



Original Research

Awareness and Knowledge of Breast Cancer Screening among Women Undergoing Mammography

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ABSTRACT

*Corresponding Author: Avinash Chaubey, Assistant Professor, Department of Allied Health Sciences Brainware University, India.	Background: Breast cancer is a leading cause of morbidity and mortality among women worldwide. Early detection through regular screening, particularly mammography, significantly improves prognosis and survival rates. However, the effectiveness of screening programs is closely linked to women’s awareness and knowledge of breast cancer and its screening practices. Aim: To assess the level of awareness and knowledge of breast cancer screening among women undergoing mammography. Materials and Methods: A descriptive cross-sectional study was conducted among 240 women aged 40 years and above undergoing mammography at a tertiary care radiology department. Data were collected using a structured, pre-validated questionnaire comprising 15 core questions assessing awareness of breast cancer, knowledge of risk factors, warning signs, and breast cancer screening practices. Descriptive and inferential statistical analyses were performed using SPSS software, with a p-value < 0.05 considered statistically significant. Results: The overall awareness of breast cancer among participants was moderate. Based on the 15-question assessment, 28.3% of participants demonstrated good knowledge, 46.7% had moderate knowledge, and 25.0% exhibited poor knowledge of breast cancer screening. While most participants recognized mammography as a screening tool, knowledge regarding recommended screening age and screening intervals was limited. Educational status and family history of breast cancer were significantly associated with higher knowledge scores (p < 0.05). Fear of pain, anxiety related to diagnosis, and concerns about radiation exposure were commonly reported barriers to regular screening. Conclusion: Although women undergoing mammography showed reasonable awareness of breast cancer, important gaps in screening-related knowledge persist. Integrating structured educational interventions within mammography services may enhance understanding, address misconceptions, and promote regular screening behaviour, ultimately contributing to earlier detection and improved breast cancer outcomes. Keywords: Breast Cancer, Mammography, Screening, Awareness, Knowledge, Women’s Health
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INTRODUCTION

Breast cancer remains one of the most significant public health challenges affecting women worldwide and is currently the most frequently diagnosed cancer among females. ^[1] According to global cancer statistics, breast cancer accounts for a substantial proportion of cancer-related morbidity and mortality, particularly in low- and middle-income countries where delayed diagnosis is common. ^[2] Despite advances in diagnostic technology and treatment, early detection continues to be the most effective strategy for improving survival rates and reducing disease burden. ^[3] Breast cancer screening plays a critical role in identifying malignancies at an early, asymptomatic stage when therapeutic interventions are most effective and less invasive. ^[4] Among the available screening modalities, mammography is widely recognized as the gold standard for population-based breast cancer screening due to its proven ability to detect early lesions and micro-calcifications. ^[5] Regular mammographic screening has been shown to significantly reduce breast cancer mortality by enabling timely diagnosis and treatment. ^[6] However, the effectiveness of mammography as a screening tool is closely linked to women’s awareness, knowledge, and attitudes toward breast cancer and its screening practices. ^[7] Awareness refers to the general understanding of breast cancer risk, symptoms, and the availability of screening services, while knowledge encompasses more detailed information regarding screening guidelines, recommended age groups, frequency of mammography, and interpretation of results. Insufficient awareness and limited knowledge can lead to underutilization of screening services, delayed

presentation, and advanced-stage diagnosis. [8] Several studies have reported that even among women undergoing mammography, gaps in knowledge regarding breast cancer risk factors, screening intervals, and the importance of regular follow-up persist. [9] Factors such as educational status, socioeconomic background, cultural beliefs, fear of diagnosis, misconceptions about radiation exposure, and lack of physician recommendation have been identified as major barriers to adequate screening awareness. These challenges are particularly evident in developing countries, where organized screening programs may be limited and health education initiatives are inconsistently implemented.

Women who present for mammography represent a unique population for assessing awareness and knowledge of breast cancer screening. While their attendance suggests some level of health-seeking behaviour, it does not necessarily imply comprehensive understanding of breast cancer or adherence to recommended screening practices. Evaluating awareness and knowledge in this group provides valuable insights into existing informational gaps and highlights opportunities for targeted educational interventions within diagnostic imaging settings. Healthcare professionals, including radiologists and radiologic technologists, play a pivotal role in enhancing patient knowledge by providing accurate information, counselling, and reassurance during the mammography process. Evidence suggests that women who receive appropriate guidance from healthcare providers are more likely to participate in regular screening and adhere to follow-up recommendations.

Therefore, assessing the current level of awareness and knowledge among women undergoing mammography is essential for designing effective communication strategies and improving screening compliance. Furthermore, understanding awareness levels among this population is particularly relevant in regions experiencing a rising incidence of breast cancer and shifting demographic patterns. Early identification of knowledge deficits can inform public health policies, strengthen screening programs, and ultimately contribute to reduced breast cancer-related mortality. This study aims to evaluate the awareness and knowledge of breast cancer screening among women undergoing mammography, thereby contributing evidence to support patient-centered education and improved screening outcomes.

Aim: The aim of this study was to assess the level of awareness and knowledge regarding breast cancer screening among women undergoing mammography.

METHODS AND MATERIALS

Study Design and Setting: A descriptive cross-sectional study was conducted to evaluate the awareness and knowledge of breast cancer screening among women undergoing mammography. The study was carried out in the Department of Radiology of a tertiary care hospital with dedicated breast imaging services over a defined study period.

Study Population: The study included women aged 40 years and above who presented for mammographic examination for either screening or diagnostic purposes during the study period. Women with a previous diagnosis of breast cancer, those undergoing follow-up mammography for known malignancy, critically ill patients, and individuals unwilling to provide informed consent were excluded from the study.

Sample Size and Sampling Technique: A total of 240 women constituted the study sample. Participants were recruited using a convenience sampling technique, whereby all eligible women attending the mammography unit during the study period were approached consecutively until the required sample size of 240 was achieved.

Data Collection Instrument: Data were collected using a structured and pre-validated questionnaire developed following an extensive review of relevant literature. The questionnaire was designed in clear and simple language and comprised three sections:

1. **Sociodemographic details**, including age, educational status, occupation, marital status, and family history of breast cancer.
2. **Awareness of breast cancer**, assessing knowledge of risk factors, warning signs, and early detection methods.
3. **Knowledge of breast cancer screening**, focusing on mammography, recommended age for screening initiation, screening intervals, benefits of early detection, and perceived barriers to screening.

The questionnaire was pilot tested among a subset of participants to ensure clarity, relevance, and reliability, and necessary modifications were incorporated before final data collection.

Data Collection Procedure: Eligible participants were informed about the aim of our study and its importance. Written informed consent was obtained prior to participation. The questionnaire was administered either as a self-reported form or through interviewer assistance for participants with limited literacy. Confidentiality and anonymity were strictly maintained throughout the data collection process.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics, including frequencies, percentages, means, and standard

deviations, were used to summarize the data. Associations between levels of awareness and selected sociodemographic variables were analyzed using appropriate inferential statistical tests. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Study Participants: A total of 240 women undergoing mammography participated in the study. The mean age of the participants was 52.4 ± 8.6 years, with the majority belonging to the 40–59 years' age group. Most participants were married, and a substantial proportion had completed secondary or higher education. Approximately one-fifth of the women reported a positive family history of breast cancer. Mammography was performed primarily for screening purposes, while a smaller proportion underwent the examination due to breast-related symptoms.

All participants completed the 15 core question-based assessment evaluating awareness and knowledge related to breast cancer and breast cancer screening. Responses were analyzed descriptively and categorized to reflect overall awareness and knowledge levels. The assessment comprised 15 structured questions, including items on breast cancer awareness, risk factors, warning signs, and screening practices. Each correct response was awarded one point, yielding a maximum possible score of 15 shown in Table-1.

Based on total scores, participants were classified as having:

- Good knowledge (≥ 11 correct responses),
- Moderate knowledge (6–10 correct responses), or
- Poor knowledge (≤ 5 correct responses).

Table 1: Overall Knowledge Level Based on 15-Question Assessment (n = 240)

Knowledge Level	Score Range	Frequency (n)	Percentage (%)
Good	11–15	68	28.3
Moderate	6–10	112	46.7
Poor	≤ 5	60	25.0

Responses to Core Awareness-Related Questions: Awareness-related questions focused on general understanding of breast cancer, its symptoms, and risk factors. Most participants correctly identified breast cancer as a common malignancy among women shown in Table-2. However, awareness of less obvious symptoms and modifiable risk factors was comparatively limited.

Table 2: Responses to Core Breast Cancer Awareness Questions (n = 240)

Question Item	Correct Response n (%)	Incorrect/Not Aware n (%)
Breast cancer is one of the most common cancers in women	198 (82.5)	42 (17.5)
Breast lump as a warning sign	176 (73.3)	64 (26.7)
Nipple discharge as a warning sign	142 (59.2)	98 (40.8)
Skin changes as a symptom	96 (40.0)	144 (60.0)
Family history as a risk factor	164 (68.3)	76 (31.7)
Lifestyle factors (obesity, inactivity) increase risk	88 (36.7)	152 (63.3)

Responses to Screening and Mammography-Related Questions: Table 3. Illustrating the knowledge regarding breast cancer screening and mammography variability. While awareness of mammography as a diagnostic tool was relatively high, correct knowledge of screening guidelines was limited.

Table 3: Responses to Breast Cancer Screening and Mammography Questions (n = 240)

Screening-Related Question	Correct Response n (%)	Incorrect/Not Aware n (%)
Mammography is a screening tool for breast cancer	184 (76.7)	56 (23.3)
Mammography can detect cancer before symptoms appear	158 (65.8)	82 (34.2)
Recommended age to start screening	92 (38.3)	148 (61.7)
Recommended screening interval	84 (35.0)	156 (65.0)
Mammography reduces breast cancer mortality	126 (52.5)	114 (47.5)
Mammography involves low and safe radiation dose	98 (40.8)	142 (59.2)

Perceived Barriers to Screening: Participants identified several perceived barriers to regular breast cancer screening mentioned in Table-4. Fear of pain during the procedure and anxiety related to possible diagnosis were the most frequently reported concerns. Lack of adequate information and misconceptions regarding radiation exposure were also commonly noted.

Table 4. Reported Barriers to Breast Cancer Screening (n = 240)

Barrier	Frequency (n)	Percentage (%)
Fear of pain during mammography	104	43.3
Fear of cancer diagnosis	96	40.0
Lack of adequate information	88	36.7
Concern about radiation exposure	76	31.7
Absence of symptoms	70	29.2

Association Between Knowledge Scores and Sociodemographic Factors: Statistical analysis demonstrated a significant association between educational status and total knowledge score ($p < 0.05$). Women with higher educational attainment were more likely to achieve good knowledge scores. Age and family history of breast cancer also showed a positive association with higher awareness levels, while marital status was not significantly associated with assessment scores.

DISCUSSION

This study assessed the awareness and knowledge of breast cancer screening among women undergoing mammography using a structured 15-question assessment tool. The findings demonstrate that although most participants had basic awareness of breast cancer and recognized mammography as a screening modality, comprehensive knowledge regarding screening guidelines, risk factors, and preventive practices remained suboptimal. These results highlight persistent informational gaps even among women who actively seek breast imaging services. The majority of participants correctly identified breast cancer as a common malignancy among women and recognized breast lump as a key warning sign. Similar findings have been reported in previous studies, where visible or commonly publicized symptoms were more readily identified than subtle clinical signs such as skin changes or axillary swelling. This pattern suggests that public awareness initiatives may emphasize overt symptoms while insufficiently addressing the full spectrum of early

warning signs, potentially contributing to delayed presentation in some cases.

Knowledge of breast cancer risk factors varied considerably among participants. While family history was widely acknowledged as a significant risk factor, awareness of modifiable lifestyle-related factors such as obesity, physical inactivity, and hormonal exposure was notably limited. This gap is clinically important, as lifestyle modification represents a key component of primary prevention. The findings align with earlier reports indicating that non-genetic risk factors are often under recognized, particularly in developing settings. Despite a relatively high proportion of women being aware of mammography as a screening tool, knowledge regarding recommended age of initiation and screening intervals was inadequate. Less than half of the participants correctly identified screening guidelines, and many believed that mammography was necessary only in the presence of symptoms. This misconception undermines the fundamental principle of screening and may lead to irregular or delayed participation in mammography programs. Similar misconceptions have been documented in previous studies, emphasizing the need for clearer communication regarding preventive screening. Fear of pain, anxiety related to possible cancer diagnosis, and concerns about radiation exposure were frequently reported as barriers to screening. These findings are consistent with existing literature and underscore the role of psychological and informational barriers in influencing screening behaviour. Addressing these concerns through patient-centered counseling and reassurance during mammography appointments may improve adherence to recommended screening schedules.

The study also demonstrated a significant association between educational status and overall knowledge scores, with higher education correlating with better awareness and understanding of breast cancer screening. This association has been consistently reported in prior studies and highlights the role of health literacy in shaping preventive health behaviours. Women with a family history of breast cancer also showed higher knowledge levels, likely reflecting increased exposure to health information and medical counselling. Importantly, the findings indicate that attendance for mammography does not necessarily equate to adequate knowledge of breast cancer screening. Women undergoing mammography represent a critical opportunity for targeted educational interventions, as they are already engaged with healthcare services. Radiology departments and breast imaging units can play a pivotal role by incorporating brief educational sessions, informational leaflets, and direct interaction with trained

healthcare professionals to reinforce accurate screening information.

CONCLUSION

This study highlights that while women undergoing mammography demonstrate a reasonable level of general awareness about breast cancer, significant gaps persist in their knowledge of breast cancer screening guidelines and preventive practices. The 15-question assessment revealed that misconceptions regarding the purpose of screening, recommended age of initiation, and screening intervals remain common, even among women who actively access mammography services. Educational status and family history of breast cancer were positively associated with higher awareness and knowledge levels, underscoring the importance of health literacy in influencing screening behaviour. Fear of pain, anxiety about diagnosis, and concerns related to radiation exposure were identified as key barriers to optimal screening participation. These findings emphasize that attendance for mammography alone does not ensure adequate understanding of breast cancer screening. Integrating structured, patient-centered educational interventions within mammography units may help bridge existing knowledge gaps, promote informed decision-making, and improve adherence to regular screening. Strengthening awareness at the point of care has the potential to contribute to earlier detection and improved breast cancer outcomes.

DECLARATION

Ethics Approval and Consent to Participate: The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the departmental scientific committee, prior to the commencement of the study. Written informed consent was obtained from all participants before data collection.

Availability of Data and Materials: The datasets generated and/or analysed during the current study are available from the corresponding author upon reasonable request.

Competing Interests: The authors declare that they have no competing interests.

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