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Breast cancer mortality in Brazil between the years 2000 and 2020: ecological study

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1 INTRODUCTION

Breast cancer is one of the most incident cancers and has been considered the leading cause of death for women worldwide. When it is restricted to a mumlobulum or duct it is defined as noninvasive breast cancer, such as ductal carcinoma *in situ* and lobular carcinoma *in situ*. On the other hand, when malignant cells extend to regions adjacent to or far from breast tissue, an invasive or metastatic breast cancer is characterized, such as infiltrated ductal and lobular carcinomas, mucinous carcinoma, and tubular carcinoma[1].

From menarche to senility, with each menstrual cycle or gestational period, breast tissue undergoes several physiological changes. From the moment atypical cell units are developed, whose replication occurs in an uncoordinated and exacerbated manner to the point of overcoming immunological mechanisms and apoptosis, the neoplastic focus with distinct structure and functioning of the tissue of origin[2] arises.

The incidence of breast cancer is influenced by modifiable risk factors and hereditary mutations in genes such as BRCA1 and BRCA2. It is known that the incidence of the disease is higher in married women, nulliparas, whose first pregnancy occurred after 30 years of age, who use birth control pills or started hormone replacement therapy. Dietwith foods high in fat and low in fiber, as well as obesity, family history, smoking and alcohol consumption are also known risk factors for cancer. Women are 100 times more at risk of developing breast cancer than men and the risk is increasing as aging progresses, being a rare disease before the age of 20[3].

From the anamnesis and physical examination, suspicions of breast cancer arise. During the initial evaluation it is necessary to investigate the age of menarche and menopause, gestational history, family

history, medications in use and personal history of cancer. The self-examination has a controversial utility, considering that there are no studies that demonstrate an impact on the number of deaths in the face of encouraging its practice. To complement the investigation, tests such as breast ultrasound, computed tomography with single photon emission (SPECT) or positrons (PET/CT)[4] are performed.

The diagnosis of breast cancer is only made by biopsy that demonstrates malignant neoplastic cells by microscopy, while mammography is the gold standard test for screening and early detection of patients[5]. In all stages of cancer, it is recommended to measure tumor markers because they allow predicting metastases, determining therapeutic management and monitoring the evolution of the condition. The most used tests investigate the presence of receptors for estrogen and progesterone in breast tissue, in addition to the HER2 receptor identified in immunohistochemistry, to obtain information about the aggressiveness of cancer and expected response to certain therapies[6].

Survival due to breast cancer varies according to the socioeconomic level of the site considered by the relationship with the restriction of access to resources and infrastructure for early recognition, diagnosis and treatment. Developed countries show a decline in mortality and increased prevalence due to facilitated access to such elements, which is not the case in developing countries such as Brazil[7].

It has been described that awareness about the mortality rates of a disease and its demographic distribution allow the development of public policies and more efficient interventions based on state planning and ecological studies[8,9]. Thus, considering the lack of research on the subject, the present study aimed to present a longitudinal analysis of breast cancer mortality in Brazil between the years 2000 and 2020.

2 METHODOLOGY

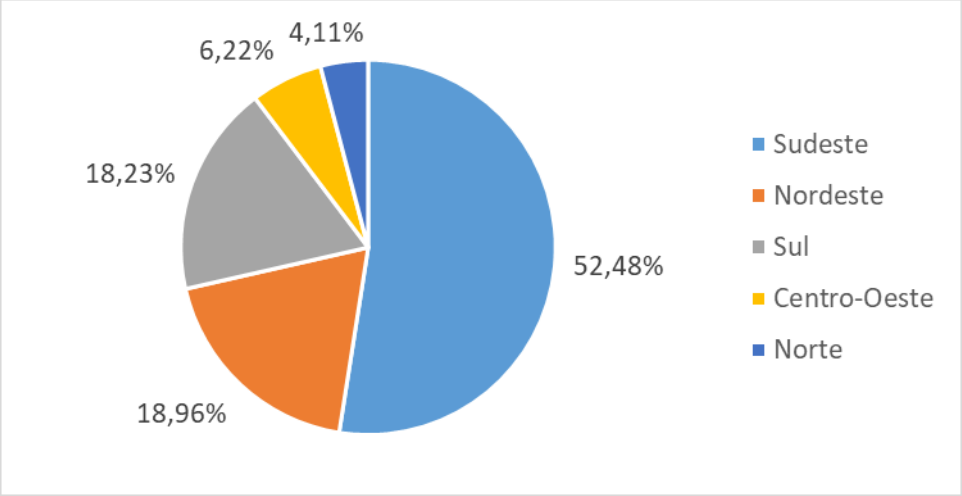
In this ecological study, the Mortality Information System (SIM) and the Management system of Studies and Analyses of Demographic Dynamics of the Ibge Research Directorate[10,11] were used. From these databases, the number of deaths per place of residence and year according to region, age group, gender, color/ race, educational level and marital status were collected; population estimate according to gender.

The whole national territory was considered, the years 2000 to 2020 and the categories ICD-10 C50 malignant neoplasm of the breast and ICD-10 D05 carcinoma *in situ of* the breast. A summary containing all the collected data was created to compare the adjusted values according to the total number of people belonging to each group, disregarding ignored data to avoid overestimated results. For the calculation of specific mortality, the number of deaths due to breast cancer was divided each year and the estimated population living in that year, multiplying the result by 10^5, which gives information on the number of deaths from breast cancer per 100,000 inhabitants. Adjusted values and specific mortality rates were evaluated to establish trends.

3 RESULTS

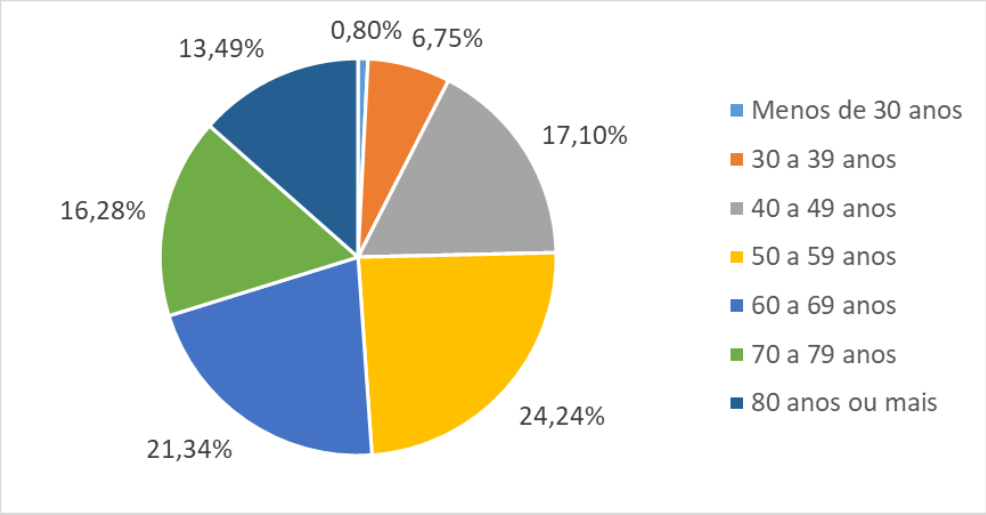
As breast cancer mortality was about 200 times higher in females (200,684) than in males (2,114), only deaths of women were considered to avoid underestimated results. Considering the region of Brazil, 105,327 deaths were recorded in the Southeast, 38,054 in the Northeast, 36,577 in the South, 12,478 in the Midwest and 8,248 deaths in the North of the country.

Figure 1. Proportional mortality due to breast cancer according to the region of Brazil.



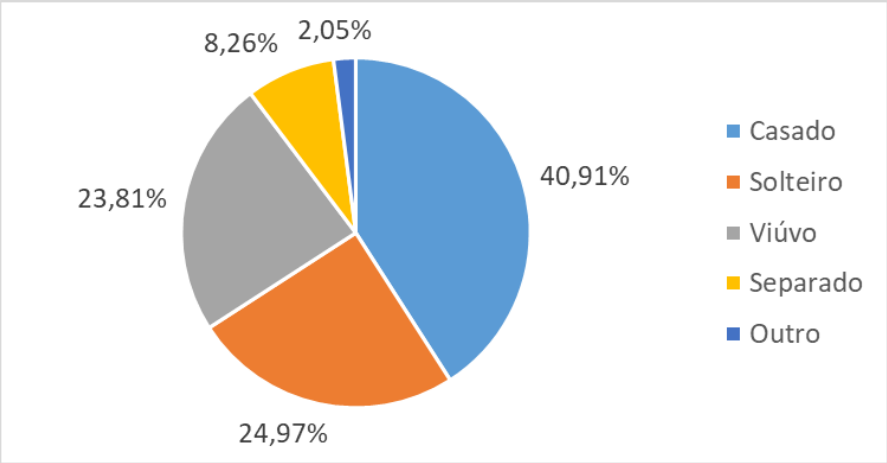
The number of deaths from breast cancer before the age of 20 was 25, while between 20 and 29 years was equal to 1,585. Between 30 and 39 years the number of deaths was equal to 13,541, between 40 and 49 years equal to 34,307, between 50 and 59 years equal to 48,648, between 60 and 69 years equal to 42,825, between 70 and 79 years equal to 32,675. Finally, 27,078 women aged 80 and over died of breast cancer between 2000 and 2020.

Figure 2. Proportional mortality due to breast cancer according to age group.



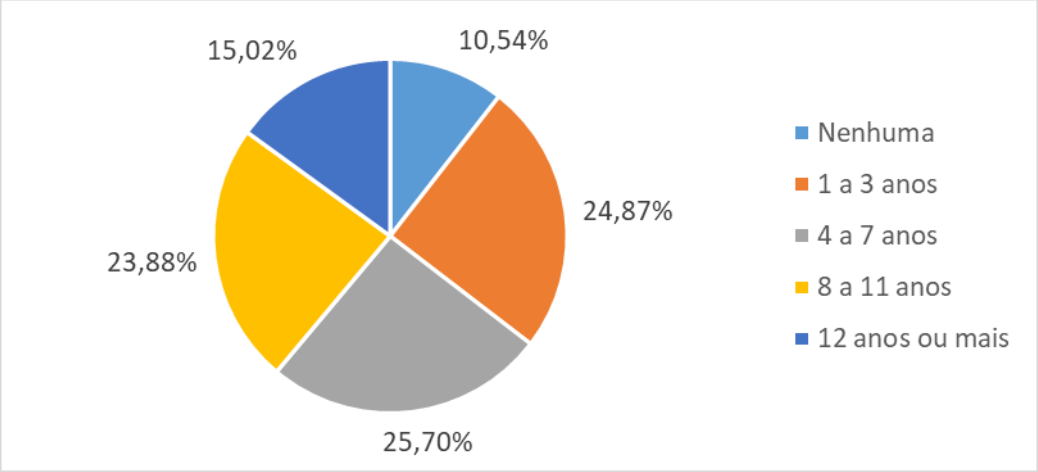
When observing ethnicity, 129,000 white women died of breast cancer, 54,984 brown women, 15,286 black women, 1,243 yellow and 171 indigenous women. As for marital status, 82,102 women were married, 50,108 were single, 47,774 widows and 20,700 were legally or otherwise separated.

Figure 3. Proportional mortality due to breast cancer according to marital status.



The level of education was also investigated, evidencing 21,151 women without any year of schooling, 49,909 women with 1 to 3 years of schooling, 51,574 women aged 4 to 7 years, 47,915 women aged 8 to 11 years and 30,135 women with 12 years or more of study.

Figure 4. Proportional mortality due to breast cancer according to years of schooling.



The specific mortality, considering mortality per 100,000 inhabitants, went from 5.61 in 2000 to 6.96 in 2005, after 7.52 in 2006 to 9.21 in 2010, from 9.85 in 2011 to 11.77 in 2015 and from 12.33 in 2016 to 13.74 in 2020.

4 DISCUSSION AND CONCLUSION

Even though it is considered a success in public health, Brazil has demonstrated problems with breast cancer mortality in the last two decades, probably due to deficient screening, inadequate management of risk factors, late diagnosis and treatment initiated already in advanced stages of the disease[12]. The

socioeconomic level of the region did not influence how expected in the proportions of breast cancer mortality, but this can possibly be attributed to population differences between regions[13]. The same was the case with the level of education, because the predominance in women with less access to education was not demonstrated, but proportions with statistically little statistically expressive differences[14].

Proportional mortality according to age was observed in the scientific literature, and cases before 20 years of age were rare, a progressive increase up to 59 years of age and a subtle decline in the following[years 15]. The study showed significant differences in race/color, with evident predominance in white women (64.28%) and few cases in yellow (0.62%) and indigenous (0.09%), which is related to the proportion that each race represents of the total number of women in the[country 9]. In addition, marital status also showed an influence on the risk of evolving to death from breast cancer, especially in married women due to the delay in the search for medical help, which delays the diagnosis and makes the beginning of treatment late, favoring unfavorable outcomes[16,17].

Despite the limitations, especially records with missing data that were disregarded during the collection of the values used, the present study demonstrated behaviors of mortality rates similar to those found by other similar articles. In a light, it is likely that the trends of mortality from breast cancer in Brazil were determined by population differences between regions, proportions that each race represents of the total number of women and delay in the search for medical help by married women. Considering the increasing specific mortality, doubling over the two decades observed, it is concluded that it is evident that screening strategies and early detection of breast cancer are necessary in Brazil to better the panorama of this disease so relevant.

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