
Knowledge and Breast Self-Examination Practice Among Health and Non-Health University Students

M. Badzlul Rahmansyah^{1*}, Farhan Aqil Putra Hermawan², Nurhidayati³, Rizka Vidya Lestari⁴, Hanan Afifah⁵

¹Faculty of Medicine and Health Sciences, Universitas Mataram, Jl. Pendidikan No 37 Mataram 83125, West Nusa Tenggara, Indonesia

*Corresponding Author : badzlulmbr1094@gmail.com

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Abstract . Breast cancer remains the most prevalent malignancy in Mataram City, with many cases diagnosed at advanced stages due to inadequate early screening. This study aims to analyze the relationship between breast cancer knowledge and Breast Self-Examination (BSE/SADARI) practice among health and non-health university students in Mataram. An observational analytic quantitative design with a cross-sectional approach was utilized. Data were collected from 256 female students across multiple universities in Mataram using a validated questionnaire distributed via Google Forms, selected through quota sampling. Data analysis included univariate descriptive statistics, Chi-Square tests, and Independent Sample T-tests. The results revealed that 41.4% of respondents had poor knowledge, while 56.3% demonstrated poor BSE practices. Bivariate analysis showed a statistically significant positive relationship between knowledge levels and BSE practice, although the correlation strength was relatively weak. Students in the health cluster demonstrated significantly higher scores in both knowledge and practice compared to those in the non-health cluster. This study concludes that while knowledge serves as a foundational requirement, a prominent "knowledge-practice gap" exists, likely influenced by psychological barriers such as fear and forgetfulness. Future interventions should move beyond disseminating theoretical facts and focus on digital-based technical training and self-efficacy to bridge the gap between awareness and consistent preventive behavior among university students.

Keywords: Breast Cancer, Knowledge, BSE Practice, University Students, Mataram

INTRODUCTION

Breast cancer is a malignant condition characterized by the uncontrolled growth of abnormal cells within the breast epithelium [1]. This uncontrolled proliferation is not localized to the breast tissue; it can metastasize to other organs, severely compromising normal physiological functions [2]. Globally, breast

cancer remains one of the most frequently diagnosed malignancies. According to the Global Cancer Observatory (GLOBOCAN) in 2020, it ranked as the fifth leading cause of cancer-related death, with 2.3 million new cases and 684,996 fatalities recorded [3].

In the Indonesian context, breast cancer dominates the oncological landscape, accounting for 30.8% of all cancer cases in 2020 and 20.4% of female cancer deaths. Projections suggest a staggering 47.1% increase in incidence and a 62.1% rise in mortality by 2040 [4]. Specifically in Mataram City, West Nusa Tenggara (NTB), breast cancer is the most prevalent type of cancer, with 420 cases recorded between 2015 and 2020. Alarmingly, many cases are diagnosed at an advanced stage, contributing to a mortality rate of 5.48% [5]. While the highest prevalence occurs in women over 40, young women aged 18–25 are not immune. Although incidence rates in this demographic are relatively low, they begin to rise as individuals approach age 25 [6]. Given these high incidence and mortality rates, early detection is paramount. One of the most accessible and cost-effective methods for early screening is Breast Self-Examination (BSE/SADARI) [7]. Regular BSE allows individuals to recognize their normal breast anatomy and detect suspicious changes, potentially reducing morbidity and mortality by 20–30% [8].

Despite its benefits, knowledge regarding breast cancer and early detection remains low among young women. This lack of understanding contributes significantly to late-stage diagnoses. Interestingly, studies show a discrepancy in knowledge levels among university students. A study found that medical students in Indonesia still exhibit relatively low knowledge of BSE. Conversely, some studies on non-health students, such as computer science majors, have shown high levels of awareness [9, 10]. This suggests that a medical background does not inherently guarantee better preventive behavior compared to non-health backgrounds. As a major educational hub in West Nusa Tenggara, Mataram City hosts a diverse student population from both health and non-health programs. There is a critical need to investigate the relationship between breast cancer knowledge and preventive behaviors in this group. This study aims to describe how knowledge influences the frequency and consistency of BSE practice among students. The findings are expected to serve as a foundation for more effective educational programs to increase early detection awareness, reduce advanced-stage cases, and ultimately improve survival rates.

METHODS

Research design

This study utilized an observational analytic quantitative design with a cross-sectional approach. Data were collected via Google Forms using a validated and adopted reliable questionnaire that has been tested for its reliability and validity item-total correlation 0,482–0,891 and Cronbach's alpha 0,81 and others are validated by face validity from expert on its fields [11,12]. Research may contain bias because of the nature itself, that is self-reporting through questionnaire.

Settings and participants

The study was conducted in Mataram from January to September 2025. The population included active female students (2021–2025 cohorts) from University of Mataram (Unram), UIN Mataram, Poltekkes Mataram, and STIKES Mataram. Inclusion criteria were female gender and no history of breast cancer. The

participants remained anonymous and are assured of its secrecy by obtaining written informed consent and through ethical clearance No:178/UN18.F8/ETIK/2025 from Ethical Committee Faculty of Medical and Health Sciences.

Sampling and sample size

Quota sampling was employed to recruit 200 respondents, divided equally between health and non-health programs (100 each). The sample size was determined using the formula for categorical analytic research with a 5% alpha and 80% power.

Table 1. Sample Quota Distribution

Category	Sub-Category	Number of Respondents
Health Science Students	UNRAM Health Students	50
	Non-UNRAM Health Students	50
Sub-Total		100
Non-Health Science Students	UNRAM Non-Health Students	50
	Non-UNRAM Non-Health Students	50
Sub-Total		100
Total Sample		200

Knowledge was measured using a 40-item multiple-choice questionnaire (adapted from Masytah, 2013 [11]), and BSE behavior was assessed using a Likert scale (adapted from Dewi, 2021 [12]). Data were analyzed using SPSS version 29, employing univariate analysis for descriptive statistics and bivariate analysis (Chi-Square and T-test) to test correlations.

RESULT

The demographic profile of the 256 respondents in this study provides a comprehensive overview of the student population across several higher education institutions in Mataram. The data reveals that the majority of participants are affiliated with Universitas Mataram, accounting for 54.3% (139) of the total sample. In contrast, UIN Mataram and Poltekkes Kemenkes Mataram contributed equally at 19.9% each, while STIKES Mataram represented the smallest proportion at 5.9%. This distribution indicates that the findings are heavily influenced by the academic environment and student culture of the region's largest public university.

Regarding the age of the participants, the respondents fall within the late adolescent to young adult range, specifically between 17 and 24 years old. The most prominent age group is 20 years old, comprising 31.3% of the sample, followed closely by those aged 19 (23.8%) and 18 (18.4%). This concentration in the late teens and early twenties suggests that the issues or variables being researched are most relevant to students in their peak years of undergraduate study, where they often face significant transitions in both academic and personal development.

Furthermore, the distribution of academic cohorts shows a strong representation of newer students. The sample is dominated by the Class of 2025 (30.5%) and the Class of 2023 (29.3%). On the other hand, the Class of 2021 represents the smallest segment at only 4.3%. This lower participation rate among senior students might be attributed to their focus on final-year projects or internships, which often limits their

availability for research participation compared to their juniors. Collectively, these demographic markers provide a solid contextual foundation for interpreting the primary findings of this research.

Table 2. Characteristics of respondent

Characteristic	Category	Frequency (n)	Percentage (%)
Institution	Universitas Mataram	139	54.3%
	UIN Mataram	51	19.9%
	Poltekkes Kemenkes Mataram	51	19.9%
	STIKES Mataram	15	5.9%
Age (Years)	17	6	2.3%
	18	47	18.4%
	19	61	23.8%
	20	80	31.3%
	21	36	14.1%
	22	22	8.6%
	23	3	1.2%
	24	1	0.4%
Academic Year	2021	11	4.3%
	2022	28	10.9%
	2023	75	29.3%
	2024	64	25.0%
	2025	78	30.5%
Total		256	100.0%

In terms of academic discipline, the study participants represent a balanced distribution between Non-Health-related programs (53.5%;) and Health-related programs (46.5%;). This balanced composition ensures that the research findings are not exclusively skewed toward a single field of study, providing a broader perspective on the variables being measured among the student population.

A more detailed analysis of the faculties shows that the Faculty of Medicine and Health Sciences contributed the largest number of respondents, totaling 53 individuals (20.7%). Other significant representations came from the Faculty of Food Technology and Agroindustry (12.9%), as well as the Faculty of Tarbiyah and Teacher Training and the Department of Nursing, which each accounted for 12.1% of the sample.

Faculty / Department	Frequency (n)	Percentage (%)
Faculty of Medicine and Health Sciences	53	20.7%
Faculty of Food Technology and Agroindustry	33	12.9%
Faculty of Tarbiyah and Teacher Training	31	12.1%
Department of Nursing	31	12.1%
Medical Laboratory Technology	22	8.6%
Islamic Economics and Business	15	5.9%
Mathematics and Natural Sciences	14	5.5%
Economics and Business	12	4.7%
Law, Social Sciences, and Political Sciences	12	4.7%
Teacher Training and Education	10	3.9%
Department of Midwifery	7	2.7%
Nutrition	6	2.3%

Faculty / Department	Frequency (n)	Percentage (%)
Faculty of Engineering	4	1.6%
Da'wah and Communication Sciences	3	1.2%
Sharia	1	0.4%
Agriculture	1	0.4%
Ushuluddin and Religion	1	0.4%
Total	256	100.0%

The high participation rate from health-related departments, such as Medicine and Nursing, might be linked to the heightened interest of these students in research topics related to health or social dynamics. Conversely, the smaller participation from faculties such as Sharia, Agriculture, and Ushuluddin suggests a need for more targeted outreach in these specific areas in future studies. Overall, the diversity of academic backgrounds among the respondents enriches the data, allowing for a multifaceted understanding of the student experience across various scientific clusters. The assessment of student knowledge was categorized into three levels based on total scores: Good (76–100%), Fair (56–75%), and Poor (<56%). With a 10-item questionnaire where each correct answer earned 10 points, the score range was 0–100.

Knowledge Category	Frequency (n)	Percentage (%)
Good (80–100)	98	38.3%
Fair (60–70)	52	20.3%
Poor (0–50)	106	41.4%
Total	256	100.0%

The distribution of knowledge scores reveals that a plurality of respondents, 41.4% (), fall into the "Poor" category. While a significant portion (38.3%) demonstrated "Good" knowledge, the "Fair" category was the least represented at 20.3%.

Detailed item analysis shows that respondents possess strong foundational knowledge; 74.6% correctly identified non-painful lumps as the most common symptom (P2), and 71.5% understood the basic definition of breast cancer (P1). Knowledge of risk factors such as genetic history (69.1%) and obesity (64.8%) was also relatively high. However, technical details remain a challenge. Only 43.0% correctly identified early menarche as a risk factor, which also saw the highest "Don't Know" response (25.8%). Furthermore, while many know the general frequency of BSE, specific technicalities such as the exact timing post-menstruation and finger techniques showed higher rates of uncertainty, indicating a gap between general awareness and technical accuracy.

The practice of BSE was evaluated using a 4-point Likert scale (Always, Often, Sometimes, Never). Scores were converted into percentages and categorized as High ($\geq 76\%$), Moderate (56–75%), and Low (<56%).

Table BSE Practice Categories

Practice Category	Frequency (n)	Percentage (%)
Good (High)	36	14.1%
Fair (Moderate)	76	29.7%
Poor (Low)	144	56.3%
Total	256	100.0%

The findings highlight a significant discrepancy between knowledge and practice. Although many respondents understand the theory of breast cancer, 56.3% show a "Poor" level of actual BSE practice. Adherence to the recommended schedule is alarmingly low; nearly half of the respondents (49.2%) "Never" perform the examination during the ideal timeframe (7-10 days after menstruation), and only 10.2% perform it consistently every month.

Table Distribution of BSE Practice Items

No	Step / Practice Item	Never	Rarely	Sometimes	Always
P1	Monthly Frequency	35.2%	29.7%	25.0%	10.2%
P2	Timing (7-10 days post-menses)	49.2%	25.4%	15.6%	9.8%
P3	Observation in front of mirror	24.6%	28.1%	26.6%	20.7%
P4	Arms above head	38.3%	27.7%	19.9%	14.1%
P5	Hands on hips	43.4%	28.5%	18.4%	9.8%
P6	Palpation with 3 fingers	34.8%	27.7%	21.5%	16.0%
P7	Palpation while lying down	40.2%	29.3%	18.4%	12.1%
P8	Circular/Vertical movements	36.7%	27.7%	21.1%	14.5%
P9	Checking for nipple discharge	44.1%	24.2%	18.8%	12.9%
P10	Palpating the axilla (armpit)	33.6%	27.3%	24.2%	14.8%

Specific procedural steps are also frequently neglected. The most skipped steps include checking for nipple discharge (44.1% Never) and hands-on-hips observation (43.4% Never). While basic observation in the mirror (P3) is the most commonly practiced step, more technical maneuvers such as palpation while lying down or examining the axillary area are largely ignored. This suggests that even when students attempt BSE, they often do not perform it systematically or thoroughly. The high "Never" rates across all items indicate that the primary barrier is not just a lack of technical skill, but a fundamental lack of behavioral integration into their monthly health routine.

Knowledge Level		BSE (Good)	Practice	BSE (Fair)	Practice	BSE (Poor)	Practice	Total	p-value
Good	n	22		31		45		98	0.000
	%	22.4%		31.6%		45.9%		100%	
Fair	n	8		23		21		52	
	%	15.4%		44.2%		40.4%		100%	
Poor	n	6		22		78		106	
	%	5.7%		20.8%		73.6%		100%	
Total	n	36		76		144		256	

The Chi-Square analysis reveals a highly significant association between knowledge levels and BSE practice. A clear trend emerges from the crosstabulation: respondents with "Poor" knowledge are overwhelmingly likely to also have "Poor" practice habits. Specifically, 73.6% (n=78) of the low-knowledge group reported poor BSE practices, while also representing the smallest proportion of the "Good" practice category.

Conversely, while respondents with "Good" knowledge showed the highest proportion of "Good" practice (22.4%), the data highlights a critical finding: high knowledge does not automatically translate to consistent behavior. Even among those with good knowledge, the largest subgroup (45.9%) still exhibited poor BSE practices. This suggests that while knowledge is a prerequisite for behavior, it is not the sole determinant; other factors likely influence the actual implementation of SADARI.

To evaluate the impact of academic background, an Independent Sample T-Test was conducted to compare scores between students in Health-related and Non-Health-related programs.

Independent T-Test Results						
Variable	Program	N	Mean (M)	Std. Dev (SD)	t	p
Knowledge Score	Health	119	1.72	0.812	-5.427	< 0.001
	Non-Health	137	2.30	0.878		
BSE Practice Score	Health	119	2.20	0.787	-4.623	< 0.001
	Non-Health	137	2.61	0.609		

The analysis indicates a statistically significant difference in both knowledge and practice based on the respondent's field of study. Students in the Health cluster demonstrated significantly higher knowledge levels compared to their Non-Health counterparts.

A consistent pattern was observed in BSE practice. Health students significantly outperformed Non-Health students in their application of SADARI. These differences were proven to be highly significant for both knowledge and practice. This confirms that academic exposure to health sciences plays a vital role in enhancing both the understanding and the proactive behavior toward breast cancer early detection.

DISCUSSION

The results of this study provide a comprehensive overview of the relationship between breast cancer knowledge and Breast Self-Examination (BSE/SADARI) practices among 256 female university students in Mataram. Demographically, the sample was dominated by students from Universitas Mataram (54.3%), with a significant concentration of respondents aged 20 years (31.3%) and belonging to the Class of 2025 (30.5%). While the academic background was relatively balanced between Non-Health (53.5%) and Health-related (46.5%) programs, the univariate analysis revealed a concerning trend: a profound "knowledge-practice gap."

Regarding knowledge, the distribution was somewhat polarized, with 41.4% of respondents categorized as having "Poor" knowledge and 38.3% having "Good" knowledge. Most respondents showed a solid grasp of basic concepts, such as identifying non-painful lumps as a primary symptom (74.6%) and recognizing genetic history as a risk factor (69.1%). However, technical details, specifically the impact of early menarche and the precise timing for SADARI—remained areas of significant confusion. This theoretical understanding, however, did not translate into consistent action. The majority of respondents (56.3%) fell into the "Poor"

category for SADARI practice. Alarming, 49.2% reported "Never" performing the examination during the recommended 7–10 days post-menstruation, and only 10.2% adhered to a monthly routine.

Statistical analysis further illuminated this discrepancy. While the Chi-Square test and Pearson Correlation confirmed a significant positive association between knowledge and practice, the correlation strength was notably weak. This suggests that while knowledge is a necessary foundation, it is not the primary driver of behavior. For instance, even among respondents with "Good" knowledge, 45.9% still exhibited poor practice habits. These findings align with studies and Situmeang & Lantiar [1,13], which similarly reported high rates of poor SADARI behavior despite academic exposure. The weak correlation is likely moderated by psychological barriers identified in this study, such as "forgetfulness" and "fear of finding a lump," which mirror international findings [14,15]

Anxiety and lack of confidence are major factors, as emphasized [9], who reported that 67% of respondents faced barriers like fear of consulting a doctor. Furthermore, the Independent Samples T-test revealed a significant disparity based on academic cluster. Students in Health-related majors demonstrated statistically superior scores in both knowledge and practice compared to Non-Health majors. The weak statistical correlation between breast cancer awareness and the actual practice of breast self-examination (SADARI) indicates that the transition from knowledge to action is heavily moderated by psychological barriers that can be elucidated through the Health Belief Model (HBM) [17] and the Theory of Planned Behavior (TPB) [18]. According to the HBM, an individual's decision to perform a health behavior is determined by the balance between perceived threats and perceived barriers [17]; in this context, the "fear of finding a lump" and "fear of diagnosis" act as significant psychological barriers that trigger avoidance, as supported by Al-Dubai et al., who identified "fear of being diagnosed with cancer" (60.6%) and "worrying upon finding a lump" (59.6%) as primary deterrents [14]. Furthermore, the TPB posits that "perceived behavioral control"—the belief in one's ability to perform a behavior—is a critical predictor of intention [2], explaining why reasons such as "not knowing the correct method" and "always forgetting," as highlighted by Raghavan et al. [15], serve as significant practical disruptions that undermine self-efficacy. This emotional resistance is further underscored by Rezano et al., who reported that 67% of respondents faced barriers such as a lack of confidence or fear of medical consultation [9,14,15], illustrating how non-cognitive factors override academic understanding.

Interestingly, the shift toward social media (30.5%) as a primary information source, as also noted presents a strategic opportunity [16,9]. This digital dominance marks a shift from previous decades where print media was primary [14]. Utilizing digital platforms for technical training could mitigate the identified technical errors, as proven by the effectiveness of video-based interventions in improving SADARI skills. In conclusion, although this study is limited by its cross-sectional design and reliance on self-reported data—weaknesses also acknowledged in similar studies [1,8,16] it successfully highlights that increasing knowledge alone is insufficient to ensure preventive behavior. The transition from "knowing" to "doing" is hindered by psychological anxiety and a lack of technical confidence. Therefore, future interventions should not only

focus on disseminating facts but also on addressing the emotional barriers and utilizing digital media to provide step-by-step practical guidance for female students in Mataram.

CONCLUSION

This study concludes that there is a significant positive relationship between breast cancer knowledge and Breast Self-Examination (BSE/SADARI) practices among female university students in Mataram, thereby supporting the research hypothesis. However, the strength of this correlation is relatively weak, indicating that while knowledge serves as a foundational requirement, it does not act as the sole determinant for behavioral implementation. A prominent knowledge-practice gap exists, where high theoretical understanding often fails to translate into consistent or technically correct preventive actions.

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