RESEARCH PAPER

Effectiveness Of Educational Intervention On Knowledge and Practice Regarding Breast Cancer and Breast Self-Examination among Higher Secondary Students in Selected Schools: A Pre-Post Quasi-Experimental Study.

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ABSTRACT:

Background: One of the most prevalent types of cancer that is commonly diagnosed in women around the world is breast cancer. The condition is prevalent in all countries and can be experienced at any stage of life after puberty, although the probability of the condition rises with their age. The study objectives will entail to determine the baseline knowledge and practices regarding breast cancer and breast self-examination (BSE) in both the experimental and control groups; to compare differences in knowledge scores in the pre-test and post-test in both groups; to confirm the effectiveness of an educational intervention by finding out the significant changes observed between pre-test and post-test knowledge scores in the experimental group; and to establish the correlation between the selected demographic variables and the levels of post-test knowledge among higher secondary students in the experimental group. Method: The quasi-experimental pre-test-post-test research design was used to conduct the study in DRIEMS Higher Secondary School. A sample of 150 female students, consisting of 75 participants in the experimental and 75 in the control group, was used in the study and was chosen using the purposive sampling technique. The data collected were evaluated in both descriptive and inferential ways of statistical analysis. Findings: The results showed that the mean pre-test knowledge score of the experimental group had the value of 5.427, and this was upgraded to 11.48 in the post-test. After the educational intervention, the mean knowledge score of the experimental group was significantly higher as opposed to the control group (p 0.00). Most students 60 failed to do breast self-examination regularly and did not use the proper method and time. A serious correlation was noted between knowledge scores on post-tests in the experimental group and the level of education the students, have in education, together with the education of their mothers. Conclusion: The research found that the organised educational programme has substantially increased the level of knowledge among higher secondary students. Educational interventions play a crucial role in raising awareness and the level of knowledge on breast cancer and prevention. Early detection and intervention for school-going girls through appropriate measures to identify health problems at an early stage can help enhance health outcomes.

Keywords: Structured Educational intervention, higher secondary students, breast cancer and breast self-examination

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INTRODUCTION: Breast cancer is the most frequently diagnosed cancer in women and is the second leading cause of cancer-related deaths worldwide. In 2022, about 2.3 million women were diagnosed with breast cancer, and nearly 670,000 deaths were reported across the globe. Cancer develops in the body when cells begin to grow uncontrollably in any organ or system. This uncontrolled and abnormal cell growth leads to the formation of malignant tumours. The high mortality rate associated with breast cancer is largely due to poor knowledge among women, delayed diagnosis, and late initiation of treatment.[1,2]

Breast cancer starts in the tissues of the breast. The usual warning signs are a breast lump, changes in breast size or shape, skin dimpling, and discharge of fluid or blood from the nipple, newly inverted nipple or red and scaly spots on the skin.[3]

Early detection of breast cancer is very important as it improves survival rates, reduces treatment expenses, and enhances the quality of life of affected women. Among the available screening methods, Breast Self-Examination (BSE) is considered one of the simplest and most cost-effective techniques. It is non-invasive, easy to perform, and serves as an important secondary preventive measure for identifying breast abnormalities and detecting cancer at an early stage.[4,5]

The adolescence (10-19 years) period is a transition age between childhood and adulthood characterized by

drastic changes in physiological, psychological and hormonal transformations such as the emergence of secondary sexual characteristics. Health behaviours developed during this period tend to continue throughout life. Therefore, educating adolescent girls can help build positive health practices early and they can also act as agents of change by spreading awareness about Breast Self-Examination among peers and family members. Although BSE is generally recommended from the age of 20 years, some experts suggest that it may be started earlier, around 18 years or soon after full breast development.[6]

Breast Self-Examination is a self-examination technique of detecting breast cancer, it is a non-invasive, no-radiation, or radiation-free procedure. Conducting BSE once a month, ideally, postmenstrual period, is among the simplest but significant methods of detecting early breast changes. Research has indicated that women are capable of screening up to 95 percent of breast cancers and approximately 65 percent of early minimal cancers themselves by use of self-examination. This is a time-saving method which is safe and could be practiced by any woman.[7]

However, research indicates that even though many young women have heard about breast cancer, their detailed knowledge regarding risk factors, symptoms, and screening methods remains inadequate. An Indian quasi-experimental study reported that while all participants were aware of breast cancer, only 11% had ever practiced BSE before the educational intervention, showing a gap between awareness and actual practice.[8]

Higher secondary school students belong to an age group that is highly receptive to health education, where behavioural changes can have long-term impact. Unfortunately, breast health education is not systematically included in many school curricula, particularly in developing countries. Lack of awareness, cultural taboos, shyness, and absence of practical training further restrict the practice of BSE among adolescents.

Therefore, it is important to plan and conduct structured educational programmes for this group of students. Evaluating the effectiveness of these programmes using a pre-test and post-test quasi-experimental design will help to understand how much they improve students' knowledge and practice. The results of the study can be useful in strengthening school health programmes, improving nursing education efforts, and developing community awareness activities for the early detection and prevention of breast cancer.

MATERIALS AND METHODS

Research Approach

The present study is based on a quantitative kind of research method. This strategy was taken into account since the investigator was to quantify and assess in a numerical manner the effectiveness of an educational intervention on the knowledge about breast cancer and breast self-examination.The study being discussed focuses on the topic of (BSE) in female students of higher secondary. The quantitative method enabled systematic collection, analysis, and interpretation of measurable data related to knowledge and practice.

Research Design

The study followed a quasi-experimental pre-test and post-test research design to evaluate outcomes involving an experimental and a control group. In this design, baseline data were collected from both groups before the intervention (pre-test), followed by implementation of the educational programme only for the experimental group. Post-test assessment was then conducted for both groups after a stipulated period to determine the effectiveness of the intervention.

Variables of the Study

Variables are the measurable characteristics observed in the study.

- Independent Variable: Education intervention on breast cancer and self-examination of the breast.
- Dependent Variables: Knowledge and practice of female students of higher secondary level on breast cancer and breast self-examination.

Research Setting

The present study was conducted at DRIEMS Higher Secondary School. The setting was selected based on feasibility, accessibility of participants, and administrative permission to conduct the study.

Population and Sample

The population of the study comprised higher secondary female students studying at DRIEMS Higher Secondary School. The overall group of students was 150 females, and out of them

- The experimental group was allotted 75 students.
- The control group was allocated 75 students.

The samples were chosen under a purposive sampling technique where the subjects were chosen in accordance to particular inclusion criteria of the study.

Criteria for Sample Selection

Inclusion Criteria:

- Female students studying in DRIEMS Higher Secondary School
- Students who were eligible to take part in the research.
- Students who had time then when the data collection occurred.

Exclusion criteria : The following participants were excluded from the study:

- Female students who were absent at the juncture of data collection.
- Students who had previously received formal training or education programmes related to breast cancer and breast self-examination.
- Young people who failed to fill in the pre-test or post-test questionnaire.

Research Instrument

A structured questionnaire was developed by the researcher to evaluate knowledge of breast cancer and breast self-examination practices. Its development was guided by a thorough review of relevant literature and input from subject experts.

The questionnaire consisted of three sections:

Section I : Demographic Variables:

Age, educational status, mother's education, area of residence, previous exposure to training programmes, and source of information.

- Section II – Knowledge Questionnaire:

This section included 15 items related to breast cancer, such as meaning, risk factors, causes, signs and symptoms, diagnosis, treatment, and prevention.

- Section III – Practice Questionnaire:

Questions related to the practice of breast self-examination were included to assess whether students were performing BSE and their method of practice.

Validity and Reliability of the Instrument

To ensure content validity, the questionnaire was submitted to five experts in Obstetrics and Gynaecological Nursing and one Gynaecologist. Based on their valuable suggestions and recommendations, necessary modifications and corrections were made.

The feasibility and reliability of the instrument were evaluated through a pilot study conducted with a small group of participants and the findings confirmed that it was reliable and suitable for the main study.

Data Collection Procedure

Before the start of data collection, approval was obtained from the concerned institutional ethics committee. Formal permission was also secured from the Principal/administrative authorities of DRIEMS Higher Secondary School.

All participants provided informed consent after the purpose and significance of the study were explained to them. Their confidentiality and anonymity were maintained,

Step-wise data collection process:

1. A pre-test was given to both groups using a structured questionnaire to assess their initial knowledge and BSE practices.
2. Following the pre-test, a structured educational intervention was delivered only to the experimental group. The teaching programme included:
   - Definition of breast cancer
   - Risk factors and causes
   - Signs and symptoms
   - Diagnostic investigations
   - Treatment and management
   - Prevention
   - Step-by-step procedure of breast self-examination
3. No intervention was given to the control group during this period.
4. After seven days, a post-test was given to both groups using the same questionnaire to assess changes in knowledge and practice.

Data Analysis

The data collected was properly ordered, coded and tabulated and analyzed in both descriptive manner and inferential statistics.

- Frequency and percentage measures of descriptive statistics were used to describe demographic variables and to evaluate pre-test and post-test knowledge.
- The effectiveness of the educational intervention by was determined using a paired t-test, comparing the mean knowledge test scores on pre-test and post-test of the experimental group.
- A chi-square test was done to determine the correlation between the post-test knowledge scores and the chosen demographic variables as age, education, mother's education, area of residence, prior exposure to training, and origin of information.

RESULTS:

Table 1: Description of the Demographic Variables of the experimental and control groups

Characteristics	Category	Experimental group (N=75) (%)
Age (in Years)	15-17	51 (68%)
	18-19	24 (32%)
Education	11th	28 (37%)
	12th	47 (63%)
Area of residence	Urban	34(45%)
	Rural	41(65%)
Education of mother	Primary School	4 (5%)
	High School	13(17%)
	Higher secondary	33 (44%)
	Graduate and above	25 (33%)
Source of information	Parents	20 (27%)
	Social media	37 (49%)
	Peer	17 (24%)
	Health personnel	1 (1%)
	Yes	1 (1.3%)

Exposure to a previous awareness session	No	74 (98.7%)	73 (97.3%)	74 (98.7%)

The table 1: shows the background details of students in both the experimental and control groups. Most students in the experimental group (68%) were aged 15–17 years, while in the control group the majority (65%) were 18–19 years old. Majority students in the experimental group were studying in 12th standard (63%), whereas most students in the control group were in 11th standard (60%). Over half of the students (53%) were from rural backgrounds, with the rest (47%) coming from urban areas. When mothers' education was considered, most had studied up to higher secondary level (41%), followed by graduates (36%). Only a few had primary or high school education. Social media was the main source of information (45%), followed by parents (29%) and friends (24%). Very few students got information from health workers (2%).Almost all students (98%) had not attended any previous awareness programme on breast cancer and breast self-examination, and only a very small number (2%) had prior exposure.

Table 2: Levels of breast cancer knowledge before and after the intervention in the experimental and control groups

Level of knowledge	Score	Experimental group		Control group	
		Pre-test Knowledge (%)	Post-test Knowledge (%)	Pre-test Knowledge (%)	Post-test Knowledge (%)
Inadequate (<50%)	0-6	64	0	58	56
Average (50-75 %)	7-11	11	32	17	19
Adequate (> 75 %)	12-15	0	43	0	0

Table 2 shows that, in the experimental group, the pre-test results indicated that most students (64%) had inadequate knowledge, while only 11% demonstrated an average level of knowledge. None of the students had adequate knowledge before the intervention. However, after the educational programme, there was a clear improvement. No students remained in the inadequate category, 32% had average knowledge, and 43% achieved adequate knowledge. In the control group, the pre-test results showed that 58% of students had inadequate knowledge and 17% had average knowledge, while none had adequate knowledge. In the post-test, there was also no significant improvement. More than half of the students (56%) still had inadequate knowledge, 19% had average knowledge, and none reached the adequate level.

Table 3: Comparison showing the significant improvement in knowledge scores from pre-test to post-test regarding breast cancer among higher secondary students in the experimental group.

Overall	Mean	SD	Mean Difference	t-value	p-value
Pre-Test	5.42667	0.77	6.0566	52.44	0.0001
Post-Test	11.48	1			

The average pretest knowledge level was 5.42 and the standard deviation was 0.77 and this means that the female students were relatively poor in their knowledge regarding breast cancer prior to the learning intervention. After the intervention of a structured teaching programme was implemented and the post-test means score of knowledge level rose to 11.48, and the standard deviation of 1, indicates a definite bettering of the knowledge level of students. The calculated mean difference between the pretest and post-test scores was 6.05 that indicates a significant increase in the score. intervention knowledge. The t-value obtained is 52.44, very high and this shows that it is strong impact of the educational programme. The level of significance exceeded the p-value that was 0.0001 ($p< 0.05$). This means that the difference between the pre-test and post-test scores was statistically significant and not accidental. Thus, it can be concluded that the education intervention was very efficient in raising the awareness of high school and secondary students about breast cancer.

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Table 4: Area-wise differences in breast cancer knowledge before and after the test among higher secondary students in both experimental and control groups.

Component	Experiment Group			
	Mean difference	t-value	p-value	Significant
Definition	0.374	2.57	0.006	S
Risk and cause	0.987	10.06	0.000	S
Signs & Symptoms	1.667	27.5	0.000	S
Treatment and prevention	3.027	23.65	0.000	S

The table no.4 shows the comparison of knowledge scores in different components of breast cancer between the experimental and control groups. In the experimental group, students showed improvement in all areas after the educational programme. Knowledge about the definition of breast cancer improved, and the difference was statistically significant ($t = 2.57$, $p = 0.006$). Knowledge regarding risk factors and causes also increased significantly ($t = 10.06$, $p = 0.000$).There was a marked improvement in knowledge about signs and symptoms, which was highly significant ($t = 27.5$, $p = 0.000$). The greatest improvement was seen in treatment and prevention, where the mean difference was highest and statistically significant ($t = 23.65$, $p = 0.000$). The control group did not show any significant improvement in any component and all the p-values were not significant. Overall, the results show that the educational intervention successfully improved students' knowledge in all areas within the experimental group.

Table 5: Association between the post -test level of knowledge and sociodemographic variables in the experimental group

Characteristics	Category	Knowledge Score		X^2	P value	Level of Significance
		Average	Adequate			
Age (in Years)	15-17	23	28	0.137	0.711	NS
	18-19	9	15			
Education	11th	17	11	4.83	0.028	S
	12th	15	32			
Area of residence	Urban	12	22	1.87	0.17	NS
	Rural	20	19			
Education of mother	Primary School	3	1			
	High School	8	5	15.11	0.002	S
	Higher secondary	18	15			
	Graduate and above	3	22			
Source of information	Parents	6	14			
	Social media	16	21	3.39	0.34	NS
	Peer	9	8			
	Health personnel	1	0			
Exposure to a previous awareness session	Yes	0	1	0.75	0.39	NS
	No	32	42			

The results presented in Table 5 reveal a statistically significant relationship between students' knowledge scores and factors such as their education level and mothers' education ($p < 0.05$).In contrast, other demographic variables showed no significant relationship with post-test breast cancer knowledge.

Table 6: Practice of Breast self-examination among higher secondary female students.

Statement	Response
Have you ever carried out breast self-examination (BSE)?	Yes
	No
How frequently do you practice Breast Self-Examination?	Daily
	Weekly
	Monthly
	Yearly
When do you usually do breast self-examination during the month?	Prior to menstruation
	During the menstruation
	A few days after menstru
	There is no specific time
Which position do you usually use while performing Breast Self-Examination?	Standing in front of a mi
	While bathing
	Lying down on the bed
	Sitting on the chair
How do you perform Breast Self-Examination?	Using Ultrasonography
	By mammography
	By palpating the breast u
	By observing breast size discharge
Who usually performs Breast Self-Examination?	Doctor
	Nurse
	Individual
	Not aware
At what age did you begin practicing breast self-examination?	Puberty
	From 15 Years
	From 19 Years
What action do you take if you notice any abnormality during Breast Self-Examination?	Consult a doctor
	Inform family members
	Under laboratory investi
	Seek spiritual healing
	Not sure

The above table no. 6 shows that out of 150 female participants, 60% had practised breast self-examination. Of those who self-examined, 45% did BSE after menstruation, 43 % no specific time, 7%perform during menstruation and 4.2 % before menstruation. Regarding the technique of BSE, 50 % perform BSE by palpating the breast using fingers, 32% by observing breast size, shape and discharge. Most (81 %) perform BSE themselves, while 3 % preferred a nurse and 10 % preferred a doctor. 48 % perform BSE by standing in front of a mirror, 35 % while bathing, 8 % by sitting and 9 % by lying in bed.

DISCUSSION

In this study, social media was the most common source of information (45%). This was followed by parents (29%) and friends (24%). Only a very small number of students (2%) reported getting information from health workers. Regarding previous awareness programmes, almost all students (98%) had never attended any programme on breast cancer or breast self-examination, and only 2% had prior exposure

A similar study conducted by A. Packia Seeli Chinnarani, Anju Mariat Manoj, Anju Mariya Thomas, and others reported that most participants received information through awareness classes. About 95.74% (45) gained knowledge from awareness programmes, while only 2.13% (1) received information from social media and another 2.13% (1) from other sources, such as family members.[11]

The findings revealed that before the educational programme, most students in the experimental group (64%) had inadequate knowledge, a small proportion (11%) had average knowledge, and none demonstrated adequate knowledge. After the intervention, a clear improvement was seen. No student remained in the inadequate category, 32% had average knowledge, and 43% achieved adequate knowledge. In the control group, the pre-test findings showed that 58% of students had inadequate knowledge and 17% had average knowledge, with none having adequate knowledge. Even after the post-test, there was no noticeable improvement. More than half of the students (56%) still had inadequate knowledge, 19% had average knowledge, and none reached the adequate level.

Anjana Tiwari and Mamta Naik performed a similar study with the aim of determining the level of knowledge among girls. As it was in the experimental group, the pre-test results indicated that most girls, 8 (53.3%), had inadequate knowledge, and 7 (46.7) had average knowledge. At the start of the intervention, none of the girls demonstrated good or excellent knowledge. Again, following the educational programme, the post-test results were very impressive. The majority, 11 (73.3%), had excellent knowledge and 4 (26.7%) had good knowledge. No participants remained in the poor or average category. In the control group, the pre-test results revealed that most girls, 10 (66.7%), had poor knowledge and 5 (33.3%) had average knowledge. The post-test findings showed only a slight change, where 8 (53.3%) had poor knowledge and 7 (47.7%) had average knowledge. None of the girls in the control group achieved good or excellent knowledge either in the pre-test or post-test period.[12]

This study identified a significant improvement in breast cancer knowledge in the experimental group following an educational intervention among higher secondary female students. In the experimental group, students showed improvement in all areas after the educational programme and was statistically significant in all component whereas in the control group did not show slight improvement in every component, but all the p-values were not significant. Findings from studies by Abd El Aziz HM, Akl OA, and Ibrahim HK showed marked improvements in knowledge related to symptoms, risk factors, prevention, and early detection through screening after a successful educational intervention.[9]

The findings revealed a statistically significant link between students' knowledge scores and certain demographic characteristics, including their education level and their mothers' education ($p < 0.05$). However, other demographic variables did not show any significant association with the post-test knowledge level regarding breast cancer.

In a study by Meenakshi et al. scholars established that age and year of study were highly correlated with post-test knowledge among the students in the experimental group and this was in college. Nevertheless, among the control group of respondents, all the chosen variables did not exhibit any significant correlation with knowledge.[13]

In the present study, out of 150 female participants, 60% reported that they had practiced breast self-examination (BSE). Among those who performed BSE, 45% did it after menstruation, 43% reported no specific timing, 7% practiced it during menstruation, and 4.2% performed it before menstruation.

Regarding the technique, about 50% of the participants performed BSE by palpating the breast using their fingers, while 32% examined by observing changes in breast size, shape, or discharge. Most of the participants (81%) preferred to perform BSE by themselves. A small proportion preferred assistance, with 3% opting for a nurse and 10% for a doctor. With respect to the position during examination, 48% performed BSE while standing in front of a mirror, 35% during bathing, 8% while sitting, and 9% while lying on the bed.

In a similar study conducted by Kandasamy G among 397 participants, only 24 women (6%) had good breast self-examination (BSE) practices, whereas the majority, 373 (94%), had poor practice. Among the women who performed BSE, 16.3% examined their breasts one week after menstruation, 74.1% did it at any time during the menstrual cycle, and 9.5% practiced it before menstruation. Among those who did not perform BSE, 58% felt that it was not necessary, while 42% reported that they did not know how to do it. Regarding the

technique used, 42.6% reported using their palms and three fingers correctly, but 48.9% were not sure about the proper method. In terms of the place of examination, 21.7% of women performed breast self-examination while lying on the bed, while nearly half (49.1%) did not practice BSE. If a breast problem was noticed, 9.6% said they would inform their mother, 14.4% their spouse, and 25.2% reported they would remain silent due to embarrassment. The majority of women (69.3%) preferred to examine their breasts on their own, whereas 30.7% preferred help from a nurse or doctor.[10]

Recommendations

In light of the study findings, the following recommendations are made

1. Similar educational programmes on breast cancer and breast self-examination can be conducted regularly in schools and colleges to improve awareness among adolescent girls.
2. A similar study also can be conducted among School health nurses, and teachers
3. A similar study can be conducted by using Health education materials such as pamphlets, charts, videos, and demonstration models
4. A similar study can also be conducted as an awareness programmes among mothers related to breast cancer and breast self-examination.
5. The same study can be recreated under a bigger sample and at other locations so as to generalize the outcomes.
6. The same study may be conducted to evaluate the knowledge and attitude regarding breast cancer and breast self-examination.

IMPLICATIONS

Implications for Nursing Practice

Nurses have an important role in health promotion and disease prevention. The study highlights that nurses can actively participate in providing health education on breast cancer and breast self-examination in schools and community settings. They can teach correct techniques of Breast self examination and motivate young girls to practice it regularly for early detection.

Implications for Nursing Education

Nursing curriculum should emphasize more on adolescent health education and cancer awareness. Student nurses can be trained to conduct teaching programmes in schools as part of their community postings. This will improve both student learning and community awareness.

Implications for Nursing Administration

Nursing administrators can plan and organize regular school health education programmes focusing on women's health issues like breast cancer. Policies can be developed to include cancer awareness sessions in school health services.

Implications for Nursing Research

The present study adds to the existing body of knowledge regarding effectiveness of educational interventions. Further research can be conducted using different teaching strategies, larger samples, and longer follow-up periods to strengthen evidence in this area.

CONCLUSION

The study aimed to assess how effective an educational programme was in improving knowledge about breast cancer and breast self-examination among higher secondary female students at DRIEMS Higher Secondary School. Pre-test results showed that most students had limited knowledge of breast cancer, its risk factors, warning signs, early detection, and the correct procedure for breast self-examination. This shows that adolescent girls do not have enough awareness about this important health problem. After giving the educational intervention to the experimental group, a clear improvement was seen in their knowledge during the post-test when compared to the control group. The statistical findings also proved that the teaching programme was effective.

The study further found that factors like the student's education and mother's education had some influence on the knowledge level, whereas other demographic factors did not show much association. Overall, the study concludes that providing structured health education programmes in schools is very useful in improving awareness about breast cancer and breast self-examination. Such programmes can help young girls gain correct knowledge, develop healthy practices, and support early detection, which can ultimately help in reducing the impact of breast cancer in the future

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