Journal of Obstetrics, Gynecology and Cancer Research | ISSN: 2476-5848

Does the Extended Parallel Process Model Promote Breast Self-Examination? A Controlled Experimental Study

Atefeh Mousavi[1], Sharareh Jannesari[2*], Sepideh Hajian[2], Mahnaz Solhi[3], Mehdi Khabaz Khoob[4], Malihe Nasiri[5], Aryan Sadeghyan[6]

1. *Student Research Committee, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
2. *Department of Midwifery and Reproductive Health, Midwifery and Reproductive Health Research Center, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
3. *Department of Health Education and Promotion, School of Public Health, Iran University of Medical Sciences, Tehran, Iran*
4. *Department of Epidemiology, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
5. *Department of Biostatistics, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
6. *Student Research Committee, Semnan University, Semnan, Iran*

Article Info

10.30699/jogcr.7.4.304

Received: 2021/09/08;
Accepted: 2021/11/17;
Published Online: 14 Mar 2022;

Use your device to scan and read the article online

Corresponding Information:
Sharareh Jannesari,
Department of Midwifery and Reproductive Health, Midwifery and Reproductive Health Research Center, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran
Email: shararehjannesari@gmail.com

ABSTRACT

Background & Objective: Breast cancer is the most common type of cancer and about one-third of all cancers in women. Within the case of early detection, more than 90% of the patients are treated. However, most women do not perform breast self-examination as a simple, effective, and inexpensive way to prevent cancer deaths. Therefore, this study aimed to inform and educate women to promote self-efficacy and encourage individuals to self-care.

Materials & Methods: This study is quantitative research and was conducted on 80 women aged 20-60 years old in health centers of the city of Some Sara. The data collection tool was a researcher-made questionnaire designed based on the Extended Parallel Process Model. The educational intervention was conducted using lecture, question and answer, movie screening, and practical presentation using Moulage. The health behaviors and performance of the participants before and immediately after the intervention, and two months later, were compared within the intervention and control groups. Data were analyzed by repeated-measures test, chi-square, Mann -Whitney, Fisher's Exact test.

Results: The study results showed that educational intervention based on the Extended Parallel Process Model had increased self-efficacy within the intervention group compared with the control group. The intervention increased the average score of individuals from model structures. So that before the educational intervention, the average perceived susceptibility and severity score, perceived self-efficacy and response efficacy, perceived threat, and perceived efficacy was moderate. After the intervention, the average score of all model components increased (P<0/05). The mean score of the performance checklist was 14 before the intervention, which was upgraded to 20 after the intervention (P<0/05).

Conclusion: The results of this study supported the effectiveness of the Extended Parallel Process Model in preventing breast cancer.

Keywords: Breast neoplasm, Cancer screening, Education, Health promotion

Introduction

Breast cancer is the most common malignancy in women worldwide and the second leading cause of malignancy death in this population **(1)**. In Iran, 16% of all cancers in women are breast cancer, which is the number one cancer among Iranian women **(2)**. The incidence age of breast cancer in Iranian women is ten years earlier than that of women living in developed countries **(3)**. There's a rising trend of death from breast cancer in Iran, although this rate is still relatively low compared to industrialized countries **(4)**. The significant increase in treatment costs in the second and third stages underscores the importance of early diagnosis and policy-making for necessary interventions on this subject in Iran **(5)**. According to

the current knowledge, one-third to half of the cancers are potentially preventable. This finding owes to the greater understanding of the risk factors of some malignancies, including breast cancer, and the development of related preventive interventions **(6)**. Studies show that prognosis decline is proportional to the cancer progression rate. The upper is the rate of progression, the worse will be the prognosis, and the lower the 5-year survival rate **(7)**.

Moreover, most patients are not informed about how to perform early-stage breast cancer detection by touching, and self-examination training or screening tools should therefore be incorporated into women's health promotion programs **(8)**. Early detection is crucial to improving outcomes and survival rates **(9)**. Breast Self-Examination (BSE) could be a self-diagnostic method that is easy, effortless, private, safe, cost less, and equipment-free, and is helpful for screening **(10)**. Nevertheless, BSE is a forgotten part of the health behaviors of many Iranian women; therefore, Iranian women should be further educated about the benefits of this behavior **(11)**. In addition, targeted training based on health promotion models for Iranian women has been assessed as useful for increasing breast cancer awareness and controlling the burden of cancer in the future **(12)**. Although having sufficient knowledge on various health issues is a prerequisite for health behaviors, there is not always a direct relationship between people's knowledge and behaviors. In other words, people with higher knowledge do not necessarily have better health behaviors. There is a relationship between the two factors: (i) People's attitudes, which can predict their behavior too; that is, when people's attitudes are improved, more appropriate actions can be expected from them; and (ii) Education, which can significantly improve a person's knowledge, attitude, and behavior about BSE **(10)**. In addition, perceived self-efficacy can lead to behavior adoption, while perceived subjective or objective barriers can lead to the non-adoption of the BSE behavior. Therefore, educational interventions for promoting BSE health behavior should emphasize improving women's performance to promote their self-efficacy and modify the perceived barriers through proper education **(13)**.

Different models are used in health education to study health behavior. Theories can answer planners' questions about why people do not have the desired behavior, how to change behaviors, and what factors should be considered in evaluating programs **(14)**. Furthermore, the success rates of health education and promotion programs vary, and those based on proper theories and models are more likely to succeed. Theories and models form the basis of educational interventions, are considered tools for explaining and justifying health plans, and comprise a framework for health intervention planning; they also enable the repeating of health interventions and provide a structured process for analyzing successes and failures **(15)**.

The Extended Parallel Process Model (EPPM) is one of these health education models that was introduced by Witte in 1992 based on the central variable of fear and aimed to answer the questions of how and when the instinct of fear works effectively and successfully to promote the right behavior and when and why it fails. According to this model, messages mixed with fear-arousal produce two assessments in a person. One is "threat assessment," and the other is "efficiency assessment", both of which lead to three reactions: Indifference, rejection of the message, and acceptance of the message. Initially, the target audience of these messages assesses the severity of the threat (How does breast cancer occur? What are its symptoms, risks, and complications?), and their sensitivity to the risks of the threat (Am I at risk for breast cancer?). By considering these two factors (perceived severity and sensitivity to the risk), the person feels fear and threat. Then, if the presented messages motivate the audience, the second assessment emerges, i.e., assessing the efficiency and effectiveness of the message, and the degree of importance of the threat is judged **(16)**. The key distinguishing aspect of this model from other models based on the fear instinct is the ability to predict health-related behaviors in individuals by determining critical points. The audience is placed at one of two processes, either risk control (increased likelihood of a positive behavior change) or fears control (decreased likelihood of a positive behavior change), depending on whether the degree of perceived threat is dominant or the degree of perceived effectiveness. The numerical calculation of the critical point enables the researcher to predict the likelihood of positive behavior change in the future **(17)**. Since breast cancer is a disease that leaves its first psychological traces in the patient in the form of fear and worries and given the two main EPPM constructs of risk control and fear control, a model has to be used that incorporates this concept and helps empower audiences to adopt self-care behaviors. To date, no research has been conducted on the effectiveness of the EPPM in promoting breast cancer screening behaviors in Iran. This study was conducted to increase women's sensitivity and perception of the risk of this disease to improve their self-care behaviors, and while increasing their awareness about the risk factors of malignant breast tumors and encouraging self-care behaviors, it helps them benefit from early cancer detection in the future and the reduction of the economic and health costs of this disease.

Methods and Materials

This experimental study was a randomized controlled trial on 80 women aged 20-60 years in Some Sara in Guilan Province of Iran. The sample size was estimated as 72 (36 per group) using the data from a related study (Nangle *et al.* 2003) and considering a high test power (90%), type-I error of 5%, and equal division of the subjects into the two groups. Considering the possibility of sample loss and to prevent a decline in the study's power, 10% was added

to the sample size, and it finally reached 80 (40 patients per group). The inclusion criteria were: The lack of pregnancy and nursing, no history of malignant breast tumors, lack of malignant breast tumor detection during the study, incorrect or non-performance of breast self-examination by observation and the researcher's confirmation, willingness to regularly attend training courses, and the unlikelihood of immigrating from Some Sara. The exclusion criteria were: Unwillingness to continue participation in the study, non-regular attendance of the training classes (for the intervention group), or immigration from the city. Sampling was carried out in several stages. First, a list of the health centers in the city of Some Sara was prepared; then, two centers with the largest population coverage and various demographic characteristics were selected. After obtaining written permission from the Ethics Committee (IR.SBMU.PHNM.1395.577), the researcher obtained written consent from the eligible women. Also, this study was confirmed at the Iranian Clinical Trial Registration Center with IRCT clinical trial registration number: IRCT20200525047565N1. Sampling continued (except on holidays) until the desired sample size from both centers was reached through convenience sampling on different days of the week (Sat., Mon., Wed. for the intervention group and Sun., Tues., Thu. for the control group). Due to differences in the physiological characteristics of women of reproductive age and the possible differences in self-care behaviors, participants in both groups were divided into two age groups: A group aged 20-39 years and a second group aged 40-60 years. The training package was prepared using health promotion and reproductive health experts' opinions based on the EPPM and was presented based on the steps recommended in this model **(16, 17)**.

The required data were collected using a demographic questionnaire, the Breast Self-Examination Behavior Predicting Scale (11 items), and the Risk Behavior Diagnosis Scale (RBDS) based on the EPPM to determine perceived threat (12 items) and perceived efficiency (12 items), which are generally used to determine people's subjective perception of risk and the probability of change in health behavior **(16)**. Data were collected before, immediately after, and two months after the intervention. The RBDS was scored based on a 5-point Likert from 'strongly disagree' (=1) to 'strongly agree' (=5). The minimum and maximum scores in each construct were 12 and 60. The training sessions were four 60-min sessions held over one month in the intervention group. That is, an average of four one-hour sessions with an average attendance of seven to ten people were held every week, making for a total of 16 training sessions. Educational aids, such as anatomical moulages and video and slide display by video projectors, were used to convey the materials better and facilitate understanding the content. In the intervention group, the questionnaires were answered before, immediately after, and two months after the intervention. The questionnaires were completed before, immediately after, and two months after receiving routine care in the control group. The BSE Behavior Predicting Scale was also completed by the researcher before, immediately after, and two months after the last training session in both groups through observation. After the educational intervention was over, to adhere to ethical standards and not deprive the control group of the administered care, a summary of the educational materials was provided to the control group in one session through a speech over 20 minutes but without using the multiple EPPM stages.

The validity of the RBDS was determined by qualitative and quantitative content validity and qualitative face validity. The Content Validity Index (CVI) and Content Validity Ratio (CVR) of the questionnaire were calculated for each of the subscales of perceived sensitivity (0.96 and 0.95), perceived severity (0.96 and 0.93), perceived effectiveness (0.83 and 0.99), perceived self-efficacy (0.76 and 0.94) and performance (0.94 and 0.99), respectively. The total CVI and CVR of the tool were also calculated as 0.9 and 0.95, respectively. Also, the reliability of the tool was determined by measuring its internal consistency and Cronbach's alpha coefficient, which was 0.75, 0.8, 0.79, 0.85, and 0.75 for the subscales of perceived sensitivity, perceived severity, perceived effectiveness, perceived self-efficacy, and performance, respectively. In addition, the reliability of the tool over time was also assessed by the test-retest method with at least a two-week interval, and the correlation analysis of the two test scores yielded a reliability coefficient of 0.9. The crude data were analyzed in SPSS 21 (SPSS Inc., Chicago, Ill., USA) using the Chi-square test, Mann-Whitney test, Fisher's exact test, and therefore the inter-group and intra-group repeated measures ANOVA. The significance level was less than 0.05.

Results

Three subjects in the intervention group and eight within the control group were eliminated during the study because of unwillingness to continue participation. The three subjects in the intervention group were replaced with new subjects. More than half of the participants (58%) were 20-39 years old, and the other half (41%) were 40-60 years old. The study results showed that the two groups had no statistically significant differences in terms of personal characteristics (P<0.05). Table 1 presents a comparison of the most important demographic variables. A comparison of the critical point between the two groups before and after the intervention indicates that, within the intervention group, there was a statistically significant difference in the amount of this variable immediately and two months after the intervention compared to before the intervention. In contrast, this finding was not true for the control group (Figure 1).

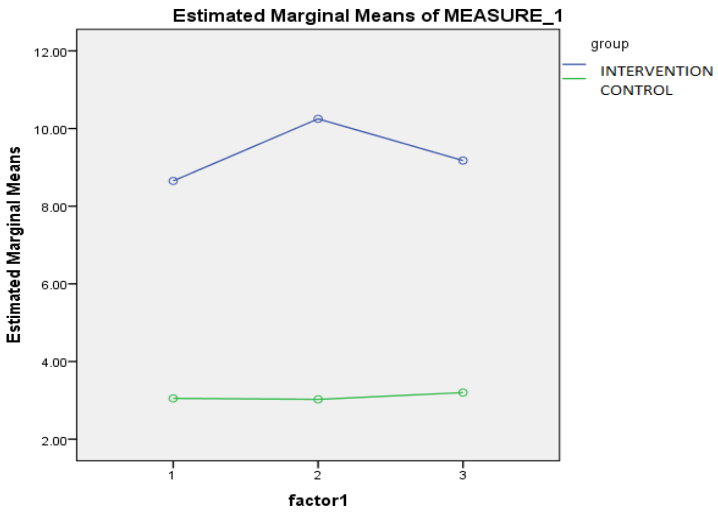

Figure 1. A comparison of the critical point in the intervention and control groups before, immediately after, and two months after the educational intervention

Table 1. The absolute and relative frequency of the personal characteristics of the participating women by study group

Variable	Intervention Group (No. %)	Control Group (No. %)	Significance Level
Age group			
20-39	22 (55)	25 (62.5)	0.50*
40-60	18 (45)	15 (37.5)	
Marital status			
Married	39 (97.5)	35 (87.5)	0.17**
Single	1 (2.5)	2 (5)	
Divorced		3 (7.5)	
Education			
Primary school	3 (7.5)	6 (15)	0.54***
Junior high school	9 (22.5)	13 (32.5)	
High school	8 (20)	3 (7.5)	
High school diploma	16 (40)	10 (25)	
University	4 (10)	8 (20)	
Occupation			
Employee	3 (7.5)	5 (12.5)	0.22**
Laborer	2 (5)		
Self-employed	1 (2.5)	4 (10)	
Housewife	34 (85)	31 (77.5)	
Family structure			
With spouse and children	38 (95)	33 (82.5)	0.32**
With parents	1 (2.5)	4 (10)	
Only with children	1 (2.5)	15)	
Lives alone		1 (2.5)	
Family history of breast cancer	6 (15)	4 (10)	0.5*
Hormonal therapy history	10 (25)	9 (22.5)	0.79*
Hormonal contraceptive history	26 (65)	17 (42.5)	0.07

*Chi-square **Mann Whitney *** Fisher's exact test

Moreover, the repeated-measures ANOVA was used to evaluate the changes within the mean scores of perceived susceptibility and severity, perceived response efficacy and self-efficacy, and perceived threat in the intervention and control groups. The results revealed that perceived susceptibility and severity, perceived response efficacy, and perceived self-efficacy had changed in the intervention group (P<0.05). No significant difference was observed within the control group (Tables 2 and 3). The mean performance score was assessed with the ANOVA and was 14 before the intervention, 25 immediately after the intervention, and 20 two months after the intervention (P<0.001), which reflect the improved

performance in the intervention group regarding BSE behavior (Figure 2).

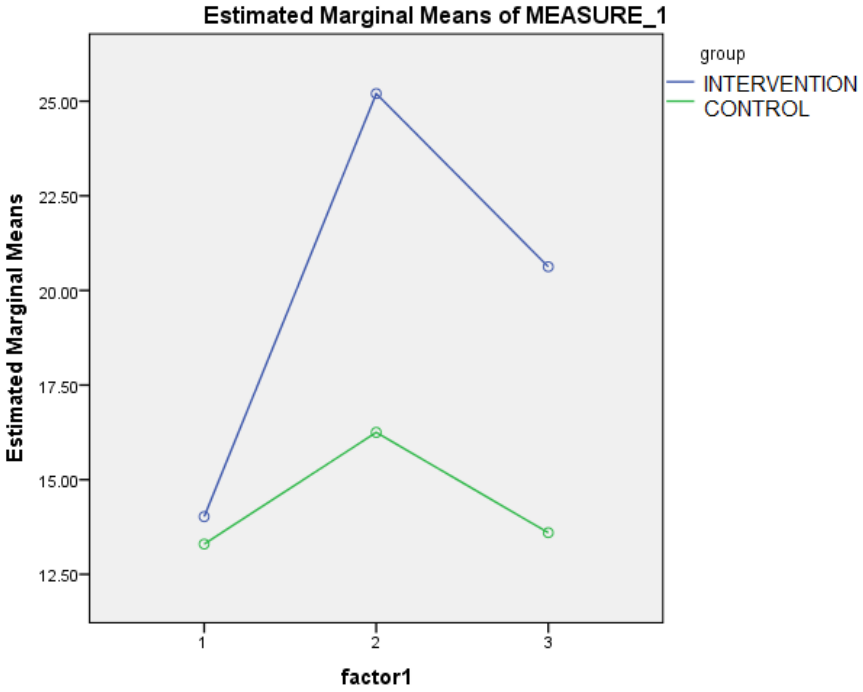

Figure 2. A comparison of the performance score before, immediately after, and two months after the educational intervention

Table 2. A comparison of the mean scores of the perceived threat and its sub-constructs before, immediately after, and two months after the intervention

Perceived threat / Group	Intervention	Control	* Significance level
	Mean (SD)	Mean (SD)	Comparison of the two groups
Perceived susceptibility	Before the intervention	19.25±4.13	18.52±5.31	0.006
	Immediately after the intervention	22.07±1.55	18.55*5.17	
	Two months after the intervention	21.75±1.73	18.45±5.63	
	**Significance level	<0.001	0.95	
Perceived severity	Before the intervention	21.72±5.73	21.32±5.76	0.022
	Immediately after the intervention	24.92±3.56	21.52±5.79	
	Two months after the intervention	25.25±3.24	21.6±6.033	
	**Significance level	<0.001	0.99	
Total construct score	Before the intervention	40.97±9.05	40.05±9.95	0.005
	Immediately after the intervention	47±4.01	40.07±9.74	
	Two months after the intervention	47±3.79	40.04±10.46	
	**Significance level	<0.001	0.99	

* Inter-group repeated measures ANOVA ** Intra-group ANOV

Table 3. A comparison of the mean scores of perceived efficiency and its sub-constructs before, immediately after, and two months after the intervention

Group / Perceived efficacy		Intervention	Control	* Significance level
		Mean (SD)	Mean (SD)	Comparison of the two groups
Perceived response efficacy	Before the intervention	24.12±6.59	22.2±9.61	0.009
	Immediately after the intervention	28.37±2.07	22.6±9.68	
	Two months after the intervention	28.07±2.32	22.8±9.25	
	**Significance level	<0.001	0.99	
Perceived self-efficacy	Before the intervention	25.5±4.25	20.2±10.20	<0.001
	Immediately after the intervention	28.87*2.05	20.5±10.23	
	Two months after the intervention	28.10±2.52	20.42±10.12	
	**Significance level	<0.001	0.99	
Total construct score	Before the intervention	49.62±9.27	43.1±17.95	<0.001
	Immediately after the intervention	57.25±3.83	43.3±17.91	
	Two months after the intervention	56.17±4.29	43.2±17.46	
	**Significance level	<0.001	0.99	

* Inter-group repeated measures ANOVA ** Intra-group ANOVA

Discussion

The current research findings suggest that using the EPPM can be effective in arousing the perception of threat in the audience and overcoming fear perception and thus fostering health-promoting behaviors. The results obtained by Hajian *et al.* (2016) in the rural areas of Qeshm, south of Iran, showed that the highest probability of behavior change in those receiving regular prenatal care was in women who overcame the perception of fear of not receiving prenatal care after perceiving threat and mainly efficiency played a significant role in the correction of their self-care behaviors **(18)**. Consistent with the present findings, in a study on the effect of education supported the health belief model in creating breast self-examination behaviors, Karimy *et al.* (2017) found that such education can, to a large extent, create sensitivity leading to behavior change in the target group **(19)**. Within the current research, women in both the intervention and control groups had a low perceived susceptibility score before the intervention, which may indicate their low perception of their vulnerability to breast cancer. After the educational intervention, the mean perceived susceptibility increased within the intervention group and a statistically significant difference emerged with the control group, as similar to the research by Asadi *et al.* (2014) on the effect of health-belief-model-based training on the practice of women about breast self-examination **(20)**.

Comparing the perceived severity score before and after the intervention revealed that the subjects were unaware of the severity of breast cancer complications, which may be another reason for not performing BSE. This finding was consistent with the results of the research by Karimi *et al.* (2013) accessing the effect of education based on the EPPM on self-treatment in the older adults of Zarandiyeh and another study also by Karimy *et al.* (2007) to assess the effect of education based on the health belief model on BSE. Nonetheless, it was not similar to the research findings by Jasemzadeh *et al.* (2016) on women's self-care behavior against air pollution based on the EPPM **(21)**, which can be due to the difference in the type of behavior examined. Using the EPPM showed that comparing the values of the perceived threat and perceived response efficacy constructs can help explain the perception of individuals about potential health risks and the likelihood of future behavior change **(19-22)**.

According to Albert Bandura's theory (1997), self-efficacy is included as a principal agent in people's perception of better performing activities that result from their ability to do things they had not previously been able to do. Self-efficacy perception is a cognitive process that enables the control of health-threatening issues and coping with problems in individuals. The perception of this ability causes the individual to

display effective behaviors **(23)**. Our findings also showed that the training program based on the steps recommended in the EPPM has promoted confidence in one's ability to perform self-care and BSE in women. Perceived self-efficacy has been emphasized in studies as a predictor of behavior **(24)**. In the present study, perceived self-efficacy increased significantly within the intervention group after the educational intervention, while no significant change was observed in the control group. This finding was consistent with the results of a study by Sadeghnejad *et al.* (2014) that applied the EPPM in detecting a risky behavior (not wearing a seat belt) in drivers in Tehran and provided suitable educational programs, and also with a study by Shamsi *et al.* (2010) on the effect of an educational program based on the health belief model on the preventive behaviors of self-medication in pregnant women in Arak **(25, 26)**.

Nonetheless, it had been inconsistent with the findings of a study by Mostajabi *et al.* (2017) that compared traditional training (face to face) and EPPM-based training on the knowledge of pre-pregnancy obesity complications in women with a high BMI **(27)**, which may result to the differences within the type of intervention designed (face to face training). The results of the current study showed that self-efficacy could be a predictor of self-care behavior, which is in line with the results obtained by Araban *et al.* (2013) in their study to introduce a new measure for assessing self-efficacy in responding to air pollution risks for pregnant women **(28)**. Based on the results of numerous studies during this field, it can be concluded that the likelihood of performing BSE is higher in women with higher self-efficacy **(29)** and self-efficacy is the strongest predictor of BSE **(30)**.

The findings of the research showed that EPPM-based education could enhance perceived response efficacy in individuals, which is consistent with the results of a study by Gharlipour *et al.* (2010) going to determine cigarette smoking among secondary school students using the EPPM and also the results obtained by Mostajabi *et al.* in 2017 **(27, 31)**. Fear-arousing messages will play a very effective role in behavior change when combined with efficient and useful strategies to deal with the threat **(32)**.

In this study, perceived efficacy increased signify-cantly in the intervention group after the educational intervention, while it remained the same in the control group, which is similar to the results obtained by Sadeghnejad *et al.* (2014) and a study by Chib *et al.* (2010) examining the sensitivity of adolescents to the use of social media for spreading AIDS prevention messages **(25, 33)**. The EPPM stresses the critical point to separate and distinguish the risk control process from the fear control process **(17)**. The critical point changed from low to high in the present study, which indicates that there is a potential for behavior change, as in line with the results obtained by Hajian *et al.* (2013), who assessed the psychological predictors of behavioral intention for vaginal delivery in Iranian women through the EPPM and found that there is an increased possibility of screening behaviors in these women **(34)**. In the present study, the mean perceived susceptibility was lower than the other components of the EPPM. Women appear to perceive a lower vulnerability to breast cancer or deny its importance. Although, after training, this component increased just like the other components and was significantly different compared to pre-intervention, it still had a lower score than the other EPPM constructs.

The ANOVA results showed no significant differences between the two arms of the study in terms of performance before the intervention, and the women's performance was low. After the intervention, the significant difference within the intervention indicates the positive effect of EPPM-based education on women's performance and BSE behavior promotion. This finding was according to the results of research by Mirzaii *et al.* (2016) about the training women using the Systematic Health Education and Promotion model (SHEP), which was found to be efficient on the BSE attitudes and skills of the participants, and also with the findings of a study by Kocaöz (2018) that promoted women's attitudes and behaviors to participate in cancer screening programs **(35, 36)**. At the same time, women's awareness of health issues increases their sensitivity to compliance **(37)**.

Conclusion

Given the importance of enhancing breast cancer self-examination behaviors and utilizing easy and cost-effective methods, this health promotion model can be used to improve breast cancer screening behaviors by women in first-level care centers

Although this model has a novel approach to promoting screening behaviors for breast malignancies, it has limitations, as in most studies. These limitations include the self-reporting nature of the questionnaires, the study being conducted in a single city, and also the participation of women who visit urban health centers for any reason, which itself indicates a sort of attention to health and self-care behaviors, and also the urban life of the participants; therefore, the results may not be generalizable to non-urban environments and inaccessible groups. Therefore, given the high prevalence and increasing trend of breast cancer, more extensive research is recommended to be conducted on BSE based on educational models. It also appears that if BSE educational materials are accompanied by solutions, recommendations, and methods of enhancing perceived susceptibility, women's self-care behavior will improve.

Acknowledgments

This study was extracted from the first author's master's thesis in midwifery. We are grateful for the cooperation of the Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, the staff of Sowme'eh Sara health centers No. 1 and 2, and all the study participants.

Author Contribution

Study concept and design: Sharareh Jannesari, Sepideh Hajian, and Atefeh Mousavi. Analysis and interpretation of data: Atefeh Mousavi, Sharareh Jannesari, and Aryan Sadeghyan. Drafting of the manuscript: Sharareh Jannesari, Sepideh Hajian, Atefeh Mousavi. Mahnaz Solhi as an advisor, has been involved in guiding the EPPM model. Analysis of statistical data: Malihe Nasiri and Mehdi Khabaz Khoob.

Conflict of Interest

The authors declared no conflict of interest.

References

1. Soheili F, Alizadeh S, Hassani M, Bastami P. The pathologic assessment of breast masses, before and after menopause. Iran J Obstet Gynecol Infertil. 2013;16(68):21-7.
2. Karimi A, Moradi Z, Sayehmiri K, Delpisheh A, Sayehmiri F. Investigation of 1 to 10-year survival of breast cancer in Iranian women: a systematic review and meta-analysis. Iran J Obstet Gynecol Infertil. 2016;19(22):17-25.
3. Afsharfard A, Mozaffar M, Orang E, Tahmasbpour E. Trends in epidemiology, clinical and histopathological characteristics of breast cancer in Iran: results of a 17-year study. Asian Pac J Cancer Prevent. 2013;14(11):6905-11. [DOI:10.7314/APJCP.2013.14.11.6905] [PMID]
4. Taghavi A, Fazeli Z, Vahedi M, Baghestani AR, Pourhoseingholi A, Barzegar F, et al. Increased trend of breast cancer mortality in Iran. Asian Pac J Cancer Prevent. 2012;13(1):367-70. [DOI:10.7314/APJCP.2012.13.1.367] [PMID]
5. Yavari P. Health expenditure in initial diagnostic and treatment approach to non-metastatic breast cancer in Iran. Iran Quarterly J Breast Dis. 2013;6(2):14-25.
6. Cancer prevention and control in the context of an integrated approach [Internet]. WHO. 2016 [cited. 2017/7/26]. Available from: apps.who.int.
7. Muthoni A, Miller AN. An exploration of rural and urban Kenyan women's knowledge and attitudes. regarding breast cancer and breast cancer early detection measures. Health Care Women Int. 2010;31(9):801-16. [DOI:10.1080/07399331003628453] [PMID]
8. Hariri I, Kolahdoozan S, Karbakhsh M, Chegini N, Mohseni S, Montazeri A, et al. Twenty years of breast cancer in Iran: downstaging without a formal screening program. Ann Oncol. 2011;22(1):93-7. [DOI:10.1093/annonc/mdq303] [PMID]
9. Abedzade M, Sadat Z, Saberi F. A survey on knowledge, attitude, and practice regarding breast cancer and. screening methods in Kashanwomens. Freeze J Kashan Univ Med Sci Health Serv. 2006;26(3):85-90.
10. Kashfi S, Khani Jeihooni A, Yazdankhah M. The effect of education about breast self-examination on. knowledge, attitude, and practice of women in Nourabad Mamasani health clinics. 2009. J Jahrom Univ Med Sci. 2012;10(1):36-40. [DOI:10.29252/jmj.10.1.40]
11. Toomaj H SA, Jouibari L. Survey of determining breast cancer by patients and its related benefits. J Student Res Committee Golestan Univ Med Sci. 2008;1:10.
12. Sharifian A, Pourhoseingholi MA, Emadedin M, Nejad MR, Ashtari S, Hajizadeh N, et al. Burden of the breast. cancer in Iranian women is increasing. Asian Pac J Cancer Prev. 2015;16(12):5049-52. [DOI:10.7314/APJCP.2015.16.12.5049] [PMID]
13. Hasani L, Aghamolaei TE, Tavafian SS, Zare SH. Constructs of the Health Belief Model as Predicting Factors in Breast Self-Examination. Hayat. 2011;17(1):62-9.
14. Glanz K, Rimer BK, Viswanath K. Health behavior, and health education: theory, research, and practice: John Wiley & Sons; 2008.
15. Doak CC, Doak LG, Root JH. Teaching patients with low literacy skills. Am J Nurs. 1996;96(12):16M. [DOI:10.1097/00000446-199612000-00022]

16. Witte K, Meyer G, Martell D. Effective health risk messages: A step-by-step guide: Sage Publications; 2001.

17. Witte K, Allen M. A meta-analysis of fear appeals: Implications for effective public health campaigns. Health Educ Behav. 2000;27(5):591-615. [DOI:10.1177/109019810002700506] [PMID]

18. Hajian S, Imani F, Riazi H, Salmani F. Prediction of Adequate Prenatal Care Utilization Based on the. Extended Parallel Process Model. Int J Commun Based Nurs Midwifery. 2017;5(4):342.

19. Karimi M, Hasani M, Khoram R, Gafari M, Niknami SH. The effect of education, based on health belief model on breast self-examination in health liaisons of Zarandieh city. Zahedan J Res Med Sci. 2009;10(4):283-91.

20. Nahidi F, Dolatian M, Roozbeh N, Asadi Z, Shakeri N. Effect of health-belief-model-based training on performance of women in breast self-examination. Electron Physician. 2017;9(6):4577 [DOI:10.19082/4577] [PMID] [PMCID]

21. Jasemzadeh. M, Jaafarzadeh N, Khafaie MA, Malehi AS, Araban M. Predicator of pregnant women's self-care behavior against air pollution: an explanation based on the extended parallel process model (EPPM). Electron Physician. 2016;8(9):2871. [DOI:10.19082/2871] [PMID] [PMCID]

22. Mahmoud Karimi, Mohsen Shamsi, Iraj Zarban, Jalil Koupayee Zadasifhani, Hamid Baradaran, The Effect of Education Based on the extended Parallel Process Model on Self-Therapy Status in Elderly Nan Zarandiyeh. J Kermanshah Univ Med Sci. 2013;17(8):e74391.

23. Bandura A. Self-efficacy: the exercise of control1997. 1thed. New York: HW. freeman and company: Co.1997.

24. Barkley Jr TW, Burns JL. Factor analysis of the Condom Use Self-Efficacy Scale among multicultural college students. Health Educ Res. 2000;15(4):485-9. [DOI:10.1093/her/15.4.485] [PMID]

25. Sadeghnejad F, Niknami S, Hydarnia A, Montazeri A. Using Extended Parallel Process Model (EPPM) to improve seat belt wearing among drivers in Tehran, Iran. Payesh (Health Monitor). 2016;15(1):103-11.

26. Shamsi MO, Bayati AK, Mohamadbeygi A, Tajik R. The effect of educational program based on Health Belief Model (HBM) on preventive behavior of self-medication in woman with pregnancy in Arak, Iran. Pejouhandeh. 2010;14(6).

27. Mostajabi SZ, Jahani Shourab N, Kordi M, Esmaeli H, Nematy M. Comparison of traditional Training (face to face) with Extended parallel process model (EPPM)-based training on knowledge of obesity complications before pregnancy in women with high BMI. Iran J Obstet Gynecol Infertil. 2017;20(9):82-90.

28. Araban M, Tavafian SS, Zarandi SM, Hidarnia AR, Gohari MR, Prochaska JM, et al. Introducing a new measure for assessing self-efficacy in response to air pollution hazards for pregnant women. J Environ Health Sci Eng. 2013 Dec;11(1):1-7. [DOI:10.1186/2052-336X-11-16] [PMID] [PMCID]

29. Pirasteh A, Khajavi Shojaie K, Kholdi N, Davati A. Stages of change and predicting of self efficacy construct in breast self examination behavior among women attending at Tehran Health Centers, Iran, 2011. Iran J Obstet Gynecol Infertil. 2013;16(70):16-23.

30. Hasani L, Aghamolaei TE, Tavafian SS, Zare SH. Constructs of the Health Belief Model as Predicting Factors in Breast Self-Examination. Hayat. 2011;17(1).

31. Gharlipour GZ, Hazavehei MM, Sharifi MH, Nazari M. Study of cigarette smoking status using extended parallel process model (EPPM) among secondary school male students in Shiraz city. Jundishapur J Health Sci. 2010; 2 (3):26-36.

32. So J. A further extension of the extended parallel process model (E-EPPM): Implications of cognitive appraisal theory of emotion and dispositional coping style. Health Commun. 2013;28(1):72-83. [DOI:10.1080/10410236.2012.708633] [PMID]

33. Chi AI, Lwin MO, Lee Z, Ng VW, Wong PH. Learning AIDS in Singapore: Examining the effectiveness of HIV/AIDS efficacy messages for adolescents using ICTs. Knowl Manag E-Learning: Int J. 2010;2(2):169-87.

34. Hajian S, Shariati M, Najmabadi KM, Yunesian M, Ajami ME. Psychological predictors of intention to deliver vaginally through the extended parallel process model: a mixed-method approach in pregnant Iranian women. Oman Med J. 2013;28(6):395. [DOI:10.5001/omj.2013.115] [PMID] [PMCID]

35. Mirzaii K, Nessari Ashkezari S, Khadivzadeh T, Shakeri MT. Evaluation of the Effects of Breast Cancer Screening Training Based on the Systematic Comprehensive Health Education and Promotion Model on the Attitudes and Breast Self-examination Skills of Women. Evid Based Care J. 2016;6(3):7-18

36. Kocaöz S, Özçelik H, Talas MS, Akkaya F, Özkul F, Kurtuluş A, et al. The effect of education on the

early diagnosis of breast and cervix cancer on the women's attitudes and behaviors regarding participating in screening programs. J Cancer Educ. 2018;33(4):821-32. [DOI:10.1007/s13187-017-1193-8] [PMID]

37. Rashidi Fakari F, Kiani Z. The relationship between age and COVID-19 in pregnancy. J Obstet Gynecol Cancer Res. 2021;6(3):143-6. [DOI:10.30699/jogcr.6.3.143]

How to Cite This Article:

Mousavi A, Jannesari SH, Hajian S, Solhi M, Khabaz Khoob M, Nasiri M, et al . Does the Extended Parallel Process Model Promote Breast Self-Examination? A Controlled Experimental Study. J Obstet Gynecol Cancer Res. 2022; 7(4):304-13.

Download citation:
BibTeX | RIS | EndNote | Medlars | ProCite | Reference Manager | RefWorks