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A School–Based Pre–Post Interventional Study in Toba Tek Singh, Pakistan on Breast Cancer Knowledge and Breast Self-Examination Among Adolescent Female Students Using Peer-Assisted Learning

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ABSTRACT

Objective: To evaluate the baseline level of breast cancer and breast self-examination knowledge among adolescent female students and to assess the effectiveness of an educational intervention with peer assistance at a public school in Toba Tek Singh, Punjab, Pakistan.

Study Design: A school-based pre–post interventional study.

Place and Duration of Study: The study was conducted at Government Secondary High School in Toba Tek Singh, Punjab, Pakistan, from April 2023 to October 2023.

Methods: A total of 310 female high school students between the ages of 13 and 18 participated in a pre-post interventional trial**.** The WHO sample size calculator was used to determine the sample size, using a 95% confidence level, a 5% margin of error, and an anticipated improvement in knowledge following the intervention. The required number of students came to 310. Simple random sampling was adopted to identify participants from different parts of the class.

Baseline knowledge regarding breast cancer risk factors, symptoms, and BSE was assessed using a validated questionnaire. Later, a peer-supported educational intervention was introduced. The peer educators were trained by the researchers. The procedure comprised lectures, audiovisual presentations, question-and-answer sessions, and a live demonstration of how to perform a breast self-examination using anatomical models. Knowledge was reassessed after six weeks using the questionnaire as used before the intervention.

Results: Baseline awareness of breast cancer and Breast self-examination was poor across all domains. Following the intervention, there was a statistically significant improvement in knowledge of breast cancer risk factors, symptoms, and correct BSE technique (P<0.001).

Conclusion: Peer-assisted learning is an effective and acceptable strategy for improving breast cancer awareness and breast self-examination (BSE)knowledge among adolescent girls and may be incorporated into

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school-based health education programs, particularly in resource-limited settings.

Keywords: *Adolescents*, *Breast Cancer*, *Breast Self-Examination*, *Health Education*, *Peer-Assisted Learning.*

Introduction

Breast cancer continues to be a major cause of cancer-related death and is the most common cancer diagnosed in women globally. Breast cancer is a disorder in which breast cells begin to grow uncontrollably and form an undifferentiated cell mass. In general, there are mainly two types of breast cancer: invasive and in-situ. While invasive

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breast cancer has the ability to spread to neighboring breast tissues, in-situ breast cancer stays localized.[1] There were about 2.3 million new cases and 685,000

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barriers, and engage learners. There is support that peer-assisted interventions are most useful when the topic is sensitive, such as breast
fatalities worldwide in 2020.[2] Due to delayed

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health/reproduction.[12] This research sought to

diagnosis and restricted access to screening facilities, low- and middle- income nations bear a disproportionate burden.[3] In Pakistan, breast cancer accounts for nearly one-third of all female cancers, with a lifetime risk of approximately one in nine women.[4,5]

Late-stage presentation of breast cancer is common in developing countries and is strongly associated with poor awareness, sociocultural barriers, stigma, and restricted access to healthcare services.[6] Early diagnosis leads to a significant improvement in survival, a reduction in treatment expenses, and an improvement in quality-of-life.[7]

Periodical mammograms, clinical breast examinations (CBE), and monthly breast self- examination are useful screening techniques for the detection of breast cancer at an early stage.[7] The screening mammography cost is very high. In many countries, policymakers implemented screening programs based on CBE rather than mammography.[8] Despite advancements in therapy, for improving health outcomes identifying breast cancer as soon as possible is critical. For early detection of breast cancer, BSE is the screening method that can be performed at home.

"Breast self-examination (BSE), a simple, non- invasive, low-cost technique, helps a woman become accustomed to her own breast anatomy, which, in turn, helps her recognize any pathologic changes." Although BSE cannot affect mortality rates, it has also been recognized for its importance in enhancing breast health awareness, especially in a situation where there is no available screening program.[9]

Adolescence is a very important stage of life for developing healthy habits throughout one's life span. Despite this, a lack of knowledge regarding BCC and BSE is evident in research from Pakistan, Nepal, and Bangladesh in adolescents in the age group of the targeted girls.[10,11]

Peer-assisted learning (PAL) has recently been identified as a useful educational tool in the health sciences. PAL exploits closeness, a common shared experience, to facilitate communication, overcome

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examine the pre-intervention level of knowledge on breast cancer among adolescent girls, as well as the usefulness of the peer-assisted educational intervention.

Methods

This was a school-based pre–post interventional study conducted over six months, from April 2023 to October 2023, at Government Secondary High School in Toba Tek Singh, Punjab, Pakistan, after obtaining approval from the Ethical Review Committee of the institute vide letter no: ERC/ID/299, dated 22nd May 2023. The design was selected to measure changes in knowledge attributable to educational intervention.

The study's population included female students in grades 9 and 10, who were all adolescents. The age requirement included participants aged 13 to 18 who provided consent. Participants who did not want to take part in the research, were not in class when baseline research was conducted, or had a birth defect in the chest wall were excluded from the research.

The WHO sample size calculator was used to determine the sample size, using a 95% confidence level, a 5% margin of error, and an anticipated improvement in knowledge following the intervention. The required number of students came to 310. Simple random sampling was adopted to identify participants from different parts of the class. The baseline measurement was obtained in a supervised manner during school hours by administering a self-designed questionnaire, which was validated by experts from the college research team for its content before being administered to students. Immediately after completion, the questionnaires were retrieved.

Later, a peer-supported educational intervention was introduced. The peer educators were trained by the researchers. The procedure comprised lectures (In which one of the authors gave information on breast cancer, such as definition, risk factors, signs & symptoms, screening and diagnostic methods, treatment, and prevention of breast cancer), audiovisual shows, question-answer sessions, and a

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live demonstration of how to conduct a breast self- examination with anatomical models.
Six weeks post-intervention, the same questionnaire was administered to assess knowledge retention. The analysis of the findings was carried out using SPSS version 26. Descriptive statistics were used to analyze the variables. McNemar's Test was used to compare responses pre-intervention and post- intervention, with a significance level of $P < 0.05$.
In addition, the research obtained clearance from the relevant school authorities while maintaining the confidentiality of participating students.

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Results

In this research, 310 adolescent female students participated. Of these, 150 (48.4%) were from grade 9 and 160 (51.6%) were from grade 10. The mean age of participants was 13.8±0.8 years, as shown in Table 1.

The baseline assessment showed that 181 (58.4%) students reported never having heard of breast cancer. Table 2 shows the responses of students regarding their knowledge of breast cancer.

There were statistically significant improvements in all knowledge domains after the peer-assisted educational intervention. The percentage of women who were aware that breast cancer is a frequent type of cancer rose from 25.25 to 100% ($P \leq 0.001$).

About 89 (21.7%) students were aware that starting menstruation before 12 is a risk factor for breast cancer. This proportion increased to 202 (67.5%) following intervention ($P \leq 0.001$). Prior to the intervention, knowledge of other risk factors was low (Table 3). The improvement in knowledge following

Table 1: Demographic information

Variable	Category	Frequency (N)	Percentage (%)
Grade Level	Grade 9	150	48.4%
	Grade 10	160	51.6%
Total	-	310	100%
Age(years)	Mean ± SD	13.8 ± 0.8	-

Table 2: Responses of students on general knowledge of breast cancer

Knowledge of breast cancer	Pre		Post	
	N	%	N	%
Did you ever hear of breast cancer before?	129	41.6	310	100.0
Do you know anyone having breast cancer?	82	26.5	301	97.0
Do you have anyone from your family with breast cancer?	37	11.9	42	13.5
Do you think breast cancer is a common cancer in women?	78	25.2	310	100.0
Do you think breast cancer occur more commonly in old age	126	40.6	304	98.0
Do you think breast cancer can be inherited?	89	28.7	301	97.0
Do you think early diagnosis improves the outcome of treatment?	135	43.7	310	100.0
Do you think breast self-examination is useful in early diagnosis?	226	72.9	259	83.5
Do you think breast cancer is curable when detected early?	224	72.3	310	100.0

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intervention was statistically significant for all the risk factors $P \leq 0.001$.

Table 4 shows that recognition of early warning indicators, such as painless breast lumps, nipple discharge, and changes in breast size or shape, increased by almost 98% ($P<0.001$).

Knowledge concerning the timing and technique of breast self-examination showed significant improvement. The fact that BSE should be conducted

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Table 3: Responses of students on knowledge of risk factors of breast cancer

knowledge risk factors of breast cancer	Pre		Post	
	N	%	N	%
History of breast cancer in a first-degree relative	208	67.0	301	97.0
Use oral contraceptive pills for more than 5 years	67	21.6	301	97.0
Hormone therapy after menopause	75	24.2	298	96.0
History of benign breast disease	117	37.7	280	90.3
High radiation to the chest or breast in childhood or adolescence	161	51.9	274	88.4
Started menstruating before age 12	89	28.7	202	65.2
Late menopause (after age 55)	52	16.8	274	88.4
Giving birth for the first time after age 30	51	16.5	280	90.3
Not having a childbirth experience	41	13.2	280	90.3
Low physical activity, Overweight and obesity, intake of fats	84	27.1	310	100.0
Age over 40 years	103	33.2	259	83.5
Lack of breastfeeding	103	33.2	304	98.0
Smoking or alcohol consumption in the past or present	161	51.9	289	93.2
Stress	190	61.3	289	93.2
High consumption of red meat, Low consumption of vegetables and fruit	142	45.8	304	98.0

Table 4: Responses of students on knowledge of symptoms of breast cancer

knowledge of the symptoms of breast cancer	Pre		Post	
	N	%	N	%
Painless and palpable breast lump	53	17.0	304	98.0
Painless mass under armpit	168	54.2	307	99.0
Bleeding or discharge from the nipple	120	38.7	304	98.0
Pulling of the nipple inward	117	37.7	304	98.0
Wound around the nipple	91	29.4	307	99.0
Redness of the breast skin	87	28.0	304	98.0
Abrupt changes in the size of the breast	84	27.0	307	99.0
Abrupt changes in the shape of the breast	83	26.8	310	100.0

at the end of a menstrual cycle increased from 29.4% to 100% (P<0.001). The identification of key steps in BSE, which involved techniques of inspection and palpation, increased from below 35% at baseline to almost universal post-intervention.

The overall mean knowledge score significantly improved from 43.33±11.57 to 84.42±4.39 following intervention (P<0.001). The mean knowledge score

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of breast cancer risk factors increased from 14.70±4.16 to 27.98±2.82, breast cancer symptoms increased from 7.48±3.38 to 15.83±1.14, and steps of breast self-examination increased from 10.65±5.31 to 23.90±0.98 following intervention (*P*<0.001). Hence, the effectiveness of the peer- assisted learning strategy was proven.

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Table 5: responses of students on knowledge of breast self-examination				
knowledge breast self-examination	**Pre**		**Post**	
	N	**%**	**N**	**%**
Examining breast at the end of the menstrual period Looking at the breast in the mirror with arms on side Looking at the breast in mirror with arm over head Looking at the breast with hands on thigh	91			
When looking into mirror, look for swelling, dimpling of skin or any other change in the nipple Examining breast while lying down, place a towel or pillow under the shoulder	113			
Examining breast while lying down, place one hand above the head	94	30.3	307	99.0
Use right hand to examine the left breast and the left hand to examine the right breast	103	33.2	307	99.0
Examine one breast at a time	136	43.9	307	99.0
Examine the breast in a circular, clockwise motion moving from outside in	99	31.9	310	100.0
When examining the breast, for lumps, hard knots, or thickening	96	31.0	310	100.0
Squeezing the nipple of each breast to look for discharge	154	49.7	307	99.0

Discussion

The purpose of the current study was to evaluate high school female students' knowledge and

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cancer in the current study; this result is better than reported from Pakistan, where 19.1% of the female students considered early menstruation as a risk comprehension of breast cancer. This study was

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factor for breast cancer.[15] Many of the students
done to assess the knowledge and understanding of high school female students about breast cancer. The participants reported overall poor knowledge (41.6% students had never heard of breast cancer) regarding breast cancer risk factors, and signs and symptoms. Additionally, the knowledge was also poor regarding breast self-examination. These findings are consistent with the studies among Nigerian females in Ibadan, which state that only 9.5% of high school students had good knowledge about breast cancer and breast self-examination.[13] In the current study, surprisingly quite a good number (67.0%) of the participants considered this as a risk factor (before intervention) for developing breast cancer, this is same as a good knowledge score reported from the female university students of Turkey (54.8%) and China (63.6%), and this score

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(33.2%) were unaware of the protective effect of breastfeeding. Such knowledge is very important for decisions on the choice of infant feeding later in life and it increased to 98.0% following the intervention, majority of the students also did not know that some life style choices were associated with higher risk of BC such as lack of physical activity, obesity and excessive alcohol intake, stress, high consumption of red meat and low consumption of vegetables and fruits, and these findings are consistent with the study conducted in Nigeria.[12]

The early detection of breast cancer can only be possible when women are familiar with their signs and symptoms. In this study, participants were not conversant with symptoms of breast cancer, such as painless and palpable breast lump (17.0%), which is a very low score, as found out according to the studies increased to 97.0% (*P* value <0.001).[14] This study's

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in Pakistan. The knowledge about the discharge from

results showed that only 21.6% of the participants knew the prolonged use of oral contraceptives as a risk factor for breast cancer; the result is the same as the studies conducted in Pakistan (14% considered a risk factor). Moreover, only 28.7% of the participants knew early menstruation as a risk factor for breast

	29.4	310	100.0
88	28.4	310	100.0
74	23.9	307	99.0
85	27.4	307	99.0
	36.5	310	100.0
135	34.5	310	100.0

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the nipple (38.7%) is comparatively higher than studies conducted in Pakistan (28.4%).[15] Moreover, the participants in our study were little known to the morphological changes in the breast, like abrupt changes in size and shape (27.0%), which can be a sign and symptom of breast cancer, while the

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awareness about this sign and symptoms was high in Ethiopian (74.3%) university female students.[16,17]
In the current study, the participant had poor knowledge regarding the signs and symptoms like wound around the nipple (29.4%) and bleeding or discharge from the nipple (38.7%). These findings were consistent with a reported study from China

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awareness, promote early detection, and lead to better outcomes later in life. It is important to consider structured, peer-led education on breast health as part of the school curriculum in resource- poor settings, as an integral component of public health strategies.

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(37.2%, 29.4% respectively).[18] In the current it was

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cooperation and assistance of the staff of the school

found out that none of the student knew all the steps correctly for performing BSE, overall knowledge score of all students was low. The student body lacked adequate knowledge about Breast self- examination, certain aspects of examination, such as examining the armpits, raising the arms, and the best position to carry out BSE, which was while lying down, were uncommon knowledge. The present results are consistent with the study conducted in

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in conducting this study. We also acknowledge the students who participated in this research and provided valuable feedback about their experiences. **Conflict of Interest**: The authors declare no conflict of interest **Grant Support and Financial Disclosure**: None

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Bangladesh.[19] Ogunkayode JA et al. studied the

knowledge, attitude, and practice of breast self- examination among 348 female secondary students aged 10 to 19 in Ibadan, Nigeria. They reported that only 9.5% of high school students among 348 female students had good knowledge about breast cancer and breast self-examination.[13] The overall knowledge was improved following the lectures, and these findings are consistent with those of a study on peer education in Turkey.[20] The peer-supported educational intervention led to a marked improvement in all the domains of knowledge. Knowledge of breast cancer risk factors, symptoms, and early detection techniques has increased significantly. The outcomes are in line with earlier peer-supported interventional studies performed in Turkey and Nigeria, which reported a similar increase in knowledge and awareness.[12,20] The research in this matter has some limitations, including being a single-school intervention with no follow-up on knowledge retention regarding breast self-examination. Despite these factors, the results support the incorporation of girl-to-girl education on breast health into the institution's educational systems.

Conclusion

Breast cancer and breast self-examination knowledge were greatly improved among adolescent female school students through the peer- assisted educational intervention. Early education in adolescence may help improve breast health

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