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Knowledge, Attitude and Practice of Breast Cancer among Female Students: A Cross-Sectional Study from Pakistan

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ABSTRACT

Breast cancer is a significant global health concern, with early detection being critical for improving survival rates. **Objective:** To evaluate the Knowledge, Attitudes, and Practices (KAP) regarding breast cancer among female university students. **Method:** Data were collected through structured questionnaires administered to a representative sample of students. **Results:** The study showed a positive attitude among female students regarding Breast Cancer (BC): 80% believed BC could be prevented, 67% recognized family history as a risk factor, 77% felt comfortable discussing BC with doctors, and 93% emphasized public education. However, significant gaps in practices were observed: 46% never attended BC awareness sessions, 28% never adopted preventive lifestyle changes, 36% did not seek medical advice for breast changes, 73% never had a mammogram, and 30% never performed breast self-examinations. **Conclusion:** These findings underscore the need for improved education and practical interventions to enhance BC awareness and early detection behaviors.

INTRODUCTION

Breast Cancer (BC) is an uncontrolled growth of epithelial cells lining the ducts or lobules of the breast. It is a heterogeneous medical disease that can vary in its characteristics, behavior, and treatment response. The risk factors of BC include family history and genetic mutations (e.g., BRCA1 and BRCA2), exposure to estrogen and progesterone, previous radiation therapy, increasing age, and dense breast tissue. The symptoms include the development of a lump, changes in size and shape of the breast, puckering, nipple discharge, and redness. BC can be diagnosed through mammography, ultrasound, and biopsy. The treatment options include surgery, radiation therapy chemotherapy, hormone therapy, and targeted therapy [1-3]. BC is the most common cancer worldwide. BC is a global health problem affecting millions of women and it is the leading cause of death among women. The 5-year survival rate for breast cancer exceeds 90% in high-income countries, compared to 66% in India and 40% in South Africa [4]. In Pakistan, BC accounts for the highest incidence among cancers, with 34,038 cases (23% of the total 148,041 cases). BC is also the leading cause of cancer-related deaths, contributing to 16,232 fatalities (16.1% of the total 101,113 deaths) [5]. The risk factor contributing to such a high number of cases might be associated with late-stage diagnosis, cultural taboos, limited access to healthcare, and insufficient awareness which contributes to delayed detection [6-9]. Therefore, raising awareness among young women, especially university students, is essential for promoting a culture of early detection and prevention. Knowledge, Attitude, and Practice (KAP)

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studies help reduce the morbidity and mortality of diseases including BC. Knowledge about understanding risk factors and symptoms of BC is essential to changing the attitude which is about beliefs and willingness to act on breast cancer awareness and if one is determined then adopt practice modification of behaviours like self-examinations or seeking medical advice. Previously conducted KAP studies from Pakistan reported alarming low levels of knowledge among women about Pakistan. For example, a recently conducted systematic and meta-analysis pooled data of 9766 females across Pakistan reported that only 47% were aware of risk factors, 41.8% were aware of symptoms 38% were aware of treatment options, 28.7% performed self-examination of breasts and only 15% of women underwent a clinical examination of the breast [9]. Female university students are a suitable demographic group for targeted awareness initiatives. As an educated group in a formative stage, they could adopt preventive habits and share knowledge within their communities. However, there has been limited research on their awareness, attitudes, and practices related to breast cancer in Pakistan. This study aimed to assess the knowledge, attitude, and practices of BC among female university students.

METHODS

This descriptive cross-sectional study using stratified random sampling was carried out from 1st October 2024 to 30th October 2024 among tertiary educational institutions of Sindh among adult participants. The sample size was calculated using an online software. A pre-tested online questionnaire was designed to collect the data. The questionnaire was distributed using WhatsApp and Facebook. The first part of the questionnaire contained the aims and objectives of the research and participants were asked if they agreed with the aims and objectives of the study, they could proceed to a section about their consent to participate in the study. The questionnaire did not contain any identifiable information to ensure the privacy of the respondents. The first section contained demographic factors such as age, marital status, university, department, residence, ethnicity, mother's education, father's education, profession, and income. The second section of the questionnaire contained information about the knowledge. There were 15 questions to assess the knowledge about BC. The knowledge section included questions 1) Have you heard of BC? 2) Do patients in BC suffer from lumps in the chest, pain, skin changes, or nipple discharge? 3) Do BCs attack the human body at above 20 ages to onwards? 4) Are BCs can be found only in women? 5) Are these factors such as obesity, smoking, alcohol consumption, family history, and radiation exposure the risk factors of BC? 6) Do women should perform breast self-examination every month? 7) Can BC be treated if detected early? 8) Does cancers can be treated by antibiotics? 9) Does Chemotherapy, radiotherapy, and surgery are the best options for cancer treatments? 10) Can BC spread to other body parts if not treated? 11) Are women with dense breast tissues at higher risk of BC? 12) Does a mammogram (a machine used especially for chest X-rays) help detect BC? 13) Does obesity increase the risk of BC? 14) Does breastfeeding decrease the risks of BC? 15) Do lifestyle changes such as regular exercise, a healthy diet, avoiding tobacco, and limiting alcohol can reduce the risks of BC? Participants were given 3 options such as "yes", "no" or "do not know" to record their responses. The Cronbach's alpha value was 0.718, indicating an acceptable internal consistency reliability level for the measurement scale used to assess knowledge. The third section of the questionnaire contained information about the attitude. There were 7 questions to assess the attitude about BC. 1) Do you believe BC can be prevented? 2) Do you believe that having a family history of BC increases your risk? 3) Do you feel comfortable discussing BC with your doctors? 4) Do you think that awareness of BC is necessary in the public education systems? 5) Do you believe that BC is a serious health issue in your community? 6) Do you think BC treatment should be accessible to every community? 7) Should you participate very willingly in the BC screening programs? The participants were asked if they strongly agree, agree, neutral, disagree and strongly disagree with the question statement. The fourth section of the questionnaire contained information about the practice. There were 7 questions to assess the practice of the BC. 1) Have you ever performed breast self-examination? 2) Are you afraid of having BC ever? 3) Have you ever had a mammogram? 4) Do you seek medical advice when you notice any changes in your breasts? 5) Are you afraid of wearing black blouses, black gowns, black shawls, and black clothes of any type to avoid BC? 6) Have you ever practiced lifestyle changes like smoking, alcohol, food, and lipid consumption after hearing about this dangerous disease? 7) Have you ever attended any BC awareness sessions? The participants were given options such as always, frequently, sometimes, rarely and never to record their response to the practice question statement. Informed consent was recorded from all participants of the study. The data was analyzed using the Statistical Package for Social Science (SPSS) (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. version 23. The Likert scale was used to analyze the responses. The mean, frequencies, and percentage were computed for demographic variables and chi-square was computed for the association of demographic factors with knowledge about the risk factors of the BCs. The threshold for statistical significance was set at p value of 0.05.

RESULTS

Five hundred ten (510) participants were contacted and 480 (94.11%) recorded their answers. Then 10 (1.96%)

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questionnaires were excluded because of incomplete data provided by participants. The final study sample comprised 470 (92.15%) participants. The mean age of the study participants was 22.16±4.06 years. Second-year and 4th year students who participated were in the majority in this study. Fifty-Four percent of students were pursuing nursing as a major. Fifty-four percent of students belong to rural areas, 61.5% were non-hostellers, and 60% of the students were Sindhi (Table 1).

Table 1: Basic Demographic Characteristics of Study Participants

Factors	Frequency (%) / Mean ± SD
Class	
First Year	91 (19%)
Second Year	122 (16%)
Third Year	77 (16%)
Fourth Year	131 (29%)
Pass Out	43 (9%)
Field of Study	
Nursing	257 (54.68%)
Non-Nursing	213 (45.32%)
Area	
Urban	215 (46%)
Rural	255 (54%)
Current Residence	
Hosteller	181 (39.5%)
Non-Hosteller	289 (61.5%)
Ethnicity	
Sindhi	311 (66.1%)
Urdu	159 (33.8%)
Age (Years)	22.16 ± 4.06

Knowledge-wise distribution of data showed that 87.4% of the participants have heard of BC 10% did not hear about BC 2.8% were unaware of BC. Do patients with BC suffer from lumps in the chest, pain, skin changes, and nipple discharge? Eighty percent of participants recorded their responses as yes 8.1% of participants recorded their responses as no and 11.1% were unaware. Does BC attack the human body at above 20 ages to onwards? 64% of the participants recorded their responses as yes, 14% of the participants recorded their responses as no, and 21.9% of participants were unaware. Can BCs be found only in women? 67% of the participants recorded their responses as yes 24.5% of the participants recorded their responses as no, and 8.5% of the participants were unaware. Are these factors such as obesity, smoking, alcohol consumption, family history, and radiation exposure the risk factors for BC? 74.9% of the participants recorded their responses as yes, 9.8% of the participants as no, and 15.3% were unaware. Do women should perform breast self-examination every month? 82.1% of the participants recorded their responses as yes 8.3% of the participants recorded their responses as no, and 9.6% of the participants were unaware. Can BCs be treated if detected early? 86.8% of the participants recorded their responses as yes, 5% of the participants recorded their responses as no, and 8.1% of the participants were unaware. Can antibiotics treat BC? 32.3% of the participants recorded their responses as yes, 38.2% of the participants recorded their responses as no 29.4% of the participants were unaware. Does Chemotherapy, radiotherapy, and surgery are the best options for cancer treatments? 84.5% of the participants recorded their responses as yes, 4.5% of the participants recorded their responses as no, and 11.1% of the participants were unaware. Can BCs spread to the other parts of the body if not treated? 67.4% of the participants recorded their responses as yes, 13.8% of the participants recorded their responses as no, and 18.7% of the participants were unaware. Are women with dense breast tissues at a higher risk of BC? 58.1% of the participants recorded their responses as yes, 7.2% of the participants recorded their responses as no, and 34.7% of participants were unaware of it. Is a mammogram (a machine used especially for chest x-ray) helpful in detecting BCs? 68.9% of the participants recorded their responses as yes 16.2% of the participants recorded their responses as no, and 22.8% of the participants were unaware. Does obesity increase the risk of BC? 52.8% of the participants recorded their responses as yes, 16.2% of participants recorded their responses as no, and 31.2% of the participants were unaware. Does breastfeeding decrease the risks of BC? 60.9% of the participants recorded their responses as yes, 13.8% of the participants recorded their responses as no 25.3% were unaware. Do lifestyle changes such as regular exercise, a healthy diet, avoiding tobacco, and limiting alcohol can reduce the risks of BC? 81.1% of the participants recorded their responses as yes, 6.8% of the participants recorded their responses as no 12.1% of the participants were unaware (Table 2).

Table 2: Percentage of Responses about Knowledge of Breast Cancer among University Students. Percentage is taken from Samples (N=470) (100%)

Q. No.	Items	Yes (%)	No (%)	Don't Know (%)
KNQ1	Have you heard of breast cancer?	87.4%	9.8%	2.8%
KNQ2	Do patients with breast cancer suffer from lumps in the chest, pain, skin changes, and nipple discharge?	80.9%	8.1%	11.1%
KNQ3	Does breast cancer attack the human body at above 20 ages to onwards?	64%	14%	21.9%
KNQ4	Can breast cancers be found only in women?	67%	24.5%	8.5%
KNQ5	Are these factors such as obesity, smoking, alcohol consumption, family history, and radiation exposure the risk factors for breast cancer?	74.9%	9.8%	15.3%
KNQ6	Do women should perform breast self-examination every month?	82.1%	8.3%	9.6%
KNQ7	Can breast cancers be treated if detected early?	86.8%	5.1%	8.1%
KNQ8	Can antibiotics treat breast cancer?	32.3%	38.3%	29.4%

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KNQ9	Does Chemotherapy, radiotherapy, and surgery are the best options for cancer treatments?	84.5%	4.5%	11.1%
KNQ10	Can breast cancers spread to the other parts of the body if not treated?	67.4%	13.8%	18.7%
KNQ11	Are women with dense breast tissues at a higher risk of breast cancer?	58.1%	7.2%	34.7%
KNQ12	Is a mammogram (a machine used especially for chest x-ray) helpful in detecting breast cancers?	68.9%	8.3%	22.8%
KNQ13	Does obesity increase the risk of breast cancer?	52.8%	16.2%	31.2%
KNQ14	Does breastfeeding decrease the risks of breast cancer?	60.9%	13.8%	25.3%
KNQ15	Do lifestyle changes such as regular exercise, a healthy diet, avoiding tobacco, and limiting alcohol can reduce the risks of breast cancer?	81.1%	6.8%	12.1%

The study assessed factors influencing breast cancer awareness among participants, focusing on age, study year, field of study, and residence. Age showed no significant impact on awareness, with similar levels observed between participants aged 18–22 years and those over 22 years (p=0.14). A borderline association was noted between awareness and study year, suggesting that senior students, particularly those in their fourth year, exhibited higher awareness levels (p=0.061). The field of study emerged as a significant factor, with nursing students demonstrating substantially greater awareness compared to non-nursing students (p=0.004). However, no significant differences were observed between rural and urban participants regarding awareness levels (p=0.391). These findings highlighted the importance of educational background in shaping breast cancer awareness and suggest the need for targeted interventions to improve knowledge among non-nursing students and earlier-year cohorts (Table 3).

Table 3: Demographic Factors Associated with Awareness of Breast Cancer among Study Participants

Factors	Aware	Unaware	Chi-Square	p-Value
Age				
18-22 Years	115	30	2.15	0.14
>22 Years	237	88		
Study Year				
First	75	16	9.02	0.061
Second	85	37		
Third	57	20		
Fourth	108	29		
Pass Out	27	16		
Major				
Nursing	206	67	8.351	0.004
Non-Nursing	146	51		
Residence				
Rural	157	58	0.73	0.391
Urban	195	60		

In Table 4, demographic factors related to awareness of Breast Cancer (BC) among study participants were analysed by dichotomizing responses to the question: "Are factors such as obesity, smoking, alcohol consumption, family history, and radiation exposure considered risk factors for BC?" into 2 variables that were aware based on their response yes and unaware based on their responses no or do not know. The major-wise distribution of data showed that participants who were studying nursing as a major were more aware compared to others (chi square=8.351 p value=0.004). All other factors were non-significant. Most participants believed that BC could be prevented, with 48.1% agreeing and 32.1% strongly agreeing. A smaller proportion were neutral (15.1%), disagreed (3.8%), or strongly disagreed (0.0%). When asked whether having a family history of BC increases risk, 41.5% of participants agreed, and 26.6% strongly agreed. Meanwhile, 18.1% were neutral, 11.7% disagreed, and 2.1% strongly disagreed. Most participants expressed comfort in discussing BC with doctors, with 42.8% agreeing and 35.5% strongly agreeing. Others were neutral (14.3%), disagreed (5.1%), or strongly disagreed (2.3%). Nearly all participants supported the inclusion of BC awareness in public education, with 25.5% agreeing and 68.1% strongly agreeing. Few were neutral (4.3%), disagreed (1.3%), or strongly disagreed (0.9%). Most participants recognized BC as a serious health issue in their community, with 33.6% agreeing and 58.5% strongly agreeing. Only 6.0% were neutral, while 1.1% disagreed and 0.9% strongly disagreed. Participants overwhelmingly supported making BC treatment accessible to all communities, with 33.6% agreeing and 49.6% strongly agreeing. Some were neutral (9.8%), disagreed (4.3%), or strongly disagreed (2.8%). Many participants expressed willingness to participate in BC screening programs, with 39.4% agreeing and 38.2% strongly agreeing. Others were neutral (16.0%), disagreed (4.3%), or strongly disagreed (2.1%) (Figure 1). A substantial proportion of participants reported that they had "never" performed a breast self-examination (30.6%). Additionally, 11.3% reported performing self-examinations "rarely," 26.8% "sometimes," 10.4% "frequently," and 20.9% "always." Fear of developing BC varied among participants, with 16.0% reporting they were "never" afraid, 10.6% "rarely," 24.7% "sometimes," 10.6% "frequently," and 38.1% "always". Most participants (73.6%) indicated they had "never" undergone a mammogram. Smaller percentages reported undergoing mammograms "rarely" (7.9%), "sometimes" (7.7%), "frequently" (4.0%), and "always" (6.8%). When noticing changes in their breasts, 36.4% of participants stated they "never "A substantial proportion of participants reported seeking medical advice. In comparison, 9.1% did so "rarely," 19.4% "sometimes," 8.7% "frequently," and 26.4% "always." Regarding the belief that wearing black clothing

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could increase the risk of BC, 56.6% of participants reported they "never" held this belief. In comparison, 9.1% reported it "rarely," 13.6% "sometimes," 6.0% "frequently," and 14.7% "always". In terms of adopting lifestyle changes such as quitting smoking, reducing alcohol intake, and modifying diet, 28.3% of participants reported "never" practicing such changes, 8.5% did so "rarely," 13.0% "sometimes," 10.6% "frequently," and 39.6% "always." Attendance at BC awareness sessions was mixed, with 46.0% of participants stating they had "never" attended such sessions, 8.3% "rarely," 19.4% "sometimes," 7.4% "frequently," and 18.9% "always" (Table 4).

Table 4: Summary of Survey Results on Breast Cancer Awareness, Beliefs, and Practices Among Participants

Category	Response	Percentage (%)
Awareness of BC Risk Factors	Nursing majors more aware (p = 0.004)	N/A
Belief: BC Can Be Prevented	Agree	48.10%
	Strongly Agree	32.10%
	Neutral	15.10%
	Disagree	3.80%
	Strongly Disagree	0.00%
Family History Increases BC Risk	Agree	41.50%
	Strongly Agree	26.60%
	Neutral	18.10%
	Disagree	11.70%
	Strongly Disagree	2.10%
Comfort in Discussing BC with Doctors	Agree	42.80%
	Strongly Agree	35.50%
	Neutral	14.30%
	Disagree	5.10%
	Strongly Disagree	2.30%
BC Awareness in Public Education	Agree	25.50%
	Strongly Agree	68.10%
	Neutral	4.30%
	Disagree	1.30%
	Strongly Disagree	0.90%
BC as a Serious Health Issue	Agree	33.60%
	Strongly Agree	58.50%
	Neutral	6.00%
	Disagree	1.10%
	Strongly Disagree	0.90%
BC Treatment Accessibility	Agree	33.60%
	Strongly Agree	49.60%
	Neutral	9.80%
	Disagree	4.30%
	Strongly Disagree	2.80%
Participation in BC Screening Programs	Agree	39.40%
	Strongly Agree	38.20%
	Neutral	16.00%
	Disagree	4.30%
	Strongly Disagree	2.10%
Frequency of Breast Self-Examination	Never	30.60%
	Rarely	11.30%
	Sometimes	26.80%
	Frequently	10.40%
	Always	20.90%
Fear of Developing BC	Never	16.00%
	Rarely	10.60%
	Sometimes	24.70%
	Frequently	10.60%
	Always	38.10%
Undergoing a Mammogram	Never	73.60%
	Rarely	7.90%
	Sometimes	7.70%
	Frequently	4.00%
	Always	6.80%
Medical Advice for Breast Changes	Never	36.40%
	Rarely	9.10%
	Sometimes	19.40%
	Frequently	8.70%
	Always	26.40%
Belief: Black Clothing Increases BC Risk	Never	56.60%
	Rarely	9.10%
	Sometimes	13.60%
	Frequently	6.00%
	Always	14.70%
Lifestyle Changes (e.g., Smoking, Diet)	Never	28.30%
	Rarely	8.50%
	Sometimes	13.00%
	Frequently	10.60%
	Always	39.60%
Attendance at BC Awareness Sessions	Never	46.00%
	Rarely	8.30%
	Sometimes	19.40%
	Frequently	7.40%
	Always	18.90%

DISCUSSION

The findings of this study showed that while a significant portion of study participants had high levels of awareness regarding BC, its risk factors and symptoms and gaps were identified in attitudes and prevention practices. A study conducted on female students of universities reported that 97% of the female students had heard about the BC, 78% of the females had good knowledge of breast self-examination, 43% of the females knew how to perform breast self-examination and only 24.9% performed breast self-examination [10]. A study conducted on medical and non-medical undergraduate students assessed awareness scores and noted a limited understanding of breast cancer, mammography, and early detection, with medical students demonstrating significantly higher awareness levels compared to non-medical students. The findings of another study from Pakistan indicated that over 55% of students had an acceptable level of knowledge. When

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categorized by the education sector, about 70% of health students and 40% of non-health students demonstrated an acceptable knowledge level [11]. A study conducted on preclinical and clinical students of Lahore reported that 38.7% of participants, reported rarely checking their breasts, while 33.1% felt confident and 8.6% felt very confident about detecting changes. Half (50.0%) had never noticed any changes, but 77.4% stated they would consult a doctor within a week or less if they found one [12]. This study indicated an overall positive attitude among female students about BC. Eighty percent of the study population agreed that BC could be prevented. Sixty-seven percent of the participants agreed that having a history of breast cancer increases their risk. Seventy-seven percent of participants agreed they would feel comfortable discussing BC with their doctor. Ninety-three percent of participants agreed that awareness of BC is necessary in the public education system. Ninety-one percent of the study participants believed that BC is a serious public health concern in their community. Eighty-three percent of the participants agreed that breast cancer treatment should be available to all and 77% of the participants agreed that breast cancer could be willing to participate in BC screening programs [13-15]. These findings indicated a substantial difference in practices among females about the BC. Forty-six percent of participants never attended a breast cancer awareness session. Twenty 28% never practiced lifestyle changes recommended for preventing BC [16]. Nineteen percent of participants feared wearing black color clothes because they were afraid of BC. Thirty-six percent of the females never sought medical advice on whether they notice changes in breast cancer. Seventy-three percent never had a mammogram. Thirty-eight percent never appeared afraid of breast cancer. Thirty percent of participants 30% never performed the best self-examination [17-19]. The demographic factors associated with breast cancer (BC) awareness among study participants analysed responses to a dichotomized question regarding the recognition of key risk factors for BC, including obesity, smoking, alcohol consumption, family history, and radiation exposure. Participants were categorized as "aware" if they responded "yes" and "unaware" if they responded "no" or "do not know." The table highlights differences in awareness based on demographic characteristics, with significant findings noted for nursing majors being more aware compared to others. Non-significant associations for other demographic factors are also reported [20].

CONCLUSIONS

The analysis revealed that nursing majors had significantly greater awareness of breast cancer risk factors compared to participants from other disciplines. However, awareness among the broader demographic groups remained limited, with no significant associations observed for other factors. These findings underscored the need for targeted educational initiatives to enhance awareness of breast cancer risk factors across diverse populations.

Authors Contribution

Conceptualization: SIS
Methodology: HBC, AM
Formal analysis: HBC
Writing, review and editing: WA, AM, A, AAS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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