

Inequalities associated with lack of mammography in Teresina-Piauí-Brazil, 2010-2011

Desigualdades associadas à não realização de mamografia na zona urbana de Teresina-Piauí-Brasil, 2010-2011

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Abstract

Introduction: Randomized studies have shown that screening for breast cancer with mammography reduces the breast cancer mortality. However there are signs of a great inequality in access to mammography in Brazil. **Objectives:** To analyze the percentage of women who did not undergo mammography according to socioeconomic and demographic variables in women aged from 40 to 69 years in Teresina, Piauí State, Brazil. **Methods:** This was a cross-sectional population-based study in women aged 40-69 years in Teresina-Piauí in 2010/2011. The sampling was randomly conducted in five stages. The data were processed by SPSS 19.0 and it was performed univariate and multivariate analysis. **Results:** Among 433 women who answered the questionnaire, 75,3% had a mammography and 17,2% of these women had not a mammography over the last two years. The lack of breast cancer screening was associated with non-white skin color ($p = 0,030$), never being married ($p = 0,041$), low levels of education ($p = 0,010$), low family income ($p < 0,001$), smoking ($p = 0,006$), having no private health insurance ($p < 0,001$). The Unified National Health System (SUS) performed 56,3% of reported mammograms. **Conclusion:** About 24.7% of women in the sample never had a mammography. According to the findings, the lack of breast cancer screening is associated with social and racial inequalities.

Keywords: Breast Neoplasms. Breast Cancer Prevention. Mass Screening. Mammography. Health Inequalities. Social Inequity.

Resumo

Fundamentos: Estudos demonstram que a realização da mamografia em programas de rastreamento diminui a mortalidade do câncer de mama. Entretanto, há indícios de grande desigualdade no acesso à realização deste exame no Brasil. **Objetivos:** Analisar o percentual de mulheres que não realizaram mamografia segundo variáveis socioeconômicas e demográficas em mulheres de 40 a 69 anos de Teresina-PI. **Métodos:** Estudo transversal realizado em 2010/2011, com amostragem multifásica em cinco etapas, realizando-se entrevista face a face com cada mulher sorteada. Processou-se os dados com programa SPSS 19.0, realizando-se análise uni e multivariada. **Resultados:** Dentre as 433 mulheres que responderam o questionário, a taxa de realização de mamografia foi de 75,3%, sendo que, destas, 17,2% a haviam realizado há mais de dois anos. A não realização de mamografia esteve relacionada com raça parda/negra ($p = 0,030$), ausência de companheiro ($p = 0,041$), menor grau de instrução ($p = 0,010$), menor renda ($p < 0,001$), tabagismo ($p = 0,006$), não possuir plano ou seguro de saúde ($p < 0,001$). O Sistema Único de Saúde (SUS) foi responsável por realizar 56,3% das mamografias. **Conclusão:** 24,7% das mulheres teresinenses nunca haviam realizado mamografia e 37,9% não a haviam realizado nos últimos dois anos. A não realização deste exame foi associada à existência de desigualdades racial e socioeconômica.

Palavras-chave: Neoplasias da mama. Prevenção de câncer de mama. Programas de rastreamento. Mamografia. Desigualdades em saúde. Iniquidade social.

Introduction

Breast cancer is the most common form of cancer among women, accounting for approximately 22% of new neoplasm cases in women every year. According to the National Institute of Cancer (INCA), in 2012 there will be 52,680 new cases in Brazil, with an estimated risk of 52 cases per 100 thousand women. In Teresina (Piauí, Brazil), the overall incidence rate per 100 thousand inhabitants is estimated at 40.76, and 180 new cases are expected this year¹. Mortality rates are also high, having increased by approximately 20% between 1995 and 2005 in Brazil².

Early detection to attain better prognosis has been the objective of several public health programs. There is evidence that mammograms have an efficacy of approximately 23% in the reduction of mortality by breast cancer among women from 50 to 69 years old. From 40 to 49 years old, however, using mammograms for screening is controversial, because the incidence of breast cancer is lower in this group and the test has lower sensitivity, resulting in a higher number of false positives³.

In several developed countries, like Australia, Canada, Denmark, Iceland, Finland, Italy, the Netherlands, the United Kingdom, Spain and Sweden, breast cancer screening programs have been on for more than 10 years, and the mammogram is the main and only test used^{4,5}. In our country, although the breast cancer screening program from the Ministry of Health (MS) has existed since 2003, it is still more frequent to diagnose tumors in more advanced phases^{6,7}. The MS' recommendation is for women from 50 to 69 years to have a mammogram at least every two years, whereas those from 40 to 49 years should be submitted to an annual clinical breast examination. For those with a family history of breast cancer in first-degree relatives, the recommendation in Brazil is to be submitted to clinical examination and a mammogram as of 35 years old⁷. Self-examination stopped to be recommended in recent years as an effective procedure for breast cancer screening⁸.

The Brazilian Society of Mastology (SBM), in turn, recommends that asymptomatic women have mammograms annually as of 40 years old, high risk women after they turn 35, and those genetically predisposed should start at 25 years of age².

Therefore, considering the high incidence and mortality rates of breast cancer and the need for early detection in Brazil^{1,2}, we believe it is necessary to assess the preventive practices for this condition. To this end, the present study focused on analyzing the percentage of women aged 40 to 69 that did not have a mammogram in Teresina-PI, taking into consideration socioeconomic and demographic variables. We thus hope to offer data for public managers to implement strategies that can guide health services towards universality and equity in women's health care.

Methods

This cross-sectional study was conducted in the 2010-2011 period among the population of women aged 40 and 69, living in the municipality of Teresina. According to estimates from the MS/SE/Datasus, the city had 106,602 individuals in this group in the referred period⁹. The Home Inquiry on Risk Behaviors and Referred Morbidity of Diseases and Non-Transmissible Conditions of the Ministry of Health¹⁰ assessed 16 Brazilian cities (not including Teresina) and found percentages between 46.9% and 52.3% for mammograms in other cities of Northeast Brazil. Based on these data, we assumed the prevalence of women that did not have a mammogram as about 50% and, using a 95% confidence level and error of 5%, and we defined the size of the sample at 384 women.

Sampling was performed in five stages. Initially, districts were grouped into five administrative regions according to the IBGE (Brazilian Institute of Statistics), which on average works with regions comprising 23 districts. The first stage consisted of drawing 20% of the districts in each administrative region, corresponding to the 23 districts of

Teresina. District selection in each region followed the proportionality of the number of households in the region districts.

In the second stage, 10% of the census sectors in the district were selected. If the district drawn in the first stage had less than ten sectors, one sector among the existing ones would be drawn. The selection of sectors within the district was also proportional to the number of households in each sector.

The third stage focused on choosing a block inside the sector. Blocks were numbered to facilitate selection and then five blocks were drawn. Sectors with less than five blocks had all blocks included in the study. When the block drawn was not residential, a new draw was performed.

The fourth stage consisted of a random choice of the household. This choice followed a systematic sampling, in which the systematization interval (k) was the result of the number of households existing in the district divided by the number of households in the sector. If the site selected was a non-residential home or a collective residence, we alternated our choice between the household immediately before or after it. We drew one of the block corners to start systematization. As from the corner drawn, the random beginning of the interval was the number drawn between 1 (corresponding to the household of the corner drawn) and k .

The fifth and last stage was the choice of women. The choice of this unit of analysis inside the household focused on the closest birth date among those women aged 40 to 69 years that lived there. If there were no women in the age group object of the study in the household, we alternately chose the following household to the right or to the left.

Women drawn for the study were submitted to a face-to-face interview using a structured questionnaire with closed questions, applied by the authors of the study. Non-response was considered in the following situations: refusal, unoccupied household, no women living in the household for a period longer than the deadline

for data collection, and if the woman drawn was absent after we returned to the household on three different occasions.

The dependent variable considered in the present study was never having had a mammogram. The independent variables analyzed were:

- Socioeconomic and demographic: age group, color/race (self-referred), marital status, number of children, schooling, monthly family income and occupation. The minimum wage in effect in the country at the time of the study was used to calculate family income;
- Life habits: regular physical activity and smoking status: smoker, former smoker and non-smoker;
- Co-morbidities: hypertension, diabetes, overweight;
- Family and personal history of breast cancer; and
- Use of health services: having healthcare insurance or plan to finance the mammogram.

Duly filled out questionnaires were supervised and checked and then processed in the SPSS 19.0 program (SPSS Inc., Chicago, United States). Descriptive and analytical statistical analysis was performed. The descriptive analysis distributed absolute and relative frequencies for category variables and means, with standard deviations for continuous variables. The analytical approach applied univariate analysis, using the Pearson Chi-square test (considering a 5% level of significance), and multivariate logistic regression, using 'never having had

a mammogram' as the dependent variable and all the others as independent ones. We used the overall and adjusted odds ratio (OR) for the other variables to measure association, considering a 95% confidence interval (95% CI).

The present study was approved by the Ethics and Research Committee of the Federal University of Piauí (UFPI).

Results

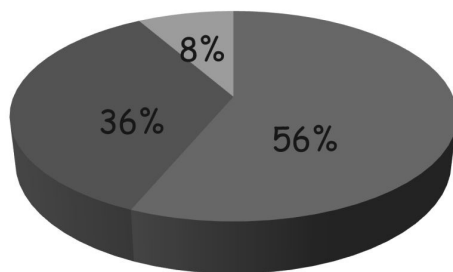
Altogether, 460 women were drawn for the study. The non-response rate accounted for 5.9%. Considering the 433 women that agreed to answer the questionnaire, the mean age was 51.8 years, 88.4% had children (mean number of children = 3.1), 56.1% had completed elementary school only, 57.7% had a partner, 63.3% referred themselves as brown (mulatto), 54.3% had income below two minimum wages, 59.8% had never smoked, 73.9% were sedentary, 64.9% did not have any kind of healthcare insurance or plan, 6.2% had a first degree relative with a history of breast cancer and 0.7% had a personal history of breast cancer.

We observed in the present study that 107 (24.7%) of the total women interviewed had never had a mammogram. Among the 326 (75.3%) who said they had had it, it was over two years ago for 17.5%, and in the past year for 66.6% (Table 1). Thus, we observed that 62.1% of all respondents had taken the test in the past two years. Of the tests performed, 56.3% were paid by the SUS, 35.4% by healthcare insurance or plan and 8.3% by patients themselves (Chart 1).

Table 1 - Time elapsed since the last mammography among 326 women who had undergone mammography in Teresina-PI, 2010-2011.

Tabela 1 - Tempo decorrido desde a realização da última mamografia entre 326 mulheres que já haviam realizado mamografia em Teresina-PI, 2010-2011.

Time elapsed	N	Frequency of having test (%)	Accumulated Frequency (%)
Past 6 months	103	31.6	31.6
More than 6 months and less than 1 year	114	35.0	66.6
More than 1 year and less than 2 years	52	16.0	82.5
More than 2 years	57	17.5	100.0



■ Unified Health System ■ Health Plan ■ Private

Graphic 1 - Funding of mammography among 326 women who had undergone mammography in Teresina, Piauí, 2010-2011.

Gráfico 1 - Financiador da mamografia entre 326 mulheres que já haviam realizado mamografia em Teresina-Piauí, 2010-2011.

Table 2 shows that not having a mammogram had a statistically significant association with age, with lower rates in the interval between 50 and 59 years old ($p < 0.001$). In addition, we also observed a significant association between not having the test and: mulatto/black women ($p = 0.030$), absence of a partner ($p = 0.041$), smoking ($p = 0.006$), low level of schooling ($p = 0.010$), low family income ($p < 0.001$) and absence of healthcare insurance or plan ($p < 0.001$).

The values attained in the multivariate analysis, with their respective overall/adjusted OR and 95% confidence intervals are also in Table 2. We observed that the likelihood of not having a mammogram among those that were self-referred as black and mulatto was, respectively, 3.22 and 3.58 times higher than among whites. As for marital status, singles were 2.09 times more likely to not having had the test than those with a partner. With regard to schooling, the likelihood of illiterate women not having a mammogram was 6.89 times higher than for college graduates. Having an income below two minimum wages, in turn, was 5.97 times more likely than for income above six minimum wages, and not having a healthcare plan 3.19 more likely than for those who have one. When we adjusted the Odds Ratio for all variables in Table 2, we observed that such associations attenuated or disappeared.

When the 107 women who had not had a

mammogram were asked about the reasons for not having ever taken the test, the most frequent answers included no physician had ever requested the test before (55.1%) and that they had never felt anything wrong with their breast (51.4%), as detailed in Table 3.

Discussion

The present study enabled us to verify that 24.7% of women between 40 and 69 years old living in urban Teresina had never had a mammogram before and 37.9% had not had one in the past two years. In terms of comparison, the coverage found is higher than in Campinas (47.9% had not had the test in the past two years), but lower, for example, to that of Pelotas (31.1% in the past two years)^{11,12}. According to data attained in the inquiry performed by the National Institute of Cancer (INCA) between 2002 and 2003, the prevalence of not having mammograms in the past two years in Teresina are also lower than those observed in the cities of Manaus, Belém, Fortaleza, Natal, João Pessoa, Recife, Aracaju, Campo Grande, the Federal District, Rio de Janeiro, São Paulo and Curitiba, but higher than those observed in Belo Horizonte, Vitória, Florianópolis and Porto Alegre¹⁰.

In comparison to studies from other countries, mammogram coverage in Teresina is also higher than in Barcelona (where 40.7% never had a mammogram

Table 2 - Prevalence and factors associated with the non-utilization of mammography in women aged between 40 and 69 years of Teresina, Piauí, 2010-2011.

Tabela 2 - Prevalência e fatores associados a **não realização** da mamografia em mulheres com idade entre 40 e 69 anos de Teresina-Piauí, 2010-2011.

Variables	N	Prevalence of not having test (%)	p*	Overall OR	95% CI	Adjusted OR **	IC 95%
Age (in years)			<.001				
40-49	193	33.2		3.20	1.83-5.59	3.03	1.12-8.22
50-59	149	13.4		1.00		1.00	
60-69	91	25.3		2.18	1.12-4.25	5.00	0.97-25.81
Race			.030				
White	62	9.7		1.00		1.00	
Yellow	19	26.3		3.33	0.89-12.52	1.72	0.37-7.93
Brown	274	27.7		3.58	1.48-8.66	2.37	0.85-6.62
Black	78	25.6		3.22	1.20-8.61	2.05	0.54-7.73
Marital status			.041				
Single	74	36.5		2.09	1.19-3.65	1.89	0.99-3.65
Widow	53	18.9		0.84	0.39-1.79	0.69	0.28-1.69
Divorced	56	28.6		1.45	0.76-2.79	2.01	0.91-4.42
With a companion	250	21.6		1.00		1.00	
Smoking			.006				
Never smoked	259	26.6		0.66	0.36-1.20	0.54	0.16-1.82
Former smoker	114	14.9		0.32	0.15-0.67	0.33	0.09-0.79
Smoker	59	35.6		1.00		1.00	
Exercising			.458				
Yes	113	22.1		0.83	0.49-1.37	0.89	0.36-2.19
No	320	25.6		1.00		1.00	
Schooling			.010				
Illiterate	40	40.0		6.89	1.79-26.39	1.65	0.32-8.43
Incomplete elementary school	146	31.5		4.75	1.38-16.35	1.36	0.33-5.53
Complete elementary school	57	19.3		2.47	0.64-9.58	1.14	0.25-5.16
Incomplete High School	31	25.8		3.59	0.86-15.05	0.95	0.15-6.22
Complete High School	106	18.9		2.40	0.67-8.65	0.91	0.22-3.87
Incomplete College Degree	19	15.8		1.93	0.35-10.72	1.89	0.28-12.91
Complete College Degree	34	8.8		1.00		1.00	
Family income (minimum wages)			<.001				
<2	235	32.8		5.97	2.08-17.15	2.33	0.77-7.03
2-4	111	19.8		3.03	0.99-9.29	1.61	0.53-4.89
4-6	34	11.8		1.63	0.38-7.02	0.95	0.21-4.39
>6	53	7.5		1.00		1.00	
Health plan			<.001				
Yes	152	12.5		1.00		1.00	
No	281	31.3		3.19	1.86-5.49	1.57	0.75-3.27
Family history of breast cancer			.441				
Yes	27	18.5		1.00		1.00	
No	406	25.1		1.48	0.55-3.99	1.51	0.46-4.94

*Qui-quadrado / *chi-square

**Odds ratio ajustado para todas as variáveis da tabela / **Adjusted odds ratio for all variables in the table.

Table 3 - Reasons to justify non-utilization of mammography among 107 patients who had never performed this exam in Teresina, Piauí, 2010-2011.

Tabela 3 - Motivos relatados para justificar a não realização da mamografia dentre 107 pacientes que nunca fizeram o referido exame em Teresina-Piauí, 2010-2011.

Reason	N	Frequency (%)
Because no physician requested the test before	59	55.1
Because never felt anything wrong with breast	55	51.4
The test was already requested, but I was afraid to do it	6	5.6
It was very difficult to get an appointment for the test	14	13.1
I did not know at what age I should begin doing it	10	9.3
Because I think it must be uncomfortable	5	4.7
Other reason	11	10.3

before and 65.9% did not have one in the past year), than in Turkey (where 56% of individuals had never heard or read about mammograms and only 25% of women had ever had the test once in life), than in Mexico (where only 14.8% had a mammogram in the past two years) and, than in Australia (where 49%, 25%, and 33% of women of 40-49 years old, 50-59 years old and 69-69 years old, respectively, never had a mammogram)¹³⁻¹⁶.

Despite showing higher mammogram rates in the past two years than in many Brazilian and international cities, the coverage observed of 62.1% is still below the goal of 70% established in the Healthy People document of 2010 and much below the goal of 76.8% established for 2020^{17,18}. Considering that in Northeast Brazil, in general more than half the mammogram equipment is found in the capital, we can assume that, due to an uneven distribution of equipment, mammogram coverage in the state of Piauí is probably even more insufficient than that presented in Teresina¹⁹.

As for distribution in age groups, not having a mammogram was significantly lower in the group from 50 to 59 years old (13.4%), supporting data from the National Household Sample Survey (PNAD) of 2003, in which the 40-49 and 50-59 age groups were strongly associated with having had the test and also data from an Australian

study, in which not having a mammogram was significantly lower ($p < 0.01$) among women between 50 and 59^{16,20}. Considering that the Ministry of Health recommends asymptomatic women to start mammogram screening as of 50 years old, the 40 to 49 year-old group is really expected to have a higher rate of not having the test than the group from 50 to 59⁷.

Some authors have discussed that there is an excess of tests without recommendation, since, according to the Ministry of Health, only 10% of women from 40 to 49 years old may have alterations in their clinical breast examination that would indicate having a mammogram. In our study, 66.8% of women in this age group had already had the screening²¹. Despite the current recommendation of the Brazilian Society of Mastology for screening to be started as of 40 years old, this is quite a controversial subject in the literature^{2,3}. A recent analysis published by the Cochrane Database System Review showed that regular mammogram screening achieves an absolute risk reduction of 0.05%. A consequence of this was a 30% over diagnosis and excessive treatment, which challenges whether the age group for such procedure should not be more strictly limited²². Analyses from programs in the United Kingdom and Sweden, in turn, estimated that, for each case over diagnosed, approximately 2 to 2.5 lives are saved by early identification²³.

When we analyze women's skin color, we observed a significantly lower rate of not having a mammogram for those self-referred as white (only 9.7%). Mulatto and black women were, respectively, 3.58 and 3.22 times more likely to not having the test. This was also observed in other studies, like the one conducted in Campinas, where non-test rates in the past two years among white women were 45.8% and among mulatto/black women, 71.7%¹¹. According to Oliveira et al.¹⁹, however, there is a trend toward reducing inequalities: the Brazilian population that declares to be black or mulatto showed the highest increase in access to mammograms, with a growth of, respectively, 32% and 40% from 2003-2008

The marital status variable showed there is a significantly higher rate of not having the test (36.5%) among single women, who were 2.09 times more likely to not having the test than those with a partner, which slightly diverges from the literature. In the study performed in Campinas, for example, there was no statistically significant difference, but those without partners showed a higher rate of not having the test¹¹. In a Mexican study, in turn, there was a significant difference, but in that study single women had a higher rate of having the test (23.8% of single women had had the test against 11.9% of married women). A possible cause for such would be the difficulty faced by those with a partner to keep up with all expenses and care with the children and the household¹⁵.

Smoking was strongly associated with higher rates of not having a mammogram, in that the lowest rates were found among former smokers, probably reflecting higher concern with their own health. Thus, former women smokers showed a decreased chance of not having a mammogram (OR = 0.32, IC 95% = 0.15-0.67), which was maintained even after OR adjustment for the other table variables. Nevertheless, physical exercising, which could also show a higher concern with health, did not show a significant association in the present study.

Although women without a family history of breast cancer were 1.48 more likely

to not having a mammogram (25.1% against 18.5% among those with history), such difference was not statistically significant in our study. Rutten & Iannotti (2003)²⁴ say that women with a positive family history adherent to screening report higher benefits in mammograms and higher perception of the importance of family history than those with a negative history. In a North-American study, most Afro-American women with a family history of breast cancer were adherent to recommendations for mammograms (75%) and clinical breast examination (93%), in that 41% of them also performed self-breast examination excessively.²⁵

As for socioeconomic variables, the prevalence of not having the mammograms decreased according to the level of schooling, from 40.0% to 8.8%, and was significantly lower among those with high level of education. An illiterate woman, for example, is 6.89 times more likely to not have a mammogram than one that has graduated from college. A very strong significant relation was also found with regard to family income: 38.5% of those women with family income below two minimum wages had never had a mammogram, compared to only 7.5% of those with income above six minimum wages who never had had the test, which represents a chance 5.97 times higher than the first group. We can thus see the deep socioeconomic inequalities associated with having the test in our city, which is also verified throughout Brazil and in several countries in the world^{10,11,14-17,19,26-28}. Social status not only influences the perception of risk and behavioral factors that play a role in the decision to seek for care, but also is determinant in access to the test¹⁹.

Adjusting the Odds Ratio for all the study variables (Table 2), we observed that the relations between not having a mammogram and race, schooling and family income proved to be attenuated or nonexistent. This fact can be justified by considering that such variables are interrelated¹⁹.

A strong association was also observed in relation to having healthcare insurance or plan or not. Those who did not have

one have much less mammograms (3.19 times more likely of not having the test), which is compatible to data from several studies^{11,17,20,27}. Such fact possibly reflects the difficulty of those that do not have healthcare insurance or plan to be able to have the test at the SUS. It is important to note that private healthcare coverage in Teresina is 15.53% and that, therefore, more than four fifths of the population has to pay for the test on their own (price ranges from \$ 60 to 100 Brazilian *reais* in the city) or become dependent of a small amount of public establishments available to have the mammogram²⁹. A recent study shows that Northeast Brazil is one of the regions that has the highest proportion of women that live far from a mammogram (more than 50 kilometers), thus posing additional difficulty in taking the test¹⁹.

Since a substantial part of the population does not have healthcare insurance or plan, it is justifiable that most women sought public services to have the test and that, therefore, SUS was the main source of funding for the 326 women who had already had a mammogram in Teresina, accounting for 56.3% of tests (Figure 1). According to the National Registry of Health Establishments (CNES), Teresina-PI has sixteen establishments with simple command mammogram machines and nine are stereotaxic, of which, only four and one, respectively, are public³⁰. Knowing that the female population of Teresina in the 40 to 69 age group is of approximately 106 thousand, we can realize the incapacity of this small amount of public establishments with mammograms to meet the needs of not only those women

who do not have a healthcare plan, but also the demand of the population from several cities in the state inland where there are no mammograms.⁹

When women that have never had a mammogram are asked why they had not done so, most answered that no physician had asked for the test before (55.1%) and/or that they had never felt anything in their breasts before (51.4%). The concerning report that no physician had asked for the test before corroborates data from other studies²⁶ and poses a question: would our physicians be really disregarding breast cancer screening or would these women not be going regularly to health services? Some authors say the preventive and breast cancer screening measures adopted by non oncologists in relation to adopted guidelines are unsuitable³¹. Other less mentioned reasons were the difficulty in scheduling the test (13.1%) and lack of information about the age to start having it (9.3%).

Conclusions

Awareness of sociodemographic variables in breast cancer screening can help identify population groups at risk for not having tests. We observed that approximately one fourth of women in Teresina had never had a mammogram and that only 62.1% had had one in the past two years. Not having the test was associated with socioeconomic inequalities. SUS was the major source of funding for the test, but proved to be incapable of meeting existing needs.

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