Knowledge and Practice of Breast Cancer and Its Screening Methods among Girls Attending an Engineering College in Ahmednagar

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Authors' contributions

This work was carried out in collaboration between both authors. Author YA designed the study idea, conducted the study and statistical analysis, did literature searches, and authored the first draught of the paper in the aforementioned study. Author GC conducted literature searches, reviewed and managed the study's analysis. The final manuscript was read and approved by them. Both the author finalise the manuscript.

Original Research Article

ABSTRACT

The rising incidence rate of breast cancer at a younger age is an alarming sign that future mothers will need to be empowered to recognise breast cancer warning symptoms at an early stage.
Aim and Objectives: To assess the knowledge and practice breast cancer and its screening methods, to determine the relationship between knowledge and practice, and its association with demographic variables among engineering girls.
Method: Quantitative research approach with cross sectional study conducted at engineering College of Ahmednagar, 100 engineering girls of various branches participated in the study. Responses were recorded on a pretested questionnaire and self-reported practices through online mode and participants were agreed to participate in the study. Knowledge aspects consisted

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general information of breast cancer, risk factors and signs and symptoms, whereas self-reported practice for breast self-examination, clinical breast examination and mammography. Data was analysed with mean, SD, Chi Square test and Karl Pearson Co-efficient correlation.

Result: Mean age of participants was 21 years. Maximum girls from 34% Information and Technology and 25% Electronics and Telecommunication. Maximum engineering girls had good 62% to average 22% and 16 % poor knowledge. Majority 63% had poor and 36 % average breast cancer screening practices measures. Poor practices for breast self-examination followed by clinical breast examination and mammography. Knowledge was directly associated with education of mothers and Source of information is associated with practises with a significance level of *p* < 0.05. Knowledge and practises had a positive correlation of "r" =.270.

Conclusion: engineering girls had average knowledge and poor practices of breast cancer screening measures. Knowledge was directly associated with education of mothers and source of information were significantly associated with practices. Future mothers should be empowered through hands on training for breast self-examination and enhanced BSE and CBE will help for early detection for breast cancer among younger girls in future.

1. INTRODUCTION

Breast cancer is the major cancer detected among females, with a rising incidence rate. GLOBOCON 2020 report showed that the world has 47.5 female the ASRs, with Northern America having 89.4, Central America 39.5, and South Central Asia 26.2 per 100,000 people [1]. Breast cancer is ranked second among all cancers in Asia [2].

In Asia, the number of new cases of breast cancer among women of all ages grew by 22.9 percent by 2020. In India, among the 13 lakh new cancer cases, 178361 new breast cancer cases were reported. The 5-year mortality rate and 5-year prevalence of all ages is 69.28 per 100,000 people. The age-adjusted rate is high, at 25.8%, and the mortality rate is high 12.7 per 100,000 among women as well [3]. Raising the AGR rate in Delhi to 41 per 100,000 women.

The main objective of the World Health Organization's Global Breast Cancer Initiatives (GBCI) is to reduce global breast cancer mortality by 2.5% per year [4]. Based on current trends in India, the ICMR predicts that 13.9 lakh cancer cases will be diagnosed in 2020, rising to 15.7 lakh by 2025 [5].

The vast majority, according to a study conducted by Prashant Mathur, 57.0% of patients diagnosed with locally advanced breast cancer. The American Cancer Society guidelines recommend yearly mammography and clinical breast examinations once every three years for women in their twenties and thirties, and every year for women at the age of forty and over for

early detection of breast cancer [6-9] Monthly breast self-examination (BSE) should start at high school age. It is a helpful tool to empower and raise awareness among young women about their breasts and help them detect any abnormality when it occurs [10]. Breast cancer at a young age changes a woman's life. We need to prepare an algorithm for breast cancer categorization and early detection [6]. If breast cancer is diagnosed at an early stage before spreading to other sites, it can be treated successfully and survival can be improved [11].

Studies from other parts of the country have shown good knowledge but poor practise about breast cancer screening among university students. A study in Ethiopia reported that 83.3% of participants were aware and had knowledge but had poor practices [12]. The Saudi Arabia Study reported that 52.2% of those who responded had adequate knowledge about breast cancer and only 18% had practised BSE [13]. Female students were aware of breast cancer but had poor knowledge about signs and symptoms of breast cancer, whereas there was a lower rate of knowledge about performing breast self-examination [14].The Egypt study reported a moderate level of knowledge of breast cancer and its screening methods [15]. Despite having knowledge of various aspects of breast cancer such as risk factors, warning signs, and symptoms, they had little knowledge of screening methods and practised lower BSE [16].

In India, awareness increases with education [17]. Basic science college students in Bengaluru reported having very little knowledge of breast cancer and BSE practices [18]. Many of the

students from Allied Health Science also reported poor awareness and knowledge about breast cancer and poor screening practices [19]. Medical students had better awareness and knowledge of cervical and breast cancer than non-medical students [20]. A higher number (*p*.000) of women had advanced stages of BC due to late diagnosis and treatment [21]

In Maharashtra, studies found that more than half of women delayed seeking medical help after the first signs and symptoms. 6.5% had never heard of breast self-examination. A higher number of women had advanced stages of BC due to late diagnosis and treatment [21]. Therefore, the higher rate of breast cancer at a younger age demands early prevention. Making awareness and promoting healthy behaviour is the need of the hour. Research has found that the maximum number of young, educated women seeking treatment for breast cancer in clinical settings has a lack of knowledge regarding breast cancer and its screening methods.

Objectives: Goal of the study was to create awareness about breast cancer among engineering girls. The study was designed with objective to assess the knowledge and practice breast cancer and its screening, to determine the relationship between knowledge and practice, and its association with demographic variables among engineering girls. The researchers reasoned that engineering girls might have a good understanding of and use of appropriate screening methods.

2. METHODOLOGY OF RESEARCH

A cross-section study was carried out at a selected engineering college with a non-probability, purposive sampling technique. Engineering girls who understand English and have an Android-based mobile phone. Girls who had any family history of breast cancer, who had attended previous workshops, training programmes on breast cancer and its screening were excluded from the study. Engineering girls who wish to withdraw from studies during the study period are granted consent without providing a reason.

2.1 Setting

Dr.V.V.P.F's College of Engineering was established in the year 1983 in the proximity of Ahmednagar industrial area, offering UG and PG courses. Over the last thirty years, the Institute

has offered Civil Engineering, Electrical Engineering, Mechanical Engineering, Electronics and Telecommunication Engineering (E & T), Information Technology (IT) courses with an intake capacity of 60, respectively. It is an institute for girls and boys. A total of 637 girl's students from first, second, third, and final year were enrolled in the above courses, out of which 100 (15.69%) students filled out the goggle linked form during the 20-day time period (01 May 2021 to 20 May 2021).

2.2 Instruments and Techniques

The tool was categorised into three sections. Section A-socio-demographic variables: Socio-demographic variables include age, education, and marital status, area of residence, and urban/rural sources of information. Section B-Structured Knowledge questionnaires that include general information, risk factors, and signs and symptoms of breast cancer. Structured questionnaires consist of twenty six "Yes" (1), "No" (0). The knowledge score was summed up and was categorised as 0 to 8 (0-30%) poor, 9to7 (31-65%) average, and score 18-26 (66-100%) good knowledge. Structured questionnaires were constructed in English. Section C contains breast cancer screening practise questions. Twenty five practise questions with "Yes" (1), "No" (0). All the scores were summed up and the scores were categorised as 0 to 7 (0-28%) poor practices, 8 to 16 (29-64%) average practices, and 17 to 25 (65-100%) good practises. The tool was developed through previous study references [22-25]. The tool was validated by the experts in the fields of community health medicine, community health nursing, and medicine for its contained adequacy. Tool reliability was obtained by the split-half method, at 0.84. A pilot study was conducted on 10 samples to check the feasibility of the study.

2.3 Data Collection Procedure

Written permission was obtained from the Principal, College of Engineering. IEC clearance was obtained for the study. Due to the COVID-19 pandemic, data was collected through an online mode. The Google link form was prepared and tested for its correctness. Engineering girls were contacted personally through telephone for voluntary participation in the study, and they were told that they could withdraw from the study at any point of time. The Google Link form was shared through a message on the collected

mobile number. Study subjects were given detailed explanations regarding the study and its objectives. Subjects were assured anonymity and confidentiality of data given by them. Instruction was given to the participants regarding the marking process. A single entry response was allowed to each participant and the Google link was closed after twenty days. The Response record excel sheet was downloaded and the data was checked for its correctness and completeness.

2.4 Data Analysis

Data was scored and tabulated on an excel data sheet. Demographic, knowledge, and practise variables were analysed by frequency and mean percentage. Statistical analysis procedures Karl Pearson and the standard deviation Coefficient correlation "r" was used to determine the relationship of knowledge and practices. The Chi square test was used to find out the association of knowledge and practise with demographic variables.

3. RESULT AND DISCUSSION

Mean age of participants was 21 years. The educational branch of engineering consists of five branches. (17%) participants were from Civil Engineering, (16%) from Electrical Engineering, (8%) students were from Mechanical Engineering, (25%) were from E & Tc (Electronics and Telecommunication) Engineering, and a maximum of 34% were from IT (Information Technology) Engineering. The maximum number of engineering girls was from the IT branch of engineering. Academic level: 17 (17%) first-year engineering students, 27 (27%), second-year engineering students, 25 (25%), third-year engineering students, and a maximum of 31 (31%). was made up of final-year (Bachelor of Engineering) students. Maximum number of female students' parents were educated, with a maximum of 47% of mothers having completed secondary school. The majority of the students (72%) came from rural areas. (50%) of the students staying in the hostel were 34% of the day scholars.

Table 1. Demographic and base line information of Engineering Girls (N=100)

Variables	Frequency (f)	Percentage (%)
Age (In Years)		
18-19Years	30	30.00%
20-21 years	41	41.00%
22-23 years	26	26.00%
24-25 years	3	3.00%
Engineering branch		
Civil Engineering	17	17.00%
Electrical Engineering	16	16.00%
Mechanical Engineering	8	8.00%
ENTC Engineering	25	25.00%
IT Engineering	34	34.00%
Academic level (Year)		
First Year	17	17.00%
Second Year	27	27.00%
Third Year	25	25.00%
Final Year (Bachelor of Engineering)	31	31.00%
Total	100	100.00%

Table 2. Aspect-wise knowledge level of female engineering students (N=100)

Aspect wise knowledge	Min-Max	Max. possible score	Mean	Std. Deviation	Average (%)	Level of Knowledge
General Information	0-6	7	3.26	1.23	46.57	Average
Risk factors	0-12	12	5.95	2.82	49.58	Average
Signs and symptoms	0-7	7	2.88	2.42	41.14	Average
Over all knowledge	0-24	26	12.09	4.74	46.5	Average
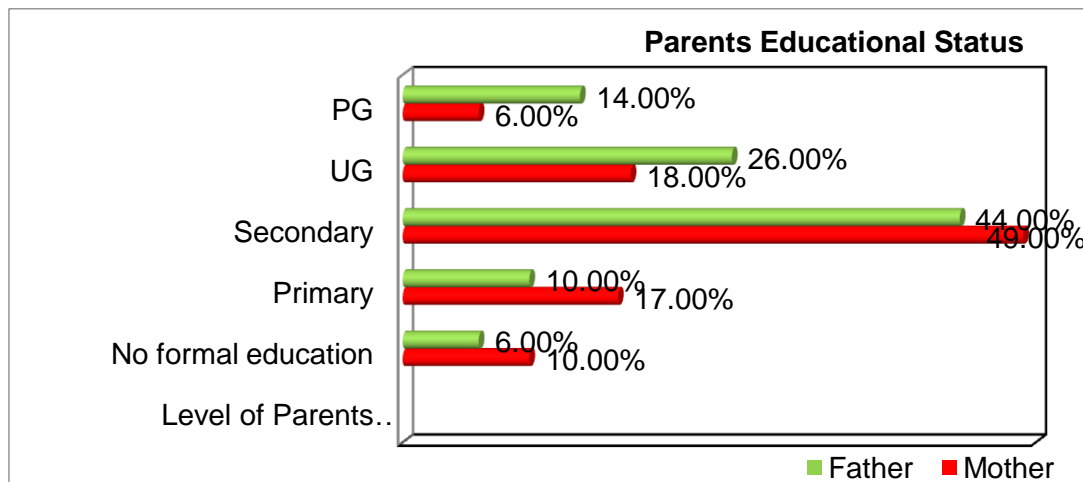
Fig. 1. Participant's parents educational status

Sixteen percent of engineering girls had poor knowledge, 22 percent had average knowledge, and 62% had good knowledge. The majority of engineering girls were well-versed. Table 2. The majority of people had poor to average knowledge. Whereas aspect-wise knowledge level shows that, engineering girls had average level of knowledge in the area of general information the mean was 3.26 ±1.23. Majority 74% of respondents said breast cancer can be cured with early diagnosis. These findings are higher than those done by Dahiya N at 68% [26]. Only 32% of breast cancers are hereditary, compared to 91% in the Subramanian L. study [27]. Early diagnosis will improve prognosis and survival, which is replied by 52% of participants, which is lower than the 61.2% in the Md. Sabbir Ahmed study [28].The vast majority of72% answered that breast cancer is a more common cancer and similar 82.1% study findings were reported by Md. Sabbir Ahmed's study. Very few (33% of participants) know that chemotherapy, radiation therapy, and surgery are the treatments for breast cancer [28]. Only 30% of participants heard about breast cancer screening methods.

The risk factors mean was 5.95 ±2.82, Less than half (49.58%) of the students had average knowledge about risk factors for breast cancer. The findings are more than the Nigerian Aluko et.al. Study, 33.7% [29]. Our study had a lower response rate for risk factors like unmarried and null parity, early menarche, late menopause, breast cancer as an old age disease, lack of physical exercise compared to Yadav SP [30], Gebresillassie BM study [12] and Parash Mani

Nepal study [31], whereas more than half the respondents responded that smoking was a risk factor for BC. A maximum of 55% of girls reported that their first child after the age of 30 is at risk for breast cancer, which corresponds to 51% in the Gebresillassie BM study [12]. Consumption of oral contraceptives is a risk factor. Our study findings are higher at 42% than Suwarna Madhukumar's in pretest 195 girls 19% [18]. High fat intake is a risk factor reported by 69%, which is congruent with 70.3% in the Subhojit Dey et.al. study [17].

The signs and symptoms mean was 2.88 ±41.11. Less than half (41.1%) had average knowledge about the signs and symptoms of breast cancer. More than half (52%) replied that changes in shape and size of the breast findings are more than those done in Nepal (20.0%) [31]. A maximum of 49% of women reported a lump in their breast as a symptom, which is 23% higher than in the Saudi Arabia study [13]. More than half, 54%, said they have pain in their nipples or breasts, which is more than Nepal's 23.3% [31]. At most, 39% Changes in skin colour, texture, and dimpling symptoms and findings are higher than those of Suwarna Madhukumar (306) by 30% [18]. Discharge from the breast or nipple was reported at 31%, which is more than the study done in Nepal at 14.1% [31] and congruent with Suwarna Madhukumar (322) at 31% [18]. 40% responded that a swelling or lump in the armpit is a typical sign of breast cancer, while a very small percentage (23% inverted nipple) reported lower findings. Engineering girls had knowledge about risk factors. Table 2.

Table 3. Breast cancer screening practises of female engineering students

(N=100)

Practices of breast cancer screening	Min-Max	Maximum possible score	Mean	Std. Deviation	Mean (%)	Level of Practice
Breast self-Examination	0-11	13	3.54	2.3	27.23	Poor practice
Clinical Breast Examination	0-5	6	1.6	1.38	26.67	Poor practice
Mammography	0-4	6	1.09	1.39	18.17	Poor practice
Over all practice	0-17	25	6.23	3.81	24.92	Poor practice

Our research found that engineering girls had poor breast screening practises, with an overall mean of 6.23 SD 3.81 and a mean proportion of 24.92 percent. A total of 63 percent of the girls had a poor practise score. Engineering girls had poor practise for breast self-examination (BSE) with a mean of 3.54 SD 2.3 and a mean percentage of 27.23%, according to the study. Maximum 60% of girls had never heard of breast self-examination, and 49% of girls had never heard of BSE being useful for early identification of BSE. They haven't taught anyone how to perform BSE, according to 82 percent of respondents. BSE should be begun at what age, according to 73% of the girls. Only 29% of girls do BSE on a monthly basis. After menstruation, 23% indicated they practise BSE. Seventy-one percent have no idea how often they should exercise.

BSE is done by self, according to 42% of respondents. BSE is performed by examining the breast in the mirror for any changes in shape and size, followed by probing, according to 22% of respondents. BSE is not practised by 81 % of the girls. Only 19 % practise monthly BSE findings, compared to 17 % in the Md.Sabbir Ahmed study, and 5% discovered a minor lump in the breast and reported it to a doctor [28]. The percentage of people who think that BSE is a beneficial procedure for early identification of breast cancer is lower than the 76 %t who agreed in the Dahiya N research in Delhi [26].

The clinical breast examination mean was 1.6 SD±1.38. The present findings of a clinical breast examination revealed that 26.67 % of women have poor practise. Thirty-four percent of engineering girls had heard of clinical breast examination, and forty percent believe it is a good technique for early identification of breast cancer. CBE is done by a doctor, according to 22% of respondents, which is higher than the 18.3 % Joel Ojo Nigerian survey [29]. Clinical breast examination should be done by hand,

according to 11% of respondents. Monthly CBE is practised by 38 percent of respondents, which is greater than the 26.2% reported by Joel Ojo in a Nigerian study [29], but CBE abnormalities were detected by 15% of respondents in the current study.

The mammography mean was 1.09 SD ±1.39. Engineering girls had poor practise of 18.17% for mammography. It's possible that poor practise stems from female pupils' perceptions that they're still young. 27 % had heard of mammography, and 38 % thought that mammography is a useful tool for the early detection of breast cancer .17% replied Mammography is initiated after the age of 40. After 40-45 years, women should undergo yearly mammography, according to 23 percent of students. Only 3 percent of students underwent mammography, which is lower than Joel Ojo's Nigerian study [29] and did not find any abnormalities, which is consistent with Osei-Adriye S et al 2.3 percent. [32]. Table 3.

There was a positive correlation between knowledge and practise of breast cancer and its screening methods among engineering girls as measured by the Pearson coefficient correlation "r" of .270. Practices can be improved by improving knowledge, as there was a high correlation between knowledge and practices (Fig. 2).

The mother's education was significantly associated with the girls' knowledge. Other demographic variables were not significantly associated with knowledge *at a p* 0.05 level of significance. There was a significant association between the source of information regarding breast cancer and the methods of breast cancer screening practice. *p .020.* Internet was the preferred source of information, followed by health professionals, family and friends. Table No. 4. There was no significant association between demographic variables and practise *at the p <* 0.05 level of significance.

Table 4. Methods of breast cancer screening practiced by engineering girls

(N=100)

Methods for breast cancer screening practices	Correct (%)	Incorrect (%)
Breast Self-Examinations (BSE)		
Heard of Breast Self-Examinations (BSE)	40	60
BSE is a useful tool for early detection of breast cancer.	51	49
Have you been taught how to do BSE?	18	82
At what age should BSE be started (at 20 years old)?	27	73
Every month, BSE should be done	29	71
After the menstruation period is the best time to do BSE.	23	77
Who should do BSE (Doctor or Nurses)	42	58
Breast Self-Examination is an examination of the breasts by observing them in a mirror for any changes in shape and size, and having palpation	22	78
Do you practise BSE by palpating with a padded finger in a clockwise direction in four quadrants correctly?	19	81
Practiced BSE Monthly (n=19)	83	16
On BSE, we found an abnormality (n=19)	5	95
After consulting a doctor (n=19)	5	95
Do you think BSE is good practice?	46%	54%
Breast Examination in the Clinic (BSE)		
Have you ever heard of a Clinical Breast Exam (CBE)?	34	66
CBE is a useful tool for the detection of breast cancer.	40	60
CBE should be done by the doctor.	22	78
CBE is done using your hands.	11	89
CBE is performed on women aged 25–39 every 1-3 years.	38	62
Have you discovered any anomalies on the CBE?	15	85
Heard of the Clinical Breast Examination (CBE)	34	66
Mammography		
Heard of mammography?	27	73
Mammography a useful tool for the early detection of breast cancer	38	62
After 40 years of age mammography is started	17	83
After 40-45 years women should do yearly mammography	23	77
Practiced mammography	3	97
There was no abnormality discovered.	97	1
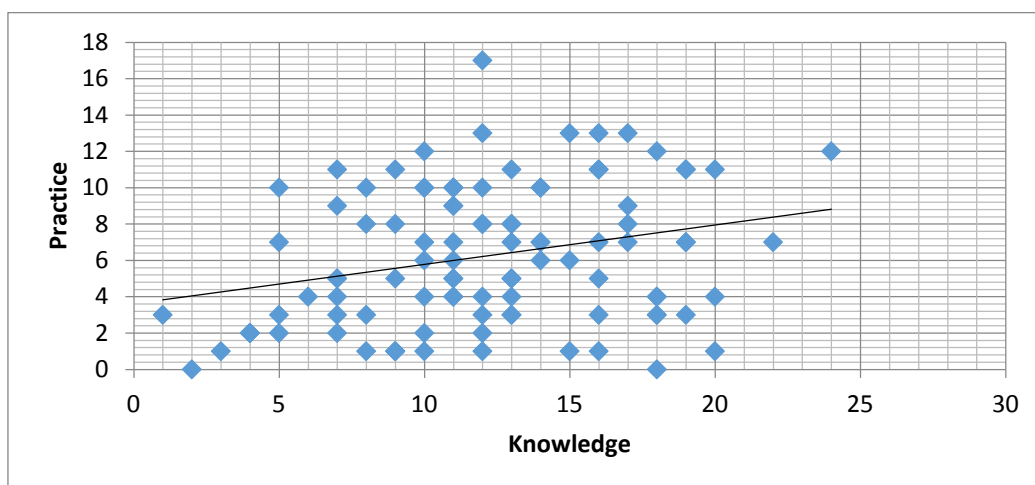
Fig. 2. Depicts the relationship between breast cancer knowledge and practice, as well as screening methods, among engineering girls

4. CONCLUSION

Engineering girls had average degree of awareness and poor practises of breast cancer screening techniques such as breast self-examination, clinical breast examination, and mammography, according to the study's findings. According to a study, the higher the mothers' educational level, the better their knowledge of breast cancer and cancer screening, and the internet plays an important role in disseminating health awareness information in rural areas among students, so future mothers should be empowered with health information activities. Breast screening procedures among younger female students will improve with enough understanding. According to the findings, raising awareness is a good thing to do.

Health promotion and awareness initiatives about risk factors, signs, and symptoms of lethal diseases should be implemented at the institute level among university students. Promote the establishment of facilities that require them to undergo regular screening examinations. University and institutional administrative authorities must concentrate on capacity development through health awareness and screening training.

LIMITATION OF THE STUDY

The samples were from a single institute in a defined geographic area, generalisation to the entire country was impossible, and the purposeful sampling technique resulted in a reduced sample size. Participants' prejudice may have influenced the outcome of self-reported data. To overcome the constraint, such a study might be carried out on a broad scale at the national level.

CONSENT

Participants were contacted directly by phone to inquire about their willingness to participate in the study, and they were advised that participation in the study was optional and that they might withdraw at any moment. The Google Link was sent to the gathered mobile number through text message. After clicking on the consent agreed box, participants agreed to participate in the study. The study subjects were given detailed explanations about the study and its goals. At the time of dissemination of the results, subjects were assured of anonymity and confidentiality of the information they provided.

ETHICAL APPROVAL

All authors hereby declare that study is approved by Institutional Ethical and have the therefore been performed in accordance with the ethical standards.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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