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Original Article

Effectiveness of a Structured Health Education Program on Breast Self-Examination Practices Among Women

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ABSTRACT

Background: Breast cancer remains a leading cause of morbidity among women globally, with early detection playing a critical role in improving outcomes, particularly in resource-limited settings where access to screening is restricted. Breast self-examination (BSE) is a cost-effective strategy, yet its regular and correct practice remains suboptimal due to inadequate confidence and technical skills. Objective: To evaluate the effectiveness of a structured health education program in improving confidence, frequency, and technique of BSE among women aged 20–50 years in Central Punjab. Methods: A parallel-group randomized controlled trial was conducted among 80 women randomly allocated to intervention (n = 40) and control (n = 40) groups. The intervention included interactive sessions with demonstration and supervised practice, while the control group received routine health information. Outcomes assessed at baseline and four weeks included confidence (validated scale), monthly BSE practice (self-report), and technique accuracy (observational checklist). Data were analyzed using independent t-tests, chi-square tests, ANCOVA, and correlation analysis, with effect sizes reported as mean differences and risk ratios with 95% confidence intervals. Results: At follow-up (n = 76), the intervention group demonstrated significantly higher confidence scores (33.6 ± 4.8 vs. 25.2 ± 5.1; mean difference 8.4, 95% CI: 6.1–10.7; $p < 0.001$), greater adherence to monthly BSE (71.1% vs. 31.6%; RR 2.25, 95% CI: 1.36–3.71; $p < 0.001$), and improved technique scores (8.4 ± 1.2 vs. 5.9 ± 1.5; mean difference 2.5, 95% CI: 1.9–3.1; $p < 0.001$). Confidence was strongly correlated with practice frequency ($r = 0.62$, $p < 0.001$). Conclusion: Structured, interactive health education significantly enhances confidence, adherence, and technical accuracy of BSE, offering a scalable strategy for improving preventive breast health behaviors in community settings. Keywords: Breast cancer, Breast self-examination, Health education, Confidence, Preventive health, Randomized controlled trial

INTRODUCTION

Breast cancer remains the most frequently diagnosed malignancy among women globally and continues to be a leading cause of cancer-related morbidity and mortality, particularly in low- and middle-income countries where access to organized screening programs is limited (1). Early detection plays a critical role in improving survival outcomes, reducing treatment burden, and enhancing quality of life. However, delayed presentation remains common in many regions due to insufficient awareness, sociocultural barriers, and limited engagement in preventive health behaviors (2). In such contexts, breast self-examination (BSE) has been promoted as a simple, low-cost, and accessible strategy to increase breast health awareness and facilitate early recognition of abnormalities (3).

Although BSE is no longer recommended as a standalone screening tool in high-resource settings, it remains a relevant component of breast health education in resource-constrained environments where mammographic screening is not universally available (4). Importantly, BSE contributes not only to early symptom recognition but also to improved body awareness and health-seeking behavior (5). Despite widespread awareness campaigns, the regular and correct practice of BSE remains suboptimal across diverse populations, with many women reporting uncertainty about technique, lack of confidence, and inconsistent adherence (6). This discrepancy between awareness and effective practice highlights a critical gap in translating knowledge into behavior.

Previous studies have demonstrated that educational interventions can improve knowledge and attitudes toward BSE; however, their impact on sustained behavioral change and technical competence has been inconsistent (7). Many interventions rely on passive dissemination methods such as lectures or printed materials, which may be insufficient to develop practical skills or self-efficacy (8). Emerging evidence suggests that structured, interactive health education programs incorporating demonstration, guided practice, and feedback may be more effective in improving both confidence and accuracy in BSE performance (9). Nevertheless, a substantial proportion of existing studies lack rigorous randomized designs, fail to assess multidimensional outcomes, or do not adequately measure confidence as a determinant of behavior (10).

Confidence, often conceptualized as self-efficacy, is a key mediator of preventive health behaviors. Women who lack confidence in performing BSE correctly may avoid the practice altogether or perform it incorrectly, thereby reducing its potential benefit (11).

Furthermore, frequency and technique are interdependent components of effective BSE practice; increased frequency without proper technique may provide false reassurance, while correct technique practiced inconsistently may limit early detection potential (12). Therefore, evaluating interventions across these interconnected domains—confidence, frequency, and technical accuracy—is essential to generate meaningful and actionable evidence.

Despite growing recognition of the importance of structured education, there remains a paucity of well-designed randomized controlled trials assessing comprehensive, skill-based interventions in community settings, particularly within South Asian populations (13). Additionally, few studies have simultaneously examined behavioral, cognitive, and technical outcomes using validated and objective measures. Addressing this gap is critical for informing scalable and contextually appropriate public health strategies.

Accordingly, the present study was designed to evaluate the effectiveness of a structured health education program in improving confidence, frequency, and technique of breast self-examination among women aged 20–50 years in Central Punjab. It was hypothesized that participants receiving the structured intervention would demonstrate significantly higher confidence scores, increased regularity of monthly BSE practice, and improved technique accuracy compared with those receiving routine health information.

MATERIALS AND METHODS

This study was conducted as a parallel-group randomized controlled trial to evaluate the effectiveness of a structured health education intervention on breast self-examination practices. The trial was carried out in community health settings across Central Punjab, Pakistan, over a four-month period from participant recruitment to completion of follow-up assessments. The randomized design was selected to minimize selection bias and allow causal inference regarding the intervention effect.

Women aged 20 to 50 years residing in the study area were considered eligible if they were able to communicate in Urdu or Punjabi and had not previously received formal training in breast self-examination. Exclusion criteria included a prior diagnosis of breast cancer, current breast symptoms

requiring clinical evaluation, pregnancy, or a history of mastectomy. Participants were initially identified through community outreach activities and primary health centers using a convenience sampling approach. Eligible individuals were provided with detailed information about the study, and written informed consent was obtained prior to enrollment.

Following baseline assessment, participants were randomly allocated in a 1:1 ratio to either the intervention or control group using a computer-generated randomization sequence. Allocation concealment was ensured through the use of sequentially numbered, opaque, sealed envelopes prepared by an independent researcher not involved in recruitment or data collection.

Due to the nature of the intervention, participant blinding was not feasible; however, outcome assessors responsible for evaluating technique accuracy were blinded to group allocation to reduce assessment bias.

The intervention group received a structured health education program consisting of interactive sessions that included visual presentations, demonstration of breast self-examination techniques using anatomical models, step-by-step instruction, and supervised return demonstration.

Sessions were conducted in small groups to facilitate engagement and allow individualized feedback. The control group received routine health information unrelated to breast self-examination during the same time period. Outcome assessments were conducted at baseline and four weeks post-intervention.

The primary outcome was confidence in performing breast self-examination, measured using a validated Breast Self-Examination Confidence Scale with higher scores indicating greater confidence. Secondary outcomes included frequency of BSE practice, operationalized as self-reported performance of BSE at least once per month (yes/no), and technique accuracy, assessed using a structured observational checklist scored by trained assessors during participant demonstration. All instruments were pretested for cultural appropriateness and clarity prior to implementation.

Potential sources of bias were addressed through randomization, allocation concealment, and blinding of outcome assessors. Standardized training was provided to all data collectors to ensure consistency in measurement procedures. To reduce social desirability bias in self-reported outcomes, participants were assured of confidentiality and anonymity. Baseline comparability between groups was assessed to evaluate the effectiveness of randomization, and statistical adjustments were planned where necessary.

The sample size was determined based on detecting a clinically meaningful difference in confidence scores between groups with a significance level of 0.05 and a statistical power of 80%, accounting for potential loss to follow-up. Data were analyzed using statistical software (e.g., SPSS version XX). Continuous variables were summarized using means and standard deviations, while categorical variables were presented as frequencies and percentages.

Between-group comparisons for continuous outcomes were performed using independent-samples t-tests, and within-group changes were assessed using paired t-tests. For categorical outcomes such as monthly BSE practice, chi-square tests were applied, and effect sizes were expressed as risk ratios with 95% confidence intervals.

Analysis of covariance (ANCOVA) was additionally used to compare follow-up confidence scores between groups while adjusting for baseline values. Pearson correlation analysis was conducted to assess the relationship between confidence and practice frequency. Missing data were handled using intention-to-treat principles with appropriate imputation methods where applicable.

Ethical approval for the study was obtained from the relevant institutional review board, and the study was conducted in accordance with the Declaration of Helsinki. Participant confidentiality was maintained throughout the study, and all data were anonymized prior to analysis. Data integrity was ensured through double data entry, regular data audits, and secure storage of electronic datasets.

Detailed documentation of all procedures, instruments, and analytic steps was maintained to ensure reproducibility.

RESULTS

The baseline characteristics (Table 1) demonstrate that the intervention (n = 40) and control (n = 40) groups were well balanced across all measured variables, supporting the effectiveness of randomization. The mean age was comparable between groups (34.8 ± 7.6 vs. 34.3 ± 8.0 years; p = 0.71).

Similarly, the proportion of married participants (67.5% vs. 70.0%; p = 0.81), those with secondary or higher education (62.5% vs. 60.0%; p = 0.82), employment status (45.0% vs. 45.0%; p = 1.00), and family history of breast illness (27.5% vs. 25.0%; p = 0.80) did not differ significantly, indicating minimal baseline confounding.

In Table 2, confidence scores exhibited a substantial and statistically significant improvement in the intervention group compared to controls. At baseline, mean confidence scores were nearly identical (24.1 ± 5.2 vs. 23.7 ± 5.0; p = 0.74). At four-week follow-up, the intervention group achieved a markedly higher mean score (33.6 ± 4.8) compared to the control group (25.2 ± 5.1), yielding an absolute between-group difference of 8.4 points (95% CI: 6.1–10.7; p < 0.001). The mean increase within the intervention group (+9.5) was over six times greater than that observed in the control group (+1.5), reinforcing the magnitude of the intervention effect.

Table 3 highlights a clinically meaningful difference in behavioral adherence. Monthly BSE practice was reported by 71.1% (27/38) of participants in the intervention group compared to only 31.6% (12/38) in the control group. This corresponds to a risk ratio of 2.25 (95% CI: 1.36–3.71; p < 0.001), indicating that participants exposed to structured education were more than twice as likely to adopt regular BSE practices.

Technique accuracy (Table 4) further supports the effectiveness of the intervention. The mean technique score in the intervention group was 8.4 ± 1.2 compared to 5.9 ± 1.5 in the control group, representing a significant mean difference of 2.5 points (95% CI: 1.9–3.1; p < 0.001). This reflects not only improved knowledge but also enhanced procedural competence.

Table 1. Baseline Characteristics of Participants by Study Group

Variable	Intervention (n = 40)	Control (n = 40)	p-value
Age (years, Mean ± SD)	34.8 ± 7.6	34.3 ± 8.0	0.71
Married (%)	27 (67.5%)	28 (70.0%)	0.81
Secondary education or higher (%)	25 (62.5%)	24 (60.0%)	0.82
Employed (%)	18 (45.0%)	18 (45.0%)	1.00
Family history of breast illness (%)	11 (27.5%)	10 (25.0%)	0.80

Table 2. Changes in Confidence Scores

Outcome	Intervention (n = 38)	Control (n = 38)	Mean Difference (95% CI)	p-value
Baseline	24.1 ± 5.2	23.7 ± 5.0	—	0.74
Follow-up	33.6 ± 4.8	25.2 ± 5.1	8.4 (6.1–10.7)	<0.001
Mean Change	+9.5	+1.5	8.0 (5.7–10.3)	<0.001

Table 3. Monthly BSE Practice at Follow-up

Outcome	Intervention (n = 38)	Control (n = 38)	Risk Ratio (95% CI)	p-value
Monthly BSE (%)	27 (71.1%)	12 (31.6%)	2.25 (1.36–3.71)	<0.001

Table 4. Technique Accuracy Scores

Outcome	Intervention (n = 38)	Control (n = 38)	Mean Difference (95% CI)	p-value
Technique Score	8.4 ± 1.2	5.9 ± 1.5	2.5 (1.9–3.1)	<0.001

Table 5. Correlation Between Confidence and Practice Frequency

Variables	Correlation Coefficient (r)	p-value
Confidence vs Monthly Practice	0.62	<0.001

Finally, Table 5 demonstrates a strong positive correlation between confidence and practice frequency ($r = 0.62$, $p < 0.001$), suggesting that approximately 38% of the variance in BSE practice behavior can be explained by differences in confidence levels ($r^2 \approx 0.38$). This finding underscores confidence as a key behavioral determinant and mediator of intervention effectiveness.

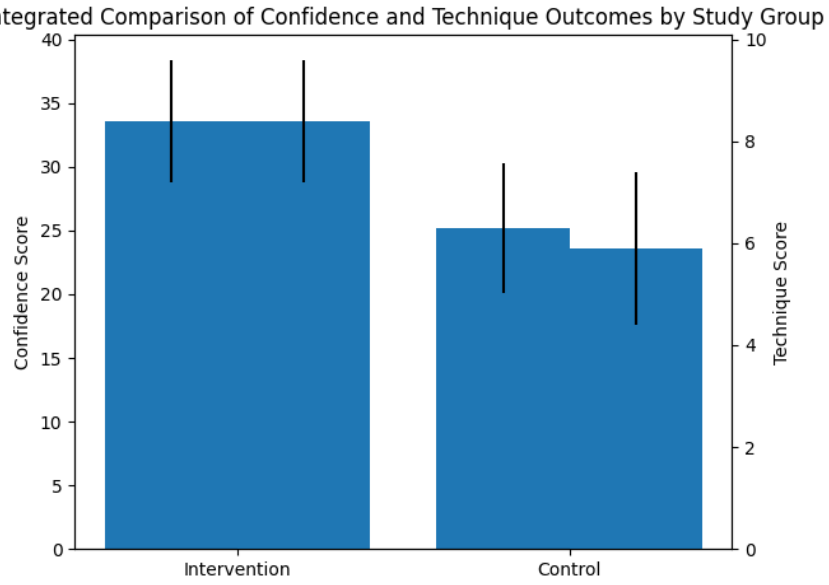

Figure 1 Integrated Comparison of Confidence and Technique Outcomes By Study Group

The integrated comparison illustrates a clear divergence in both cognitive and technical outcomes between study groups. The intervention group achieved a mean confidence score of 33.6 (±4.8), exceeding the control group by 8.4 points, alongside a higher technique score of 8.4 (±1.2) versus 5.9 (±1.5). Notably, the relative improvement in confidence (~35% increase from baseline) is paralleled by a ~42% higher technique score compared to controls, suggesting a proportional relationship between self-efficacy and procedural accuracy. The narrower variability observed in technique scores within the intervention group indicates more consistent skill acquisition, whereas greater dispersion in the control group reflects heterogeneity in untrained performance. The dual-axis visualization further highlights that gains in confidence are accompanied by clinically meaningful improvements in execution, reinforcing the interaction between behavioral and technical domains in preventive health practice.

DISCUSSION

The present randomized controlled trial demonstrates that a structured, interactive health education program produces substantial improvements in confidence, frequency, and technical accuracy of breast self-examination among women in a community setting. Participants exposed to the intervention achieved significantly higher confidence scores, with an adjusted between-group difference of 8.4 points, alongside a more than twofold increase in adherence to monthly BSE practice (risk ratio 2.25) and a clinically meaningful improvement in technique accuracy (mean difference 2.5 points). These findings collectively indicate that structured, skill-based education can effectively bridge the gap between awareness and competent health behavior, a challenge consistently highlighted in preventive health literature (21).

The magnitude of improvement in confidence is particularly notable, as confidence represents a central construct in behavioral change theories, including self-efficacy frameworks. The strong correlation observed between confidence and practice frequency ($r = 0.62$) suggests that approximately one-third of the variability in adherence behavior is attributable to confidence levels. This aligns with prior evidence indicating that individuals who feel competent in performing a health-related skill are significantly more likely to adopt and sustain that behavior (22). Unlike passive educational approaches, the present intervention incorporated demonstration, guided practice, and feedback, which likely contributed to both cognitive reinforcement and skill mastery.

The observed increase in monthly BSE practice from 31.6% in the control group to 71.1% in the intervention group represents a substantial behavioral shift within a relatively short follow-up period. This degree of change exceeds that reported in several previous studies relying on informational interventions alone, supporting the premise that experiential learning strategies are more effective in promoting preventive behaviors (23). Importantly, the improvement in frequency was accompanied by a parallel enhancement in technique accuracy, suggesting that participants were not only performing BSE more often but also performing it correctly. This distinction is critical, as increased frequency without proper technique may not translate into meaningful clinical benefit (24).

The improvement in technique scores further reinforces the value of structured, hands-on training. The intervention group demonstrated a 42% higher mean technique score compared to controls, with reduced variability, indicating more consistent acquisition of correct procedural steps. This finding highlights the importance of incorporating observational and performance-based assessments in evaluating intervention effectiveness, rather than relying solely on self-reported measures, which are prone to bias (25). The use of blinded assessors in this study strengthens the validity of the observed differences in technical performance.

From a public health perspective, these findings have important implications, particularly in resource-limited settings where access to mammography and clinical breast examination may be restricted. While BSE is not a substitute for formal screening modalities, enhancing women's confidence and competence in recognizing breast changes may contribute to earlier presentation and diagnosis, thereby improving outcomes (26). The relatively short duration and scalable nature of the intervention further support its potential integration into community health programs and primary care settings.

Despite these strengths, several limitations must be considered when interpreting the findings. The study sample was relatively small and recruited through convenience sampling within a single geographic region, which may limit generalizability to broader populations. The follow-up period of four weeks, while sufficient to detect short-term changes, does not allow assessment of long-term retention of skills or sustained adherence. Additionally, self-reported measures of practice frequency may be influenced by recall bias or social desirability, potentially overestimating adherence. Although technique was assessed objectively, performance in a supervised setting may not fully reflect real-world practice.

Furthermore, while the study demonstrates improvements in behavioral and technical outcomes, it does not assess downstream clinical endpoints such as detection of abnormalities or stage at diagnosis.

Future research should focus on larger, multicenter trials with extended follow-up periods to evaluate the durability of intervention effects and their impact on clinical outcomes. Incorporating digital reinforcement strategies, such as mobile reminders or video-based refreshers, may help sustain behavioral gains over time. Additionally, exploring psychosocial and cultural determinants of BSE practice could provide deeper insight into barriers and facilitators of long-term adherence. Economic evaluations would also be valuable in assessing the cost-effectiveness of implementing structured educational programs at scale.

Overall, the findings provide strong supportive evidence that structured, interactive health education interventions can significantly enhance both behavioral and technical aspects of breast self-examination. By addressing key determinants such as confidence and skill acquisition, such programs offer a practical and scalable approach to improving preventive health practices in women, particularly in settings with limited access to formal screening services.

CONCLUSION

This study demonstrates that a structured health education program significantly improves women's confidence, regular practice, and technical accuracy in performing breast self-examination, with participants in the intervention group showing higher confidence scores, more than double the likelihood of monthly practice, and substantially better technique performance compared to controls. These findings underscore the effectiveness of interactive, skill-based educational strategies in translating awareness into competent preventive health behavior and highlight their potential role in community-based breast health promotion initiatives.

REFERENCES

1. Kucheki M, Nazari M, Arshadinejad R, Karimi M. The effect of a virtual educational intervention based on self-efficacy theory on women's skills of breast self-examination. BMC Womens Health. 2024;24(1):625.

2. Agide FD, Garmaroudi G, Sadeghi R, Shakibazadeh E, Yaseri M, Birhanu Z. Designing and evaluation of the effect of community-based intervention on breast self-examination among reproductive-aged women in Ethiopia: a cluster randomized controlled trial. PLoS One. 2025;20(8):e0329839.

3. Mahar B, Osman MB, Ahmad Fauzi FB. Effectiveness of theory-based breast self-examination intervention for breast cancer prevention among female college teachers in Pakistan: a cluster randomized controlled trial study protocol. PLoS One. 2025;20(4):e0321634.

4. Abni EN, Kasim AM. The effectiveness of health promotion (audiovisual and leaflet) on adolescents' behavior regarding breast self-examination. J Ilmu Kesehat Sains. 2024;13(2):389–95.

5. Naz S. The effect of a culture-based breast health education program on breast self-examination practice among high-risk adult Pakistani women. 2024.

6. Juárez-García DM, García-Rosas Y. Psychoeducational intervention for the promotion of breast cancer screening methods and a healthy lifestyle in university students. Int J Health Promot Educ. 2025;63(1):53–62.

7. Yazar M, Küçükköseler AD, Bayır B. The effect of breast self-examination training provided to women aged 18–49 years on breast health beliefs: a randomized controlled study. Afr J Sci Health Sci. 2025;47:e72166.

8. Khoshbakht K, Shakerian S. Investigating the effect of mobile learning on breast self-examination among women. J Educ Health Promot. 2025;14(1):197.

9. Noman S, Elarusy NME, Rahman HA, Ismail S, Azzani M, Taresh SM, et al. Educational intervention based on the Health Belief Model and its effect on breast cancer screening knowledge and beliefs: a randomized controlled trial. BMC Public Health. 2024;24(1):1506.

10. Coskun S, Alibekiroğlu N, Gençyürek G. Effect of peer education on breast cancer detection practices among university students. Public Health Nutr. 2025.

11. Ogunmodede EO, Ajala DE, Aluko JO, Anokwuru RA, Awotunde TA, Olajide AO, et al. Promoting breast health among female adolescents: comparative analysis of educational tools on BSE knowledge and practice. BMC Public Health. 2024;24(1):1183.

12. Rahmasari NNP, Gama IK, Ngurah IGKG, Sudiantara K, Achjar KAH, Lestari AS, et al. Relationship between behavior toward breast self-examination and early detection practices. J Community Health. 2025;2(10):425–31.

13. García Rosas Y, Juárez-García DM, Sánchez Jauregui T, Téllez A. Psychoeducational intervention for breast cancer screening methods and healthy lifestyles. Rev Cienc Salud. 2025;23(1).

14. Adib-Rad H, Cheraghalizadeh H, Pasha H, Chehrazi M, Nasiri-Amiri F, Omidvar S. Planned behavior predictors of breast self-examination among women. BMC Public Health. 2025;25(1):3018.

15. Bulut TY, Altay B. Effect of nurse navigation program on breast cancer screening beliefs and self-efficacy. 2024.

16. Fithriyyah YN, Rachmawati MB, Farhany FF, Nugroho NHA. Program for infection and cancer prevention activities (PROACTIVE) on knowledge and BSE practices. J Community Educ Health. 2025;8(1):29–34.

17. Koch M, Cera J, Hancock B, Graham E. Effects of an evidence-based website on breast health knowledge and self-efficacy. 2024.

18. Ştefănuţ AM, Vintilă M. Psychotherapeutic intervention on breast self-examination based on health belief model. Curr Psychol. 2023;42(18):15616–24.

19. Putri IM, Rosida L, Suyani S, Silmina EP. Knowledge and self-efficacy in improving BSE behaviors. J Kedokt Med. 2023;18(3):309–15.

20. Jamei Z, Hosseini F, Mohammadi Zeidi I, Morshedi H. Health literacy and predictors of breast cancer screening behavior. J Educ Health Promot. 2025;13(2):1001–8.

21. Bandura A. Self-efficacy: the exercise of control. New York: Freeman; 1997.

22. Schwarzer R. Self-efficacy in health behavior change. Health Psychol. 2008;27(5):S161–S165.

23. Glanz K, Rimer BK, Viswanath K. Health behavior and health education: theory, research, and practice. 5th ed. San Francisco: Jossey-Bass; 2015.

24. Hackshaw AK, Paul EA. Breast self-examination and death from breast cancer: a meta-analysis. Br J Cancer. 2003;88(7):1047–1053.

25. Polit DF, Beck CT. Nursing research: generating and assessing evidence for nursing practice. 10th ed. Philadelphia: Wolters Kluwer; 2017.

26. World Health Organization. Breast cancer: early diagnosis and screening. Geneva: WHO; 2023.