ORIGINAL RESEARCH PAPER

Radiology

KEYWORDS: Mammography. Breast Neoplasms. Women's Health. Public Health Political.

ANALYSIS OF THE PREVALENCE OF MAMOGRAPHIC EXAMS MADE IN THE SCHOOL HOSPITAL OF THE FACULTY OF MEDICINE OF ITAJUBÁ (HE) USING THE BI-RADS® CLASSIFICATION®

Bruna Flávia Campos Cesário, Specialist, Full Member of the Brazilian College of Radiology and Diagnostic Imaging (CBR), assistant professor at the Medical School of Itajubá and Radiologist at the Hospital Escola de Itajubá (HE - FMIt).

ABSTRACT

The objective of this study was to analyze the prevalence of mammography exams of women in the School Hospital (SH) of the Faculty of Medicine of Itajubá (Minas Gerais) between January 2015 and January 2016. The method was the observational study, descriptive, cross-sectional and retrospective. Data collection and analysis of 324 registries of SISMAMA (Breast Cancer Information System) was carried out between 2015 and 2016. The information analyzed was age and BI-RADS® categorization. In the results, we verified that the main categories in the mammographic exams were BI-RADS® 1 for the right breast = 25.3% (IC: 20.5-29.9) and BI-RADS® 2 = 62.0% (IC: 56.6-67.0). For the left breast: BI-RADS® 1 = 23.5% (CI: 18.8-28.7) and BI-RADS® 2 = 55.2% (IC: 49.4-61.3). Age averages increase as the categories of right breast (p = 0.016) and left breast (p = 0.016) BI-RADS® classification increase. At the conclusion, it was observed that there was a significant difference in the right breast, with p = 0.004 and in the left breast, with p = 0.016. This correlation provided a better analysis and safety in the application of the classification as a way of predicting malignancy and guiding behaviors to be taken.

This study analyzed the prevalence of mammographic mammography findings in a hospital in Itajubá (MG), using the BI-RADS® (Breast Imaging Reporting and Data System) classification. It is hoped to provide knowledge that can be used as a subsidy to public health policies, structuring actions relevant to preventive, diagnostic and therapeutic assistance to women.

The Breast Cancer Information System (SISMAMA), SUS subsystem, aims to monitor and manage actions of early detection and registration of altered mammograms, for women between 50 and 69 years, allowing their follow-up. The registered breast changes are based on the categorization of the Breast Imaging Reporting and Data System (BI-RADS®), published by the American College of Radiology (2003) and translated by the Brazilian College of Radiology (CBR)1.

Breast cancer is the fifth leading cause of cancer death (522,000 deaths) and the most common cause of cancer death in women,[2] with 12.66 deaths / 100.000 women in 2013.[3]

In the search for results with better prognosis and lower morbidity associated with disease treatments, strategies for the early detection of cancer that are aimed at the diagnosis of cases of the disease in the initial phase of its natural history are fundamental. In turn, screening is the identification of breast cancer in asymptomatic individuals,4

with actions such as mammography, among others.5
Materials and methods

This research is an observational, descriptive, cross-sectional and retrospective study, based on the collection and analysis of records and data from 2100 SISMAMA registries of women who underwent mammographic screening at a hospital in Itajubá (MG), in the period between January From 2015 to January 2016. The information analyzed was age and BI-RADS® categorization.

Inclusion criteria:
Women aged 50 and 69 years submitted to mammography at the School Hospital of the Medical School of Itajubá (HE). It was requested to waive the informed consent form, since it is a retrospective study, and it is not feasible to obtain consent from all the women already submitted to the mammographic examination. To that end, all the women enrolled in SISMAMA within the defined period were included in the study.

Exclusion criteria:
Women under the age of 50 and above the age of 69. Mammographic screening in women in this age group results in a low frequency of breast cancer diagnosis, and thus the increase in costs with undetected efficacy to reduce mortality.

For the statistical treatment of the data, the program EPI INFO 7.1.5 was used, in which the initial analysis was carried out to characterize the study sample. With a target population of 2.100 women, aged 50-69 years, and based on a 95% confidence level and 80% power, a total sample of 324 patients was estimated. We included women aged 50 to 69 years who underwent mammography from January 2015 to January 2016. Those that were not in this age group were excluded.

The data were managed by the Statistical Package for Social Sciences (SPSS) version 23. For the descriptive analysis, the mean and standard deviation (SD) for the numerical variable age and the frequency distribution were calculated for the categorical variables: Age (50-59 years, ≥60 years), BI-RADS® (Breast Imaging-Reporting and DataSystem) categorization with six categories that correlate cancer risk (no risk / low risk with risk). The prevalence ratio (PR) was also calculated between age and cancer risk.

The results are presented by tables of relative and absolute frequency to describe the categorical variables and by means of position statistics (mean, minimum, maximum, standard deviation, amplitude). We also performed odds ratios between the age and risk groups.

To verify the association between age (50-59 and 60 years or older), BI-RADS® categories (Breast Imaging-Reporting and DataSystem) and risk group (with risk and without risk) of breast cancer, the Chi-square test (X2), which describes the control of the normality of the distributions, as well as the independent variables investigated, being considered significant $p \leq 0.05$ values and the measures of effect whose confidence interval did not include the unit. Analysis of variance, ANOVA, using the F statistic, was used to verify the relationship between the means of age and BI-RADS® categorization. The level of significance adopted in the tests was 5% and 95% confidence interval (95% CI).

The professional responsible for the mammographic analysis was duly qualified, legally qualified and qualified to practice radiological medicine, with more than 20 years of experience.

The study was approved by the Research Ethics Committee of Itajuba Medical School (CEP).

Results
The survey showed the mean age of 57.35 years (95% CI: 56.7225-58.0183), with SD = 5.65205. It was observed 67.3% of women aged 50-59 years (n = 218) and in the age group of 60 to 69 years, was 37.7% (n = 106).

The main categories of mammography according to the BI-RADS® classification found in the study were: for the right breast: BI-RADS® 1 = 25.3% (CI: 20.5-29.9) and BI -RADS® 2 = 62.0% (IC: 56.6-67.0). The BI-RADS® 0 and BI-RADS® 3 categories of mammography presented a prevalence of 6.5% (CI: 4.0-9.7) and 6.2% (CI: 3.7-8, 3), respectively. The categories BI-RADS® 4, BI-RADS® 5 and BI-RADS® 6 were not observed in the study (Table 1).

And for the left breast: BI-RADS® 1 = 23.5% (CI: 18.8-28.7) and BI-RADS® 2 = 55.2% (IC: 49.4-61.3). The BI-RADS® 0 and BI-RADS® 3 categories of mammography presented a prevalence of 10.8% (CI: 7.7-14.5), 9.9% (CI: 7.1-13, 4) and 0.6% (CI: 0.0-1.5) respectively (Table 2).

It can be observed that category 2 of the BI-RADS® classification (benign mammographic findings) prevailed in both breasts, among women aged between 50 to 59 years and 60 to 69 years. No records were found with categories 4, 5 and 6 of the BI-RADS® classification in the right breast, and categories 5 and 6 of the BI-RADS® classification, in the left breast.

Table 1. Distribution of the BI-RADS® category frequency in the right breast.

BI-RADS® classification	%	%(CI95%)
Right breast		
category 0	21	6,5 (CI: 4,0-9,7)
category 1	82	25,3(CI:20,5-29,9)
category 2	201	62,0(CI:56,6-67,0)
category 3	20	6,2(CI:3,7-8,3)
Total	(n=324)	100,0

Table 2. Distribution of the BI-RADS® category frequency in the left breast.

BI-RADS® classification		
Left breast	%	%(CI95%)
category 0	35	10,8 (CI:7,7-14,5)
category 1	76	23,5(CI:18,8-28,7)
category 2	179	55,2(CI:49,4-61,3)
category 3	32	9,9(CI:7,1-13,4)
category 4	2	0,6(CI:0,0-1,5)
Total	(n=324)	100,0

No significant associations between age (50-59 years and 60-69 years) and BI-RADS® classification groups were identified: NO RISK / LOW RISK (categories 0, 1 and 2) and WITH RISK(categories 3, 4, 5 and 6) in the right breast (p = 0.822) (Table 3).

However, it was found that the prevalence of women aged 50-59 years in the NO RISK / LOW RISK group for malignancy for breast cancer was 94% (n = 205) compared to those that presented a risk of malignancy, estimated in only 6% (n = 13). When the age range of 60 to 69 years old was observed, the prevalence of malignancy risk was much lower, 6% (n = 7), when compared to the NO RISK / LOW RISK group of malignancy, which was 93.4% (n = 99) (Table 3).

Table 3. Distribution of risk groups for the age group.

			RISK RIGHT BREAST		
			WITHOUT RISK/ LOW RISK	WITH RISK	TOTAL
Age	50 to 59 years	count	205	13	218
		% of age	94,0%	6,0%	100,0%
	60 to 69 years	Count	99	7	106
		% of age	93,4%	6,6%	100,0%
Total		Count	304	20	324
		% of age	93,8%	6,2%	100,0%

r from Pearson for this table is 0.822.

The odds ratio for the absence or low risk (GROUP WITHOUT RISK / LOW RISK) of malignancy for breast cancer (category 0, 1 and 2 of the BI-RADS® categorization) associated with the age groups (50-59 years and 60 At 69 years), in the right breast, was equal to 1.007 (95% CI = 0.948-1.007). The odds ratio for the WITH RISK group (categories 3, 4, 5 and 6 of the BI-RADS® categorization) was less than 1 (Table 4).

Table 4. Risk estimation between groups (right breast).

	Reason for Chances (Odds ratio)	CI 95%
Age (50-59 years and 60-69 years)	1,115	0,431 - 2,882
Grupo WITHOUT RISK/LOW RISK	1,007	0,948 - 1,070
Grupo WITH RISK	0,903	0,371 - 2,197
Number of Valid Cases	324	

There were no significant associations between age (50-59 years and 60-69 years) and BI-RADS® classification groups: NO RISK / LOW RISK (categories 0, 1 and 2) And WITH RISK (categories 3, 4, 5 and 6) in the right breast (p = 0.468) (Table 5).

However, it was found that the prevalence of women aged 50-59 years in the NO RISK / LOW RISK group of malignancy for breast cancer was 90.4% (n = 197) compared to those at risk of malignancy, being only 9.6% (n = 21) in these patients. When the age range of 60 to 69 years was observed, it was also verified that the prevalence of malignancy risk was much lower, being 12.3% (n = 13), when compared to the NO RISK / LOW RISK group of malignancy, which was 87.7% (n = 93) (Table 5).

Table 5. Distribution of risk groups (left breast).

			RISK LEFT BREAST		
			WITHOUT RISK LOW RISK	WITH RISK	TOTAL
Age	50 a 59 anos	Count	197	21	218
		% of age	90,4%	9,6%	100,0%
	60 to 69 years	Count	93	13	106
		% of age	87,7%	12,3%	100,0%
Total		Count	290	34	324
		% of age	89,5%	10,5%	100,0%

r de Pearson para esta tabela tem o valor de 0,468.

The odds ratio for the absence or low risk (GROUP WITHOUT RISK / LOW RISK) of malignancy for breast cancer (category 0, 1 and 2 of the BI-RADS® categorization) in the left breast, associated with the age groups (50 At 59 years and 60 to 69 years) was equal to 1.003 (95% CI = 0.948-1.19). The odds ratio for WITH RISK group (categories 3, 4, 5 and 6 of the BI-RADS® categorization) was less than 1 (Table 6).

Table 6. Risk estimation between groups (left breast)

	Reason for Chances (Odds ratio)	CI 95%
Age (50 a 59 anos e 60 to 69 years)	1,311	0,629 - 2,773
Grupo WITHOUT RISK/LOW RISK	1,030	0,948 - 1,119
Grupo WITH RISK	0,785	0,409 – 1,507
Nº de Cases Válidos	324	

For comparison of the categories BI-RADS® of the RIGHT and LEFT breast, and the mean age of the patients, the F test of the analysis of variance ANOVA was applied here. The results showed a significant difference in the right breast, with p = 0.004 and in the left breast, with p = 0.016. This means that there is difference in the mean ages and categories (0, 1, 2 and 3) in the right breast and the categories (0, 1, 2, 3 and 4) in the BI-RADS® left breast.

No records were found with BI-RADS® category 4, 5 and 6, in the right breast and category BI-RADS® 5 and 6, in the left breast. The mean age of patients in categories 2 (mean: 58.109; SD: 5.82735) and category 3 (mean: 58.4000; SD: 6.04718) in the right breast are higher than in the categories 0 (mean: 56.0476, SD: 4.64194) and 1 (mean: 55.5976; SD: 4.93879) (Table 7).

The mean age of patients in categories 3 (mean: 58.7188; SD: 6.32575) and category 2 (mean: 57.9553; SD: 5.59376) in the left breast are higher than Of categories 1 (mean: 56.2105; SD: 5.15963) and 0 (mean: 55.9429; SD: 5.74939) and (Table 8). In the identification of the patients who underwent mammographic examinations, using the BI-RADS® classification, both in the right and left breast, it was observed that the mean age increases as the categories increase (Table 8).

There is one exception in category 4 of the BI-RADS® classification. The rationale for the mean age of 50.5 years is that there are only 2 women in category 4, and therefore, the verification of the average reduction.

Table 7. Distribution of the categories and the Ages average (right breast).

		Statistic	%(CI95%) Lower	Upper
category 0	N	21	13	33
	Average	56,0476	53,8510	58,1444
	Standard Deviation	4,64194	3,06597	5,57370
	Standard Error	1,01295		
category 1	N	82	69	97
	Average	55,5976	54,5461	56,7753
	Standard Deviation	4,93879	4,09584	5,62463
	Standard Error	0,54540		
category 2	N	201	184	215
	Average	58,1095	57,2295	58,9699
	Standard Deviation	5,82735	5,36721	6,26033
	Standard Error	0,41103		
category 3	N	20	12	28
	Average	58,4000	55,7395	60,8342
	Standard Deviation	6,04718	4,50964	7,18844
	Standard Error	1,35219		
Total	N	324	324	324
	Average	57,3580	56,7346	58,0045
	Standard Deviation	5,65205	5,24918	6,00710
	Standard Error	0,31400		

Table 8. Distribution of categories and Average of Ages (left breast).

		Statistic	%(CI95%) Lower	Upper
category 0	N	35	23	47
	Average	55,9429	54,1092	58,0637
	Standard Deviation	5,74939	3,91315	6,94021
	Standard Error	0,97182		
category 1	N	76	62	90
	Average	56,2105	55,1262	57,2886
	Standard Deviation	5,15963	4,39712	5,75045
	Standard Error	0,59185		
category 2	N	179	160	199
	Average	57,9553	57,1636	58,8295
	Standard Deviation	5,59376	5,13109	6,09644
	Standard Error	0,41810		
category 3	N	32	22	42
	Average	58,7188	56,5349	61,1842
	Standard Deviation	6,32575	5,19263	7,18303
	Standard Error	1,11825		
category 4	N	2	1	6
	Average	50,5000	50,0000	51,0000
	Standard Deviation	0,70711	0,00000	0,70711
	Standard Error	0,50000		
Total	N	324	324	324
	Average	57,3580	56,8013	57,9843
	Standard Deviation	5,65205	5,30994	6,01310
	Standard Error	0,31400		

Discussion

In the results observed in mammographic screening in women aged 50-69 years, there was a low frequency of breast cancer diagnosis at the Hospital Escola (HE) in Itajubá. It can be observed that the absence of mammographic findings of the BI-RADS® classification categories 5 and 6, may be related to the absence of a reference cancer center in the Hospital Escola (HE) of Itajubá. This suggests that the attention should be based on multiprofessional interventions, so that the early diagnosis of breast cancer, can promote the reduction of morbidity and mortality.

Thus, we suggest that the screening criteria for women of normal risk seen in the radiology sector of the Hospital Escola (HE) of Itajubá, especially in categories 4, 5 and 6 of the BI-RADS® classification, should be integrated with a multiprofessional team , Consisting of mastologists, oncologists and radiologists, regarding the validation of the results and the perspective of a greater perception of the risks and benefits, respecting the autonomy of the patient to decide on the best form of follow-up.

In order to solve, in the patients classified mainly in categories 4 and 5 of the BI-RADS® classification, in which biopsy is recommended, that the investigation of the histopathological results of surgical biopsy be encompassed by an adequate infrastructure, together with a service Of pathology, thus being able to clearly and accurately demonstrate the results obtained in these services, and that can be used to analyze the positive predictive value of malignancy in categories 4 and 5. In the literature,

it is stated, for example, that the probability of cancer in category 5 is to be above 90%.6

There are variability in the classification of mammographic findings and histopathological findings that may be related to some factors, such as: mammographic technique (adequate positioning, breast density, indication of age and range of examinations, adequacy of film and development, and diagnostic failure Which is associated with poor positioning); The breast density (breasts with higher parenchyma density present a 30% greater chance of disagreement regarding the categorization of the BI-RADS®

method when compared to breasts with a greater amount of adipose tissue)7; the variability among observers (despite the application of BI-RADS® categorization to standardize and standardize mammography reports, there is variability among observers)8-10

Thus, concomitant with the multiprofessional team, a continuous development of methods of standardization in mammographic interpretation is necessary to reduce this variability more and more.

BI-RADS® categorization is a faithful predictor of malignancy, especially in patients classified in category 5, where the high mammographic suspicion is confirmed with positive histopathological findings for malignancy. However, in category 4 mammograms, although they have shown, in correlation with the histopathological data, very varied and sometimes low rates of malignancy, there is a need for biopsy investigation, since in this category there is a greater chance of finding lesions in an early stage and with this obtain better prognosis.

The correlation between the mammographic findings and the histopathological findings will allow the Hospital Escola (HE) of Itajubá a better analysis and safety in the application of this classification as a way to predict malignancy and guide conducts.

It is also necessary to seek excellence in the diagnosis and care of women, and the integration among mastologists, radiologists, oncologists and pathologists should be encouraged, guaranteeing the quality of a service that is relevant to the population and in line with the area literature7. With these implementation strategies, we will be able to increase the comprehensiveness and effectiveness of early detection of breast cancer through mammographic screening at the Hospital Escola (HE) in Itajubá.

As one of the public health problems that most affect women in the country, breast cancer demands Brazilian control strategies.11 The policy followed by Brazil is guided by the World Health Organization (WHO), which defines as a priority the Screening of breast cancer in the age range of women between 50 and 69 years of age.12

Existing methods for the early detection of breast cancer do not reduce incidence, but may reduce morbidity and mortality by disease13. There are three secondary prevention strategies for early detection: breast self-examination (AEM), clinical breast examination (ECM) and bilateral mammography (MMG), the latter being considered the method of selecting screening in population programs for their Impact on mortality.14 Thus, mammography remains the best tool for breast cancer screening, and it is essential to ensure easy access to reduce late diagnosis rates.15

The current health policy seeks to prioritize the possible benefits and reduce the harm associated with mammography screening, as well as the use of other strategies that may contribute to the reduction of the damages associated with this practice, such as the recommended periodicity and age.16 Screening by mammography is still the primary means of early detection for the diagnosis of malignant neoplasms of the breast.17

Conclusions

The results of the present study indicate that, in the majority of the women surveyed, there was predominance of categories 0, 1 and 2 of the BI-RADS® classification. No significant associations between age (50-59 years and 60-69 years) and BI-RADS® classification groups were identified: NO RISK / LOW RISK (categories 0, 1 and 2) and WITH RISK (categories 3, 4, 5 and 6), in the right breast (p = 0.822). No significant association between age (50-59 years and 60-69 years) and BI-RADS® classification groups were identified: NO RISK / LOW RISK (categories 0, 1 and 2) And WITH RISK (categories 3, 4, 5 and 6) in the left breast (p = 0.468).

Comparing the BI-RADS® classification categories and the mean age of the patients, it was observed that there was a significant difference in the right breast, with p = 0.004 and in the left breast, with p = 0.016. This means that there is difference in the mean ages and categories (0, 1, 2 and 3) in the right breast and the categories (0, 1, 2, 3 and 4) in the BI-RADS® left breast. No records were found with BI-RADS® category 4, 5 and 6, in the right breast and category BI-RADS® 5 and 6, in the left breast.

Therefore, it is hoped to contribute, through the implementation of SISMAMA and the categorization of BI-RADS®, with actions of a tracking program with preventive targets, in identifying the population most vulnerable to breast cancer, aiming at the diagnosis and early treatment of Population, providing easy access and assurance of an infrastructure for the quality of early diagnosis.

With the results obtained in this study, information about the importance of standardization with BI-RADS® for strategies of implementation and effectiveness of the early detection of breast cancer through mammographic screening was provided. The BI-RADS® categorization, in addition to standardizing the mammographic reports, is a faithful predictor of malignancy, especially in patients classified in category 5. Thus, the correlation of the mammographic findings allows a better analysis and safety in the application of this classification as Way of predicting malignancy and guiding behaviors to be taken.

Thanks

This study received financial support from the Foundation for Research Support of Minas Gerais (FAPEMIG) and support from the Nucleus of Research and Graduate Development of the Medical School of Itajubá (NDPPG).

Disclosure

The authors report that there are no conflicts of interest.

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