



Evaluation of breast cancer knowledge, beliefs, and self-examination practices among female college teachers in Pakistan

Benazir Mahar, Malina Binti Osman, Fatimah Ahmad Fauzi, Rafidah Binti Hod¹, Tazeen Shah²

Abstract:

BACKGROUND: Breast cancer (BC) is a prevalent malignancy in women, and breast self-examination (BSE) is an important tool for early diagnosis. Despite its significance, BSE is insufficiently practiced, particularly in developing countries. This research evaluated the knowledge, beliefs, and practices concerning breast cancer and breast self-examination among female college teachers in Pakistan.

MATERIALS AND METHODS: A cross-sectional study was conducted in August 2024, using the health belief model (HBM) as a theoretical framework, involving 176 female college teachers in Hyderabad, Pakistan. A validated questionnaire was employed for data acquisition. Descriptive and inferential statistics, including regression analysis, were used to determine predictors.

RESULTS: Only 13.6% of the individuals indicated consistent breast self-examination (BSE) engagement. The median knowledge score was 12, with an interquartile range of 5. Regression analysis revealed that marital status, level of education, family history of breast cancer, history of benign breast diseases, and having a health professional in the family were significant predictors of knowledge, beliefs, and BSE practices ($P < 0.05$).

CONCLUSION: There is a notable gap in awareness and regular BSE performance among respondents. To improve BSE practices, targeted strategies, including educational interventions for teachers, are crucial.

Keywords:

Attitudes, breast neoplasms, breast self-examination, educational personnel, health belief model, health knowledge, health promotion practice, Pakistan

Introduction

Current research and data sources have revealed an increased incidence of breast cancer (BC) throughout the past decade. The prevalence, morbidity, and mortality rates are increasing.^[1] BC is the most prevalent malignancy among women worldwide,^[2] constituting 23% of all cancers prevalent in females. It is also the primary factor contributing to cancer-related deaths in low-income countries.^[3] The growing

burden in these regions is exaggerated by an aging population and the burgeoning prevalence of risk factors associated with economic transitions, smoking, obesity, physical inactivity, and shifting reproductive patterns.^[4]

According to the World Health Organization (WHO), in 2022, there were 2.3 million new cases, and 670,000 deaths reported worldwide, which are the most frequently reported malignancies among women in 157 out of 185 countries in

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the following year.^[5] In low- and middle-income countries (LMICs), where access to screening is often limited, outcomes are typically compromised. Compared with 81% of women in the USA, only 32% of women in sub-Saharan Africa survive five years after receiving a breast cancer diagnosis. Similarly, the incidence rates are 4.8% and 5.8% in Asia and Africa, respectively. However, mortality rates are markedly higher, with Asia at 57.4% and Africa at 7.2%.^[6] Pakistan, among Asian countries with a high prevalence, reported 178,388 new BC cases in 2020.^[7]

To reduce the morbidity and mortality of patients with breast cancer, early diagnosis is essential. Mammography (MMG), clinical breast examination (CBE),^[8] and breast self-examination (BSE) is among the advised preventative measures.^[9,10] Although CBE and MMG require a physician's consultation and specialized tools,^[11] BSE is an economical, convenient, noninvasive, and straightforward method that does not involve specialized instruments.^[4] Women who regularly perform BSE are more proficient in identifying abnormalities in their breast tissue, hence promoting early diagnosis. Previous studies have shown that BSE can be effective in detecting breast lumps at early stages.^[12]

Nevertheless, a thorough comprehension of BSEs remains limited in several developing countries. A survey of 790 female household members in Southwest Cameroon revealed that just 25% had a sufficient understanding of BSE, and only 15% of those informed persons participated in the practice.^[13] Similarly, in Iran, a lack of awareness and proficiency was recognized as a potential limitation to the practice of BSE. In Pakistan, despite the elevated prevalence and mortality rates associated with breast cancer, early detection through BSE remains significantly underdeveloped. Research indicates that 89% of BC patients in Pakistan are diagnosed with delays, and 59% of these patients are diagnosed at an advanced stage.^[14] Sociocultural and economic factors such as age, lack of awareness, employment status, fear of surgery, reliance on traditional remedies, and spiritual beliefs contribute to delays in screening.^[15] Consequently, BC in Pakistani women is often diagnosed at advanced stages, significantly diminishing survival prospects.^[16]

Regular screening is essential for detecting asymptomatic lumps,^[17] and is effective in identifying small, noninvasive lumps at an early stage.^[18] Research in Pakistan has shown markedly low levels of knowledge and practice of BSE. For example, only 33.1% of medical university students practice BSE regularly,^[19] and another study indicated that fewer than 10% of community females engaged in self-examination.^[20] This study is grounded on the health belief model (HBM). The HBM is an effective

framework for analyzing preventive health behaviors^[21] including BSE,^[22] as showed in Figure 1. This model asserts that individuals' intentions to participate in health behavior are shaped by six primary factors: perceived susceptibility, perceived severity, perceived benefits, cues to action, perceived barriers, and self-efficacy.^[23] The HBM has undergone extensive validation but has limitations, such as social desirability bias and the presumption of rational behavior. Despite its limitations, the HBM is a valuable framework for understanding and promoting health-related behaviors.^[24] Researchers can improve its applicability by addressing these shortcomings.

The primary objective of this study was the practice of BSE. This is evaluated by surveying performance and practice frequency. In addition, secondary outcomes include participants' understanding of breast cancer risk factors, symptoms, and the importance of early detection through BSE and the participants beliefs regarding their susceptibility to breast cancer, the severity of the disease, and their confidence (self-efficacy) in performing BSE.

This study is remarkable since it offers a thorough assessment of breast cancer knowledge, beliefs, and self-examination behaviors, especially among female college teachers in Pakistan. Although worldwide and in Pakistan studies have examined these elements across other groups, there is a significant deficiency of studies focused on this particular demographic group within the Pakistani setting. Female faculty members play a crucial role in promoting health awareness in their communities. By concentrating on this under-explored demographic, our research fills a significant need in the literature and offers essential insights that can guide specific intervention methods. To our knowledge, no prior research has been undertaken on this group in Pakistan, providing our results crucial for enhancing breast cancer awareness and preventative measures within this demographic. This study aims to examine the prevalence of knowledge, beliefs, and practices associated with breast cancer and breast self-examination among college teachers in Hyderabad, Pakistan. This study aims to address this gap, potentially leading to increased awareness among female college teachers, their students, and the broader community about breast cancer and the importance of BSE. The findings of this study may offer significant insights for governmental health officials and nongovernmental organizations focused on cancer, especially breast cancer, to improve awareness and incorporate BSE into prevention and control initiatives.

Materials and Methods

This study adheres to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)

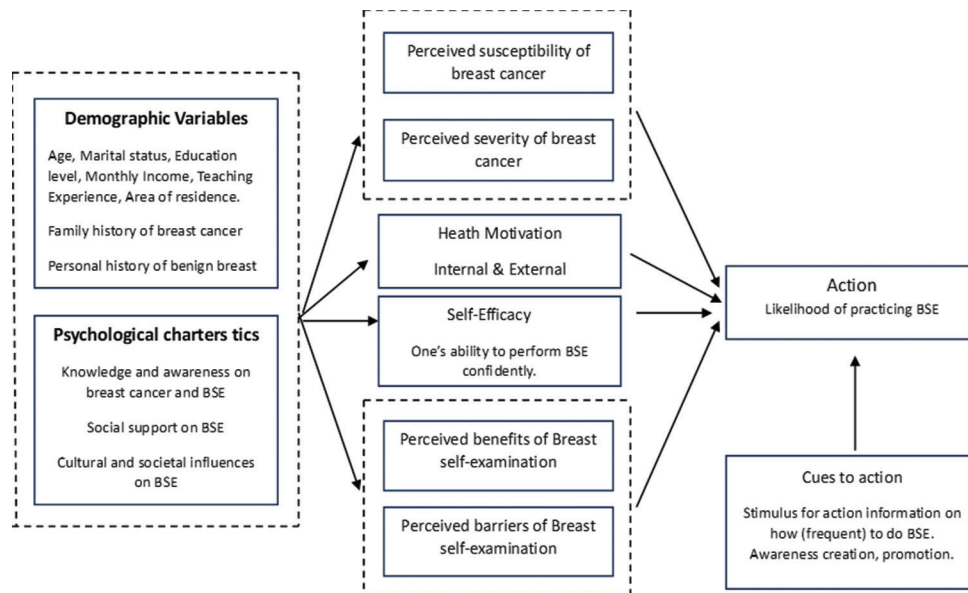


Figure 1: Theoretical framework of the interrelation of HBM concepts and relationships with behavior change^[25]

guidelines for cross-sectional studies. The STROBE checklist was used to ensure the comprehensive and transparent reporting of all study components, including the design, analysis, and interpretation of results. Study ID. no. (MMC/ERC/1-6-24).

Study design and setting

A descriptive cross-sectional study involving college teachers appointed to government girls' colleges located in the district of Hyderabad, Pakistan, was conducted in August 2024. Hyderabad, located in Sindh Province in southeastern Pakistan, is situated 175 kilometers north of Karachi and ranks second largest in Sindh and eighth-largest city in Pakistan. The Hyderabad district hosts ten government colleges offering intermediate and bachelor's degree programs in arts, science, and commerce for females specifically.^[26]

Study participants and sampling

The sample size was determined by using the one proportion formula.^[27] This method involves calculating $n = Z^2 (P) (1-P) / d^2$, where d is the intended margin of error, P is the predicted percentage, Z is the Z score, and n is the sample size. By substituting the given values of $P = 0.134$, (13.4% expressed as a decimal),^[28] $d = 0.05$, and $Z = 1.96$, the calculated sample size was approximated to be 178. A post hoc power analysis revealed an achieved power of 97.87% ($\alpha = 0.05$) for detecting the effect of a personal history of breast cancer on BSE practice, suggesting that the sample size was sufficient to reliably detect this effect. Eligibility for this study was defined by specific inclusion and exclusion criteria. The participants had to be full-time college faculty members aged 25-59 years. Those previously diagnosed with breast cancer were excluded, as their experience

might influence their knowledge and practices, those unwilling to participate, and faculty absent on the data collection day. The age range of 25-59 years aligns with the minimum and maximum appointment ages for college faculty.

A probability sampling strategy was employed. Among the ten colleges, three colleges were randomly selected. The participants were subsequently selected from these colleges via a stratified proportionate sampling method. This involved dividing the college population into strata of academic disciplines (Arts, Science, Commerce) and allocating sample sizes proportionally to the size of each stratum. Random sampling was then employed within each stratum to select the final participants. Eligible participants provided written informed consent before data collection.

Data collection tool and technique

It was a structured, self-administered, paper-based questionnaire. Participants were first provided with a consent form to ensure informed participation. The questionnaire was administered face-to-face, allowing for direct interaction and clarification of any queries. On average, participants required approximately 25 minutes to complete the questionnaire. This method ensured accurate data collection in a controlled environment.

A reliable and validated questionnaire was used to gather the data. The reliability of the original questionnaire, which is based on the HBM constructs, was reported as 0.87, 0.80, 0.69, 0.83, and 0.90.^[29] However, the reliability of the health belief model-based instrument for this study was assessed via Cronbach's alpha. The coefficients for the constructs of susceptibility, seriousness, benefits

of BSE, barriers to BSE, BSE self-efficacy, and health motivation were 0.87, 0.85, 0.90, 0.84, 0.80, and 0.81 respectively. It has four sections: the first is about sociodemographic, the second section includes questions on Knowledge of BC and BSE, the third section is based on beliefs and the fourth section is on practice assessment of participants.

Ethical considerations

Permission letters and ethical approval were obtained from the Secretary of College Education and the director of Colleges, Hyderabad ref.no. DCEHRH- 2023-24/423. Ethical approval for the study was also granted by the Ethical Review Board of Mekran Medical College. In addition, written informed consent was obtained from all study participants.

Data analysis

The data were entered into Excel and exported to SPSS version 29 for analysis. Four returned questionnaires had missing responses, which were handled through mean imputation to maintain accuracy and minimize bias. Normality was assessed for dependent variables. The results are presented as frequency tables and percentages. The Bivariate analysis explored associations between factors and breast self-examination (BSE), whereas multivariate regression identified predictors of knowledge, beliefs, and practices regarding breast cancer (BC) and BSE. The statistical significance level was set at 0.05, and all analyses were conducted with a 95% confidence interval. The knowledge scores were dichotomized into good and poor categories, and BSE practice was treated as a binary variable (yes/no) in logistic regression. Linear regression was applied to the continuous belief scores to identify predictors.

Results

In line with the study's objectives, several key findings were identified. This cross-sectional study involved 176 respondents, and the response rate for this study was 98.88%. The findings revealed a mean age of 41.9 years (7.9) and an average teaching experience of 13.2 years (7.9), as shown in Table 1. Most of the female respondents were married $n = 149$, (84.7%). The majority of the respondents were Muslim $n = 169$; (96%). Concerning education, $n = 172$ (97.7) held a postgraduate degree. The majority resided in urban areas $n = 145$; (82.4%). Economically, $n = 58$ (33%) of the respondents were middle class, and $n = 118$ (67%) were upper class. In terms of native language, $n = 108$ (61.3%) spoke Sindhi, while $n = 43$ (24.4%) spoke Urdu, and $n = 25$ (14.3%) spoke other languages.

Figure 2 shows several key characteristics of the study participants regarding their health-related backgrounds.

Table 1: Characteristics of the study participants (n:176)

Variable	Mean (SD)
Age	41.9 (7.9)
Teaching experience	13.2 (7.9)
n (%)	
Marital status	
Single	17 (9.7)
Married	149 (84.7)
Divorced/separated/widow	10 (3.6)
Religion	
Muslim	169 (96.0)
Non-Muslim	07 (3.9)
Education level	
Graduate	04 (2.3)
Postgraduate	172 (97.7)
Area of residence	
Nonurban	31 (17.6)
Urban	145 (82.4)
Economic status	
Middle	58 (33.0)
Upper	118 (67.0)
Native language	
Sindhi	108 (61.3)
Urdu	43 (24.4)
Other	25 (14.3)

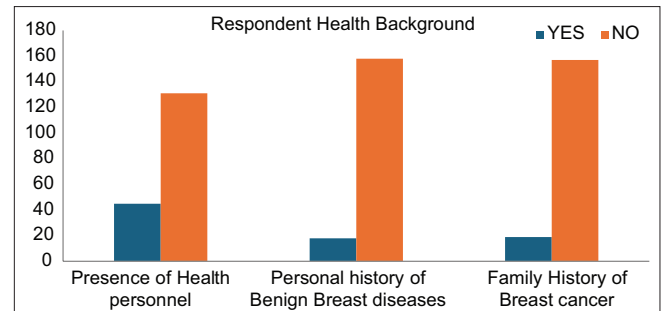


Figure 2: Health-related background characteristics of the participants

Notably, 25.6% of the respondents reported having health personnel in their family, whereas 74.4% did not. When considering personal medical history, 10.2% of the respondents indicated that they had a history of benign breast diseases, whereas 189.8% reported no such history. In addition, 10.8% of the respondents had a family history of breast cancer, with the remaining 89.2% having no such family history.

Table 2 presents breast cancer knowledge across the four domains. The participants exhibited the greatest understanding of the screening methods, with 64.9% indicating recognition of common screening methods. Awareness of risk factors (36.8% "yes") and symptoms (28.8% "yes") was moderate, with gaps in identifying certain risk factors, such as early menarche and symptoms, including alterations in skin texture. In terms of knowledge of BSE, only 33.4% of the

respondents responded positively, highlighting a low level of comprehension of certain procedures, including time and technique. These findings underscore differing degrees of awareness and areas requiring focused educational intervention.

Regarding participants' beliefs regarding BC and BSE across six different domains. The highest agreement percentages have been observed in Motivation and Barriers at 68.2% and 66.5%, respectively, whereas Susceptibility exhibited the lowest agreement at 9.5%. Neutral answers occurred most frequently for benefits (70.6%) and self-efficacy (53.8%). Disagreement was most pronounced for Susceptibility (57%) and least pronounced for Benefits (4.2%). These findings underscore differing degrees of conviction and trust around breast cancer awareness and procedures.

Figure 3 shows the current level of BSE performance and the frequency of participants. Among the total sample, 24 (13.6%) of the respondents reported performing BSE, whereas 152 (85.5%) did not. For performance frequency, 10 (41.6%) of them performed BSE every month, whereas 14 (58.3%) reported seldom performing BSE every month.

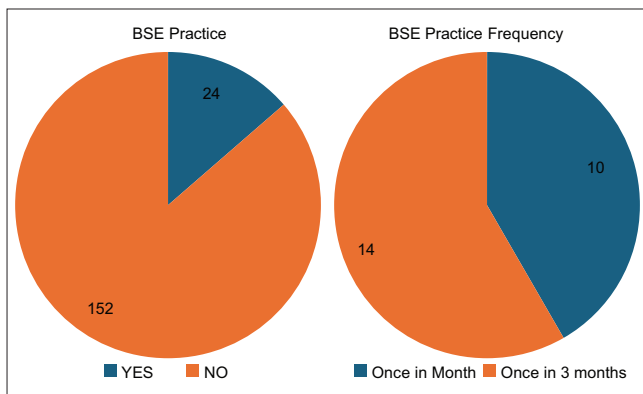


Figure 3: BSE performance and frequency of study participants

Table 3 shows that teaching experience and age do not significantly influence the practice of BSE, with mean BSE practice scores for those with and without teaching experience being 15.13 and 12.90, respectively ($P = 0.204$). Similarly, participants who practice BSE are slightly older (mean age 43.58) than those who do not (mean age 41.65), but the difference is not significant ($P = 0.272$). However, marital status, personal history of breast disease, family history of breast cancer, and having a health professional in the family were significantly associated with BSE practice ($P < 0.05^*$). The regression analysis assessed the influence of various factors on the dependent variable through both simple linear regression (SLR) and multiple linear regression (MLR). The results presented in Table 4 revealed that having health professionals in the family, education level, personal history of benign disease (BD), and family history of breast cancer (BC) were significant predictors in the simple linear regression model. Specifically, a family history of breast cancer had the strongest association with a standardized beta of 0.43 (95% CI: 13.71-25.90, $P < 0.001$), indicating a robust relationship with the dependent variable. A personal history of BD also demonstrated a moderate association, with a standardized beta of 0.28 (95% CI: 6.764-20.059, $P < 0.001$).

In the multiple linear models, which represent the final adjusted model, education level, personal history of BD, and family history of BC remained significant predictors after adjusting for other variables. Here, a family history of BC continued to have the strongest effect, although its standardized beta slightly decreased to 0.39 (95% CI: 11.99-23.83, $P < 0.001$). The effect of education level was reduced from a standardized beta of 0.22 in the SLR model to 0.13 in the MLR model (95% CI: 0.228-24.89, $P < 0.001$), indicating that its impact was partially explained by the other variables. Notably, the variable "health professionals in the family" was significant in the SLR but did not remain significant in the final MLR

Table 2: Respondents' knowledge and Beliefs about breast cancer and BSEs

Knowledge regarding breast cancer and breast self-examination			
Domain	Yes (%)	No (%)	Don't know (%)
Risk factors	36.8	9.4	53.8
Symptoms	28.8	9.6	61.6
Screening methods	64.9	9.1	26.0
Breast self-examination	33.4	6.1	59.9
Beliefs regarding breast cancer and breast self-examination			
Domain	Strongly agree/agree (%)	Neutral	Disagree/strongly disagree (%)
Susceptibility	9.5	33.5	57.0
Seriousness	20.3	33.2	46.4
Benefits	25.1	70.6	4.2
Barriers	66.5	15.5	17.9
Self-efficacy (confidence)	41.6	53.8	4.6
Health motivation (Cue to action)	68.2	6.2	25.5

model, suggesting that its influence diminished when controlling for additional factors.

Simple and multiple logistic regression analyses identified key predictors of breast cancer (BC) and BSE knowledge and practices, as presented in Table 4. Marital status showed a non-significant inverse association with knowledge (OR 0.41, $P = 0.08$) in the simple model

and was excluded in the adjusted model, indicating minimal impact. Having health professionals in the family strongly predicted increased knowledge (crude OR 6.67, adjusted OR 5.96, $P < 0.001$), as did having a personal history of benign disease (BD) (adjusted OR 6.47, $P = 0.007$). A family history of BC was the most significant predictor (OR 24.0, adjusted OR 24.22, $P < 0.001$), emphasizing its strong influence on

Table 3: Determinants of breast self-examination practices among respondents

Variable	BSE practice		Test value	P
	Yes	No		
Age (mean SD)	43.5(7.6)	41.6(8.0)	1.10	0.78
Teaching experience	15.1(8.2)	12.9(7.8)	1.2	0.8
Religion				
Muslim	23 (13.6%)	146 (86.4%)	$X^2=0.3$	0.9
Non-Muslim	1 (14.3%)	6 (85.7%)		
Marital status				
Married	16 (10.7%)	133 (89.3%)	$X^2=6.92$	0.008*
Single	8 (29.6%)	19 (70.4%)		
Area of Residence				
Rural	1 (5.6%)	17 (94.4%)	$X^2=1.1$	0.2
Urban	23 (14.6%)	135 (85.4%)		
Personal history of Benign diseases				
Yes	8 (44.4%)	10 (55.6%)	$X^2=16.15$	<0.001*
No	16 (10.1%)	142 (89.9%)		
The presence of medical personnel in the family				
Yes	14 (31.1%)	31 (68.9%)	$X^2=15.67$	<0.001*
No	10 (7.6%)	121 (92.4%)		
Family history of breast cancer				
Yes	10 (52.6%)	9(47.4%)	$X^2=27.50$	<0.001*
No	14 (8.9%)	143 (91.1%)		

*Significance value <0.05

Table 4: Predictors of breast cancer and breast self-examination knowledge, beliefs, and practices

Predictors of Beliefs							
Variable	Simple linear regression			Multiple linear regression			
	Standardized β (95%CI)		P	Standardized β (95%CI)		P	
Health professionals in the family	0.21 (23.02-11.71)		0.004**				
Education level	0.22 (7.783-35.27)		0.002**	0.13 (0.228-24.89)		<0.001*	
Personal history of BD	0.28 (6.764-20.059)		<0.001**	0.25 (5.815-17.74)		<0.001*	
Family history of BC	0.43 (13.71-25.90)		<0.001**	0.39 (11.99-23.83)		<0.001*	
Predictors of knowledge of BC and BSE							
Variable	Simple logistic regression				Multiple logistic regression		
	b	COR	CI 95%	P	b	AOR	CI 95%
Marital Status	-0.87	0.41	0.15-1.12	0.08**			
Health professionals in the family	1.898	6.67	2.74-16.2	<0.001**	1.785	5.962	2.02-17.5
Personal History of BD	1.538	4.65	1.61-13.4	0.05**	1.867	6.471	6.74-86.9
Family History of BC	3.178	24.0	7.81-73.6	<0.001**	3.187	24.22	1.67-25.0
Predictors of BSE Practice							
Education level	-3.07	0.46	0.05-0.46	0.009**			
Marital status	-1.25	0.28	0.10-0.75	0.012**	1.25	3.519	1.09-11.2
Health professional in family	1.69	5.46	2.21-13.47	<0.001**	1.361	3.899	1.34-11.3
Family history of BC	2.42	11.34	3.95-32.5	<0.001**	2.45	11.69	3.44-39.6
Personal history of BD	1.96	7.10	2.45-20.5	<0.001**	2.20	9.068	2.47-33.2

No multicollinearity was observed, and the coefficient of determination $R^2=0.277$. **Significance level in simple linear regression at $P<0.25P$. *Significant in multiple linear regression at $P<0.05$. AOR: Adjusted odd ratio, COR: Crude odd ratio, C: Confidence interval. **Significance level in simple logistic regression at $P<0.25P$. *Significant in multiple logistic regression at $P<0.05$

knowledge levels. The correlation matrix revealed no significant multicollinearity, and the standard error-to-coefficient ratios were low, confirming model precision and fitness.

Discussion

Breast cancer continues to pose a significant health challenge among Pakistani women, and timely screening and diagnosis prove pivotal in improving survival outcomes. Conversely, the Pakistani healthcare landscape is marked by a stark reality: A vast majority (82%) of BC patients are diagnosed at advanced stages, which significantly compromises patient prognosis.^[14]

Breast self-examination (BSE) is a simple and cost-effective technique to improve breast awareness and speed up early detection, particularly in limited resource setups. The goal of this study was to evaluate the respondents' knowledge and beliefs toward breast cancer and BSE and evaluate practices aimed at identifying the determinants influencing women's BSE practices, knowledge, and beliefs toward BC and BSE.

In this study, while most participants recognized the importance of breast self-examination, the study revealed significant gaps in practice, with many participants being unsure about the proper methodology, frequency, and timing of performance. The gap in practice highlights an overall trend seen in similar research studies,^[30] including studies conducted on Pakistani females, among students in Karachi and Kashmir,^[19,31] where information typically fails to be put into practice. Earlier research performed in Pakistan indicated that while roughly 71.4% of females in Pakistan were aware of BSE, only 33.1% have conducted it.^[19] Among those who participate in the practice, the frequency is considerably lower breast self-examinations regularly, while the majority infrequently practice, similar results are revealed by prior research conducted in Ethiopia.^[32] This inconsistency highlights the need for practical guidance and supportive conditions that promote regular practice. Interactive approaches, such as demonstrations and reminders, may close this gap and enable women to integrate BSE into their routines.

Concerning knowledge of breast cancer, the study results revealed considerable variation in the levels of knowledge of the respondents. While knowledge of very commonly recognized risk factors, such as family history of cancer and age, was moderately high, awareness of critical risk factors, including postmenopausal obesity, reproductive history, and lifestyle factors, was less understood by the study group, which was similarly reported in earlier research.^[33] The respondents demonstrated inconsistency in their understanding of

symptoms associated with breast cancer, often limited to the presence of a painless lump, which has also been reported in earlier research.^[30] Knowledge of screening methods such as mammography and the technical understanding of BSE remain insufficient, underscoring the need for accessible, evidence-based training materials, which was also reported by Ghazanfer *et al.*^[34]

The participants' beliefs about breast cancer and BSE reveal a nuanced mix of awareness, anxiety, perceived benefits, barriers, confidence, and motivation. These beliefs are critical when designing interventions to increase breast cancer awareness and encourage regular BSE practices. A significant portion of participants experienced fear and anxiety when thinking about breast cancer. Nearly one-third are frightened. However, despite these fears, most participants do not believe that breast cancer severely impacts their relationships or drastically affects their lives, similar findings are reported by the study conducted in Nigeria.^[35] In addition, many participants are uncertain about their survival prospects if diagnosed, reflecting a need for educational interventions that address both the emotional and factual aspects of breast cancer. Despite recognizing the benefits, many participants face significant barriers to performing BSE regularly, including discomfort, embarrassment, and time constraints, which is consistent with earlier studies.^[34,36] The identified challenges indicate that although participants recognize the significance of BSE, these obstacles hinder its regular implementation. This approach may assist participants in effectively managing their fears and comprehending the potential impact of the disease on their lives, which is essential for early diagnosis. The neutral position of numerous participants regarding the effectiveness of BSE highlights the need for enhanced education to emphasize the importance of regular self-examination and to foster confidence in its advantages.

Confidence in performing breast self-examinations is inconsistent, as numerous participants indicate uncertainty regarding their proficiency in executing the procedure accurately or identifying abnormalities, especially minor lumps, these findings are comparable with the study, performed in Saudi Arabia, which found that in females who are confident in completing breast self-examinations (BSE) correctly are (30.7%), among them only 18.7% reported feeling confidence in their capacity to identify cancers in the breast using BSE.^[37] The deficiency in confidence may arise from inadequate knowledge or practice, underscoring the need for thorough training and educational resources. Emphasizing both visual and tactile components of BSE in these resources could help increase participants' confidence in their ability to conduct thorough self-examinations.

Although predicting significant predictors of breast cancer knowledge, beliefs, and practices, the findings of this study align with those of previous studies, where a personal history of benign breast diseases and a family history of BC have similarly been associated with increased awareness and engagement in preventive behaviors, reinforcing findings from earlier studies.^[38,39] Education has also emerged as a key factor that significantly influences beliefs about BC and BSE, which echoes prior research highlighting the role of education in promoting health awareness.^[40] In addition, easy access to the health care system and correct information by having a health professional in the family has consistently been linked to greater knowledge and practice of breast cancer (BC) and breast self-examination (BSE). This could be due to increased access to reliable health information. Interestingly, while having a health professional in the family was significant in the simpler model, it lost prominence in the multiple regression, suggesting that education.^[41] And family history plays a more dominant role in shaping beliefs that are in line with previous work.^[42] The moderate explained variance in beliefs indicates the complexity of health behaviors, which are influenced by multiple factors.

This study offers valuable insights into breast cancer knowledge, beliefs, and practices among college teachers in Hyderabad, Pakistan, a group rarely examined in breast cancer prevention research. By highlighting predictors such as marital status and family health history, the findings underscore the role of social and familial structures in shaping health behaviors in cultural settings. The study also deepens the understanding of how socioeconomic factors, including access to resources and family support, interact with educational backgrounds to influence preventive practices, providing a foundation for targeted educational interventions.

Limitations and recommendations

The self-reported data may introduce recall and social desirability bias, which may affect data accuracy. However, pre-survey briefing and participant information were given by the researcher, highlighting anonymous response and confidentiality considerations. The findings, based on an educated group of female college teachers, may not be generalizable to less-educated populations. Although a validated tool was used to assess beliefs, the complexity of personal attitudes and cultural influences may not have been fully captured, limiting broader applicability. Future research should include diverse populations to enhance generalizability. Furthermore, incorporating objective assessments and qualitative approaches can provide deeper insights into BSE practice and cultural influences on awareness of BC.

Conclusion

This study indicates a significant gap in knowledge, beliefs, and practices related to breast cancer self-examination among female college teachers in Pakistan. This finding corresponds with national health policy benchmarks that underscore the critical need for increased awareness of and education on breast cancer. To address this challenge, authorities should prioritize creating accessible educational resources and community outreach programs to increase breast health awareness. Furthermore, incorporating breast self-examination hands-on training for female teachers could be an important measure in developing a more knowledgeable population regarding breast health. Equipping teachers with the necessary skills and awareness empowered them not only to perform self-examinations but also to educate their students and communities about the importance of early detection and awareness of breast cancer.

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Conflicts of interest

There are no conflicts of interest.

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