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Original Article

Evaluation of Knowledge Regarding Breast Cancer and Its Early Detection Through Breast Self-Examination Among Nursing Students

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ABSTRACT

Background: Breast cancer is a major public health concern among women in Pakistan, and breast self-examination (BSE) remains a practical, low-cost strategy for improving breast awareness and encouraging early health-seeking behavior. Nursing students are expected to possess adequate knowledge of breast cancer and BSE because of their future role in patient education and preventive health promotion. **Objective:** To assess knowledge regarding breast cancer and breast self-examination among female nursing students at the School of Nursing, Ali Fatima Hospital, Lahore. **Methods:** A descriptive cross-sectional quantitative study was conducted from January to April 2026 among third-year, fourth-year, and internship-level female nursing students. A total of 65 participants were recruited using convenience sampling. Data were collected through an online structured questionnaire assessing demographic characteristics and knowledge of breast cancer and BSE. Data were analyzed using SPSS version 25, and findings were summarized using frequencies and percentages. **Results:** Most participants were aged 18–22 years (58.5%), and all were unmarried. Fourth-year students represented the largest academic group (46.2%), followed by internship students (27.7%) and third-year students (26.2%). More than half of the participants had a GPA of 3.5–3.99 (53.8%). Overall, 51 students (78.5%) had poor knowledge, 1 student (1.5%) had satisfactory knowledge, and 13 students (20.0%) had good knowledge. **Conclusion:** Most nursing students demonstrated inadequate knowledge regarding breast cancer and BSE, highlighting the need for structured breast cancer education, awareness sessions, and practical BSE training within nursing curricula. **Keywords:** Breast cancer, breast self-examination, knowledge, awareness, nursing students, Pakistan.

INTRODUCTION

Cancer is characterized by uncontrolled proliferation of abnormal cells with the potential to invade adjacent tissues, disseminate to distant organs, and disrupt normal physiological function. Among malignancies affecting women, breast cancer remains a leading public health concern because of its high incidence, potential mortality, psychosocial burden, and dependence on timely recognition for improved outcomes (1). Breast cancer commonly arises from epithelial cells of the milk ducts or lobules, and early clinical suspicion may be prompted by changes such as a breast lump, altered breast contour, nipple discharge, skin dimpling, or axillary swelling (2). Although the disease is frequently associated with older age, evidence indicates that breast cancer also affects younger women, making awareness and early-detection literacy important across reproductive and adult age groups (3).

In Pakistan, breast cancer represents a particularly urgent women's health problem. The country has been reported to have one of the highest breast cancer burdens in Asia, with substantial annual risk

among women and notable regional incidence estimates, including reported breast cancer incidence in Karachi. Established risk factors include increasing age, early menarche, family or personal history of breast cancer, alcohol exposure, and socioeconomic influences, while delayed presentation, limited screening access, sociocultural barriers, and inadequate awareness may further worsen outcomes in low-resource settings (4). Because organized mammographic screening may be limited by cost, availability, and accessibility, especially in developing healthcare contexts, breast self-examination (BSE) and breast awareness remain practical educational strategies that can help women recognize abnormal changes and seek timely clinical assessment (5).

Breast self-examination is a simple, private, low-cost, and non-invasive practice that requires no specialized equipment. While BSE is not a replacement for clinical breast examination or mammography, it can improve familiarity with normal breast appearance and texture and may encourage earlier consultation when abnormal changes are noticed (6). The value of BSE is therefore strongly linked to correct knowledge, confidence, and regular practice. Educational interventions that improve women's understanding of breast cancer symptoms, risk factors, screening options, and BSE technique can strengthen preventive health behavior and may be especially relevant in populations where formal screening uptake remains low (7).

Nursing students are a strategically important population for breast cancer education because they are future healthcare professionals who may directly influence patient counseling, community awareness, and preventive health practices. Their knowledge is expected not only to guide their own health behaviors but also to shape the quality of education they provide to women in clinical and community settings. However, studies among nursing students, medical students, and female university populations have shown variable and often inadequate knowledge of breast cancer and BSE. Research among nursing professionals reported that only 36.8% had good knowledge and 56.6% consistently practiced BSE, indicating that knowledge and practice gaps may persist even within health-related groups (8). Similarly, studies among students have reported limited BSE behavior despite awareness, with one study showing that 64.8% of respondents did not perform BSE, and another reporting that only 25.9% had good knowledge while 22.8% had a history of BSE practice (7,9).

Evidence from different countries further suggests that awareness alone may not translate into competent BSE practice. Studies among female students have reported deficiencies in knowledge of BSE procedures, breast cancer risk factors, and screening techniques, while barriers such as fear, misinformation, low confidence, and perceived good health may reduce self-examination behavior (10,11). In Pakistan, previous research among female undergraduate students and healthcare-related populations has similarly identified shortcomings in breast cancer awareness and self-breast examination literacy, supporting the need for institution-level assessment and targeted educational planning (12,13). These findings indicate a persistent gap between expected knowledge among health-science students and their actual readiness to recognize breast cancer warning signs, perform BSE correctly, and educate others.

Despite the importance of nursing students in preventive health promotion, limited local evidence is available regarding knowledge of breast cancer and BSE among female nursing students in Lahore, particularly among senior undergraduate and internship-level students who are close to entering professional practice. The population of interest in the present study is female nursing students enrolled in third year, fourth year, and internship at the School of Nursing, Ali Fatima Hospital, Lahore; the exposure of interest is their academic and clinical training environment; the outcome is their level of knowledge regarding breast cancer and breast self-examination; and the context is the need to identify educational gaps that may inform curriculum strengthening and practical BSE training. Therefore, this study aimed to assess knowledge regarding breast cancer and breast self-examination among female nursing students at the School of Nursing, Ali Fatima Hospital, Lahore.

MATERIALS AND METHODS

A descriptive cross-sectional observational study with a quantitative approach was conducted to assess knowledge regarding breast cancer and breast self-examination among female nursing students. The cross-sectional design was selected because it allowed measurement of participants' knowledge at a single point in time and enabled estimation of the distribution of knowledge levels within the target academic population. The study was carried out at the School of Nursing, Ali Fatima Hospital, Lahore, Pakistan, over a four-month period from January to April 2026. The study population comprised female nursing students enrolled in third year, fourth year, and internship-level training at the institution.

Eligible participants were female nursing students aged 18 years or older who were enrolled in third year, fourth year, or internship and who agreed voluntarily to participate. Students who declined participation, were absent during the data collection period, or submitted incomplete questionnaires were excluded. Participants were recruited from the eligible academic groups through a convenience sampling approach. A final sample of 65 students was included. The sample size was determined using the finite population formula, $n = N / [1 + N(e^2)]$, where n represents the required sample size, N represents the accessible study population, and e represents the margin of error set at 5%.

Data collection was initiated after administrative permission had been obtained from the School of Nursing, Ali Fatima Hospital, Lahore, and ethical approval had been granted by the Research Ethics Committee of Green International University, Lahore. The purpose of the study was explained to eligible students before data collection, and informed consent was obtained electronically. Participation was voluntary, and students were informed that their responses would remain anonymous and would be used only for research purposes. The questionnaire was administered online, and participants accessed the survey through a barcode or QR code using their smartphones. Completed responses were submitted electronically on the same day.

Data were collected using a structured, pretested questionnaire adapted from previously validated research instruments relevant to breast cancer and breast self-examination knowledge. The questionnaire included items on demographic characteristics and knowledge of breast cancer and breast self-examination. Demographic variables included age group, marital status, academic year, and grade point average. The primary outcome variable was knowledge regarding breast cancer and breast self-examination. Knowledge was operationalized using the questionnaire scoring key and categorized into poor, satisfactory, and good knowledge levels. Breast cancer knowledge included awareness of disease-related concepts, warning signs, risk factors, and screening-related information, while breast self-examination knowledge included awareness of its purpose, timing, and technique.

To minimize information bias, the same structured questionnaire was provided to all participants with uniform instructions. The online format reduced interviewer influence and allowed participants to complete responses privately. Selection bias was addressed by inviting eligible students from all included academic levels: third year, fourth year, and internship. Incomplete questionnaires were excluded from analysis to maintain data completeness. Age group, academic year, marital status, and GPA were treated as descriptive covariates because these characteristics could influence knowledge exposure and academic learning experience.

Data were entered and analyzed using SPSS version 25. Categorical variables were summarized using frequencies and percentages. Demographic characteristics were reported as grouped categorical variables. Knowledge level was summarized by frequency and percentage across predefined categories. Incomplete responses were not included in the final analysis. Data integrity was maintained by using structured electronic submission, anonymous response collection, and review of completed questionnaires before final analysis. Ethical principles of voluntary participation, informed consent, anonymity, confidentiality, and research-only use of data were maintained throughout the study.

RESULTS

A total of 65 female nursing students were included in the analysis. The demographic profile showed that most participants were aged 18–22 years, and all participants were unmarried. Fourth-year students represented the largest academic group, followed by internship and third-year students. Most participants had a GPA between 3.5 and 3.99, indicating that the sample largely consisted of academically high-performing students.

Table 1. Demographic Characteristics of Participants (n = 65)

Variable	Category	Frequency (n)	Percentage (%)
Age group	18–22 years	38	58.5
	22–26 years	27	41.5
	26–30 years	0	0.0
Marital status	Single	65	100.0
	Married	0	0.0
Academic year	Third year	17	26.2
	Fourth year	30	46.2
	Internship	18	27.7
GPA	<3.0	4	6.2
	3.0–3.4	26	40.0
	3.5–3.99	35	53.8

The majority of participants were in the 18–22-year age group, accounting for 38 of 65 students (58.5%), while 27 students (41.5%) were aged 22–26 years. No participant was recorded in the 26–30-year age category. All 65 participants (100.0%) were single. In relation to academic year, fourth-year students formed the largest subgroup, with 30 participants (46.2%), followed by internship students with 18 participants (27.7%) and third-year students with 17 participants (26.2%). Regarding academic performance, 35 students (53.8%) had a GPA between 3.5 and 3.99, 26 students (40.0%) had a GPA between 3.0 and 3.4, and only 4 students (6.2%) had a GPA below 3.0.

Table 2. Knowledge Level Regarding Breast Cancer and Breast Self-Examination (n = 65)

Knowledge Category	Frequency (n)	Percentage (%)
Poor knowledge	51	78.5
Satisfactory knowledge	1	1.5
Good knowledge	13	20.0
Total	65	100.0

The knowledge assessment showed that 51 of 65 participants had poor knowledge regarding breast cancer and breast self-examination, representing 78.5% of the total sample. Only 1 participant (1.5%) demonstrated satisfactory knowledge, while 13 participants (20.0%) demonstrated good knowledge. Overall, fewer than one-quarter of participants reached either satisfactory or good knowledge levels combined, as 14 of 65 students (21.5%) were classified above the poor-knowledge category.

Table 3. Summary Distribution of Adequate Versus Poor Knowledge (n = 65)

Knowledge Grouping	Frequency (n)	Percentage (%)
Poor knowledge	51	78.5
Satisfactory or good knowledge	14	21.5
Total	65	100.0

When satisfactory and good knowledge categories were combined, only 14 students (21.5%) demonstrated knowledge above the poor category, compared with 51 students (78.5%) who remained in the poor-knowledge group. This shows a marked imbalance in knowledge distribution, with approximately four out of every five participants demonstrating poor knowledge of breast cancer and breast self-examination.

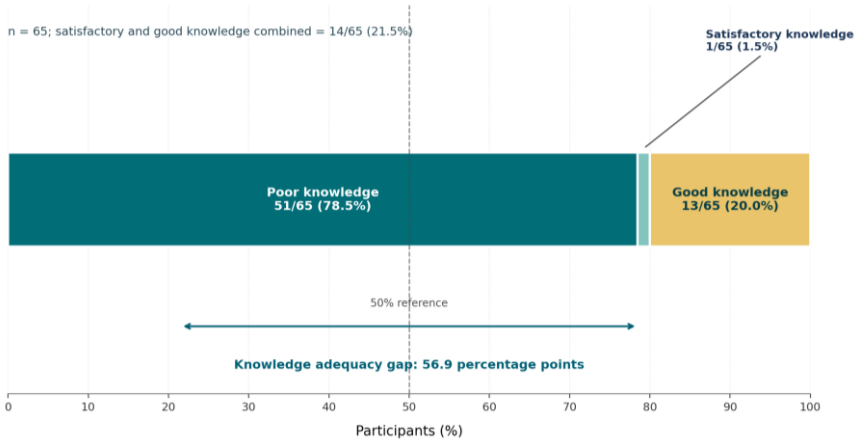

Figure 1. Distribution of Breast Cancer and Breast Self-Examination Knowledge Levels

Figure 1 shows a marked knowledge imbalance among the 65 nursing students, with poor knowledge accounting for 51 participants (78.5%), while only 1 participant (1.5%) had satisfactory knowledge and 13 participants (20.0%) had good knowledge. When satisfactory and good knowledge were combined, only 14 students (21.5%) demonstrated knowledge above the poor category, producing a 56.9-percentage-point adequacy gap between poor knowledge and satisfactory-or-good knowledge. This pattern indicates that breast cancer and breast self-examination knowledge was concentrated heavily in the lowest category despite the participants being senior nursing students and interns.

DISCUSSION

The present study assessed knowledge regarding breast cancer and breast self-examination among female nursing students and found a substantial knowledge deficit despite participants being enrolled in senior academic and internship levels. Among 65 participants, 51 students demonstrated poor knowledge, corresponding to 78.5% of the sample, whereas only 1 student had satisfactory knowledge and 13 students had good knowledge. This distribution indicates that knowledge was heavily concentrated in the lowest category, with only 21.5% of students achieving knowledge above the poor level. The finding is clinically important because nursing students are expected to develop the competence to recognize breast cancer warning signs, understand early-detection practices, and educate women in both clinical and community settings. In a context where breast cancer remains a major public health concern and where early presentation is essential for improving outcomes, insufficient knowledge among future nurses may limit their readiness to contribute effectively to preventive health education (14,15).

The demographic profile provides important context for interpreting these findings. Most participants were young adults, with 38 students aged 18–22 years and 27 students aged 22–26 years, while all participants were unmarried. This age distribution is consistent with the expected profile of undergraduate and internship-level nursing students. Younger female students may have had limited personal exposure to breast-health concerns, screening encounters, or reproductive-health counseling, which may partly explain lower perceived urgency toward breast cancer awareness and BSE. However, because the sample consisted of health-science students rather than the general population, a higher level of knowledge would be expected. This gap suggests that academic exposure alone may not be sufficient unless breast cancer education is reinforced through structured teaching, practical demonstration, and repeated clinical integration (16).

Academic seniority did not appear to translate into adequate breast cancer and BSE knowledge. Fourth-year students represented the largest subgroup, followed by internship and third-year students, meaning that most participants had already received considerable theoretical and clinical exposure. Despite this, poor knowledge remained the dominant category. This finding suggests a possible mismatch between

general nursing education and topic-specific competency in breast cancer awareness and self-examination. Similar concerns have been reported in studies among nursing and medical students, where awareness of breast cancer may exist at a superficial level, but detailed knowledge of risk factors, screening methods, correct BSE timing, and technique remains inadequate (17,18). For nursing students, this gap is particularly relevant because their future professional role includes patient counseling, health promotion, and early identification of warning signs.

The results also showed that high academic performance did not necessarily correspond to adequate knowledge of breast cancer and BSE. More than half of the participants had a GPA between 3.5 and 3.99, and 40.0% had a GPA between 3.0 and 3.4, yet most students remained in the poor-knowledge category. This finding indicates that overall academic achievement may not reflect competency in specific preventive-health topics. Breast cancer awareness requires not only theoretical understanding but also applied knowledge, confidence, and skill-based learning related to self-examination and patient education. Therefore, knowledge of BSE may depend more on targeted educational exposure, clinical demonstration, and reinforcement through seminars or workshops than on general academic performance alone (19,20).

The observed knowledge deficit is consistent with evidence from several student-based and healthcare-related populations. Previous studies have reported variable but often inadequate knowledge and practice of BSE among female students and nursing populations. For example, studies among students and nursing professionals have shown that only a proportion demonstrate good knowledge, while many either do not practice BSE or lack confidence in performing it correctly (7–9). Similar findings from Pakistan and other developing settings suggest that limited awareness of risk factors, symptoms, screening options, and self-examination technique remains a recurring barrier to early detection behavior (12,13). The present findings therefore strengthen the evidence that breast cancer education among female health-science students requires more practical and competency-based emphasis.

Several factors may explain the high proportion of poor knowledge observed in this study. Breast cancer and BSE may not be covered in sufficient depth within routine coursework, or teaching may remain theoretical without practical demonstration. Students may also lack repeated exposure to breast-health counseling in clinical placements, reducing opportunities to convert classroom knowledge into applied health-promotion skills. Cultural sensitivity surrounding breast-related discussions may further limit open learning, peer discussion, and self-practice. In addition, online data collection may have captured knowledge recall rather than demonstrated competence, meaning that students who had heard of BSE may still have lacked detailed procedural knowledge. These factors highlight the importance of structured, culturally appropriate, and skills-based educational strategies for improving both knowledge and confidence.

The findings have important implications for nursing education and public health practice. Nursing students represent a key group for community-level breast cancer awareness because they can influence patients, families, and peers through formal and informal health education. When students lack adequate knowledge, opportunities for early recognition and timely referral may be missed. Integrating breast cancer awareness and BSE training into nursing curricula can strengthen preventive-health competencies. Educational strategies should include interactive lectures, simulation-based BSE demonstrations, peer-led awareness sessions, visual learning aids, clinical counseling practice, and periodic reassessment of knowledge and skills. Evidence from educational-intervention studies indicates that structured breast-health education can improve knowledge, attitude, and self-examination behavior, supporting the value of organized training rather than passive awareness alone (21,22).

The study has limitations that should be considered when interpreting the findings. The sample was limited to 65 female nursing students from a single institution, which may restrict generalizability to other nursing colleges or broader student populations. The use of convenience sampling may have introduced selection bias, as students who were available or willing to participate may differ from those

who did not respond. The online questionnaire format may also have introduced response bias or limited the ability to assess practical BSE competence. In addition, the analysis was descriptive and did not examine associations between knowledge level and demographic or academic variables such as age, academic year, or GPA. Future studies with larger multicenter samples, item-level analysis, and inferential testing would provide stronger evidence regarding predictors of breast cancer and BSE knowledge among nursing students.

Overall, the study demonstrates a clear knowledge gap regarding breast cancer and breast self-examination among female nursing students, even though most participants were academically strong and enrolled in advanced years of nursing education. The high proportion of poor knowledge suggests that existing educational exposure may not be sufficiently preparing students for breast-health promotion roles. Strengthening curriculum content, adding practical BSE demonstrations, and conducting repeated awareness activities may improve students' readiness to participate in early-detection education and preventive healthcare counseling for women.

CONCLUSION

This study found a substantial knowledge gap regarding breast cancer and breast self-examination among female nursing students at the School of Nursing, Ali Fatima Hospital, Lahore. Although most participants were academically strong, with 53.8% reporting a GPA between 3.5 and 3.99, knowledge regarding breast cancer warning signs, screening awareness, and BSE remained inadequate in the majority of students. Among 65 participants, 51 students were classified as having poor knowledge, while only 1 student had satisfactory knowledge and 13 students had good knowledge, indicating that only a small proportion demonstrated an acceptable level of understanding. These findings highlight the need to strengthen breast cancer and BSE education within nursing training through structured teaching, practical demonstrations, awareness sessions, and repeated skill-based learning so that future nurses are better prepared to promote early detection and preventive health practices among women.

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