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IMPACT ON PUBLIC HEALTH: CANCER IN NORTHEAST BRAZIL FOR THE YEARS 2023 TO 2025

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Abstract: Breast cancer is the disease with the highest mortality rate in women in Brazil and from the age of 40, the incidence and mortality tend to increase progressively, making it imperative to treat the disease in its early stages. The current research aims to show the estimates for the disease in the Northeast until 2025, indicating the state with the highest demographic density and number of cases; mention the age group with the highest mortality and point out the challenges facing the public health service. A quantitative study was carried out using raw data from the 2023 to 2025 estimates of population density, age groups and mortality rates. Bahia had the highest incidence of new cases. Ceará came second, followed by Pernambuco. The age group with the highest number of deaths in 2022 was between 50 and 59 years old. In terms of public health challenges, the following stood out: making a timely diagnosis of suspicious breast lesions; starting the first treatment within 60 days; having access to quality mammography and being guaranteed treatment by a multidisciplinary team. It was concluded that the mortality rate in women over 70 is higher than in other age groups and survival is higher in the 30-39 age group.

Keywords: Breast Inflammatory Neoplasia; Mortality Rate by Age Group; Women's Health Services.

INTRODUCTION

Breast cancer is caused by genetic alterations, which can be associated with internal factors such as genetic inheritance and also external factors such as smoking, long-term use of hormones (HRT - hormone replacement therapy), obesity, smoking and alcoholism¹.

According to INCA², breast cancer is also the leading cause of cancer death in women in Brazil, registered in all Brazilian regions, and from the age of 40, the incidence and mortality from breast cancer tend to increase pro-

gressively, which makes treatment in the early stages of the disease essential.

Recently, a number of studies have looked at this issue from different perspectives, including Dias³, who reports on the importance of adequate provision of procedures in the early stages of the disease; Santos⁴ who estimates the magnitude and distribution of the main types of cancer that will occur in the three-year period 2023-2025, for the country, geographical regions, Federation Units (UF), Federal District and capitals, by sex, for the 21 main types of cancer; Jomar⁵ who points out the late time to start treatment for breast cancer and Cruz¹ who takes into account the clinical and pathophysiological aspects of breast cancer. Meanwhile, this study will look at breast cancer estimates in the Brazilian Northeast for the years 2023 to 2025.

The study by Barbosa et al (2015) showed that breast cancer mortality in Northeast Brazil has shown a strong upward trend, with large increases in rates until 2030, which makes it imperative to structure health promotion, surveillance and care services for this disease in this region. The relevance of the current research lies in providing a firm basis for decision making, through estimates, regarding prevention and appropriate treatments for each situation, allowing the identification of groups of more vulnerable people, to whom actions should be directed, making it possible to generate hypotheses about the determinants of the disease, being fundamental information for the planning and definition of public policies in the control of the disease in the country.

Soares⁷ mentions that cancer prevention encompasses actions taken to reduce the risk of getting the disease. To this end, three levels of prevention have been created since the 1980s with the aim of reducing the risk of acquiring a specific disease that may affect the individual.

Lima⁸ describes these preventions as: primary - which includes avoiding exposure to cancer risk factors and adopting a healthy lifestyle; secondary - is the action taken to detect a health problem at an early stage, often at a subclinical stage, in the individual or population, facilitating definitive diagnosis, treatment and reducing or preventing its spread and long-term effects, such as screening and early diagnosis; and tertiary prevention - which is the action implemented to reduce in an individual or population the functional impairments resulting from an acute or chronic problem, including rehabilitation.

Considering the high incidence of breast cancer in women, it is imperative to be alert to the signs, since early detection is fundamental for good control of the disease, highlighting the importance of regular self-examination, clinical examination, ultrasound and mammography.

As breast cancer is directly related to women's health, it is necessary to seek more information and improvements in public services aimed at women, as they represent the largest registered population in Brazil (Census⁹). There are currently 6.0 million more women than men in our country.

According to data from the 2022 Census (IBGE¹⁰), Brazil's population reached 203,062,512, an increase of 12.3 million since the last Census in 2010. The Southeast remained the most populous region. The Northeast, South and North follow. The least populous region is the Midwest.

According to the Inter-Agency Network on Health Information¹¹, population demography is an important science for public health, among other reasons because it provides fundamental concepts and measures of health in its dimension population. Some demographic indicators are usually analyzed for the purpose of directly assessing health conditions, such as fertility and the age structure of the

population, which is recognized as a variable fundamentally linked to the demand for health services and determines the organizational and technological needs of the health system as a whole.

Brazil's mortality rate from breast cancer is worrying in the Southeast and South (considered the most populous regions), which have the highest death rates. This is followed by the Northeast, Midwest and North¹².

Dias³ emphasizes that mortality from breast cancer can be reduced through early diagnosis and appropriate treatment, with mammography being the most effective test for this detection.

According to INCA¹² data, the high rates of breast cancer recorded in the Southeast (36,470) and South (10,890) of Brazil in 2022 are probably related to external factors such as poor diet and alcohol consumption, and internal factors such as the habit of having few or no children and, when they do have children, they don't breastfeed.

This study took into account the Northeast region due to the worrying estimate based on mortality projections up to 2030, which in Barbosa's research⁶ found a considerable increase in the burden of breast cancer mortality for all the states in Northeast Brazil

This is justified by the health services offered in the different regions of the country. As Barbosa⁶ reports, the low availability of health services, in many aspects related to breast cancer, has been associated with the poorest regions, which includes the Northeast. This precariousness is related to screening, the diagnostic apparatus, the stage of the disease when it is diagnosed, the treatment methods available and, as a consequence, the impact on survival.

For this reason, the current research aims to show the estimates for the incidence of breast cancer in the Northeast of Brazil until 2025, as well as indicating the states with the highest demographic densities; identifying

the states with the highest number of cases of the disease; citing the age group with the highest mortality recorded in 2022 and pointing out the challenges of the public health service by suggesting possible social actions that contribute effectively and efficiently to the prevention of the disease.

METHODS

TYPE OF STUDY

A quantitative study will be carried out, which aims to quantify a problem and understand its dimension, measuring information on a subject that is already known, as well as a narrative review of the literature in which scientific works published in the qualitative approach will be surveyed, equivalent to the systematic literature review¹³.

DATA SOURCE

The data on the estimated number of breast cancer cases was collected from the website of the National Cancer Institute (INCA) for the years 2023 to 2025.

This database will analyze the incidence of breast cancer through the crude rates of malignant breast neoplasms per 100,000 women, estimated for the three-year period from 2023 to 2025, recorded in the nine states of Northeastern Brazil.

With regard to population density, secondary data was obtained from the website of the Brazilian Institute of Geography and Statistics¹⁰ for the 2022 Census.

For the data obtained on mortality rates, those available from INCA¹² were used.

INSTRUMENT

VARIABLES ANALYZED

As an indicator of health status, the estimate of breast cancer for the three-year period from 2023 to 2025 was used, and the following variables were used as determinants: population density, age group and mortality rates.

The incidences of breast cancer in the nine northeastern Brazilian states available from the National Cancer Institute (INCA) for the three-year period from 2023 to 2025 were analyzed, while the population density and age group variables were obtained from the IBGE¹⁰ and INCA¹² websites, respectively.

DATA PROCESSING

The data from the data collection instruments was organized into tables and graphs showing absolute values, which were then discussed in the light of the literature on the subject.

Data processing in research plays a fundamental role in the process of collecting, analyzing and interpreting information, consisting of applying techniques and using tools to organize and transform raw data into useful and relevant information¹⁴.

This analysis approach is based on the need to make a diagnosis focused on finding patterns in the variable, analyzing the estimate for the three-year period from 2023 to 2025.

ETHICAL ASPECTS

In accordance with Resolution 510 of April 7, 2016 of the National Health Council¹⁵, this study was not submitted to a research ethics committee because it used only secondary, publicly accessible data without the possibility of identifying the individuals who underwent the screening and diagnostic procedures analyzed.

RESULTS

The Census⁹ showed that Brazil's population had reached 203,062,512, an increase of 12.3 million since the last Census in 2010. The Southeast remained the most populous region with 84.8 million inhabitants, corresponding to 41.8% of the country's population. It is followed by the Northeast (26.9%), the South (14.7%) and the North (8.5%). The least populous region is the Midwest, with 16.3 million inhabitants or 8.02% of the country's population.

The Brazilian Northeast has 54,658,515 inhabitants, which is equivalent to 29.2% of the Brazilian population according to the 2022 census. According to IBGE data¹⁰, Bahia has a population density of 14,141,626 inhabitants, making it the most populous state in the Northeast, followed by Pernambuco (9,058,931 inhabitants); Ceará (8,794.957 inhabitants); Maranhão (6,776,699); Paraíba (3,974,687); Rio Grande do Norte (3,302,729); Piauí (3,271,199); Alagoas (3,127,683) and Sergipe, which is the state with the smallest population with only 2,210,004 inhabitants (Table 1).

Region / Federation Unit	Population density (inhabitants)
Northeast Region	54.658.515
Alagoas	3.127.683
Bahia	14.141.626
Ceará	8.794.957
Maranhão	6.776.699
Paraíba	3.974.687
Pernambuco	9.058.931
Piauí	3.271.199
Rio Grande do Norte	3.302.729
Sergipe	2.210.004

Table 1. Population density of the Northeast Region and its Federative Units, according to the Brazilian Institute of Geography and Statistics - IBGE, 2023.

Source: IBGE (Brazilian Institute of Geography and Statistics) 2023

An interesting factor observed in Brazil is that among people up to the age of 19, men are the majority; more boys than girls are born in Brazil. On the other hand, from the age group of 25 to 29, the proportion of women becomes the majority in all regions of the country. And above the age of 60, this difference grows even more.

With regard to population density in the Northeast, it was found that there is a predominance of women aged between 30 and 39 in all the Federative Units. It can also be seen that every 10 years, the proportion of women decreases gently until the age of 69. After the age of 70, there was a reduction of more than 35% in the number of women in the nine northeastern states (Table 2).

Table 3 shows that of the nine northeastern Brazilian states, Bahia had the highest rate of breast cancer cases estimated for the three-year period from 2023 to 2025, with a total of 4,230 new cases.

Breast Cancer Estimates 2023 to 2025	
Alagoas	690
Bahia	4230
Ceará	3080
Maranhão	1060
Paraíba	1180
Pernambuco	2880
Piauí	860
Rio Grande do Norte	1140
Sergipe	570

Table 3- Breast cancer estimates for the Northeast Region of Brazil for the three-year period from 2023 to 2025.

Source: INCA (2022)

The state of Ceará was considered to have the second highest number of new cases with 3,080, followed by Pernambuco, where 2,880 new cases are expected by 2025 (Table 3).

POPULATION DENSITY										
UF/ Age group	AL	BA	EC	MA	PB	PE	PI	RN	SE	TOTAL
30-39	249.509	1.151.078	725.930	552.465	315.872	734.376	261.980	271.613	184.207	4.447.030
40-49	232.387	1.101.666	643.113	457.591	297.369	695.177	238.126	247.538	170.674	4.083.641
50-59	184.053	857.376	531.424	338.482	244.433	566.701	191.018	208.712	134.909	3.257.108
60-69	126.258	614.664	365.854	235.403	173.314	405.117	138.586	143.247	88.794	2.291.237
70-79	69.348	361.781	224.177	131.082	110.204	237.224	85.000	85.790	49.940	1.354.546
TOTAL	861.555	4.086.565	2.490.498	1.715.023	1.141.192	2.638.595	914.710	956.900	628.524	15.433.562

Table 2. Population density of the Northeast Region and its Federative Units, according to the different age groups of women.

Source: Brazilian Institute of Geography and Statistics - IBGE, 2022

In Paraíba, the estimate for the disease is 1,180 new cases, followed by Rio Grande de Norte with 1,140 and Maranhão with 1,060 estimates for breast cancer (Table 3).

Although Maranhão has a larger population than Paraíba (Table 1), the latter had a higher estimated rate of breast cancer, which according to data obtained from the State Government of PB, these high rates are due to the majority of Paraíba women seeking information from their own gynecologist, delaying the search for a specialist doctor, the mastologist.

Studies carried out by UFPB¹⁶ showed that in Paraíba in 2022, 330 deaths from breast cancer were recorded and current data shows that in the state there has been an increase in the disease in younger and younger women.

This calls attention to the importance of publicizing the reality of cancer worldwide, nationally and in the states, increasing awareness among the population in order to develop greater awareness and search for healthier ways of living, as well as actions to prevent this disease. It is therefore of the utmost importance for society to publicize these figures of incidence and deaths caused by cancer.

The state of Piauí has an estimated 860 new cases by 2025, while Alagoas has an estimated 690 incidences. The state with the lowest rate of the disease was Sergipe, with 570 women (Table 3).

Knowing statistics about the disease according to Costa¹⁷ is fundamental for planning the tools available at all levels of health care, starting with Primary Health Care (PHC), for organized and economically efficient care. The prevention and early detection of breast cancer are essential for dealing with it, curing it and increasing the survival rate of patients.

According to INCA data¹⁸, breast cancer mortality rates are higher among older women, but proportional mortality is higher in the 50-69 age group, which accounts for around 45% of all deaths from this type of cancer (Table 4).

Women		
Age group	Number of Deaths	Specific Rate
30 a 39	277	5,75
40 a 49	636	15,48
50 a 59	1.019	31,64
60 a 69	876	39,66
70 a 79	680	51,62
80 or more	671	94,17

Table 4 - Crude and age-adjusted breast cancer mortality rates per 100,000 men and women in the Northeast Region in 2022.

Sources: MS/ SVS/ DASIS/ CGIAE/ Mortality Information System - SIM MP/Fundação Instituto Brasileiro de Geografia e Estatística - IBGE MS/ INCA/ Conprev/ Surveillance Division

The mortality rate from breast cancer recorded in Northeast Brazil in 2022 (Table 4) showed that the 50 to 59 age group had the highest number of deaths with 1,019, equivalent to a rate of 31.64 referring to total population density of 3,257,108 women at this age, as shown in Table 2.

For those aged between 60 and 69, the mortality rate stood at 876 deaths throughout the Northeast, corresponding to a specific rate of 39.66, taking into account the total number of women of 2,291,237 (Tables 2 and 4). Advancing age is known to be a risk factor for the development of breast cancer in older women.

The number of reported deaths between the ages of 40 and 49 was 636 (Table 4), representing a specific rate of 15.48, the lowest rate of any age group, excluding those under 39. This is due to the fact that the population density is 4,083,641, the second highest number of women at this age in the whole of the Northeast of Brazil.

In addition, the Brazilian Society of Mastology¹⁹ and the Brazilian Federation of Gynecology and Obstetrics Associations²⁰ recommend annual mammography for women aged 40 and over, which contributes significantly to cancer prevention, while for younger women a physical examination of the breasts is recommended, carried out by a specific doctor, and if any risk factors arise, such as a family history of breast cancer at an early age, the recommendations are individualized. That's why it's important to see a doctor for this assessment.

Unlike what was found previously, among those aged 70 to 79, a total of 680 deaths were observed in 2022, however, the specific rate was high at 51.62, the highest among all age groups due to the population reduction of more than 60%, with only 1,354,546 women in the whole of the Northeast (Table 2 and 4).

DISCUSSIONS

For those who live in the Northeast, health seems to be a more important problem than those who live in the Southeast. This is the conclusion of a face-to-face survey carried out by the Institute for Health Policy Studies²¹ in 2022.

According to data from the IEPS²¹, 14 health indicators were analyzed between 2010 and 2020 and this study found that the states in the North and Northeast regions had the worst indices in the basic care, resources, mortality and morbidity blocks.

The analysis of data collected by the Regions and Networks platform and by institutions such as the Oswaldo Cruz Foundation²², the Ministry of Health²³, the Brazilian Institute of Geography and Statistics¹⁰, the Institute for Health Policy Studies²¹ and the Brazilian Medical Association²⁴ confirmed that the Brazilian health system is marked by profound regional inequality.

As seen in the results of this study, the Northeast of the country is more fragile because it is the region that most depends on SUS services. Noronha²⁵ adds that the high demand creates significant challenges, especially because the region has precarious physical facilities and difficulties in accessing vulnerable populations, such as indigenous, riverine and quilombola communities, as well as a lack of other health professionals and community workers.

Another aggravating aspect is that according to the most recent data from Medical Demography in Brazil²⁶, Brazil has 2.41 doctors per 1,000 inhabitants. There are 584,121 doctors for a total population of 203,062,512 people. The Southeast has the highest medical density (3.39), followed by the Midwest (3.10) and the South (2.95). While the North and Northeast are below the national average with 1.45 and 1.93, respectively.

Although Brazil has a medical density close to that of the United States, Japan, Canada and Chile, the Brazilian Medical Association²⁴ points out that there is no norm or standard for the minimum density of doctors recommended for countries. In the case of Brazil, the intensity of the unequal distribution of doctors across the country and the characteristics of the health system lead to a greater concentration of professionals in the private sector than in the SUS, which is why caution is required when comparing the national rate with that of other nations.

Santos Júnior²⁷ mentions that even though the growing numbers of doctors who have recently graduated and are specializing are encouraging, this scenario of strong inequality in relation to the distribution of professionals across the country is still worrying, especially in the areas furthest from urban centers. As this is a recurring problem, it is necessary to encourage public policies to mitigate care gaps and strengthen the SUS.

Stralen²⁸ has already pointed out the lack of public policies to attract these professionals to the underserved regions of the Northeast, mainly due to the lack of prospects of working in more distant regions, without transportation, health units, medicines, among other factors.

Since its implementation in 1990, the Unified Health System (SUS) has never been able to meet all the demands of the population. This has led to other problems in healthcare, such as long waits for appointments and poor service to the population.

Also according to data from Medical Demography in Brazil²⁶, the state of Alagoas has a medical density of 1.84, Bahia 1.83; Ceará 1.89; Maranhão 1.22; Paraíba 2.81; Pernambuco 2.23; Piauí 1.81; Rio Grande do Norte 2.10 and Sergipe with 2.15. All the Northeastern states were below the country's average (2.41), except for Paraíba, which came eighth in the country.

These inequalities in medical care in the Northeast will only contribute to the increase in estimates for breast cancer by the year 2025. This is due to a reduction in medical care, delays in having tests carried out and a lack of follow-up treatment.

Treatment varies according to the stage of the disease, its biological characteristics, as well as the patient's condition (age, menopausal status, comorbidities and preferences)²⁹.

According to Ribeiro⁽³⁰⁾, the prognosis of breast cancer depends on the extent of the disease (staging), as well as the characteristics of the tumor. When the disease is diagnosed early on, treatment has greater curative potential. When there is evidence of metastases, the main aim of treatment is to prolong survival and improve quality of life. Reducing the barriers to access to health services for early detection is also a strategic component that requires continuous qualification of the Unified Health System²³.

Early diagnosis helps to reduce the stage of the cancer. In this strategy, the importance of educating women and health professionals in recognizing the signs and symptoms of breast cancer is highlighted, as well as quick and easy access to health services, both in primary care and in referral services for diagnostic investigation.

Law 14.450 of 2022 created the National Patient Navigation Program for People with Malignant Breast Neoplasia³¹. The program provides for monitoring of suspected or confirmed cases of breast cancer, with individual approaches to patients to provide guidance and help speed up the diagnosis and treatment of the disease. This monitoring will be carried out by patient navigators, who are professionals (usually nurses and social workers) trained to facilitate the patient's journey. This law favours breast cancer patients, providing specific and humanized treatment.

According to Freitas Júnior³⁽²⁾, one of the challenges facing the Public Health Service is to keep women informed through efficient communication; to diagnose suspicious breast lesions in a timely manner; to start the first treatment within 60 days; to have access to quality mammography; to be guaranteed treatment by a multidisciplinary team and to receive palliative care.

Currently, the Brazilian Society of Mastology¹⁹ recommends that all women with no history of breast cancer or population risk should start mammography from the age of 40, and that it should be repeated every year. However, women with a family history of breast or ovarian cancer should start earlier.

Social actions that can contribute to the primary prevention of the disease include practicing physical activity, maintaining an adequate body weight, eating a healthier diet and avoiding or reducing alcohol consumption. Breastfeeding is also a protective factor.

According to Ribeiro³⁰, primary prevention of breast cancer is related to the control of known risk factors and the promotion of practices and behaviors considered to be protective (excess body weight, physical inactivity, alcohol consumption and hormone replacement therapy), which in principle can be changed. Whereas hereditary factors and those associated with a woman's reproductive cycle are, for the most part, not modifiable.

Correlating the theme of the articles analyzed with public policies and existing screening programs in Brazil, Melo Perdigão³³ observed that there is no faultless method for primary prevention of breast cancer. However, there are three secondary prevention strategies for early detection: breast self-examination (BSE), clinical breast examination (CBE) and bilateral mammography (BMS), the latter being considered the screening method of choice in population-based programs with the greatest impact on mortality.

By preventing the disease, the number of new cases can be reduced, and this will consequently reduce the number of deaths caused by cancer. Contrary to what many patients think, breast cancer is predominantly sporadic and has little to do with genetic predisposition. According to the National Cancer Institute², hereditary breast cancer accounts for 5% to 10% of all cases.

That's why it's essential to carry out self-examinations and take care of your physical health, which will lead to a better quality of life.

Therefore, the public health service has the challenges of ensuring preventive examinations, guaranteeing immediate treatment once the disease has been diagnosed, providing humanized medical care, supplying the medicines needed to cure the cancer and ensuring the patient's survival.

CONCLUSIONS

The Brazilian Northeast has the second highest population density in the country. The state of Bahia is considered the most populous, followed by the states of Pernambuco, Ceará, Maranhão, Paraíba, Rio Grande do Norte, Piauí, Alagoas and Sergipe.

The state of Bahia had the highest estimates for breast cancer incidence between 2023 and 2025. Ceará came in second, while Pernambuco was the third state with the highest rates of new cases. The states of Paraíba, Rio Grande do Norte, Maranhão, Piauí, Alagoas and Sergipe had the lowest incidences of new cases of the disease.

In terms of the age group with the highest population density, the 30-39 age group stood out, and the female population is gradually decreasing every 10 years.

The mortality rate was found to be higher in the 70-79 age group than in the other age groups, and the survival rate for women was higher in the 30-39 age group.

Among the various challenges faced by the Public Health Service were: efficient and effective communication between medicine and the population; increasing medical density for critical states in terms of public health care; increasing the number of clinical appointments at health centers and hospitals to meet the ne-

eds of the northeastern population, which was below the national average; carrying out diagnostic tests and starting treatment within 60 days; meeting the demand for mammograms and ultrasounds; providing a multidisciplinary team to carry out palliative care.

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