Jordan Medical Journal, Volume 58, No.2 2024
DOI: https://doi.org/10.35516/jmj.v58i2.306

Knowledge, Attitude, and Practice of Breast Self-Examination among Jordanian Women: A Quasi-Experimental Study

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Abstract

Breast cancer is the most common cancer affecting women worldwide. Breast self-examination (BSE) is recognized as an effective practice for early detection. The present study aims to assess the effect of a BSE training program on women's health practices to prevent breast cancer. A quasi-experimental design was employed to evaluate the effect of a BSE training program on the participants' knowledge, attitude, and practice (KAP). We recruited 117 women aged 20–54 years from maternal and child health care centers in Jordan; 66 women received BSE training, while 51 did not. Pre-and post-tests were administrated to both groups, revealing significant differences in mean scores for knowledge (F (2, 116) = 122.84, $p = 0.001$), attitude (F (2, 116) = 5.21, $p = 0.007$), and practice (F (2, 116) = 58.30, $p = 0.001$) before and after the training program. The results suggest that BSE, when performed appropriately, can improve women's knowledge, attitudes, and practices.

Keywords: Breast cancer, training program, Jordan, women

(J Med J 2024; Vol. 58(2):129–137)

Received *August 10,2022* *Accepted* *December 18,2022*

INTRODUCTION

Breast cancer is one of the most common types of cancer among women, affecting around 2.3 million people in 2020 and accounting for 11.7% of all newly diagnosed cancer cases [1]. In Jordan, breast cancer is a leading cause of death among women of reproductive age [2]. It is usually detected after symptoms have appeared, although some women may experience no symptoms [3]. The absence of symptoms often results in the cancer being discovered only at an advanced stage, thereby impacting recovery rates and potentially leading to death. In contrast, early-stage diagnosis of breast cancer offers more treatment options, increases survival [3], and reduces the cost of treatment [4].

In Jordan, an annual national campaign is conducted to encourage women to undergo screening, directed by the Ministry of Health and the King Hussein Cancer Center. Despite these efforts, participation in the screening program remains low due to various factors, including fear of the results (64%), lack of support (60%), financial constraints (53%), religious beliefs, and insufficient information [5].

As early detection of cancer improves survival rates, public awareness campaigns should aim to motivate women to make informed decisions regarding preventive measures and screening activities [6]. While training programs play an important role in promoting breast cancer examinations [7, 8], it is generally not expected for women to perform breast self-examination (BSE)without adequate training. This underscores the importance of enhancing the public awareness of BSE and other screening options, particularly in developing countries where women are often

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diagnosed at younger ages and in advanced stages [9].

The Health Belief Model (HBM) has been widely applied in BSE programs [10] to promote the practice, with health education promotion programs tailored to meet women's specific understanding of health beliefs. Increasing awareness may provide women with the information and encouragement to perform BSE. However, a study conducted in Jordan in 2016 to explore knowledge, attitudes, and practices revealed that knowledge without training was insufficient [11].

Similarly, a study conducted in a Turkish university revealed that the majority of the sampled female students had sufficient knowledge of BSE, but only half stated that they practiced it [12]. In another study, only 21% of women attending public health centers were reported to have ever practiced BSE [13]. Lack of awareness about the examination and shyness are widely known as the main reasons accounting for the non-implementation of BSE. Thus, it is important to develop appropriate health education programs about breast cancer and BSE [14].

Training in BSE has been implemented for different groups and in different ways [7, 16]. In Jordan, around 236 female university students had inadequate knowledge (46%) and a positive attitude (56%) on breast cancer, while for 38%, BSE was a common practice [17]. Similarly, Suleiman found that half of 900 university students had insufficient awareness of breast cancer (52%), and a third reported inadequate practice of BSE (35%) [18]. There have been few interventional studies conducted to investigate the effect of BSE training on the knowledge, attitudes, and practices of BSE. Therefore, the aim of this study is to examine the effectiveness of an instructional training program for BSE on women's knowledge, attitudes, and practices toward breast cancer, its risk factors, and its effectiveness in early detection among postpartum women in maternal and child health centers (MCHCs) in Al-Mafraq city.

METHODS

A quasi-experimental design with pre- and post-tests was used to compare the knowledge, attitude, and practice of women before and after the educational session.

Population and sample

Researchers conducted the intervention in the MCHC in Jordan. The rationale was for easy access to a large number of participants and to re-evaluate the effect of the intervention after two months. This timing aligns with postpartum women's regular visits to an MCHC, where they approach it for the BCG vaccination for their infants within the first two weeks of their lives. Additionally, they are asked to return to the MCHC after two months to vaccinate infants against six diseases (hepatitis, diphtheria, tetanus, influenza, pertussis, and rotavirus).

This study targeted women of reproductive age, specifically, those aged 20 years and above. The focus on this group is due to the continued high incidence of breast cancer among younger women in developing countries, facilitating early detection. Research assistants visited the MCHC each Tuesday (vaccination services are available on Tuesdays as announced by the Ministry of Health) and invited potential participants to join the study. Eligible participants included Jordanian women who were aged 20 years and older, attending health care centers, and who were physically and mentally willing to participate. Exclusion criteria were women diagnosed with breast cancer, pregnant women, and those who had previously attended other health awareness programs on BSE.

The sample size was calculated using G power (with 0.05 effect size, alpha error 0.05, power 0.80 in 1:1 ratio). Researchers used G* power software to help determine the required number of participants in the current study. A power level of .80, an effect size of .25 for repeated measurement analysis of variance (ANOVA), and an alpha level of .05 were indicated to determine the sample size. Based on these statistics, the minimum required sample size was 86 participants. However, to decrease attrition and incomplete data, the number of participants increased to 117.

Recruitment strategies and study procedures

200 women were invited to participate in the present study; however, only 130 of them agreed to participate. After obtaining consent, 13 did not provide complete answers to the questionnaire, leaving the sample size reaching 117. The first meeting was held to recruit participants and randomly assign them to either the intervention or control group. The women were randomly allocated and matched based on demographic characteristics (age, number of children, and educational level). All participants were asked to complete the pre-test questionnaire during the first visit. The instrument (pre-test, post-test, and checklist) was developed by the researchers after an extensive review of previous studies. Researchers assessed the internal consistency of the tool using Cronbach's alpha (0.84), indicating that the instrument is reliable. The

content validity was applied, and the results showed that the content validity index (CVI) was 0.87.

The intervention group (n=66) received training on breast cancer in the first visit, specifically the importance of practicing BSE. A video was shown on how to practice BSE, followed by a demonstration using a BSE mannequin, brochures, and a face-to-face discussion. To assure privacy and confidentiality, the actual demonstration of BSE was performed alone with each trainee. The control group (n=51) received no training. After two months, the research assistants met all the participants and asked them to fill in a post-test questionnaire and carry out a BSE in a private room in the health center.

The women were asked to fill in a pre-test questionnaire on the first visit (before receiving training) and a post-test one on the second visit. Pre-test questionnaires were distributed; after the training session had been completed, a post-test questionnaire was distributed to evaluate the participants' knowledge and attitude about BSE. The women were then asked to perform BSE, and the trained research assistants used a checklist to evaluate their practice of the BSE.

After completion of the data collection, all participants in the control group were provided with information (leaflets and educational materials) and given training sessions on BSE.

Setting

Women attending Jordan's MCHC in public and private healthcare settings are recruited in the present study since they offer women essential maternal and child health services. They cover pregnancy, birth, and postpartum care, vaccinations, and routine pediatric sickness treatment. They are distributed in urban and rural locations [19].

Instrument

The researchers developed the instruments (pre-test and post-test questionnaire, and the checklist) after an extensive review of previous studies [17, 18, 20]. The questionnaire had four parts. The first collected socio-demographic data. The second was comprised of 20 items to assess the knowledge level about breast cancer and BSE (six items on BSE, three on mammograms, and eleven on knowledge of breast cancer). The third part was designed to investigate the participants' responses about risk factors (11 items) and the clinical manifestation of breast cancer (6 items), while the fourth covered the participants' attitude to BSE (11 items). The last part was an 8-item checklist evaluating the BSE practice, adopted from the Bates Guide to Physical Examination and History Taking textbook [21] and translated into Arabic, to assess the extent of the participants' ability to perform BSE.

A pilot study was conducted with 15 participants, and the instrument was modified accordingly, in terms of clarity, length, time needed, and any other issues. These participants were excluded from the main study. The validity and reliability of the instrument were evaluated.

Ethical considerations

The researchers attained IRB approval from a public university IRB committee, as well as the Ministry of Health IRB committee. The research assistants were told how to distribute the questionnaires and explain the purpose and procedures of the study; they also completed the checklists. In addition, the researchers reassured the women suspected of having signs and symptoms of breast cancer and were referred to a gynecologist (a volunteer from the private sector) for further investigation.

Participation was voluntary in the present study and no names were sought anywhere in the research; instead, a code number was given to each subject. The information was collected on paper-based questionnaires and stored in a locked cabinet in the university. Those who agreed to participate were asked to sign a consent form and assured that their participation was voluntary and that they could withdraw at any time. The researchers maintained confidentiality and anonymity, and the examination of the participants was performed individually in a private room allocated for this purpose.

Data analysis plan

Researchers performed descriptive statistics to analyze the demographic characteristics of the sample, and the independent *t*-test and Chi-square were calculated to examine the difference between the two groups in terms of demographic characteristics. Researchers performed a one way-repeated ANOVA measure to evaluate the effect of the training program on the knowledge, attitude, and practice concerningBSE among women two months after the program's completion. An independent *t*-test was used to identify any statistically significant differences between the experimental and control groups in the level of knowledge, attitude, and practice.

RESULTS

The participants were randomly assigned to either the intervention (n=66) or control group (n=51). Their mean age was 33.62 years, standard deviation

(SD) = 8.19, and they ranged from 18 to 44 years old. Eighty percent of the sample were married (n=94). More than half had a monthly income of less than 500 Jordanian dinar (n=64). Almost two-thirds (n=73) had more than a secondary education and more than 60% were not employed (n=72). The majority of the sample (n=101) had no family history of breast cancer. Seven participants had a family history of cancer: two leukaemia, four lymphoma, and one lung cancer.

Table 1: Sample characteristics at baseline for the intervention and control groups (n=117)

Variable	Intervention group n=66	Control group n=51	*p* value*
Age (years) M (SD)	34.27 (8.05)	32.88(8.38)	0.36
Employment			
Working	42	30	.0.59
Not Working	24	21	
Marital status			
Married	50	44	0.15
Unmarried	16	7	
Educational level			
Less than secondary education	24	20	0.75
More than secondary education	42	31	
Monthly income M(SD)			
Less than 500 JOD	38	26	0.47
More than 500 JOD	28	25	
Family history of cancer			
Yes	11	5	0.21
No	55	46	
Knowledge	16.22 (7.23)	17.37(8.20)	0.42
Attitude	88.45(16.04)	90.60(14.31)	0.45
Practice	04.10(1.19)	3.64(1.23)	0.44

* $p \leq 0.05$ level (2-tailed), *M= mean; SD= standard deviation, JOD: Jordanian Dinar, One JOD=1.4 USD*

As shown in Table 1, the independent *t*-test revealed no significant difference in age ($p = 0.36$), knowledge about BSE ($p = 0.42$), attitude toward BSE ($p = 0.45$), and practice of BSE ($p = 0.44$) between the experimental and control group at baselines. Chi-square showed no significant differences in the remaining variables (education, marital status, employment, monthly income, and family history of cancer). These results confirmed that the two groups were homogenous for these demographic variables.

Effectiveness of the BSE training program on knowledge, attitude, and practice of breast cancer

As shown in Table 2, a one-repeated ANOVA measure was used to evaluate the effect of the training program on the knowledge, attitude, and practice of BSE among women two months after the conclusion of the program.

Table 2: Repeated measure ANOVA examining the effect of the BSE training program on knowledge and practice (n=117)

Variable	Group	Pre-test mean(SD)	*p** for pre- &post-test	Post-test M(SD)
Knowledge	Intervention	16.22 (7.23)	0.001	26.01 (3.08)
	Control	17.37 (8.20)	0.001	25.52 (3.30)
Knowledge	Intervention	2.31 (1.40)	0.001	3.54 (0.96)
(Examination)	Control	2.29 (1.55)	0.001	3.25 (1.26)
Knowledge	Intervention	4.33 (2.05)	0.001	6.37 (1.64)
(Breast Cancer)	Control	4.88 (2.45)	0.001	6.19 (2.20)
Knowledge	Intervention	3.07 (1.51)	0.001	4.34 (1.25)
(Warning signs)	Control	3.03 (1.78)	0.04	3.80 (1.77)
Knowledge	Intervention	6.51 (3.99)	0.001	10.12 (3.57)
(Risk Factors)	Control	7.15 (5.00)	0.006	9.45 (4.10)
Practice	Intervention	4.10 (1.19)	0.001	7.43 (1.34)
	Control	3.46 (1.23)	0.001	5.96 (1.09)

M=Mean, SD=Standard deviation, * $p \leq 0.05$ level (2-tailed)

The full model was statistically significant ($F(2, 116) = 122.84$, $p = 0.001$), indicating a significant change in the knowledge mean score before and after the application of the training

program. It also showed a statistically significant change (F (1, 116) = 135.06, p= 0.001) in the knowledge mean score between pre-test and post-test. The training program also had a statistically significant impact on all knowledge subscales. The corresponding effect size was .65, showing that 65% of the variance in knowledge was explained by the application of the education program. Regarding the control group, there was a statistically significant change (F (1, 116) = 40.40, p= 0.001) in the knowledge mean score between pre-test and post-test, and a statistically significant change in all knowledge subscale mean scores between pre-test and post-test.

The full model was also statistically significant (F (2, 116) = 5.21, p= 0.007), indicating a significant change in the attitude mean score before and after the education program. There was also a statistically significant change (F (1, 116) = 11.68, p= 0.001) in the attitude mean score between pre-test and post-test. The corresponding effect size was .07, indicating that 7% of the variance in attitude was related to the training program. Regarding the attitude subscales, there was a statistically significant change in the participants' attitude to their ability to perform BSE (F (1, 116) = 11.24, p= 0.00), their perceptions about breast cancer (F (1, 116), 3.84, p= 0.02) and their attitudes towards their general health (F (1, 116) = 6.44, p= 0.003) before and after the program. Regarding the control group, there was a non-statistically significant change (F (1, 116) = 1.49, $p = 0.22$) in the attitude mean score between pre-test and post-test, as illustrated in Table 3.

Table 3: Repeated measure ANOVA examining the effect of the BSE training program on attitude (n=117)

Attitude	Group	Pre-test mean(SD)	p*pre- and post-test	Post-test M(SD)
Total score	Intervention	88.45 (16.04)	0.15	92.28 (15.46)
	Control	90.60 (14.31)	0.22	94.25 (17.80)
Perceptions about breast cancer	Intervention	18.87 (6.05)	0.16	16.59 (6.11)
	Control	17.21 (8.06)	0.58	17.80 (7.67)
Positive attitudes towards BSE	Intervention	17.56 (4.91)	0.65	17.93 (5.21)
	Control	15.11 (6.82)	0.75	14.78 (6.09)
Negative attitudes towards BSE	Intervention	11.21 (6.02)	0.28	10.15 (5.51)
	Control	12.21 (6.59)	0.46	13.19 (6.93)
Susceptibility to breast cancer	Intervention	8.59 (4.06)	0.28	7.92 (3.47)
	Control	8.25 (4.48)	0.19	9.49 (5.46)
Ability to perform BSE	Intervention	17.95 (8.27)	0.06	22.81 (9.02)
	Control	16.01 (8.50)	0.06	19.23 (9.75)
Attitudes to their general health	Intervention	14.57 (6.56)	0.10	17.68 (5.42)
	Control	13.47 (7.01)	0.78	13.74 (7.21)

* $p \leq 0.05$ level (2-tailed)

The full model was statistically significant (F (2, 116) = 58.30, p= 0.001), indicating a significant change in the practice mean score before and after the training program. There was a statistically significant change (F (1, 116) = 59.83, p= 0.001) in the practice mean score between pre-test and post-test, and a statistically significant change (F (1, 116) = 72.53, p= 0.001) in the practice mean score between pre-test and post-test. The corresponding effect size was 0.47, showing that 47% of the variance in practice was explained by the application of the training program. Regarding the control group, there was no statistically significant change (F (1, 116) = 19.41, p= 0.001) in the practice mean score between pre-test and post-test, as shown in Table 2.

An independent t-test was used to identify any statistically significant differences between the experimental and the control group in the level of knowledge, attitude, and practice post-test. The results are presented in Table 4. There was no significant difference (t (115) = 0.82, p= 0.41) in the knowledge mean score for the intervention group (M

= 26.01, SD = 3.08) compared to the control group (M = 25.52, SD = 3.30), and no significant difference (t (115) = -.64, p= 0.52) in the attitude mean score for the intervention group (M = 92.28, SD = 15.46) compared to the control group (M = 94.52, SD = 17.80). However, there was a statistically significant difference (t (115) = 3.48, p= 0.001) in the practice mean score for the intervention group (M = 7.43, SD = 1.34) compared to the control group (M = 5.96, SD = 1.09).

Table 4: Independent *t*-test examining the effect of education on knowledge, attitude and practice at the post-test level (n=117)

Variable	Intervention group	Control group	*t*test	*p*value	CI(Upper-Lower)
Knowledge	26.01 (3.08)	25.52 (3.30)	0.81	0.41	-0.68–1.66
Attitude	92.82 (15.46)	94.25 (17.80)	-0.64	0.52	-8.06–4.13
Practice	7.43 (1.34)	5.96 (1.09)	3.48	0.001	0.63–2.31

* $p \leq 0.05$ level (2-tailed, CI: Confidence Interval)

DISCUSSION

The current study examined the effects of a BSE training program on Jordanian women's knowledge, attitudes, and practices. In the past, the diagnosis of breast cancer was predominantly at a late stage, leading to a poor survival rate, greater suffering, and increased cost of treatment. Moreover, educational programs are important for enhancing knowledge, attitude, and skills to practice BSE. The findings of this study revealed that the sampled women's knowledge of breast examination was significantly improved after training, congruent with previous studies [11, 23–25]. Moreover, Othman, Ahram, Al-Tarawneh, and Shahrouri [6] found that Jordanian women have limited knowledge about breast cancer screening.

Gadgil et al. [23] found that increasing alertness via mailed brochures and entry to cancer care may lead to down-staging of breast cancer. Raithatha et al. [26] concluded that insufficient knowledge of BSE was the main reason for not practicing it. Women should, therefore, have sufficient knowledge of breast examination procedures, e.g. BSE, physical examinations, and mammograms. In particular, their knowledge of BSE has a major effect on early diagnosis and treatment [24, 25, 27]. Parchuri et al. [24] found that BSE training improved the cancer detection rate by 1.5% among Indian women. However, the type of training provided plays a role in the comprehension of the material used. For example, Gadgil et al. [23] used mailed brochures, and Raithatha et al. [26] reported that the use of a mannequin for training was more beneficial than the use of a flip chart.

The results of the current research revealed that the knowledge score of women in the experimental group improved significantly between the first post-test and the second post-test compared with those in the control group. These findings are consistent with the findings of other researchers [11, 23, 24] and confirm that training in BSE had a significant effect on knowledge of BSE. Nurses play a crucial role in assessing and educating women about the importance of practicing BSE and undergoing breast screening tests. They can use social media and smartphone applications to enhance their knowledge of breast cancer early detection procedures.

In the current study, the findings showed a significant change in the mean scores of the participants' attitude towards BSE before and after training. The mean scores for attitude in the intervention group were higher than those in the control group. This is consistent with the findings of Akarsu and Andsoy [28], that BSE educational programs had a significant impact on the mean total score of women's attitudes toward BSE practice.

LIMITATION

This study enhanced our understanding of the importance of BSE training, but it has limitations, such as a small sample size and the short interval between the pre- and post-test.

CONCLUSION

Our findings are significant as they contribute to alerting healthcare providers about the importance of providing women with sufficient education to enhance their ability to perform BSE. We also hope that the findings will benefit decision-makers and healthcare workers in designing effective health awareness and training programs related to breast cancer screening.

We believe that providing women with sufficient and appropriate information on breast cancer and BSE can help detect breast cancer in the early stages, which will enhance treatment and cure.

Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Published 2022 Jun 28. doi:10.1371/journal.pone.0270417

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معرفة واتجاهات وممارسة الفحص الذاتي للثدي بين الأردنيات: دراسة شبه تجريبية

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الملخص

سرطان الثدي هو أكثر أنواع السرطانات شيوعًا التي تصيب النساء في جميع أنحاء العالم، ومن المعروف أن الفحص الذاتي للثدي (BSE) هو ممارسة فعالة للكشف المبكر عن سرطان الثدي. الغرض من هذه الدراسة هو فحص تأثير برنامج تدريبي على الفحص الذاتي للثدي على الممارسات الصحية للمرأة للوقاية من سرطان الثدي. تم استخدام تصميم شبه تجريبي لتحديد تأثير برنامج تدريبي حول الفحص الذاتي للثدي على معرفة المشاركات ومواقفهن وممارساتهن (KAP). قمنا باختيار 117 امرأة تتراوح أعمارهن بين 20 و 54 عامًا في مراكز رعاية صحة الأم والطفل في الأردن، وتلقت 66 امرأة تدريبًا على الفحص الذاتي للثدي و 51 امرأة لم يتم تدريبهن، وتم إجراء اختبار قبلي وبعدي لكلا المجموعتين. كشفت النتائج عن اختلاف معنوي في متوسط الدرجة المعرفية ($F(2, 116) = 122.84, p = 0.001$)، والسلوك ($F(2, 116) = 5.21, p = 0.007$) والتطبيق ($F(2, 116) = 58.30, p = 0.001$) قبل وبعد تطبيق البرنامج التدريبي. يمكن أن يؤدي التدريب على الفحص الذاتي للثدي للنساء إلى تحسين معرفتهن، ومواقفهن، وممارستهن لأداء الفحص الذاتي للثدي بشكل مناسب.

الكلمات الدالة: سرطان الثدي، برنامج تدريبي، الأردن، النساء.