ORIGINAL ARTICLE
https://doi.org/10.29289/2594539420250035

Gynecologists' knowledge and adherence to breast cancer screening guidelines: a study in Teresina-PI

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ABSTRACT

Introduction: In Brazilian women, the most common type of cancer, excluding non-melanoma skin cancer, is breast cancer (BC). The estimated number of new BC cases for the 2023–2025 triennium in Brazil is 73,610 cases, corresponding to an estimated risk of 66.54 new cases per 100,000 women. Screening is a strategy for examining and detecting cancer at an early stage, when it may be easier to treat or cure. The study examines gynecologists' knowledge about BC screening in Teresina, PI, Brazil. The aim of the study was to assess these professionals' adherence to BC screening guidelines, which are essential for early detection and reducing mortality. **Methods:** This is a cross-sectional study conducted in 2019 with 138 gynecologists selected through simple random sampling. Data collection included a sociodemographic questionnaire and a knowledge evaluation on BC screening. **Results:** The study found that most gynecologists (58.39%) used mammography alone to screen asymptomatic women, while 40.15% preferred to combine mammography with ultrasound. Screening was most often recommended starting at age 40, and annual screening was suggested for women with a family history of BC. Only a small portion of professionals (11.76%) prescribed chemoprevention with tamoxifen or raloxifene. Notably, 20% reported calculating BC risk. Gynecologists who had completed residency training showed a better understanding and greater accuracy regarding the recommended guidelines. **Conclusion:** There is a need for continued education to align screening practices with current guidelines and standardize practices, promoting early diagnoses and potentially reducing BC mortality. Harmonizing protocols and regularly updating professionals are fundamental to optimizing screening outcomes.

KEYWORDS: gynecologist; breast cancer; screening; knowledge; research.

INTRODUCTION

For BC screening, the National Cancer Institute (INCA) recommends a routine mammogram for women aged 50–69 years once every 2 years. On the other hand, the Brazilian College of Radiology (CBR), the Brazilian Society of Breast Disease (SBM), and Febrasgo recommend annual mammograms after age 40[1,2]. In Brazilian women, the most common type of cancer, excluding non-melanoma skin cancer, is breast cancer (BC). The estimated number of new BC cases for the 2023–2025 triennium in Brazil is 73,610 cases, corresponding to an estimated risk of 66.54 new cases per 100,000 women.[1]

Screening is a strategy for examining and detecting cancer at an early stage, when it may be easier to treat or cure. The benefits of screening are based on better disease prognosis, associated with a decrease in morbidity and mortality due to treatment. Nevertheless, BC screening may also be related to overdiagnosis and overtreatment of tumors that would not be life-threatening if they went unnoticed[3].

Clinicians have a fundamental role in the early detection and prevention of disease[4]. Knowledge about the topic is essential, whether the professional is recently graduated or already a specialist. In Brazil, the patient with breast complaints is usually seen by a gynecologist, who has a fundamental role in cancer diagnosis.

Early detection is essential to reduce BC mortality, with the American College of Radiology recommending annual screening starting at age 40 for women at average risk and more intensive protocols for those at higher risk. In the latter group, breast magnetic resonance imaging (MRI) is the preferred complementary method, especially for genetic mutation carriers, women with a lifetime risk ≥20%, or those exposed to chest radiation at a young age, with surveillance beginning between ages 25 and 30,

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Conflict of interests: nothing to declare. **Funding:** none.
Received on: 06/26/2025. **Accepted on:** 09/26/2025.

combined with annual mammography. Patients diagnosed with cancer before age 50 or with dense breasts should also undergo annual MRI, while women with a personal history or atypia should strongly consider this examination. When MRI is not feasible, alternatives such as contrast-enhanced mammography or ultrasound may be considered. Risk assessment by age 25 is strongly recommended, particularly for Black women and those of Ashkenazi Jewish ancestry, in order to identify high-risk individuals early and implement personalized screening strategies[5].

In their study, Dhanasekaran et al. highlighted that a routine of theoretical and practical training can improve knowledge about BC screening by up to 50%. However, it would still be necessary for gynecologists to continue their studies so that this knowledge could be consolidated in the long term[6]. In this context, knowledge of gynecologists regarding BC screening was evaluated in the city of Teresina-PI.

METHODS

This is a cross-sectional study involving doctors specializing in gynecology from the public and private health sectors, conducted in 2019 in the capital of a state in Northeastern Brazil. These physicians worked in the capital (Teresina-PI), and had been awarded degrees in gynecology and obstetrics.

All participants were selected through an in-person invitation at a doctor's office. Informed consent forms and the research questionnaire were provided. Data collection was from April to June 2018.

To calculate the sample size, the number of registrations in the Regional Council of Medicine—was used during the period of research construction. For the purpose of sample size calculation (n), we considered a 5% margin of error (E) and 95% confidence level (z=1.96) with the parameter value, p=0.5. Considering a finite population (N) of 214 professionals, the sample was calculated to include 138 gynecologists.

The sample was selected by simple random probability sampling without replacement. All participants were given an Informed Consent Form and research questionnaire, composed of sociodemographic questions and an evaluation about screening for the types of cancers in question.

The study was approved by the Research Ethics Committee of the Federal University of Piauí, with report nº 2.527.864 and Certificate of Submission for Ethics Appraisal nº 83627318900005214.

RESULTS

The profile of healthcare professionals participating in the research (Table 1) showed that 61.59% (n=85) of these gynecologists and obstetricians were women. The mean age of the professionals was 45.82 years, and the mean time since graduation was 20.49 years. Regarding the specialist degree, the large majority had a specialist degree in gynecology and obstetrics (TEGO), corresponding to 74.79% (n=89). In addition, 135 (97.83%) of these had medical residency in gynecology and obstetrics, and 21.9% (n=30) had a Master's or PhD degree or postgraduation.

Concerning the practice of BC screening, the collected data indicated that 58.39% (n=80) of the healthcare professionals used mammography as the only screening method for the asymptomatic population, and 40.15% (n=55) used ultrasound associated with mammography. For the beginning of mammogram screening, the most widely used age was 40 years, and screening was repeated by 60.87% (n=84) of the clinicians.

Of the respondents, 31.88% (n=44) ordered screenings up to a maximum age of 75 years. Already 47.83% (n=66) always

Table 1. Profile of gynecologists participating in the research. Teresina (PI), 2019.

		Nº	%	mean
Sex	Male	53	38.41	
	Female	85	61.59	
Age group	27 |---- 37	29	21.48	
	37 |---- 47	47	34.81	
	47 |---- 57	36	26.67	
	57 |---- 67	16	11.85	
	67 |---- 77	7	5.19	
Time since graduation (years)	4 |---- 15	38	28.57	
	15 |---- 26	60	45.11	
	26 |---- 37	25	18.80	
	37 |---- 48	10	7.52	
Medical residency*	Gynecology Obstetrics	135	97.83	
	General Surgery	3	2.17	
	Oncology	—	—	
	Breast Disease	11	7.97	
	Without residency	3	2.17	
	Others	10	7.25	
Specialty degree*	Tema	10	8.40	
	Teca	—	—	
	Tego	89	74.79	
	Others	39	32.77	
Duration of specialty degree				
Postgraduation*	Specialization	104	75.91	17.00
	Master's	17	12.41	
	PhD	13	9.49	
	None	21	15.33	
Total		138	100.00	

Source: Direct research.
*Multiple-choice question, adds more than 100%.

recommend BC screening in patients with other advanced cancers. Regarding women with a first-degree family history, 60.58% (n=83) recommend annual mammograms starting at age 35. Only 11.76% (n=16) of the clinicians prescribed chemoprevention with tamoxifen/raloxifene. In 20% (n=27) of cases, BC risk was calculated using the Gail model or another risk assessment tool. In cases of mammogram assessed as BI-RADS 3, 70.8% (n=97) recommend that patients have 6-month follow-up visits for 2 years, while 19.71% (n=27) prefer to always refer the patient to the breast disease specialist (Table 2).

DISCUSSION

There are now 33,309 doctors with a degree in Gynecology and Obstetrics in Brazil. It is the fourth most common specialty by number of professionals and the second specialty choice for women. Regarding its distribution in the country, 57.3% of the gynecologists are female, and the Southeast region concentrates more than half of all the specialties. The Northeast is right behind, occupying the second place, with 18.1%. The mean age of Brazilian gynecologists is 50 years, with a mean time of 22.4 years since graduation. These data are closely related to the profile observed in the research study[7,8].

Knowledge about the prevention and early diagnosis of BC is scarce across diverse social strata[7,9]. Therefore, whether a general practitioner or a specialist in gynecology, doctors remain the primary source for disseminating information and educating the public on early diagnosis[6]. Both in the clinical setting and in prevention campaigns, the physician can promote breast health.

Table 2. Practice of breast ca screening, Teresina (PI), 2019.

		Nº	%
Practice of breast cancer screening for the general asymptomatic population	Ultrasound and mammography	55	40.15
	Mammography	80	58.39
	Mammography, ultrasound, and magnetic resonance imaging	2	1.46
	Mammography and magnetic resonance imaging	—	—
	Ultrasound and magnetic resonance imaging	—	—
Age to start BC screening *	Annually after age 40	84	60.87
	Annually after age 50	14	10.14
	Every 2 years after age 40	35	25.36
	Every 2 years after age 50	11	7.97
Maximum age for breast cancer screening	69 years	54	39.13
	75 years	44	31.88
	80 years	12	8.70
	Until the life expectancy of less than 5 years	28	20.29
Breast cancer screening in patients with other advanced metastatic cancers	Does not recommend	56	40.58
	Always recommends	66	47.83
	Recommends sometimes	16	11.59
Mammogram and BIRADS 3 *	6-month follow-up for 2 years	97	70.80
	Refers to a breast disease specialist sometimes	15	10.95
	Always refers to the breast disease specialist	27	19.71
Screening for patients whose mother, sister, or daughter had breast cancer	Annual mammogram after age 30	23	16.79
	Annual mammogram after age 35	83	60.58
	Annual mammogram after age 40	31	22.63
Prescribes chemoprophylaxis for breast cancer with Tamoxifen/Raloxifene	No	120	88.24
	Yes	16	11.76
Calculates breast cancer risk by the Gail method or other risk estimation method	No	108	80.00
	Yes	27	20.00
Total		138	100.00

Source: Direct research.
*Multiple-choice question, sum is over 100%.

Continuing Medical Education is a tool that enhances the role of the gynecologist. It is always based on the most recent scientific advances in cancer diagnosis and control. Shah et al.[5] observed better test results in professionals who had participated in a teaching module on BC diagnosis. The majority of interviewees in this research were open to the idea of being updated.

A cross-sectional Syrian study aimed at determining students' knowledge about BC evaluated 301 students. The study revealed knowledge scores above the mean concerning BC. Clinical students (4th, 5th, and 6th years) scored higher in comparison to pre-clinical students. Nevertheless, effort is still required to correct misinformation by reevaluating the university curriculum and promoting awareness about BC[10]. Similarly, in Brazil, the study also showed that among medical students, there is still great misinformation about BC diagnosis. However, after attending the class, knowledge about the matter increased significantly. These findings reinforce the importance of knowledge for a better clinical practice[11].

Early detection is a form of secondary prevention[1,6], that includes BC screening. In a study by Vieira and Koch[12], it was observed that one of the main limiting factors for BC screening was the practitioner. Moreno et al.[13] perceived that one of the barriers to mammogram screening for BC was the physician who did not order the test.

There is a large number of different cancer screening recommendations, which may be confusing and make it difficult for the gynecologist to choose the best method. Freitas et al.[14] noted that gynecology residency was the key differentiating factor in screening, and these doctors were most knowledgeable about the topic. Thus, the aim of the specialist should be to make recommendations based on the highest scientific evidence and never rely solely on their clinical experience.

A Brazilian study aimed at evaluating the level of knowledge about BC screening and diagnosis among gynecologists from the State of Goiás evaluated 85 gynecologists. Of these, 28% were female, and the mean time of professional practice was 17 years. Medical residency was the highest level of degree in 70%. The mean age of the doctors was 44 years. The rates of correct answers were: 94% for knowledge about the most common sign of BC, 75% for the best screening method, 88% for the start of mammogram screening, 93% for the periodicity of mammogram screening after age 50, and 83% for the indication of supplemental ultrasound screening. Having studied in a medical residency program was the only factor that influenced the rate of correct answers. The sex of the professional, being a specialist in Gynecology and Obstetrics (TEGO), and the city of the study did not influence the rate of correct answers. Therefore, the gynecologists evaluated were knowledgeable about BC screening and diagnosis. Medical residency was the only factor that influenced the rate of correct answers[14].

A study conducted in 2023 by Urban et al.[15] analyzed the recommendations of the Brazilian College of Radiology and Diagnostic Imaging (CBR), the Brazilian Society of Mastology (SBM), and the Brazilian Federation of Gynecology and Obstetrics Associations (Febrasgo). It found strong consensus among specialists that annual mammography screening should begin at age 40 and end at age 74 for the population at usual risk. Ultrasound is recommended only when screening women with dense breasts, and MRI does not show strong evidence.

From a different perspective, the Ministry of Health (MS)[16], in its Mammography Update, recommends biennial mammography screening for women between 50 and 69 years of age, which may be combined with ultrasound, since the latter alone is not recommended. Additionally, the MS also recommends MRI screening for women at high risk of BC, in association with mammography.

The discussion on when to start and end screening remains broad. Migowski et al.[17] indicate that the 40–49 age group presents the highest rates of overdiagnosis and question the increase in the number of early-stage cancer cases without a corresponding reduction in late-stage diagnoses. This suggests that such diagnoses may not improve overall survival rates.

In contrast to these analyses, the CBR, SBM, and Febrasgo recommend screening in this age group[5], also highlighting that, in Brazil, the number of women under 50 diagnosed with BC is higher compared with developed countries.

In this context, the study's findings aligned with the researchers' expectations, as the professionals assessed were favorable to following the guidelines of the societies to which they are affiliated.

The use of natural or synthetic chemical agents to reverse, block, or prevent cancer in high-risk populations is known as chemoprophylaxis or chemoprevention. Among the classes of drugs used for BC chemoprevention and treatment are tamoxifen and raloxifene, selective estrogen receptor modulators. These drugs act as antagonists in breast cells, thereby preventing disease progression in patients with estrogen receptor-positive tumors[18]. According to FEMAMA (Federação Brasileira de Instituições Filantrópicas de Apoio à Saúde da Mama)[19], tamoxifen may reduce the risk of developing BC by 50% in both premenopausal and postmenopausal women.

Although widely used in clinical practice, tamoxifen is associated with some side effects, such as thromboembolic events and an increased incidence of endometrial cancer. In this regard, some authors advocate for other drug classes, such as aromatase inhibitors (e.g., anastrozole), which may offer a safer profile compared with selective estrogen receptor modulators[20]. In this sense, the low adherence of surveyed physicians to tamoxifen or raloxifene was surprising, though it may be linked to the greater number of side effects associated with these medications.

The Gail Model (an online calculator) was developed to assess the risk of an individual developing invasive BC. Based on medical and reproductive history, as well as family history of BC in

first-degree relatives, this tool estimates the absolute risk of developing the disease. The low adherence to the calculator was not surprising to researchers, as it lacks satisfactory predictive value and was validated in U.S. women, which does not ensure its applicability in Brazil[21].

Mammography is currently the main imaging-based screening strategy for BC in Brazil. The exam is categorized by the Breast Imaging Reporting and Data System (BI-RADS) system, which is subdivided into categories: 0 (inconclusive), 1 and 2 (normal findings), 3 (probably benign findings), 4 (suspicious findings), 5 (highly suspicious findings), and 6 (malignancy confirmed by previous biopsy). For BI-RADS 3 mammograms, the guidelines recommend repeating the test every 6 months for 2 years to detect changes in a shorter time frame[22,23]. The study results were satisfactory in this regard, showing that most physicians were knowledgeable on the subject.

This article proved relevant as there are few similar and updated studies in the literature on this topic. One limitation of the research was not including a question in the survey regarding the use of other hormonal therapies beyond tamoxifen or raloxifene. Another limitation was the use of self-reporting as the method for questionnaire responses. Recall bias and the possibility of providing socially desirable answers that deviate from physicians' actual clinical practice may have influenced the results obtained.

CONCLUSIONS

This study highlights the critical role gynecologists play in BC screening and emphasizes the need for ongoing education and standardization in BC screening practices. Despite the high level of training observed among the participants, variations in screening methods and frequency reveal a need for further alignment with national and international guidelines. The findings indicate that gynecologists with residency training demonstrate more accurate knowledge about BC screening recommendations, reaffirming the importance of formalized training in enhancing diagnostic accuracy and screening adherence. Additionally, the data underscore the influence of continued medical education on improving BC knowledge and diagnostic confidence, contributing to early detection and reduced mortality.

Overall, harmonizing screening protocols and promoting consistent educational updates for healthcare providers may optimize BC screening outcomes and support long-term health benefits.

ACKNOWLEDGMENTS

We would like to thank the city's gynecologists for their contributions to fostering research and discussion on such an important topic. We thank each author for their contribution to the article through the development of research tools and the critical writing of the text. We also declare that we do not have any source of funding for the construction and development of the article.

AUTHORS' CONTRIBUTION

RSN: Writing – original draft, Writing – review & editing. DRSF: Conceptualization, Data curation, Formal analysis, Methodology. SCV: Project administration, Supervision, Writing – review & editing.

REFERENCES

1. Brasil. Ministério da Saúde. Instituto Nacional de Câncer José Alencar Gomes da Silva (INCA). Estimativa 2023: incidência de câncer no Brasil. Rio de Janeiro: INCA; 2022.
2. Andrade AV, Lucena CE, Santos DC, Pessoa EC, Mansani FP, Andrade FE, et al. Desafios do rastreamento do câncer de mama. Femina. 2023;51(9):538-42. Disponível em: https://pesquisa.bvsalud.org/portal/resource/pt/biblio-1532483
3. Andrade MC de, Ribeiro AP, Lanza K, Lima LM de, Oliveira GL. Ações de Detecção Precoce do Câncer de Mama no Brasil: Análise dos Dados do Sistema de Informação do Controle do Câncer de Mama (Sismama), 2009-2015. Rev Bras Cancerol. 2022;68(3):e-082189. https://doi.org/10.32635/2176-9745.RBC.2022v68n3.2189
4. Shah NM, Soliman AS, Banerjee M, Merajver SD, Ismail K, Seifeldin I, et al. Knowledge gained after a brief CME module on breast cancer diagnosis. J Cancer Educ. 2006; 21(3):169-74. https://doi.org/10.1207/s15430154jce2103_17
5. Monticciolo DL, Newell MS, Moy L, Lee CS, Destounis SV. Breast Cancer Screening for Women at Higher-Than-Average Risk: Updated Recommendations from the ACR. J Am Coll Radiol. 2023;20(9):902-14. https://doi.org/10.1016/j.jacr.2023.04.002
6. Dhanasekaran K., Babu R., Kumar V, Mehrotra R, Hariprasad R. Capacity Building of Gynecologists in Cancer Screening Through Hybrid Training Approach. J Canc Educ. 2020;35(6):1243-9. https://doi.org/10.1007/s13187-019-01589-0
7. Scheffer M, Cassenote A, Guilloux AGA, Miotto BA, Mainardi GM, Matijasevich A, et al. Demografia Médica no Brasil 2018. São Paulo: FMUSP/CFM/Cremesp; 2018. 286 p.
8. Scheffer M, Cassenote A, Guerra A, Guilloux AGA, Brandão APD, Miotto BA, et al. Demografia Médica no Brasil 2020. São Paulo: FMUSP/CFM; 2020. 312 p.
9. Brasil. Ministério da Saúde. Instituto Nacional do Câncer José Alencar Gomes da Silva (INCA). Atualização em mamografia para técnicos em radiologia. 2. ed. rev. atual. Rio de Janeiro: INCA; 2019.

10. Ismail H, Shibani M, Zahrawi HW, Slitin AF, Alzabibi MA, Mohsen F, et al. Knowledge of breast cancer among medical students in Syrian Private University, Syria: a cross-sectional study. BMC Med Educ. 2021;21(1):251. https://doi.org/10.1186/s12909-021-02673-0

11. Aires NM, Freitas Jr R, Paulinelli RR, Baêta LF, Finotti MCCF, Silveira MT. Conhecimento dos métodos diagnósticos do câncer de mama entre estudantes de medicina. RevBrasGinecolObstet 1999: 21:133-7.

12. Vieira AV, Koch HA. Conhecimento sobre mamografia por mulheres que frequentam o Serviço de Radiologia da Santa Casa de Misericórdia do Rio de Janeiro (SCMRJ). Rev Bras Mastol. 1999;9(2):56-61.

13. Moreno TES, Torres LVP, Filomeno SB, Sobreira Filho PAF, Pinto MBF, Ramos JA, et al. Prevalência e fatores associados à realização da mamografia no Estado de Pernambuco durante o período de 2015-2019. Braz J Develop. 2021;7(7):65796-80. https://doi.org/10.34117/bjdv7n7-044

14. Freitas Junior R, Oliveira ELC, Marinho ER, Zampronha RAC, Pereira RJ, Soares FA. Conhecimento sobre o diagnóstico e rastreamento do câncer de mama entre os ginecologistas do estado de Goiás (Brasil). Rev Assoc Med Bras. 2003;49(3):312-6. https://doi.org/10.1590/S0104-42302003000300037

15. Urban LABD, Chala LF, Paula IB, Bauab SP, Schaefer MB, Oliveira ALK, et al. Recommendations for breast cancer screening in Brazil, from the Brazilian College of Radiology and Diagnostic Imaging, the Brazilian Society of Mastology, and the Brazilian Federation of Gynecology and Obstetrics Associations. Radiol Bras. 2023;56(4):207-14. https://doi.org/10.1590/0100-3984.2023.0064-en

16. Brasil. Ministério da Saúde. Instituto Nacional do Câncer José Alencar Gomes da Silva (INCA). Atualização em mamografia para técnicos em radiologia. 2. ed. rev. atual. Rio de Janeiro: INCA; 2019.

17. Migowski A, Nadanovsky P, Vianna CMM. Estimação do Sobrediagnóstico no Rastreamento Mamográfico: uma Avaliação Crítica. Rev Bras Cancerol. 2021;67(2):e-151281. https://doi.org/10.32635/2176-9745.RBC.2021v67n2.1281

18. Costa MM. Atualização em câncer de mama. Med Ciên Arte. 2022;1(4):55-73.

19. Federação Brasileira de Instituições Filantrópicas de Apoio à Saúde da Mama (FEMAMA). Quimioprevenção [Internet]. FEMANA; 2017 [cited on 2021 Apr. 28]. Available from: https://www.femama.org.br/site/br/cancer-de-mama/interna/quimioprevencao

20. Silva LM, Bernardo AAS, Morais GFL, Menezes ABEO, Fernandes GHS, Neto LSM. O uso do tamoxifeno no tratamento do câncer de mama. Rev Uni Bras. 2024;2(3). https://doi.org/10.5281/zenodo.14641985

21. Macêdo CMMH. Análise do risco de câncer de mama por meio de APP versus comparação com a mamografia [dissertação]. Fortaleza: Faculdade de Medicina, Universidade Federal do Ceará; 2023.

22. Santos JA; Girianelli VR; Silva GA. Acompanhamento de mulheres rastreadas para o câncer de mama com lesões provavelmente benignas no estado do Rio de Janeiro. Cad Saúde Colet. 2023;31(3):e31030471. https://doi.org/10.1590/1414-462X202331030471

23. Nascimento DMA; Silva RT; Galhardo AT. Câncer de mama: fatores de risco e prevenção. Estudos Avançados sobre Saúde e Natureza. 2024;18. https://doi.org/10.51249/easn18.2024.1956

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