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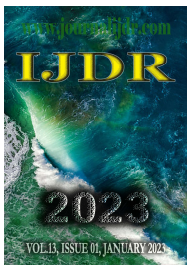

RESEARCH ARTICLE OPEN ACCESS

SURVEY OF MORTALITY FROM BONE TUMORS IN BRAZIL IN THE LAST 10 YEARS

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ABSTRACT

Introduction: Despite being rare, primary malignant bone tumors have a high morbidity and mortality rate. Currently, there is an increase in mortality from this type of tumor in Brazil. **Aim:** To analyze the demographic profile and temporal trend of mortality from bone tumors in Brazil in the last 10 years. **Methodology**: This is an exploratory descriptive study carried out in Brazil with a survey of the number of deaths due to primary bone tumors in the period from 2009 to 2019. The platform of the Department of Informatics of the SUS (DATASUS) was used, selecting the variables. **Results and Discussion**: During the study period, 19,889 deaths from bone tumors were recorded in the country. Considering the variables studied, it was observed that the most affected age group was individuals aged 60-69 years with 3,888 (19.55%) deaths, males with 11,592 deaths (58.71%) and the region Southeast with 8,292 deaths (41.69%). When analyzing the state of Bahia and the city of Alagoinhas, the results are similar to the Brazilian profile. **Conclusion**: It is believed that these results may help to better understand the profile of patients with bone tumors in the country, encouraging hospital strategies and politics.

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INTRODUCTION

Primary malignant bone tumors are rare and account for less than 0.2% of all cancers (DINIZ *et al*., 2005; EYRE *et al*., 2009). Although uncommon, they constitute a significant cause of mortality and morbidity, especially among young people, being the sixth most common neoplasm in children, and the third most frequent among adolescents and young adults (HORNICEK *et al*., 2020). In the case of primary bone tumors, osteosarcoma is the most prevalent, around 20%, followed by Ewing's sarcoma and chondrosarcoma (PETRILLI *et al*., 1991). The incidence of osteosarcoma varies according to the region of the country and presents between 2 and 4 cases per million in the age group from 0 to 14 years and from 4 to 3 in the age group from 0 to 19 years, with a predominance of males, and peak around 15 to 19 years (FAIRLEY, 2016; HOWLADER, 2021; PARKIN, 1988 AND STILLER, 1992). The incidence of Ewing's sarcoma is 0.3 to 0.5 cases per million, rare in black populations, suggesting an important genetic factor involved (SIEGEL *et al*., 2014). It is estimated that in the United States, 3,300 new cases of bone tumors are diagnosed annually, with the exception of bone marrow diseases (HORNICEK *et al*., 2020). In the case of Brazil, there is no similar estimate available. The etiology of bone tumors is not fully understood. However, factors such as previous cancer treatment with radiation, chemotherapy or the use of stem cell transplantation and benign bone conditions such as Paget's disease, increase the chances of developing this neoplasm (ROSENBERG ANDREW, 2010). Furthermore, genetic factors such as ploid modifications, chromosomal aberrations and gene translocation are involved in the appearance and development of this tumor (ROSENBERG ANDREW, 2010). Early diagnosis and tumor staging are key components for successful treatment. In this perspective, epidemiological indicators become indispensable for a better understanding of this dynamic and to outline strategies for better patient care (BURGER *et al*., 2018). Thus, considering the scarcity of studies on mortality from bone tumors in Brazil, the aim of the present study is to carry out a survey of mortality from primary malignant bone tumors in Brazil in the last 10 years.

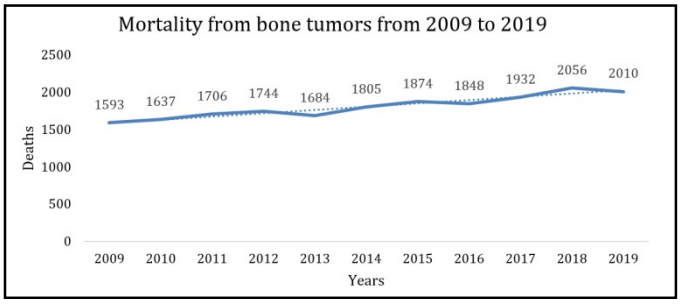
MATERIALS AND METHODS

This is an exploratory descriptive study carried out in Brazil with a survey of the number of deaths from primary bone tumors in the period from 2009 to 2019. Data were collected at the Department of Informatics of the SUS (DATASUS), considering mortality from bone tumors of according to the International Classification of Diseases, tenth revision (ICD-10: C40 – Neoplasm of bones and joint

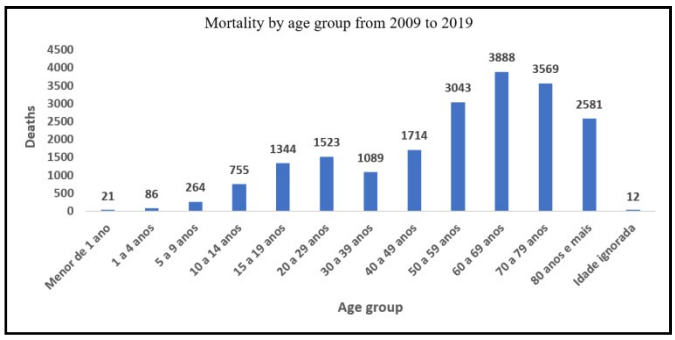
cartilages of the limbs, C41 – Malignant neoplasms of bones and joint cartilages of other unspecified locations). Data were analyzed based on gender, age group, year of death and Brazilian regions. After the survey, the data were organized and recorded in Excel tables with subsequent construction of graphs.

RESULTS

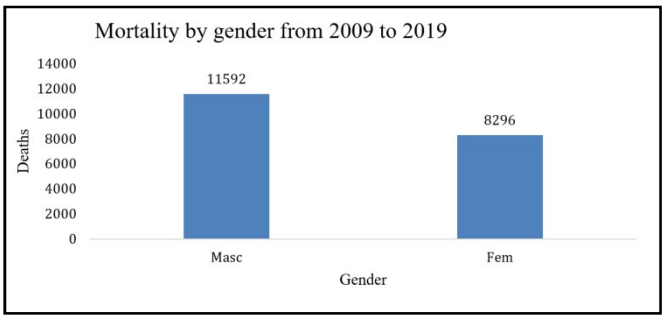
From 2009 to 2019, 19,889 deaths from bone tumors were recorded in the country. There is an increase in mortality in the period studied, with emphasis on the year 2018 with 2,056 (10.34%) deaths and the year with the lowest mortality in 2009 with 1593 (8.01%) deaths (Graph 1). When analyzing mortality by age group, it is observed that the most affected age group was individuals aged between 60-69 years with 3,888 (19.55%) deaths and the least affected age group is individuals younger than 1 year with 21 deaths (0.11%) (Graph 2). As for mortality by gender, it is observed that males were the most affected with 11,592 deaths (58.71%). Females, on the other hand, had 8,296 (41.71%) deaths from bone tumors (Graph 3).



Graph 1. Mortality from bone tumors from 2009 to 2019 in Brazil

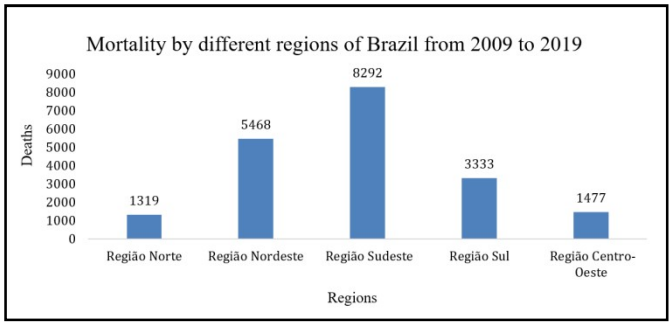


Graph 2. Mortality from bone tumors from 2009 to 2019 in Brazil stratified by age group

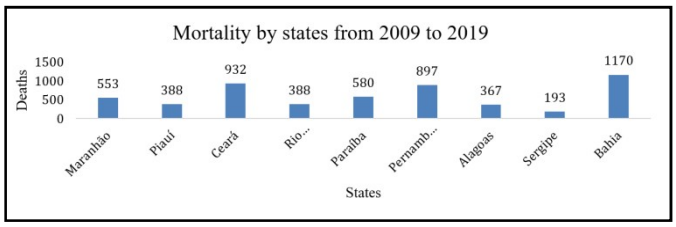


Graph 3. Mortality from bone tumors from 2009 to 2019 in Brazil stratified by gender

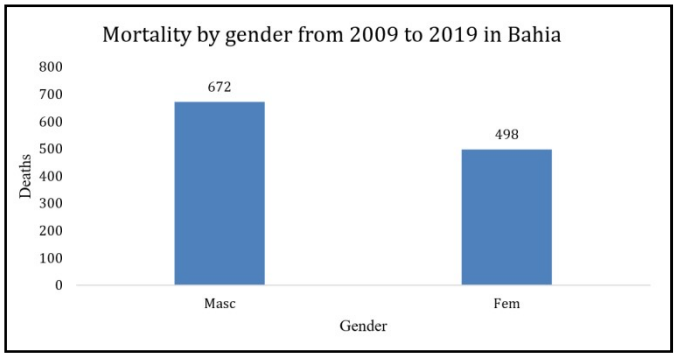
Among the Brazilian regions, the Southeast region has the highest number of deaths from the tumor with 8,292 deaths (41.69%) and the least affected region was the North region with 1,319 deaths (6.63%). The Northeast region ranks second with 5,468 deaths (27.49%)(Graph 4). Amid the states in the Northeast region, Bahia is the state with the highest number of deaths, with 1,170 (21.40%) deaths, and Sergipe is the state with the lowest number of deaths, with 193 (3.53%) deaths (Graph 5).



Graph 4. Mortality from bone tumors from 2009 to 2019 stratified by different regions of Brazil

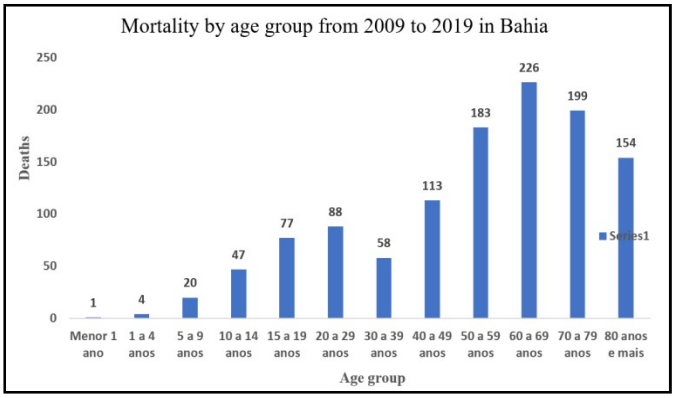


Graph 5. Mortality from bone tumors in the period from 2009 to 2019 stratified by states in the Northeast region



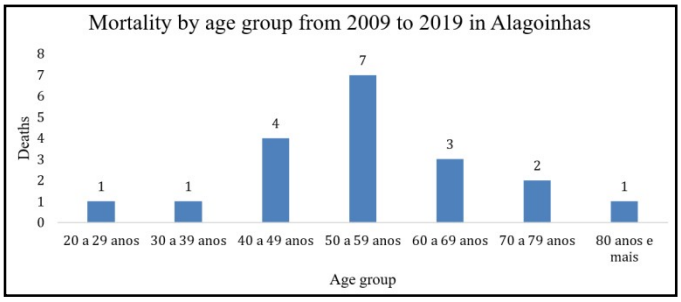
Graph 6. Mortality from bone tumors from 2009 to 2019 in Bahia stratified by gender

As for sex in the state of Bahia, males have the highest number of deaths with 672 (57%) cases, while females have 498 (42%) deaths (Graph 6). Analyzing mortality by age group in the state of Bahia, it is observed that the most affected age group was that of individuals aged between 60-69 years with 226 (19.32%) deaths and the least affected age group is that of minors 1 year with 1 death (0.09%) (Graph 7).

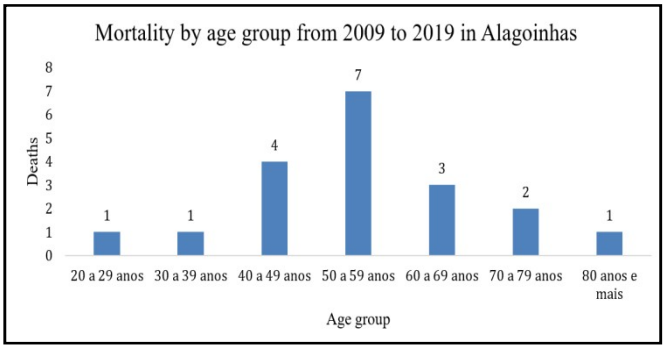


Graph 7. Mortality from bone tumors from 2009 to 2019 in Bahia stratified by age group

As for the municipality of Alagoinhas, 19 deaths due to primary malignant bone tumors were observed during the period studied. When analyzing the age group, it was found that the highest number of deaths occurs in the age group between 50-59 years, with 7 (36.84%) deaths and the lowest in the age groups of 20 to 29 years; 30 to 39 years old; 80 years or older, with 1 death (5.26%) (Graph 8). As for mortality by gender in the municipality of Alagoinhas, males had the highest number of deaths with 12 (63.16%) deaths, while females had 7 (36.84%) deaths (Graph 9).



Graph 8. Mortality from bone tumors from 2009 to 2019 in Alagoinhas stratified by age group



Graph 9. Mortality from bone tumors from 2009 to 2019 in Alagoinhas stratified by gender

DISCUSSION

The present study observed an increase in the number of deaths from primary bone tumors from 2009 to 2019 in Brazil. According to Soares, 2021, although the incidence of malignant neoplasms is higher in developed countries, due to greater access to diagnosis and early treatment, mortality rates have been increasing in developing countries, including Brazil. (SOARES *et al*., 2021). In addition, the country is experiencing an accelerated process of population aging, directly increasing morbidity and mortality from non-communicable chronic diseases (SCHRAMM, 2004). This reality is associated with advancing age, which is an independent risk factor for the onset of cancer, since senescence implies greater exposure to risk factors for tumor formation, such as alcohol and cigarette consumption, greater exposure to pollution and radiation, in addition to cellular transformations including the accumulation of DNA damage, disruption of the DNA repair system and regulation of cell growth (RUFINO *et al*., 2020). As for age group, although the incidence is higher in young people, more advanced ages show the highest rates, due to the aggressiveness of bone tumors, and late diagnoses that result in more advanced staging and worse prognosis (PETCA *et al*., 2016). According to Nagano (NAGANO *et al*., 2021), the prognosis in the elderly is linked to lower tolerance to chemotherapy and surgery, justified by the presence of comorbidities that contraindicate these approaches. In the study carried out by Houdek *et al*., 2020, in patients with chondrosarcoma, which is the second most common bone tumor, advancing patient age was an independent risk factor for worse survival and disease recurrence (HOUDEK *et al*., 2020). Differences in mortality between genders can be explained by factors such as biological-genetic specificities, accumulation of comorbidities and risk factors among men, different social expectations for both genders, in addition to low demand and use of services of health by men (RUFINO *et al*., 2020 and MOURA *et al*., 2016). It is noteworthy that there are discrepancies in the number of deaths among the five regions of Brazil. This is mainly due to cultural and socioeconomic differences (SOARES *et al*., 2021). With greater evidence for the Southeast region, where a higher mortality rate is observed, justified by the greater hospital coverage and improvement in diagnostic techniques resulting from the incorporation of diagnostic imaging methods, which include computed tomography and other more sophisticated ones, thus offering greater accuracy in early diagnoses in addition to having the largest population compared to other regions (SILVA, 2007). As for mortality in the state of Bahia and in the municipality of Alagoinhas, the results found are similar to the Brazilian profile, however, there is a lack of information in the literature on these regions, and it is important to develop studies that aim to describe the epidemiological panorama.

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