

The impact of breast cancer early detection education on breast self-examination (BSE) knowledge women of reproductive age

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Abstract

Background: Breast cancer is one of the leading causes of morbidity and mortality among women in Indonesia. The low level of knowledge among women of reproductive age (WRA) regarding breast cancer and the importance of early detection highlights the need for educational interventions such as health education. This study aims to analyze the effect of counseling on early detection of breast cancer on knowledge of Breast Self-Examination (BSE) among women of reproductive age. **Methods:** This research used a quantitative pre-experimental method with a one-group pretest-posttest design. The population consisted of women of reproductive age in Klitih Hamlet, Randegansari Village, Driyorejo, Gresik. A total sample of 63 respondents was selected using purposive sampling. The data were analyzed descriptively and using the Wilcoxon Signed Rank Test with the IBM SPSS software. **Results:** The findings showed that among 63 respondents, the Wilcoxon test yielded $p < 0.001$ ($p < 0.05$), indicating a significant difference between knowledge before and after counseling. A total of 61 respondents (96.8%) experienced an increase in knowledge, 2 respondents (3.2%) showed no change, and none showed a decrease. Overall, respondents' knowledge prior to counseling was in the poor and fair categories, and improved to the good category after counseling. **Conclusion:** Counseling on early detection of breast cancer significantly improved the knowledge of women of reproductive age regarding how to perform BSE. Continuous health education is essential to enhance awareness and early detection capabilities for breast cancer within the community.

Keywords: Counseling; Early Detection of Breast Cancer; BSE; Knowledge; Women of Reproductive Age

1. Introduction

Breast cancer is the most common malignancy among women and is influenced by genetic, environmental, and lifestyle factors. Its prevalence continues to increase, and delayed treatment in late stages raises mortality risks. In Indonesia, 68,858 new breast cancer cases and about 22,000 deaths were reported in 2020 [9]. Early detection rates remain low, as reflected in East Java and Gresik, where cases continue to rise among both younger and older women [7].

Routine breast self-examination (SADARI) can reduce breast cancer incidence when performed monthly on days 7–10 after menstruation. However, limited knowledge leads to only one-third of women practicing SADARI correctly. Educational interventions are therefore needed to strengthen awareness and early detection behaviors among women of reproductive age [1]. According to Green's behavioral theory, knowledge, perception, social support, and enabling factors influence health behaviors such as SADARI [4]. Leaflet-based education has been shown effective in improving SADARI knowledge [3], while various psychological, cultural, and economic barriers continue to hinder practice (Kutu, 2024). Low levels of knowledge, attitudes, and SADARI behaviors have also been reported in previous studies [5].

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To enhance a person's knowledge, various types of media can be utilized to deliver information. One effective medium is leaflets, which can provide clear and easily understood guidance. SADARI leaflets, for example, offer practical instructions that help individuals understand the procedure of breast self-examination and the importance of early detection. By reading these leaflets, people can become more confident in performing SADARI regularly, which can reduce the risk of delayed diagnosis. Insufficient knowledge about BSE may lead individuals to neglect self-examinations and engage in harmful behaviors when faced with a breast cancer diagnosis. Therefore, providing accessible and accurate information is crucial to raising awareness and encouraging preventive actions. Proper education through such media can empower individuals to take responsibility for their own health and make informed decisions.

Given the persistently low awareness of early detection, this study aims to analyze the effect of breast cancer counseling on knowledge regarding SADARI among women of reproductive age. Specifically, the study seeks to identify the characteristics of participants, assess their knowledge before and after counseling, and determine the influence of the intervention on improving their understanding and ability to perform breast self-examination.

2. Material and methods

2.1. Research Design

This study employed a quantitative pre-experimental approach using a one-group pretest-posttest design, which involved a single intervention group without a control group. Women of reproductive age (WRA) received counseling on Breast Self-Examination (SADARI), and their knowledge was measured before and after the intervention. The implementation of counseling on early detection of breast cancer through the SADARI method (Breast Self-Examination) among women of reproductive age (WRA) represents a critical intervention aimed at increasing awareness and promoting early prevention of breast cancer. This counseling is intended to enhance WRA's knowledge regarding the importance of SADARI as a proactive measure for early detection of breast cancer.

The level of knowledge among WRA about SADARI is influenced by a variety of internal and external factors. Internal factors include intelligence, interest, age, and individual condition, while external factors encompass educational level, access to information sources, social environment, prior experiences, and socio-cultural and economic conditions. These factors collectively, both directly and indirectly, affect how individuals receive, comprehend, and internalize the information provided during counseling sessions.

The knowledge gained through counseling subsequently shapes WRA's attitudes toward SADARI. Such attitudes reflect the individual's acceptance, trust, and motivation to perform SADARI independently. Ultimately, this process is expected to lead to behavioral change, whereby WRA actively and routinely conduct breast self-examinations as a form of preventive action and early detection of breast cancer.

2.1.1. Intervention Procedure

The intervention consisted of structured health counseling regarding SADARI, delivered using lecture methods, leaflet media, and direct demonstration. Knowledge assessments were conducted twice: prior to counseling (pretest) and after the counseling session (posttest).

2.2. Population and Sample

2.2.1. Population

The study population comprised all women of reproductive age residing in Klitih Hamlet, Randegansari Village, Driyorejo, Gresik, totaling 126 individuals who met the preliminary criteria [4].

2.2.2. Sample

The sample included all WRA who met the inclusion criteria, participated throughout the counseling activity, and had not previously performed SADARI. Inclusion criteria were:

- Women aged 20–49 years;
- Willingness to participate;
- Attendance during counseling, pretest, and posttest;
- Literacy in reading and writing Indonesian;
- Domicile in Klitih hamlet, Randegansari village.

2.2.3. Sample Size Determination

The sample size was calculated using the Lemeshow formula with a significance level (α) of 0.05, population proportion (p) of 0.2, and precision level (d) of 0.1. Using a population size of 126, the calculated sample size was $n = 54.75$, rounded to 55 respondents. To anticipate dropouts and incomplete responses, an additional 14% was added, resulting in a final sample of 63 respondents.

2.2.4. Sampling Technique

A purposive sampling technique was applied, selecting respondents based on predetermined inclusion criteria relevant to the study purpose.

2.3. Study Location and Period

The study was conducted in Klitih Hamlet, Randegansari Village, Driyorejo District, Gresik Regency, East Java. Data collection was conducted from August to September 2025.

2.4. Variables, Operational Definitions, and Measurement

The study consisted of two variables:

- **Independent variable:** counseling on early detection of breast cancer [4].
- **Dependent variable:** knowledge of Breast Self-Examination (SADARI) among WRA.

Knowledge was measured using a structured questionnaire administered during pretest and posttest phases, and scores were categorized into levels according to established assessment criteria.

2.5. Hypothesis

Based on the conceptual framework, the research hypothesis is as follows: There is an effect of health education on early detection of breast cancer on the knowledge of performing breast self-examination (BSE) among women of reproductive age.

3. Results and discussion

3.1. Characteristics of Women of Reproductive Age (WRA)

The study involved 63 women of reproductive age (WRA) in Klitih Hamlet, Randegansari Village. The majority of respondents were aged 20–29 years (39.7%), followed by 40–45 years (31.7%) and 30–39 years (28.6%). In terms of education, most had graduated from senior high school (49.2%), while 23.8% held a bachelor's degree. The majority were housewives (57.1%), and most accessed health information through electronic media (57.1%), followed by a combination of media sources (23.8%) and mass media (15.9%) (see Table 1).

Table 1 Characteristics of respondents (N = 63)

Characteristic	Category	Frequency	Percentage (%)
Age (years)	20-29	25	39.7
	30-39	18	28.6
	40-45	20	31.7
Education	Senior High School	31	49.2
	Bachelor's Degree	15	23.8
	Vocational High School	9	14.3
	Junior High School & Below	5	7.9
	Diploma III	3	4.8
Occupation	Housewife	36	57.1
	Self-employed	21	33.3
	Other (sales, merchant, etc.)	6	9.5
Source of Information on BSE	Electronic Media	36	57.1
	Combination of Media	15	23.8
	Mass Media	10	15.9
	Print Media	2	3.2

The demographic profile indicates that the participants were predominantly young, educated, and economically active women with good access to electronic media. This suggests that health education programs targeting WRA can be effectively delivered through digital and multimedia approaches, which align with their media consumption habits.

3.2. Knowledge Level Before and After Counseling

The knowledge of WRA regarding breast self-examination (BSE) and early detection of breast cancer was measured using a validated questionnaire before and after the counseling intervention. The mean knowledge score before counseling was 21.02 (SD = 3.54), which increased to 24.30 (SD = 3.26) after counseling (see Table 2). The minimum and maximum scores also showed improvement, indicating a general upward shift in knowledge levels across the sample.

Table 2 Knowledge Scores Before and After Counseling (N =63)

Knowledge Level	N	Mean \pm SD	Median	Min-Max
Before Health Education	63	75,06 \pm 12,66	75	32,14-92,86
After Health Education	63	86,79 \pm 11,65	89,29	46,43-100

Before the intervention, 63.5% of respondents had "good" knowledge, 31.7% had "fair" knowledge, and 4.8% had "poor" knowledge. After counseling, the proportion of respondents with "good" knowledge increased significantly, while the categories of "fair" and "poor" decreased correspondingly. These findings suggest that although a considerable number of women already possessed basic awareness, the structured counseling enriched their understanding, particularly regarding the procedural and technical aspects of BSE.

3.3. Effect of Counseling on Knowledge: Statistical Analysis

To determine the significance of the change in knowledge, the Wilcoxon Signed Rank Test was used due to the non-normal distribution of the data. The test yielded a p-value < 0.001 ($p < 0.05$). This indicates a statistically significant difference between knowledge scores before and after the counseling intervention. Out of 63 respondents, 61 (96.8%) showed an increase in knowledge, 2 (3.2%) showed no change, and none showed a decrease. This confirms that the counseling session—using lecture, leaflets, and direct demonstration—was effective in enhancing WRA's knowledge of BSE and early breast cancer detection.

4. Discussion

The study demonstrates that structured health counseling significantly improves knowledge of breast self-examination among women of reproductive age. This aligns with previous studies, such as those [6] and Lestari [3], which also reported significant knowledge gains following BSE education. The success of this intervention can be attributed to the multi-method approach that combined verbal explanation, visual aids (leaflets), and practical demonstration, facilitating cognitive processing through multiple channels. The participants' demographic characteristics, such as relatively high educational attainment and frequent use of electronic media, likely contributed to their receptiveness to health information. Higher education levels are associated with better health literacy, which enhances comprehension and retention of health messages[4]. Moreover, the use of leaflets as a take-home material allowed for repeated exposure, reinforcing learning beyond the counseling[8].

In addition, the significant difference in knowledge levels before and after the intervention, as confirmed by the Wilcoxon Signed Rank Test, strengthens the conclusion that the observed improvement was not incidental but a direct effect of the health counseling provided. The non-normal distribution of the data justified the use of a non-parametric test, ensuring the robustness of the statistical analysis. This finding highlights the importance of selecting appropriate analytical methods in evaluating educational interventions

Despite the overall improvement, a small proportion of respondents remained in the "fair" knowledge category post-intervention. This may be due to factors such as limited health literacy, cognitive load, or environmental distractions during the session, as noted in the limitations of this study. Future interventions could consider personalized follow-up, use of interactive digital tools, or smaller group sessions to address these barriers. In conclusion, this study provides evidence that health counseling is an effective strategy for increasing knowledge of BSE among WRA. Given the high burden of breast cancer in Indonesia, integrating such educational programs into routine community health services especially at integrated health posts (posyandu) and community health centers (puskesmas), could contribute to early detection and reduced mortality from breast cancer.

5. Conclusion

Based on the results of the study, it can be concluded that the characteristics of women of reproductive age (WRA) participating in the counseling varied in terms of age, education, occupation, and sources of health information. Prior to the counseling, their knowledge regarding breast self-examination (BSE) was still uneven, with several respondents categorized as having fair and poor knowledge. After the counseling intervention, a significant improvement in knowledge was observed in almost all respondents. Overall, the findings indicate that health education on early detection of breast cancer has a positive and significant effect on increasing WRA's knowledge of performing BSE.

Compliance with ethical standards

Acknowledgments

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Disclosure of Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Statement of Ethical Approval

This study was conducted in accordance with ethical research principles involving human participants. Ethical approval was obtained from the appropriate ethics committee prior to data collection.

Statement of Informed Consent

Informed consent was obtained from all participants before their inclusion in the study. Participation was voluntary, and respondents were informed about the study objectives, procedures, confidentiality, and their right to withdraw at any time.

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