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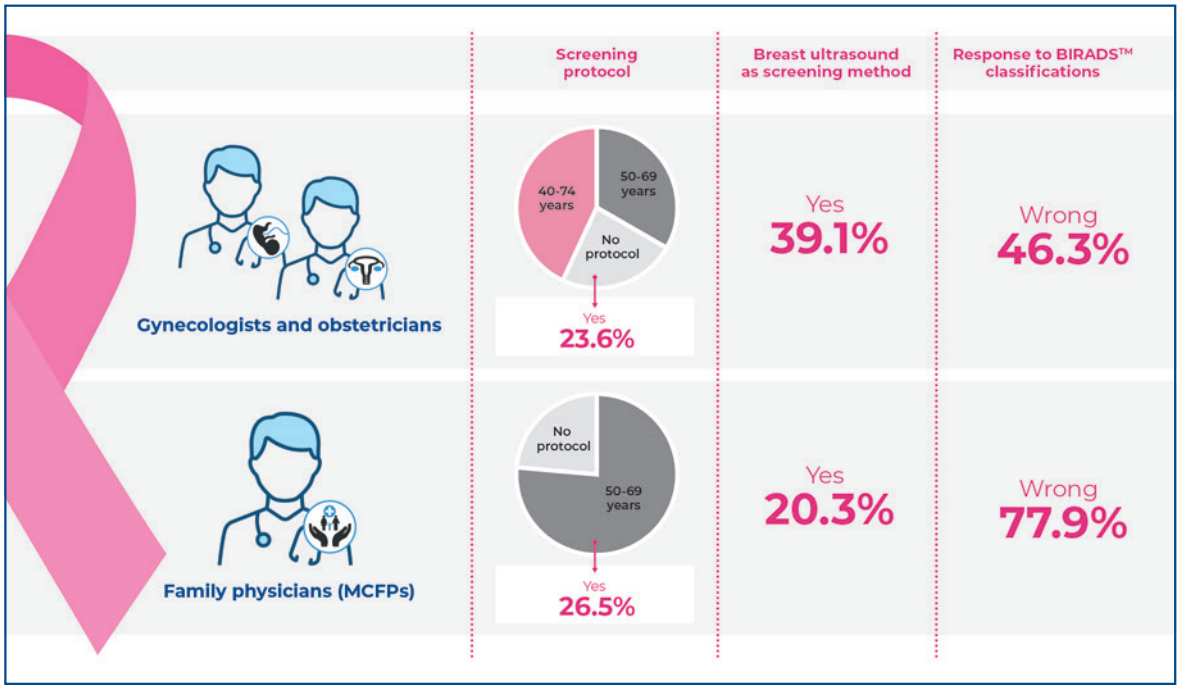
Knowledge related to breast cancer screening programs by physicians in Brazil



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In Brief

Antonini et al. evaluated gynecologists', obstetricians', and family and community physicians knowledge of breast cancer screening and their adherence to recommendations defined by the BI-RADS™ system. The study demonstrated that inadequate training resulted in insufficient screening and failure to follow the protocols recommended by the BIRADS™ system.

Highlights

- Variability in screening protocols: only 42.8% of gynecologists and obstetricians follow the 40-74 years protocol, while 76.6% of family physicians follow the 50-69 years protocol.
- High rate of incorrect BIRADS™ interpretation: there were 46.3% incorrect responses among gynecologists and obstetricians and 77.9% among family physicians, highlighting significant knowledge gaps.
- Misconception about breast ultrasound: 39.1% of gynecologists and obstetricians and 20.3% of family physicians incorrectly consider ultrasound as a screening method.
- Impact of inadequate training: inadequate training leads to improper screening practices that do not align with the BIRADS™ recommended guidelines.

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ORIGINAL ARTICLE

Knowledge related to breast cancer screening programs by physicians in Brazil

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ABSTRACT

Objective: To evaluate the knowledge and practices of gynecologists, obstetricians, and family and community physicians in Brazil regarding breast cancer screening, mammographic findings defined by the BIRADS™ system, and their approach to suspected clinical lesions. **Methods:** This was an observational, cross-sectional, descriptive study conducted using an online research questionnaire distributed via email to 9,000 gynecologists and obstetricians and 5,600 family and community and preventive medicine doctors actively practicing in Brazil. **Results:** Among gynecologists and obstetricians, 42.8% follow the 40-74 years screening, 33.5% follow the 50-69 years screening, and 23.6% do not follow any specific protocol. Among the family and community physicians, 76.6% follow the 50-69 years screening protocol, and 23.4% do not follow any specific protocol. When we evaluated the responses regarding the behaviors of each BIRADS™ classification, 46.3% of responses were wrong among gynecologists and obstetricians, and 77.9% were wrong among community and preventive medicine doctors, exhibiting a significant difference. The role of breast ultrasound in screening was evaluated; 39.1% of gynecologists and obstetricians and 20.3% of community and preventive medicine doctors consider it as a screening method. Among gynecologists and obstetricians who do not follow any screening protocol, 94.7% consider ultrasound as a screening method. Among community and preventive medicine doctors, only 26.5% of physicians who follow the 50-69 years screening method consider it as a screening method. **Conclusion:** Inadequate training results in gynecologists and obstetricians, and family and community physicians performing inadequate screening and not following the recommended practices outlined in the BIRADS™ system.

Keywords: Mass screening; Mammography; Breast neoplasms; Preventive medicine; Gynecologists; Obstetricians; Family; Health knowledge, attitudes, practice; Surveys and questionnaires; Physicians, family; Brazil

INTRODUCTION

According to the Global Cancer Statistics 2020, breast cancer was the leading cause of global cancer incidence in 2020, with an estimated 2.3 million new cases, accounting for 11.7% of all cancer cases. It is the fifth leading cause of cancer mortality worldwide, with 685,000 deaths. Among women, breast cancer accounts for 1 in 4 cancer cases and 1 in 6 cancer deaths, ranking first in incidence in most countries (159 out of 185 countries) and mortality in 110 countries.[1] In Brazil, excluding non-melanoma skin tumors, breast cancer is also the most frequent cancer in women in all regions. For the year 2023, 73,610 new cases were estimated, corresponding to an incidence rate of 43.74/100,000 cases.[2,3]

Breast cancer screening aims to identify the cancer in its early stages, often before symptoms develop, leading to improved prognosis.[4]

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Several techniques have been tested for breast cancer screening. The most well-known and scientifically validated screening techniques include imaging tests, clinical breast examination, and breast self-examination. The accuracy (sensitivity and specificity) of mammography depends on several factors: female-related factors (breast density, age, and the use of hormone replacement therapy) and factors related to the technical variability of the examination. Mammography is considered the gold standard for screening the standard-risk population.[4]

For other methods, no long-term clinical trials with clinical breast examination and self-examination have been conducted in women who did not undergo another type of screening, which makes the evidence for such methods uncertain.[5] Regarding ultrasonography, despite being widely available, relatively inexpensive, and highly sensitive, its specificity is much lower than that of mammography. Therefore, it is reserved for cases of dense breasts in which mammography is inconclusive.[6]

In Brazil and worldwide, several recommendations have been made regarding the start, interval, and frequency of breast cancer screening. Table 1 outlines these recommendations.

For early diagnosis of breast cancer, annual mammographic screening is recommended from age 40 to 74. For women aged 75 or older, mammographic screening is recommended if they have a life expectancy longer than 7 years, as recommended by Brazilian societies such as the Brazilian Society of Mastology (SBM - *Sociedade Brasileira de Mastologia*), the Brazilian College of Radiology (CBR - *Colégio Brasileiro de Radiologia*), and the Brazilian Federation of Gynecology and Obstetrics Associations (Febrasgo - *Febrasgo Federação Bras Soc Ginecologia e Obstetrícia*).[7]

However, according to the current recommendations of the Ministry of Health, mammographic screening is recommended every two years for women aged 50 to 69 years.[8]

Breast cancer screening should be tailored to women based on age group and frequency, aligning with evidence that shows a reduction in breast cancer mortality and a favorable balance between benefits and potential harm.[8] A wide range of behaviors among specialist physicians (gynecologists, obstetricians, and family physicians) has been observed, regardless of the adoption of practices according to the established consensus or guideline.

Table 1. Comparison between mammography screening in Brazil and worldwide

Organization	References	Age groups			Frequency
		40-49	50-75	75+	
Sociedade Brasleira de Mastologia *Federação Brasileira de Ginecologia e Obstetrícia* *Colégio Brasileiro de Radilogia*	Urban et al. 2017[7]	Yes	Yes	Continue screening if life expectancy >7 years	Yearly
Instituto Nacional do Cancer *Ministério da Saúde Brasil* *Sociedade Brasileira de Medicina de Família e Comunidade*	*Instituto Nacional do Câcner José Alencar Gomes da Silva*, 2019[8]	No	50 -59	No	Biennial
US Preventive Task Force	Siu et al. 2016[19]	Individualize	Yes	No evidence	Biennial
American College of Obstetricians and Gynecologists	Practice Bulletin Number 179, 2017[20]	To offer	Yes	No evidence	1-2 years
American Cancer Society	Smith et al. 2018[21]	To offer 40-44 Recommended 45-49	Yes	Continue screening if life expectancy >10 years	Yearly 40-54 Biennial >54
National Comprehensive Cancer Center	NCCN, 2024[22]	Yes	Yes	Continue screening if life expectancy >10 years	Yearly
American College of Radiology	Monticciolo et al. 2021[23]	Yes	Yes	Continue screening if life expectancy >7 years	Yearly
American College of Physicians	Qaseem et al. 2019[24]	Individualize	Yes	No	Biennial
American Academy of Family Physicians	Jordan et al. 2019[25]	Individualize	Yes	No evidence	Biennial
European Society for Medical Oncology	Cardoso et al. 2019[26]	Yes	Yes	No	Yearly

Such varied approaches can lead to delays in early diagnosis or false-positive results, resulting in overdiagnosis and overtreatment related to the identification of indolent tumors (tumors that are diagnosed and treated without representing a threat to life). This can also increase the risk of obtaining false-positive results, which generate anxiety and excessive testing and false-negative results, leading to a false sense of security.[9]

The American College of Radiology developed the Breast Imaging Reporting and Data System (BIRADS®) to standardize mammographic reporting. This system includes terms to describe breast parenchyma patterns, characteristics of masses and calcifications, associated findings, and final categorization. The use of the BIRADS system enhances clarity in reports, improves communication, and facilitates research. The use of the BIRADS system by the professionals who conduct the screening is fundamental, as the direction for each of the conducts must be known to avoid delays in the early diagnosis of breast cancer.[10]

Knowledge and attitudes of health care providers largely influence the adoption of breast cancer screening methods in a community.[11] Health professionals such as obstetricians and gynecologists and family doctors constitute the most relevant group for this purpose in Brazil, as they evaluate women and are responsible for requesting mammography.[12] Therefore, assessing the knowledge levels of these professionals regarding screening is crucial. This assessment would aid in developing educational programs to improve screening knowledge and behaviors related to test findings.

OBJECTIVE

To evaluate the knowledge of breast cancer screening, the practices related to mammographic findings defined by the BIRADS™ system, and the approach to suspected clinical lesions by gynecologists, obstetricians, and family physicians in Brazil.

METHODS

Study design

This observational, cross-sectional, descriptive study was conducted using an online research questionnaire (Google Questionnaire), distributed via email to 9,000 gynecologists and obstetricians (GO) and 5,600 family and community and preventive medicine doctors actively engaged in clinical practice, selected through a marketing email list.

Data collection

Data were collected through a pre-tested system of self-administered Google Forms questionnaires. The questionnaire was developed based on previous studies following an extensive literature review. The questionnaire was validated and assured by a committee of experts in research methodology, obstetrics, gynecology, mastology, and family and community medicine before administration to the study population. A pilot study involving approximately 50 participants, including residents, assistants, and teachers from a teaching service in Brazil, was conducted to ensure the clarity and reliability of the questionnaire. Cronbach's alpha was calculated to assess the reliability of the questionnaire, yielding a value >0.75.

The questionnaire was divided into four sections, The first section evaluated the physicians' socio-demographic information (age, years since graduation, sex, region of practice, academic background, teaching activity, specialist titles, and workplaces).

The second section of the questionnaire focused on knowledge of mammographic screening parameters, including starting age (35, 40, or 50 years old), ending age (69, 75, continuing after 75 if life expectancy >7 years, or no age limit), screening frequency (annual, biennial, or semi-annual). Responses were grouped into three categories for the analysis: unfamiliar with screening protocols, screening in accordance with *Sociedade Brasiliera de Mastologia* guidelines (40-75 years),[7] or screening according to *Instituto Nacional do Cancer* (INCA) *Ministério da Saúde Brasil* guidelines (50-69 years).[8]

The third section assessed the knowledge about the BIRADS™ classification. BIRADS™ 0 guidelines include maintaining standard screening according to age; repeating mammography in 6 months; requesting breast USG; requesting biopsy; repeating mammography immediately. BIRADS™ 3 guidelines include maintaining standard screening according to age; repeating mammography in 6 months; requesting breast USG; requesting biopsy; repeating mammography immediately). BIRADS™ 4 guidelines include repeating mammography in 6 months; repeating mammography in 1 year; requesting breast USG; referral to a mastologist; requesting core needle biopsy; requesting USG and guided core-needle biopsy. BIRADS™ 5 guidelines include referral to a mastologist; requesting guided core-needle biopsy; requesting USG and guided core-needle biopsy).

The final section addressed the use of ultrasound in screening, indicating whether it must always be requested, is only requested in cases of dense breasts, or can replace mammography. Respondents were asked if they were aware of BIRADS™ for ultrasound and which procedures to follow for clinically suspicious nodules (core needle biopsy and mammography and ultrasound or mammography and/or ultrasound only).

Each question allowed for the selection of only one response alternative.

Data analysis

The collected data facilitated a purely descriptive analysis to assess medical knowledge about breast cancer screening and to identify variations and discrepancies in professional practices across study variables. For statistical analysis, the ANOVA test and the chi-square test were used, with a 95% confidence interval (95%CI) ($p<0.05$).

Sample validation

Based on the last *Conselho Federal de Medicina* medical census, the target population of GOs and community and preventive medicine doctors was 30,414 and 7,349, respectively.[13] Thus, through sample calculations (5,310 and 2,700 surveys, respectively), while maintaining a 95%CI, we achieved a margin of error of 0.5%, which is extremely low and ensures excellent reliability.

Ethical aspects

This study was approved by the Research Ethics Committee of the *Hospital do Servidor Público Estadual "Francisco Morato de Oliveira,"* CAAE: 48020421.5.0000.5463; #4.858.305.

All respondents signed a Free and Informed Consent Form (TCLE) agreeing with the research before answering the online questionnaire. When analyzing the study, the responsible researcher was not aware of the correspondence between the answers and individual respondents.

RESULTS

The survey was emailed to 9,000 GOs and 5,600 family and preventive medicine physicians. Of these, 5,310 GOs and 2,700 family doctors completed the survey, representing 59.0% and 48.2%, respectively, based on the total number of emails sent.

Socio-demographic characteristics

The average age of GOs was 55 years and that of the community and preventive medicine doctors was 54.3 years, with no significant difference ($p=0.302$). However, a significant difference existed in the average time since graduation: 23.6 years for the GOs and 21.7 years for the community and preventive medicine doctors ($p<0.001$). The number of females was the largest between the two groups, accounting for 73.3% of GOs and 72.8% of community and preventive medicine doctors. Regarding academic training, most doctors in both groups completed medical residency, comprising 67.4% of GOs and 57.0% of community and preventive medicine doctors, with a significant difference ($p=0.044$). Specialist titles were held by 64.6% of community and preventive medicine doctors and 57.6% of GOs. Only 7.4% of GOs and 4.1% of community and preventive medicine doctors possessed a master's or doctorate degree. All community and preventive medicine doctors practiced in public institutions (100%), whereas GOs were distributed as follows: approximately 1/3 exclusively public, 1/3 exclusively private, and 1/3 both. Table 2 presents these data.

Screenig knowledge

Responses regarding knowledge about screening were categorized into three groups: those adhering to screening between 50-69 years, those adhering to screening between ages 40-74 years, and those not following any specific protocol. Among GOs, 42.8% followed the 40-74 years screening protocol, 33.5% followed the 50-69 years screening protocol, and 23.6% did not follow any specific protocol. Among the community and preventive medicine doctors, 76.6% followed the 50-69 years screening protocol, and 23.4% did not follow any specific protocol. A significant difference was observed between the groups. Table 2 presents the specialty-specific results.

Factors influencing non-adherence to a specific protocol were evaluated. Among the GOs, the identified factors included not undergoing medical residency (55.8%), not having a specialist title (80.5%), not holding a master's or doctorate (100%), not engaging in teaching activity (95.5%), and working only in the private environment (49%). Among the community and preventive medicine doctors, not undergoing medical residency (65.7%), not having a specialist title (62.1%), and not engaging in teaching activities (85.1%) were the identified factors. A significant difference was observed across all the evaluated criteria.

Table 2. Socio-demographic and educational characteristics of medical professionals by specialty

Variables	Medical specialty		p value
	Gynecologist and Obstetrician (n=5,310)	Family and Community Medicine (n=2,700)	
Age (mean±SD years)	55.0±17.2	54.3±17.4	0.302
Time since graduation (mean±SD years)	23.6±12.0	21.7±10.9	<0.001
Sex, n (%)			
Female	3,892 (73.3)	1,965 (72.8)	0.274
Male	1,418 (26.7)	735 (27.2)	0.626
Specialization status, n (%)			
Specialization	1,732 (32.6)	1,162 (42.0)	0.044
Medical residency	3,578 (67.4)	1,538 (57.0)	
Specialist title, n (%)			
No	2,249 (42.4)	955 (35.4)	<0.001
Yes	3,061 (57.6)	1,745 (64.6)	
Teaching activity, n (%)			
No	4,600 (86.6)	2,461 (91.1)	<0.001
Yes	710 (13.4)	239 (8.9)	
Postgraduate, n (%)			
Doctorate degree	274 (5.2)	86 (3.2)	<0.001
Master's degree	112 (2.1)	24 (0.9)	
None	4,924 (92.7)	2,590 (95.9)	
Service location, n (%)			
Both	1,670 (31.5)	0 (0.0)	<0.001
Private	1,998 (37.6)	0 (0.0)	
Public	1,642 (30.9)	2,700 (100.0)	
Region of the country, n (%)			
Midwest	399 (7.5)	226 (8.4)	0.001
North East	1,082 (20.4)	545 (20.2)	
North	558 (10.5)	229 (8.5)	
Southeast	2,393 (45.1)	1,203 (44.6)	
South	878 (16.5)	497 (18.4)	

Knowledge about BIRADS™

Knowledge of the BIRADS™ was assessed by a direct question: Do you know the BIRADS™ system and its conduct? Of the GOs, 50.6% answered no, and 88.8% of the community and preventive medicine doctors answered no, with a significant difference among responses. When we evaluated the responses regarding the behaviors of each BIRADS™ classification, 46.3% of GOs and 77.9% of community and preventive medicine doctors provided wrong responses, with a significant difference among responses. Regarding BIRADS™ 0, the main error among GOs (29.5%) and community and preventive medicine doctors (47.7%) related to requesting an ultrasound. For BIRADS™ 3, among the GOs unfamiliar with the procedure, 60% considered requesting an ultrasound, whereas 47% of community and preventive medicine doctors opted to maintain standard screening. For BIRADS™ 4 and 5, the primary course of action for both GOs (46.8%) and community and preventive medicine doctors (58%) was referral to a mastologist instead of requesting a core needle biopsy. Significant differences were observed in all responses. Table 3 presents all the data.

The evaluation of factors associated with not knowing the BIRADS™ conducts among GOs revealed that 61.5% did not complete a medical residency and 54.4% lacked a specialist title, 45.2% worked in both the private and public environment, and 56.9% did not follow a screening protocol. Among the community and preventive medicine doctors, training did not correlate with knowledge of BIRADS™, and not following a screening protocol was the primary influence, affecting 91.6%. These associations exhibited significant differences. Table 4 presents all the data.

Table 3. Breast cancer screening knowledge

Screening questions	Medical specialty		p value
	Gynecologist and Obstetrician (n=5,310)	Family and Community Medicine (n=2,700)	
In your daily practice, at what age do you start mammography screening in Brazil for the general population?, n (%)			
35 years	833 (15.7)	0 (0.0)	<0.001
40 years	2,275 (42.8)	0 (0.0)	
50 years	2,202 (41.5)	2,700 (100.0)	
In your daily practice, at what age do you stop mammographic screening in Brazil for the general population?, n (%)			
69 years	2,030 (38.2)	2,069 (76.6)	<0.001
70 years	0 (0.0)	161 (6.0)	
75 years	628 (11.8)	244 (9.0)	
After 75 years, continue screening if the patient has a life expectancy of more than 7 years	2,028 (38.2)	0 (0.0)	
No age limit	624 (11.8)	226 (8.4)	
In your daily practice, what is the periodicity of mammography screening in Brazil for the general population?, n (%)			
Yearly	3,108 (58.5)	268 (10.0)	<0.001
Biennial	2,202 (41.5)	2,432 (90.0)	
What is the role of breast ultrasound in screening, n (%)			
Request during screening for dense breasts	2,021 (38.1)	1,328 (49.2)	<0.001
Request during screening for dense breasts and/or breast complaints	1,212 (22.8)	823 (30.5)	
Ultrasonography is an effective screening test	2,077 (39.1)	549 (20.3)	
Screening Protocols, n (%)			
INCA (50–69 years, Biennial)	1,781 (33.5)	2,069 (76.6)	<0.001
SBM (40–75 years or expectancy > 7 years, Yearly)	2,275 (42.8)	0 (0.0)	
No protocol	1,254 (23.6)	631 (23.4)	
What is your approach to highly suspicious changes on clinical examination?, n (%)			
Order mammography and ultrasound	3,611 (68.1)	1,404 (52.0)	<0.001
Forward to mastologist	954 (17.9)	297 (11.0)	
Order core needle biopsy and mammogram	745 (14.0)	999 (37.0)	

INCA: *Instituto Nacional do Cancer;* SBM: *Sociedade Brasileira de Mastologia.*

Awareness of the existence of BIRADS™ for other breast imaging tests (ultrasound and magnetic resonance imaging) is minimal, with 59.4% of GOs 59.4%, and 95.8% of community and preventive medicine doctors being unaware of it. Similarly, knowledge of the conducts outlined in the BIRADS™ is also limited, with 59.8% of GOs and 93.0% of community and preventive medicine doctors lacking knowledge. These findings persist even among the groups that correctly answered all the questions regarding the BIRADS™ procedures, with a significant difference. Table 4 presents the detailed data.

The role of ultrasound in screening

The role of breast ultrasound in screening was evaluated through three questions. Among GOs, 39.1% considered it a screening method, whereas among community and preventive medicine doctors, 20.3% considered it as a screening method, indicating a significant difference. Among GOs who did not follow any screening protocol, 94.7% considered ultrasound a screening method. Conversely, among community and preventive medicine doctors, only 26.5% of those following the 50-69 years screening protocol considered it a screening method. This difference was significant.

Management of clinically suspicious nodules

The presence of a clinically suspicious nodule demands a different conduct from mammographic screening. However, 68.1% of GOs and 52% of community and preventive medicine doctors consider requesting an ultrasound and mammography, while 17.9% and 11%, respectively, refer them to a mastologist. Only 14% of GOs and 37% of community and preventive medicine doctors perform the ideal approach, which involves requesting core needle biopsy and mammography. Table 3 presents the data.

Table 4. Knowledge about BIRADS™

Knowledge questions about BIRADS™	Medical specialty				p value
	Gynecologist and Obstetrician (n=5,310)		Family and Community Medicine (n=2,700)		
	Got the question right about BIRADS™ conduct				
	Yes (n=2,853) n (%)	No (n=2,457) n (%)	Yes (n=597) n (%)	No (n=2,103) n (%)	
Do you know the BIRADS™ system and its conduct?					
No	1,289 (45.2)	1,397 (56.9)	471 (78.9)	1,926 (91.6)	<0.001
Yes	1,564 (54.8)	1,060 (43.1)	126 (21.1)	177 (8.4)	
In cases of BIRADS 0 mammography, what is your conduct?					
Maintain the usual screening	1,118 (39.2)	697 (28.4)	98 (16.4)	847 (40.3)	<0.001
Request complete exam	572 (20.0)	1,034 (42.1)	402 (67.3)	253 (12.0)	
Order breast ultrasound	1,163 (40.8)	726 (29.5)	97 (16.2)	1,003 (47.7)	
In the case of BIRADS 3 mammography, what is your conduct?					
Maintain the usual tracking	0 (0.0)	876 (35.7)	988 (0.0)	988 (47.0)	<0.001
Repeat mammograms in 6 months	2,853 (100.0)	108 (4.4)	1,255 (100.0)	658 (31.3)	
Order breast ultrasound	0 (0.0)	1,473 (60.0)	457 (0.0)	457 (21.7)	
In cases of BIRADS 4 mammography, what is your conduct?					
Refer to the Mastologist	0 (0.0)	1,151 (46.8)	0 (0.0)	1,231 (58.5)	<0.001
Maintain usual screening	0 (0.0)	82 (3.3)	0 (0.0)	0 (0.0)	
Request fine needle puncture	0 (0.0)	177 (7.2)	0 (0.0)	0 (0.0)	
Request a core needle biopsy	2,853 (100.0)	1,047 (42.6)	1,469 (100.0)	872 (41.5)	
In cases of BIRADS 5 mammography, what is your approach?					
Refer to the Mastologist	0 (0.0)	1,151 (46.8)	0 (0.0)	1,231 (58.5)	<0.001
Maintain usual screening	0 (0.0)	82 (3.3)	0 (0.0)	0 (0.0)	
Request fine needle puncture	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Request a core needle biopsy	2,853 (100.0)	1,224 (49.8)	597 (100.0)	872 (41.5)	
Do you know that there is BIRADS for ultrasound and MRI exams?					
No	1,121 (39.3)	2,032 (82.7)	534 (89.5)	2,053 (97.6)	<0.001
Yes	1,732 (60.7)	425 (17.3)	63 (10.5)	50 (2.4)	
Is the conduct of BIRADS for ultrasound and MRI the same as for mammography?					
No	1,221 (42.8)	1,953 (79.5)	513 (85.9)	1,998 (95.0)	<0.001
Yes	1,632 (57.2)	504 (20.5)	84 (14.1)	105 (5.0)	

MRI: magnetic resonance imaging.

DISCUSSION

This is one of the few studies evaluating the knowledge of GOs and family and community and preventive medicine physicians about breast cancer screening and the management of screening findings using the BIRADS™ system.

In Brazil, breast cancer screening operates on an opportunistic basis, meaning that it relies on women proactively seeking a doctor to request a mammogram for early detection. Given that GOs and community and preventive medicine doctors typically initiate this request, these specialties must be familiar with the screening protocols and conduct of the BIRADS™.

Most participants demonstrated knowledge of the mammographic screening criteria, with 23.6% of GOs and 23.4% of community and preventive medicine doctors not following any consensus. However, given that Brazil has established screening protocols, the most followed protocol among the GOs is the screening 40-75 years protocol (42.8%), whereas among community and preventive medicine doctors, it is the Ministry of Health 50-69 years protocol (76.6%). This discrepancy is attributed to the type of service, with community and preventive medicine doctors exclusively operating in the public environment and the GOs evenly distributed between public, private, or both sectors. Other studies

have revealed similar divergences in screening ranges, even in countries that have a single protocol, ranging from 30 to 60% discrepancy.[14]

Approximately 23% of GOs and community and preventive medicine doctors do not follow any recommended protocol, which can impact the effectiveness of breast cancer screening. Our study identified a significant association between professionals with a poorer academic background (those who did not complete a medical residency and lacked a specialist title) and these behaviors. Among GOs, 55.8% have only completed a specialization, and 80.1% do not hold a specialist title. Martin et al. also demonstrated this association between inadequate training and lack of knowledge about screening.[15]

Contrary to findings from a published systematic review by Neugut et al., which observed that GOs perform mammographic screening more effectively than community and preventive medicine doctors, our research in Brazil did not observe this, as both groups exhibited similar rates of not following recommended protocols.[16]

The results of another study indicated that GOs (92.3%) are more likely to recommend initiating screening after 40 years of age compared to community and preventive medicine doctors.[12] However, in this study, only 42.8% of GOs commenced screening at 40 years of age, while 100% of community and preventive medicine doctors initiated screening at 50 years of age.

Knowledge of screening, particularly adherence to an adequate and standardized protocol, is essential for reducing the number of unnecessary exams performed in age groups where screening is ineffective.[15] Therefore, establishing continuing education and updating programs can improve the performance of physicians and standardization of screening practices in Brazil.

Most previous research on breast cancer screening knowledge has focused solely only on mammography requests, not addressing the normal and abnormal findings of these exams.[11]

An unprecedented aspect of our evaluation is the assessment of knowledge regarding the conducts outlined by the BIRADS™ system, given its direct relevance to breast cancer screening.

Our study revealed that 46.3% of GOs and 77.9% of community and preventive medicine doctors are unfamiliar with all the conducts established by the BIRADS™ system. This knowledge gap can have a detrimental impact on screening, leading to delayed early diagnosis, which is crucial for reducing breast cancer mortality. Regarding behaviors associated with BIRADS™ 4 and 5, which involves requesting a core needle biopsy for a histological diagnosis, 76.8% of GOs and 54.4% of community and preventive medicine doctors indicated that they request a biopsy, while others indicated they would refer them to a mastologist. These practices can affect early diagnosis. Studies have demonstrated that in developing countries, delays in diagnosis can negatively affect the survival of patients with breast cancer, potentially reducing survival time by up to 12 months.[17-20]

Another finding of our research pertains to the management of a patient with clinically suspicious nodules. The ideal course involves requesting a core needle biopsy, mammography to evaluate the contralateral breast, and referral to a mastologist. In our study, only 14% of the GOs and 37% of the community and preventive medicine doctors responded according to this conduct. Majority indicated that they request only imaging tests (mammography and ultrasonography).

In Brazil, data from the Cancer Information System of the Unified Health System (SISCAN/DATASUS - *Sistema de Informação do Câncer/Departamento de Informação e Informática do Sistema Único de Saúde*) reveal that the interval between a mammography BIRADS™ 4 or 5 until the request for a biopsy is over 30 days in 26.7% of cases and between 20 to 30 days in over 8.5% of cases. Additionally, following the biopsy, 32.8% experienced delays of 30 days or more to receive the results. Given that the initial conduct recommended for BIRADS™ 4 and 5 and clinically suspicious nodules involves referral to mastologists to determine further management, these delays may lead to diagnostic and treatment initiation delays exceeding 90 days.[18,21,22]

The results of this study contribute to the ongoing discussion regarding the information needs of physicians responsible for breast cancer screening. It emphasized the need to improve awareness, understanding, and uniformity in screening protocols.[11,23-26]

In aiming for improved care for patients undergoing breast cancer screening, physicians have a crucial role in providing professional assistance and health education. This includes providing information about the examination and disease control and management. Continuing education courses have high adherence among physicians directly involved with medical students and/or residents. They can serve as a viable and accessible alternative to standardizing practices.

CONCLUSION

Inadequate training of gynecologists and obstetricians and community and preventive medicine doctors leads to suboptimal screening practices and not following the conduct recommended by the BIRADS™ system.

These findings underscore the importance of improving awareness and adherence to the BIRADS™ screening guidelines and management recommendations, as well as providing educational opportunities that address knowledge and practice gaps for clinicians.

The study results can be used to develop and implement educational support to engage, educate, and empower clinicians across the entire spectrum of breast cancer screening.

AUTHORS' CONTRIBUTION

Marcelo Antonini: formal analysis, methodology, writing - original draft and writing - review & editing. Gabriel Duque Pannain and Gabriela Silva Solino de Souza: investigation and writing - review & editing. Odair Ferraro, Andre Mattar, Reginaldo Guedes Coelho Lopes and Juliana Monte Real: supervision.

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