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RESEARCH ARTICLE

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EXPLORING BREAST CANCER AWARENESS AND RISK FACTORS AMONG FEMALE UNDERGRADUATES IN MEDICAL AND NON-MEDICAL DISCIPLINES: A COMPARATIVE CROSS-SECTIONAL STUDY FROM PESHAWAR, PAKISTAN

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ABSTRACT

Background: Breast cancer, constituting approximately 23% of all cancer cases in females globally, is a significant health challenge. Projections suggest a rising incidence, emphasizing the importance of awareness and early detection.

Objectives: This research aims to assess and compare breast cancer awareness, and risk factors among female undergraduate students of medical and non-medical disciplines in Peshawar, Pakistan.

Methodology: A four-month comparative observational cross-sectional study involved 600 female participants from diverse colleges in Peshawar. Utilizing a self-designed questionnaire, the study

examined breast cancer awareness, and risk factors. Statistical analysis, employing SPSS version 26, utilized chi-square test and descriptive statistics.

Results: The study included 600 female participants, with 301 (50.2%) from the medical field and 299 (49.8%) from non-medical disciplines. The participant's age range was from 18 to 28 years with an average age of 21.17 ± 1.966, 96.7% had heard of breast cancer, with differences in awareness between medical (94.7%) and non-medical students (98.7%). Notably, 43.1% were aware of Breast Self-Examination, while 12.4% and 24.1% knew of clinical breast examination and mammography, respectively. Approximately 32.7% have breast cancer history in family. Lifestyle factors indicated that 66.2% engaged in activities to stay fit, 2.3% reported smoking, and only 0.8% had a previous breast cancer diagnosis.

Conclusion: The study reveals a commendable overall awareness of breast cancer among both medical and non-medical undergraduate students, predominantly sourced from social media. Age at first menstruation during adolescence and a family history of breast cancer are highlighted as significant perceived risk factors in the studied population. Despite high awareness, significant gaps exist in understanding of the risk factors and symptoms, emphasizing the requirement for targeted educational interventions.

Keywords: Risk factors, Awareness, Breast cancer, Peshawar, Pakistan.

INTRODUCTION:

Breast cancer is the most common type of cancer that affects women worldwide, constituting approximately 23% of all cancer cases in females. By 2030, projections indicate that the total incidence of breast cancer is predicted to surpass 2 million, with a notable increase in proportions observed in developing nations. (1,2) The prevalence of breast cancer is increasing, both in developing and developed countries. Each year, around one million new cases of breast cancer are identified worldwide. (3,4) Early detection of breast cancer is crucial for effective treatment, making health awareness initiatives and early screening programs valuable strategies. These approaches aim to enhance female awareness and encourage behavioral modifications that facilitate the timely diagnosis of breast cancer. (5,6) A recent study conducted among undergraduate university students across 24 nations in America, Asia, and Africa revealed that 35.4% of female participants have insufficient knowledge of several risk factors linked to breast cancer. These factors include heredity, alcohol consumption, physical activity, weight, stress, and smoking. (7) Breast cancer traditionally manifests after the age of 45, but there is a declining age of onset, leading to an increasing number of cases in younger women. Cancers in this demographic are frequently more aggressive, leading to lower survival rates, underscoring the heightened importance of early detection. (8,9) As previously mentioned, there is limited coverage of breast cancer awareness in underdeveloped nations, primarily because a small number of women in these regions possess awareness regarding the risk factors, preventive measures, and screening tools for early detection.

The inadequate understanding and misconceptions about the preventability of breast cancer when identified early, as well as the efficacy of screening tests, contribute to women's poor perceptions in these areas. (10) Among Asian nations, incidence of breast cancer is greatest in Pakistan. A study conducted in Punjab, Pakistan, revealed that less than 35% of students were familiar with breast cancer's early signs. This underscores the significance of launching awareness campaigns and conducting further research. (11,12) Hence, the objective of this research was to assess and expand our understanding of breast cancer knowledge and risk factors among undergraduate students, encompassing both those pursuing medical and non-medical disciplines.

METHODOLOGY:

In this research comparative observational cross-sectional study design was used for examining the level of knowledge of breast cancer, awareness and risk factors among female undergraduate students in Peshawar, KPK, Pakistan. The study spanned a period of four months, commencing in April 2023 and concluding in July 2023. For ensuring statistical robustness, OpenEpi calculator was used for calculating necessary sample size, with confidence level 99%, a confidence limit 5% (d), and 74.7 expected frequency (p) (13). To enhance precision a sample of 600 participants was chosen rather than considering the calculated sample of 503 participants. For data collection The Non-Probability Convenient Sampling Technique was used, including answers from 299 non-medical students and 301 medical students. Female undergraduates, both medical and non-medical disciplines, were included in study from various colleges in Peshawar. Inclusion criteria was based on the consent of participants. The information regarding objectives of study was conveyed to participants prior to their enrollment, and their consent regarding the involvement was taken verbally. The protocols of the designed study was reviewed and approved by the ethical committee and medical research board of Northwest School of Medicine to ensure the rights of those individuals that were part of the study. A questionnaire was designed to access information regarding breast cancer awareness and prevalent risk factors among selected participants, based on information gained through previous literature. The questionnaire contained details regarding gender, age, and objectives of study, besides level of awareness of breast cancer, reviews, and acknowledgement of participants about the risk factors. Statistical analysis was conducted using SPSS version 26, utilizing descriptive statistics like frequencies, percentages, and means with standard deviation for effective data presentation. The chi-square test was applied to examine the relationship between the responses of medical and non-medical students, having significance level set at 0.05 to identify any noteworthy differences.

RESULTS:

The study included 600 female participants, with 301 (50.2%) from the medical field and 299 (49.8%) from non-medical disciplines. The mean age of the participants was 21.17 ± 1.966, ranging from 18 to 28 years. The majority of participants fell within the 21 to 23 years age group (48.3%). Among the participants, 27 (4.5%) were married, with 13 associated with the medical field and 14 with non-medical fields. Additionally, 47.2% were in their junior years of study, while 52.8% were in their senior years (Table No. 1).

Table No. 1: Demographics of the Participants.

Variables	Medical Students (%)	Non-Medical Students (%)	Total (%)
Age of the Participants			
18 to 20 Years	125 (41.5)	120 (40.1)	245 (40.8)
21 to 23 Years	139 (46.2)	151 (50.5)	290 (48.3)
24 to 25 Years	37 (12.3)	28 (9.4)	65 (10.8)
Marital Status of the Participants			
Married	13 (4.3)	14 (4.7)	27 (4.5)
Un-Married	288 (95.7)	285 (95.3)	573 (95.5)
Year of Study of the Participants			
Junior Years (1^{st}, 2^{nd})	125 (41.5)	158 (52.8)	283 (47.2)
Senior Years (3^{rd}, 4^{th}, 5^{th})	176 (58.5)	141 (47.2)	317 (52.8)

The study highlighted that 580 (96.7%) of the 600 participants had prior knowledge of breast cancer, and 20 (3.3%) had never heard of it (P-Value = 0.007). A noteworthy majority (96.7%) were familiar with breast cancer, with a significant association between sources of information and awareness (p=0.007, X^2=7.366). Primary sources included social media (46.7%), print media (3.8%), electronic media (2.8%), friends and relatives (20.7%), and teachers (14.8%). About 58.7% had seen someone with breast cancer, showing a significant association (p=0.022, X^2=7.620). The majority of the 580 participants (43.1%) were knowledgeable of Self-Examination of Breast, while 12.4% and 24.1% knew of clinical breast examination and mammography, respectively (P-Value = 0.000). Participants

demonstrated varying awareness of signs and symptoms, with lumps in the breast being most recognized (56.5%). Regarding awareness of risk factors, genetics (43.7%) and family history (37%) were prominently acknowledged, with significant associations ($p<0.05$). (Table No. 2)

Table No. 2: Awareness knowledge of breast cancer among participants

Variables	Medical (%)	Non-Medical (%)	Total (%)	P – Value	X^2 - Value
Have you heard of breast cancer before?					
Yes	285 (94.7)	295 (98.7)	580 (96.7)	*0.007*	*7.366*
No	16 (5.3)	4 (1.3)	20 (3.3)		
If yes, what was your source of information?					
Print Media	12 (4)	11 (3.7)	23 (3.8)	*0.003*	*20.114*
Social Media	118 (39.2)	162 (54.2)	280 (46.7)		
Electronic Media	12 (4)	5 (1.7)	17 (2.8)		
Friends and Relatives	67 (22.3)	57 (19.1)	124 (20.7)		
Teachers	48 (15.9)	41 (13.7)	89 (14.8)		
Healthcare Workers	28 (3.9)	19 (6.4)	47 (7.8)		
Does Not Apply to Me	16 (5.3)	4 (1.3)	20 (3.3)		
Have you ever seen someone with breast cancer?					
Yes	170 (56.5)	182 (60.9)	352 (58.7)	*0.022*	*7.620*
No	115 (38.2)	113 (37.8)	228 (38)		
Does Not Apply to Me	16 (5.3)	4 (1.3)	20 (3.3)		
Which Breast Screening method are you aware of?					
Breast Self- Examination	93 (32.6)	157 (53.2)	250 (43.1)	*0.000*	*101.073*
Clinical Breast Examination	29 (10.2)	43 (14.6)	72 (12.4)		
Mammography	106 (37.2)	34 (11.5)	140 (24.1)		
All of these	26 (9.1)	61 (20.7)	87 (15)		
None	31 (10.9)	0 (0)	31 (5.3)		
The signs and symptoms of breast cancer are?					
Signs/Symptoms	**Medical (%)**	**Non-Medical (%)**	**Total (%)**		
Lump in Breast	199 (66.1)	140 (46.8)	339 (56.5)		
Nipple Discharge	124 (41.2)	105 (35.1)	229 (38.2)		
Swollen Nipple	69 (22.9)	76 (25.4)	145 (24.2)		
Ulcerated Breast	34 (11.3)	36 (12)	70 (11.7)		
Inverted Nipple	72 (23.9)	57 (19.1)	129 (21.5)		
Pain in Breast	131 (43.5)	127 (42.5)	258 (43)		
Redness of Breast	74 (24.6)	68 (22.7)	142 (23.7)		
Nipple Itch	37 (12.3)	52 (17.4)	89 (14.8)		
Enlarged Axillary Lymph Nodes	120 (39.9)	91 (30.4)	211 (35.2)		
Pulling of Nipple	25 (8.3)	57 (19.1)	82 (13.7)		
Don't Know	23 (7.6)	15 (5)	38 (6.3)		
The risk factors of breast cancer are?					
Genetics	150 (49.8)	112 (37.5)	262 (43.7)		
Drugs	61 (20.3)	74 (24.7)	135 (22.5)		
Radiations	138 (45.8)	104 (34.8)	242 (40.3)		
Money in Brassier	18 (6)	17 (5.7)	35 (5.8)		
Female Gender	125 (41.5)	73 (24.4)	198 (33)		
Aging	64 (21.3)	50 (16.7)	114 (19)		
Lifestyle	65 (21.6)	70 (23.4)	135 (22.5)		
Nulliparity	40 (13.3)	21 (7)	61 (10.2)		
Obesity	32 (10.2)	29 (9.7)	61 (10.2)		
Early Menstruation /Late Menopause	53 (17.6)	30 (10)	83 (13.8)		
Family History	121 (40.2)	101 (33.8)	222 (37)		
Don't Know	18 (6)	20 (6.7)	38 (6.3)		

Table No 3 outlines perceived risk factors of breast cancer among participants, distinguishing between non-medical and medical variables. Notably, majority participants experienced their first menses at ages 13-14 comprised 52.5%, showing an overall significant association ($p=0.009$,

X^2=9.360). While the majority reported never having had sexual intercourse (95.3%). In terms of reproductive history, a low percentage reported pregnancy (2%) and induced abortion (0.3%), with no significant differences. Approximately 32.7% had a family history of breast cancer, and relatives were significantly associated with the condition (p=0.016, X^2=13.944). Lifestyle factors revealed that 66.2% engaged in activities to stay fit, showing a significant association (p=0.000, X^2=15.976), with walking being the most common exercise (48.5%, p=0.001, X^2=19.671). Notably, 2.3% reported smoking, and only 0.8% had a previous breast cancer diagnosis, both without significant associations.

Table No. 3: Perceived Risk Factors of Breast Cancer by Participants

Variables	Medical (%)	Non-Medical (%)	Total (%)	P – Value	X^2 - Value
At what age did you have your first menses?					
10 – 12 Years	70 (23.2)	72 (24.1)	142 (23.7)	*0.009*	*9.360*
13 – 14 Years	174 (57.8)	141 (47.2)	315 (52.5)		
15 – 17 Years	57 (18.9)	86 (28.8)	143 (23.8)		
At what age did you have your first sexual intercourse?					
15 – 18 Years	2 (0.7)	1 (0.3)	3 (0.5)	*0.801*	*1.646*
19 – 22 Years	3 (1)	6 (2)	9 (1.5)		
23 – 26 Years	3 (1)	2 (0.7)	5 (0.8)		
Can't Remember	5 (1.7)	6 (2)	11 (1.8)		
Never Had	288 (95.7)	284 (95)	572 (95.3)		
Have you been pregnant before?					
Yes	4 (1.3)	8 (2.7)	12 (2)	*0.239*	*1.388*
No	297 (98.7)	291 (97.3)	588 (98)		
Have you had induced abortion before?					
Yes	1 (0.3)	1 (0.3)	2 (0.3)	*0.996*	*0.000*
No	300 (99.7)	298 (99.7)	598 (99.7)		
Have you had a miscarriage before?					
Yes	2 (0.7)	3 (1)	5 (0.8)	*0.648*	*0.208*
No	299 (99.3)	296 (99.0)	595 (99.2)		
Do any of your relative have/had breast cancer?					
Yes	88 (29.2)	108 (36.1)	196 (32.7)	*0.072*	*3.232*
No	213 (70.8)	191 (63.9)	404 (67.3)		
If yes, how are they related to you?					
Sister	1 (0.3)	5 (1.7)	6 (1)	*0.016*	*13.944*
Mother	3 (1)	12 (4)	15 (2.5)		
Grandmother	5 (1.7)	11 (3.7)	16 (2.7)		
Auntie	17 (5.6)	26 (8.7)	43 (7.2)		
Other Relatives	62 (20.6)	54 (18.1)	116 (19.3)		
Does not apply to me	213 (70.8)	191 (63.9)	404 (67.3)		
Do you do anything to keep yourself fit?					
Yes	176 (58.5)	221 (73.9)	397 (66.2)	*0.000*	*15.976*
No	125 (41.5)	78 (26.1)	203 (33.8)		
If yes, what exercise do you do?					
Walking	139 (46.2)	152 (50.8)	291 (48.5)	*0.001*	*19.671*
Jogging	10 (3.3)	23 (7.7)	33 (5.5)		
Sports	18 (6)	30 (10)	48 (8)		
Other	10 (3.3)	15 (5)	25 (4.2)		
I don't exercise	125 (41.5)	78 (26.1)	203 (33.8)		
How often do you do this activity?					
2-3 times a week	140 (46.5)	165 (55.2)	305 (50.8)	*0.000*	*22.028*
Once in 15 days	22 (7.3)	46 (15.4)	68 (11.3)		
Once in a month	14 (4.7)	10 (3.3)	24 (4.3)		
Does not apply to me	125 (41.5)	78 (26.1)	203 (33.8)		
Do you currently Smoke?					
Yes	5 (1.7)	9 (3)	14 (2.3)	*0.274*	*1.198*
No	296 (98.3)	290 (97)	586 (97.7)		
Have you been diagnosed with breast cancer before?					
Yes	3 (1)	2 (0.7)	5 (0.8)	*0.659*	*0.195*
No	298 (99)	297 (99.3)	595 (99.2)		

DISCUSSION

Worldwide, breast cancer is acknowledged as the most frequently diagnosed cancer, constituting 12.5% of all newly reported cancer cases annually in the United States (14). However, the prevalence in Pakistan is alarming, with statistics indicating that 1 in every 9 women in the country is diagnosed with breast cancer (15). Given the increasing incidence of breast cancer, this study involved 600 female student participants, with 50.2% from the medical field and 49.8% from non-medical disciplines. In comparison, a study conducted at the University of Sharjah by Rehman and colleagues enrolled 241 female students (16). According to their findings, 99.2% of female students were already aware of breast cancer, and 74.7% relied on social media as their primary source of information. In our study, 96.7% of participants possessed some knowledge about breast cancer, with social media (46.7%) being primary source of information, while 20.7% cited friends and family as their informational sources. In a separate study conducted in Jordan (17), 67.4% of participants exhibited knowledge about breast cancer, with 91.1% of them lacking any family history of the disease. In our context, 32.7% of participants had a positive family history, indicating an elevated prevalence of breast cancer in our region. Similarly, Iltaf Hussain et al. conducted a study in Pakistan (18), revealing that 28.8% of participants had a positive family history of breast cancer. They also detailed knowledge about other breast cancer risk factors, including use of oral contraceptives (14.1%), exposure to radiation (27.9%), late menopause (16.5%), obesity (34.9%), and early menstruation (19.1%). These percentages align with our study, where participants recognized radiation (40.3%), genetics (43.7%), female gender (33%), obesity (10.2%), and early menstruation/late menopause (37%) as risk factors for breast cancer. Likewise, in a study by Samina Rafique et al. (19), findings underscored that female students were aware of various risk factors, including increasing age (76.3%), nulliparity (48.6%), and obesity (53.2%). In a separate study conducted in Cameroon (20), late menopause (9.2%), early menstruation (8.2%), and nulliparity (7.9%) emerged as some of the least recognized risk factors. A comprehensive review of existing literature revealed that our study aligns with national literature, while international literature presents more optimistic results. In our research, undergraduate students demonstrated awareness of a lump in breast (56.5%) as the most common presentation of breast cancer, followed by painful breasts (43%) and nipple discharge (38.2%). In contrast, a study conducted in Ghana (21) revealed that 92.2% of participants recognized a lump in the breast as a presenting sign, followed by nipple discharge (77.9%), and lymph nodes in the armpits (68%). Notably, our study observed that 56.5% of participants considered a lump in breast as a cautionary symbol, while only 35.2% regarded a lump or lymph nodes in the axilla as a warning sign. Considering these findings, it is crucial to emphasize that breast cancer has a favorable prognosis when diagnosed early. Among female undergraduate students, only 15% were knowledgeable about all available screening methods for breast cancer, 43.1% were aware only of Breast Self-Examination, and 5.3% of the students had no awareness of any screening examinations. Unexpectedly, a noteworthy proportion of non-medical students exhibited awareness of screening examinations compared to their medical counterparts. According to research carried by Abdullah Omar et al. (22), 86.7% of participants were familiar with self-examination of breast. Another study in Karachi, Pakistan, conducted in 2016, reported that 71.4% of participants had heard of Breast Self-Examination (BSE) before (23).

Study's Strengths and Limitations: The study's comparative approach sheds light on variations in awareness of breast cancer among undergraduate students, both medical and non-medical. With a substantial sample size of 600 participants, the research gains statistical strength and reliability. The diverse involvement of different colleges in Peshawar guarantees a thorough understanding. The study's authenticity was further enhanced by thorough questionnaire design and Ethical approval. The study focuses on breast cancer and aligns with more general objectives related to public health, since it highlights the need for early identification and prevention. Concerns about questionnaire reliability, a cross-sectional design that limits causal inference, a dependence on self-reported data subject to social desirability biases and recall, potential convenience sampling bias, a narrow

geographic focus on Peshawar that affects generalizability, and a lack of in-depth investigation of social variables affecting breast cancer perception among female undergraduate students were some of the limitations of this study.

CONCLUSION:

Based on the findings of this research, it can be concluded that the majority of undergraduate students, both in medical and non-medical fields, were aware of breast cancer. Social media and conversations with friends and family were identified as the primary sources of information. A substantial number of participants were familiar with breast examination methods, recognizing lumps as a common sign, and acknowledged genetics as a prevalent risk factor. In relation to perceived risk factors, the significance of age at first menstruation, particularly during adolescence, and the prevalence of a family history of breast cancer highlights their importance as potential risk factors within the studied population. Additionally, participation in fitness activities, particularly walking, was noted as a potential positive influence.

Recommendations: The result of this study highlights the need for focused awareness programs, especially in communities with low levels of understanding about this common health condition. Given the differences in knowledge between medical and non-medical students, it is obvious that educational programs ought to be tailored to a wider range of learners. Additionally, the study emphasizes the need for thorough education on early detection by highlighting a considerable knowledge gap regarding currently accessible screening techniques for breast cancer. Closely addressing this information gap might have a major impact on improving breast cancer outcomes generally. In the future, joint initiatives by academic institutions, medical professionals, and public health organizations can be extremely important in raising awareness, encouraging preventive health behaviors, and eventually reducing incidence of breast cancer in our communities.

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