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REVIEW

The Effectiveness of Health Promotion on Breast Self-Examination Ability In Early Detection of Breast Cancer: literature review

La Eficacia de la Promoción de la Salud en la Habilidad de Autoexploración Mamaria para la Detección Temprana del Cáncer de Mama: Revisión de la Literatura

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ABSTRACT

Introduction: breast cancer remains a major cause of morbidity and mortality among women worldwide. Early detection through Breast Self-Examination (BSE) is an inexpensive and accessible method that increases survival rates. However, the practice of BSE among women is still low, indicating the need for effective health promotion programs.
Method: a review of 25 experimental and quasi-experimental studies published between 2021 and 2025 was conducted. Articles were obtained from Scopus, ScienceDirect, PubMed, ResearchGate, and Google Scholar databases. Data were analyzed by identifying study design, sample characteristics, type of intervention, and outcomes.
Results: most studies reported significant increases in knowledge, attitudes, confidence, and BSE skills ($p < 0,05$). Theory-based interventions such as the Theory of Planned Behavior strengthened behavioral intentions. Digital platforms—mobile applications, WhatsApp, and animated videos—improved knowledge and practice. Simulation-based training produced the highest improvement in practical skills and self-confidence. Programs that combined face-to-face and digital methods yielded more optimal outcomes than single approaches.
Conclusions: health promotion interventions effectively enhance women's knowledge, attitudes, skills, and confidence in performing BSE. Integrating education, digital media, and simulation training can strengthen breast cancer early detection programs in community settings

Keywords: Breast Neoplasms; Breast Self-Examination; Health Promotion; Digital Media; Simulation Training.

RESUMEN

Introducción: el cáncer de mama sigue siendo una de las principales causas de morbilidad y mortalidad en mujeres a nivel mundial. La detección temprana mediante la Autoexploración Mamaria (AEM) es un método accesible y económico que aumenta las tasas de supervivencia. Sin embargo, la práctica de la AEM sigue siendo baja, lo que refleja la necesidad de programas eficaces de promoción de la salud.

Objetivo: esta revisión de la literatura tuvo como propósito analizar la eficacia de las intervenciones de promoción de la salud para mejorar la capacidad de las mujeres en la realización de la AEM como estrategia de detección temprana del cáncer de mama.
Método: se revisaron 25 estudios experimentales y cuasi-experimentales publicados entre 2021 y 2025. Los artículos se obtuvieron de las bases de datos Scopus, ScienceDirect, PubMed, ResearchGate y Google Scholar. Los datos se analizaron identificando el diseño del estudio, las características de la muestra, el tipo de intervención y los resultados.
Resultados: la mayoría de los estudios reportó incrementos significativos en el conocimiento, las actitudes, la confianza y las habilidades en AEM ($p < 0,05$). Las intervenciones basadas en teorías como la Teoría del Comportamiento Planificado fortalecieron la intención conductual. Las plataformas digitales —aplicaciones móviles, WhatsApp y videos animados— mejoraron el conocimiento y la práctica. El entrenamiento basado en simulación produjo el mayor aumento en habilidades y autoconfianza. Los programas que combinaron métodos presenciales y digitales lograron resultados más óptimos.
Conclusiones: las intervenciones de promoción de la salud resultan eficaces para fortalecer el conocimiento, las actitudes, las habilidades y la confianza de las mujeres en la práctica de la AEM. La integración de educación, medios digitales y entrenamiento con simulación puede potenciar los programas comunitarios de detección temprana del cáncer de mama.

Palabras clave: Neoplasias Mamarias; Autoexploración Mamaria; Promoción de la Salud; Medios Digitales; Formación mediante Simulación.

INTRODUCTION

Cancer remains one of the leading causes of death worldwide, responsible for nearly one in six deaths according to the World Health Organization,[1] regardless of socioeconomic status.[2] Women diagnosed at an early stage of breast cancer can survive more than five years by 95 %. So many doctors recommend that women undergo Self Examination on a regular basis and suggest getting an examination every year to detect lumps in the breasts.[3] The World Cancer Research Fund International states that breast cancer is the number one cancer in women. In 2022, there were 2 296 840 cases of breast cancer in women, with a total death toll of 666 103.

Breast cancer increases mortality and impacts the quality of life of sufferers. Delayed diagnosis is a major factor in the high mortality rate from breast cancer, as most cases are discovered at an advanced stage.[1] To reduce this rate, prevention and early detection efforts are essential.

Early detection remains the cornerstone of reducing breast cancer mortality.[4,5] Globally, countries have implemented various early detection programs, including mammography screening, clinical breast examination (CBE), and Breast Self-Examination (BSE)[6]—a simple, low-cost method that women can perform on their own to detect abnormal changes in their breasts at an early stage. However, despite its proven practicality, the regular practice of BSE remains low worldwide, particularly in developing countries.

Breast self-examination (BSE) is a simple method women can perform themselves to identify lumps or abnormal changes in their breasts. The primary goal of BSE is to increase women's awareness and ability to detect breast cancer early before it progresses to a more severe stage.[7,8] These efforts need to be optimized with a more intensive health promotion approach so that women can implement BSE routinely as a preventive measure.[9] Health promotion plays an important role in improving women's knowledge, attitudes, and skills regarding breast self-examination (BSE). Through appropriate education, women can gain a better understanding of the benefits of BSE, learn how to perform the examination properly, and recognize the importance of early detection of breast cancer.[10,11,12]

Extensive research has been conducted on health promotion of Breast Self-Examination (BSE) among women to improve their knowledge and skills. Several studies have shown that BSE education programs for women of childbearing age and adolescents are essential for strengthening understanding and encouraging regular self-examination.[13] Furthermore, mobile text messaging has been used for health education to increase awareness of breast cancer and breast self-examination among women.[14,15]

Based on the above description, a literature review is needed to examine the effectiveness of health promotion in improving women's ability to perform BSE as an early detection method for breast cancer. This literature review is expected to provide a scientific basis for developing more optimal health promotion interventions to reduce breast cancer incidence through early detection. This literature review aims to determine the effectiveness of health promotion on the ability of BSE in the early detection of breast cancer

METHOD

The study employed a narrative literature review. A structured systematic literature search were conducted following Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA).[16] The criteria are as

follows: 1) The latest research journal published in the last 5 years, from 2021 to 2025, 2) The online database sources used come from repositories either from Indonesia or from other countries that use English, including the Medline database, Google Scholar, Science Direct, Scopus, and PubMed. The use of the words are "health promotion, BSE capabilities," and "early detection of breast cancer," which consist of experimental research. The number of references used in this literature review is 25 articles, consisting of abstract and full-text indexed by SINTA and Google Scholar, with articles in Indonesian and English. The results of the research reviewed are studies with study characteristics in the form of PICO consisting of: Population: Research participants are women from various age groups, Intervention: The main type of intervention that is determined as is health promotion programs for women of various age groups, including health education, counseling, training, and outreach media aimed at improving knowledge, attitudes, and skills in performing BSE.

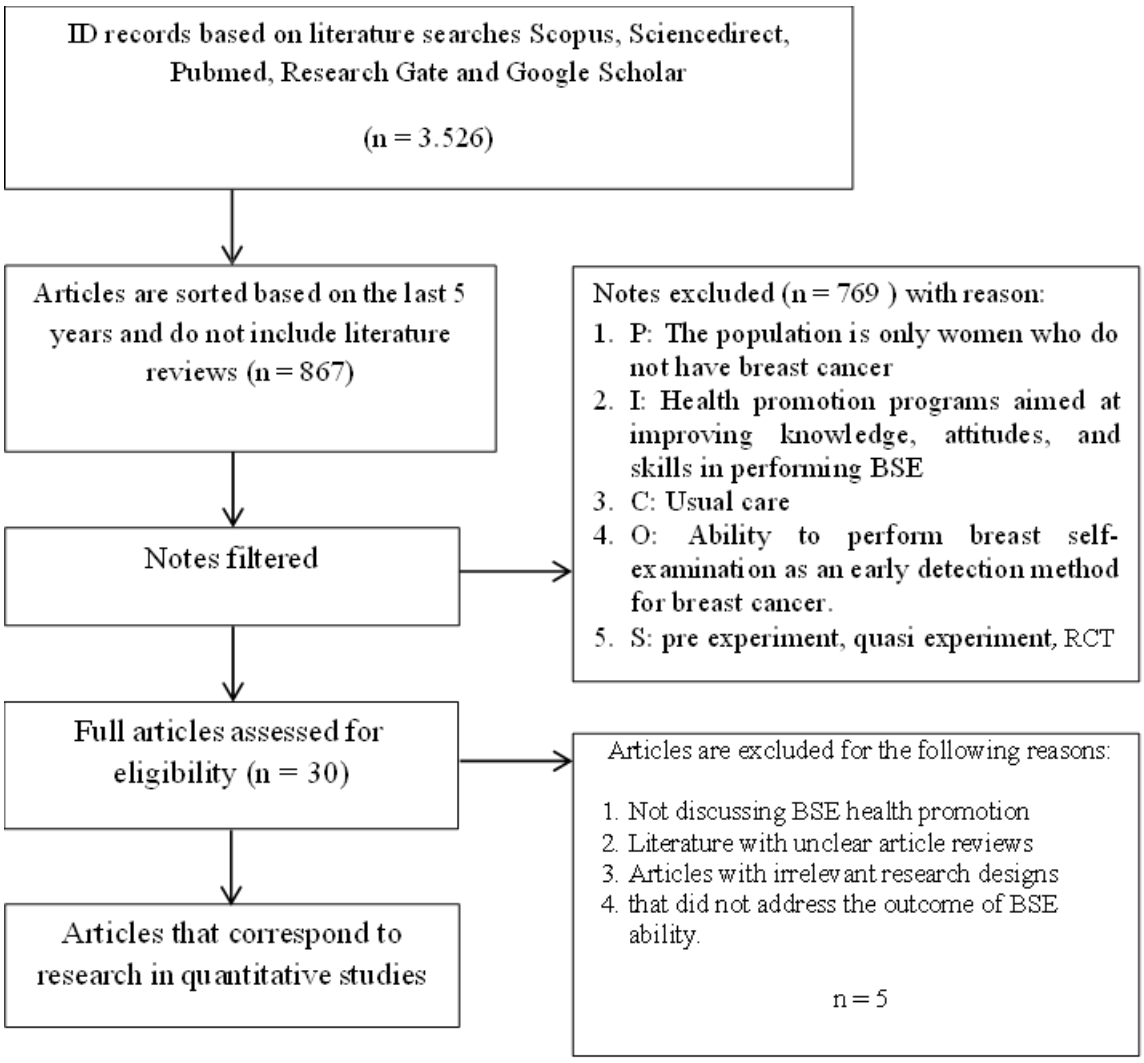

Figure 1. Selection and inclusion study flow (PRISMA diagram)

The articles were then narrowed down and identified based on PICOS (Population, Intervention, Comparison, Outcomes and Study Design) and obtained as many as 867 articles that could be included in the article screening process. At the article screening stage in accordance with the articles and research that will be carried out, 769 articles have been issued and the remaining 98 articles discuss increasing breast self-knowledge. Then the eligibility selection was carried out based on the essence and coverage of the discussion in the article as a whole, it was found that as many as 30 articles could be selected for further selection, namely as many as 25 articles were selected for inclusion and as many as 5 articles were excluded because they did not meet the quality of the study in critical assessment.[17,18]

RESULTS

From table 1, a total of 25 articles that met the inclusion criteria were analyzed in this review. Most studies employed a quasi-experimental design (64 %), followed by randomized controlled trials (24 %), pre-post intervention studies (8 %), and a cluster randomized controlled trial (4 %). The majority of participants were

women aged 18–55 years, with several studies involving adolescents and college students.

The majority of interventions used were theory-based education, such as the Theory of Planned Behavior and the Health Belief Model (28 %), followed by digital media interventions including mobile applications, WhatsApp, animated videos, and email reminders (40 %), as well as simulation-based training (16 %). The remaining studies applied conventional face-to-face education, peer education, pamphlets, booklets, or a combination of these methods.

Most studies (80 %) reported a statistically significant improvement in knowledge of breast cancer and breast self-examination (BSE) after the interventions ($p < 0,05$). For example, Rini et al.[19] reported an increase in mean knowledge scores from 5,79 to 8,07 ($p < 0,0001$), while Prusty et al.[17] found a mean difference of 4,09 in knowledge of breast cancer signs and symptoms ($p < 0,001$).

A total of 60 % of the studies assessed BSE skills or actual practice. Simulation-based training demonstrated the greatest improvements in participants' skills and self-confidence.[4] Digital interventions such as mobile applications and WhatsApp-based education also showed significant improvements in practical skills ($p \leq 0,001$). Furthermore, hybrid simulation training was reported to be more effective than conventional methods in improving skills and the ability to evaluate BSE outcomes.[18]

Table 1. Summary of review results

No	Authors (Years)	Design	Samples	Interventions	Results
1	Cheraghalizadeh et al.[8]	Randomized Controlled Trial	240 women aged 30–55	Four weeks of BSE training based on the Theory of Planned Behavior, delivered virtually via WhatsApp for the digital group.	The study showed that BSE education based on the Theory of Planned Behavior (TPB), both face-to-face and virtual, was equally effective in improving BSE knowledge and behavior up to three months after the intervention ($p < 0,001$).
2	Rini et al.[19]	Quasi-experimental study	410 women aged 18–55 years	Health education–based intervention module	Significant improvement in knowledge of breast cancer signs and symptoms, risk factors, and BSE practice. Mean difference in knowledge of signs/symptoms (MD 4,09, SD 4,05, $p < 0,001$) and risk factors (MD 5,64, SD 4,00, $p < 0,001$).
3	Prusty et al.[17]	Quasi-experimental design	276 high school girls (grades I–III)	BSE practice using traditional vs. modern methods	The modern method was significantly more effective in teaching BSE among adolescent girls, who were more inclined to use technology.
4	Ogunmodede et al.[20]	Quasi-experimental design	30 adolescent females	Health education using the Word Square model	The Word Square method was effective in improving BSE skills among adolescents in Ngawi Village. $p = 0,000 < 0,05$ indicates a significant difference before and after education.
5	Widyanto A[21]	Quasi-experimental design	150 women	Mobile app including BSE reminder, training, alarm, and therapist feedback	The app significantly improved participants' BSE performance and health confidence compared to the control group ($p = 0,001$).
6	Shakery et al.[22]	Experimental study	135 women	Two educational interventions (workshop and e-learning program)	Significant differences in knowledge and theoretical constructs before and after interventions ($p < 0,001$). Both methods had similar effects, but intervention groups showed significantly higher BSE practice than controls ($p < 0,001$).
7	Bashirian et al.[23]	Randomized Controlled Trial	98 women aged 18–49	Practical BSE training program	Confidence and belief in BSE practice increased after training.

8	Yazar et al.[24]	Quasi-experimental design	172 women	Health promotion program with monthly cell phone reminders	Health promotion significantly improved knowledge, confidence, and monthly BSE practice. Group A improved significantly (p < 0,001), while Group B showed no change (p > 0,05). Between-group differences were significant across all variables.
9	Jabeen et al.[25]	Experimental design with randomized distribution	210 women	Daily email messages for 30 days	Significant improvements in perceived severity, perceived benefits of BSE, and the percentage of women performing BSE.
10	*Ştefănuţ* et al.[26]	Quasi-experimental	146 women aged 18–59 years	Virtual education for four weeks via WhatsApp by sharing educational videos, booklets, and posters	BSE skills in the intervention group were significantly higher than in the control group (p < 0,001). Virtual training through social media alone was relatively effective in improving BSE skills. However, because accurate BSE is crucial for early breast cancer detection, it appears important to investigate the effectiveness of combining face-to-face and virtual training to achieve proper BSE practice.
11	Kucheki et al.[27]	Quasi-experimental	41 women	Downloaded the BrAware Breast Cancer Awareness Measure app (online adaptation)	The BrAware app was proven to increase knowledge of risk factors, awareness of warning signs, and women's confidence in performing BSE. The app has potential as a supportive tool for breast cancer education.
12	Yusuf et al.[28]	Quasi-experimental	70 women aged 18–55 years	Three-hour face-to-face health intervention using a workshop guidebook	Based on theory and the Intervention Mapping framework, the active group was expected to be more effective in improving BSE intention and behavior due to live practice and instructor feedback. The passive group likely experienced improvement in knowledge/literacy only, but not to the same degree in actual behavior.
13	Dewi et al.[29]	Quasi-experimental	400 women aged 18–26 years	Educational program	Significant increase after the educational intervention. A significant percentage change in BSE practice was found between pre-test and post-test (21,3 % vs. 33,8 %; p < 0,001).
14	Sarker et al.[30]	Quasi-experimental	90 women	Educational pamphlet alone (BPAM) and a combination of BSE pamphlet and BSE training (BPAME)	The pamphlet and training interventions had significant effects on adolescents' knowledge and BSE practice. For intervention 1, ES = 0,87, p = 0,000; for intervention 2, knowledge ES = 0,97, p = 0,000; and BSE practice ES = 0,92, p = 0,000.
15	Amosu AM, et al.[31]	Pre-post intervention study	124 adolescents	Peer education	The peer education strategy effectively increased adolescents' knowledge about breast cancer and BSE. There was a statistically significant increase in mean knowledge scores in each class after training (p = 0,000).

16	Sadoh et al.[6]	Quasi-experimental	50 women aged 18–55 years	Health counseling on BSE using Android media	There was a behavioral difference before and after counseling using Android media (p = 0,607). Counseling through Android media provided better benefits.
17	Hazanah et al.[32]	Randomized Controlled Trial	46 women	Simulation-based breast health training	After simulation-based training, there was a significant increase in confidence, skills, and behavioral awareness in the intervention group compared to the control group (p < 0,001).
18	Kuru Alici et al.[4]	Cluster Randomized Controlled Trial	57 women	Educational intervention on BSE for three months	The theory-based intervention significantly increased the level of early breast cancer detection through BSE practice.
19	Mahar B et al.[33]	Quasi-experimental	34 adolescent girls	Health education on BSE	Health education on BSE significantly influenced adolescent girls' knowledge of early breast cancer detection.
20	Aurilia et al.[34]	Randomized Controlled Trial	72 students	Hybrid simulation-based training	Hybrid simulation-based training was more effective than classical training in improving knowledge, skills, pathology evaluation, and BSE performance.
21	Özdemir et al.[18]	Experimental study	110 women aged 20–60 years	Face-to-face and video-based multimedia training	Results showed that face-to-face training was more effective in reducing negligence and forgetfulness in performing BSE (p = 0,03).
22	Karimian et al.[35]	Quasi-experimental	46 women	BSE education using slideshow video	The results showed a significant difference in scores before and after BSE education using animated and slideshow videos. Animated video media was effective in improving BSE knowledge and behavior.
23	Sukriani et al.[36]	Quasi-experimental	96 women	Education via WhatsApp	Results showed p = 0,000, indicating significant differences in knowledge and skills among adolescent girls after viewing BSE audio-visual content via WhatsApp.
24	Nurdahliana[37]	Quasi-experimental	38 adolescent girls	Health education using animated video on BSE in the intervention group and leaflet media in the control group	Health education using animated video significantly improved knowledge and skills related to BSE among adolescent girls.
25	Rosanti et al.[38]	Randomized Controlled Trial	240 women aged 30–55	Four weeks of BSE training based on the Theory of Planned Behavior, delivered virtually via WhatsApp for the digital group.	The study showed that BSE education based on the Theory of Planned Behavior (TPB), both face-to-face and virtual, was equally effective in improving BSE knowledge and behavior up to three months after the intervention (p < 0,001).

48 % of the studies evaluated attitudes, self-efficacy, and behavioral intention. These studies reported significant improvements after the interventions. Yazar et al.[24] found increased confidence in performing BSE following hands-on training, while Dewi et al.[29] showed that participants in the active workshop group with live practice demonstrated better intention and behavioral changes compared to those in the passive booklet group (p < 0,05). Several studies also reported that combining different methods yielded more optimal effects compared to single-method interventions. Amosu et al.[31] demonstrated that the combination of pamphlets

and hands-on training was more effective in improving knowledge (ES = 0,97; p = 0,000) and skills (ES = 0,92; p = 0,000) than pamphlets alone.

Overall, the reviewed articles indicate that health promotion interventions—whether theory-based, digital, simulation-based, or combined approaches—consistently and significantly improved women's knowledge, skills, self-confidence, and regular BSE practice, with high statistical significance (p < 0,05).

DISCUSSION

The findings of this literature review confirm that health promotion interventions significantly improve women's ability to perform Breast Self-Examination (BSE) as part of early breast cancer detection. The 25 studies included consistently demonstrated positive effects on knowledge, attitudes, self-efficacy, and practical skills. These outcomes reinforce the importance of structured educational and behavioral approaches in promoting breast health among women of various age groups.[8,19,29]

Most of the included studies employed quasi-experimental and randomized controlled designs, indicating a strong evidence base for evaluating intervention effectiveness. The predominance of participants aged 18–55 years highlights that health promotion for BSE is relevant not only for adult women but also for adolescents and young adults[17,31] This finding aligns with previous reports suggesting that early introduction of breast health education encourages long-term preventive behaviors and enhances awareness from an early age.[6,35]

The interventions reviewed varied in type and delivery method. The largest proportion involved theory-based education, particularly those grounded in the Theory of Planned Behavior (TPB) and the Health Belief Model (HBM). These frameworks emphasize behavioral intention, perceived benefits, and self-efficacy as determinants of preventive behavior. The positive outcomes reported in these studies confirm that integrating behavioral theory into health promotion enhances learning outcomes and supports sustained behavior change.[8,26] This finding is consistent with earlier literature indicating that theory-guided health education improves not only knowledge but also motivation and consistency in preventive actions.[11,12]

A notable trend observed in this review is the increasing use of digital media interventions, including mobile applications, WhatsApp, email reminders, and animated videos. Approximately 40 % of the included studies used these methods, which proved highly effective in improving knowledge and practice.[21,27,36] Digital platforms facilitate interactive and continuous learning, overcome geographical barriers, and provide reminders that reinforce regular BSE practice. These results align with global evidence showing that mobile health (mHealth) technologies are effective tools for health education and behavioral reinforcement, particularly in low-resource and remote settings.[14,15]

In addition, simulation-based training emerged as the most effective approach for improving practical skills and self-confidence. Studies using simulation or hybrid training models reported significant gains in BSE accuracy and performance compared to conventional education.[4,32,34] This approach allows learners to engage in hands-on practice, receive direct feedback, and correct errors in real time—key components in skill mastery. Such findings are consistent with nursing and medical education research that highlights simulation as a superior method for developing psychomotor and procedural competencies.[18]

The review also identified that combining multiple intervention methods—such as digital education with face-to-face sessions or pamphlets with simulation practice—resulted in more optimal outcomes than using a single method.[30,31] This multimodal approach addresses diverse learning preferences and reinforces behavioral change through multiple cognitive and experiential channels. In the context of breast cancer prevention, combining informational and experiential learning ensures both understanding and skill retention, which are critical for accurate and regular BSE practice.

Furthermore, approximately half of the reviewed studies evaluated attitudes, self-efficacy, and behavioral intention, reporting significant improvements across all indicators.[24,29] These psychosocial factors are essential for sustaining long-term behavior change, as women who perceive themselves as capable and believe in the benefits of BSE are more likely to perform it regularly. This aligns with Bandura's theory of self-efficacy, which emphasizes that confidence in one's ability directly influences preventive health behaviors.[39]

Overall, this literature review provides strong evidence that health promotion interventions—whether theory-based, digital, simulation-based, or integrated—are effective in enhancing BSE-related knowledge, attitudes, and skills. The findings underscore the importance of adopting innovative, accessible, and theory-driven health education strategies in breast cancer prevention programs.

From a public health perspective, these results highlight the need to incorporate BSE-focused health promotion into broader cancer control initiatives, especially in regions where access to clinical screening is limited. The integration of digital technologies and community-based educational programs can bridge gaps in awareness and access, particularly among women in rural or low-resource areas.[7]

However, this review also identifies certain limitations. The majority of included studies were quasi-experimental, which may limit causal inference compared to randomized controlled trials. Moreover, there remains limited evidence on the long-term retention of BSE skills and whether improved knowledge and

attitudes translate into sustained practice over time. Future research should therefore focus on longitudinal evaluations, cost-effectiveness analyses, and culturally adapted interventions that address contextual barriers to BSE adoption.

CONCLUSIONS

Health promotion has been proven to be highly effective in improving the ability to perform breast self-examination (BSE). Theory-based education plays an important role in strengthening the intention and consistency of BSE behavior, while digital media such as mobile applications, WhatsApp, and animated videos provide easier access and simultaneously enhance knowledge and skills. Simulation-based training has a more significant impact on practical skills and self-confidence, whereas the integration of face-to-face methods with digital technology produces more optimal effects. Thus, health promotion on BSE not only improves knowledge but also attitudes, skills, and actual behavior in practicing breast self-examination. The integration of various methods, both conventional and digital, is an important strategy to strengthen breast cancer early detection programs among women.

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None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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