

Breast cancer knowledge among health professionals: A pre–post-knowledge-based intervention study

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ABSTRACT

Introduction: Breast-cancer-related morbidity and mortality can be reduced by following worldwide-accepted screening guidelines and by appropriate education and training of health professionals on risk identification and screening. The study aimed to determine the significance of educational sessions in improving health professionals' knowledge about breast cancer, particularly screening modalities that can benefit the patients. **Method and Materials:** An interventional study was conducted among 260 health professionals, including medical students, nurses, and allied health professionals. The intervention was an educational session on breast cancer risks and screening guidelines. Health professionals' knowledge about breast cancer risk, presentation, and screening were tested by a structured questionnaire before and after the educational session. Data were analyzed using Statistical Package for the Social Sciences 26. Chi-square was used to identify differences in pre and post-test. *P* value was considered significant at <0.05. **Results:** There is a significant difference between pre-session and post-session responses in all areas of knowledge about breast cancer, with much improved outcomes after the educational session. **Conclusion:** Health professionals lack knowledge about breast cancer risk factors, screening tools, presentation, and management. Regular education sessions improve these knowledge gaps and help early detection and treatment of women at risk of breast cancer.

Keywords: Breast cancer, health professionals, primary health care, screening

Introduction

Breast cancer is the most commonly occurring cancer in women globally. The incidence of breast cancer worldwide has significantly increased since 1990, with a more than twofold increase over the last three decades.^[1] Breast cancer contributed to one-fourth of new cancer cases among women. In 2020, more

than 2 million breast cancer cases were reported.^[2] Breast cancer is also one of the leading causes of cancer death, contributed to 6.9% (685,000) of all cancer deaths globally in 2020.^[2,3]

Breast cancer disproportionately affects women worldwide, with relatively lower incidence in low-income countries and high incidence in high-income countries.^[4] In high-income countries, breast cancer mortality rates have dropped consistently due to widespread screening and early treatment intervention.^[5] In contrast, early detection and timely treatment in low-income countries are unavailable, leading to late diagnosis of women and high morbidity and mortality.^[6] Early detection is critical for

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improving breast cancer outcomes and survival. Two primary early detection approaches include early diagnosis and screening of asymptomatic women.^[7] Mammography is an effective screening tool for early cancer detection but is not feasible in resource-limited areas. Early diagnosis can be possible in a limited resource setting by knowledge of the early presentation of breast cancer and prompt referral for diagnosis and treatment.^[8]

There are multiple reasons for the late detection of breast cancer in developing countries. Besides limited health resources, lack of awareness is one of the major contributing factors. People are unaware of risk factors, presenting signs and symptoms of early breast cancer, and available screening tests.^[9] Women are also reluctant to seek medical help for breast issues due to cultural norms and personal privacy factors. Women often seek medical help when in pain. Breast anomaly is not considered a severe concern if painless.^[10] Many women also believe that breast cancer is an untreatable disease, so they do not seek medical advice unless they are severely sick. People also believe that breast cancer affects only older women. An increasing number of women are being affected at a relatively younger age with breast cancer and, due to ignorance, present late and get a worse prognosis.^[11] With increased breast cancer incidence globally, governments are focusing more on breast cancer prevention education, risk identification, and health promotion. In low- and middle-income countries, limited data on breast cancer incidence make it challenging for governments to prioritize this global health problem.^[12]

Pakistan is a developing country with poor access to basic health needs. Breast cancer prevalence is high in Pakistan, with one in every nine women affected by the disease.^[13,14] In Karachi, one of the largest cities in Pakistan, the incidence of breast cancer was 69.1 per 100,00 from 1998 to 2002.^[15] With no well-defined or functioning primary-care system, the interval between a patient's awareness of having a breast lump or another symptom to receiving care can be anywhere between 31 and 128 days.^[16] Without raising awareness among the general population about risk factors, self-examination, and the importance of early detection, breast cancer cases will increase in Pakistan.^[17]

Health professionals can best deliver breast health education locally and nationally.^[18] However, primary health-care providers lack training in breast cancer screening and early detection tools.^[19] Educating primary health-care providers on a general level, getting trained to do clinical breast exams, and referring to mammography and breast ultrasound can improve health outcomes. Moreover, primary health-care professionals can educate women about prevention through risk factor modification, identification of common symptoms, and self-breast examination. A study conducted in a Pakistani medical college demonstrated significant differences in knowledge about breast cancer presentation, risk factors, and identification of warning signs among female medical students before and after clinical exposure to breast cancer patients.^[20]

Improvements in cancer knowledge among primary health-care professionals can be brought about by incorporating this topic into the curriculum and continuing education courses and attending breast cancer awareness sessions. A Mexican study found improved knowledge and understanding of breast cancer risk factors and prevention after training sessions in community health workers and primary health-care providers.^[21] There is limited evidence available regarding the effectiveness of such educational sessions in Pakistan. This study aims to document the effectiveness of awareness sessions in educating health professionals on breast cancer prevention and early detection.

Methods

Study design and sample population

This was a nonrandomized intervention study to assess the effectiveness of the session on breast cancer knowledge. Study participants included final-year medical students, nurses, and students of biomedical sciences and doctor of physical therapy. All participants attended the educational session. Participation in the study was voluntary. A face-to-face educational session was conducted at a medical institution in Lahore on March 15, 2022. Data were collected during this session. Informed consent was obtained from each participant before the start of the study. They were also informed that involvement in the study was fully voluntary and withdrawal at any stage was assured. Information obtained from the survey was kept confidential. In addition, patient identifiers were not used in the study.

Study instrument

The principal investigators developed the study tool to assess knowledge about breast cancer in English and Urdu. The flow and language of the questions were corrected after a pilot study among 20 doctors who were not participants in the main study. The questionnaire had two sections. The first section included sociodemographic variables. The second part comprised knowledge of breast cancer risk factors, symptoms, and screening tests and assessed participants' approach toward breast symptoms and understanding of the need for educational/training sessions. The questionnaire knowledge part was multiple choices based. Two types of questionnaires were developed, pre-session and post-session, with slight differences among the two, each containing 12 questions.

Study procedure

Pre-session

Participants of the educational session filled out a self-administered questionnaire before the start of the session.

Session

Principal investigator conducted the awareness sessions. The educational session comprised information about breast cancer risk factors and early detection tools, including clinical and self-breast exams.

Post-session

After the educational session, the participants filled out the same questionnaire again to determine any change in their knowledge.

Ethical approval and consent

The study was approved by the ethical review committee [ref no.: UHS/REG-20/ERC/3130].

Data analysis

Data were tabulated in Microsoft Excel (2010) and were analyzed using the Statistical Package for the Social Sciences software version 26.0. Pearson’s χ^2 test was used for establishing a relationship between the categorical variables. Pre- and post-educational intervention change in breast cancer awareness was analyzed by Chi-square test to ascertain the differences between pre–post-tests. *P* values ≤ 0.05 were considered statistically significant.

Results

There were a total of 260 participants who completed their pre–post-questionnaires. The mean age of the participants was 25.8 ± 7.2 years. Out of 260, 215 (83%) participants were female and 45 (17%) were male. Professionally, 126 (49%) participants were final-year medical students, 97 (37%) were nurses, and 37 (14%) were allied health professionals. Upon inquiring about their interest in the session through a pre-session questionnaire, 63% of participants attended the session on the instruction by their department and only 35% were self-motivated. In pre-session questionnaires, 47 (18%) participants revealed having experienced breast-related concerns in the past, out of which 25 (53%) consulted a doctor, 15 (31%) were shy to consult while 7 (14%) assumed it a benign disease.

Impact of educational intervention in various knowledge domains

General knowledge of breast cancer

Pre–post-session comparison of participants’ general knowledge of the disease was improved significantly (*P* value = 0.000), and they acquired a better understanding of the disease prognosis and age of onset of disease after the session as depicted in Table 1.

Knowledge of signs and symptoms

Regarding the approach on noticing breast lumps, experiencing mastalgia before menses, and counseling a lady having painless breast lumps, following pre–post-session responses were recorded with significant post-session improvement as described in Table 2.

Knowledge of breast cancer screening

In Table 3, a comparison is done between the pre- and post-session for knowledge of breast cancer screening methods and its importance, and it has shown significant improvement after the session with statistical significance (*P* value <0.010). Two hundred and fifty participants (96%) understood the importance of asking about breast cancer family history after the session, which was 159 (61%) before the session with a percent change of 35. Two hundred and twenty-two participants (85%) post-session, compared to 127 (49%) decided to go for regular screening on the advice of their doctor with a percent change of 36 (*P* value = 0.000). Awareness regarding the age of breast cancer screening recommendations increased after the session from 28% to 78%. Knowledge about other ways of early breast cancer detection also improved after the session with a percent change of 10 (*P* value = 0.000). There is an increase of 77 people (30%) after the session who will share the information with other people.

Understanding and appreciation of future educational sessions

Regarding the importance of the educational intervention session, participants’ perception improved after the session when compared with pre-session with an increase of 25% about the purpose of the educational session and 10% for need of proper training after the session as described in Table 4.

Discussion

In this breast-cancer-related knowledge-based interventional study, we found significant improvements in the knowledge of young health professionals after the educational session. Health professionals apprehended the importance of self-examination, risk factors, symptoms, and screening tests for early detection and diagnosis of breast cancer. Health professionals also understood the role of screening for breast cancer treatment and prognosis. Frequent health education sessions on topics such as breast cancer can reinforce health professionals’ knowledge and information about the latest developments in prevention, early diagnosis, and management.

Various presentations of breast cancer

Most participants (58%) knew that a breast lump is a significant symptom of breast cancer but did not know that an axillary lump can also present with breast cancer. The awareness about axillary lumps being a symptom of breast cancer increased post-knowledge session. Three-quarters of health professionals considered axillary lumps an alarming symptom to check for

Table 1: Pre-post-session comparison of participant’s general knowledge of breast cancer

Knowledge item	Response options	Pre-session	Post-session	χ^2	<i>P</i>	CI
Breast cancer is a disease of women older than 50 years	No (correct response)	151	225	52.59	0.000	0.139-0.332
	Yes (incorrect response)	109	35			
Breast cancer is a deadly disease	Early detection improves outcome (correct response)	125	218	74.1	0.000	0.118-0.268
	Yes/Not sure (incorrect response)	135	42			

Table 2: Pre-post-session comparison of participants' knowledge of breast cancer symptoms

Knowledge item	Response options	Pre-session	Post-session	χ^2	P	CI
What should a woman do if she notices a painless lump in the breast?	She should consult a doctor to make sure it is not cancer	143	156	4.9	0.020	0.475-0.9557
	Others	123	106			
	She should self-check the lump every month to see if it is getting bigger or subsiding/should consult a doctor if it gets painful					
How will you proceed, if you experience breast pain/soreness or lumpiness in both breasts just before periods?	If symptoms improve with periods, then no doctor visit, however, if do not, then consult a doctor	101	208	91.3	0.000	0.1072-0.2353
	Others	159	52			
	Consult a doctor right away to make sure it is not cancer/ignore it, consider it as a muscular pain					
If a 45-year-old lady in your neighborhood with a painless breast lump asks your advice, what will be your response?	Consult a doctor to make sure it is not cancer	161	255	106.2	0.000	0.0127-0.0799
	Others	99	5			
	No need to see a doctor as a painless lump is usually not cancer/too young to have breast cancer					
How can a woman with breast cancer present?	Lump in the breast			6.8	0.008	1.296-9.82
	Yes	255	243			
Lump in the axilla	No	5	17	49.1	0.000	0.1908-0.3978
	Yes	110	189			
Bloody nipple discharge	No	150	71	45.7	0.000	0.1992-0.4154
	Yes	114	190			
Skin and areola changes	No	146	70	49.4	0.000	0.1881-0.394
	Yes	113	192			
Inverted nipple	No	147	68	50.3	0.000	0.1878-0.3916
	Yes	109	189			
	No	151	71			

breast cancer compared to pre-session. Other studies conducted in the UAE and Ghana also reported a significant knowledge change in health professionals about breast cancer symptoms,^[22,23] showing effectiveness of these sessions.

Most health professionals were unaware of the changes in nipples and areola in breast cancer. A little over half of the health professionals did not think of bloody nipple discharge as a symptom of breast cancer, which improved post-session significantly. Health professionals' awareness of skin and areola changes in breast cancer improved significantly after the educational session. Other areas where there was a significant change in knowledge post-session were changes in the shape of the nipple, including the inverted or pinched nipple. Similar results were also reported from Egypt, Izmir, and Iran,^[24-26] which shows that health professionals need in-depth knowledge of breast cancer.

Like previously reported studies, the health professionals in our study also recognized that breast cancer could affect women of all ages, although the risk increases with age. Post-knowledge session, most health professionals also recognized the importance of screening breast lumps irrespective of being painful or painless, to rule out breast cancer in women of all ages. Health professionals' knowledge also significantly improved about identifying and managing sore and painful lumpy breasts due to hormonal changes and breast cancer in younger women. The knowledge of health professionals also increased significantly about screening painless breast lump in older women to exclude

breast cancer.^[27] Such knowledge gain can reduce unnecessary testing for women with low risk of breast cancer and more focus on women with high risk of breast cancer.

Importance of family history

Before the awareness sessions, more than half of the health professionals (56.5%) knew that a family history of breast cancer is a primary risk factor. However, about two-fifths (43.4%) of health professionals were either unaware of this risk or thought all women with a positive family history would develop breast cancer in their lifetime. The knowledge about the relation of positive family history with breast cancer risk improved significantly after the session, and about 96% of health professionals answered correctly, in line with the study from Bangladesh.^[28]

Importance of screening and patient education

Regular breast screening is recommended in asymptomatic low-risk women after the age of 50 in many countries to rule out breast cancer or to have an early diagnosis for timely treatment.^[29] The screening is recommended earlier in high-risk women. Women highly regard their health professionals' advice in deciding about regular breast screening.^[22,30,31] The health education sessions raised health professionals' awareness about their responsibility to educate patients about the risks, signs, and symptoms and the importance of early diagnosis and screening in successful breast cancer treatment. Educating patients, especially high-risk women about risk factors, prevention, and screening, can promote earlier diagnosis and better survival among breast cancer patients.

Table 3: Participants' knowledge about breast cancer screening

Question	Options	Pre-session	Post-session	χ^2	P	CI
Is it important to ask about the family history of breast cancer in each woman?	Yes, but need further questioning about the age of presentation and relation to the woman	147	235	76.3	0.000	0.085-0.223
	Others	113	25			
Why is it important to ask the family history of breast cancer as a routine question on the first visit to a general practitioner?	Yes, as a positive history family history means all the women in the family will get breast cancer/No need to ask as breast cancer is non-inherited (sporadic disease)			94.8	0.000	0.031-0.124
	Breast cancers with strong family history need genetic testing	159	250			
	Others	101	10			
No need to ask this question, as breast cancer is always a non-inherited/ sporadic disease/Breast cancer is a contagious disease that will affect all the family all family members				78.6	0.000	0.107-0.249
	Yes, for sure	127	222			
	Others	133	38			
Will you be willing to go for regular breast cancer screening testing, as per advice of your doctor?	No, as I do not have any breast-related symptoms/will ask for another opinion			75.1	0.000	0.040-0.157
	Yes, for sure	173	250			
	Others	87	10			
Are you going to spread the message to your friends, family, and neighborhood about the importance of screening in early breast cancer detection?	No, as I am not convinced yet/will search more			126.5	0.000	0.076-0.169
	At the age of 50, done every 2-3 years	74	202			
	Others	186	58			
When should regular screening for breast cancer start?	At the age of 60, done every 2-3 years/not sure			28.6	0.000	0.249-0.529
	Perform monthly, 1 week before or after the end of the periods	141	199			
	Others	119	61			
When should a self-breast examination be performed?	Monthly anytime/six-monthly, 1 week before periods			18.3	0.000	0.082-0.438
	Clinical/Self-breast exam	227	253			
	Others	33	7			
In areas with limited resources where mammography is not available, how can we improve early detection?	Plain X-ray/blood test			6.48	0.010	0.265-0.850
	It is the most used screening as well as a diagnostic test for breast cancer	223	241			
	Others	37	19			
Have you ever heard about mammography?	Never heard/test to check for breast density			57.0	0.000	0.144-0.328
	Yes	42	122			
	No	218	138			
Screening test assures that woman is breast cancer free	Yes	78	10	63.2	0.000	5.39-21.26
	No	182	250			

Table 4: Participants' general perception about the session

Knowledge item	Response options	Pre-session	Post-session	χ^2	P	CI
Purpose of today's educational session	Correct response	159	225	43.3	0.000	0.1585-0.3782
	Incorrect responses (to show unity/raise funds/remember those who died of breast cancer)	101	35			
Appreciation of need for workshops to train doctors regarding breast	Agree	194	220	8.01	0.08	0.345-0.8278
	Disagree/Not sure	66	40			

Importance of self-breast examination

A regular self-breast examination is of utmost significance as it helps women to assess their bodies most comfortably and observe any changes in the breast that could be a symptom of breast cancer. The self-breast examination would eventually be helpful in the early detection and treatment of breast cancer, leading to a rise in survival and recovery rate. Health professionals were briefed about the self-breast examination in

the session. Approximately half (54%) of health professionals knew pre-session about the self-breast examination process and when it should be performed. A significantly higher percentage of health professionals (76%) understood the process and best time each month to perform a basic self-breast examination.

Post-session also showed raised health professionals' awareness about the meaning of screening tests for breast cancer diagnosis.

As reported in other studies also, the most common screening test reported by majority of health professionals (85.7%) was mammography.^[32,33] However, mammography is not available in low-resource rural settings and therefore health professionals may need to emphasize more on breast self-examination.

Knowledge of various diagnostic tools

Screening is also performed to confirm the breast cancer diagnosis. Mammography, magnetic resonance imaging, and ultrasound are noninvasive diagnostic tools. If the noninvasive tests detect breast cancer, invasive techniques such as biopsy are used in the second step to determine the type and stage of cancer.^[34] The present study found that one-third of 30% of health professionals, including medical students and nurses, were unaware of the screening test. None of them had previously attended breast cancer awareness sessions. Post-session, the knowledge of health professionals increased significantly (30–96%), similar to the findings reported from Turkey and Bangladesh.^[22,28]

Limitation of the study

A limitation of our study was that it was not representative of all health professionals. However, this study presents crucial insight into young health professionals' current awareness and knowledge of breast examination and screening techniques. Insufficient knowledge of health professionals about breast cancer screening identifies the need to incorporate and strengthen medical and allied health curricula on preventive intervention.

Conclusion

In conclusion, the present study found significant breast-cancer-related knowledge and awareness gained among health professionals after the educational sessions, emphasizing the need of such programs for health professionals and community on regular basis.

Key points

1. Breast cancer is the most common cancer globally. Pakistan is a developing country with limited health resources and inadequate patient awareness about the disease.
2. Morbidity and mortality from breast cancer can be reduced by implementing screening guidelines, educating patients about the early presentation, and training health professional to timely intervene and manage the disease.
3. Proper training and education of health professional is crucial in achieving adequate disease control.
4. Educational session about breast cancer presentation, screening, and risk factors including importance of self-breast examination showed knowledge gaps about the disease among health professionals that improved dramatically after the session.

Take home message

Awareness campaigns and education including breast self-examination should be strengthened at the school, college,

and university levels to educate public and health professionals about breast cancer and its prevention. Besides, a well-functioning primary-care system and established referral systems need to be in place to minimize further delays.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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