

# A CROSS-SECTIONAL STUDY TO ASSESS THE AWARENESS LEVEL OF BREAST CANCER AMONG STUDENTS IN AN ENGINEERING COLLEGE IN KANCHIPURAM DISTRICT

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## Abstract

**Background:** Reducing global breast cancer mortality by 2.5% per year would avert 25% of breast cancer deaths by 2030 and 40% by 2040 among women under 70 years of age. The three pillars toward achieving these objectives are health promotion for early detection; timely diagnosis; and comprehensive breast cancer management. We intended to study the awareness of breast cancer among students in an engineering college in Kanchipuram District. **Methodology:** A cross-sectional study was conducted among 414 female students in an engineering college in Kanchipuram district, Tamil Nadu. Participants were selected using probability proportionate to size sampling technique. A self-administered questionnaire modified Breast Cancer Awareness Measure (Breast CAM) version 2 was used for the study and data was collected by Google Forms. **Results:** The majority of them were third-year students N=144, unmarried N=388. The participants reported overall poor knowledge regarding breast cancer risk factors, and signs and symptoms. The majority of the participants 242 (58.6%) and 410 (99.2%) had awareness of the warning signs and risk factors of breast cancer respectively but only 19 (4.7%) had a satisfactory attitude, confidence, and skills towards detecting breast cancer early. **Conclusion:** A total of 413 responses were collected out of which the majority of women were able to identify the risk factors and warning signs; the level of awareness among educated females is not satisfactory. Current trends point out that a higher proportion of the disease is occurring at a younger age in Indian women.

**Keywords:** Breast Self-Examination, Warning Signs, Risk Factors.

## INTRODUCTION

Breast, colorectal, lung, cervical, and thyroid cancer are the most common among women. Breast cancer occurs in every country of the world in women at any age after puberty but with increasing rates in later life. Approximately half of breast cancers develop in women who have no identifiable breast cancer risk factor other than gender (female) and age (over 40 years)[1]. In countries where health systems are strong, survival rates of many types of cancers are improving thanks to accessible early detection, quality treatment, and survivorship care. In 2020, there were 2.3 million women diagnosed with breast cancer and 685,000 deaths globally. As of the end of 2020, there were 7.8 million women alive who were diagnosed with breast cancer in the past 5 years, making it the world's most prevalent cancer. There is more loss of disability-adjusted life years by women to breast cancer globally than any other type of cancer[2]. Lack of understanding about breast cancer discourages women from accessing screening facilities and doing self-examination of their breasts[3]. The mortality rates for breast cancer continue to be the highest in the nation despite decades-old national programs, such as the National Cancer Control Program established under the National Programme NPCDCS launched under the 12th five-year Plan from 2012 to 2017) to increase awareness and early detection behaviors.

High mortality rates are caused in part by barriers like low cancer awareness among women, as well as by the existence of stigma, fear, gender inequality, and the presence of these emotions. These factors also lead to lower participation in screening behavioral patterns like breast self-examinations[4]. Even though breast cancer is a leading cause of cancer death among Indian women, numerous women are uninformed of their ailment. Adequate knowledge and awareness about the signs and symptoms and early breast cancer detection through breast self-examination, clinical breast examination, or mammogram is crucial to reducing breast cancer-related morbidity and mortality. Unfortunately, only a few women practice those methods to examine their breasts.

The purpose of this study is to evaluate and determine the level of awareness of breast cancer among engineering students in urban setups. In this study, an attempt was made to study the awareness of breast cancer prevailing among engineering students. The objectives were to evaluate the level of awareness of breast cancer among engineering students, to assess the attitude and confidence toward identifying the signs of breast cancer, and to determine the association of knowledge about warning signs of breast cancer on attitude, behavior, and confidence.

## **MATERIALS AND METHODS**

This study was carried out on 414 female students of an engineering college. Informed consent was obtained from all participants involved in this study. The privacy of the participants was considered and confidentiality was maintained. The data was used only for research purposes. The authors assert that all procedures contributing to this work comply with the ethical standards of the Indian Council of Medical Research guidelines on human experimentation, which is as per the Helsinki Declaration of 1975, as revised in 2000, and have been approved by the Ethical Clearance Committee of the Saveetha Medical College Hospital.

In this cross-sectional study, the study participants were girls studying in an engineering college in Kanchipuram district. The study was done for 3 months, with data collection for 1 month followed by analysis and discussion. According to a study done in Iraq by Nada A S Alwan et al., the prevalence of breast self-examination was 57.4%, and assuming a 95% confidence limit with a 5% allowable error the minimum sample size was calculated using an Open epi sample size calculator version 3.0 as N=376. Taking into account a non-response rate of 10%, the final sample was N=414. The participants were selected based on probability proportionate to size and every alternate girl was chosen for the study selected by systematic sampling technique. The study procedure was explained to the participants and informed consent was obtained at the start of the study. The Modified Breast Cancer Awareness Measure [BCAM Version 2] was used for this study. The BCAM questionnaire contains several categories- Warning signs, Confidence, skill, behavior, delay in calling a doctor, obstacles to getting medical attention, and risk factors. It has been determined that the Breast CAM is a tool for assessing women's breast cancer awareness. The questionnaire was passed on in the form of Google Forms to the individuals to obtain data. Since a time-tested, pre-validated proforma was used to measure the study outcomes, quality was ensured. The Statistical Package for Social Sciences version 25 was used to analyze the data. Demographic factors were evaluated using frequency and proportion. The association between baseline details and each domain of the questionnaire was evaluated using the Chi-square test. A p-value  $\leq 0.05$  was

considered significant for all the statistical analyses. This questionnaire was sent in google forms to 414 students of whom 1 student did not respond.

## RESULTS

The age category of the participants was from 17 – 25 years. The results for each domain are mentioned below.

**Table 1: Distribution of participants**

S.No	Year of Study	No.of females	Sample taken
1	1 <sup>st</sup> Year	300	127 (30%)
2	2 <sup>nd</sup> Year	200	83 (20.1%)
3	3 <sup>rd</sup> Year	250	144 (34.9%)
4	4 <sup>th</sup> Year	150	62 (15%)
	<b>Total</b>	<b>1000</b>	<b>414 (100%)</b>

Table 2 shows the baseline characteristics of the students among which the majority 144 (34.9%) of the students were studying in 3<sup>rd</sup> year of college, 388 (93.9%) females were unmarried and 286 (69.2%) students were in the age group of 19-25 years.

**Table 2: Baseline Characteristics**

S.No	Variables	Categories	N (%)
1	Age	≤18	127 (30.8)
		19 - 25	286 (69.2)
2	Year of Study	1 <sup>st</sup> Year	124 (30.0)
		2 <sup>nd</sup> Year	83 (20.1)
		3 <sup>rd</sup> Year	144 (34.9)
		4 <sup>th</sup> Year	62 (15)
3	Marital status	Married	25 (6.1)
		Unmarried	388 (93.9)

The results are detailed in Table. 3; 347 (84%), and 208 (50.4%) responded that a lump or thickening in the breast and bleeding or discharge from the nipple are warning signs of breast cancer respectively. 333(80.6%), 312 (75.5%), 283 (68.5%), 245 (59.4%), 226 (54.7%) could not identify the warning signs of breast cancer respectively. 404 (97.8%), 323 (78.2%) strongly agree being overweight, past history of breast cancer are risk factors for developing breast cancer respectively. 252 (61.1%) disagree that taking hormone replacement therapy is a risk factor for developing breast cancer.

Table. 3 (continued) shows, 273 (66.1%) never check their breasts atleast once a week. 221 (53.5%) are not very confident that they would notice any change in their breast. The majority of the participants 304 (73.6%) have never been to see a doctor about any changes they had noticed in their breasts.

Table 4: Keeping the year of study and marital status as baseline characteristics, each domain was compared. The participants had an overall satisfactory attitude, and poor confidence, and 376 (96.91%) students had unsatisfactory behavior toward awareness of breast cancer when compared to their counterparts and this difference was statistically significant ( $p=0.0001$ ). 77 (53.5%) third year students had awareness of warning signs of breast cancer compared to other students of the same year and this difference was found to be statistically significant ( $p=0.001$ )

**Table 3: Frequency table on awareness of warning signs of Breast Cancer**

S.No	Variables (Warning Signs)	N (%)	
		Yes	No
1	A lump or thickening in your breast	347 (84.0)	66 (16)
2	Lump or thickening in your armpit	80 (19.4)	333 (80.6)
3	Bleeding or discharge from the nipple	208 (50.4)	205 (49.6)
4	A change in the position of your nipple	130 (31.5)	283 (68.5)
5	Rash around your breast	187 (45.3)	226 (54.7)
6	Redness around the nipple	101 (24.5)	312 (75.5)
7	Dimpling of skin	168 (40.7)	245 (59.4)

**Table 3 (continued): Frequency table on awareness of risk factors of Breast Cancer**

S.No	Variables (Risk Factors)	N (%)	
1	Having a past history of breast cancer	Strongly agree	323 (78.2)
		Agree	17 (4.1)
		Not sure	47 (11.4)
		Disagree	26 (6.3)
		Strongly Disagree	0
2	Taking hormone replacement therapy	Strongly agree	79 (19.1)
		Agree	23 (5.6)
		Not sure	59 (14.3)
		Disagree	252 (61.0)
		Strongly Disagree	0
3	Drinking one unit of alcohol per day	Strongly agree	126 (30.5)
		Agree	19 (4.6)
		Not sure	127 (30.8)
		Disagree	141 (34.1)
		Strongly Disagree	0
4	Being overweight	Strongly agree	404 (97.8)
		Agree	0
		Not sure	0
		Disagree	9 (2.2)
		Strongly Disagree	0
5	Having a close relative with breast cancer	Strongly agree	181 (43.8)
		Agree	26 (6.3)
		Not sure	104 (25.2)
		Disagree	102 (24.7)
		Strongly Disagree	0
6	Having children later in life or not at all	Strongly agree	104 (25.2)
		Agree	27 (6.5)
		Not sure	112 (27.1)
		Disagree	170 (41.2)
		Strongly Disagree	0
7	Attaining age at a very young age	Strongly agree	131 (31.7)
		Agree	23 (5.6)
		Not sure	126 (30.5)
		Disagree	133 (32.2)
		Strongly Disagree	0
8	Having late menopause	Strongly agree	99 (24.0)
		Agree	28 (6.8)
		Not sure	165 (40.0)
		Disagree	121 (29.3)
		Strongly Disagree	0
9	Not exercising for 30 min everyday	Strongly agree	104 (25.2)
		Agree	25 (6.1)
		Not sure	122 (29.5)
		Disagree	162 (39.2)
		Strongly Disagree	0

**Table 3 (continued): Frequency Table on Attitude, Confidence, and Behaviour of Breast Cancer**

S.No	Variables (Attitude, Confidence, Behaviour)	N (%)	
1	How often do you check your breast	At least once a week	21 (5.1)
		At least once a month	42 (10.2)
		At least once every 6 months	77 (18.6)
		Rarely or never	273 (66.1)
2	Are you confident you would notice a change in your breast	Very confident	39 (9.4)
		Fairly confident	85 (20.6)
		Not very confident	221 (53.5)
		Not at all confident	68 (16.5)
3	Have you ever been to see a doctor about a change you have noticed in one of your breasts	Yes	49 (11.9)
		No	304 (73.6)
		Never noticed a breast change	60 (14.5)
4	If you found a change in your breast how soon would you contact your doctor	Within a week	100 (24.2)
		Within a month	192 (46.5)
		Within 6 months	69 (16.7)
		Don't know	52 (12.6)

**Table 4: Association of Baseline Characteristics and Breast Cancer Awareness Measure**

S.No	Variables	Categories	Confidence		Chi-square test	p value
			Yes N=124	No N=289		
1	Year of Study	1 <sup>st</sup> Year	33 (26.62)	91 (73.38)	6.260	0.10
		2 <sup>nd</sup> Year	25 (30.13)	58 (69.87)		
		3 <sup>rd</sup> Year	53 (36.81)	91 (63.19)		
		4 <sup>th</sup> Year	13 (20.97)	49 (79.03)		
2	Marital Status	Married	11 (44)	14 (66)	2.474	0.11
		Unmarried	113 (29.12)	275 (70.88)		
			Attitude			
			Yes N=292	No N=121		
1	Year of Study	1 <sup>st</sup> Year	86 (69.35)	38 (30.65)	3.988	0.263
		2 <sup>nd</sup> Year	62 (74.69)	21 (25.31)		
		3 <sup>rd</sup> Year	106(73.61)	38 (26.39)		
		4 <sup>th</sup> Year	38 (61.29)	24 (38.71)		
2	Marital Status	Married	19 (76)	6 (24)	0.361	0.548
		Unmarried	273(70.37)	115 (29.63)		
			Behavior			
			Yes N=19	No N=394		
1	Year of Study	1 <sup>st</sup> Year	4 (3.22)	120 (96.78)	5.723	0.126
		2 <sup>nd</sup> Year	6 (7.22)	77 (92.78)		
		3 <sup>rd</sup> Year	9 (6.25)	135 (93.75)		
		4 <sup>th</sup> Year	0	62 (100)		
2	Marital Status	Married	7 (28)	18 (72)	33.199	<b>0.0001*</b>
		Unmarried	12 (3.09)	376 (96.91)		

\*p-value = <0.05 is statistically significant

**Table 4 (continued): Association of Baseline Characteristics and Breast Cancer Awareness Measure**

S.No	Variables	Categories	Awareness of Warning signs		Chi-square test	P value
			Yes N=242	No N=171		
1	Year of Study	1 <sup>st</sup> Year	69 (55.6)	55 (44.4)	17.192	0.001*
		2 <sup>nd</sup> Year	65 (78.3)	18 (21.7)		
		3 <sup>rd</sup> Year	77 (53.5)	67 (46.5)		
		4 <sup>th</sup> Year	31 (50)	31 (50)		
2	Marital Status	Married	16 (64)	9 (36)	0.320	0.571
		Unmarried	226 (58.2)	162 (41.8)		

p value = \* < 0.05 is statistically significant

**Table 4 (continued): Association of Baseline Characteristics and Breast Cancer Awareness Measure**

S.No	Variables	Categories	Awareness of Risk factors		Chi-square test	p value
			Yes N=410	No N=3		
1	Year of Study	1 <sup>st</sup> Year	123 (99.2)	1 (0.8)	4.779	0.189
		2 <sup>nd</sup> Year	81 (97.6)	2 (2.4)		
		3 <sup>rd</sup> Year	144 (100)	0		
		4 <sup>th</sup> Year	62 (100)	0		
2	Marital Status	Married	25 (100)	0	0.195	0.659
		Unmarried	385 (99.2)	3 (0.8)		

\*p value = < 0.05 is statistically significant

Table 5 shows that among participants who were confident, 71.77% had knowledge of warning signs compared to others and this difference was found to be statistically significant (p=0.0001). Among participants who had positive attitudes and good behaviour, 57.19% and 73.68% had knowledge of warning signs.

**Table 5: Association of Knowledge on Warning Signs and Confidence, Attitude, and Behavior towards Breast Cancer**

S.No	Variable	Categories	Knowledge on warning signs		Chi-square test	P value
			Present N=242	Absent N=171		
1	Confidence	Confident	89 (71.77)	35 (28.23)	12.685	0.0001*
		Not confident	153 (52.94)	136 (47.06)		
2	Attitude	Positive attitude	167 (57.19)	125 (42.81)	0.810	0.368
		Negative attitude	75 (61.98)	46 (38.02)		
3	Behavior	Good	14 (73.68)	5 (26.32)	1.869	0.172
		Bad	228 (57.86)	166 (42.14)		

\*p-value = < 0.05 is statistically significant

## DISCUSSION

The current study was conducted to assess the knowledge and understanding of university female students about breast cancer. The participants reported overall good knowledge regarding breast cancer risk factors, and signs and symptoms. The early

detection of breast cancer in females can only be possible when they are familiar with their signs and symptoms. Participants were little known about the signs and symptoms of breast cancer. Contrary to our study, a number of studies with different groups of women in Malaysia have found that a lack of knowledge of breast cancer was the most commonly identified addressed barrier to breast cancer prevention practices [5]. In this current study majority of the participants, 242 (58.6%) and 410 (99.2%) had awareness of the warning signs and risk factors of breast cancer respectively but only 19 (4.7%) had a satisfactory attitude, confidence, and skills towards detecting breast cancer early. A moderate number of respondents had positive attitudes toward the early detection of breast cancer, which has also been found in Iraq [6]. Our findings confirmed the previous reports that the deficit in attitude and practices of breast cancer, risk factors might be the reason for the delayed presentation of breast cancer in developing countries, Muhammad A. Hadi et al [7]. Regarding the breast cancer risk factors, most of the participants were unaware of the risk factors associated with breast cancer. Similarly, a study carried out to determine the awareness of breast cancer risk factors and practice of breast self-examination among female students of the University of Nigeria Enugu Campus [8] showed that the only risk factors that are widely known are family history of breast cancer (50%), and tobacco smoking (36%). The findings also showed that very few students knew other risk factors (obesity, alcohol intake, early menarche, nulliparity, breastfeeding for at least 18 months as possible risk factors for breast [9]. 347 (84%), and 208 (50.4%) of the students thought that a lump in the breast and bleeding or discharge from the nipple were the important warning signs of breast cancer respectively.

The students were not aware of the other important warning signs. Similar to our study, Md. Sabbir Ahmed and Abu Sayeed et al [10], It was observed that 61.2% of participants believed that early diagnosis of breast cancer improved treatment outcomes. Only 21.6% (59) knew that it occurs in old age. Lumps in the breast were the predominantly mentioned signs of breast cancer followed by pain in the breast or nipple. More than half of the respondents (54.2%) stated that dissimilarity in the size of a breast or nipple is the major sign of breast. Besides that, about 41.8% of the respondents stated that discharge from the breast or nipple, swelling or a lump in the armpit (38.2%), change in the size of the breast (54.2%) and discoloration/ dimpling of the breasts (37.8%) are the major signs of breast cancer. 404 (97.8%) and 323 (78.2%) strongly agreed that being overweight and having a past history of breast cancer are important risk factors whereas the other risk factors were not recognized. A comparatively higher knowledge about these signs and symptoms was reported from Ethiopia (53.7%, and 57% respectively) [11].

Informing youth about breast cancer is both a challenge and a key investment in the health of future generations of women as it is well-known that low cancer awareness contributes to delays in the presentation of cancer symptoms, and subsequent diagnosis leading to less favorable outcomes [12], [13]. According to Dina N. K. Boulos et al [8], more than half of the students (63.4%) heard about breast self-examination. This study showed that female university students may not have adequate knowledge about breast self-examination as only 8.8% of the students knew about an appropriate time to perform breast self-examination. Not knowing how to perform breast self-examination was the primary reason for not practicing breast self-examination as reported by 47.7% of Nigerian female students, lack of interest was identified by 35% and only 7.4% mentioned fear of a positive finding as a reason [3],

[9], the mean score of knowledge about breast cancer risk was significantly higher among participants who reported being 24–26 years old . About one-fifth of participants reported they had ever practiced breast self-examination (21.3%). The mean score of practice of breast self-examination was significantly higher among participants who reported having family members of breast cancer. About 33.3% of the participants have addressed ‘lack of knowledge’ as the main barrier to practicing breast self-examination. A Malaysian study found that knowledge of breast cancer was low among young and less educated women [5]. On the contrary, a study conducted in India found no significant association between demographic variables and level of knowledge of breast cancer and breast self-examination among women and younger women in college [14], [15].

These indicate that in different populations, the association level may vary based on social, cultural, and demographic factors. The present study indicated that the knowledge gap was the main driving factor that impeded attitudes and practices among participants, although we only included women enrolled in an engineering college so we cannot comment on educational and socio-economic differences with other women in India.

The objective of the WHO Global Breast Cancer Initiative (GBCI) is to reduce global breast cancer mortality by 2.5% per year, thereby averting 2.5 million breast cancer deaths globally between 2020 and 2040. Reducing global breast cancer mortality by 2.5% per year would avert 25% of breast cancer deaths by 2030 and 40% by 2040 among women under 70 years of age[16]. The three pillars toward achieving these objectives are health promotion for early detection; timely diagnosis; and comprehensive breast cancer management. By providing public health education to improve awareness among women of the signs and symptoms of breast cancer and, together with their families, understand the importance of early detection and treatment, more women would consult medical practitioners when breast cancer is first suspected, and before any cancer present is advanced. This is possible even in the absence of mammographic screening that is impractical in many countries at the present time [17].

Public education needs to be combined with health worker education about the signs and symptoms of early breast cancer so that women are referred to diagnostic services when appropriate. Rapid diagnosis needs to be linked to effective cancer treatment that in many settings requires some level of specialized cancer care. By establishing centralized services in a cancer facility or hospital, using breast cancer as a model, treatment for breast cancer may be optimized while improving the management of other cancers. Survival of breast cancer for at least 5 years after diagnosis ranges from more than 90% in high-income countries to 66% in India and 40% in South Africa[18].

Early detection and treatment have proven successful in high-income countries and should be applied in countries with limited resources where some of the standard tools are available. Age-standardized breast cancer mortality in high-income countries dropped by 40% between the 1980s and 2020. Countries that have succeeded in reducing breast cancer mortality have been able to achieve an annual breast cancer mortality reduction of 2-4% per year. If an annual mortality reduction of 2.5% per year occurs worldwide, 2.5 million breast cancer deaths would be avoided between 2020 and 2040[19]. Limitations are the present research is a cross-sectional study on



female students in one of the colleges in the Kanchipuram district of South India, as a result, it does not represent the Indian female youth population as a whole as the results of the current study do not represent the entire population of Indian female college students.

## CONCLUSION

This study clearly revealed the knowledge of breast cancer among common women was very poor and influenced by different factors as mentioned earlier. This study clearly showed that to reduce the mortality rate from these types of cancers, the awareness level in society has to be improved through different initiatives such as awareness camps and by educating the common women. In a country like India, where cultural beliefs are high in society, knowledge has to be improved at a large scale; otherwise, women may not intend to participate in early diagnostic screenings such as mammograms for breast cancer. Regular awareness camps are required to spread knowledge. No matter what advanced screening techniques are available, the mortality rate cannot be reduced unless basic knowledge and awareness are improved.

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