

The effectiveness of an educational program on the women's attitude regarding early detection of breast cancer .

Abstract:

Background: Lack of awareness and negative attitudes are still hindering women's participation in screening for early detection of breast cancer (BC). The study aimed to evaluate the effectiveness of an educational program on women's attitudes regarding breast cancer early screening.

Methods: A quasi-experimental study was implemented at Al-Hilla Teaching Hospital, Babylon governorate in Iraq from November 1st 2025 to May 10th 2026. A non-randomized purposive sample of 160 women were recruited and randomly allocated to a study (n = 80) or control group (n = 80). The study population consisted of women who completed a four-session educational intervention about breast cancer risk factors, warning signs & symptoms, and screening (breast self Exm, clinical breast exam, mammography & importance of early detection. To assess attitudes to screen doors, a validated questionnaire consisting of 10 attitude statements measured on a three-point Likert scale was administered before and after the intervention. Descriptive and inferential statistics, including the chi-square test and independent and paired t-tests were used for analysis; a $P < 0.05$ was considered statically significant.

Results: All parameters of women's attitudes toward breast cancer early detection showed a statistically significant improvement following the educational program. Before the intervention, 6% of women had positive attitudes, compared with 44% after the intervention; negative attitudes decreased from 46 to 18 % ($\chi^2 = 36.99$, $P < 0.001$). No such differences were observed in the control group. Post hoc analysis of the association between post-intervention attitudes and educational level ($P = 0.031$), as well as source of breast cancer information ($P = 0.011$) indicate significant associations, while age and marital status was not statistically associated with post intervention attitudes.

Conclusion: The findings indicate that the structured informative program has been effective in significantly increasing women's attitudes toward breast cancer early detection. The implementation of similar educational interventions in both healthcare settings and community settings may increase the demand for breast cancer screening among women, which will lead to an earlier diagnosis and better health outcomes.

Keywords: Attitude, Early Detection, Breast cancer,

Introduction:

Breast cancer constitutes one of the most frequently diagnosed cancers globally with an estimated global incidence of 2.3 million new cases annually (Łukasiewicz et al., 2021). Breast cancer remains one of the most common causes of

cancer-related morbidity and mortality in females, and it is the fifth most common cause of cancer-related mortality, despite significant progress made so far in preventive, screening, and adjuvant treatment strategies (Freihat et al., 2025). Data from global cancer estimates show that breast cancer burden has significantly increased worldwide over the past decades with millions of new cases diagnosed every year. The increasing burden is attributed to population growth, aging, lifestyle changes and improved detection methods; hence the need for effective strategies to reduce disease-related complications and mortality. Breast cancer is also a recognized basis of cancer control since detecting tumors at an early stage improves the probability of successful treatment and leads, ultimately, to better quality survival (Sung et al., 2021).

The best way to minimize the negative impact of breast cancer on morbidity and mortality is early detection, given that tumors identified at an early, small (less than 1 cm), or non-palpable stage are most likely more amenable to treatment, and related with improved clinical outcomes and survival. Several imaging modalities, namely mammography, ultrasonography and magnetic resonance imaging (MRI), are employed in breast cancer screening to facilitate early detection of malignant lesions (Munir et al., 2025). These strategies are designed to detect significant changes before advanced disease development. It is well established that early diagnosis of breast cancer has a far better prognosis, whilst late-stage diagnosis often results in more complex treatment and an increase in health systems costs (Wilkinson & Gathani, 2022). Nonetheless, early detection programs can only be effective if women become aware of them, have positive attitudes and beliefs about the benefits of screening, and are willing to participate. Hence, an optimal way to prevent breast cancer is the improvement of women's attitude towards early detection (Georga et al., 2025).

Breast cancer screening is a test that prevents disease from taking place as well as its cost affected by complex factors related to health behavior; screened populations differ little from non-screened ones. This would help in designing targeted interventions which may increase women's participation in screening. Moreover, community-specific attitudes of women in the target community are essential for successful implementation of breast cancer screening programs in order to increase uptake (Keshavarz et al., 2012). Negative attitudes such as fear of cancer detection, embarrassment during clinical examinations or the beliefs that screening is not needed in asymptomatic persons might result in delayed presentation and lower

participation rates to screening programs. On the other hand, positive/negative attitudes & awareness have been associated with increased engagement in preventive behaviors such as monthly breast exam and following recommendations for screening (Marlow et al., 2021).

Educational interventions have been acknowledged as successful methods for increasing women knowledge and attitudes pertaining to breast cancer prevention and early detection (Rakhshani et al., 2022). Well-planned health education programs have the potential to describe risk factors and warning signs of breast cancer, available screening methods and encourage timely medical consultation. It might also decrease misconceptions and psychological barriers that promote fears of screening. The findings around breast cancer awareness via structured form of education from community-based sessions, health care settings, and digital media have been substantiated in the recent studies that state they improve general knowledge regarding reproductive tract cancers by bettering approaches toward screening (Dahiya et al., 2021).

These educational programs are especially needed in low and middle-income countries, where a high proportion of women die either because they are diagnosed only once the disease is advanced or do not participate in screening programs. These conditions are typically associated with delayed stage presentation as a result of insufficient awareness, discrimination against health resources and socio-cultural barriers. Its culturally appropriate educational strategies that change women attitudes may be a practical and cost-effective method to improve these behaviors of early detection and preventable deaths (Azaiza& Cohen, 2020).

The study aimed to evaluate the effectiveness of an educational program on women's attitudes regarding breast cancer early screening. It also investigates the association between demographic data of women and their attitude regarding breast cancer early screening.

Methods and subjects

The research design involved using a quasi-experimental pretest–posttest approach to assess the impact of an educational intervention on women's attitudes toward early detection of breast cancer. The duration of the study was from November 1st 2025 to May 10th 2026 Al-Hilla Teaching Hospital, Babylon, Iraq. A quasi-experimental

design was chosen to measure changes in the attitudes of participants after implementation of the educational intervention.

Study Participants and Sample Size

This study performed among 160 women using a purposive sampling method which divided into intervention (80 women) and control group (80 healthy women). Women originally allocated to the intervention group completed the educational programme, and those in the control group received standard health information only; that is, they were not exposed to higher education through a structured educational intervention.

Before selection of participants, a sampling framework was established based on previously formulated inclusion and exclusion criteria; inclusion criteria included women aged ≥ 18 years who were willing to participate in the study, capable of understanding and completing the questionnaire with no prior diagnosis of breast cancer. Eligible criteria for exclusion of women included having had breast cancer treatment in the past, severe medical conditions that would impact their participation or refusal to participate.

Data Collection Instrument

A structured self-administered questionnaire was designed based on literature about breast cancer prevention and early detection studies. The questionnaire is divided into two main parts:

Section I: Demographic Characteristics

In this section, demographic variables of the participants (age, educational level, marital status, occupation/residence/family history of breast cancer and previous exposure to breast cancer information) were collected.

Section 2: Women's Attitude Towards Early Detection of Breast Cancer

This section was intended to evaluate knowledge of and attitudes toward breast cancer early detection practices among women. It included 10 items that were assessed on a three-point Likert scale:

Agree = 3 points, Neutral = 2 points, Disagree = 1 point

Where higher scores (10–30) stood for breast cancer early detection positive attitude, giving a total of 30 points (table 1).

Table1. Selected items for assessment of breast cancer early detection attitude

No.	Attitude Item
1	Early detection of breast cancer increases the chance of successful treatment and survival.
2	Women should regularly perform breast self-examination to detect abnormal changes early.
3	I believe that mammography and clinical breast examination are important methods for early detection of breast cancer.
4	I feel confident seeking medical advice if I notice any breast-related changes.
5	Fear of discovering breast cancer should not prevent women from undergoing screening examinations.
6	Breast cancer screening should be performed even when there are no symptoms.
7	Educational programs can improve women's awareness and attitudes toward breast cancer prevention.
8	Family history of breast cancer increases the importance of early screening.
9	Women should encourage other women to participate in breast cancer early detection programs.
10	Regular breast cancer screening is an important responsibility for maintaining women's health.

The attitude level based on the total mean score was: (Negative attitude: 10–16 points Moderate attitude: 17–23 points, Positive attitude: 24–30 points).

Educational Program

The researcher developed the educational intervention grounded in the current evidence for breast cancer prevention and early detection strategies. The program's objective was women's understanding and attitude towards breast cancer screening and early diagnosis. The educational program involved four theoretical sessions during a two-week period. All sessions were approximately 45–60 minutes in length consisting of lectures, interactive discussions, educational material and moments for participants to ask questions.

The main topics covered included: breast cancer overview, risk factors and myths. the importance of early detection and its impact on treatment outcomes and survival breast self-awareness, breast self-examination and recognition of warning signs screening tests (clinical breast examination and mammography) and barriers to participation in screening.

The intervention group was tested for attitude at pretest within 72 hours before the educational program and post-test after completion of the program. During the same periodic times, the control group did not have the educational intervention therefore completed Western forms without receiving educational test.

Validity and Reliability of Study Instrument

The content validity of the questionnaire was evaluated by experts regarding relevance, clarity and adequacy of items (nursing, community health, oncology). Data on the content validity index (CVI) showed good data. A pilot test of the questionnaire was performed on 16 women (10% of the study sample), who were not included in final study; to assess the clarity of the material, feasibility of data collection and approximate time taken to complete testing. Cronbach's alpha coefficient to assess the reliability of attitude scale.

Ethical Considerations

Data collection was proceeded after obtaining ethical approval from Scientific Research Ethics Committee of the Babylon Technical Institute, Al-Furat Al-Awsat Technical University. The aims of the study, that their participation was completely voluntary, that all data collected would be kept confidential, and they could withdraw in the absence of any consequences were communicated to all participants. All participants were required to provide written informed consent before being included.

Statistical Analysis

Data were analyzed using SPSS Statistics for Windows (Version 26.0: IBM Corporation, Armonk, NY) Continuous variables with normal distribution were expressed as mean $\pm$ standard deviation (SD) and the categorical variables as frequency and percentage. Associations between categorical variables were examined using the chi-square test. Statistical significance was defined at a P-value <0.05 .

Results:

Demographic data descriptive statistics for the study and control groups are depicted in demographic characteristics of women in study and control groups (Table 1) Results The two groups did not differ in terms of age category, marital status, level of education and sources of information about breast cancer. Regarding age ($\chi^2 = 1.22$, $P = 0.39$), marital status ($\chi^2 = 2.77$, $P = 0.37$), educational level ($\chi^2 = 1.47$, $P = 0.32$) and source of breast cancer information ($\chi^2 = 1.33$, $P = 0.35$), there were no statistically significant differences between those in the study versus control groups.

Table 1. Demographic data of both study and control groups

Demographic data		Study Group (N=80)	Control Group (N=80)	χ^2	P value
Age / Years	20-29	28 (35.0%)	31 (38.8%)	1.22	0.39 NS
	30-39	27 (33.8%)	26 (32.5%)		
	≥ 40	25 (31.2%)	23 (28.7%)		
Marital Status	Married	54 (67.5%)	58 (72.5%)	2.77	0.37 NS
	Single	26 (32.5%)	22 (27.5%)		
Level of Education	Primary School	18 (22.5%)	20 (25.0%)	1.47	0.32 NS
	Secondary School	27 (33.8%)	25 (31.2%)		
	College	30 (37.5%)	28 (35.0%)		
	Postgraduate	5 (6.2%)	7 (8.8%)		
Source of information about BC	Friends	18 (22.5%)	21 (26.2%)	1.33	0.35 NS
	Social media	34 (42.5%)	30 (37.5%)		
	Books	8 (10.0%)	10 (12.5%)		
	Physician	20 (25.0%)	19 (23.8%)		

NS: Non-Significant at $P > 0.05$

The findings have shown that the study group classification at the baseline assessment according to their attitude was: 46% negative, 48% moderate and only 6% positive attitude. After implementation of the program, the attitude assessment has become as follows: 18% negative, 28% moderate and only 44% positive attitude ($\chi^2 = 36.99$, $df = 2$, $P < 0.001$).

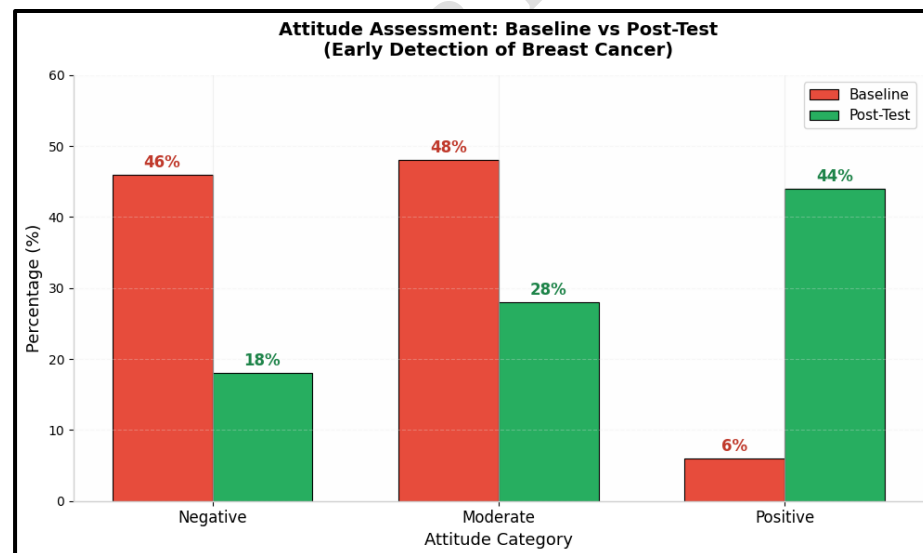


Figure1. Comparison of women attitude assessment between baseline and posttest evaluation for study group

The findings have shown that the control group classification at the baseline assessment according to their attitude was: 47% negative, 45% moderate and only 8% positive attitude. After implementation of the program, the attitude assessment did not

show significant difference follows: 43% negative, 48% moderate and only 9% positive attitude($\chi^2 = 0.65$,df = 2 , P < 0.75).

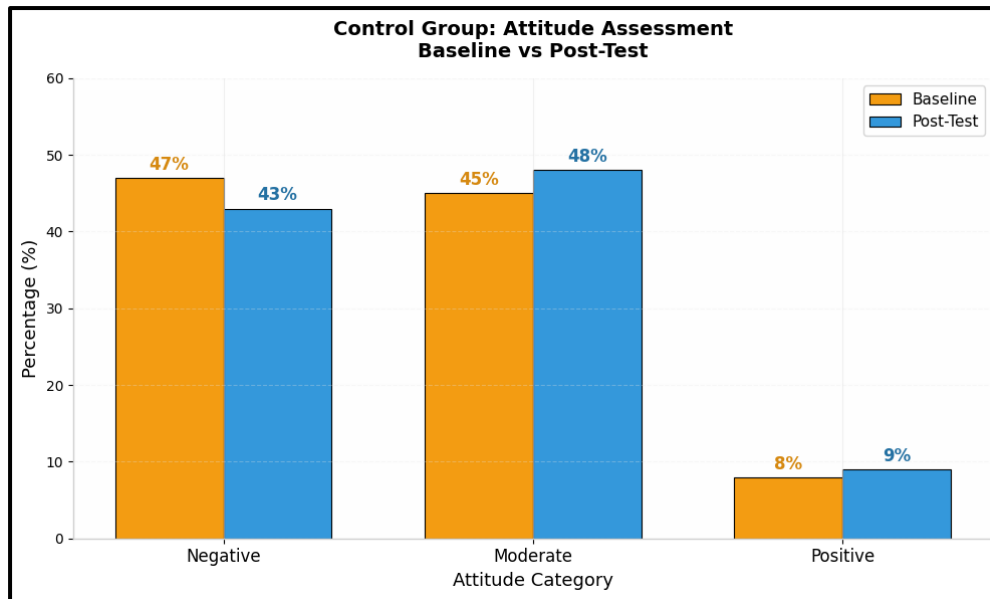


Figure2.Comparison of women attitude assessment between baseline and posttest evaluation for control group

Table 2 shows the demographic factors of participants in relation to attitudes one week after the posttest on early detection of breast cancer. There were no significant correlation between post-intervention attitude levels and age (P = 0.295) or marital status (P = 0.404), indicating that the educational program was similarly effective in all age groups and with both married and unmarried men; see Table 3 for a summary of analysis on demographic variables. On the other hand, posttest attitude was significantly associated with educational level ($\chi^2 = 13.87$, P = 0.031), suggesting those who belonged to higher education levels were more likely to develop a good attitude toward early detection of breast cancer than those were less educated after receiving an educational program. In the same vein, breast cancer information source ($\chi^2 = 16.54$, P = 0.011) substantially predicted outcomes for attitudes.

Table 2.Association between demographic data of the study groups and the attitude assessment of the posttest evaluation

Demographic data	χ^2	df	P value
Age / Years	4.92	4	0.295 NS
Marital Status	1.81	2	0.404 NS
Level of Education	13.87	6	0.031 S
Source of information about BC	16.54	6	0.011 S

S: Significant at P<0.05 ;NS: Non-Significant at P>0.05

Discussion:

The current study also investigated the impact of an educational program on breast cancer early detection behavior by focusing on women's attitude. Results revealed a statistically significant positive change in attitudes after the intervention. Before surgery, almost half of the women in the study group had a negative attitude (46%); 48% had a moderate attitude and only 6% positive attitude towards breast cancer early detection. After the intervention, a much higher proportion of women expressed positive attitudes (44%) and a lower proportion expressed negative attitudes (18%) ($\chi^2 = 36.99$, $P < 0.001$). These results suggest that the educational intervention increased positive beliefs toward breast cancer screening and early detection activities.

The most notable influence of the intervention was in women's attitudes, which significantly improved after the intervention; this may be due to structured educational content (breast cancer risk factors, warning signs and methods of screening as well as the benefits of early diagnosis). If training, educational programs aimed at increasing knowledge and modifying health beliefs, decreasing misperceptions hand in improving belief in offering a sense of available tools to prevent health habits. One of the most effective ways to lower mortality due to breast cancer is still early detection, since diagnosis prior to disease progression allows therapy. Thus, women's attitudes toward screening is an urgent public health challenge as a delayed diagnosis is still prevalent in developing countries(WHO, 2026).

The current results corroborate the findings of Wondmu et al. (2022) who assessed a health belief model-based intervention for improving breast cancer knowledge and positive behaviors among Ethiopian female university students. Their study showed that those who had sessions on educational classes had improved health beliefs, knowledge and breast self-examination practices. The authors of the review concluded that educational interventions have a positive influence on the perception of susceptibility, perceived benefits of screening, and confidence in taking preventive behaviors among women. This dramatic change toward more positive views may be explained by similar mechanisms in the present study.

Similarly, results are consistent with systematic review by Noman et al. (2020) synthesized evidence from educational interventions directed towards increasing breast cancer screening rates amongst women. The author concluded that educational strategies improved women's knowledge, beliefs and attitudes on breast cancer screening and increased participation in preventive practices. Education is an efficient and economical strategy to dispel misconceptions and promote the validation of screenings, said the authors. The substantial effect observed in this study substantiates these findings and showcases that with organized educational initiatives through group processes, positive shifts in health-related beliefs can be accomplished.

Hamed et al(2025) had also similar findings studied the role of health education in adherence to breast cancer screening guidelines in women. They found that educational interventions lead to a significant increase in willingness to screen as well as enhanced positive attitudes toward early detection. They noted that offering evidence based information and personal counseling alleviates fear and uncertainty

about breast cancer diagnosis, thereby enhancing acceptance of screening services. The current intervention also integrated similar educational components, which might be a reason for the change in attitudes among participants.

In addition, the present findings are in line with Shahwar et al. (2026) who indicated that structured health education methods were found to enhance breast self-examination practice among women. The behavioral enhancements found in their study were closely related to more positive feelings about breast cancer prevention, which substantiates the findings of this investigation. Previous studies reported that the educational program significantly enhanced participants' confidence in identifying suspicious breast changes and increased their willingness to engage in routine breast cancer screening (Kamyab et al., 2024).

The improvement in attitudes that were observed may also be accounted for by long-established theories of behavior change associated with health education. Providing accurate information through educational interventions that address misconceptions and psychological barriers, including the fear of diagnosis, embarrassment, and perceived fatalism (Koulouvari et al., 2025). These factors often dissuade women from taking part in screening programs. Evidence shows that women who received educational approaches based on behavioral theories, such as the Theory of Planned Behavior and the Health Belief Model, exhibited a positive change in intention and attitude toward breast cancer. Consequently, the large improvement documented in this study is likely a combination of improved perception of the benefits of early detection and lower barriers to screening (Wondmu et al., 2022).

Another noteworthy finding of the current study was that post-intervention posttest attitudes/knowledge were associated with those demographic characteristics. Women attitudes were significantly associated with educational level ($P = 0.031$). Women with high educational background showed better attitude improvement post program participation. As general, higher education levels generally correlate with greater health literacy, a better understanding of disease prevention, and an enhanced ability to interpret health information (Mohamed Amin et al., 2025). Thus, women with higher education are more likely to access educational interventions and more likely to be ready to engage in preventive health behaviors. This is in agreement with previous studies which concluded that education has significant effect on participants breast cancer awareness, and their participation in screening (Noman et al., 2020, Hamed et al., 2025).

Similarly, the source of breast cancer information was significantly associated with posttest attitude ($P = 0.011$). Participants who obtained information from healthcare professionals or reliable educational resources demonstrated more favorable attitudes than those relying primarily on informal sources such as friends or unverified social media content. This observation emphasizes the importance of providing women with accurate, evidence-based health information through trusted communication channels. Choudhary et al. (2024) also found evidence for this result researched the knowledge, attitude, and practice regarding breast cancer among women in a high-altitude sub-Himalayan region of India. They found that although many of the women had heard about breast cancer, the quality and source of information mattered a great deal in

shaping women's attitudes toward their screening practices. Women who received information from a health professional or participated in organized health education campaigns exhibited significantly better knowledge and more favorable attitudes compared to women educated solely by relatives, friends, or mass media. The authors also pointed out some of the fundamental barriers to access and sharing reliable educational resources, especially within underserved communities; that is to say, dissemination of breast cancer awareness and knowledge is further hindered by misinformation (Kourakos et al, 2024). These findings correlate with the current study, which showed that following an educational intervention, reliable sources of information were associated with more positive attitudes.

Conclusions:

Based on the findings, the study concluded that following the intervention, the study group demonstrated a very high key and practical improvement in the aspect of knowledge ($p = 0.000$), thus verifying the effect of the training program.

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