ORIGINAL ARTICLE

Evaluation of Knowledge of the Breast Cancer Symptoms, Risk Factors, and Level of Awareness about Practice of Breast Self Examination among Female University Students

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ABSTRACT

Background: Breast cancer is the most common cancer among women across the globe, with Pakistan having the highest incidence in South Asia.

Objective: To evaluate the level of knowledge of breast cancer symptoms and risk factors, breast self-examination (BSE) among female university students.

Methodology: This cross-sectional study was conducted among 227 female students from November 2023 to June 2024 at Liaquat University of Medical and Health Sciences and the University of Sindh. Data were collected using a structured questionnaire and analyzed using SPSS Version 22. Descriptive statistics, non-parametric tests, and tertile-based awareness score categorization were performed, with results reported as p-values and 95% confidence intervals.

Results: The mean awareness score was 47.95%, reflecting moderate awareness. While 81.1% recognized the importance of early detection, only 20.7% were aware of the correct lying-down BSE technique. Symptoms such as breast lumps (72.7%) and swelling (68.3%) were more commonly recognized than skin shrinking (43.2%) and sagging (35.7%). Although breast cysts (77.1%) and family history (76.2%) were widely recognized as risk factors, a smaller number of participants recognized obesity (38.3%) and alcohol use (40.1%). No significant difference was observed between medical and non-medical students (p = 0.544).

Conclusion: Moderate awareness and poor BSE practice were observed, with significant gaps in knowledge and technique. No significant difference was found between medical and non-medical students. Designated awareness campaigns and educational programs are essential to improve breast cancer knowledge and BSE practices among young women.

Keywords: *Breast cancer, self-examination, attitude, knowledge, practice, awareness.*

INTRODUCTION

Breast cancer is a condition that occurs due to the uncontrollable division of breast cells and results in an undifferentiated cell mass [1]. There are two major types of breast cancer: ductal carcinoma and lobular carcinoma. Around 90% of women are diagnosed with ductal carcinoma, which initiates in the lining of the milk ducts. In comparison, 8-10% of females are affected by lobular carcinoma, which initiates within the breast lobules [2]. Breast cancer occurs due to a gene mutation. The signs of advanced breast cancer include changes in breast size, skin color, and texture. It is important to know the signs, symptoms, and pathology of breast cancer for the identification of targeted prognostic outcomes [3].

Breast cancer (BC) is the most common cancer in women worldwide. It affects around 2.1 million women each year, and this number could increase to 3.2 million annually by 2050 [4]. In addition, 2.3 million new cases and 685,000 deaths of BC were reported in 2020 [5].

Pakistan has the highest incidence rate of BC compared to other South Asian countries, affecting one in nine women [6]. It has been reported that the chances of breast cancer increase significantly with age. Furthermore, women with a family history of breast cancer are at higher risk of developing the BC. The associated risk factors of breast cancer include alcohol consumption, body mass index, estrogen and progesterone hormonal replacement therapy, radiation exposure, early menarche, late menopause, and null parity [7]. The late presentation of breast cancer likely contributes to its poor prognosis and high mortality rates [8]. Early diagnosis leads to a 5-year survival rate of approximately 80-90%, but in the final stages of the disease, that number drops to 22-63% [9]. The chance of survival and the efficacy of treatment both improve with early detection of breast cancer [10].

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The recommended methods for the screening of breast cancer are breast self-examination (BSE), clinical breast examination (CBE), and mammography. Moreover, the recommended method in developing countries is BSE because it is easy, convenient, private, and safe, and requires no specific equipment [11]. Several retrospective studies on breast cancer patients show a positive association between BSE and early detection of breast cancer. If women examine their breasts regularly, they can easily recognize any abnormality in their breast tissues [12].

Additionally, there is proof that most of the early self-discoveries are made by BSE performers, and that the majority of early breast tumors are self-discovered [13]. According to Breast Health Global Initiative (BHGI) reports, breast cancer could be diagnosed earlier and managed more easily if women had proper knowledge of breast cancer and breast self-examination [14].

Pakistan has seen a relatively low number of studies on breast cancer awareness. Few studies, mostly on small samples in specialized groups, have examined the knowledge, attitude, and practices of female university students towards breast cancer in Pakistan. Breast cancer prevention is complicated because there have not been enough studies done in this field. Therefore, the current survey was conducted to assess the understanding and awareness of female university students regarding breast cancer risk factors, signs, symptoms, and breast self-examination to minimize the prevalence of breast cancer and detect it at an early stage. This study aimed to assess the knowledge of breast cancer and its symptoms, risk factors, and breast self-examination practice.

METHODOLOGY

This is a descriptive cross-sectional study conducted at Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro, and the University of Sindh, Jamshoro, Pakistan. The study was carried out from November 2023 to April 2024, after obtaining approval from the Research Ethics Committee of LUMHS (LUMHS/REC/-198). The permission was also taken from the Administrative Department of University of Sindh for the data collection. The targeted population includes female students aged 18 years and above. Females who had breast cancer-related symptoms or a diagnosis were excluded.

Sample size was calculated using OpenEpi Version 3.01, assuming a 50% response rate, a 7% margin of error, and a 95% confidence level; the calculated sample size was 196. Data were collected by sharing the questionnaire link *via* Google Forms with university WhatsApp groups. Before responding to the survey, students were required to fill out the online consent form.

The study tool was a self-developed questionnaire, based on related studies and questionnaires used for similar populations. Its Content validity was ensured through review from two relevant experts who were not part of this study. The questionnaire had 4 sections: demographics (4 items), breast cancer symptoms (7 items), risk factors (10 items), and self-examination (7 items). All of the knowledge questions are based on yes/no and don't know options. The study questionnaire is provided as a supplementary file. Bloom's Cut-off value (Fixed Criteria) method [15] was used to assess the level of knowledge, which is categorized into three levels: High, Moderate, and Low, depending on the score. Low Knowledge: Score < 60%, Moderate Knowledge: Score 60%-79% and High Knowledge: Score 80%-100%. 'Yes' answer gets 1 score, and 'No' answer gets zero score. The symptom variable score ranges from 0-7 because it has seven questions (If any respondent's score is from 0-3, it will be less than 60% of the total seven score, which means less knowledge. Likewise, if the score is 4-5, it is less than 80%, indicating moderate knowledge, and if the score is 6-7, it is more than 80% out of a total of 7 scores, indicating a high level of knowledge. Likewise, the risk factor score ranges from 0 to 10 because it has 10 questions, and for self-examination, the score ranges from 0 to 7 because it has 7 questions. Out of 227 respondents, the total number who fall into each knowledge level category was calculated based on their scores.

The collected data were entered and analyzed using SPSS (Statistical Package for the Social Sciences), IBM version 22.0. Descriptive statistics, including percentages and frequencies, were calculated for categorical variables. An independent t-test was used to assess differences in overall knowledge scores between medical and non-medical students. P-values < 0.05 were considered statistically significant.

RESULTS

A total of 227 participants completed the survey. Most participants were single (217; 95.6%), while only 10 (4.4%) were married. The majority of participants fell into the middle socio-economic category, with only 12 (5.3%) in the high and 8 (3.5%) in the low category. A significant number of respondents were undergraduates 207 (91.2%), and only 20 (8.8%) were postgraduates. About 146 (64.3%) participants had a medical background, while 81 (35.7%) had a non-medical background (**Table 1**).

Table **2** shows participants' knowledge regarding breast cancer symptoms. Knowledge was highest for lump formation in the breast or armpit (72.7%) and breast swelling (68.3%), followed by changes in nipple shape/size (64.3%) and blood or pus discharge from the nipple (59%). Knowledge was comparatively lower for color changes (52%), breast sagging (35.7%), and skin shrinkage (43.2%). A substantial proportion of

Table 1: Demographic variables of participants.

DEMOGRAPHIC VARIABLES	
MARTIAL STATUS	
Single	217(95.6%)
Married	10(4.4%)
SOCIO-ECONOMIC STATUS	
High	12(5.3%)
Middle	207(91.2%)
Low	8(3.5%)
LEVEL OF EDUCATION	
Undergraduate	207(91.2%)
Postgraduate	20(8.8%)
STUDENT BACKGROUND	
Medical	146(64.3%)
Non-Medical	81(35.7%)

Data is expressed as n(%)

Table 2: Knowledge about symptoms of breast cancer.

Items.	Yes	No	Don't Know
Does blood or pus discharge from the nipple in breast cancer?	134 (59%)	22 (9.7%)	71 (31.3%)
Does sagging of the breast occur in breast cancer?	81 (35.7%)	34 (15%)	112 (49.3%)
Is there any lump formation in the breast or armpit in breast cancer?	165 (72.7%)	15 (6.6%)	47 (20.7%)
Is there any color change of the breast, including redness or flaky skin, in breast cancer?	118(52%)	20(8.8%)	89 (39.2%)
Is there any shrinking of the breast skin in breast cancer?	98 (43.2%)	31 (13.7%)	98 (43.2%)
Is there any change occur in shape and size of nipple in breast cancer?	146 (64.3%)	18 (7.9%)	63 (27.8%)
Does part of the breast swell in breast cancer?	155 (68.3%)	21 (9.3%)	51 (22.5%)

Data is expressed as n(%)

participants responded "Don't Know" for sagging (49.3%) and skin shrinkage (43.2%).

Regarding knowledge of breast cancer risk factors, knowledge was highest for breast cysts (77.1%) and genetic/family history (76.2%), followed by previous hormone or radiation treatment (61.7%) and unhealthy food habits (54.6%). Moderate knowledge was seen for physical inactivity (45.8%), aging (41%), alcohol consumption (40.1%), birth control pills (38.8%), and obesity (38.3%). Less knowledge was observed for family history alone (21.6%) (**Table 3**).

Table **4** outlines participants' knowledge regarding self-examination. Most participants (81.1%) recognized that early detection through BSE or clinical examination can prevent complications, and 63.0% were aware of what BSE involves. Knowledge of specific examination techniques was variable: mirror inspection for changes in size, shape, color, discharge, or nipple inversion was correctly identified by 42.3%; palpation while bathing by 57.3%; lying-down palpation with proper positioning by only 20.7%; and vertical up-and-down motion for armpit examination by 23.3%.

Table 3: Knowledge about risk factors of breast cancer.

Items.	Yes	No	Don't Know
Family history of breast cancer	49 (21.6%)	168 (74%)	10 (4.4%)
Do you believe that obesity can be a risk factor of breast cancer?	87 (38.3%)	53 (23.3%)	87 (38.3%)
Do you believe that consuming birth control pills regularly can be a risk factor of breast cancer?	88 (38.8%)	25 (11%)	114 (50.2%)
Do you believe that aging/ getting older can be a risk factor of breast cancer?	93 (41%)	66 (29.1%)	68 (30%)
Do you believe that previous treatment with hormones or radiation can be a risk factor of breast cancer?	140 (61.7%)	16 (7%)	71 (31.3%)
Do you believe that not being physically active can be a risk factor of breast cancer?	104 (45.8%)	50 (22%)	73 (32.2%)
Do you believe that alcohol consumption can be a risk factor of breast cancer?	91 (40.1%)	35 (15.4%)	101 (44.5%)
Do you believe that genetic reasons or family history can be a risk factor of breast cancer?	173 (76.2%)	18 (7.9%)	36 (15.9%)
Do you believe that a cyst in the breast can be a risk factor of breast cancer?	175 (77.1%)	8 (3.5%)	44 (19.4%)
Do you believe that food habits can be a risk factor of breast cancer?	124 (54.6%)	40 (17.6%)	63 (27.8%)

Data is expressed as n(%)

Table 4: Knowledge about breast self examination.

Items.	Yes	No	Don't Know
Early detection by BSE/clinical exam prevents complications?	184 (81.1%)	18 (7.9%)	25 (11.01%)
Know what breast self-examination is?	143 (63.0%)	21 (9.25%)	63 (27.75%)
Mirror inspection (size/shape/ color/discharge/inversion)?	96 (42.3%)	29 (12.77%)	102 (44.93%)
Lying down palpation (pillow under shoulder, circular/up down motion)?	46 (20.7%)	42 (18.50%)	139 (61.23%)
Palpation while bathing with soap?	130 (57.3%)	31 (13.65%)	68 (29.95%)
Armpit examination (vertical up down motion)?	52 (23.3%)	34 (14.97%)	141 (62.11%)
Armpit examination (vertical up down motion)?	52 (23.3%)	39 (17.18%)	136 (59.91%)

Data is expressed as n(%)

The level of knowledge for each component, including symptoms, risk factors, and self-examination, is displayed in Table **5**. The frequency of high knowledge of symptoms, risk factors, and self-examination was 26.6%, 29.5%, and 18.1%, respectively.

The overall knowledge scores for non-medical students were (M=1.098, S.D. = 0.300) and for medical students were (M=1.075, S.D. = 0.264) without statistical significance (p=0.544) (**Table 6**).

Table 5: Level of Knowledge about symptoms,risk factors and self-examination.

Knowledge about Symptoms		
Level of Knowledge	**Number of Respondents**	**Percentage**
Low	34	14.9%
Moderate	132	58.5%
High	61	26.6%
Total	100	100%
Knowledge about Risk Factors		
Level of Knowledge	**Number of Respondents**	**Percentage**
Low	42	18.51%
Moderate	118	51.98%
High	67	29.51%
Total	100	100%
Knowledge about Self Examination		
Level of Knowledge	**Number of Respondents**	**Percentage**
Low	87	38.32%
Moderate	99	43.62%
High	41	18.06%
Total	100	100%

Table 6: Comparison of knowledge score between medical and non-medical students.

Type of student	N	Overall knowledge scores		p-value
		Mean	SD	
Non-Medical	81	1.0988	0.30021	0.544
Medical	146	1.0753	0.26485	

DISCUSSION

This study investigated the knowledge regarding breast cancer symptoms, risk factors, and self-examination among female university students in Jamshoro, Pakistan. The findings reveal a moderate level of knowledge, despite the majority (81.1%) being aware of early detection. This gap between general awareness and practical knowledge is a critical concern of public health, particularly among young, educated females who are likely to influence future health awareness in society.

The recognition of non-modifiable risk factors, such as family history (76.2%) and breast cysts (77.1%), was relatively high, consistent with a study from Pakistan [1, 6]. However, knowledge of modifiable risk factors related to lifestyle, like obesity (38.3%) and alcohol use (40.1%), was poor, which is consistent with earlier research indicating limited understanding of lifestyle contributions to breast cancer [4, 16]. This shows a missed opportunity in public health education where emphasis remains on genetic risks rather than modifiable behaviors.

Additionally, only 21.6% of respondents initially recognized "family history" as a risk factor, whereas 76.2% correctly linked genetics to breast cancer. This disparity was evident in two different sections of the questionnaire. This indicates a lack of conceptual knowledge or a misunderstanding of terminology, which mirrors findings from previous studies conducted in other South Asian regions [16, 17].

In terms of symptom Knowledge, common indicators like breast lumps (72.7%) and swelling (68.3%) were widely acknowledged. However, misunderstood symptoms, such as breast skin shrinking (43.2%) and sagging (35.7%), were less well recognized. The same pattern of knowledge was observed in studies from Bangladesh and Somalia, suggesting a broader lack of emphasis on symptom education [4, 5].

Knowledge of breast self-examination techniques seemed poor. Although a good number of participants reported knowing what BSE is (63.0%), only 20.7% correctly identified the palpation method lying down, and just 23.3% examined the armpits, critical aspects in BSE. Similar gaps have been reported in practical technique among female students in both Low- and Middle-Income Countries and developed countries, emphasizing the need for structured skill-based training rather than general information [12, 18].

Knowledge of symptoms (26.6%), risk factors (29.5%), and self-examination (18.1%) was lower. Moreover, no significant difference in overall knowledge scores was found between medical and non-medical students ($p=0.544$). This contradicts the assumption that non-medical students possess less knowledge than medical students. Previous studies also reported comparable findings, highlighting the need for additional measures to promote breast health awareness [19]. This also suggests the inclusion of such courses for medical students or routine awareness programs for non-medical students to enhance the knowledge level. The strength of this study is the inclusion of both medical and non-medical participants, as well as a comparatively large sample size, which allows a comprehensive understanding of the awareness landscape. However, its cross-sectional design, dependence on self-reported data, and regional focus limit its applicability. Another limitation is the reliance on self-reported data, which may have introduced recall or reporting bias despite measures taken to reduce it. Although the technique of breast self examination is not the so sensitive and reliable technique to completely diagnose the breast cancer but it is one of the ways which can be used and promoted by campaigns, seminars, courses to be adopted and implemented among the women to improve the one's own awareness and understandings of the breast health and ultimately can lead to significant results in minimizing the prevalence of further cases of breast cancer.

CONCLUSION

The study shows that even young and educated women have substantial gaps in awareness about their breast health. These findings can direct the need for promotion of a campaign of breast self-examination techniques to improve understanding of one's own breast health and boost results in the battle against breast cancer.

ETHICS APPROVAL

The entire research involving participants was conducted after obtaining ethical approval (No. LUMHS/REC/-198) from the Research Ethics Committee, Liaquat University of Medical & Health Sciences, Jamshoro.

CONSENT FOR PUBLICATION

Informed written consent was obtained from participants regarding the purpose of the study and the confidentiality of their data before their participation.

AVAILABILITY OF DATA

The data for this study are available from the Corresponding author upon reasonable and documented request, subject to institutional and ethical data-sharing policies.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORS' CONTRIBUTION

Faiza Yusuf Zai: Concept, literature review, and writing.

Syed Mubashir Shah: Design and drafting.

Bhawna Devi Lohana: Data collection and writing of results.

Juveria Aman: Writing and data collection.

Ayesha Aman: Data analysis.

Ali Qureshi: Data analysis, critical revision and review.

Asif Ali Soomro: Data collection and entry.

Nabeela Channar: Critical review and revision.

GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

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