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Knowledge, Attitude, And Practice of Breast Self-Examination Among Female Non- Medical College Students in Andhra Pradesh and Telangana: A Cross-Sectional Study

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Research Article

Keywords: BSE, KAP, Female Non -medical students, Andhra Pradesh and Telangana

Posted Date: August 4th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10519608/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

Breast cancer (BC) is the leading cause of cancer incidence and mortality in India. BC burden is higher in the state of Telangana and Andhra Pradesh. Early detection of Breast cancer can reduce its morbidity and mortality. Breast self-examination (BSE) is a simple, non-expensive, relatively quick, non-invasive, and harmless intervention considered to be an effective strategy for early detection. This study assessed the knowledge, attitude, and practice (KAP) regarding BSE among female non-medical college students in Andhra Pradesh and Telangana.

Methods

This cross- sectional study included responses from 513 women (Mean age = 20.30 ± 2.00) from non-medical college going students of Andhra Pradesh and Telangana. Data collection adopted a self – administrated questionnaire assessing KAP regarding BSE. Statistical analysis included independent samples t-tests, one-way analysis of variance (ANOVA) and Binary logistic regression.

Results

The majority of the participants demonstrated inadequate knowledge (74.5%), unfavourable attitudes (82.8%) and poor practice (89.1%). Prior awareness of BSE emerged as the strongest predictor of good practice, with participants who heard about BSE demonstrating significantly higher odds of good practice (OR = 2.441, 95% CI: 1.355–4.397, p = .003). Educational level, Place of birth and area of residence were not significantly associated with BSE- related outcomes.

Conclusion

Female non- medical college students in Andhra Pradesh and Telangana exhibited suboptimal breast health literacy. These findings highlight that in order to raise awareness and promote early detection practices; higher education institutions should implement organized campus-based breast health initiatives.

Background

Cancer is a group of diseases that cause the body's cells to alter and proliferate uncontrollably. Most cancer cell types eventually grow into a lump or mass called a tumor, which gets its name from the body part it initially occurs in. The breast tissue, which is made up of the lobular glands that produce milk and the ducts that connect them to the nipple, is where breast cancer (BC) starts [(1)]. According to the data from the 2022 Global Cancer Observatory (GLOBOCAN) report, female BC is the second most common type of cancer worldwide, accounting for 11.6% of all cancer cases with an estimated 2.3 million cases annually. According to demographics-based projections, the annual number of new cases of cancer is projected to reach 35 million by 2050, a 77% rise from the 2022 figures, based on anticipated changes in

population growth and aging and assuming that global cancer rates remain stable. BC is the most common cancer diagnosed in women worldwide and the leading cause of cancer-related deaths, occurring in 157 countries for incidence and 112 countries for mortality [2].

In India, among female BC is the leading cause of cancer incidence and mortality [3]. The median age of presentation at diagnosis is 49 years in India compared to 62 in the Western population, indicating that younger Indian women have a higher incidence of BC than those in the west [4]. In 2025, it was expected that female BC would cause 5.6 million disability-adjusted life years (DALYs) [3]. Regarding the stage of breast cancer at diagnosis, approximately half of all cases in India are detected at locally advanced or later stages. Early detection, supported by health education and awareness [4], is essential for reducing the morbidity and mortality associated with the disease. Mammography, Clinical Breast Examination (CBE), and Breast Self-Examination (BSE) are considered effective strategies for early detection [5]. The United States Preventive Services Task Force (USPSTF) recommends biennial screening mammography for women aged 40 to 74 years [6].

Furthermore, all women should become familiar with the appearance and texture of their breasts to detect any changes and report them promptly to their physician [1]. The only non-invasive procedure that can be routinely carried out is BSE [7] which involves visual inspection in front of a mirror in both standing and supine positions [8]. The American Cancer Society provides guidance on breast awareness, acknowledging the limitations of BSE [9].

According to age – standardized estimates, three southern states Telangana, Karnataka, and Tamil Nadu carry a significant BC burden, with each reporting more than 7000 DALYs per 100,000 women, and Telangana recording the highest rates [3]. Similarly, the National Cancer Registry reported 73,536 cancer cases in Andhra Pradesh in 2020, with BC accounting for nearly 16% of total [10]. Mitigating this impact requires targeting the younger population, as health behaviours formed during adulthood can enhance future health and have implications for the entire life course [11].

Most medical students are more knowledgeable about BC. The knowledge, attitude, and skill scores of adults in the medical and non-medical streams differ significantly [12]. Although the literature confirms a high BC burden in Southern India, particularly in Telangana and Andhra Pradesh, there remains a scarcity of recent, comparative data evaluating preventive health practices among young women outside of the healthcare tracks. Thus, the purpose of the cross-sectional study was to assess the Knowledge, Attitude, and Practice (KAP) regarding BSE among non-medical female college students in Andhra Pradesh and Telangana.

Methods

An online cross-sectional survey was conducted among non-medical college going females aged 18 to 26 years of Andhra Pradesh and Telangana, India in the year 2026 regarding their KAP on BSE. This study

recruited participants over the course of three months, from February 2026 to May 2026, using a snowball sampling technique via digital channels. The necessary sample size was 385, with a 5% margin of error for an infinite population proportion (50%) and a 95% confidence level (p=.05). However, data were collected from 513 participants in which 350 responded from Andhra Pradesh and 163 from Telangana. A total of 530 responses were recorded during the 3-month period. Following the automatic exclusion of 17 respondents who selected “NO” on mandatory e- informed consent page, ultimately totalling 513 completed questionnaires. Initially, a secured Google form web link of the online survey was distributed via electronic platforms like WhatsApp to primary participants, who were female Undergraduate (UG) and Post Graduate (PG) students from non-medical disciplines across Andhra Pradesh and Telangana. The response to the survey begins on the same date of circulation and these first responders were then encouraged to create a continuous chain referral system by sending the survey invitation link to their female peers to maximize the reach.

Data collection used a close-ended self-administered questionnaire that was adopted from established literature [13] Cronbach's alpha assessed the reliability of internal consistency. The knowledge scale demonstrated moderate reliability (α = .651), the attitude scale demonstrated moderate reliability (α = .676), and the practice scale demonstrated acceptable reliability (α = .739), indicating satisfactory internal consistency of the study instrument. Thirteen items on attitude, seven on practice, and fifteen on knowledge made up the 35-item questionnaire. Knowledge items utilized categorical responses (scored as 2 for correct, 1 for "not knowing," and 0 for incorrect). Attitude items were measured on a 5-point Likert scale (0–4), and practice items used equivalent ordinal scoring (0–4), with negative items reverse-coded.

For data analysis, IBM SPSS Version 26 was utilized. Descriptive statistics, including means, frequencies, percentages, and standard deviations, have been used to characterize participant characteristics and KAP scores. Continuous variables were tested for normality using the Kolmogorov-Smirnov and Shapiro-Wilk tests. The internal consistency reliability of the questionnaire was evaluated using Cronbach's alpha, and its construct validity was examined using principal component analysis with Varimax rotation. The Chi-square test of independence was performed to analyse correlations between categorical variables. Independent samples t-tests and one-way analysis of variance (ANOVA) were used to compare the mean KAP scores for every demographic group. Using Pearson's correlation coefficient, the associations between KAP scores were assessed. Lastly, independent predictors of Adequate Knowledge, Favourable Attitude, and Good Practice were found by binary logistic regression analysis and the statistical significance was set at $p < 0.05$.

Additionally, specific women’s universities across the target regions were identified and formally approached. Administrative permissions and institutional approvals were secured from these universities to deliver BSE awareness sessions to the student population based on the findings.

Results

Sociodemographic Characteristics

A total of 513 female non-medical college students responded to the survey and were included in the final analysis. The information of the participants is presented in Table 1. The majority were UG students (82.3%), while 17.7% were PG students and most participants belonged to urban areas (68.2%), followed by rural areas (21.4%) and sub-urban areas (10.3%). More than half of the participants (53.4%) reported that they had never heard about BSE, whereas 46.6% had heard about BSE.

Table 1
represents the sociodemographic characteristics of the study participants (n = 513)

Variable	Category	n	frequency
Education	UG	422	82.3
	PG	91	17.7
Heard about BSE	Yes	239	46.6
	No	274	53.4
Area of Residence	Urban	350	68.2
	Rural	110	21.4
	Sub-urban	53	10.3

KAP Levels of Non-medical female students

Table 2 represents the KAP Levels based on the predetermined 70% cut-off criteria, 25.5% (n = 131) of participants demonstrated adequate knowledge regarding BSE, while 74.5% (n = 382) had inadequate knowledge. Favourable attitudes towards BSE were observed in 17.2% (n = 88) of participants, whereas 82.8% (n = 425) exhibited unfavourable attitudes. Regarding practice, only 10.9% (n = 56) reported good BSE, while the majority (89.1%, n = 457) demonstrated poor practice.

Table 2
Distribution of knowledge, Attitude and practice categories

Domain	Category	n	frequency
Knowledge	Adequate Knowledge	131	25.5
	Inadequate Knowledge	382	74.5
Attitude	Favourable Attitude	88	17.2
	Unfavourable Attitude	425	82.8
Practice	Good Practice	56	10.9
	Poor Practice	457	89.1

Participant characteristics and baseline KAP scores

The mean age of the participants was 20.30 ± 2.00 years. The mean knowledge score was 18.06 ± 4.43 out of a maximum possible score of 30. The mean attitude score was 30.96 ± 6.71 out of 52, while the mean practice score was 11.91 ± 5.82 out of 28. Notably, the average knowledge (18.06), attitude (30.96), and practice (11.91) scores were below their respective adequacy thresholds (21, 37, and 20), indicating generally low levels of knowledge, unfavourable attitudes, and poor BSE practices among the study participants. (Table 3)

Table 3
represents the descriptive Statistics of Continuous Study Variables (N = 513)

Variable	Mean ± SD	Median	Min–Max	95% CI
Age (years)	20.30 ± 2.00	20.00	18–28	20.13–20.48
Knowledge Total Score	18.06 ± 4.43	17.00	7–30	17.67–18.44
Attitude Total Score	30.96 ± 6.71	30.00	13–52	30.38–31.54
Practice Total Score	11.91 ± 5.82	12.00	0–28	11.41–12.42

Comparison of KAP Scores by Place of Birth - Independent-samples t tests (Table 4) revealed no significant differences between participants from Andhra Pradesh and Telangana in knowledge scores, attitude scores, or practice scores.

Table 4
represents the Comparison of KAP Scores

Variable	AP (n = 350) Mean ± SD	TG (n = 163) Mean ± SD	*t*(511)	*p*	Mean Difference (AP − TG)	95% CI
Knowledge total	17.98 ± 4.47	18.21 ± 4.36	−0.55	.581	−0.23	[− 1.06, 0.59]
Attitude total	31.20 ± 6.82	30.45 ± 6.45	1.17	.243	0.74	[− 0.51, 1.99]
Practice total	12.05 ± 5.98	11.61 ± 5.48	0.80	.425	0.44	[− 0.64, 1.53]

Comparison of KAP scores across age groups

One-way ANOVA was conducted to evaluate differences in KAP scores across four age groups (18–19 years, 20–21 years, 22–24 years, and 25 years). As shown in Table 5, no statistically significant differences were observed across age categories for KAP.

Table 5
Comparison of KAP scores across age groups

Variable	Age Group	n	Mean ± SD	F (df)	p
Knowledge	18–19 years	217	18.44 ± 4.67		
	20–21 years	169	17.59 ± 4.15		
	22–24 years	109	17.90 ± 4.43		
	≥ 25 years	18	18.78 ± 3.83	1.39 (3, 509)	.244
Attitude	18–19 years	217	31.41 ± 7.07		
	20–21 years	169	30.37 ± 6.40		
	22–24 years	109	30.66 ± 5.78		
	≥ 25 years	18	32.89 ± 9.73	1.34 (3, 509)	.260
Practice	18–19 years	217	11.79 ± 6.11		
	20–21 years	169	11.89 ± 5.59		
	22–24 years	109	12.07 ± 5.37		
	≥ 25 years	18	12.61 ± 7.41	0.15 (3, 509)	.933

Note. Values are presented as mean ± standard deviation (SD). One-way analysis of variance (ANOVA) was used to compare KAP scores across age groups. Levene's test indicated homogeneity of variances for Knowledge (p = .141) and Practice (p = .170), while Attitude violated the homogeneity assumption (p = .021). Therefore, Games–Howell post hoc comparisons were considered for Attitude.

Association between prior awareness of BSE and KAP levels

Table 5 represents prior awareness of BSE was significantly associated with KAP categories.

Table 5
association between prior awareness of BSE and KAP levels

Outcome Variable	No n (%)	Yes n (%)	χ^2	df	p
Adequate Knowledge	55 (20.1)	76 (31.8)	9.231	1	.002*
Favourable Attitude	35 (12.8)	53 (22.2)	7.940	1	.005*
Good Practice	20 (7.3)	36 (15.1)	7.912	1	.005*
• p < .05					

Correlation Analysis among KAP scores

No significant correlations were found between age and knowledge, attitude, or practice scores. However, Pearson correlation analysis showed (Table 6) strong positive correlations between knowledge and attitude scores, knowledge and practice scores, and attitude and practice scores.

Table 6
The corelation matrix of KAP scores

Variable	1	2	3
1. Knowledge Total	1	.366**	.226**
2. Attitude Total	.366**	1	.392**
3. Practice Total	.226**	.392**	1
Note. **p < .001 (two-tailed).			

Predictors of adequate knowledge

Table 7 represents Participants who had heard about BSE were approximately 1.95 times more likely to possess adequate knowledge compared with those who had not heard about BSE. No significant associations were observed for age, education, or residence.

Table 7
Predictors of adequate knowledge

Predictor	OR (Exp(B))	95% CI	p
Age	0.917	0.803–1.047	.200
Education (UG vs PG)	0.955	0.474–1.925	.897
Heard BSE (Yes vs No)	1.954	1.299–2.941	.001*
Residence (Rural vs Urban)	1.037	0.635–1.695	.884
Residence (Sub-urban vs Urban)	0.513	0.238–1.105	.088

Model Statistics: χ^2 (5) = 14.861, p = .011; Nagelkerke R^2 = .042; Hosmer-Lemeshow p = .073.

Predictors of favourable attitude-Participants who had heard about BSE were 2.12 times more likely to demonstrate a favourable attitude toward breast self-examination. Age was also a significant predictor, indicating a slight decrease in the odds of favourable attitude with increasing age (Table 8)

Table 8
The Predictors of favourable attitude

Predictor	OR (Exp(B))	95% CI	p
Age	0.846	0.722–0.990	.037*
Education (UG vs PG)	0.498	0.227–1.095	.083
Heard BSE (Yes vs No)	2.123	1.317–3.421	.002*
Residence (Rural vs Urban)	1.001	0.563–1.780	.998
Residence (Sub-urban vs Urban)	0.675	0.287–1.585	.367

Model Statistics: χ^2 (5) = 13.751, p = .017; Nagelkerke R^2 = .044; Hosmer-Lemeshow p = .042.

Predictors of Good Practice

Participants who had heard about BSE were 2.44 times more likely to exhibit good BSE practice compared with those who had not heard about BSE. No significant associations were observed for age, education, or residence (Table 9)

Table 9
Independent Predictors of good practice

Predictor	OR (Exp(B))	95% CI	p
Age	0.995	0.832–1.190	.960
Education (UG vs PG)	0.494	0.204–1.196	.118
Heard BSE (Yes vs No)	2.441	1.355–4.397	.003*
Residence (Rural vs Urban)	1.703	0.900–3.221	.102
Residence (Sub-urban vs Urban)	0.337	0.078–1.459	.146

Model Statistics: χ^2 (5) = 18.391, p = .002; Nagelkerke R^2 = .071; Hosmer-Lemeshow p = .329.

Discussion

In order to promote awareness and improve the health of young women, Health education is crucial. A total of 513 female non-medical college students answered the survey, which aimed to evaluate the KAP regarding BSE. The findings revealed inadequate knowledge, unfavourable attitudes, and poor BSE practices. This highlights a significant gap in breast health literacy despite their engagement in higher education.

Approximately three-fourths of the participants demonstrated inadequate knowledge (74.5%) regarding BSE, indicating poor understanding of BSE procedures, warning signs, and screening recommendations. Similarly, only one in ten participants (10.9%) demonstrated good BSE practice, highlighting a substantial gap between awareness and adoption of preventive behaviours. Despite the importance of BSE for early detection of breast abnormalities, actual implementation among participants was extremely low. These findings are consistent with previous studies that reported reduced knowledge about BSE, with many participants indicating that they were not aware of it. Additionally, a sizable percentage of participants stated that their low practice rate was caused by a lack of understanding and skill required to perform BSE [12, 14, 19, 21]. Similarly, other studies also reported that the female college going students had poor knowledge regarding BSE [18, 20]. This highlights a significant disconnect between clinical health literacy and overall academic advancement. Unless public health education is purposefully incorporated into the curriculum, progression through higher education does not immediately translate into a functional understanding of Preventive personal health screening practices.

A binary Regression model was used to identify the fundamental behavioural drivers underlying the data. According to the statistical model, participants who previously heard of BSE had considerably higher attitude scores than those without. Similarly, Participants who had heard about BSE were 2.44 times more likely to exhibit good BSE practice compared with those who had not heard about BSE. This suggests that awareness is the most vital step in the development of positive health behaviours and these results are consistent with studies where knowledge and practice were highly corelated [15, 17, 22].

However, in contrast a study revealed that the respondents had a negative opinion regarding BSE and were hesitant to practice BSE despite being aware of the approach, suggesting that awareness alone may not always translate into behavioural change [16].

Interestingly, the results displayed that educational level is not significantly associated with knowledge, attitude, or practice and the area of residence was also not significantly associated with KAP outcomes. These findings contrast with existing literature Which states that living in an urban area encourages greater preventative health practices [23, 26]. Furthermore, sub group analysis across age categories demonstrated no significant variations in KAP scores indicating that deficits in breast health literacy are uniformly distributed across age bands within non-medical student populations. Regarding the regional patterns found in the literature, which showed that advancing through higher academic levels considerably improved breast health literacy [25, 26] This divergence highlights a crucial structural difference across academic streams typical non-medical curricula lack integrated health education, but advancements within the professional healthcare track naturally provide cumulative, formal exposure that enhances KAP over time. Additionally, none of the KAP domains showed any discernible changes between participants from Andhra Pradesh and Telangana. This result implies that the gaps in breast health literacy that have been noted are widespread in both states indicating a common need for breast health education among non-medical female college students.

From a public health perspective, these findings underscore the urgent need for structured breast health promotion programmes targeting non-medical college students. Given that BC incidence continues to rise in India and younger women are increasingly affected, educational institutions provide a valuable setting for introducing awareness campaigns, breast self-examination training sessions, and breast health literacy initiatives. Such programmes may contribute to earlier recognition of breast abnormalities and potentially facilitate timely healthcare seeking behaviour.

This cross-sectional study relies entirely on self-reported questionnaire data from 513 female students, which may introduce social desirability and recall biases regarding their actual BSE practices. Furthermore, the online survey used snowball sampling through digital platforms which has an inherent selection bias that may restrict how broadly the results can be applied to all Andhra Pradesh and Telangana students. Lastly, this cross- sectional design could not assess long-term behavioural compliance or determine whether participants who have heard about BSE truly execute the physical examination procedure appropriately over time.

Conclusion

This study reveals a substantial gap in breast health literacy among non-medical female college students in Andhra Pradesh and Telangana, with the majority exhibiting inadequate knowledge (74.5%), unfavourable attitudes (82.8%), and poor BSE practice (89.1%). Crucially, prior awareness of BSE was identified as the most consistent predictor for better performance across all three domains, whereas place of birth, area of residence and educational level had no significant influence. These findings

highlight the need for introducing structured, campus-based breast health programs to build awareness and actively foster early-detection behaviours among young women.

Abbreviations

• ANOVA
One-way Analysis of Variance
• AOR
Adjusted Odds Ratio
• BC
Breast Cancer
• BSE
Breast Self-Examination
• CBE
Clinical Breast Examination
• CI
Confidence Interval
• DALYs
Disability-Adjusted Life Years
• df
Degrees of Freedom
• GLOBOCAN
Global Cancer Observatory
• IBM SPSS
International Business Machines Statistical Package for the Social Sciences
• KAP
Knowledge, Attitude, and Practice
• OR
Odds Ratio
• PG
Postgraduate
• SD
Standard Deviation
• UG
Undergraduate
• USPSTF
United States Preventive Services Task Force
• YLDs
Years Lived with Disability
• YLLs

Years of Life Lost

Declarations

Ethics approval and consent to participate - Ethical clearance from the institutional ethical committee (REG. NO: ECR/431/1nst/TN/2013/RR-24) with IEC No: 9232 was obtained. Anonymity and confidentiality of the response were assured. Participants have to read and complete an electronic informed consent form. Only after obtaining their consent digitally participants can access and complete the questionnaire.

Consent for publication – NA

Availability of data and materials- The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests- The authors declare that they have no competing interests.

Funding: This study was fully funded by SRMIST. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Authors' contributions-

Udaya Rasi Budireddi conceptualized the study, coordinated data collection, drafted the manuscript Suresh T.N. contributed to study design supervised data analysis and critically revised the manuscript

Acknowledgements- would like to express sincere gratitude to student participants who voluntarily dedicated their time to complete the survey and also to the principals and administrative authorities of identified women’s colleges for granting permission to deliver BSE awareness session.

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