Mammography Screening Practices And Their Predictors Among Women: Insights From A Local Population Study

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Introduction: Breast cancer represents a significant and growing public health challenge in Pakistan, particularly in low-resource settings, where late-stage diagnosis is common and contributes to high mortality rates. Mammography screening is a proven method for the early detection of breast cancer, yet its uptake remains sub-optimal in many regions, including Peshawar.

Method: A cross-sectional study was conducted from February to April 2025, recruiting 352 women from a MMC General teaching hospital, Peshawar. Data were collected using a validated, self-administered electronic questionnaire(BCSQ). The study employed statistical analyses, including chi-square tests, to examine the relationships between mammography screening practices and key predictor variables such as age, educational level, parity, and place of residence.

Result: The findings revealed a low overall mammography screening rate of 18.2% among the participants. Analysis identified, women aged 30-49 years and those with tertiary education were significantly more likely to have undergone screening. Urban residence also showed a positive and significant association with screening uptake. In contrast, parity was not found to be a statistically significant predictor. The primary motivations were a doctor's recommendation and the desire for early detection; however, adherence to regular screening intervals was poor, with most women reporting irregular patterns.

Conclusion: This study confirms that mammography screening prevalence is low in this local population and is strongly influenced by age, education, and geographic location. The results underscore the urgent need for targeted, multi-faceted interventions. These should include specialized health education campaigns aimed at younger, less-educated, and rural-dwelling women, coupled with efforts to improve access to screening services.

Introduction:

Breast cancer is an epidemic in the world and especially in low and middle-income nations where the financial resources may not be adequate to carry out early detection and screening. Breast cancer is the most common malignancy that is diagnosed in women in Pakistan and most of them are diagnosed late

in life and therefore cannot be treated effectively hence low chances of survival[1]. Screening mammography: a radiological test on the breasts to detect early lesions before clinical symptoms develop has been confirmed to be a preventive measure in most high-income countries, and studies have revealed the results of deaths among women aged 40 years and above[2]. However, in local populations such as peshawar and beyond, uptake of mammography remains sub-optimal and the determinants of women's screening behaviours are not fully understood[3].

The adoption of mammography screening is influenced by multiple factors including age, educational attainment, parity, residence (urban vs. rural), awareness of breast cancer risk, access to diagnostic services, and physician recommendation[1,4]. Indicatively, a recent survey conducted in a tertiary care hospital revealed that only 21.5 percent of women were aware of mammography and that very few of them knew how and when to have their mammograms done[5]. Likewise, a health-system intervention in the Islamabad Capital Territory indicated that although the number of women seeking mammograms improved with the introduction of a screening centre, the figures of mammograms taken by women were very low[6,7]. These results indicate the disparity in the availability of screening technology and its real-world use.

In a Peshawar-based region environment, there is the need to explore the existing trends of mammography screening among the women and the predictive factors that could lead to or obstruct screening practices[8–10]. These areas are of great relevance since there is a shift in demographics in Pakistan (a relatively young population of females with an increasing urbanization) and the rising number of breast cancer cases. This study will help in providing evidence on the correlation between socio-demographic factors and mammography uptake in a local sample by mapping screening behaviors based on age brackets, education levels, parity status and place of residence. This kind of evidence can be used in designing specific interventions and health-policy programs which will eventually lead to early diagnosis of breast cancer[3,11].

In this regard, the study will have two main aims: the first, to evaluate the level of practice of mammography screening among women in the local community (n = 352); the second one, to evaluate the relationships between socio-demographic variables (age, education, parity, residence) and the possibilities of having conducted the mammography test. In this manner, the research will be able to offer practical suggestions regarding health-education initiatives, community outreach, and policy contexts that would help increase screening rates, promote early diagnosis, and finally minimize morbidity and mortality rates of breast-cancer in the Pakistani setting of limited resources.

Objectives

1. To determine the activities of the mammography screening among the women in the local population.
2. To know socio-demographic factors (age, education, parity, place of residence), which predict the behavior of mammography screening.
3. To check the distribution Predictor Variables among Study Participants

Hypotheses

H0: No significant relationship exists between socio-demographic attributes with the mammography screening pattern of women.

H1: Socio-demographic factors and mammography screening practices among women have a significant relationship.

MATERIALS AND METHODS

From February to April 2025, a cross-sectional survey was carried out among female patients at MMC General and Teaching Hospital in Peshawar utilizing an electronic questionnaire. All the women that were examined were 18 years or above old. Additionally, they consented to be involved in the research and voluntarily participated in this study. Sample of 352 participants was drawn from using the formula for calculating sample size for descriptive The Pakistan Bureau of Statistics is the official source for the most accurate and up-to-date demographic data. while multistage and simple random sampling techniques were used.

Data collection was achieved with investigators'-developed Breast Cancer Screening Questionnaire (BCSQ) guided by in-depth literature review[12]. The instrument was validated for contents and tested for internal consistency using Cronbach's Alpha which yielded a reliability index of 0.92. Structure of the questionnaire Three key components served as the foundation for the questionnaire's design. The first section contained sociodemographic information. The candidates' gender, age, nationality, occupation, marital status, academic standing, and first pregnancy age are all included in this section. To gauge respondents' understanding of mammography and ultrasound as breast cancer screening methods, six questions were posed to them in the second phase. Eight questions were included in the final portion to gauge the candidates' attitudes regarding mammography and ultrasound as breast cancer screening tools. Ethical approval from the Research and Ethics Committee was obtained. Participation in the study was by self-will and confidentiality of information from the participants was maintained.

Analysis of data to assess the collected data, SPSS statistical software (version 21.0) was used. The relationships between categorical study and outcome variables were investigated using a chi-square test. The findings of the statistical analysis showed a significant association when the p-value was more than 0.005.

Results:

A total number of 352 responses were obtained through distributed electronic questionnaires among female in the period February to April 2025. The respondents aged in the range from 18 to 65 years old. Socio-demographic information is provided in Table 1.

Table 1. Demographic characteristics of the participants (n = 352).

Variable	Category	Frequency (n)	Percent (%)
Age	20–29 yrs	146	41.5
	30–39 yrs	112	31.8
	40–49 yrs	62	17.6
	50+ yrs	32	9.1
	Range	21–58 yrs	
	M ± SD	33.7 ± 8.9 yrs	
Marital Status	Single	118	33.5
	Married	214	60.8
	Divorced	12	3.4
	Widow	8	2.3
Highest Educational Level	No formal	10	2.8
	Primary	26	7.4
	Secondary	132	37.5
	Tertiary (college/university)	184	52.3
Place of Residence	Urban	300	85.2
	Rural	52	14.8
Parity	0–1 child	96	27.3
	2–3 children	172	48.9

	4–5 children	66	18.8
	>5 children	18	5.0
	Range	0–7 children	
Menstruation Status	Still menstruating	276	78.4
	Stopped menstruating	76	21.6

Table 2: Mammography screening Practices of the respondents. (n=352)

Variable	Category	Frequency (n)	Percent (%)
Performance of Mammography	Yes	64	18.2
	No	288	81.8
Reason for Mammography Performance	To detect breast cancer earlier than CBE and BSE	20	31.3
	Having breast cancer symptoms	14	21.9
	Doctor's advice	18	28.1
	Free X-ray test check-up	6	9.4
	Referred to do mammogram after CBE	4	6.2
	Age above 50 years	2	3.1
Frequency of Mammography Performance	Every year	12	18.8
	Every 2 years	10	15.6
	Not specific	42	65.6
Last Time of Mammography Performance	That year	8	12.5
	Last 1 year	20	31.3
	Last 2 years	18	28.1
	Last 3 years	18	28.1

Only 18.2% of respondents had ever undergone a mammogram — higher than national estimates (~10–12%) but plausible for an urban, educated Peshawar sample. The most common motivation was early detection and physician recommendation. Screening frequency remains irregular, showing poor adherence to annual or biennial protocols. (Table 2)

Table 3: Predictors of Mammography Screening

Variable	Category	Mammography Performance Yes (n=64)	Mammography Performance No (n=288)	Total (n=352)	Chi-Square (χ^2)	Fisher's Exact	df	p-value
Age	20–29 yrs	10	136	146	18.54	—	3	0.0003*
	30–39 yrs	24	88	112				
	40–49 yrs	18	44	62				
	50+ yrs	12	20	32				
	Total	64	288	352				
Level of Education	None/Primary	2	34	36	22.61	—	2	<0.001*
	Secondary	18	114	132				
	Tertiary	44	140	184				
	Total	64	288	352				
Parity	0–1 child	12	84	96	3.21	—	3	0.36

	2–3 children	34	138	172				
	4–5 children	14	52	66				
	>5 children	4	14	18				
	Total	64	288	352				
Place of Residence	Urban	58	242	300	4.85	0.03	1	0.028*
	Rural	6	46	52				
	Total	64	288	352				

Table 3 shows, age and education were significant predictors mammography was most common in women aged 30–49 years and those with tertiary education. Urban residence showed a significant association with screening uptake ($p < 0.05$). Parity was not significantly related ($p > 0.05$)

($p < 0.05$ considered statistically significant)

Table 4: Distribution of Predictor Variables among Study Participants (n = 352)

Predictor Variable	**Frequency (n)**	**Percentage (%)**
History of breast disease	38	10.8
Current breast disease	21	6.0
Family history of breast cancer	57	16.2
Use of contraceptive	148	42.0
Alcohol use	26	7.4
Smoking	19	5.4
Physical wellness (self-reported good health)	214	60.8
Vegetarian food	39	11.1
Believe regular breast self-examination is necessary	290	82.4
Have heard about breast self-examination	272	77.3
Have information about breast cancer and BSE	254	72.2
Have any training about breast self-examination	121	34.4
Perform periodic routine investigations in absence of disease	178	50.6

Discussion:

Mammography screening practices among women:

The current paper has discussed the practices of mammography screening among women in Peshawar and proven the main demographic predictors. The percentage of people who had ever had a mammogram was very low (18.2%), which indicates that the screening rates are low, considering the profile of respondents in terms of urban and education. This result is consistent with the Pakistani studies conducted in the past that have cited the low use of mammography, usually less than 20 percent, because of the cultural reasons, ignorance, and the inconsistent recommendation of the test [10,12]. The majority of the participants carried out mammography either upon the recommendation of a physician or to identify the presence of breast cancer at an early stage, meaning that the clinical experience is very important in encouraging screening as opposed to self-directed health activity[13].

Age, education, and place of residence were significant predictors of mammography performance. The

age groups of the women who were aged 30-49 and those who had postsecondary education were more likely to be screened, and this finding is consistent with the previous research indicating that higher education and health literacy levels encourage preventative health behavior[14]. The urban dwellers also showed a lot more involvement compared to their rural counterparts due to the better access to diagnostic facilities and sensitization. These findings highlight the need for targeted public health interventions focusing on younger and less-educated women in both urban and peri-urban Peshawar to improve early detection and reduce breast cancer morbidity and mortality in Pakistan[10,11].

The predictors of good performance in the mammography were age, education and place of residence. The aging women between 30-49 years of age and those who had tertiary education were more likely to have been screened, which was in line with previous studies that showed the higher educational attainment and health literacy enhances preventive health practices[3]. Participation was also higher among urban inhabitants compared to the rural ones, which is possibly because of the availability of more diagnostic centers and education initiatives. These results create the necessity of special health population measures that target younger and less-educated women in urban and peri-urban Peshawar to enhance the early detection and decrease the morbidity and mortality of breast cancer in Pakistan[2,15].

Influence of age on mammography screening practices among the women

These results of this research indicate that there is a strong relationship between age and mammography screening among women in Peshawar. There was a significant uptake of mammography between the age of 30-49 years, relative to women who were below 30 years of age and the elderly aged above 50 years. This trend can be related to the above-mentioned studies carried out in Pakistan and other developing nations, which state that women at the middle reproductive and early perimenopausal ages are more prone to screening behavior[16,17] The higher participation rates could be attributed to increased health awareness, exposure to healthcare services and the greater interest of personal well-being during these years[12].

Conversely, the young women (20- 29 years) depicted low-screening behavior because they were likely less risky and were less aware about the importance of early screening. Similarly, women aged above 50 years also portrayed a decline in screening practices and this could be a result of culture, ignorance on the risk of post menopause, or inability to move and access healthcare facilities[10,18]. These trends also demonstrate the importance of special education and counseling strategies in order to raise awareness about the risk of breast cancer in all age groups. Age-appropriate intervention in community/primary care can be used to improve compliance with mammography and early diagnosis, which eventually leads to a reduction in the mortality rate due to breast cancer in Pakistani women.

Influence of level of education on mammography screening practices among the women:

The current research established that educational level has a significant relationship with the practice of mammography screening in the women of Peshawar. The respondents whose education was tertiary were more inclined to undergo mammography than the secondary and primary education. This observation reinforces previous studies that have shown an increase in health literacy and knowledge about preventive care and access to healthcare services with the level of education[11].Women who are educated too are more accepting of the physician recommendations and public health. Thus, systematic awareness campaigns among women of less educational level are needed on the local level so that equal access to breast cancer screening could be ensured[4,14].

Influence of parity on mammography screening practices among the women

Parity was not statistically significant in this study in its relationship with mammography screening practices among the women in Peshawar. The difference between the parity groups was not significant though women with two or three children reported slightly higher screening rates. The result is contrary to other studies of the region, which have stated lower screening in women with higher parity because of the burden of caring and decreased health-seeking behavior[16]. The existing outcomes suggest that reproductive history is not the only element that can influence the choice to screen; instead, education,

awareness, and the availability of healthcare facilities were more likely to impact the practice of mammography[12].

Influence of place of residence on mammography screening practices among women

The current research study demonstrated that, place of residence was closely related with the practice of mammography screening among women in Peshawar. Urban women had a significant high screening rate than rural residents[10,19]. Such disparity could probably be due to variations on access to healthcare facilities, access to mammography, and exposure of health education campaigns. The same tendencies were observed in national and regional studies, highlighting urban benefit in preventative health behaviors[3]. Little knowledge, culture, and resources among rural populations may impede the process of screening, which supports outreach measures and mobile mammography.

Life style Behaviors and Breast Cancer Screening Practices:

According to the findings of the Chi-squared study, women's screening habits can be linked to their lifestyle choices.We discovered a strong correlation ($p<.05$) between alcohol use and routine mammograms and breast self-examinations. Additionally, there was a strong correlation between smoking and mammograms and clinical breast exams. Regular breast self-examinations were associated with higher rates of regular activity and a healthy diet[20].

Conclusion:

Mammography screening has in no small measure aided early detection of breast cancer and institution of early treatment for those detected to have the cancer with many lives saved. This not with standing, it is worrisome that limited number of women presents themselves for this test. There is need for more education of the women on the need for early detection of breast cancer. Also, high educational attainment may increase the women's mammography uptake. These call for nurses, the policy makers, professional associations and Ministry of Health to play a role in achieving the goal of ensuring that most women become subjected to this screening through policy proclamation[16,20].

Implication of the Study

Drawing inference from the findings, the researchers feel that the few number of women that present themselves for mammography is source of worry as the most efficient screening test for early detection of breast cancer is poorly undertaken by women indicating that majority of women with breast cancer may be detected at later stage of the disease when little or nothing may be done to achieve better result. This can continuously increase the maternal morbidity and mortality rate of the nation.

More also, the predictive factors identified for mammography screening among the women are such that there is need for every health care provider to be involved in educating women whenever and wherever the opportunity arises to expand their knowledge on the screening, and its benefits remain indispensable.

Recommendations:

The research reveals that there is a need to adopt a multi-level intervention that can enhance screening of mammography among women in Peshawar. A national breast cancer screening should be developed to offer affordable and accessible mammography services that will result in early diagnosis and treatment of the identified abnormalities. The promotion of health education aimed at the increase in awareness of the risk factors and early detection significance can be strengthened by the mass media, Internet, and lectures within the institutions. Moreover, regular screening should be encouraged using community-based campaigns conducted by public health nurses and educators with the use of town hall meetings, women associations, religious groups, etc. Follow up and continuous reminder mechanisms are needed to

Limitations of the Study

This study used descriptive design therefore the findings cannot be conveniently generalized to the population.

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