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ORIGINAL ARTICLE

BREAST CANCER AND ANALYSIS OF THE FACTORS RELATED TO THE DISEASE DETECTION AND STAGING METHODS

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ABSTRACT

Objective: to describe the profile of women affected by breast cancer and to evaluate the aspects related to the disease detection and staging methods and their associations. Method: a cross-sectional study conducted with 350 women diagnosed with breast cancer treated in specialized centers from Pernambuco - Brazil, between June 2018 and January 2019. For the analysis, associations and comparisons were made with the Chi-square test. Results: 40.3% of the sample was <50 years old, and self-examination was the prevalent detection method (74.9%) in all age roups, with a significant association for more advanced stages of the disease, >70% of the sample. Conclusion: detection by self-examination was significant and was related to more advanced stages of breast cancer, especially in younger age groups. Given the results, the actors involved in women's health may develop new strategies to intensify population screening.

DESCRIPTORS: Breast Neoplasms; Early Detection of Cancer; Screening Programs; Staging of Neoplasms; Women's Health.

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INTRODUCTION

Breast cancer is considered a public health problem and, among all the types of tumors, it is the one that most affects women worldwide[1]. The National Cancer Institute's estimate for breast cancer in Brazil is nearly 66,000 new cases a year for the 2020-2022 triennium, which represents an incidence rate of around 61.6 cases per 100,000, representing the most incident type of female cancer in women from almost all regions of the country, with the exception of the North region, where cervical cancer occupies the first position[2-3].

For the control of this neoplasm, the strategies for early detection of the lesion stand out, as prognosis is better when the neoplasm is diagnosed in its early stages, resulting in a less mutilating therapy, lower mortality rates and consequently improved quality of life in these women[4-5]. According to staging at the time of diagnosis, the survival rate for breast cancer is nearly 80% for the early stages, from 30% to 50% for the intermediate stages and 5% for the advanced stages. These data confirm the progressive decrease in survival as staging increases[6].

According to the latest national guidelines for breast cancer, the screening method adopted for asymptomatic women is mammography (MMG), performed biennially in women aged from 50 to 69 years old. However, when it comes to patients without signs suggestive of the disease or outside the recommended age range, there are no recommendations for screening[7-8].

The prevalence of breast cancer is low in young women; however, when present, it is more associated with severe cases due to delayed diagnosis; consequently, there survival rates are lower. The absence of screening strategies, low accuracy in the interpretation of test results and a false perception of low risk by health professionals are the main vulnerability factors of the women's collective to breast cancer[7].

In this context, reorganization of the public policies with the expansion of the screening program is pointed out as a strategy that can positively influence the future morbidity and mortality rates in all age groups, with emphasis on primary prevention and early detection actions[5].

Given the above, the objective of the study is to describe the profile of women affected by breast cancer and to evaluate the aspects related to the disease detection and staging methods and their associations.

METHOD

This is a cross-sectional study with a quantitative approach and analytical estimate, carried out in five outpatient clinics of specialized and reference centers from the public health network for the care and monitoring of women with breast cancer in the state of Pernambuco, Brazil. Four of these units are located in the capital city of Pernambuco, Recife, and one is in the city of Caruaru, in the inland of the state. Data collection took place between June 2018 and January 2019.

The population consisted of women diagnosed with breast cancer, aged at least 18 years old, with a confirmed diagnosis and described in medical records with respective staging and tests, undergoing treatment or not, excluding breast cancer by metastasis and individuals with some type of neurological deficit or psychiatric disorders that made it impossible to answer the questionnaire, whether self-reported or described in medical records.

Probabilistic sample and calculation for proportion of populations through the 0.65 prevalence of the disease under study, obtained in a pilot study previously carried out in one of the reference centers surveyed, mean deviation from the confidence interval of 1.96 for a 95% confidence level and an admitted 5% margin of error, reaching a sample N of 349.5856 ~350, uniformly stratified to 70 cases for each unit.

The participants' individual selection method followed free demand, according to the random order of scheduling appointments in the outpatient clinics of the units surveyed.

The data were obtained through the application of a previously elaborated instrument and applied by the researchers containing variables that met the objective proposed, in addition to being based on criteria described as pertinent to the theme according to literature in the area, as well as pertinent to the eligible cases during the consultation days of the outpatient clinics according to the criteria listed. The approach was based on the interview technique, directly and individually, in a place that favored privacy for the interviewee.

In order to characterize the sample, personal information was used, as well as characterization of the family, and personal and clinical history of each participant. For the data on how to detect the tumor, breast self-examination (BSE), clinical breast examination (CBM), ultrasound (US) and mammography (MMG) were used and, for clinical staging, the international classification of breast cancer stage was employed[2,6].

Age stratification was based on a theoretical prerequisite of the age groups considered for breast cancer screening by the Brazilian Ministry of Health. For BSE, the new guidance of the Ministry of Health (Ministério da Saúde, MS) is that the woman should make the observation and self-palpation of the breasts at the appropriate time, without the need for a systematized technique and predetermined day. CBM is a routine examination in asymptomatic women, recommended annually from the age of 35 in populations with risk factors for breast cancer, and from the age of 40 for the general population. MMG is divided into screening for asymptomatic women aged from 50 to 69 years old and diagnoses women with breast changes in any age group. Finally, breast US is a complementary exam for more accurate information in situations of abnormal clinical or mammographic findings, but it does not replace mammography, and can be used as first choice in special cases, such as pregnant, lactating and young women or women with breast inflammation[2,5].

The clinical staging of breast cancer is called TNM system, where the letter T represents the dimensions, the letter N represents the lymph node involvement and the letter M represents the presence of metastases. These representations receive graduations and grouping in stages ranging from I to IV, and are subdivided into the following categories: 0, Ia, Ib, IIa, IIb, IIIa, IIIb, IIIc and IV, used to guide the choice of the most appropriate treatment and prognostic evaluation[7]. For the results of this study, the patients classified from stage 0 to IIA were categorized as early stage, from IIB to IIIC as locally advanced, and IV as metastatic cancer.

For data analysis and treatment, a database was built in the Microsoft Excel program, with subsequent export to the EPI INFO program, version 3.5.4, in which the database was validated (double entry for later comparison and correction of the discrepant values). After validation, the database was exported for data analysis to the Statistical Package for the Social Sciences, version 26.

In the evaluation of the categorical variables, the frequency distributions were calculated and their respective percentages were constructed, as well as Pearson's Chi-square (X^2) for comparison of proportions. To evaluate the distribution of the quantitative variables, the central tendency, dispersion, minimum, maximum, mean and standard deviation measures were calculated. To analyze the influences on the outcomes, identification method and staging of the disease, contingency tables were prepared and Pearson's Chi-square and Fisher's exact test for independence were applied. All conclusions were drawn considering a 5% significance level.

This study was approved under opinion number 2,901,357.

RESULTS

Table 1 shows that the proportion comparison test was significant in almost all factors evaluated (p-value<0.05), indicating that the profile described is considerably more prevalent in the group in question. However, in the age factor, no difference is observed between the groups under 50 years old and from 50 to 69 years old, or in the occupation factor between employed/autonomous and unemployed.

Table 1 – Distribution of the proportions of the sociodemographic profile of women with breast cancer in Pernambuco. Recife, PE, Brazil, 2019 (continues)

Factor assessed	n (350)	%	p-valor*
Age			
<50 years old	141	40,3	0,085
50-69 years old	172	49,1	
≥70 years old	37	10,6	
Minimum – Maximum		26-85	
Mean ± Standard Deviation		53,4±11,9	
Marital status			
Single	112	32	<0,001
Married/Stable Union	158	45,1	
Widow	52	14,9	
Divorced	28	8	
Income			
No income	38	10,9	<0,001
<1 Minimum wage	42	12	
1 Minimum wage	196	56	
>1 Minimum wage	74	21,1	
Origin			
Recife-PE	77	22	<0,001
Metropolitan Region of Recife-PE	95	27,1	
Inland PE	176	50,3	
Other state	2	0,6	
Religion			
Catholic	198	56,6	<0,001
Evangelical	113	32,3	
Spiritist	10	2,9	
Other religions	29	8,3	

Occupation			
Employed/Autonomous	96	27,4	0,078
Unemployed	82	23,4	
Retired/Pensioner	106	30,3	
Benefit	66	18,9	
Schooling			
No schooling	28	8	<0,001
Elementary School	156	44,6	
High School	130	37,1	
Higher Education/Graduate studies	36	10,3	
Skin color			
White	111	31,7	<0,001
Black	32	9,1	
Brown	205	58,6	
Asian	2	0,6	

*p-value obtained in the X^2 test for comparison of proportions.
Source: The authors (2019).

In Table 2, the proportion comparison test was significant in almost all factors (p-value<0.05), indicating that the profile described appears significantly higher, except for the use of contraceptives.

Table 2 - Characterization of the personal and family history of women with breast cancer in Pernambuco. Recife, PE, Brazil, 2019 (continues)

Factor assessed	**n (350)**	**%**	**p-value***
Use of breast prosthesis			
Yes	7	2	<0,001
No	343	98	
Use of contraceptives			
Yes	192	54,9	0,069
No	158	45,1	
1st degree relatives with breast cancer			
Yes	110	31,4	<0,001
No	240	68,6	
Personal history of cancer			
Yes	80	22,9	<0,001
No	270	77,1	

Presence of signs and symptoms			
Yes	302	86,3	<0,001
No	48	13,7	

*p-value obtained in the X^2 test for comparison of proportions.
Source: The authors (2019).

In Table 3, in the proportion comparison test, all the factors evaluated were significant, as the result of the comparison test corresponding to the percentage proportions of each factor evaluated presented p-value <0.05.

Table 3 - Characterization of the clinical profile of the women evaluated. Recife, PE, Brazil, 2019

Factor assessed	**n (350)**	**%**	**p-valor***
Identification method			
BSE	262	74,9	<0,001
CBM	19	5,4	
US	18	5,1	
MMG	51	14,6	
Access to the health system			
BHU physician	109	31,1	0,016
BHU nurse	30	8,6	
Consultation with a specialist	118	33,7	
Hospital	93	26,6	
Diagnostic staging			
Early stage	97	27,7	<0,001
Locally advanced	231	66	
Metastatic cancer	22	6,3	

*p-value obtained in the X^2 test for comparison of proportions. Breast Self-Examination (BSE), Clinical Breast Examination (CBM), Ultrasound (US), Mammography (MMG), Basic Health Unit (BHU).
Source: The authors (2019)

Regarding breast self-examination, 196 (56%) of the women reported routine practice on a monthly basis.

Table 4 describes the association test between the variables that presented a dependence relationship (p-value<0.05) with the cancer identification method used by the women who comprised the study sample. None of the other variables described as sample characterization presented this relationship. It is observed that BSE was the most prevalent breast cancer identification method for the age group <50 years old, with 115 (81.6%). CBM and mammography (MMG) had the highest number of cases in the age group between 50 and 59 years old and US, in <50 years old.

Table 4 - Distribution of the breast cancer identification methods according to the characterization factors of the women evaluated. Recife, Brazil, 2019

Factor assessed	Breast cancer identification method								p-value
	BSE	n(%)	CBM	n(%)	US	n(%)	Mammography	n(%)	
Age									
<50 years old	115	81,6	6	4,3	10	7,1	10	7,1	0,034[1]
50-69 years old	123	71,5	10	5,8	6	3,5	33	19,2	
≥70 years old	24	64,9	3	8,1	2	5,4	8	21,6	
Signs and symptoms									
Yes	259	85,8	12	4	6	2	25	8,3	<0,001[2]
No	3	6,3	7	14,6	12	25	26	54,2	
Access to the health system									
BHU physician	90	82,6	5	4,6	4	3,7	10	9,2	0,003[2]
BHU nurse	22	73,3	6	20	1	3,3	1	3,3	
Consultation with a specialist	86	72,9	6	5,1	9	7,6	17	14,4	
Hospital	64	68,8	2	2,2	4	4,3	23	24,7	

1p-value obtained in Pearson's X^2 test, 2p-value obtained in Fisher's exact test. Breast Self-Examination (BSE), Clinical Breast Examination (CBM), Ultrasound (US), Mammography (MMG), Basic Health Unit (BHU).
Source: The authors (2019).

Table 5 presents the distributions of the significant association test (p-value<0.05) for the diagnostic staging of breast cancer. It is observed that, for almost all identification methods, the highest prevalence of case distribution occurred for locally advanced tumors, except for the routine US method, which was more prevalent for the initial stage. It is also observed that, for all staging levels, the distribution of the absolute number of people was higher for BSE. Regarding presence of signs and symptoms, the highest prevalence was also for the locally advanced type, as well as for those who have first-degree relatives with breast cancer and a personal history of other types of cancer.

Table 5 - Distribution of diagnostic staging according to the cancer identification methods and characterization factors of the women evaluated. Recife, PE, Brazil, 2019 (continues)

Factor assessed	Diagnostic staging						p-value
	Early stage	n(%)	Locally advanced	n(%)	Metastatic cancer	n(%)	
Identification method							
BSE	63	24	184	70,2	15	5,70%	0,024[2]
CBM	5	26,3	13	68,4	1	5,3	
Routine US	8	44,4	7	38,9	3	16,7	
MMG	21	41,2	27	52,9	3	5,9	

Signs and symptoms							
Yes	75	24,8	209	69,2	18	6	0,006[1]
No	22	45,8	22	45,8	4	8,3	
1st degree relatives with breast cancer							
Yes	41	37,3	60	54,5	9	8,2	0,009[1]
No	56	23,3	171	71,3	13	5,4	
Personal history of cancer							
Yes	21	26,3	48	60	11	13,8	0,007[1]
No	76	28,1	183	67,8	11	4,1	

1p-value obtained in Pearson's X^2 test, 2p-value obtained in Fisher's exact test. Breast Self-Examination (BSE), Clinical Breast Examination (CBM), Ultrasound (US), Mammography (MMG).
Source: The authors (2019)

DISCUSSION

The results obtained indicate that most of the women who comprised the sample of this study detected the breast alteration by performing the BSE method, and were related to more advanced categories of the disease, consequently associated with a worse prognosis. It is also noticed that the sample consists of a significant number of young women, with no first-degree relationship with cancer and no personal history, but with visible signs and symptoms of breast injury at the time of detecting the disease.

In relation to age, almost half of the sample was between 50 and 69 years old, an age group described as the most prevalent for breast cancer, being also the one at the highest risk and recommended by the Ministry of Health for screening[6,9]. However, the second most prevalent age group corresponded to women under 50 years old.

The early detection strategy aims at verifying the disease already installed, but in its early stages, and can be done in two ways: either by early diagnosis, which identifies the premature signs and symptoms of the disease, or by screening, which is the application of tests in people without signs and symptoms of the disease, to identify it in the pre-clinical phase, that is, asymptomatic[7]. Thus, it is important to emphasize the need to extrapolate this strategy to encompass age groups younger than 50 years old, through strategic health actions and activities routinely carried out in the health teams' work process[10-11].

In the current study, when the age for association with staging of the disease was tested, a relationship of independence was found, that is, of no association between them, evidencing that the prevalence of disease staging is independent of age, being similar in all age groups. It is thus assumed that people belonging to younger age groups can present diseases at the same severity levels as older individuals. This inference leads to reflect on the strategies currently recommended in the application of the concept of early detection in younger age groups.

It is worth noting that early diagnosis strategies are based on three pillars: a population equipped with knowledge, trained professionals, and efficient health systems and services. Achievement of this triad can occur through the alignment of knowledge strategies of the female population and the strengthening of clinical-diagnostic research studies by medical professionals and nurses through a more effective development of CBM[12].

It is mandatory to emphasize that CBM can be a good screening method for

breast cancer, being recommended in several countries, such as Canada and Colombia, especially in women under 50 years old, due to the breast density that generates image quality restrictions by MMG. In this perspective, the increase in CBM as an integral part of comprehensive care for women is configured as a simple and non-invasive method with high sensitivity[13-14].

Non-recommendation of BSE as a screening method is a consensus among the specialists, as it exerts no significant impact on the reduction of mortality, and because malignancy is already in more advanced stages in most cases, with worse prognoses. However, there is still no consensus regarding CBM[6,15].

Of the group of women who identified the disease through MMG, cancer staging was locally advanced. This result draws the attention because MMG is considered the gold standard in breast cancer diagnosis for having high sensitivity and specificity in the detection of early-stage neoplasms. A possible inference to this result is that breast cancer screening in Brazil is opportunistic, that is, it depends on the women's spontaneous demand to the health system, enabling an important time gap[4].

Thus, the main associations of national specialists have proposed an extension in the age group for screening, in addition to annual periodicity, associated with the improvement of complementary elements such as education in health for society and annual periodicity of routine clinical examinations[6,16].

On the other hand, women who identified the disease by means of breast US were in the initial stage, of which more than half belonged to the age group <50 years old. This result evidences breast US examination as a recurrent resource and with good accuracy for younger categories. Although US is not included in the Ministry of Health's recommendations and does not present evidence in reduction of mortality, it has proved to be a complementary resource that deserves further clarification.

Although there is still no strong enough scientific evidence to support the indication of breast US as a method for population screening for breast cancer, the literature points to its consolidation as an important diagnostic method for breast diseases, with the ability to differentiate the types of nodules, including malignancy, in addition to being a fast, affordable and radiation-free examination. The main factors pointed out as impediments are the relationship of dependence on the quality of the diagnosis in relation to the physician, which can generate diagnostic errors with unnecessary indications of invasive procedures, as well as give rise to feelings of anguish and fear in the patients[2,17].

Regarding the presence of signs and symptoms, it is observed that, of the women who presented them, most identified the tumor by BSE and had locally advanced cancer. The presence of symptoms points to a direct relationship with late diagnoses and worse prognoses, reinforcing that BSE cannot be stimulated as an isolated strategy, but rather as an action of knowledge of the body itself[12].

The limitation of this study is related to its cross-sectional design, which makes it possible to know the subsidies for identifying the breast cancer detection and staging methods, although it does not allow establishing temporality or cause and effect relationships between the variables.

CONCLUSION

When analyzing several aspects presented in the results, most of the women detect breast cancer through BSE, regardless of the age group, in addition to being in stratifications of a more advanced category in staging of the disease, which represents higher risks. Despite the recommendations currently used for screening and early diagnosis, women

remain with late diagnoses, which leads to worse prognoses, in addition to identifying the disease by a method not considered adequate for early screening or diagnosis.

In this sense, a situational panorama is observed that deserves sensitization of managers and professionals in the strengthening of public policies that ensure the development of strategic actions to intensify population screening and education in health.

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - Santos CMF dos, Santana VM de, Gomes TN, Cavalcante LTS; Drafting the work or revising it critically for important intellectual content - Santos CMF dos, Santana VM de, Gomes TN, Cavalcante LTS, Lima MCL de; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - CAR de O. All authors approved the final version of the text.

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