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# Self-care behaviors in high-risk women for breast cancer: A randomized clinical trial using health belief model education

Maryam Damghanian, Habibollah Mahmoodzadeh<sup>1</sup>, Zohreh Khakbazan<sup>2</sup>, Behjat Khorsand<sup>2</sup>, Mohadese Motaharinezhad<sup>2</sup>

## Abstract:

**BACKGROUND:** Breast cancer is the most common cancer in Iranian women. The number of people with this disease is increasing across the world. Positive family history is one of the risk factors for developing breast cancer. However, early detection is the main method to fight this disease. This study was conducted to examine the effect of education based on the health belief model (HBM) on self-care behaviors among first-degree relatives of patients with breast cancer.

**METHODS:** This clinical trial was conducted in 2016 on 80 women in Tehran city, Iran. Data were collected using a three-part questionnaire regarding demographic data, the HBM, and self-care behaviors. The educational program based on the HBM was held in 4 ninety-minute training sessions through lectures, group discussions, question and answer, image presentations, and PowerPoint presentations. The questionnaires were completed before and 2 months following the intervention by intervention and control groups. Data were analyzed using descriptive and inferential statistics through the SPSS16 software.

**RESULTS:** The mean score of the HBM constructs before the intervention in the groups had no statistically significant differences ( $P > 0.05$ ). Eight weeks after the intervention, the mean score of the constructs of the HBM in the intervention group significantly increased and a statistically significant increase in the mean score of self-care in the intervention group compared to the preintervention was found, so that the self-care behavior score in the intervention group was  $0.69 \pm 0.09$  before the intervention and was changed to  $0.74 \pm 0.09$  after the intervention ( $P < 0.0001$ ).

**CONCLUSION:** Our results suggest that education based on the HBM was effective in promoting self-care behaviors among first-degree relatives of breast cancer patients. Therefore, education based on HBM may have an important implication for breast cancer prevention in Iran.

## Keywords:

Breast cancer, education, health behavior, self-care

## Introduction

Breast cancer has a significant impact on women's health<sup>[1]</sup> and remains a major public health problem across the world.<sup>[2]</sup> With more than 232,000 cases of invasive cancer in 2014, it is the most common cancer among American women. Furthermore, with more than 40,000 deaths,

it is the second leading cause of death from cancer.<sup>[3]</sup> Breast cancer is the first type of cancer among Iranian women,<sup>[4]</sup> with an incidence rate of 25 in every 100,000 people.<sup>[5]</sup> Given the increase of age and life expectancy in Iranians, the number of breast cancer cases will increase. In addition, the rate of deaths caused by breast cancer has an increasing trend in Iran.<sup>[6]</sup> Evidence from

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*Nursing and Midwifery Care Research Center, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran, <sup>1</sup>Department of General Surgery, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran, <sup>2</sup>Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran*

## Address for correspondence:

Dr. Behjat Khorsandi,  
Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, Tehran University of Medical Sciences,  
P.O. Box: 1419733171, Tehran, Iran.  
E-mail: bkhorsandi\_68@yahoo.com

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past studies suggests that breast cancer in Iranian women happens 10 years sooner than women in developed countries, with an average age of 47.1 years among Iranian women.<sup>[7-9]</sup> There are various risk factors for breast cancer, and some of them are modifiable including lack of a history of delivery until the age of 35 years, unhealthy nutrition, physical inactivity, smoking, and alcohol use. Unmodifiable factors are family history, menarche before the age of 12 years, menopause after the age of 54 years, etc.<sup>[10]</sup> Meantime, having a family history of breast cancer is one of the most important risk factors for the progression of breast cancer.<sup>[11]</sup> Family history is defined as the presence of breast cancer in 10% of the patients' relatives.<sup>[11]</sup> The risk is doubled in those with first-degree relatives suffering from breast cancer.<sup>[11]</sup> Despite the importance of having a family history of breast cancer, high-risk behaviors such as smoking, alcohol consumption, and low physical activity in girls are the same in patients with a family history and no family history of breast cancer. It suggests that more awareness of the increased risk of breast cancer in individuals is not enough to prevent high-risk behaviors.<sup>[12]</sup> Kirca *et al.* study in 2018 which was a descriptive study on first-degree relatives of patients with breast cancer showed that breast cancer screening behaviors were lower in such individuals, and they may refrain from breast cancer screening because of the fear of exposure to breast cancer.<sup>[13]</sup>

The key to fighting breast cancer is an early diagnosis. However, about 70% of the cases of breast cancer in Iranian women are diagnosed at the final stages, and hence, the process of treatment is difficult.<sup>[14]</sup> According to the results of Terry and Forman study, targeted health promotion regarding risk factors of breast cancer for lifelong prevention is very influential in people with a family history of breast cancer.<sup>[15]</sup> Certainly, self-care behaviors can help with preventing breast cancer. Through the education and use of proper self-care behaviors, unhealthy lifestyle and habits which are risk factors for breast cancer can be prevented. Studies showed the positive effect of self-care education programs on the quality of life and promotion of preventive behaviors among patients.<sup>[16]</sup> Educational models and theories including health education models and the health belief model (HBM) can be used to increase the efficiency of educational programs and change behaviors.<sup>[17]</sup> The HBM is one of the health education models that are widely used in the field of breast cancer research.<sup>[18,19]</sup> The HBM consists of constructs of (1) perceived susceptibility that reflects an individual's perception of the risk level of the disease, (2) perceived severity indicating an individual's understanding of the complications and consequences of the disease, (3) perceived benefits that reflect an individual's understanding of the benefits of doing a health behavior, (4) perceived barriers that emphasize the

barriers and costs of doing a healthier behavior, and (5) self-efficacy which refers to the individual's confidence in his/her ability to perform a health behavior.<sup>[20]</sup>

The HBM evaluates the individuals' perceptions of the proportion of benefits to barriers to the provision of preventive health-care services for breast cancer. In a study conducted by Hajian-Tilaki and Auladi in 2014, positive attitudes toward perceived benefits, perceived confidence/self-efficacy, and health motivation had a strong association with performing breast self-examination and breast clinical examination.<sup>[21]</sup> According to the findings of the study of Masoudiyekta *et al.*, there was a significant relationship between women's performance and variables of knowledge, perceived sensitivity, perceived benefits, perceived barriers, self-efficacy, and cues to action<sup>[22]</sup> Accordingly, the sensitivity to the disease (for example, family history of breast cancer) and the severity of the complications and outcomes of the disease (such as a belief that breast cancer is fatal) along with motivation such as a tendency to have a healthy lifestyle and trust in their ability to overcome perceived barriers affects commitment of the individual to conduct preventive behaviors. The present study aimed to investigate the effect of education based on the HBM on self-care behaviors among first-degree relatives of patients with breast cancer.

## Methods

We conducted a clinical trial to evaluate the effect of education based on the HBM on self-care behaviors among first-degree relatives of patients with breast cancer. The research population was the first-degree relatives of patients with breast cancer referred to the Cancer Institute of Iran located in Imam Khomeini Hospital Complex, Tehran, Iran, in 2016. Given the effect of 0.5, the test power of 80%,<sup>[23]</sup> and 10% probability of sample dropouts, 80 people including mother, sister, and daughter of patients with breast cancer were recruited using convenience and purposive sampling methods. They referred to the Cancer Institute of Iran. Inclusion criteria were the family history of breast cancer, having no history of cancer, and willing to participate in the study. Exclusion criteria were not attending more than one education session, detection of a mass in ultrasound or mammography, as well as those who received education about breast cancer in the past 2 years or who were unwilling to continue with the study. After checking 120 women in terms of eligibility according to the inclusion and exclusion criteria and willingness to cooperate, 80 women who met the inclusion criteria were selected. After randomization through the classification block (4 blocks, including two participants in control group and two participants in intervention group), participants were allocated into intervention and control groups [Figure 1].

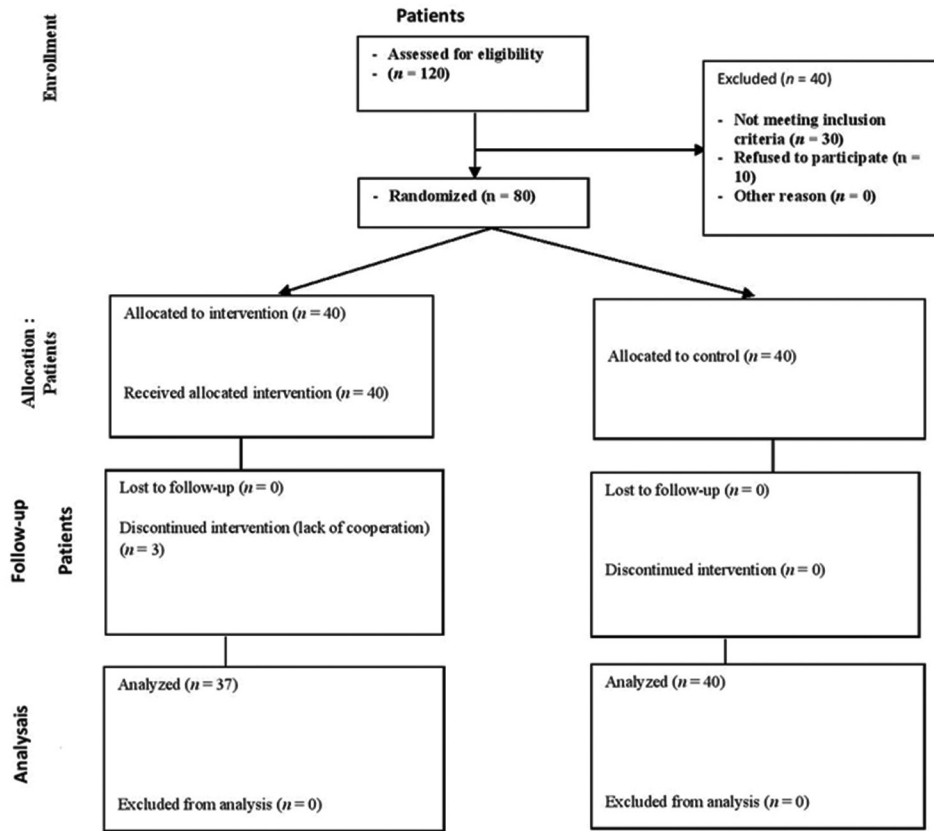


Figure 1: Consort diagram

Data were collected using a three-part questionnaire consisting of 28 questions regarding demographic and risk factors for breast cancer. The second part of the questionnaire consisted of 41 questions about the constructs of the HBM and included 8 questions about perceived sensitivity, 7 questions about perceived severity, 9 questions about perceived benefits, 17 questions about perceived barriers, and 11 questions about self-efficacy. The third part of self-care questions included questions about breast cancer screening, type of eating habits, individual physical activity, smoking, and alcohol. The questionnaire was on a Likert scale with 5 parts and its range of Likert was completely in favor of it, to completely opposite. Furthermore, it was scored from 1 to 0 for each item. For perceived barriers, scoring was completely opposite to completely in favor of it. For self-care behaviors, the score of the first three questions with a positive answer would be 1. Other self-care behavioral questions had four options of always, often, sometimes, and never with direct scoring including 1, 0.5, 0.25, and 0. The validity of the questionnaire was confirmed through content validity and its reliability was confirmed by the calculation of the Cronbach's alpha coefficient as 0.8.

In the intervention group, an educational program based on the HBM was implemented. Various teaching

methods including live lectures, discussion, collaborative methods combined with questions and answers, image and PowerPoint presentations, and practical exercise were used. The intervention consisted of 4 ninety-minute training sessions based on the HBM. Educational content based on HBM included familiarity with breast cancer and its complications, breast cancer risk factors, familiarity with appropriate breast cancer screening practices, and self-care behaviors. At the first session, we discussed breast anatomy, cancer and breast cancer identification, breast cancer's prevalence in Iran and the world, and the complications of breast cancer. The topic of the second session was about the description of the symptoms of breast cancer and risk factors. At the third session, we argued about breast cancer screening techniques, self-care strategies, and effective behaviors in confronting breast cancer. At last, the fourth session included an overview of the contents of the previous sessions and discussion on barriers to self-care behaviors in women in breast cancer, and we provided a workable and constructive approach to each obstacle.

The control group did not receive any education. Two months after the intervention, both the control and intervention groups filled out the questionnaire. Furthermore, a booklet containing the educational content was provided to the groups. Meanwhile, the

written informed consent form was signed by the participants. They were free to leave the study at each stage of the study, and all the collected data would be confidential. The collected data were analyzed through the SPSS v. 16 (IBM company, Armonk, NY, U.S.A) software using independent *t*-test, Chi-square test, and Fisher’s exact test. The significance level for all tests was considered  $P < 0.05$ .

### Results

The age range of the participants was 30–49 years, with an average of  $39.55 \pm 10.34$  years in the control group and  $37.35 \pm 11.01$  years in the intervention group. Furthermore, 51.4% of the participants in the intervention group and 35% of the control group had a diploma education degree. In addition, 70.3% of the women in the intervention group and 67.5% of them in the control group were homemakers. The percentage of married women in the intervention and control groups was 64.9% and 72.5%, respectively. Menarche age in majority of the women in the intervention (80.6%) and control (77.5%) groups was <14 years. Regarding the history of pregnancy and delivery, 63.6% of the women in the intervention group and 93.5% of the women in the control group had a positive history of pregnancy and childbirth. 43.2% and 57.5% of the women in the intervention and control groups already used LD as a contraceptive [Table 1]. The mean score of the HBM constructs before the intervention in the groups had no statistically significant differences ( $P > 0.05$ ). However, 8 weeks after the intervention, the paired *t*-test showed that the mean score of the constructs of the HBM in the intervention group significantly increased.

There were no statistically significant differences between the mean score of self-care behaviors in the intervention and control groups at the beginning of the study ( $P = 0.057$ ). However, 8 weeks after the intervention, a statistically significant increase in the mean score of self-care in the intervention group compared to the preintervention was found, so that the self-care behavior score in the intervention group was  $0.69 \pm 0.09$  before the intervention and was changed to  $0.74 \pm 0.09$  after the intervention [Table 2].

### Discussion

The purpose of this study was to investigate the effect of education based on the HBM on self-care behaviors among first-degree relatives of patients with breast cancer. The results of this study showed that education based on HBM could promote self-care behaviors among first-degree relatives of patients with breast cancer.

A comparison of mean scores of self-care behaviors including screening methods, physical activity, diet,

**Table 1: Descriptive characteristics of participants**

Variable	Intervention group (n=37), n (%)	Control group (n=40), n (%)	P
Age (years)	37.35 (11.01)*	39.55 (10.34)*	0.37
Education			
Under the diploma and diploma	27 (73)	26 (65)	0.45
University education	10 (27)	14 (35)	
Job			
Homemaker	26 (70.3)	27 (67.5)	0.79
Employed	11 (29.7)	13 (32.5)	
Marital status			
Single	13 (35.1)	9 (22.5)	0.22
Married	24 (64.9)	29 (72.5)	
Widowed and divorced	0 (0)	2 (5)	
Husband education			
Under the diploma and diploma	32 (86)	25 (80.6)	0.93
University education	5 (14)	6 (19.4)	
Husband job			
Employed	5 (20.8)	4 (12.9)	0.54
Worker	7 (29.2)	7 (22.6)	
Other jobs	12 (50)	20 (64.5)	
Health insurance			
Yes	33 (89.2)	34 (85)	0.81
No	4 (10.8)	6 (15)	
Menarche age			
14 or less	29 (80.6)	31 (77.5)	0.29
15 or more	7 (19.4)	9 (22.5)	
History of pregnancy and delivery			
Yes	21 (63.6)	29 (93.5)	0.57
No	2 (36.4)	2 (6.5)	
The status of taking OCP			
I have used before	16 (43.2)	23 (57.5)	0.14
I am using	3 (8.2)	0	
I have never used	18 (48.6)	17 (42.5)	

\*Mean (SD). OCP=Oral contraceptive pill, SD=Standard deviation

**Table 2: Mean scores of self-care between two groups before and after the intervention**

Time	Mean±SD		P**
	Intervention group	Control group	
Before intervention	0.69±0.07	0.71±0.11	0.57
After intervention	0.74±0.09	0.70±0.10	<0.001
P*	<0.001	0.83	

\*Paired t-test, \*\*Independent t-test. SD=Standard deviation

smoking, and alcohol at the beginning of the study did not show a significant difference between the groups. After 8 weeks, the mean score of self-care behaviors in the intervention group was significantly different from that of the preintervention stage, but it was not statistically significant in the control group. Such a finding demonstrates the improvement of self-care behaviors in the intervention group. Similarly, Jedgal and Zareban<sup>[23]</sup> investigated the effect of health-based

education based on health promotion behavior in patients with pulmonary tuberculosis and showed no significant difference between the intervention and control groups in terms of the mean score of behaviors. However, the mean score of pre- and posttest behaviors in the intervention group was statistically significant. In the study of Masoudiyekta *et al.*<sup>[22]</sup> on the effect of education based on the HBM on breast cancer screening behaviors in women, 3 months after the educational intervention, the mean score of breast cancer screening behaviors in the intervention group was significantly different from that of the preintervention. Parsa *et al.*<sup>[24]</sup> investigated the effect of breast self-examination consultation based on the HBM on knowledge and performance of women and showed a significant increase in breast self-examination in intervention group after the intervention.

In the present study, 8 weeks after the end of the educational intervention, a statistically significant increase was observed in the mean sensitivity and severity scores of the intervention group compared to the preintervention. Similar results were reported by Khiyali *et al.*<sup>[25]</sup> on effects of an educational intervention based on the HBM on breast self-examination behavior in women, but results of the study of Parsa *et al.* showed no significant differences in the mean score of sensitivity and severity that may be because of using the consultancy principles besides the HBM because the purpose of consulting is a reduction of anxiety and worry.<sup>[24]</sup> In the present study, the mean score of perceived benefits and perceived barriers in the intervention group showed a significant increase compared to that before the intervention. Similarly, the results of the study by Kalanfarma *et al.*<sup>[26]</sup> on the effect of education based on the HBM on women's preventive behaviors showed a significant increase in the score of perceived benefits and barriers in the intervention group 3 months after the intervention. Furthermore, Eskandari-Torbaghan *et al.*<sup>[27]</sup> showed a significant increase in perceived benefits and barriers after the intervention in the intervention group compared to the control group, but the results of the study by Nahidi *et al.*<sup>[28]</sup> on the effect of HBM-based training on performance of women in breast self-examination showed no significant differences in benefits construct and perceived barriers that may be because of their focus on knowledge during training and also the number of the participations attending in each session was greater than our study (18 people), it may have reduced the effectiveness of their study, while in our study, the number of the participations attending in each session was 7 and health educator emphasized on all structures of model during the education.

In this study, the mean score of self-efficacy 8 weeks after the intervention significantly increased in the intervention group. Similarly, Masoudiyekta *et al.*<sup>[22]</sup> and

Tuzcu *et al.*<sup>[29]</sup> investigated the effect of health education based on the HBM on breast cancer screening in women. They showed an increase in this score 3 months after the intervention.

## Conclusion

This study showed that the health education program based on this model had a positive effect on knowledge, health beliefs, and promotion of self-care behaviors in the early diagnosis and prevention of breast cancer. Therefore, this educational intervention can be used at the community level to reduce the incidence of breast cancer deaths.

The exchange of information between the control and intervention groups regarding self-care behaviors and affect the study results. However, the researchers provided sufficient explanation to the intervention group regarding the necessity of not disclosing data to the control group.

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## Conflicts of interest

There are no conflicts of interest.

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