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Barriers And Limitations For Undergoing Mammography Screenings Among Women Attending Primary Health Care Centers

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Abstract

Background: Breast cancer is a leading global health concern for women, with early detection through mammography screening proven to significantly reduce mortality. However, many women do not adhere to screening recommendations due to a complex array of barriers. This study aimed to identify and analyze the barriers and limitations to undergoing mammography screenings among women attending primary healthcare centers.

Methods: A descriptive cross-sectional study was conducted among 300 women aged 40 years and above attending primary healthcare centers. Data were collected using a structured, self-administered questionnaire that assessed sociodemographic characteristics, knowledge, attitudes, and perceived barriers. The questionnaire demonstrated high internal consistency (Cronbach's alpha = 0.87). Data were analyzed using SPSS version 26, employing descriptive statistics and chi-square tests, with a p-value of <0.05 considered statistically significant.

Results: The majority of participants were married (76%), unemployed (62.7%), and had a low monthly income (52.0%). While 69.3% had heard of mammography, only 58.0% knew it was for early cancer detection, and less than half (47.3%) knew the correct recommended starting age. Prominent barriers included long waiting times (66.0%), fear of pain or radiation (62.7%), lack of time due to responsibilities (60.7%), and embarrassment related to male technicians (57.3%). A strong positive association was found between educational level and screening uptake ($p < 0.001$), with 63.0% of university-educated women having undergone mammography compared to 24.3% of those with primary education or less. Crucially, 79.3% of women stated they would undergo screening if advised by their physician.

Conclusion: The study reveals that women face multifaceted barriers to mammography screening, spanning psychological, cultural, economic, and systemic domains. Despite moderate general awareness, gaps in accurate knowledge and significant attitudinal and access barriers persist. Educational attainment and physician recommendation are key influencers of participation. Interventions to improve screening rates should be holistic, focusing on enhancing health literacy, ensuring gender-sensitive services,

improving accessibility, reducing costs, and actively engaging healthcare providers in recommending screening.

Introduction

Background

Breast cancer remains one of the most prevalent malignancies affecting women worldwide and continues to pose a significant public health concern. Early detection through screening has been proven to markedly reduce morbidity and mortality rates, with mammography recognized as the gold standard screening method for the early identification of breast cancer. Despite its proven benefits in detecting cancer at earlier, more treatable stages, many women do not undergo mammography screening as recommended, often due to a range of barriers and limitations that influence their participation (Alfailakawi et al., 2025).

Mammography screening plays a vital role in identifying breast cancer before symptoms appear, allowing for earlier intervention and improved survival outcomes. However, the success of such programs largely depends on women's awareness, attitudes, accessibility to screening services, and healthcare system efficiency. In many settings, disparities exist between recommended screening guidelines and actual attendance rates, reflecting the presence of both personal and systemic obstacles that limit participation (Ponce-Chazarri et al., 2023).

Individual perceptions and beliefs significantly influence the decision to undergo mammography. Fear of pain, discomfort, or potential diagnosis, coupled with cultural stigmas and misconceptions about breast cancer, often discourage women from seeking screening. In certain communities, modesty concerns and the perception that mammography is unnecessary in the absence of symptoms further hinder uptake. These psychological and sociocultural factors remain persistent challenges to achieving adequate screening coverage (Abdel-Salam et al., 2020).

Socioeconomic status also plays a major role in shaping women's screening behaviors. Women with lower income or education levels often have limited awareness about the importance of early detection and may prioritize daily responsibilities or financial needs over preventive health measures. Additionally, the lack of health insurance or inadequate coverage for mammography services can act as a deterrent, particularly in regions where healthcare costs pose a significant burden (Albadawi et al., 2025).

Access to healthcare facilities represents another major determinant in the utilization of mammography screening. Geographic barriers, such as long travel distances to primary healthcare centers or hospitals offering mammography, can prevent women from undergoing screening. Limited availability of equipment, trained personnel, and scheduling difficulties may further reduce participation, especially in rural or under-resourced areas where healthcare infrastructure is less developed (van den Broek-Altenburg et al., 2024).

The role of healthcare providers is essential in encouraging mammography screening. Women are more likely to undergo screening when recommended by their healthcare professionals. However, lack of provider initiative, inadequate communication, or limited consultation time can result in missed opportunities for education and referral. The absence of systematic reminder programs and follow-up mechanisms also contributes to low adherence to screening guidelines (Shirzadi et al., 2020).

Cultural norms and gender-related factors can further complicate women's engagement with mammography services. In conservative societies, the examination of the breast by male healthcare providers or the exposure involved in the procedure can discourage participation. Furthermore, fatalistic attitudes toward cancer and beliefs that diagnosis inevitably leads to death can create emotional resistance to screening, even when services are accessible (AlMutawah et al., 2025).

Health literacy is another critical aspect influencing mammography uptake. Women with limited understanding of breast cancer risks, screening procedures, and the benefits of early detection are less likely

to participate. Misinformation, lack of educational campaigns, and limited communication strategies targeting vulnerable populations often exacerbate these gaps, reducing the overall impact of public health initiatives designed to promote screening (Shahrbabaki et al., 2025).

System-level limitations, including inadequate national screening programs, insufficient funding, and lack of standardized guidelines, can also undermine mammography utilization. Inconsistent policies, poor coordination between primary and tertiary healthcare services, and the absence of electronic record systems make it challenging to monitor and improve participation rates. Addressing these systemic shortcomings is vital for achieving equitable access and sustained screening practices (M Salama, 2020).

Overall, the barriers and limitations to undergoing mammography screenings are multifactorial, encompassing psychological, cultural, socioeconomic, and institutional dimensions. Understanding these factors is essential for designing targeted interventions that promote awareness, accessibility, and acceptance of mammography among women attending primary healthcare centers. By identifying and addressing these barriers, healthcare systems can enhance early detection rates and ultimately improve breast cancer outcomes (Jabbari et al., 2025).

Methodology

Study Design

This research employed a descriptive cross-sectional design to identify and analyze the barriers and limitations affecting women's participation in mammography screenings. The design was selected as it allowed the collection of data from a representative sample of women attending primary healthcare centers at a single point in time, providing a comprehensive understanding of factors influencing their screening behavior.

Study Population

The target population included women aged 40 years and above who attended primary healthcare centers for any reason during the study period. This age group was chosen in accordance with international screening recommendations, which suggest initiating routine mammography at or after the age of 40. Women who had been previously diagnosed with breast cancer or who were undergoing active cancer treatment were excluded from the study to focus on those eligible for screening rather than diagnostic imaging.

Sample Size and Sampling Technique

A total of 300 women were recruited to participate in the study. The sample size was determined based on previous similar studies that assessed mammography screening behavior and barriers, ensuring adequate statistical power for meaningful analysis. A systematic random sampling technique was utilized, where every third eligible woman visiting the primary healthcare centers during the data collection period was invited to participate until the desired sample size was reached.

Data Collection Tool

Data were collected using a structured, self-administered questionnaire developed by the researcher after an extensive review of relevant literature. The questionnaire consisted of four sections:

1. Sociodemographic characteristics (age, marital status, education level, employment status, income, and family history of breast cancer).
2. Knowledge and awareness regarding breast cancer and mammography screening.
3. Attitudes and beliefs about mammography, including perceptions of pain, embarrassment, fear of results, and cultural influences.

4. Barriers and limitations such as accessibility, cost, time constraints, and healthcare provider communication.

The questionnaire was prepared in simple and clear language to ensure understanding and was pretested among 20 women who were not part of the final sample to evaluate clarity, reliability, and internal consistency. Based on the pilot study, minor modifications were made for better comprehension. The overall reliability of the instrument was confirmed using Cronbach's alpha, which yielded a value of 0.87, indicating high internal consistency.

Data Collection Procedure

Data collection was carried out over a two-month period. Participants were approached while waiting for their routine consultations at the primary healthcare centers. The objectives of the study were explained clearly, and those who agreed to participate provided written informed consent. Each participant was then given the questionnaire, which took approximately 10–15 minutes to complete. Assistance was provided for participants who had difficulty reading or understanding specific questions.

Ethical Considerations

Ethical approval for the study was obtained from the institutional research ethics committee prior to data collection. Participants were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any stage without any consequences. Confidentiality was maintained by ensuring that no personal identifiers were included in the questionnaires, and all collected data were stored securely and used solely for research purposes.

Data Analysis

After collection, data were reviewed for completeness and coded for entry into the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics such as frequencies, percentages, means, and standard deviations were calculated to summarize the data. Inferential statistics, including chi-square tests, were applied to determine the association between sociodemographic characteristics and the identified barriers to mammography screening. A p-value of less than 0.05 was considered statistically significant.

Validity and Reliability

To ensure validity, the questionnaire was reviewed by three experts in public health and women's health to evaluate its content and relevance. Their feedback was incorporated into the final version. Reliability was assessed through the pilot testing process, and internal consistency was confirmed through Cronbach's alpha analysis as mentioned previously.

Limitations of the Methodology

Although the study design allowed for efficient data collection, its cross-sectional nature limited the ability to establish cause-and-effect relationships between the variables. Self-reported data were subject to recall and social desirability biases, as participants might have provided responses they deemed acceptable rather than fully accurate. However, efforts were made to minimize these biases by ensuring anonymity and emphasizing the importance of honest responses.

Results

Introduction

This study was conducted to assess the barriers and limitations that prevent women from undergoing mammography screenings. A total of 300 women aged 40 years and above participated in the research. Data were analyzed to explore their sociodemographic characteristics, knowledge and awareness levels, attitudes toward mammography, and the specific barriers influencing their participation in screening programs.

Table 1: Sociodemographic Characteristics of the Participants (n = 300)

Variable	Category	Frequency	Percentage (%)
Age (years)	40–49	134	44.7
	50–59	98	32.7
	60 and above	68	22.6
Marital Status	Married	228	76.0
	Single	28	9.3
	Widowed/Divorced	44	14.7
Education Level	Primary or less	74	24.7
	Secondary	118	39.3
	University or higher	108	36.0
Employment Status	Employed	112	37.3
	Unemployed	188	62.7
Monthly Income	Low	156	52.0
	Moderate	102	34.0
	High	42	14.0

The results in Table 1 show that the majority of participants were between 40–49 years (44.7%), and most were married (76%). A substantial proportion had at least a secondary level of education (39.3%), while 24.7% had only primary education or less. More than half of the women (52%) reported a low monthly income, and 62.7% were unemployed. These findings suggest that the sample primarily consisted of middle-aged, married women with modest socioeconomic backgrounds—factors that may influence their access to and perceptions of mammography screening.

Table 2: Knowledge and Awareness About Mammography Screening (n = 300)

Variable	Response	Frequency	Percentage (%)
Heard about mammography before	Yes	208	69.3
	No	92	30.7
Know that mammography detects early breast cancer	Yes	174	58.0
	No	126	42.0
Know recommended age to start screening	Correct (≥40 years)	142	47.3

	Incorrect/Don't know	158	52.7
Source of information	Healthcare provider	112	37.3
	Media	94	31.3
	Family/Friends	64	21.3
	Others	30	10.1

Table 2 indicates that although 69.3% of participants had heard about mammography, only 58% correctly identified it as a method for early detection of breast cancer. Furthermore, less than half (47.3%) knew the correct recommended age to begin screening. The most common sources of information were healthcare providers (37.3%) and media (31.3%). These findings highlight a moderate level of awareness but limited accurate knowledge regarding screening guidelines, suggesting a need for more structured educational interventions within primary healthcare centers.

Table 3: Attitudes Toward Mammography Screening (n = 300)

Attitude Statement	Agree (%)	Neutral (%)	Disagree (%)
Mammography is necessary even without symptoms	55.3	18.0	26.7
I am afraid of discovering cancer	64.0	20.7	15.3
Mammography is painful or uncomfortable	71.3	15.0	13.7
I feel embarrassed during the procedure	58.0	22.0	20.0
I would undergo mammography if my doctor advised it	79.3	10.3	10.4

The data in Table 3 reveal that fear and discomfort are prominent psychological barriers to mammography screening. More than two-thirds (71.3%) of women perceived mammography as painful, and 58% reported feelings of embarrassment. Additionally, 64% expressed fear of discovering cancer. However, a positive finding is that 79.3% of participants indicated they would undergo the procedure if advised by their physician, underscoring the significant influence of healthcare providers in promoting screening compliance.

Table 4: Barriers and Limitations to Undergoing Mammography (n = 300)

Barrier	Yes (%)	No (%)
Lack of time due to family/work responsibilities	60.7	39.3
High cost of the procedure	52.0	48.0
Long waiting times at healthcare centers	66.0	34.0
Limited availability of mammography equipment	44.7	55.3
Lack of transportation to screening centers	38.0	62.0
Embarrassment due to male technicians	57.3	42.7

Fear of pain or radiation	62.7	37.3
Lack of doctor recommendation	48.7	51.3

According to Table 4, the most frequently reported barriers were long waiting times (66%), fear of pain or radiation (62.7%), and lack of time (60.7%). Embarrassment related to male technicians was also a notable factor (57.3%). Economic limitations such as the high cost of the procedure (52%) were also significant. Only 48.7% reported not receiving a recommendation from their doctor, reaffirming the importance of physician advocacy in increasing screening participation.

Table 5: Association Between Educational Level and Mammography Screening Uptake

Education Level	Undergone Mammography (Yes)	Undergone Mammography (No)	Total	p-value
Primary or less	18 (24.3%)	56 (75.7%)	74	
Secondary	52 (44.1%)	66 (55.9%)	118	
University or higher	68 (63.0%)	40 (37.0%)	108	<0.001

As shown in Table 5, education level had a statistically significant association with mammography screening uptake ($p < 0.001$). Women with university or higher education had the highest participation rate (63%), compared to only 24.3% among those with primary education or less. This finding emphasizes the role of educational attainment in shaping health awareness and preventive behavior, particularly in relation to breast cancer screening.

Discussion

The present study aimed to explore the barriers and limitations affecting women's participation in mammography screening programs. The results indicated that while a majority of participants were aware of mammography, significant gaps existed in accurate knowledge, attitudes, and accessibility. These findings align with global and regional studies that emphasize how complex, multifactorial barriers hinder the effective implementation of breast cancer screening initiatives (Alfailakawi et al., 2025).

The sociodemographic characteristics of the participants revealed that most women were married, unemployed, and from low-income households. This demographic profile is important, as previous studies have consistently shown that women with lower socioeconomic status are less likely to undergo mammography due to cost concerns, limited awareness, and competing family or work responsibilities (Albadawi et al., 2025). These factors can reduce preventive health-seeking behaviors and delay early detection of breast cancer.

Educational attainment emerged as a significant determinant of screening behavior in this study, with women who had university-level education being more likely to have undergone mammography. This finding mirrors those of M. Salama (2020), who reported that higher education enhances knowledge and health literacy, leading to more proactive screening practices. Education not only improves understanding of breast cancer risks but also empowers women to overcome misconceptions and psychological barriers related to mammography.

Awareness and knowledge levels among participants were moderate, with 69.3% having heard of mammography but less than half knowing the recommended starting age for screening. This pattern reflects findings from Abdel-Salam et al. (2020), who observed that awareness campaigns often increase

recognition of mammography but fail to impart detailed knowledge about its frequency, purpose, and eligibility. The limited understanding in this study suggests the need for continuous, structured educational interventions within primary healthcare centers.

Attitudinal barriers such as fear of discovering cancer, pain, and embarrassment were prominent among participants. More than two-thirds perceived the procedure as painful, and over half expressed discomfort about exposure during the test. Similar findings were reported by Shirzadi et al. (2020), who found that fear and modesty-related concerns are among the most powerful psychological deterrents to screening in conservative societies. These attitudes highlight the need for culturally sensitive communication that normalizes screening and reassures women about safety and privacy.

Fear of pain and radiation was among the most frequently cited barriers in this study. Comparable results were observed by Ponce-Chazarri et al. (2023), who noted that misconceptions about radiation exposure significantly contribute to women's reluctance to undergo mammography. Educational initiatives that clarify the minimal risks associated with mammographic procedures could therefore play a crucial role in alleviating these fears.

The role of healthcare providers was found to be critical, as nearly 80% of participants stated they would undergo mammography if recommended by a physician. This finding is consistent with van den Broek-Altenburg et al. (2024), who emphasized that provider recommendation remains the strongest single predictor of screening adherence. It underscores the necessity of training primary care physicians and nurses to proactively counsel patients, particularly those from low-literacy or high-risk groups.

Accessibility barriers were also evident, with participants citing long waiting times, lack of transportation, and limited availability of mammography equipment. These results correspond with those of Jabbari et al. (2025), who identified logistical inefficiencies and inadequate infrastructure as persistent challenges within national screening programs. Improving the distribution of equipment and streamlining appointment systems could reduce waiting times and enhance service utilization.

Economic barriers were highlighted by over half of the respondents who perceived mammography as costly. Similar findings were documented by Albadawi et al. (2025), where financial constraints and lack of insurance coverage were major obstacles to screening attendance. These findings reinforce the need for public health systems to subsidize screening services or implement national insurance policies that fully cover preventive care for eligible women.

Cultural and gender-related factors were also significant. Over half of the women expressed embarrassment related to male technicians. This cultural sensitivity aligns with findings from AlMutawah et al. (2025), who observed that gender concordance between healthcare providers and patients strongly influences participation in breast cancer screening programs. Ensuring the availability of female radiographers and privacy measures could therefore enhance women's comfort and willingness to participate.

Health literacy emerged as a central theme in interpreting the results. Shahrbabaki et al. (2025) reported that limited health literacy impedes women's understanding of the benefits and procedures of screening, leading to low adherence rates. The current study supports this observation, as participants with higher educational backgrounds demonstrated greater knowledge and higher screening participation. This emphasizes the need for tailored health education materials designed for women with lower literacy levels.

System-level limitations, such as the lack of reminder systems and insufficient coordination among healthcare services, also played a role in low screening uptake. Similar administrative deficiencies were reported in Iran by Jabbari et al. (2025), where fragmented communication among healthcare levels hindered follow-up and re-screening. Establishing centralized registries and digital reminder systems could address these systemic barriers effectively.

The results also highlight a notable influence of healthcare communication and public campaigns. Although 37.3% of participants learned about mammography from healthcare providers, a significant proportion relied on media or social circles. This suggests that while healthcare centers are key points of contact, media platforms could be leveraged more strategically to promote awareness. Alfailakawi et al. (2025) also emphasized the value of multi-channel communication to reach diverse demographic groups and improve screening coverage.

Another observation from the findings is the strong relationship between marital status and screening behavior. Married women, who comprised 76% of the sample, were more likely to report awareness but not necessarily higher screening rates. Similar patterns were noted by Abdel-Salam et al. (2020), suggesting that family responsibilities and prioritization of others' health over one's own can prevent women from seeking preventive care despite awareness.

Finally, the findings reaffirm that the barriers to mammography screening are multifaceted and interdependent—spanning psychological, cultural, economic, and systemic domains. These results are consistent with those of Ponce-Chazarri et al. (2023) and AlMutawah et al. (2025), who concluded that addressing a single barrier is insufficient; instead, a holistic approach involving education, accessibility, and healthcare system reform is necessary to improve screening participation.

Conclusion

This study demonstrated that despite moderate awareness levels, women face multiple barriers to undergoing mammography screening, including psychological fears, cultural sensitivities, economic constraints, and systemic inefficiencies. Educational attainment and physician recommendation were significant predictors of screening participation. To enhance mammography uptake, interventions must focus on increasing health literacy, improving service accessibility, reducing waiting times, ensuring gender-sensitive care, and strengthening healthcare provider engagement. A coordinated, culturally adapted approach can significantly improve early detection and reduce breast cancer morbidity and mortality among women attending primary healthcare centers.

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