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ORIGINAL ARTICLE

Awareness and practice of breast self-examination among women in Khyber Pakhtunkhwa, Pakistan: a cross-sectional study

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ABSTRACT

Objectives: To assess awareness and practice of breast self-examination (BSE), identify factors contributing to the gap between awareness and practice, and determine key sources of information among women in Khyber Pakhtunkhwa, Pakistan.

Methods: This cross-sectional study was conducted from September to November 2022 in Khyber Teaching Hospital, Hayatabad Medical Complex, Rehman Medical Institute and Kuwait Teaching Hospital in Peshawar. A total of 385 married women aged 20–65 years were recruited through purposive sampling. Data were collected via a pretested, validated questionnaire assessing demographics, BSE awareness, and practice. Awareness and practice were scored using predefined criteria. Data were analyzed through SPSS version-22.

Results: Of 425 approached participants, 385 (90.6%) were included (mean age 36.5±11.5 years). Only 42.7% (n=164/385) had heard of BSE, and overall awareness was low, with 84% (n=323/385) not aware, 12.9% (n=50/385) partially aware, and 3.1% (n=12/385) substantially aware. Among those aware, social media (26.2%) and home sources (25.0%) were the main information channels. Practice of BSE was suboptimal; 62.8% (n=103/385) had never been taught by healthcare staff. Overall, 26.8% (n=44/164) demonstrated excellent practice, 53 (32.3%) had good, 51 (31.1%) had average, and 16 (9.8%) had poor practice. Higher educational level was significantly associated with better awareness (p=0.032), and higher awareness was strongly associated with better practice (p<0.001).

Conclusion: Awareness and practice of BSE among women in Khyber Pakhtunkhwa are suboptimal, with significant gaps influenced by education and information sources. Targeted health education strategies, particularly through social media platforms, are essential to improve early breast cancer detection practices.

Keywords: Breast Self-Examination (MeSH); Awareness (MeSH); Breast Neoplasms (MeSH); Health Knowledge, Attitudes, Practice (MeSH); Health Education (MeSH); Women's Health (MeSH); Early Detection of Cancer (MeSH); Cancer Screening (MeSH); Pakistan (MeSH); Neoplasms (MeSH); Early Diagnosis (MeSH).

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INTRODUCTION

Breast cancer is a major global health problem and a leading cause of cancer-related mortality among women.[1] According to the World Health Organization, approximately 2.3 million women were diagnosed with breast cancer in 2020, resulting in about 685,000 deaths worldwide.[2] The burden of breast cancer is increasing in developing countries, largely attributed to lifestyle changes such as smoking, physical inactivity, consumption of calorie-dense diets, altered reproductive patterns, and use of exogenous hormones.[3] Breast cancer mortality is largely attributable to delayed diagnosis, which leads to suboptimal treatment outcomes and increased risk of death.[4] Regular breast self-examination (BSE) is a practical strategy for early detection and may help reduce mortality.[5] In resource-limited settings, BSE serves as a simple, low-cost method of secondary prevention, facilitating identification of breast abnormalities where access to mammography is limited.[6]

BSE involves a systematic approach including visual inspection and palpation of the breasts for any changes, such as lumps, asymmetry, or abnormal discharge.[7] Factors influencing the practice of BSE include family history of breast cancer, level of knowledge, self-efficacy in performing the technique, and interaction with healthcare professionals.[8]

Evidence from the subcontinent highlights a substantial gap between awareness and practice of BSE. A study from India involving 1,000 women reported good knowledge in 73% of participants; however, only 46% demonstrated adequate practice.[9] Similarly, a cross-sectional study in Bangladesh among 400 female students found that only 21% had ever practiced BSE, with major barriers including lack of knowledge (33.3%), absence of symptoms (21.8%), and feelings of shyness or discomfort (16.5%).[10]

In Pakistan, findings are equally concerning. A study conducted in Karachi among 1,000 students showed that 40.3% of participants were unaware of BSE, and only one-third reported practicing it.[11] Another study from a tertiary care public hospital in Lahore reported that although most participants had low educational attainment, only 24% had heard of BSE and 26% knew how to perform it, while

none had ever practiced it.[12] Furthermore, a systematic review including 9,766 Pakistani women across 18 studies demonstrated low overall awareness, with knowledge of risk factors (42.7%), symptoms (41.8%), diagnostic methods (36.3%), and treatment options (46.6%). The prevalence of BSE practice was only 28.7%, and merely 15.3% had ever undergone a clinical breast examination.[13]

Recent evidence highlights regular BSE as an important strategy for early detection of breast cancer, particularly in low-income settings, where it can empower women to recognize abnormalities promptly and seek timely care.[14] However, a large-scale meta-analysis has reported persistently low rates of BSE practice in such settings, largely attributable to limited awareness, sociocultural barriers, and restricted access to healthcare services. The study emphasized the need for context-specific, policy-driven interventions to enhance early detection efforts.[15]

The present study aimed to assess the level of awareness and practice of BSE, explore factors contributing to the gap between awareness and practice, and identify key sources of information. Given the limited health resources and low literacy levels in Khyber Pakhtunkhwa province of Pakistan, these findings are expected to inform targeted health education strategies to improve breast cancer screening practices among women.

METHODS

This cross-sectional study was performed from 15th September 2022 to 15th November 2022 to assess the knowledge and awareness level of the females of Khyber Pakhtunkhwa, regarding BSE. Ethical approval was obtained from the Institutional Research and Ethics Review Board of Khyber Medical College, Peshawar, Pakistan (Reference #. 435/DME/KMC; dated June 27, 2022).

All those women between 20 to 65 years of age who were willing to give consent for survey and were well oriented in space and time were going to be included in the study. Women unwilling to give consent to participate in this study were excluded.

A sample size of 385 was calculated using Cochran's formula for cross-sectional studies, with a confidence level of 95% and a margin of error of 5%. The sample size, however, was increased to 425 in order to overcome the no-response fraction of the population. The respondents were selected through a purposive sampling method. Sample size was calculated on basis of study from Karachi.[11]

The study was conducted in Peshawar, which is the capital city of the Khyber Pakhtunkhwa province of Pakistan. Data was collected from two private and two public sector hospitals in Peshawar. The private hospitals included in this study were Rehman Medical Institute and Kuwait Teaching Hospital while the public hospitals included were Khyber Teaching Hospital and Hayatabad Medical Complex. Inclusion criteria included women who were married, were oriented in time and space and gave consent to be included in the study. Exclusion criteria included unmarried women and those who did not consented to be included in the study.

Data was collected through face-to-face interviews using a structured questionnaire. Prior to data collection, informed consent was obtained from all participants, and confidentiality and privacy were strictly maintained. No incentives were offered for participation. Data were collected using a previously validated questionnaire[9-12] that has been widely used in studies on BSE. The questionnaire was translated into Urdu by subject experts to enhance clarity and participant comprehension, and subsequently back translated to ensure validity.

The instrument comprised three sections. The first section included five items on demographic characteristics (age, marital status, residence, education, and socioeconomic status). The second section consisted of 14 items assessing knowledge and awareness of BSE, primarily with dichotomous (yes/no) responses, along with a question on the source of information. The third section included seven items evaluating BSE practice, measured on a five-point Likert scale (never to always).

Awareness scores ranged from 0-14; scores of 10-14 indicated substantial awareness, 7-9 partial awareness, and 0-6 no awareness. Practice scores ranged from 7-35; scores of 0-7 indicated poor practice, 8-14 average, 15-21 good, and 22-28 excellent practice. The questionnaire was pretested on 40 participants (approximately 10% of the sample) to assess reliability, with Cronbach's alpha values exceeding 0.7.

Data were entered, coded, and analyzed using SPSS version-22. Descriptive statistics, including means, frequencies, and percentages, were calculated. Associations between educational level and awareness, and between awareness and practice of BSE, were assessed using the chi-square test. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 425 women were selected as the sample of the study. However, 40 (9.4%) respondents refused to participate; therefore 90.6% (382/425) women were interviewed and included in the final analysis.

Data were collected from 385 participants with a mean age of 36.5 ± 11.5 years. All participants were married. Regarding educational status, 257 (66.8%) respondents had primary education, 43 (11.2%) had matriculation, 83 (21.6%) had graduation, In terms of socioeconomic status, majority ($n=224$; 58.2%) belonged to the middle-income group. The detailed characteristics of participants are presented in Table I.

Out of the total 385 respondents only 164 had heard of BSE which makes it 42.7% (164/385) while the remaining 57.3% (221/384) respondents had never heard about BSE. The detailed knowledge on BSE of the 164 respondents was further assessed through our questionnaire. Among those aware of BSE, most demonstrated only partial knowledge, while a small proportion showed substantial awareness. According to the already mentioned scoring criteria in

Table I: Demographic characteristics of the study participants (n=385)

Variables		Frequency	Percentage
Marital Status	Married	385	100
	Unmarried	0	0
Level of Education	Primary education	257	66.8
	Matriculation	43	11.2
	Graduation	83	21.6
	Madrassa learning	2	0.5
Socio Economic status	High income	20	5.2
	Middle income	224	58.2
	Low income	141	36.6

Table II: Awareness of breast self-examination (BSE) among the 164 respondents

Awareness	Responds	Frequency (n=164)	Percentage
Know how to perform BSE	Yes	91	55.5
	No	73	44.5
Ever Performed BSE	Yes	75	45.7
	No	89	54.3
Know BSE should be Performed Monthly	Yes	33	20.1
	No	131	79.9
Know BSE is important for Early Detection of breast Cancer	Yes	125	76.2
	No	39	23.8
Know main steps for BSE	Yes	59	36
	No	105	64
Know that BSE should be performed a week after period	Yes	13	7.9
	No	151	92.1
Aware of the correct position of body while performing BSE	Yes	56	34.1
	No	108	65.9
Know benefits of BSE	Yes	55	33.5
	No	109	66.5
Overall Awareness of BSE* (n=385)	Substantially Aware	12	3.1
	Partially Aware	50	13.9
	Not Aware	323	84

*Knowledge on BSE was scored on 14. Substantially aware was considered as score between 10 and 14; partially aware, 7-9; and not aware, 0-6

the methods and materials section, out of the total 164 respondents 7.3% (12/164) respondents were substantially aware, 30% (50/164) respondents were partially aware and 62.2% (102/164) respondents were not aware of BSE. Furthermore 221 respondents who had never heard of BSE were also considered as not aware of BSE as per scoring criteria, making the overall percentages as; Substantially aware 3.1% (12/385), Partially aware 12.9% (50/385) and not aware 84% (323/385). Detailed findings regarding awareness are presented in Table II.

Among the 164 respondents who had heard about BSE, social media was the most reported source of information (n=43; 26.2%), followed closely by home sources (n=43; 25.0%) and friends (n=35; 21.3%). Television and radio accounted for 11.6% (n=19) of the responses, while other miscellaneous sources contributed 15.2% (n=25). Newspapers were the least common source, reported by only 0.6% (n=1) of participants.

The practice of BSE among the 164 respondents who were aware of BSE was assessed using seven indicators. Among them, 68 (41.5%) respondents reported that they had never practiced BSE monthly, while 23 (14.0%) reported that they always performed BSE monthly. In addition, 86 (52.4%) respondents had never tried to learn the correct method of BSE. Only 15 (9.1%) respondents reported receiving encouragement from parents to practice BSE. Regarding communication with peers, 37 (22.6%) respondents reported always advising friends to perform BSE and 39 (23.8%) reported always discussing the importance of BSE with friends. Furthermore, 103 (62.8%) respondents reported that they had never been taught about BSE by health care staff. When asked about the appropriate response to detecting a breast abnormality, 100 (61.0%) respondents agreed that they should immediately visit a health care facility. According to the overall practice scoring criteria, 44 (26.8%) respondents demonstrated excellent practice, 53 (32.3%) had good practice, 51 (31.1%) had average practice, and 16 (9.8%) had poor practice. Detailed practice indicators are presented in Table III. A subgroup analysis was performed to determine the relationship between educational level and awareness of BSE. Among respondents with inadequate education

Table III: Practice of breast self-examination (BSE)

Practice of BSE	Never [n (%)]	Sometime [n (%)]	Usually [n (%)]	Often [n (%)]	Always [n (%)]
Do BSE once a month	68 (41.5)	35 (21.3)	18 (11)	20 (12.2)	23 (14)
Learning the correct method of BSE	86 (52.4)	13 (7.9)	20 (12.2)	16 (9.8)	29 (17.7)
Parents advise me to do BSE	112 (68.3)	15 (9.1)	8 (4.9)	14 (8.5)	15 (9.1)
Advice friends to do BSE	75 (45.7)	27 (16.5)	10(6.1)	15 (9.1)	37 (22.6)
Discuss the importance of BSE with friends	71(43.3)	26 (15.9)	13 (7.9)	15 (9.1)	39 (23.8)
Been taught on BSE by health staff	103 (62.8)	19 (11.6)	8 (4.9)	11 (6.7)	23 (14)
In case of any Breast abnormality, directly go to healthcare facility	35 (21.3)	11 (6.7)	11 (6.7)	7 (4.3)	100 (61)
Overall practice of BSE*	Excellent Practice	44 (26.8)			
	Good Practice	53 (32.3)			
	Average Practice	51 (31.1)			
	Poor Practice	16 (9.8)			

*Practice of BSE was scored out of 35, each item has a group of answer points. 5 points for always, 4 points for usually, 3 points for often, 2 points for sometimes and one point for never. The respondents who scored between 0 and 7 were considered as having poor practice, 8 and 14 had average practice, 15 and 21 had good practice and 22 and above had excellent practice

Table IV: Association of level of education with awareness about breast self-examination (BSE)

Level of Education	Not Aware [n (%)]	Partially Aware [n (%)]	Substantially Aware [n (%)]	Total [n (%)]
Inadequate education	60 (72.3)	22 (26.5)	1 (1.2)	83 (100)
Matriculation	8 (44.4)	7 (38.9)	3 (16.7)	18 (100)
Graduation	33 (53.2)	21 (33.9)	8 (12.9)	62 (100)
Madrassa education	1 (100.0)	0 (0.0)	0 (0.0)	1 (100)
Total	102 (62.2)	50 (30.5)	12 (7.3)	164 (100)

Note: Chi-square test showed a statistically significant association between level of education and awareness of breast selfexamination (p=0.032)

Table V: Association of level of awareness with practice of breast self-examination (BSE)

Awareness Level	Poor Practice [n (%)]	Average Practice [n (%)]	Good Practice [n (%)]	Excellent Practice [n (%)]	Total [n (%)]
Not aware	16 (15.7)	42 (41.2)	31 (30.4)	13 (12.7)	102 (100)
Partially aware	0 (0.0)	8 (16.0)	21 (42.0)	21 (42.0)	50 (100)
Substantially aware	0 (0.0)	1 (8.3)	1 (8.3)	10 (83.3)	12 (100)
Total	16 (9.8)	51 (31.1)	53 (32.3)	44 (26.8)	164 (100)

Note: Chi-square test showed a statistically significant association between awareness and practice of breast self-examination (p<0.001)

(n=83), 60 (72.3%) were not aware of BSE, 22 (26.5%) were partially aware, and 1 (1.2%) was substantially aware. Among respondents with matriculation education (n=18), 8/18 (44.4%) were not aware, 7/18 (38.9%) were partially aware, and 3/18 (16.7%) were substantially aware. Among 62 respondents with graduation 33 (53.2%) were not aware and 21 (33.9%) were partially aware. A statistically significant association was observed between educational level and awareness of BSE (p=0.032), indicating that respondents with higher educational attainment were more likely to be aware of BSE. Detailed results are shown in Table IV. The relationship between awareness level and practice of BSE was also analyzed. Among respondents who were substantially aware (n=12), 10 (83.3%) demonstrated excellent practice. Among partially aware respondents

(n=50), 21 (42.0%) had excellent practice and 21 (42.0%) had good practice. A statistically significant association was observed between awareness level and practice of BSE (p<0.001), indicating that higher awareness was associated with better practice of BSE. The detailed analysis is shown in Table V.

DISCUSSION

A total of 385 participants were taken in study. 42.7% (164/385) of participants have heard about BSE while the remaining 57.3% (221/385) have never heard about BSE. Out of 164 participants, 76.2% (125/164) participants knew the importance of BSE in early detection of breast cancer, 55.5% (91/164) participants knew how to perform BSE while only 45.7% (75/164) participants had ever actually performed BSE. A total of 39.0% (64/164) participants had heard about BSE from social media, TV or Radio while 61.0% (100/164) participants had heard about BSE either at home from family members or from friends. Regarding practice, 41.5% (68/164) participants had never practiced BSE monthly while only 14.0% (23/164) participants had always practiced BSE on monthly basis. Statistically significant associations were found between level of education with level of awareness about BSE (p= 0.032) and between level of awareness with practice of BSE (p< 0.001). Breast cancer is a leading cause of cancer-related mortality among women in Pakistan, making early detection critically important. Although ma-mmography remains the gold standard for screening, its availability is limited in resource-constrained settings such as Khyber Pakhtunkhwa. In this context, BSE serves as a simple, safe, and cost-effective method for early detection of breast abnormalities, emphasizing the need to improve awareness and promote its regular practice among women. In this study women with a mean age of 36.5±11.2 years belonging to various districts of KPK having different education levels and socioeconomic status participated. Among the participants only 42.7% (164/385) had heard about BSE, which is relatively low compared to similar studies performed in Karachi, Pakistan[11] and Bangladesh,[16] where 71.4% and 60.5% women had heard about BSE respectively. In our study 76.2% (125/164) women were aware that BSE is important for early detection of breast cancer which is in line with the result in the study performed in Karachi where 74% of the participants considered BSE important for early detection of breast cancer.[15] Only 7.9% (13/164) women knew the ideal time for performing BSE was after their monthly cycle which is quite low as compared to a study in Iran where 2/3rd of the population were of the view that BSE should be performed after their monthly cycle.[17]

Social media 26.2% (43/164) proved to be the best source of knowledge about BSE followed by home 25.0% (41/164) and Television 11.6% (19/164) in contrast to similar study conducted in Ethiopia where the most common source of knowledge about BSE was TV and Radio (38.1%) followed health professional (28.9%) which shows the easy access and ever increasing use of social media in KPK.[18]

Although 42.7% (164/385) women had heard about BSE, Only 3.1% (12/385) women were substantially aware and 13.0% (50/385) were partially aware after their knowledge regarding BSE was thoroughly assessed through the 14 indicators in our questionnaire. This shows that the level of awareness about BSE among women of KPK is lower as compared to studies conducted in Iran (79.8%).[17] In our study 68.5% (112/164) women had performed BSE at least once in their life while 41.5% (68/164) had never performed BSE in their whole life. For the further assessment of these women regarding practice of BSE 7 indicators were used in the questionnaire, 26.8% had excellent BSE practice. Among 164 study participants, only 26.8% (44/164) had excellent practice of BSE which is low as compared to a study in Ethiopia where 31% of the women had a good practice of BSE.[18] Despite moderate levels of awareness, the practice of BSE remained suboptimal, with only 26.8% of participants demonstrating excellent practice. Similar trends have been reported in studies from Karachi and Nigeria, where practice rates were 33% and 19%, respectively.[11,19] These findings highlight a persistent gap between awareness and actual practice. Enhancing awareness is likely to translate into improved practice and facilitate early detection of breast cancer. Given that multiple studies, including the present one, identify media as a key source of information, strengthening mass media-based health education campaigns should be prioritized.

Regular performance of BSE was particularly low, with only 14.0% of participants reporting monthly practice, compared to 31% reported among African American women.[20] These differences may be attributed to limited awareness, inadequate knowledge, and prevailing sociocultural barriers within the community.

A significant association between the level of education and awareness of BSE (p=0.032) was found. In our study, among the participants who had inadequate education only 1.2% (1/83) were substantially aware most importantly, the participants who had done with their graduation 12.9% (8/62) were substantially aware followed by partially aware 33.9% (21/62) in contrast to similar study conducted in Nigeria where only 0% of participants are aware about BSE with inadequate education, while 68.1% of the percipients who had done their graduation are substantially aware of BSE.[19] A significant association between awareness and practice of breast self-examination was also found (p<0.001). The participants who were not aware of BSE, only 12.7% (13/102) had regular practice, participants who were partially aware, 42.0% (21/50) had regular practice, while participants who were substantially aware 83.3% (10/12) had regular practice. Breast self-examination is a simple and cost-effective method for early detection of breast cancer, particularly in low-resource settings. The low level of awareness observed in this study highlights the need for healthcare professionals to educate women about the importance and correct technique of BSE during routine clinical visits.

Limitations of the study

This study has several limitations. As a

cross-sectional design, causal inferences cannot be established, and generalizability is limited. The study was conducted in a few tertiary care hospitals in the capital city of a single province, which restricts broader applicability. Therefore, nationwide mixed-method studies, incorporating both quantitative and qualitative approaches across urban and rural populations, are recommended. Additionally, socioeconomic status was not analyzed as a potential confounder. The inclusion of only married women further limits generalizability, and future studies should include both married and unmarried women for a more comprehensive assessment.

Future studies should also evaluate the effectiveness of educational interventions in improving awareness and regular practice of breast self-examination. Further research may also explore additional factors such as socioeconomic status, cultural beliefs, and access to healthcare services influencing BSE practices.

CONCLUSION

This study demonstrates low awareness and suboptimal practice of BSE among women, with only a small proportion performing it regularly. Social media emerged as a key source of information, highlighting its potential for targeted awareness campaigns. Educational status was an important determinant of both awareness and practice. Strengthening health education through mass media platforms and structured programs such as workshops and seminars is recommended. Community-based interventions, particularly in rural areas using local languages and involving Lady Health Workers and Lady Health Visitors, may further enhance outreach and adoption of BSE. Future studies should explore barriers to awareness and practice and evaluate effective strategies to improve early detection behaviors.

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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

WZ & MAK: Conception and study design, acquisition, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

SARS: Study design, drafting the manuscript, approval of the final version to be published

AH: Acquisition, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

JI: Conception and study design, critical review, approval of the final version to be published

RG: Acquisition, analysis and interpretation of data, critical review, approval of the final version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest, whether financial or otherwise, that could influence the integrity, objectivity, or validity of their research work.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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