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Mammography in asymptomatic women aged 40-49 years

Mamografia em mulheres assintomáticas na faixa etária de 40 a 49 anos

ABSTRACT

OBJECTIVE: To assess findings of mammography of and interventions resulting from breast cancer screening in women aged 40-49 years with no increased risk (typical risk) of breast cancer.

METHODS: This cross-sectional study evaluated women aged 40-49 years who underwent mammography screening in a mastology reference center in Recife, PE, Northeastern Brazil, between January 2010 and October 2011. Women with breast-related complaints, positive findings in the physical examination, or high risk of breast cancer were excluded.

RESULTS: The 1,000 mammograms performed were classified into the following Breast Imaging-Reporting and Data System (BI-RADS) categories BI-RADS 0, 232; BI-RADS 1, 294; BI-RADS 2, 294; BI-RADS 3, 16; BI-RADS 4A, 2; BI-RADS 5, 1. There was one case of grade II invasive ductal carcinoma and various interventions, including 469 ultrasound scans, 53 referrals to mastologists, 11 cytological examinations, and 8 biopsies.

CONCLUSIONS: Mammography screening in women aged 40-49 years with typical risk of breast cancer led to the performance of other interventions. However, it also resulted in increased costs without demonstrable efficacy in decreasing mortality.

DESCRIPTORS: Women. Mammography. Mass Screening. Breast Neoplasms, diagnosis. Cross-Sectional Studies.

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RESUMO

OBJETIVO: Avaliar os achados mamográficos e as intervenções decorrentes do rastreamento em mulheres de 40 a 49 anos de idade com risco habitual para o câncer de mama.

MÉTODOS: Estudo transversal com mulheres de 40 a 49 anos, submetidas ao rastreamento mamográfico em centro de referência em mastologia, em Recife, PE, de janeiro de 2010 a outubro de 2011. Foram excluídas mulheres com queixas mamárias, alterações no exame físico e com alto risco para câncer de mama.

RESULTADOS: Das 1.000 mamografias realizadas, 232 foram BI-RADS 0, 454 BI-RADS 1, 294 BI-RADS 2, 16 BI-RADS 3, duas BI-RADS 4A, uma BI-RADS 4C e uma BI-RADS 5. Observou-se um único caso de carcinoma ductal invasivo grau II e várias intervenções: 469 ultrassonografias, 53 encaminhamentos para a mastologia, 11 citologias e oito biópsias.

CONCLUSÕES: O rastreamento mamográfico em mulheres de 40 a 49 anos com risco habitual para o câncer de mama leva a outras intervenções e, assim, ao aumento dos custos com eficácia não mostrada para redução da mortalidade.

DESCRITORES: Mulheres. Mamografia. Programas de Rastreamento. Neoplasias da Mama, diagnóstico. Estudos Transversais.

INTRODUCTION

The annual incidence of breast cancer varies widely worldwide, from 19.3 per 100,000 women in East Africa to 89.9 per 100,000 in Western Europe.[4] This is related to the urbanization process. Accordingly, although the rates are higher in developed countries, in recent years, breast cancer incidence has increased in developing countries.[4]

In Brazil, breast cancer is the second most frequent type of cancer in the female population, preceded only by nonmelanoma skin cancer.[a] It is estimated that 57,120 new cases will be diagnosed in 2014, with a risk of 56 cases per 100,000 women. Of these, 64.3% is predicted to occur in the northeast of Brazil.[a] Breast cancer is the fifth most common cause of death due to cancer in the general population and the most frequent cause of death due to cancer in women.[b]

Because the early detection of breast cancer (before there is a palpable nodule) increases the chances of survival,[1] routine mammography screening and physical examination are recommended.[15]

Mammography is the best method for the early diagnosis of breast cancer, demonstrating a 15.0%-25.0% reduction in mortality among women undergoing breast cancer screening.[6] Monthly breast self-examination could be an alternative to mammography screening owing to its simplicity and low cost.[8] However, there is no evidence that it leads to decreased mortality. Furthermore, this practice is being abandoned because it causes more harm than good, such as unnecessary anxiety among women.[10] Magnetic resonance imaging is recommended for screening only in women at high risk of breast cancer.[9]

Until date, there is no consensus about the performance of mammography screening among women aged 40-49 years.[7] In this age group, breast cancer incidence is lower than that of patients aged 50-69 years,[c] but the occurrence of dense breasts and fast-growing tumors is higher.[12] Breast cancer in young women remains poorly understood. It is believed that breast cancer is biologically more aggressive in young women, with more frequent adverse histopathological characteristics and worse prognoses than in older women.[12]

Studies of women aged 40-49 years not at high risk are necessary and should consider the peculiarities of each population to determine the ideal age for starting a mammography-based breast cancer screening program.

[a] Ministério da Saúde. Instituto Nacional de Câncer. Estimativa 2014: incidência do câncer no Brasil. Rio de Janeiro; 2013.
[b] Ministério da Saúde. Instituto Nacional de Câncer. Programa Nacional de Controle do Câncer de Mama. Programa Viva Mulher. Rio de Janeiro; 2011.
[c] Ministério da Saúde. Instituto Nacional de Câncer. SISMAMA - Informação para o avanço das ações de controle do câncer de mama no Brasil. Rio de Janeiro; 2010.

The objective of this study was to assess the mammography findings and interventions resulting from breast cancer screening in women aged 40-49 years with no increased risk (typical risk) of breast cancer.

METHODS

This cross-sectional study was conducted between January 2010 and October 2011 in Recife, PE, Northeastern Brazil, in the Department of Radiology at the *Instituto de Medicina Integral Prof. Fernando Figueira* (IMIP), a specialty center in mastology.

The sample size was calculated using the public domain software OpenEpi (Atlanta, GA), version 7. An incidence of 4.6% for positive mammography was obtained from the first mammography screening in this age group.[14] Considering a 95% confidence level and power of 80.0%, a sample of 885 women was deemed required. To offset any potential losses, this number was increased to 1,000 women.

Women aged 40-49 years who underwent mammography screening between January 2010 and October 2011 were included in the study. Women with breast-related complaints (pain, nodule, nipple discharge, and increased breast volume) or positive findings in the physical examination (shrinkage, bulging, nodules, hardening, and nipple discharge) at the time of the physical examination were excluded, along with those at high risk of breast cancer and those with absent mammography reports.

Women with the following characteristics were considered to be at high risk of breast cancer: first-degree relative with breast cancer before age 50 years, male relative with breast cancer, first-degree relative with bilateral breast cancer or ovarian cancer at any age, histopathological diagnosis of a proliferative breast lesion with atypia or lobular neoplasia *in situ,* and personal history of breast or ovarian cancer.[d] Patients not presenting a high risk of the disease were considered to have typical risk.

The variables studied were as follows: exposure-related variables [age (years), ethnicity, education (years), age at menarche (years), use of hormone therapy, use of oral contraceptives, breastfeeding in any previous pregnancy, and age at first pregnancy (years)]; variables associated with sample characterization (origin and state of menopause); outcome-associated variables [Breast Imaging-Reporting and Data System (BI-RADS)];[2] and descriptive variables [mammographic characteristics (breast density, nodules, calcifications, asymmetry, and structural distortions), interventions performed (ultrasound scans, referral to mastologists, cytological examination, and biopsy), and the result of histopathological examination of the biopsy, in the order of lesions with worsening prognosis (nonproliferative lesions, proliferative lesions without atypia, proliferative lesions with atypia, *in situ* carcinoma, and invasive carcinoma)].

Cytological examination by fine-needle aspiration was indicated for patients with BI-RADS 4 and 5. For the other BI-RADS, cytological examination was indicated according to the results of other complementary examinations.[e] Biopsy was performed for the same indications, according to the lesion characteristics, in cases that were inconclusive, equivocal, or different from the clinical and radiological diagnoses.[e] The samples were obtained through core biopsy or surgical biopsy.[e]

For patient selection, a list of all the women who had undergone mammography screening within the study period was obtained. Subsequently, patient records were obtained immediately afterward; the records were stamped to avoid the risk of selecting the same patients. The records of the patients aged 40-49 years were verified according to the inclusion and exclusion criteria. The mammography reports were obtained through the institution's computer system.

During the study period, 3,574 mammograms were performed among the population of interest. Of these, 2,076 were evaluated; the other 1,498 were excluded because they belonged to the same patient or because the patient records were not found. After verification, 515 women were excluded from the total number of patients evaluated because they presented with complaints and/or physical changes and/or were at high risk, and 561 were excluded because the obtaining of mammography reports was not possible, leaving 1,000 women for analysis (Figure).

The data were analyzed using the EpiInfo software (Atlanta, GA), version 7. For the descriptive analysis, the mean and its standard deviation (SD) were calculated for numeric variables, and frequency distribution was calculated for categorical variables.

To define the association between biological, sociodemographic, reproductive, and gynecological variables and BI-RADS categories 3, 4, and 5, we used the Chi-square test of association, or Fisher's exact test where appropriate, with a significance level of 5%. To determine the strength of the association, the prevalence ratio (PR) was calculated along with its 95% confidence interval.

This study was approved by the Human Research Ethics Committee of the IMIP, under Presentation

[d] Ministério da Saúde. Instituto Nacional de Câncer. Parâmetros técnicos para o rastreamento do câncer de mama. Rio de Janeiro; 2009.
[e] Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Controle dos cânceres do colo do útero e da mama. 2. ed. Brasília (DF); 2013.

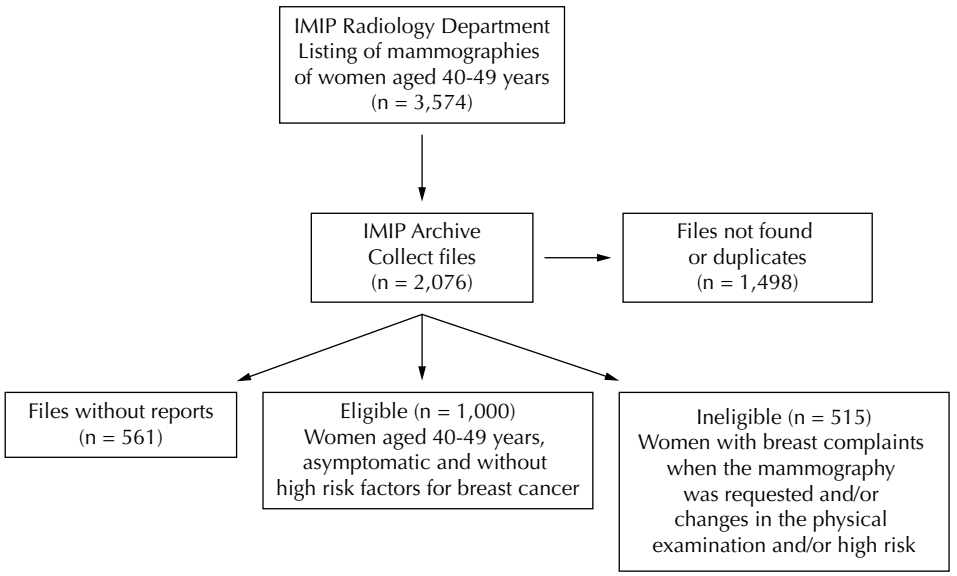

Figure. Flowchart of participant selection.

Certificate for Ethical Consideration (CAAE – 03191212.0.0000.5201 from 6/26/2012). Approval was obtained without requiring informed consent because of the retrospective nature of the study and because the collection of informed consent forms from all the women subjected to mammographic examination was not feasible.

RESULTS

The mean age was 45.2 (SD = 3.5) years. With regard to patients' location, 827 (82.7%) patients were from the Recife Metropolitan Area, 171 (17.1%) were from other cities in Pernambuco, and two (0.2%) came from other states. Most of the women were of mixed race (n = 368; 62.4%) and only one (0.2%) was of indigenous origin. With regard to education, most women had completed 4-11 years of schooling (377; 64.3%) and 13 (2.2%) were illiterate (Table 1).

The mean age at menarche was 12.9 years (SD = 1.6), with a range of 9-19 years. Oral contraceptives were used by 58 (6.4%) women. Most patients were premenopausal (n = 681; 74.4%) and hormone-replacement therapy was used by only 19 women (2.1%) (Table 1).

The mean age at first pregnancy was 22.3 years (SD = 5.1), with a range of 12-43 years; 57 patients gave birth at age ≥ 30 years and 95 women were nulliparous. In addition, 74.4% reported that they breast-fed their infants from at least one previous pregnancy (Table 1).

With regard to the mammography screening, 724 women (72.4%) had dense or moderately dense breasts, and 276 (27.6%) had breasts totally or partially replaced by fat. Nodules were observed in 71 women; 65 (91.5%) were circumscribed and six (8.5%) were not circumscribed. Calcifications were observed in 295 mammograms; 291 (98.6%) were benign, three (1.0%) were suspicious, and one (0.3%) was malignant. In addition, 63 mammograms (6.3%) were asymmetrical, and three (0.3%) showed structural distortions (Table 2).

With regard to BI-RADS categories, 232 (23.2%) were inconclusive (BI-RADS 0), 454 (45.4%) were negative for malignancy (BI-RADS 1), 294 (29.4%) were benign (BI-RADS 2), 16 (1.6%) were probably benign (BI-RADS 3), two (0.2%) had low suspicion of malignancy (BI-RADS 4A), one (0.1%) had moderate suspicion of malignancy (BI-RADS 4C), and one (0.1%) had high suspicion of malignancy (BI-RADS 5) (Table 2).

Of the 1,000 mammograms evaluated, 160 (16.1%) were requested by mastologists, 833 (83.9%) by gynecologists, and the remaining seven by other specialists. Among 833 examinations requested by gynceologists, 53 (5.3%) cases were referred to mastologists. Ultrasound examination was requested for 469 women, with 182 of these being requested concurrently with mammography (Table 3). In the cases that underwent concurrent mammography and ultrasound examinations, mastologists requested for both mammography and ultrasound scans in 46.0% of the cases, whereas obstetricians requested these examinations in 13.0% of the cases (p = 0.0001).

Eleven cases underwent cytological examination. Two cytological examinations were considered unsatisfactory in patients with breast nodules and BI-RADS 0. Five examinations revealed nonproliferative benign lesions

Table 1. Profile of women aged 40-49 years subjected to mammographic screening. Recife, PE, Northeastern Brazil, 2010-2011. (N = 1,000)

Variable	n	%
Age (years)		
40 to 44	465	46.5
45 to 49	535	53.5
Ethnicity		
Caucasian	137	23.2
Mixed	368	62.4
Black	75	12.7
East Asian	9	1.5
Indigenous	1	0.2
Origin		
Recife Metropolitan Area	827	82.7
Other cities in the state	171	17.1
Other states	2	0.2
Education		
Illiterate	13	2.2
1 to 3 years completed	104	17.7
4 to 7 years completed	186	31.7
8 to 11 years completed	191	32.6
≥ 12 years completed	92	15.7
Menarche		
< 12 years	157	17.6
≥ 12 years	735	82.4
Menopausal status		
Premenopausal	681	74.4
Postmenopausal	234	25.6
Use of hormone therapy		
Yes	19	2.1
No	886	97.9
Use of oral contraceptives		
Yes	58	6.4
No	847	93.6
Breastfeeding		
Yes	547	74.4
No	188	25.6
Age at first pregnancy		
Nulliparous	95	13.4
< 30 years	556	78.5
≥ 30 years	57	8.0

in patients with breast nodules, with three of these with BI-RADS 0 and two with BI-RADS 1. Four examinations revealed fibroadenoma in patients with breast nodules whose mammographies were BI-RADS 0 (Table 3).

Biopsies were performed in eight cases. Two cases showed nonproliferative lesions in patients with breast nodules

Table 2. Mammographic findings in women aged 40-49 years who underwent mammography screening. Recife, PE, Northeastern Brazil, 2010-2011. (N = 1,000)

Mammographic findings	n	%
Breast density		
Dense breasts	277	27.7
Moderately dense breasts	447	44.7
Breasts partially replaced by fat	120	12.0
Breasts completely replaced by fat	156	15.6
Nodules		
Circumscribed nodules	65	91.5
Noncircumscribed nodules	6	8.5
Calcifications		
Benign	291	98.6
Suspicious	3	1.0
Malignant	1	0.3
Asymmetry		
Yes	63	6.3
No	937	93.7
Structural distortions		
Yes	3	0.3
No	997	99.7
BI-RADS		
0	232	23.2
1	454	45.4
2	294	29.4
3	16	1.6
4A	2	0.2
4B	0	–
4C	1	0.1
5	1	0.1

BI-RADS: Breast Imaging-Reporting and Data System

(one with noncircumscribed nodules and BI-RADS 2 and the other with BI-RADS 1 who had already undergone cytological examinations). Five showed proliferative lesions without atypia in patients with breast nodules, three of which had BI-RADS 0 (one with noncircumscribed nodule and two with BI-RADS 2). The remaining case showed invasive ductal carcinoma, grade II, with the mammogram showing microcalcifications and BI-RADS 5 (Table 3). In this case, the immunohistochemical examination was positive for estrogen and progesterone receptors and negative for HER-2 (1+). The patient was in clinical stage IIIb and had undergone neoadjuvant chemotherapy followed by mastectomy. After surgical treatment, the patient underwent radiotherapy followed by hormone therapy with tamoxifen. At present, the patient is being monitored for breast cancer, without clinical signs of recurrence or distant disease 10 months after surgery.

Table 3. Frequency of complementary methods, procedures, and histopathological findings in women aged 40-49 years who underwent mammography screening. Recife, PE, Northeastern Brazil, 2010-2011. (N = 1,000)

Methods and procedures	n	%
Ultrasound	469	46.9
Referral to mastologists	53	5.3
Cytological examination	11	1.1
Unsatisfactory	2	0.2
Nonproliferative lesions	5	0.5
Proliferative lesions without atypia	4	0.4
Proliferative lesions with atypia	0	–
Carcinoma	0	–
Biopsy	8	0.8
Histopathological findings		
Nonproliferative lesions	2	0.2
Proliferative lesions without atypia	5	0.5
Proliferative lesions with atypia	0	–
In situ carcinoma	0	–
Invasive carcinoma	1	0.1

One of the patients with BI-RADS 4A showed dense right axillary lymph nodes and remains under investigation. The other patient with BI-RADS 4A could not be located and the mammogram showed grouped pinpoint calcifications. One patient with BI-RADS 4C and pleomorphic microcalcifications did not follow up for medical care.

For the purposes of bivariate analysis, women were divided into two groups according to BI-RADS categories (3, 4, and 5 *versus* 1 and 2). Because it is inconclusive, BI-RADS 0 cases were excluded. Higher frequency of women with ≥ 8 years of education had BI-RADS categories 3, 4, or 5 than women with BI-RADS 1 and 2 (4.2% *versus* 0.8%; PR 5.08; 95%CI 1.11;23.3; p = 0.02). Nulliparous women had a higher frequency of BI-RADS categories 3, 4, and 5 (6.7% *versus* 2.6%) than others; however, this difference was not statistically significant (p = 0.07). For the variables age 45-49 years, Caucasian ethnicity, menarche at age < 12 years, use of hormone-replacement therapy, use of oral contraceptives, breastfeeding in at least one previous pregnancy, and age at first pregnancy ≥ 30 years, no significant differences were detected between the two BI-RADS groups (Table 4).

DISCUSSION

Only one case of breast cancer was found among the 1,000 women aged 40-49 years who underwent routine mammography screening. In addition, several additional procedures were performed, but the tests were inconclusive for many of these women.

Age continues to be one of the most important risk factors for breast cancer.[17] Our results showed a prevalence of one case of breast cancer among 1,000 women aged 40-49 years. However, the study was limited by its retrospective nature, and the infeasibility of obtaining histopathological results for two patients with BI-RADS 4A and for another with BI-RADS 4C. Nevertheless, even considering these three cases as positive, the number of cases of breast cancer in the age group of 40-49 years would have been four per 1,000. This prevalence is less than that estimated by the National Cancer Institute in the United States (1 in 69)[17] but higher than that of the general population. Results like these lead to controversies about the need for screening in this age group by national and international associations.[17]

The American Cancer Society and the American College of Obstetricians and Gynecologists recommend universal screening for women aged 40-49 years.[17] However, according to the consensus reached between the US Preventive Services Task Force and the Canadian Task Force, routine mammography screening in women aged 40-49 years who are not at high risk is not recommended.[13,17] In Brazil, the Ministry of Health and the National Cancer Institute (INCA) do not recommend routine mammography screening in this age group,[d,e] but other institutions have different screening protocols.

Considering the high frequency of breast cancer in Brazil and in the Northeast region as well as difficulties related to access to mammography screening, the current IMIP recommendation is routine examination after age 40 years even for patients with typical risk. In addition, mammography should be performed annually, but this suggestion differs from the INCA recommendations.[d]

As a result of the early screening, 23.0% of the mammograms yielded inconclusive results (BI-RADS 0). This high rate of BI-RADS 0 was probably because most patients had dense breast tissue, which impaired the quality of the examination.[6,12] Only 20 women had BI-RADS 3-5, i.e., of the 1,000 women who underwent screening, only 20 (2.0%) results required further investigation; on the other hand, 23.0% of the results were inconclusive (BI-RADS 0), and in the end, only one case was confirmed to have breast cancer. Because these mammograms were conducted on asymptomatic women, no women were classified as BI-RADS 6.

Other interventions were also performed, including 469 ultrasound scans, 53 referrals to mastologists, 11 cytological examinations, and eight biopsies, totaling 541 interventions. Consequently, of the 1,000 women who underwent mammography, > 50.0% underwent complementary diagnostic methods, and these examinations contributed to a conclusive diagnosis in only a few cases. However, this study was not designed to address this issue. For this reason, future studies are

Table 4. Association of biological, sociodemographic, gynecological, and reproductive characteristics with BI-RADS categories 3, 4, and 5 in women aged 40-49 years who underwent mammography screening. Recife, PE, Northeastern Brazil, 2010-2011. (N = 1,000)

Variable	BI-RADS				p	RP	95%CI
	3-4-5		1-2				
	n	%	n	%			
Age (years)							
45 to 49	11	2.7	400	97.3	0.90[a]	1.06	0.44;2.52
40 to 44	9	2.5	347	97.5			
Ethnicity							
Caucasian	4	3.8	101	96.2	0.47[b]	1.20	0.39;3.69
Others	11	3.2	336	96.8			
Education							
≥ 8 years	9	4.2	207	95.8	0.02[a]	5.08	1.11;23.3
< 8 years	2	0.8	242	99.2			
Menarche							
< 12 years	3	2.6	112	97.4	0.52[b]	1.14	0.33;3.92
≥ 12 years	13	2.3	553	97.7			
Use of hormone therapy							
Yes	0	0	18	100	0.64[b]	–	–
No	17	2.5	660	97.5			
Use of oral contraceptives							
Yes	0	0	44	100	0.32[b]	–	–
No	17	2.6	634	97.4			
Breastfeeding							
Yes	11	2.7	395	97.3	0.17[b]	0.57	0.22;1.44
No	7	4.8	140	95.2			
Age at first pregnancy							
≥ 30 years	1	2.3	42	97.7	0.69[b]	0.90	0.12;6.83
< 30 years	11	2.6	416	97.4			
Parity							
Nulliparity	5	6.7	70	93.3	0.07[b]	2.61	0.95;7.20
≥ 1	12	2.6	458	97.4			

BI-RADS: Breast Imaging-Reporting and Data System
[a] Chi-squared test.
[b] Fisher's exact t test.

needed to compare the number of interventions in the 40-49 age group with those of women > 50 years, and cost-benefit studies are needed to evaluate the cost of detection of one case of breast cancer and the cost of all examinations and interventions resulting from this screening. The risk group (BI-RADS categories 3, 4, and 5) included BI-RADS 3 because, despite having a low rate of malignancy (approximately 2.0%), it is considered a risk of developing breast cancer and requires complementary examinations, which may sometimes be unnecessary.

We do not have the natural history of the single case of breast cancer. It has been suggested that some cases of cancer diagnosed by mammography alone would never have been diagnosed without impacting the women's survival,[5] similar to cases of prostate cancer diagnosed by screening with PSA and/or digital rectal examination.[5] The view that early detection of tumors allows curative treatment creates the so-called "time bias". This scenario favors early detection but has not been supported by solid scientific evidence.[3] In this respect, it is possible that excessive diagnostic examinations are being conducted and that tumors that do not require treatment are being treated.[3]

A systematic review[5] involving 600,000 women found that 200 of them had experienced significant psychological stress for many months because of false-positive findings, not only up to the moment of acknowledging

the definitive test results but even after they were declared cancer free.[5] In addition, when a meta-analysis was conducted for the subgroup of women aged < 50 years, stratified by study quality, a significant difference in mortality from breast cancer was observed in the studies with a randomized sample.[5]

However, another meta-analysis evaluated the effectiveness of mammographic screening in decreasing mortality from breast cancer in women 39-49 years and yielded different results.[10] Seven randomized trials were included and their joint analysis showed a significant reduction in mortality from breast cancer due to screening this age group.[10] However, the studies included were of variable quality, and after exclusion of three randomized clinical trials conducted before 1980, the overall relative risk of mortality did not decrease significantly (RR = 0.87; 95%CI 0.56;1.13). The authors discuss the importance of false-positive results and the adverse effects of screening on the possible reduction of mortality.[10] Therefore, women should be informed about the risks and benefits of screening before deciding whether or not to participate in a regular screening program before age 50.[3]

Furthermore, the number of mammograms performed in an annual screening program starting at age 40 years is almost twice those performed in a program starting at age 50 years and is done biannually. Consequently, radiation exposure is doubled.[6] Although it has been argued that the amount of radiation from mammography is very low, repeated doses of radiation in more comprehensive screening programs pose potential risks that should not be disregarded. A cohort study of 100,000 women showed that annual screening between 40 and 55 years of age and biennial screening ≤ 74 years at a dose of 3.7 mGy for both breasts resulted in 86 radiation-induced cancers and 11 deaths from this type of cancer.[19]

It was also observed that 72.4% of mammogram results showed dense or moderately dense breasts. Dense breasts are expected for this age group,[e] although some authors suggest that this density is a risk factor for breast cancer.[16] Consequently, the false-positive rate and the rate of recall for imaging studies are higher and the predictive value of biopsies is lower.[e]

In addition to age, other studies showed risk factors that favor mammographic screening in the age group of 40-49 years, including breast density, family history, and previous biopsies.[18] In the present study, nulliparous women with ≥ 8 years of education had a higher risk of BI-RADS categories 3, 4, and 5. Therefore, future studies should evaluate the benefits of individualized screening in this age group, according to the presence of risk factors for breast cancer, in addition to the existing criteria for moderate risk, including nulliparity and family history of breast cancer after age 50 years.

The study design has some limitations. Because the study was conducted in a hospital that solely serves the Unified Health System (SUS), the profile of women treated at IMIP may be different from that of women assisted in private institutions. Therefore, it is not advisable to extrapolate the results to the entire population of women aged 40-49 years. On the basis of the results of the present study, it is not possible to draw conclusions about mortality reduction. However, these findings are relevant to SUS and should be considered when assessing the cost-effectiveness of the breast cancer screening program. The data from the Breast Cancer Information System[c] should be used for a large-scale evaluation of the results of breast cancer screening in Brazil, including the tests performed in the age group of 40-49 years. It is probable that excessive tests are being recommended and are not yielding consistent benefits for women.

However, mammography screening in women aged 40-49 years in IMIP indicated a low frequency of breast cancer and led to the performance of complementary interventions. However, this screening increased costs and did not prove its efficacy in decreasing mortality. Therefore, the criteria recommended by INCA and the US and Canadian task forces should be adopted, and screening in women with typical risk should begin only at age 50 years. Before this age, biennial mammography screening should be individualized and take into account the patients' profile and expectations, including their own perception of the risks and benefits, while respecting their autonomy to decide whether to undergo this examination.

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