

Research Article

Bridging the Gap: Knowledge, Attitude, and Practice of Breast Self-Examination in Female Medical Students across Academic Years

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ABSTRACT

Introduction: Breast cancer (BC) stands as the leading cancer diagnosis for women globally. Despite its importance as an early detection tool, breast self-examination (BSE) remains underutilized, even among medical students.

Aim: To assess the knowledge, attitude, and practice (KAP) of breast self-examination among female medical students.

Materials and Methods: A cross-sectional study was conducted among 272 female medical students at Panimalar Medical College, Chennai, using a pre-validated 35-item questionnaire to evaluate their KAP toward BSE. A cut-off of 70% of the total possible score for each domain was used to categorize KAP levels as “good” or “poor”.

Results: Overall, 91.2%, 52.2%, and 34.9% of respondents had good knowledge, attitude, and practice scores on BSE, respectively. Significant differences in the proportion of good scores were observed across different academic years only for attitudes and practices related to BSE. The results indicated a significant positive correlation among the knowledge and attitude scores ($r = 0.21, p \leq .001$), knowledge and practice scores ($r = 0.24, p \leq .001$), as well as the attitude and practice scores ($r = 0.41, p \leq .001$).

Conclusion: The study findings indicate a gap between the theoretical knowledge and the practical application of BSE among female medical students. To address this, more effective training and educational programs are necessary to improve medical students' attitudes and practical proficiency with breast self-examination.

Keywords: Breast self-examination, Breast cancer, Knowledge, Attitude, Practice, Medical students

1. INTRODUCTION

Breast cancer remains a major global health issue, being the most common cancer among women and a primary contributor to cancer-related deaths worldwide [1]. According to GLOBOCAN estimates, China and India were the leading contributors to new breast cancer cases and deaths in Asia in 2022 [2]. According to statistics, one in twenty-eight women will be diagnosed with breast cancer at some point in her life. In India, the prevalence peaks between the ages of 50 and 64 after starting to increase in the early forties. The rising trend in breast cancer statistics is driven by factors such as unhealthy lifestyles, including smoking, physical inactivity,

calorie-dense food consumption, and changes in childbearing and breastfeeding practices [3].

A primary challenge in the battle against breast cancer is diagnosis at an advanced stage, with approximately 80% of patients presenting to healthcare providers when the condition has already progressed to an incurable level [4]. Consequently, there is a critical need to strengthen efforts towards early detection through comprehensive screening programs and awareness campaigns.

Breast self-examination (BSE), clinical breast examination (CBE), and mammography are the three principal methods utilized in the early diagnosis of breast cancer. The proper and

consistent application of these techniques is considered the cornerstone of breast cancer prevention. Among these early detection strategies, breast self-examination stands out as a cost-effective and feasible method for identifying breast abnormalities, particularly in developing countries, where a lack of awareness regarding screening and diagnostic techniques exacerbates mortality rates. It has the potential to identify 40% of the breast lesions [5].

Breast self-examination is a non-invasive screening method performed by a woman herself to identify any abnormalities in her breast tissue. This method involves a visual and physical inspection to identify suspicious signs, including masses, inflammation, or nipple discharge, with the goal of early identification and timely intervention. [6]. Despite its importance, the knowledge and practice of BSE among young women, including medical students, often fall short of the recommended levels.

Understanding the relationship between medical students' knowledge, attitudes, and practices regarding BSE is crucial for developing targeted educational interventions. The findings of this study may contribute to the training strategies to enhance BSE awareness and adoption among future healthcare professionals, ultimately contributing to improved breast cancer screening and early detection efforts. Although many studies have assessed knowledge, attitudes, and practices related to BSE in different populations, there remains a notable paucity of data among female medical students, particularly in South India. By evaluating KAP scores across various stages of medical education, this study aimed to provide insights into how knowledge, attitudes, and practices evolve throughout medical training.

2. MATERIALS AND METHODS

2.1 Methods

This cross-sectional study was conducted among female medical students at Panimalar Medical College Hospital & Research Institute, Chennai, Tamil Nadu, India, between March 2025 and June 2025. The Institutional Ethics Committee approved the study (Ref: PMCH&RI/IHEC/2025/248). Before data

collection, all subjects provided written informed consent. The ethical conduct of this study was guided by the Declaration of Helsinki.

Sample size calculation

The sample size was calculated using G*Power 3.1 software, based on the proportion of women with good knowledge of breast self-examination ($P=22.4\%$) in a previous study [7]. The minimum required sample size was 264, with a 95% confidence interval ($z=1.96$) and 5% precision. A total of 272 participants were included in the study, considering the non-response rate. Female MBBS students (68 from each academic year) were recruited for the study using stratified random sampling.

Inclusion criteria

The study included female MBBS students aged 18–25 who were willing to participate.

Exclusion criteria

Students who were not interested in participating and those aged <18 years or >25 years were excluded from the study.

Study Procedure

After obtaining written informed consent, the participants ($n=272$) were provided with a link to a self-administered online survey hosted on Google Forms. The survey collected basic demographic data (age and gender) and contained a validated questionnaire outlined below.

Study Tool

The knowledge, attitude, and practice (KAP) regarding breast self-examination among the study participants was assessed using a pre-validated questionnaire consisting of 35 items (15 on knowledge, 13 on attitude, and 7 on practice), developed by Rosmawati NH *et al.*, (2010) [8]. For knowledge items, categorical responses (true/false/don't know) were employed, while for attitude items, a 5-point Likert scale (strongly agree/agree/neutral/disagree /stronglydisagree) was utilized, and for practice, similar categories (never/seldom/neutral/frequent/always) were applied.

For positive knowledge items, a score of "2" was assigned to correct responses, "1" for don't know, and "0" for incorrect responses. In evaluating a positive attitude item, scores of "4,"

“3,” “2,” “1,” and “0” were used for strongly disagree, agree, neutral, disagree, and strongly disagree, respectively. Regarding practice, item scores of “0,” “1,” “2,” “3,” and “4” were designated for never, seldom, neutral, frequently, and always, respectively. Overall, the scores were reversed for all negative items.

The KAP score was classified as either good or poor based on a 70% cut-off point of the total possible score for each [8]. A total score (30) for knowledge items ≥ 21 was considered good. Out of the total score (52) for attitude items, ≥ 36 was considered good. Out of the total score (28) for practice items, ≥ 20 was considered good.

2.2 Statistical Analysis

The data was analyzed using version 29 of the Statistical Package for the Social Sciences (SPSS) software. A normality test was performed on the continuous variables, and the descriptive statistics for these variables were presented as the mean \pm standard deviation. Categorical variables were expressed as frequencies and percentages. The relationship between categorical variables and the KAP score was assessed using the chi-square test. Pearson's correlation analysis was employed to examine the correlations between the participants' scores on the three core domains—knowledge, attitude, and practice—related to breast self-examination (BSE). Statistical significance was set at $p < 0.05$.

3. RESULTS

The final study sample consisted of 272 female medical students, with a mean age of 20.08 ± 1.55 years.

As highlighted in Table 1, the mean scores of the study population for knowledge, attitude, and practice regarding BSE were 24.24 ± 3.65 , 36.35 ± 5.44 , and 16.37 ± 5.89 , respectively. The highest mean score for the knowledge domain was for “Need to observe for unusual changes in the shape and size of the breast” (1.96 ± 0.21). The lowest mean knowledge score was regarding “BSE should be done from the front view only” (0.99 ± 0.91). The highest overall attitude score was seen for “All women should do BSE” (3.61 ± 0.60). Likewise, “Feels uncomfortable, can't do BSE once a month” (1.08 ± 0.86) had the least mean score. The highest practice score was

for “Avoid learning the correct method of BSE” (3.06 ± 1.13). The lowest score was recorded for “Parents or partner always advise doing BSE” (1.81 ± 1.30).

Table 1. Scores for Knowledge, Attitude, and Practice regarding BSE among the study participants (n=272)

Variables	Mean \pm SD
Knowledge towards BSE	
BSE should be done every 2 months.	1.33 ± 0.82
BSE must be done between days 7 and day 10 after menses	1.42 ± 0.57
BSE should be done in front of the mirror.	1.77 ± 0.58
Undress to the waist when doing the BSE	1.85 ± 0.45
Hands should be raised alternately above the head when doing the BSE in front of the mirror.	1.73 ± 0.57
BSE should be done from the front view only.	0.99 ± 0.91
BSE can be done in the supine position.	1.12 ± 0.92
Palpate the right breast while lying on the left side when doing the BSE.	1.30 ± 0.72
Use finger pulps to examine any lump or thickening of the skin.	1.80 ± 0.56
BSE can be done using the vertical strip and circular technique.	1.73 ± 0.48
Need to press on the nipple to check for any unusual discharge	1.86 ± 0.38
BSE includes an armpit examination to check for any lumps	1.86 ± 0.42
Need to observe for unusual changes in the shape and size of the breast	1.96 ± 0.21
Retraction of the nipple is the warning sign that should be observed.	1.88 ± 0.34
A lump is an early sign of cancer.	1.63 ± 0.73
Total knowledge score	24.24 ± 3.65
Attitude towards BSE	
Doing BSE makes me feel so funny.	2.88 ± 0.91
BSE will be embarrassing to me.	3.01 ± 0.81
Doing BSE is wasting time.	3.53 ± 0.66
Doing BSE makes me feel unpleasant.	2.92 ± 0.91
If there is a lump, I prefer to get treatment from a traditional healer.	3.29 ± 0.81
Feels uncomfortable; can't do BSE once a month.	1.08 ± 0.86
All women should do BSE.	3.61 ± 0.60
I really care about my breasts.	3.36 ± 0.72
I'm not afraid to think about breast cancer.	2.33 ± 1.17
Avoid doing BSE because of the worry of getting breast cancer.	3.14 ± 0.78
Interested in doing breast self-examination (BSE).	2.79 ± 0.79
Always search for information regarding BSE on the internet, in magazines, and in newspapers	2.07 ± 1.06
Discuss with my friends about BSE.	2.38 ± 1.14
Total Attitude score	36.36 ± 5.43
Practice towards BSE	
Do BSE once a month	1.88 ± 1.19
Avoid learning the correct method of BSE.	3.06 ± 1.13
Parents or partner always advise doing BSE.	1.81 ± 1.30
Advise friends to do BSE.	2.25 ± 1.30
Discuss the importance of BSE with friends.	2.13 ± 1.30
Have been taught on BSE by health staff.	2.37 ± 1.11
If you notice any breast abnormality, report to public healthcare.	2.84 ± 1.17
Total Practice score	16.37 ± 5.89

The percentage of respondents with good and poor KAP scores is shown in Table 2. Among the three domains, knowledge (91.2%) exhibited the highest proportion of respondents achieving a good score, while practice (34.9%) reflected the lowest proportion of good scores. Approximately 52% of respondents demonstrated a good attitude score.

Table 2. Score Level of Knowledge, Attitude, and Practice Towards BSE (n=272)

Variables	Score level	
	Good n (%)	Poor n (%)
Knowledge	248 (91.2%)	24 (8.8%)
Attitude	142 (52.2%)	130 (47.8%)
Practice	95 (34.9%)	177 (65.1%)

Table 3. Comparison of good and poor KAP scores among various years of study

Group	n	Knowledge		Attitude		Practice	
		Poor	Good	Poor	Good	Poor	Good
I year	68	7 (12.3%)	61 (89.7%)	38 (55.9%)	30 (44.1%)	51 (75%)	17 (25%)
II year	68	8 (11.8%)	60 (88.2%)	34 (50%)	34 (50%)	50 (73.5%)	18 (26.5%)
III-year part-I	68	6 (8.8%)	62 (91.2%)	39 (57.4%)	29 (42.6%)	50 (73.5%)	18 (26.5%)
III-year part-II	68	3 (4.4%)	65 (95.6%)	19 (27.9%)	49 (72.1%)	26 (38.2%)	42 (61.8%)
² X		2.56		15.14		28.78	
p-value		0.46		0.001		0.001	

A comparison of good and poor KAP scores across years of study is presented in Table 3. The percentage of students demonstrating strong knowledge increased from 89.71% (61 out of 68) in the first year to 95.6% (65 out of 68) in the final year. Likewise, the proportion of students exhibiting a positive attitude rose from 44.1% (30 out of 68) to 72.1% (49 out of 68), while the rate of good practice showed an increase from 25% (17 out of 68) in the first year to 61.8% (42 out of 68) in the final year. A higher proportion of female medical students with good knowledge, attitude, and practice was observed among third-year part-II students (95.6%, 72.1%, and 61.8%, respectively). A statistically significant association was found between the year of study and scores for attitude ($X^2 = 15.14$, $p < 0.001$) and practice ($X^2 = 28.78$, $p < 0.001$). The bivariate correlations between BSE knowledge, attitude, and practice are examined

using Pearson's correlation coefficients, which are shown in Table 4. The results showed that knowledge and practice scores ($r = 0.24$, $p <.001$), attitude and practice scores ($r = 0.41$, $p <.001$), and knowledge and attitude scores ($r = 0.21$, $p <.001$) were significantly positively correlated. According to the study, medical students' higher knowledge levels correlate with more positive attitudes about breast self-examination. In a similar pattern, both a stronger knowledge base and a more positive attitude are linked to a higher frequency of BSE practice.

Table 4. Correlation between knowledge, attitude, and practice regarding BSE scores

Variables	Knowledge	Attitude	Practice
Knowledge		0.21 (0.000)	0.24 (0.000)
Attitude			0.41 (0.000)
Practice			

4. DISCUSSION

Assessing female medical students' knowledge, attitudes, and practices about breast self-examination is the aim of the current study.

The study findings indicate a higher mean knowledge score (24 on a total of 30) regarding BSE among the current study population compared to published results concerning Indian dental students [9]. In a pan-India study conducted among Indian women, individuals with postgraduate and graduate qualifications exhibited better knowledge scores [10]. Moreover, the level of education and the specific discipline of study play a crucial role in influencing students' BSE knowledge. The knowledge scores for breast self-examination (BSE) are generally better in medical students due to their formal training, advanced academic level, and clinical exposure. Individuals working in health care and women with a commendable educational background, supported by appropriate training, can contribute to the sharing of information within their own families, social circles, and peer groups [10].

With respect to the attitude domain, the mean score of this study was similar to the observation of Dolar Doshi et al. [9]. A substantial proportion of the population supported the view that "All women should engage in BSE," reinforcing the value of self-examination for the early detection of breast cancer. Attitude seems to be good in

nearly half of the study population (52.2%). In a comparable study, Alshafie et al. reported that just over half of the students demonstrated a positive attitude regarding BSE [11]. Fear of developing breast cancer in later life was identified as the main motivating factor for practicing breast self-examination [12]. Another reason for practicing BSE was the understanding that early detection has great value [13]. A study by Ranganath et al. showed that a structured training program led to a significant positive change in students' attitudes on BSE [14]. This illustrates that deliberately designed education is crucial for promoting positive health behaviors. The findings also highlighted a significant deficiency in Breast Self-Examination (BSE) practice within this group of Indian medical students. With a good practice score among 35% of the respondents, the results of this study are not significantly different from those reported in prior research. Despite their relatively high awareness of breast cancer, numerous female medical students do not routinely practice breast self-examination (BSE) [15]. Low rates of breast self-examination (BSE) practice were also identified in a UAE study on medical and non-medical students. The findings showed that a correct understanding of BSE was limited to only 37.3% of the participants, while the majority (72.3%) reported that they did not perform the practice [16]. Similar observations were made in other studies across different populations. For instance, a study conducted at King Saud University in Riyadh found that while 57.4% of participants possessed moderate knowledge of breast cancer, only 18% regularly practiced BSE despite 64% demonstrating a positive attitude towards it [17]. This reveals a prevalent pattern where; despite having sufficient knowledge and favorable attitudes regarding a health practice, individuals may still fail to adopt or maintain the behavior. Several factors contribute to this gap, including perceived barriers, low self-efficacy in performing BSE, and limited emphasis on BSE training within medical curricula [18]. The major shortcoming identified by the study is that knowledge alone is insufficient to ensure regular BSE practice; positive attitudes and self-efficacy are more influential in motivating the behavior.

An upward trend was observed in knowledge, attitudes, and practices related to BSE as individuals progressed through their years of education. This aligns with the results of an earlier study conducted on female medical students [19]. The observed differences in attitude and practice scores across various years of study suggest that exposure to clinical experiences and patient interactions may influence students' perspectives on BSE. This finding underscores the potential benefit of introducing practical BSE training earlier in the medical curriculum.

The primary findings of the study reveal a significant positive correlation between knowledge, attitude, and practice (KAP) scores concerning breast self-examination (BSE) among female medical students. This observation is in line with earlier studies concerning KAP and BSE, which frequently highlight significant associations between these domains, particularly among university students and healthcare providers [9, 20]. A strong correlation was observed between attitude and the practice domain in this study. This suggests that, while knowledge is important, a positive attitude may be a stronger determinant of regular BSE practice among female medical students. Strategies aimed at fostering positive attitudes and enhancing self-efficacy may prove more effective than approaches that concentrate exclusively on delivering knowledge on breast self-examination [21]. Female medical students should actively engage in practical BSE training, supported by early curriculum integration and peer collaboration, to enhance confidence and accuracy. It is also essential to maintain updated knowledge from credible sources and promptly report any detected abnormalities for timely evaluation.

The implications of the study's findings extend to the development of public health strategies. Women are advised to learn about the importance of breast self-examination (BSE) as a simple, cost-effective way for early diagnosis of breast carcinoma. Overcoming fear, embarrassment, and misconceptions through education, open discussion, and peer support can encourage regular practice. Community-based BSE

workshops led by healthcare professionals should be organized in accessible settings such as community centers, workplaces, and women's groups to promote hands-on learning. Cultural taboos, stigma, and modesty norms can create psychological barriers that discourage women from performing BSE or discussing breast health openly. Additionally, addressing cultural barriers and misconceptions about BSE may contribute to improving attitudes towards this screening method. The promotion of breast self-examination (BSE) practices can be strengthened by integrating BSE education into school curricula, implementing targeted health awareness campaigns, and effectively utilizing social media platforms to reach a wider audience.

5. CONCLUSION

The results of the study indicate that medical students' knowledge and skills regarding BSE improve as they advance in their medical training. While the high level of knowledge about BSE among female medical students is encouraging, the lower scores in attitude and practice indicate the educational gaps that need to be addressed. Implementing targeted interventions to enhance BSE skills and promote positive attitudes towards this screening method could contribute to better breast health awareness among future healthcare professionals and, by extension, the wider community.

LIMITATIONS

The major limitation of this study is its reliance on self-reported data, which is susceptible to both recall and social desirability biases. The study evaluated self-reported practice but did not assess the actual technique or accuracy of breast self-examinations performed by the participants. The study did not extensively explore other factors that may influence BSE knowledge, attitudes, and practices, such as cultural beliefs or exposure to breast cancer education outside the medical curriculum.

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Author's Contributions

Conceptualization, methodology, and design of the study: Vasanthi Chandrasekaran; Data curation: Vasanthi Chandrasekaran and Nithyashri S; Formal statistical analysis and interpretation of results: Vasanthi Chandrasekaran, Nithyashri S, Lavanya Sekhar, and Preetha Paul; Writing-Original Draft: Vasanthi Chandrasekaran, Lavanya Sekhar, and Preetha Paul; Writing-Reviewing and Editing: Vasanthi Chandrasekaran, Nithyashri S, Lavanya Sekhar, and Preetha Paul. All authors revised the manuscript for critical intellectual content. All authors have read and approved the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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Institutional Ethics Approval

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Ethics Committee of Panimalar Medical College Hospital and Research Institute (Ref: PMCH&RI/IHEC/2025/248).

Informed Consent

Written informed consent was obtained from all the participants in the study.

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