

# Breast cancer screening in Brazil. Barriers related to the health system

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## SUMMARY

**Objective:** Identify factors related to the health system that lead to a late diagnosis of breast cancer in Brazil.

**Method:** We performed a systematic review in the PubMed and LILACS databases using as keywords “Breast cancer,” “system of health” and “Brazil or Brasil.” We evaluated the content of the articles using the PRISMA methodology based on PICTOS. The final date was 12/16/2015. We were able to identify 94 publications in PubMed and 43 publications in LILACS. After assessing the title and summary, and excluding 21 repeated publications, we selected 51 publications for full evaluation. At this stage, we excluded 21 articles, with 30 publications remaining for study.

**Results:** The population coverage is low, and there are problems related to the quality of mammography. Patients with lower income, nonwhite and less educated are more vulnerable. We observed punctual and initial experiences in breast cancer screening. Diagnosis and treatment flows must be improved. The inequality in mortality reflects the differences related to screening structure and treatment. Better results are observed in well-structured services.

**Conclusion:** There are several barriers in the health system leading to advanced stage at diagnosis and limiting the survival outcomes. The establishment of a rapid and effective order for diagnosis and treatment, based on hierarchical flow, are important steps to be improved in the public health context.

**Keywords:** breast neoplasms/prevention and control, health systems, screening programs, mammography, Unified Health System.

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## INTRODUCTION

Breast cancer is a worldwide problem, with 1.7 million new cases a year. Half of the cases are in developed countries, but 62% of deaths occur in developing nations. Mortality in the United States is declining, a fact attributed to early diagnosis by mammography and to improvements in treatment. In South America, however, incidence and mortality are increasing.<sup>1</sup> Breast cancer is diagnosed in advanced stages in countries with limited resources due to a deficit in the ability to promote early detection, diagnosis and treatment. To assess the complexity of the health system in relation to breast cancer, the Breast Health Global Initiative (BHGI)<sup>2</sup> sought to categorize the organization levels of different countries in relation to breast cancer, so that the basic level encourages breast self-exam,

the limited level refers to the availability of diagnostic ultrasound and mammography, the increased level includes diagnostic mammography with opportunistic breast screening, and the maximum level refers to organized population mammary screening.<sup>2</sup> In the United States, the rate of mammography screening is high, but in countries with budget limits there are no effective screening programs, and in some cases access to treatment is limited.<sup>1</sup>

Survival in developed countries is around 73%, and 57% in developing countries. In developing countries, the incidence of breast cancer is lower, while the incidence/mortality ratio is higher than in developing countries.<sup>1</sup> Due to the economic and logistical limitations in Brazil, mammographic screening is not a widespread reality, a fact that is reflected in the high number of patients diag-

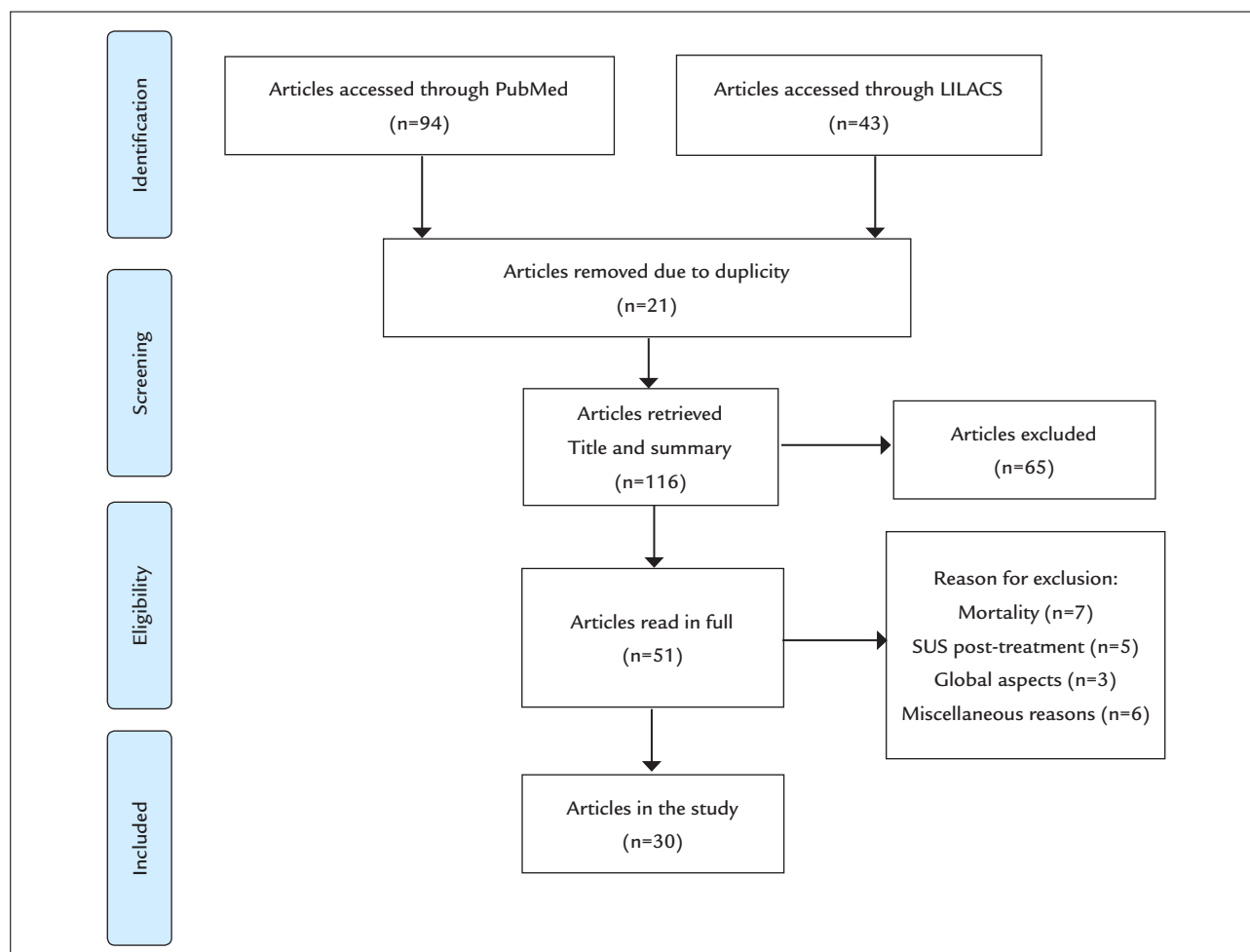
nosed at an advanced stage, due to the absence of an organized network aimed at the early diagnosis of breast cancer. There is no organized mammographic screening, only isolated experiments.<sup>3-5</sup>

When assessing the barriers related to mammography screening, they can be synthetically divided into those related to the health system, those related to education or knowledge, and those related to adherence or attitude.<sup>6</sup> In Brazil, there are innumerable factors related to adherence/attitude, including age, socioeconomic condition and formal education. The education/knowledge category includes the factors described above, associated with the fact that mammography is not often indicated by physicians, and patients do not seek tests when they do not present symptoms or if they fear pain or cancer.<sup>5</sup> Barriers related to the health system are difficult to assess as there is no specific indicator. Thus, a critical evaluation of the barriers related to the health system, which impact on the screening of breast cancer, is justified.

## METHOD

We conducted a literature review using a systematic search methodology to evaluate the barriers related to mammography screening in Brazil. We did not evaluate the methodology or quality of the study, but publications that expressed this matter. We searched the PubMed database using as keywords “Breast Cancer” and “system of health” and “Brazil or Brasil”. In the LILACS database, we used as keywords “Breast neoplasms” and “Health Systems.” PRISMA<sup>7</sup> methodology (Figure 1) based on PICTOS (Population- Intervention- Comparator- Outcome- Timing- Setting; Table 1) was adopted for article selection. The articles were grouped according to the subject addressed, trying to identify possible factors that express the limitation of the health system.

On 12/16/2015, using this methodology, we were able to identify 94 articles in the PubMed database and 43 publications in the Lilacs. We evaluated title and summary and, after excluding 21 repetitive publications, we selected 51



**FIGURE 1** PRISMA records flow diagram.

publications for full evaluation. At this stage, we excluded 21 articles, seven related to mortality, five presenting post-treatment Brazilian Unified Health System (SUS, in the Portuguese acronym) data, three presenting global aspects related to different types of cancer, and six for different reasons (breast changes, social support to cancer, costs in the private system, ethics, cervical cancer and stage of diagnosis). Aiming at a better understanding of the barriers related to the health system in Brazil, 30 publications remained in the study, and these were the basis of our bibliographic review.

The data are summarized in Figure 1. The data are mostly qualitative. We chose to present grouped results according to the subject presented (Table 2).

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## RESULTS

With 30 articles selected according to PICTOS,<sup>4-6,8-34</sup> we attempted to create groups according to contexts, namely:

**TABLE 1** Summary of the findings observed according to PICOTS.

	<b>Proposal</b>	<b>Inclusion</b>
P/ Population	Breast cancer in Brazil	Breast cancer in Brazil; dependence to the SUS
I/ Intervention	Mammography Health management	Mammography; screening Health management
C/ Comparison	Factors related to the Health System	Mammography machine: population-based coverage, availability, quality; management; type of screening
O/ Outcome	Results found	Experience in screening, vulnerable populations, diagnostic flow, clinical stage at diagnosis, treatment and mortality
T/ Time	Any	Any
S/ Study type	Any	Any

**TABLE 2** Main results summarized.

<b>PICO</b>	<b>Summary of findings</b>
<b>Goal</b>	Mammography 50-69 years, bi-annually
<b>P/ Population</b>	<b>SUS system population dependent on governmental actions</b> Subgroup without MMG: absence of health plan, non-white, low income Patients over the age of 40 who never underwent MMG Distance from place of residence to treatment greater than 150 km
<b>I/ Intervention</b>	<b>SUS Screening type</b> Mammography control done by the SISMAMA MMG usually diagnostic Opportunistic screening through collective action to meet demand Organized screening does not exist Organized screening being implemented at a single center in the country
<b>C/ Comparison</b>	<b>Comparison</b> Inadequate mammography coverage Inadequate biannual recall Unsatisfactory quality of mammography in the SUS
<b>O/ Outcome</b>	<b>Result</b> Difficulty in patient flow, from diagnosis to treatment Diagnosis in symptomatic phase Advanced clinical stage of cancer at diagnosis negatively influencing survival Mortality: Private < well-structured public < regular public services Gradual improvement in the supply of MMG and outcomes related to cancer staging, with no defined indicators Increased incidence and increased mortality: Midwest, North and Northeast regions Increased incidence and decrease in mortality: South and Southeast

MMG: mammography.

problem overview (3), management-related articles (4), mammogram and population coverage (3), assessment of factors related to non-adherence to mammography (4), the experience of opportunistic (4) and organized screening (2), difficulties in establishing a diagnostic flow (2), and mortality (8). Table 1 summarizes the findings.

Three articles were selected based on an overall assessment of the problem.<sup>8-10</sup> The Ministry of Health held a workshop where mammographic screening was discussed. Observing positive experiences, but considering the European position and recommendations of the BHGI, the Ministry restricted the orientation of mammographic screening to the age group of 50-69 years, a guideline that should be followed by health managers.<sup>9</sup> A 2012 thesis discussed mammography screening and public health conditions in Brazil, and is a good roadmap for health managers.<sup>10</sup> Evaluating the problem in a global way, there is a difference in terms of the distribution of mammography machines, with a higher proportion of unused devices in the North/Northeast of Brazil. 30-35% of women undergo proper mammography, mainly in the private sector, and 80% do not have referral from a doctor. The mean time between presentation of symptoms and diagnosis is 72-185 days, which leads to high rates of advanced stage diagnosis, with 37.0% in stage III and IV, different from that observed in the private sector, where this rate is 16.2%.<sup>8</sup>

Regarding health management<sup>11,12</sup> and information systems for the support of health management,<sup>13,14</sup> four articles were selected. Assessing the origin-destination flow of outpatient visits and hospitalizations related to breast cancer, we observed that the treatment is generally performed in large cities and in reference centers, and patients travel distances greater than 150 km from their city source.<sup>11</sup> Despite the existence of different information systems on breast cancer, they are little explored.<sup>12</sup> The SISMA system showed promising results with 50% of the examinations performed in the age group 50-69 years and about 66% of mammography reports were performed in a period inferior to 30 days.<sup>13</sup> National coverage is low, including 32% of women in the 50-59 age group and 25% in the 60-69 age group, though this actually depends on the age group of the macro-region. In general, the coverage of women in the 50-59 age group is higher in the Southern and South-eastern states, and lower in the North and Northeast.<sup>14</sup>

Evaluating the mammograms, we must observe the population-based coverage, the differences in quality of the exam, the differences related to form of the diagnosis (symptomatic or asymptomatic), and factors related to the failure to undergo mammography. Despite regional differences in population coverage in Brazil,<sup>14</sup> a study

carried out in the state of Goiás<sup>15</sup> evaluated coverage based on the number of mammography machines, the number of devices in operation for the SUS, where the state coverage was 61%, divided into 13% coverage by the SUS and 48% by non-SUS.<sup>15</sup> Also in the state of Goiás, the study assessed the quality of the machines<sup>16</sup> using performance tests. The authors found initial conformity of 64.1%, and 77.1% of unacceptable rates (< 70%), which is a percentage considered high, since low quality mammography predisposes to incorrect diagnoses.<sup>16</sup>

There are studies that attempt to evaluate the factors related to non-mammography.<sup>17-20</sup> Considering biannual mammograms, the authors evaluated a population sample of women over the age of 40 (n=290) from the state of São Paulo and found that non-white elderly women (> 70 years) with low income ( $\leq$  5 minimum salaries) were more likely to fail to undergo mammography. However, in this study, the SUS was responsible only for 28.8% of the population undergoing mammography.<sup>17</sup> A study carried out in the capital of the state of Piauí (n=433), evaluating women aged 40-69 years, revealed that 24.7% of the sample had never undergone mammography, and among those who had undergone the examination, 17.5% had mammograms more than two years earlier, and 66.6% in the previous year. In this population, 56.3% of the exams were funded by the SUS system. Factors related to failure to undergo mammography included non-white ethnicity, low educational index, low income and absence of health plan, highlighting the importance of the social and racial context for not undergoing mammography.<sup>18</sup> This fact is more serious when the regular repetition of the exams is assessed. A study conducted in the city of Taubaté (state of São Paulo) showed that correct adherence to biannual repetition occurred in only 30% of the population, and differential access to public or private health services contributed to such a reduced rate.<sup>19</sup> Another factor that must be carefully evaluated is the result of mammography, both diagnostic and screening. The detection rate was 8.8 cases/1,000 mammograms in asymptomatic patients (screening) and 61.7/1,000 mammograms in symptomatic patients, reflecting a large number of advanced stage at diagnosis in symptomatic women.<sup>20</sup>

There is no organized screening in Brazil, but collective mobilization/actions to provide mammography and organized screening models are described.<sup>4,21-23</sup> A collective action to provide mammography performed in the city of Marília (state of São Paulo) yielded 0.84 diagnosed cases/1,000 mammograms. The cost of the mobilization per case diagnosed was considered high, suggesting the superiority of implementing screening services.<sup>22</sup> Investigating a population of 4,037 women in the city of Porto Alegre

(state of Rio Grande do Sul), with patients being divided into symptomatic or asymptomatic, the authors found nine cases in 7,656 women-years,<sup>4</sup> with 60% adherence in one year, suggesting that opportunistic screening in sites with a high incidence of breast cancer is positive. Regarding lost years of life, an increased risk of death from breast cancer was observed in the range of 50-59 years, and a significant increase in the range 40-49 years.<sup>23</sup>

Regarding organized screening, we must consider the regional experience in the interior of the state of São Paulo<sup>3,5,24</sup> with a biannual screening proposal in the age range of 40-69 years. In the first two years of the project, 17,964 women were investigated and 76 cases were diagnosed, with an increase in the early stage rate from 14.5% to 43.2%. Similar to other studies, the authors describe that 42.1% of this sample had never undergone a previous mammogram in their lives, especially among women of low socioeconomic class and low education. The strategy of mobile units and the family health program were important in identifying these women.<sup>5</sup> After years of initiating the project, the authors noted that the rate of early stage in asymptomatic women was 70.8%, with only 5.6% reporting difficulty in obtaining a mammography examination, and the success of the program was due to intense community involvement associated with free mammography, tests performed according to the norms of the health system, and mammography performed near the patients' home.<sup>24</sup> The authors report the importance of the nurse in the management and operationalization of the screening action.<sup>6</sup>

As for the issue of health system,<sup>25,26</sup> difficulty in establishing a diagnosis and treatment flow is observed, which contributes to increase the time between diagnosis and beginning of treatment. Thus, in Brazil, 36.9% of the patients take more than 60 days between the diagnosis and the start of treatment. The women most susceptible to delay are not white, do not have a partner, have little formal education, are at an early stage of the disease and covered only by the SUS system.<sup>25</sup> It is true that there are multiple steps since the initial evaluation, with false-negative results, follow-up, diagnosis and treatment, which requires a structured and agile system to optimize time. Failure to give access for asymptomatic women, fear, low education, age and false-negative results contribute to the delay.<sup>26</sup>

In terms of the relationship between mortality and the health system,<sup>27-30</sup> a study carried out in the city of Juiz de Fora, state of Minas Gerais (n=282), revealed, in the univariate analysis, that patients treated in public hospitals presented worse survival. However, in this population, the advanced stage of the disease at the time of

diagnosis was more frequent in public hospitals, possibly explaining the absence of this relationship in the multivariate model.<sup>27</sup> Another study carried out in Juiz de Fora (n=437) showed in the multivariate model that public services and non-white race/color had higher mortality risk due to breast cancer.<sup>28</sup> In the state of Rio de Janeiro, there was an inverse association between the presence of mammography and mortality.<sup>29</sup> Another study conducted in Rio de Janeiro evaluating 15 hospital units (n=310) showed better survival<sup>30</sup> in patients treated in services with private health plans and Oncology Centers (p=0.02), hospitals with a large number of procedures (p=0.007), and the time between diagnosis and treatment lower than 6 months (p<0.0001), which emphasizes the importance of well-structured public services.

For the analysis of trend and mortality curves,<sup>31-34</sup> in the period between 1980 and 2002, there was increase mortality by breast cancer in the southern region of the country.<sup>31</sup> In the period from 1991 to 2010, there was an increase in mortality rates in Brazil, in the North, Northeast and Midwest regions, although they remained stable in the South region and decreased in the Southeast region. This is similar to that observed in developed countries and reinforces the need for appropriate screening and treatment programs.<sup>32</sup> This disparity was also observed in the Brazilian macro-regions in the period from 1980 to 2009, probably due to regional inequalities. There was decline and stabilization in regions with a higher socioeconomic level and the opposite in regions with low socioeconomic status.<sup>33</sup> A study comparing mortality in the USA and in the Brazilian Oncology Hospital showed that, for the same staging, overall survival was similar. However, when comparing clinical stages, there was a higher percentage of patients in advanced clinical stage in Brazil, which negatively affected the survival of the group. The conclusion was that, by undergoing the appropriate treatment, the main factor associated with high mortality is the advanced cancer stage at diagnosis.<sup>34</sup>

## DISCUSSION

Screening for breast cancer through mammography is the best methodology for secondary prevention in the general population, promoting early detection in the asymptomatic phase, leading to a substantial reductions in morbidity and mortality caused by late diagnosis. A meta-analysis with articles from the Cochrane database on mammographic screening did not show a reduction in mortality risk when evaluating studies with adequate randomization. However, the evaluation of studies with sub-optimal randomization yielded a reduction in mortality



risk of approximately 25%, and about 19% after all these studies were grouped.<sup>35</sup> The reduction in breast cancer mortality in several developed countries was probably due to the association of screening programs and improvements in adjuvant therapy.<sup>1</sup> We draw attention to an American study that compared historical data from the Surveillance, Epidemiology, and End Results (SEER), assessing clinical stage, and found a reduction in advanced stages of cancer close to 8%.<sup>36</sup> However, this study was much questioned for evaluating global data, with part of the population not being screened and population coverage below the satisfactory value.<sup>37</sup>

Changes in mortality occur mainly after the age of 50 years, with the age limit being 69 to 74 years. Therefore, to achieve a reduction in breast cancer mortality, mammography should be performed on a large scale at the general population level. The Brazilian Society of Mastology suggests that the initial age should be 40 years,<sup>38</sup> which was the guideline established by the American Cancer Society until 2015, updated in 2016 to 45 years.<sup>39</sup> Eusoma,<sup>40</sup> the US Task Force and the Brazilian Ministry of Health,<sup>10</sup> suggest that this exam should be performed from the age of 50 years.<sup>5</sup>

In developing countries, the majority of the population has low incomes, being dependent on government actions and public health infrastructure, with multiple diseases competing for limited resources. Public health practices are linked to national guidelines, available methodologies and capacity to absorb demand in the public network. In this context, the BHGI argues that organized population-based mammography screening should be conducted only in developed countries.<sup>2</sup>

There is now a lot of literature against and in favor of mammographic screening. Pro-mammography factors include: decreasing the size of diagnostic lesions, with implications for diagnosis and treatment; studies demonstrating a decrease in mortality due to breast cancer; years of life saved; an acceptable rate of hyperdiagnosis (1 to 10%); the frequency of subtypes; and the progression of carcinoma in situ. It is worth mentioning that, in order to achieve this goal, it is necessary to have population coverage, good quality exams, associated with a fast and efficient diagnostic flowchart.<sup>35,37,40</sup> Cons include partial evaluation of systematic reviews;<sup>35</sup> discussions about the actual decline of advanced tumors in the US;<sup>36</sup> hyperdiagnosis (31%);<sup>36</sup> and studies that show that there are lives saved by mammography screening, but their numbers are limited.<sup>41</sup> Usually, those who deal with the patient are in favor of screening,<sup>37,39</sup> while epidemiologists are more cautious,<sup>41</sup> presenting a somewhat more negative view.<sup>36</sup> Thus, many

studies suggest that the patient should know all the points involved in mammographic screening, and should be aware of the pros and cons associated with the potential gain related to screening,<sup>41</sup> which is possible from a theoretical point of view, but very difficult in medical practice.

The truth is that organizing a mammographic screening requires technology, money, training, education, proper staffing and patient adherence. Every program must have a beginning, a middle and an end,<sup>38</sup> that is, measures from planning to the appropriate destination of suspected and positive cases, and community intervention.<sup>5,24</sup> Associated with this, the team should be trained to evaluate mammographic screening, and not only mammographic diagnoses, respecting quality and logistics standards, as is the case in Europe.<sup>40</sup> Barriers related to the health system are the main limiting factors for not performing mammography in developing countries. This fact is influenced by accessibility to the services of health, unsatisfactory medical adhesions, cost of the exams and difficulties related to complementary exams and follow-up. The evaluation of factors related to the health system and adherence to mammography is complex, since there is no specific indicator. We noted in our review, problems related to information management, distribution of mammography machines in the public network, quality of mammography, and other issues associated with the operationalization of organized screening and effective treatment.

In developing countries, these issues are more evident, as health resources are limited. And while there are controversies in the literature, the negative points of breast screening are considered, as health resources are used preferentially in more effective programs such as cervical cancer. In these countries, BHGI suggests self-examination in conjunction with diagnostic mammography and ultrasonography.<sup>2</sup> The IARC encourages self-examination education and clinical breast examination as a screening methodology in low-income countries, with sufficient evidence for mammographic screening in the 50-69 age group in developed countries.<sup>42</sup> In Brazil, there is economic and structural diversity. The Brazilian census (PNAD survey) revealed that mammography examinations are less frequent in the North region, compared to the higher examination rate in the Southeast,<sup>43</sup> which proves the uneven mammographic coverage in the country.<sup>14</sup> Another reflex of the association of screening and treatment are the trend curves related to mortality, with a rise in the North, Northeast and Midwest, stabilization in the South, and a decrease in the Southeast region.<sup>32</sup> It should be noted that the decrease in mortality is only observed

in places where the association between screening and treatment is effective.<sup>1</sup> Similarly, as examples of Southern<sup>4</sup> and Southeastern<sup>5</sup> Brazil, there are programs in the structuring phase that have presented promising results.

In Sweden, the benefits of mammography screening are well known.<sup>35</sup> In Europe, the rules for mammographic screening are clear and the indicators are acceptable and desirable,<sup>40</sup> but understanding the multiple steps involved in the process is only achieved once the program is properly structured.<sup>38</sup> Evaluating screening quality control, for example, we observed the quality of mammography, the recall rates for complementary exams, diagnostic rates in incidence and prevalence screening, rates of invasive tumors, proportion of tumors measuring less than 1.0-1.5 cm, sensitivity of the needle biopsy, benign/malignant open biopsy ratios, and time between examinations and surgery.<sup>38</sup> In Brazil, since organized screening is not done, there is much to be implemented in terms of quality. In the experience in the interior of the state of São Paulo, symptomatic patients are observed in the initial phase of network structuring,<sup>5</sup> which is not ideal in screening programs. However, structuring the service, acquiring technology, training staff<sup>38</sup> and participating in quality programs, coupled with adherence strategies,<sup>24</sup> represent important steps to achieve improvement. Access to mammography refers to: presence of this technology and ease of access by the general population, including the quality of the exams and the possibility of performing complementary tests for biopsy and differential diagnosis.<sup>38</sup> Other regional centers need to be set up, as proposed in Europe.<sup>40</sup> Lack of knowledge of processes makes management-related analyses difficult, and these are often partially evaluated, based on mammography, test results, and cancer mortality. Organized screening targets asymptomatic patients and should be associated with a hierarchical and effective network of examinations until diagnosis, which should be rapid, comprehensive, and effective. This overrides the allocation of technological, financial and human resources.

It is estimated that the SUS system is responsible for 75% of health at the national level, with the supplementary healthcare system being responsible for the rest of the population. Breast cancer is a population-based disease and, therefore, the limitations of the SUS affect disease diagnosis, leading to advanced stages and respective increased mortality curves.<sup>32</sup> Logistical and technological limitation leads to delayed examinations and diagnosis,<sup>8</sup> with low population coverage,<sup>32,43</sup> seen in our study population, and is one of the main barriers related to the health system, as presented in the results section. The SISMAMA

system is an important auxiliary tool for health management,<sup>13</sup> but there is much to be done. There is a need for evaluation of populations vulnerable to mammography,<sup>3,5,17,18</sup> as well as strategies to improve their access.<sup>5,24</sup>

Law No. 11.664 authorized on 04/29/2008 access to mammography for women over 40, but it was superseded by Directive No. 1253 on 12/11/2013, which limited mammography to the age group of 50-69 years, according to the public policies related to the age range that should undergo mammography. Currently, the Ministry of Health suggests that the examination should target the age range of 50-69 years,<sup>5</sup> in keeping with the installed technological base and availability to the population. A Brazilian publication questions the possibility of screening in the age group of 45-69 years,<sup>44</sup> as recommended in 2016 by the American Cancer Society.<sup>39</sup> The difficulties and results observed in Brazilian literature<sup>3,5,24,38</sup> limit the proper analysis of the subject, due to the lack of results related to the second round screening, where we evaluate breast cancer detection rate in subsequent-screening examinations and indicators related to the control of quality.<sup>40</sup>

The health system must be structured, allowing access to mammography, complementary examinations, diagnosis and effective treatment. There is a migration of patients within the SUS that reflects its hierarchical system, but logistical and structural limitations increase the time between diagnosis and treatment.<sup>25</sup> Mammographic screening is the responsibility of primary health care, and is associated with procedures of small and medium complexity. Oncological treatment is the responsibility of Oncology Centers (CACONs), which perform procedures of medium and high complexity. Directive No. 3535 issue on 09/02/1988, and Health Ministry Directive No. 741 issue on 12/19/2005 regulate the hierarchy of the oncology system, but because they are treatment services, the stage at the beginning of treatment is a reflection of the diagnostic conditions and the structuring of the health system. Hospital cancer registries show us advanced stages of diagnosis, which reveals the logistic limitations prior to treatment, associated with longer periods until diagnosis,<sup>8</sup> with many symptomatic patients presenting advanced disease.<sup>8</sup> It is interesting that breast cancer patients in high-demand centers and referral hospitals have better survival rates,<sup>30</sup> possibly due to logistical facilities and use of treatment protocols.

The absence of prospective and randomized studies on the subject in the literature evaluated is a limitation of our study, but this has already been reported in other developing countries.<sup>45</sup> We report the main results found in Brazil comparing them with the main results reported

in the literature. We attempted to present the subject in a global manner, not judging its merit, in order to evaluate the results of the absence of organized screening, presenting possible reasons that could influence the facts and be used to further structure the health system. Our study does not aim to judge the health system, but to contribute to the reflection on the subject, since a structure is being constructed and progress has occurred, as shown in the trend curves of different macro-regions.

In view of the scenario presented above, we observed that breast cancer patients in Brazil are mostly dependent on the public health system, the SUS, which is responsible for the diagnosis and treatment of the vast majority of the population. Limitations of the health system are clear given the advanced stage of disease at diagnosis, and limit survival outcomes. Measures related to increased quantity, quality and regularity of mammography will allow adequate coverage of asymptomatic patients. Establishing a rapid and effective diagnostic flow, coupled with appropriate treatment, within a hierarchical context are important steps to be taken to promote women's health.

## CONCLUSION

In Brazil, the number of mammography machines in operation is limited, time to diagnosis is high, and disease stage at diagnosis is advanced. Population coverage is low, with problems related to the quality of mammography. Lower income, less educated and non-white patients are the most vulnerable. There are reports of collective actions to provide mammographic examination, and early experiences of opportunistic screening. The flow of diagnosis and treatment should be improved. Inequality in mortality is a reflection of screening and treatment limitations, so that well-structured public services perform better.

## RESUMO

Rastreamento do câncer de mama no Brasil. Barreiras relacionadas ao sistema de saúde

**Objetivo:** Identificar fatores relacionados ao sistema de saúde que determinam atraso no diagnóstico do câncer de mama no Brasil.

**Método:** Utilizou-se metodologia de revisão sistemática nas bases de dados PubMed e LILACS, pesquisando os termos “Breast cancer”, “system of health” e “Brazil or Brasil”. Não se avaliou a qualidade da publicação, mas seu conteúdo, sendo ele categorizado em função da metodologia PRISMA baseada no PICTOS. Na data limite de 16/12/2015, foi possível identificar 94 publicações na Pu-

bMed e 43 publicações na LILACS. Avaliando o título e resumo, e excluindo-se 21 publicações repetidas, foi possível identificar 51 publicações para avaliação completa, na qual foram excluídos 21 artigos, restando 30 publicações.

**Resultados:** Observou-se que a base de mamógrafos é limitada, o tempo até o diagnóstico é elevado, e o estadió ao diagnóstico é avançado. A cobertura populacional é baixa, havendo problemas na qualidade da mamografia. As pacientes de menor renda, menor escolaridade e etnia não branca são as mais vulneráveis. Observam-se exemplos de mutirões e experiências iniciais de rastreamento. Necessita-se de aprimoramento do fluxo de diagnóstico e tratamento. A desigualdade na mortalidade é reflexo da estrutura para rastreamento e tratamento, observando-se melhores resultados em serviços públicos bem estruturados.

**Conclusão:** Há diversas barreiras relacionadas ao sistema de saúde que refletem no estádio avançado ao diagnóstico e limitam os resultados na sobrevida. O estabelecimento de um fluxo de diagnóstico e tratamento rápidos e efetivos, dentro de um contexto hierarquizado, são importantes etapas a serem aprimoradas dentro do contexto da saúde pública.

**Palavras-chave:** neoplasias da mama/prevenção e controle, sistemas de saúde, programas de rastreamento, mamografia, Sistema Único de Saúde (SUS).

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