowest number of fatalities among all regions. This amount reflects the incidence of cases with fatal outcomes in that specific area of the country.

In the Northeast Region, the number of deaths rose to 277, indicating a more critical situation compared to the Northern Region. This significant increase in fatal cases suggests an increased prevalence of the condition or challenges related to access and quality of treatment. The Southeast presented the highest number of deaths, with a total of 492, highlighting the severity of osteomyelitis in this region.

The South and Central-West Regions registered, respectively, 137 and 72 deaths. These numbers, while lower than in the Southeast and Northeast, still represent a significant concern for public health authorities. The South, with an intermediate total, and the Central-West, with a lower incidence among the regions analyzed after the North, complete the panorama of deaths from osteomyelitis in the country.

DISCUSSION

The epidemiological analysis of hospitalizations for osteomyelitis in Brazil from 2019 to 2023 allows us to observe the distribution of these hospitalizations according to the age group of the affected patients. Osteomyelitis affects people of all ages, from newborns to the elderly. However, there are differences in the proportion of hospitalizations according to the age group. The most affected group is adults, aged 40 to 49. This can be related to factors such as trauma, bacterial infections, and chronic diseases. Hospitalizations in children and the elderly are also significant, indicating the importance of considering osteomyelitis as a health problem at all ages.[Acts 3, 12]

Osteomyelitis is a bone infection that can have serious consequences for the health and quality of life of affected people.[5] Osteomyelitis is a bone infection that can have serious consequences for the health and quality of life of affected people. The analysis of data on osteomyelitis hospitalizations highlights the need for gender-sensitive health policies, seeking not only to promote equitable access to health care, but also to develop specific interventions to address the specific health needs of men. Integrating these considerations into the formulation of public health strategies is crucial to improving health outcomes and ensuring equity in the Brazilian health system.

Primary prevention of osteomyelitis involves measures such as proper hygiene, especially in wound cleaning, as well as care with immunity, such as vaccination against diseases that can increase the risk of developing the infection. [1] The adoption of epidemiological control and surveillance measures is essential to monitor the incidence of

osteomyelitis, identify possible outbreaks and relevant epidemiological characteristics for the implementation of preventive measures. The promotion of awareness and health education are important to inform the population about risk factors, symptoms and ways to prevent osteomyelitis, in addition to encouraging adequate wound care and the search for medical treatment in suspected cases3. These combined measures can contribute to the reduction of incidence and thus improve the control of osteomyelitis in Brazil.

By analyzing data on deaths in different regions of Brazil, it is possible to identify a number of complex challenges in the field of public health. The Southeast Region stands out for presenting the highest number of deaths, totaling 492 records. This high statistic not only reflects the large population contingent of that region, but also shows the pressure on local health systems. On the other hand, the Northern Region stands out for presenting the lowest number of deaths, totaling only 29 records. Despite this relatively low number, it is important to highlight the difficulties of access to medical services and the need to strengthen health strategies in the most remote areas. [13]

On the other hand, 277 deaths occurred in the Northeast Region and 137 in the South Region, which reveals different socioeconomic and health realities. Although not detailed above, the Midwest Region is equally crucial in the analysis of regional health disparities. Each number carries with it the need for specific approaches that take into account the demographic and health characteristics of each region, with the aim of reducing these rates and promoting fairer access to health services.

The distribution of hospitalizations and deaths from osteomyelitis in Brazil, as presented, reflects not only the prevalence of the disease, but also highlights significant regional disparities in terms of access to health, diagnosis, and treatment. The higher incidence of hospitalizations in the Southeast Region, followed by the Northeast, corroborates previous studies that indicate a correlation between population density, health infrastructure, and incidence of infectious diseases, including osteomyelitis.[13] [14]

Analysis of the distribution by age group shows that osteomyelitis significantly affects individuals of productive age, especially in the Northeast and Southeast regions, which may have socioeconomic implications due to lost productivity and increased health costs. [12] [15] The predominance of males in hospitalizations, exceeding 69% in all regions, suggests the need to investigate specific risk factors, possibly related to occupations or risk behaviors more prevalent among men. [5] [13]

The data on deaths from osteomyelitis reveal an alarming reality, with the Southeast Region presenting the highest absolute number of fatalities. This fact can be attributed to the population concentration, but it also highlights possible deficiencies in the clinical

management of the disease and in the prevention of complications. [12] The Northern Region, despite having the lowest number of deaths, presents unique challenges related to the logistics of access to specialized health centers, which can affect the quality of treatment received by patients. [1 3 15]

FINAL CONSIDERATIONS

The study aimed to analyze the epidemiological profile of the population most susceptible to osteomyelitis and, thus, intervene before the incidence of the disease and its complications. The Brazilian epidemiological profile of osteomyelitis involvement is composed of males, aged between 40-49 years and with a higher mortality rate from the disease in the Southeast region. Identifying the risk factors and the epidemiological profile of morbidity makes it relevant to implement public health policies focused on the care of male patients, young adults and those who have had trauma with the presence of lesions that may evolve into osteomyelitis.

The total sum of hospitalizations for osteomyelitis in the five regions reaches 71,829 cases, reflecting the importance of integrated approaches that consider regional specificities to combat this health condition. Resource allocation should be guided not only by raw numbers, but also by an understanding of the underlying causes of observed disparities. This understanding is crucial for the development of effective interventions that can mitigate the impacts of osteomyelitis on the Brazilian population, promoting more equitable and accessible health for all.

These regional variations in osteomyelitis hospitalizations point to the need for a differentiated approach in public health policy planning. While regions with high numbers of hospitalizations can benefit from strategies focused on optimizing diagnostic and treatment services, areas with fewer hospitalizations need investments in health infrastructure and education to improve access to and effectiveness of medical care.

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