Section: Physiology

Original Research Article

KNOWLEDGE, AWARENESS AND PRACTICE REGARDING BREAST CANCER AND BREAST SELF-EXAMINATION AMONG YOUNG WOMEN IN TIRUCHIRAPPALLI DISTRICT, TAMIL NADU: A CROSS-SECTIONAL STUDY

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Received *: 09/09/2026*
Received in revised form *: 10/10/2026*
Accepted *: 23/10/2026*

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DOI: 10.70034/ijmedph.2026.4.309

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (4); 2052-2057

ABSTRACT

Background: Breast cancer is the leading site-specific cancer among women in India, and delayed presentation due to poor awareness continues to drive high mortality outside metropolitan centres. Young women, who represent tomorrow's screening-age population, are a strategically important but under-studied group for awareness assessment. The aim is to assess knowledge and awareness regarding breast cancer risk factors, screening, and treatment, and the practice of breast self-examination (BSE), among young women in and around Tiruchirappalli district, Tamil Nadu, and to compare these between medical/health-sciences students and students from non-medical academic streams.

Materials and Methods: A cross-sectional, questionnaire-based study was conducted among 114 young women (mean age 20.8±4.2 years, range 17–55 years) using a structured, pre-tested Tamil-language questionnaire administered through Google Forms between November 2019 and July 2020. A composite knowledge score (range 0–10) was derived from ten items with a pre-defined correct response. Data were analysed using the chi-square test, Mann–Whitney U test and Spearman's correlation; $p<0.05$ was taken as significant.

Results: Mean knowledge score was 5.92±2.26 (median 6, range 1–10). While 77.2% of respondents believed BSE helps in early detection, only 23.7% practiced it at any frequency and only 14.9% practiced it monthly as recommended. Two-thirds (67.5%) correctly identified mammogram as the method to detect an impalpable lump. Only 12.3% had a family history of breast cancer. Knowledge scores were significantly higher among medical/health-sciences students (mean 6.97±1.69, n=61) than non-medical stream students (mean 4.72±2.24, n=53; Mann–Whitney U, $p<0.001$). Awareness of BSE (85.2% vs 67.9%, $p=0.048$), awareness of mammogram (88.5% vs 43.4%, $p<0.001$), and regular BSE practice (32.8% vs 13.2%, $p=0.026$) were all significantly higher among medical/health-sciences students. A positive family history of breast cancer was not significantly associated with knowledge score or BSE practice in this predominantly young cohort ($p>0.05$).

Conclusion: Awareness regarding breast cancer among young women in this region was moderate, and BSE practice remained low despite widespread awareness of its value. Health-sciences education was the strongest determinant of both knowledge and screening behaviour, highlighting the need for structured, curriculum-independent breast-health education targeting young women outside formal medical training.

Keywords: Breast cancer, breast self-examination, awareness, young women, mammogram, cross-sectional study.

INTRODUCTION

Breast cancer has overtaken carcinoma of the cervix to become the most common cancer among women in India, and its incidence continues to rise across both urban and semi-urban populations.[1,2] Globally, breast cancer accounts for a substantial proportion of the cancer burden in women, and while early breast cancer constitutes 60–70% of cases diagnosed in developed countries, this figure is only around 30% in developing countries such as India, where women often present at an advanced, less curable stage.[2,3] This disparity is attributed less to biological differences in tumour behaviour than to poor awareness of risk factors and screening methods, delayed health-seeking behaviour, and limited penetration of organised screening programmes.[3,4]

The Government of India integrated breast and cervical cancer screening into the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) to promote early detection through breast self-examination (BSE), clinical breast examination, and mammography.4 BSE has been promoted as a low-cost method that empowers women to detect changes in their own breasts, although its independent effect on mortality reduction has been debated.[5] Regardless of this debate, breast awareness - knowing what is normal for one's own breasts and recognising change — continues to be recommended as a first step toward early presentation.[5,6]

Most Indian awareness studies have focused on adult women attending hospital outpatient departments or on rural community samples.[3,7] Young women, including those pursuing medical and paramedical education, who will go on to counsel and educate the public, and those from non-medical academic streams, who represent the general educated public of the future, have received comparatively less attention, despite evidence that knowledge acquired early in life shapes long-term screening behaviour.[8-10] Comparative data on whether health-sciences training confers a genuine awareness advantage over general higher education, within the same age band and socio-cultural setting, remain limited from Tamil Nadu.[9,11] With this background, the present study was undertaken among young women affiliated with a medical college in Tiruchirappalli district, Tamil Nadu, to assess knowledge, awareness and practice regarding breast cancer and BSE, and to examine the influence of stream of education and family history on these outcomes.

Aim and Objectives

1. To assess the level of knowledge and awareness of breast cancer risk factors, hereditary pattern, screening methods and treatment modalities among young women in and around Tiruchirappalli district, Tamil Nadu.
2. To assess the awareness and practice of breast self-examination among the study population.
3. To compare knowledge, awareness and BSE practice between medical/health-sciences students and students from non-medical academic streams, and to examine the influence of family history of breast cancer on these outcomes.

MATERIALS AND METHODS

Study design and setting: This was a descriptive, cross-sectional, questionnaire-based study conducted among young women in and around Tiruchirappalli and Perambalur districts, Tamil Nadu, affiliated with Dhanalakshmi Srinivasan Medical College and Hospital (DSMCH). Data were collected between November 2019 and July 2020.

Study population and sampling: The study population comprised 114 women aged 17–55 years (mean 20.8±4.2 years), recruited by convenience sampling, and consisting of undergraduate medical (MBBS) and allied health-sciences students together with students and young women from non-medical academic streams (engineering, commerce, arts and science, and other disciplines). Participation was voluntary.

Data collection tool: A structured, pre-tested questionnaire in the Tamil language was administered through Google Forms after obtaining informed consent. The questionnaire captured socio-demographic details (age, educational qualification, place of residence) and fourteen items assessing the age group and sex affected, risk factors, hereditary pattern and mode of inheritance, awareness and frequency of BSE practice, awareness that not all breast lumps are malignant, the method used to detect a clinically impalpable lump, curability, the effect of early diagnosis on survival, treatment modalities, and family history of breast cancer. The item structure followed the approach used in comparable South Indian breast cancer awareness surveys.[3]

Knowledge scoring: A composite knowledge score (range 0–10) was derived by assigning one point each for a pre-defined correct response on ten items-age-related risk, occurrence in men, awareness of multiple risk factors, hereditary predisposition, BSE helping in early detection, awareness that not all lumps are malignant, correct identification of mammogram as the detection method for an impalpable lump, curability, effect of early detection on survival, and awareness of all three treatment modalities [Table 1]. BSE practice and family history were analysed separately as practice/exposure variables rather than knowledge items.

Statistical analysis: Data were entered and analysed using SPSS version 28. Categorical variables are

presented as frequencies and percentages and were compared using the chi-square test. The knowledge score, treated as a continuous variable, is presented as mean ± standard deviation and was compared between groups using the Mann–Whitney U test, corroborated by the independent-samples t-test. Spearman's rank correlation assessed the relationship between age and knowledge score. A two-sided p-value <0.05 was considered statistically significant.

Ethical considerations: Informed consent was obtained from all participants before administration of the questionnaire, and confidentiality of individual responses was maintained.

RESULTS

A total of 114 young women completed the questionnaire. The mean age was 20.8±4.2 years (range 17–55 years); the great majority (>85%) were aged between 17 and 24 years. Sixty-one (53.5%) respondents were medical or allied health-sciences students and 53 (46.5%) were from non-medical academic streams. Fourteen respondents (12.3%) reported a family history of breast cancer.

Knowledge and Awareness: [Table 1] shows the proportion of respondents giving the pre-defined correct response for each of the ten knowledge items. Awareness that early detection improves survival (81.6%) and that BSE helps in early detection (77.2%) were the best-recognised items, whereas awareness that breast cancer risk rises above 50 years of age (40.4%) and definite awareness that men can also develop breast cancer (34.2%) were the least recognised [Figure 5].

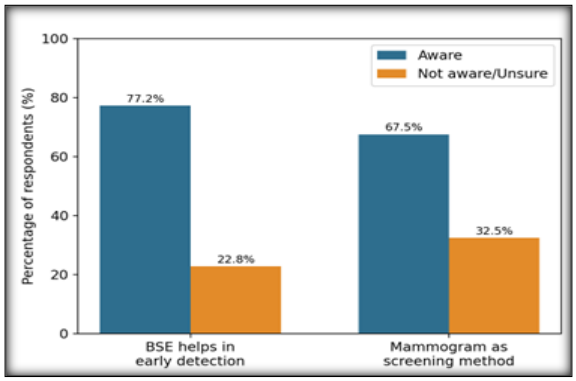


Figure 1: Awareness about screening methods (N=114).

Table 1: Knowledge and awareness of breast cancer among the study population (N=114)

Knowledge item	Correct response (pre-defined)	n	%
Breast cancer risk increases above 50 years of age	'50 years and above'	46	40.4
Men can also develop breast cancer	'Yes' (definite)	39	34.2
Multiple risk factors (smoking, alcohol, unhealthy diet, lack of exercise)	'All of the above'	55	48.2
Breast cancer can be hereditary	'Yes'	59	51.8
Breast self-examination helps in early detection	'Yes'	88	77.2
Not all breast lumps are malignant	'No'	82	71.9
Method to detect a clinically impalpable lump	Mammogram	77	67.5
Breast cancer is completely curable (if detected early)	'Yes'	51	44.7
Early detection improves survival/longevity	'Yes'	93	81.6
Awareness of all three treatment modalities (surgery, chemotherapy, radiotherapy)	'All of the above'	85	74.6

The composite knowledge score ranged from 1 to 10, with a mean of 5.92±2.26 and a median of 6 (interquartile range 4–8).

Breast Self-Examination: Awareness and Practice

Although 88 respondents (77.2%) were aware that BSE helps in early detection, only 27 (23.7%) practiced it at any frequency 17 (14.9%) monthly, 7 (6.1%) once in six months, and 3 (2.6%) daily while the remaining 87 (76.3%) had never practiced BSE [Figure 2]. Respondents who practiced BSE at any frequency had a numerically higher mean knowledge score (6.70±1.94) than those who did not (5.68±2.31), a difference that approached but did not reach statistical significance (Mann–Whitney U, p=0.055).

Knowledge, Awareness and Practice by Educational Stream: Knowledge scores were significantly higher among medical/health-sciences students (mean 6.97±1.69, n=61) than among students from non-medical academic streams (mean 4.72±2.24, n=53; Mann–Whitney U, p<0.001; independent t-test, p<0.001) [Figure 3, Table 2]. Awareness of BSE, awareness of mammogram as a screening/detection method, and current BSE practice were all significantly greater among medical/health-sciences students [Table 2, Figure 4].

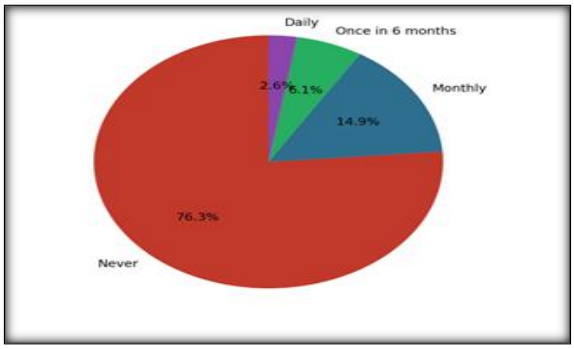


Figure 2: Frequency of breast self-examination practice (N=114)

Family History and Age: Respondents with a positive family history of breast cancer (n=14) did not differ significantly from those without (n=100) in mean knowledge score (5.64±1.86 vs 5.96±2.31;

Mann–Whitney U, p=0.522), BSE awareness (χ^2=0.04, p=0.835), or current BSE practice (χ^2=0.00, p=1.000). Age showed a significant inverse correlation with knowledge score on unadjusted analysis (Spearman's r=−0.39, p<0.001); however, this was explained by the fact that medical/health-sciences students, who had markedly higher knowledge scores, were also younger on average (mean age 19.8±1.3 years) than non-medical stream respondents (mean age 22.0±5.8 years), rather than by any true biological or cognitive effect of age itself.

Table 2: Comparison of knowledge, awareness and BSE practice by educational stream

Parameter	Medical/health-sciences students (n=61)	Non-medical stream students (n=53)	Test statistic	p-value
Mean knowledge score (±SD, /10)	6.97 ± 1.69	4.72 ± 2.24	U (Mann–Whitney)	<0.001
Aware BSE helps in early detection, n (%)	52 (85.2)	36 (67.9)	χ^2 = 3.90	0.048
Aware of mammogram as detection method, n (%)	54 (88.5)	23 (43.4)	χ^2 = 24.33	<0.001
Currently practicing BSE (any frequency), n (%)	20 (32.8)	7 (13.2)	χ^2 = 4.98	0.026

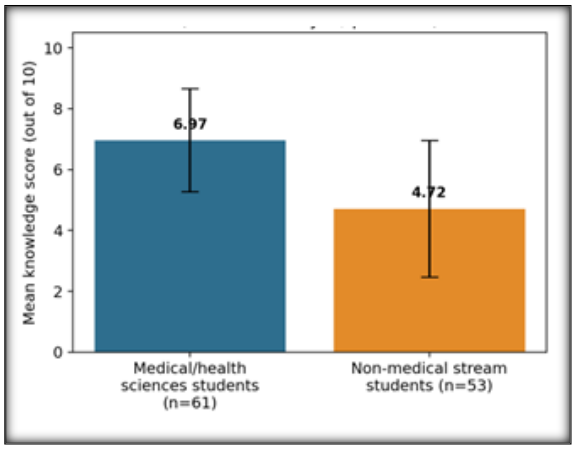


Figure 3: Mean knowledge score by educational stream (Mann–Whitney U, p<0.001)

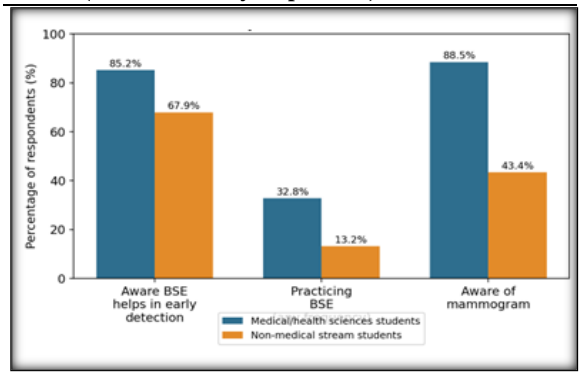


Figure 4: Screening awareness and BSE practice by educational stream

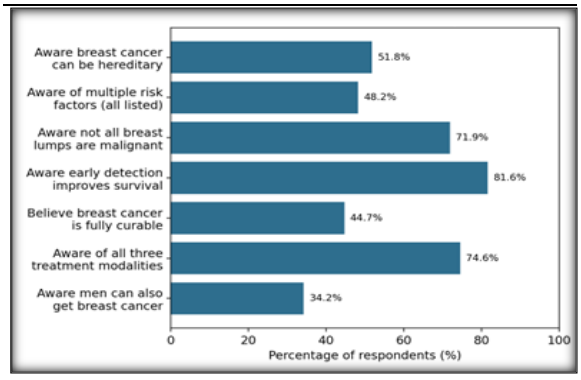


Figure 5: Awareness of selected knowledge items (N=114)

DISCUSSION

In this cross-sectional study of 114 young women in and around Tiruchirappalli district, Tamil Nadu, overall knowledge and awareness of breast cancer were moderate, mirroring the pattern reported by Subramanian et al. in a larger South Indian sample, where knowledge of risk factors was similarly low despite reasonably high awareness of BSE (78%) and general breast changes (92%).[3] In our study, awareness that BSE helps in early detection (77.2%) was almost identical to that reported by Subramanian et al,[3] while awareness of mammogram as a detection method (67.5%) was considerably higher than the 36% reported in that community-based study, a difference plausibly explained by the younger, more educated, and substantially student-based composition of our sample, over half of whom were pursuing medical or allied health-sciences courses.

Despite high awareness that BSE aids early detection, actual practice remained low (23.7% at any frequency; 14.9% monthly), a gap consistently reported across the literature. Madhukumar et al., studying basic-sciences college students in Bengaluru, similarly found that awareness of breast carcinoma was reasonably good but that knowledge of warning signs and BSE technique remained poor, limiting translation of awareness into practice.[12] Mukherjee Das et al., in a large study of 866 female college students in Delhi-NCR, likewise reported a persistent awareness–practice gap regarding BSE despite fair overall knowledge scores.[13] This awareness–practice discordance has been attributed in the literature to lack of a felt need in the absence of symptoms, embarrassment, and absence of formal instruction in correct technique rather than to disbelief in the value of BSE itself.[14,15]

A distinguishing feature of the present study was the clear and statistically significant advantage in knowledge, screening awareness and BSE practice among medical/health-sciences students compared with their non-medical peers of similar age. This finding is consistent with Bašić et al., who

compared female students of health studies and non-health faculties in Sarajevo and found better BSE-related knowledge among health-sciences students, although with narrower gaps than observed in our cohort, possibly reflecting differences in curriculum exposure to oncology topics at different training stages.[16] It also parallels the Korean nationwide study by (Lee), where academic major was an independent predictor of BSE practice among female university students, alongside age and disease knowledge.[17] Our findings extend this literature by showing that the advantage of health-sciences education in our setting was not confined to BSE alone but extended across nearly every domain assessed including awareness of mammography, treatment modalities, and hereditary risk suggesting that structured exposure to health science curricula, rather than isolated topic-specific teaching, is likely to be the operative mechanism.

Awareness of mammography as a screening/detection method was particularly divergent between the two groups (88.5% among medical/health-sciences students versus 43.4% among non-medical stream students), a gap of a magnitude comparable to that reported by Rahman et al. among university students in Sharjah, where health-college students demonstrated substantially better awareness of mammography than non-health college students.[18] This finding is of practical importance because non-medical stream students represent a large segment of India's future educated workforce who will not otherwise receive formal exposure to cancer-screening concepts unless these are addressed through general public health education, mass media, or workplace wellness programmes, echoing the recommendations of Shankar et al. following their multi-state assessment of cancer-awareness gaps among college teachers.[19]

Contrary to several earlier reports from Jordan and Iran describing better BSE-related knowledge and practice among women with a family history of breast cancer, family history in our study was not significantly associated with knowledge score or BSE practice. This is most plausibly explained by the small number of respondents with a positive family history (n=14) in a predominantly young, low-parity sample, which limited the statistical power to detect a true association, rather than a genuine absence of effect; larger, adequately powered studies would be needed to confirm this null finding locally.

The apparent inverse correlation between age and knowledge score deserves specific comment: on closer examination, this reflected confounding by educational stream, since medical students in our sample were, by virtue of being early in their undergraduate training, younger on average than non-medical stream respondents. This observation cautions against interpreting simple bivariate age–knowledge associations in mixed student populations without adjusting for the stream of education, and is best clarified in future work using multivariable regression.

Only 12.3% of our largely student-based sample reported a family history of breast cancer, and fewer than half were aware that breast cancer could occur in women below 50 years of age, echoing the concern raised by Fotedar et al. among nursing staff in Himachal Pradesh that even health-sciences-adjacent groups often underestimate risk in younger women, at a time when a meaningful minority of breast cancers in India are diagnosed in women under 40 years.[20] Similarly, only about a third of respondents were definitely aware that men can also develop breast cancer, a finding consistent with the very low awareness of male breast cancer reported in earlier South Indian data,3 and one that highlights a specific, easily addressed gap for future awareness campaigns and medical curricula alike.

Limitations: Self-reported BSE practice is subject to recall and social-desirability bias and could not be verified for correct technique. The subgroup with a positive family history was small, limiting the power of that particular comparison.

CONCLUSION

Knowledge and awareness of breast cancer among young women in this Tamil Nadu-based sample were moderate overall, with a persistent gap between awareness of breast self-examination and its actual practice. Health-sciences education emerged as the strongest and most consistent determinant of knowledge, screening awareness, and BSE practice, while a family history of breast cancer showed no significant association in this young cohort, likely reflecting limited statistical power rather than a true absence of effect. These findings support the need for structured, curriculum-independent breast-health education — including hands-on BSE demonstration — targeted specifically at young women outside medical and allied health training, so that awareness gains achieved through formal health education can be extended to the wider population of future screening-age women. Strengthening such awareness at a young age, in line with the objectives of the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke, may help shift the pattern of presentation toward earlier, more curable stages of disease.

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