Original Article

Investigating the Effect of Tailored Educational Program Based on Protection Motivation Theory on Mammography Adherence in Iranian Women

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Abstract
Background: The early diagnosis of breast cancer through mammography is effective in reducing death. Therefore, this study aimed to determine the effect of an educational program based on the protection motivation theory (PMT) on mammography adherence among women in Yazd, Iran.
Methods: In this experimental study, 144 women referring to the clinic were randomly assigned to test and control groups. The data collection tool was a valid and reliable researcher-made questionnaire with 56 items and 8 dimensions. The educational program was held in the form of 6 sessions for the test group, which included PMT–based essays, infographics, and videos. The 12-week follow-up period continued as telephone consultation, and then the data were collected and analyzed by SPSS software version 21 with a 95% confidence interval.
Results: The results showed that in the pre-training phase, the Mann-Whitney U statistical test did not reveal a significant difference between the two groups of women in terms of the mean mammography intention score (Z=2523.000, P value=0.775). Based on the results of the Wilcoxon test before and after the intervention, the protection motivation of women for mammography for the next month showed a significant difference in the test group. Furthermore, none of the women in the two groups were referred for mammography three months after the implementation of the training. In addition, the McNemar test results did not indicate a significant difference regarding mammography behavior in the two groups before and after the educational intervention.
Conclusion: According to the results, the protection motivation of the majority of the women in the test group was in the stages of possible and definitive referral for mammography after the educational intervention, which indicates the effectiveness of the tailored educational program. In this study, all the constructs of the PMT act as interconnected building blocks with logical action and interaction to promote mammography adherence in women in Yazd.
Keywords: Early detection of cancer, Mammography adherence, Protection motivation theory

Introduction

Breast cancer is the most common cancer and the most common cause of cancer-related death among women around the world. According to the latest statistics published by the International Agency for Research on Cancer (IARC), breast cancer has surpassed lung cancer as the most common cancer in the world with 2.3 million new cases in 2020 (1). In Asian countries, especially in Iran, the increase in the incidence of breast cancer has made this disease the most common cancer that worries Iranian women, and this cancer is the first rank among new cases in Iran (2) The highest cases of the disease have been reported at the ages of 45-65 and 80-85 (3). Moreover, the age of breast cancer in Iranian women has been reported to be 5 years earlier compared to women in developed countries (4).

During the last 30 years, the incidence of breast cancer in Iran has doubled, and assuming the increase in life expectancy and the aging of Iran's population, the incidence of the disease by 2020 will be estimated to be 63 cases per 100 000 women (5). According to the epidemiology of breast cancer, the 5-year survival rate of this disease is 93%-100% if it is diagnosed early (stages 1 and 2), and if the disease is diagnosed in stages 3 and 4, this rate decreases by 22%-72% (6).

According to the latest official statistics published in 2018, breast cancer is the most common cancer in Iranian women, with an incidence rate of more than 13 000 people per year and an age-standardized incidence rate of 34 per 100 000 female population per year. In Iran, the death rate due to this cancer is increasing, and the stage of breast cancer at the time of diagnosis is too advanced, with women having a mass of more than two centimeters and the involvement of lymph nodes (7). The mortality rate of breast cancer in Iran is estimated at 14.2% (8). With the death of more than 3500 people per year, this cancer is regarded as the first cause of cancer-related death in Iranian women. The 5-year survival rate for people with this cancer in the country is more than 70%, which can be improved to 90% by improving diagnostic methods and access to early diagnosis services (9). In the study conducted on the data of cancer registration in Iran from 2008 to 2016, it can be predicted that the incidence of breast cancer in women will increase by 63% by 2025, and the number of patients diagnosed in that year will reach 25 013 cases (10). In 2012, the IARC estimated the number of new cases of breast cancer based on the expected population in 2015 to 2035 for each region, based on which the number of new cases of breast cancer in Iran was expected to be 12 684, 14 920, and 17 346 in 2020, 2025, and 2030, respectively (11). The incidence of breast cancer in the country has been increasing in recent years, and the reported values are higher than the values estimated by the world's most reliable scientific cancer organizations. This increasing trend emphasizes the necessity of national policies for timely diagnosis, increasing survival, and improving the quality of life in the world (12). The early diagnosis of this disease is highly effective in the success of the treatment, reducing the mortality rate, and decreasing the burden of the disease and its treatment costs, but in Iran, the main causes of death and other unfortunate consequences of this disease are the delay of women being referred for evaluation (13). Moreover, 70% of Iranian women die after a late diagnosis of breast cancer (14). Mousavi et al (15) reported that 82% of women with breast cancer are diagnosed in advanced stages (18% in stage 2 and 77% in stage 3). In addition to mortality, breast cancer has a significant impact on a woman's life (16). For example, outcomes such as changes in social relations and marriage, change in a mental state, decrease in sexual attractiveness, pain and suffering, depression, dependence on others, fear of recurrence of disease, disability, and financial problems occur after contracting the disease (17).

Breast cancer prevalence is higher than other reported cancer cases in all provinces of Iran. In Yazd province, its age-standardized incidence rate was reported to be 38.52 in 2018, which unfortunately ranked third after Tehran and Isfahan provinces. Therefore, at present, the development of national cancer prevention and control programs is considered one of the health needs of every society and the most effective factor in reducing the incidence and burden of cancer disease (18). The instructions for performing mammography in Iran for asymptomatic people with moderate risk are once every two years in the age group of 45 to 69 years according to the discretion of the doctor and the discretion of the patient; furthermore, individuals at moderate risk in the community include asymptomatic individuals with no personal or family history of cancer or precancerous lesions, no history of chest radiotherapy, or no history of breast biopsy (7).

The results of the qualitative study by Shirzadi et al showed that Iranian women do not go for mammography due to reasons such as ignorance about mammography, perceived fear, denial of the risk of breast cancer, financial problems, lack of mammography centers, and lack of family support (19). The researcher's experiences in conducting a qualitative study indicated that women in Yazd suffer from psychological barriers such as shame, fear of being diagnosed with an underlying disease, the need to have a companion, internalizing the experiences of others, and also abnormal adaptation patterns such as religious beliefs, belief in fate, and avoiding and denying the disease, so they do not follow through with having mammography (20). Conducting a cross-sectional descriptive study on 408 women aged 30-60 in Kermanshah, Mirzaei-Alavijeh et al concluded that perceived behavioral control and behavioral intention are strong predictors of mammography behavior; moreover, age and having a positive history of breast cancer in the family were reported among the demographic variables determining mammography behavior (21). In their systematic review study, Kalan Farmanfarma et al reported that 35%-50% of breast cancer cases can be detected in the early stages through mammography; however, the rate of doing it in Iranian women is low. In this study, factors such as age, occupation, age of first menstruation, family history, marital status, family support, number of deliveries, doctors' recommendations, perceived sensitivity and intensity, self-efficacy, and perceived benefits have been the most important determinants of mammography in Iranian women (22).

Based on the key message of the World Health Organization (WHO) regarding the increase of breast cancer, especially in developing countries (23), women's awareness, attitude, and performance should be improved in relation to self-regulating behaviors to prevent breast cancer. Based on the above-mentioned materials, each research conducted on cancer prevention and control has somehow estimated the knowledge, attitude, and performance of women to be lower than expected, and this

can be an indicator of this serious health problem that the majority of women consider themselves immune to breast cancer, while the number of cases of this deadly disease is increasing. Hajian recommended designing educational interventions based on well-known psychological theories for breast cancer screening in developing countries (24). Health education and health promotion are the most important steps to promote protective and preventive behaviors, and there are many models and theories in this field, one of the most efficient of which is the protection motivation theory (PMT). This theory has a greater role in disease prevention, which is first based on motivation and then emphasizes the development of adaptation skills (25). PMT is used to promote breast cancer preventive behaviors (26). According to the theory of protection motivation, people may choose maladaptive responses such as avoidance, denial, hopelessness, wishful thinking, religious faith, and fatalism to reduce fear related to health threats, and health education strategies should lead them to adaptive responses such as rational problem solving and behavioral intention (27). In the PMT, fear arousal is used to motivate or encourage people to respond to health threats (28).

The main question of the current research is what is the nature of the constructs of the PMT regarding mammography, and to what extent the educational intervention based on this theory can be effective. It is hoped that the results will be useful for developing educational programs with appropriate strategies to promote preventive behaviors against breast cancer, encourage women to be sensitive to their health, timely diagnose the possible cancer, and control it as optimally as possible.

Materials and Methods

The present experimental study was conducted on two control and test groups. First, the list of all urban health centers in Yazd was extracted based on specific areas, and then an urban community health center was randomly selected. After obtaining a permit from the Research Vice-chancellor of Shahid Sadoughi University of Medical Sciences in Yazd and submitting it to the director's office of the selected clinic, the researcher visited the clinic on even or odd days. All women referring to the selected clinic who were willing to participate in the research were divided into test and control groups by random allocation method (using a table of random numbers). Based on the pilot study, the overall motivation of women to voluntarily go for mammography was estimated to be 46% in this study, so to increase their behavioral intention to 70% with a significance level of 5% and a test power of 80%, the number of 66 people in each group (test and control) was estimated. Then, after taking into account the probability of a 10% dropout of subjects, 72 people entered each group.

Inclusion criteria included women 40 years and older, married women whose spouses are still alive, interested in participating in research, being a native of Yazd, speaking Persian, not suffering from breast cancer (based on the statements of the research units), and not suffering from dementia/forgetfulness/schizophrenia/depression (based on the statements of the research units). The history of the use of drugs was asked from the women, and they were requested to provide the researcher with a summary sheet of the case of suffering from a specific disease. Exclusion criteria included the lack of interest in participating in any of the research stages, the death of research units, non-participation in training sessions, and moving to another city or region for residence.

The tool for data collection in this study was a researcher-made questionnaire, the formal, content, and structural validity and reliability of which have already been measured (29). Before starting the present study, the questionnaire was designed according to a qualitative approach named directed content analysis based on PMT. The final version of the questionnaire was prepared in two sections consisting of demographic characteristics and PMT constructs with 56 items and 8 dimensions, including perceived sensitivity (8 items), perceived intensity (11 items), reward (3 items), response efficiency (7 items), self-efficacy (5 items), response cost (16 items), fear (5 items), and protection motivation (1 item). The compiled item for the protection motivation construct was adjusted as follows:

What is your decision to do mammography in the next month?
A. I don't think about mammography at all (Pre-contemplation stage)
B. I am thinking of a mammogram (Contemplation stage)
C. I will probably go for a mammogram (Possible referring)
D. I will definitely go for a mammogram (Definite referring)

Each item was designed as a 5-point Likert scale from completely agree to completely disagree, and in the final scoring, reward constructs and response costs were estimated inversely.

The results obtained from the quantitative data analysis of the pilot test were used to prepare the educational content and decide to focus the educational intervention on the most significant and effective constructs of the PMT. The Pearson correlation coefficient test before the intervention showed a negative correlation between mammography behavior intention and response cost ($P < 0.01$, $r = -0.227$), reward ($P < 0.01$, $r = -0.191$), and perceived severity ($P < /005$, $r = -0.098$). On the other hand, a positive correlation was observed between mammography intention and self-efficacy ($P < 0.05$, r 0.117) and response efficiency ($P < 0.01$, $r = 0.211$). However, protection motivation did not show a significant correlation with perceived sensitivity and fear constructs.

Educational sessions were held at the selected urban community health center for 30-60 minutes for the

women participating in the test group with forming groups containing a maximum of 20 members. Moreover, there were discussions about breast cancer, risk factors, and mammography in the form of lectures, asking and answering the questions of the participants, and the related educational video was shown and discussed. The training sessions were planned and implemented by the first author (main researcher) of the present study.

In the educational sessions, PMT-based essays along with images related to breast cancer were presented to the participants to read in the session. The participants were allowed to exchange information with other participants, share their thoughts, and mention barriers to screening behaviors. A free educational package was also presented to them to study at home. During the training sessions, questions were asked based on what was taught. With regard to the control group, only a free training package was presented, and no training sessions were held.

PMT-based essays included two sections: threat essays and coping essays which were given to the women participating in the training session to study in parallel. In the threat articles, the details of breast cancer were shown to women along with color graphic images and educational videos, the side effects of chemotherapy and radical mastectomy (e.g., interference with daily life and deprivation of physical and mental comfort), and the loss of female sexual attractiveness. It was emphasized that women are more prone to breast cancer when they are under stress and eat fatty foods and fast food. The physical and psychological consequences of breast cancer were also pointed out.

In coping essays, information was given to women about the importance of mammography in the early detection of the disease and how to include breast cancer preventive behaviors in the life plan. In addition, women's ability to prevent breast cancer using existing and available strategies was emphasized, women's daily life was explained simply, and the role of women in maintaining their health and their responsibility toward their husbands and children were emphasized. Furthermore, they were taught self-care measures to maintain and improve breast health such as stress management, adequate sleep and rest, and foods that have a protective role against breast cancer, and educational videos related to mammography were shown to promote women's self-awareness. It is worth mentioning that in the last training session, a woman who survived breast cancer was invited to participate in the session and recount her real experiences related to the threat of breast cancer.

In this three-month period, which itself is divided into three one-month periods, the women of the test group were followed up through "follow-up telephone consultation" in such a way that in the first and second months, once every two weeks with participants, a phone call was made to ask questions and answers about the training provided in the meetings and if necessary, feedback was provided by the researcher. The duration of the calls was a maximum of 15 minutes, and the time between 8 AM and 8 PM was determined by agreement. The content of the calls generally included self-introductions and questions about general health status, questions about commitment to agreed goals, giving health recommendations, checking the need for referral, setting new agreed goals if needed, and ending the call with encouraging sentences and setting a time for the next call. Research participants could contact the researcher if they had questions. During the follow-up period, educational and motivational text messages related to breast cancer were sent to the participants as educational reminders. The researcher requested the participants in the educational sessions to show the educational and motivational text messages to their spouses and also provide the educational content to the spouses for reading. In the third month, only one phone call was made with the women in the test group, and at the end of the third month, the post-test questionnaires, which had demographic questions removed, were completed by referring to the postal address of the samples or inviting them to visit the clinic. For women in the control group, the post-test questionnaires were completed at the same time, and the results were compared with the pre-test results.

Statistical Analysis

In this study, descriptive statistics (frequency tables) and inferential statistics were used. The chi-square test was used to compare the frequency distribution of demographic variables of women in two groups, and the Mann-Whitney U test was employed to compare mammography intention and behavior between the two groups. Furthermore, an independent t-test and a paired t-test were used to compare the mean scores of theory constructs between the two groups after the intervention and the mean scores of the theory constructs in the two groups before and after the intervention, respectively.

Results

The results of the independent t-test did not show any statistically significant difference in the comparison of the average age of women in both test and control groups. The main source of obtaining health information in both groups was watching health programs on TV. The women in both groups were the same in terms of education level, occupation, and health insurance coverage status. Using the chi-square test, the women in both test and control groups were the same in terms of the history of breast cancer in first-degree relatives, personal history of benign breast diseases, and the method of recalling when to adopt preventive behavior by health center officials (Table 1).

In the pre-training phase, regarding the participation in mammography behavior, 54.1% of women in the test group were in the pre-thinking (n = 24) and thinking (n = 15) stages of behavioral intention, and the statistical *Mann–Whitney U test* which compared the mean score of mammography intention in the pre-training stage did not

Table 1. Comparison of Frequency Distribution of Demographic Variables of Women in Two Groups

Variable		Group				Statistical Test
		Test		Control		
		No.	%	No.	%	
Education level	Under diploma	20	27.8	23	31.9	$\chi^2=1.950$ P value=0.377
	Diploma	22	30.6	27	37.5	
	College and above	30	41.7	22	30.6	
Occupation	Housewife	42	58.3	37	51.4	$\chi^2=1.590$ P value=0.811
	Employees of institutions	21	29.2	24	33.3	
	Services workers	4	5.6	4	5.6	
	Unemployed	5	6.9	7	9.7	
Source of acquiring health information	TV	29	40.3	29	40.3	$\chi^2=13.562$ P value=0.009
	Radio	5	6.9	1	1.4	
	Employees of community health centers	13	18.1	29	40.3	
	Brochures of health centers	4	5.6	4	5.6	
	Internet	21	29.2	9	12.5	
Being insured	Yes	54	75	62	86.1	$\chi^2=2.837$ P value=0.092
	No	18	25	10	13.9	
History of breast cancer in first degree relatives	Yes	14	19.4	15	20.8	$\chi^2=0.043$ P value=0.835
	No	58	80.6	57	79.2	
History of breast diseases	Yes	9	12.5	10	13.9	$\chi^2=0.061$ P-value=0.806
	No	63	87.5	62	86.1	
Reminder of preventive behavior time	Calling	35	48.6	35	48.6	$\chi^2=3.945$ P value=0.139
	Sending SMS	31	43.1	36	50	
	Written invitation	6	8.3	1	1.4	

show a significant difference between the women in the two groups (Z = 2523.000, P value = 0.775). Furthermore, only 5.6% of women in the test group and 1.4% of women in the control group were referred for mammography in the pre-training phase (P value = 0.807, 0.060 = 2^χ). Moreover, the statistical *Mann–Whitney U test* indicated a significant difference between the mammography intention scores of the two groups of women after the implementation of the training (Z = 1486.000, P value < 0.001). However, none of the women in the two groups were referred for mammography three months after the implementation of the training (P value = 0.807, χ = 0.060), as depicted in Table 2. Based on the results of the Wilcoxon test before and after the educational intervention, the protection motivation of women for mammography for the next month showed a significant difference in the test group. Additionally, the McNemar test results did not exhibit a significant difference in the comparison of mammography behavior in the two groups before and after the educational intervention (Table 2).

The statistical paired t-test for comparing the difference in the mean scores displayed a statistically significant difference in the constructs of perceived sensitivity, self-efficacy, response efficiency, and response cost in the test group before and after the educational intervention. However, no statistically significant difference was observed in the mean scores of the constructs in the control group. In other words, the implementation of

the educational program in the test group could change women's understanding of the mentioned constructs, which is desirable. In addition, the paired t-test did not show a significant difference in the comparison of the average processes of the PMT of women in the control group in the before and after stages (Table 3). Nevertheless, the independent t-statistical test comparing the mean scores of all constructs of the PMT in the two groups after the intervention showed a statistically significant difference (Table 4).

Discussion
This study aimed to determine the impact of the educational program based on the PMT on the adoption of mammography behavior in women in Yazd. Considering that the history of breast cancer in first-degree relatives and breast diseases were significant in both groups, encouraging women in Yazd to participate in mammography is considered a necessity in designing screening programs. Since the factor of "forgetting the time to perform preventive behaviors" has been considered in various studies (30,31), the present study asked the women participating in the research about how to remember the time to perform preventive behaviors in the form of phone call options, sending text messages, and sending written invitations. The first two options were assigned a higher percentage, which indicates their demand for continuous reminders.

Table 2. Comparison of Frequency Distribution of Mammography Intention and Behavior in Two Groups before and after Intervention

Variable		Group							
		Test (n=72)				Control (n=72)			
		Before		After		Before		After	
		n (%)		n (%)		n (%)		n (%)	
Mammography behavior	Yes	4	5.6	4	5.6	1	1.4	1	1.4
	No	68	94.4	68	94.4	71	98.6	71	98.6
	Statistical test	χ²=0.000, P value=1.0				χ²=0.000, P value=1.0			
Intention of mammography in the next month	Pre-contemplation stage	24	33.3	4	5.6	25	34.7	22	30.6
	Contemplation stage	15	20.8	8	11.1	14	19.4	18	25
	Possible referring	8	11.1	29	40.3	18	25	16	22.2
	Definite referring	13	18.1	31	43.1	15	20.8	19	26.4
	Statistical test	Z=5.754, P value<0.001				Z=0.757, P value=0.485			

Table 3. Comparison of Mean and Standard Deviation of Protection Motivation Theory Constructs in Two Groups Before and After Intervention

Construct	Group			
	Test (n=72)		Control (n=72)	
	Before	After	Before	After
	M±SD	M±SD	M±SD	M±SD
Perceived sensitivity	26.47±4.90	27.59±4.09	26.06±3.72	26.08±3.73
	t=3.735, P value<0.001		t=1.00, P value=0.321	
Perceived severity	31.36±8.52	31.44±8.43	28.37±6.79	28.47±6.75
	t=1.757, P-value=0.083		t=1.00, P value=0.321	
Rewards	8.25±2.79	4.98±1.87	7.23±2.52	7.23±2.52
	t=8.081, P value=0.083		t=0.000, P value=1.00	
Fear	17.25±3.72	17.31±3.68	15.73±4.15	15.75±4.14
	t=1.688, P value=0.096		t=0.575, P value=0.567	
Self-efficacy	16.45±4.17	17.56±2.22	16.36±2.71	16.16±2.71
	t=2.759, P value=0.007		t=1.000, P value=0.321	
Response efficacy	26.58±5.14	28.34±3.70	26.93±5.23	26.84±5.23
	t=4.826, P value<0.001		t=1.000, P value=0.321	
Response costs	47.69±10.09	41.50±6.86	46.38±7.90	46.50±7.72
	t=10.688, P value<0.001		t=0.597, P value=0.552	

Note. SD: Standard deviation.

Table 4. Comparison of Mean and Standard Deviation of Protection Motivation Theory Constructs between Two Groups after Intervention

Construct	Group		Statistical Test
	Test (n=72)	Control (n=72)	
Perceived sensitivity	27.59±4.09	26.08±3.73	t=2.317 P value=0.022
Perceived severity	31.44±8.43	28.47±6.75	t=2.254 P-value=0.026
Rewards	4.98±1.87	7.23±2.52	t=6.089 P value<0.001
Fear	17.31±3.68	15.75±4.14	t=2.402 P-value=0.018
Self-efficacy	17.56±2.22	16.16±2.71	t=3.393 P value=0.001
Response efficacy	28.34±3.70	26.84±5.23	t=1.986 P value=0.049
Response costs	41.50±6.86	46.50±7.72	t=4.106 P value<0.001

Regarding participation in mammography behavior, the results showed that 54.1% of women in the test group are in the pre-thinking and thinking stages in terms of behavioral intention. Moreover, a highly limited number of women in both test (5.6%) and control (1.4%) groups were referred for mammography before the intervention. Three months after the implementation of the educational intervention, the mammography intention of the women in the test group improved, so 83.4% of them were in the stages of possible and definite referral for mammography within the next month. However, based on the results, none of the women in both the test and control groups were referred for mammography three months after the implementation of the training program. Change in women's intentions is the strength of the present study. In the present study, despite the follow-up telephone counseling, there was no change in women's behavior. The reason why the women did not perform mammography

may be related to obstacles or response costs. Therefore, by eliminating the perceived costs, behavior can be improved. Since not every intention leads to behavior change, there must be many facilitating factors to fill the gap between intention and behavior to eventually exacerbate behavior change (32). In this regard, Bashirian et al stated that social support plays a key role in screening behaviors. In their study, they used a hybrid model of PMT and social support theory to design the educational intervention. The designed training program included a workshop and an e-learning course. The results revealed that 84.1% of participants in the workshop group and 60% of women in the e-learning group perform breast self-examination regularly during the first three months after the intervention. In addition, there were positive changes in the constructs of the PMT after the intervention (33). This inconsistency may be due to the different intervention methods and training materials. Conley and colleagues' study aimed to predict the intention to undergo MRI in women who have a normal mammogram but are at high risk of contracting the disease. Their results showed that the educational program designed based on the PMT can improve perceived risk, and self-efficacy and efficiency can influence the response in women but had no effect on their behavior, so the researchers suggested further research to promote behavioral intention (34). The results of Moodi and colleagues' study with the aim to determine the distribution of stages of change in connection with mammography on 384 women over 40 years old in Isfahan indicated that 36.2% and 21.1% of women are in pre-thinking and thinking stages, respectively. The researchers acknowledged that women in the mentioned stages of change need more training than other groups, and the benefits and obstacles of mammography, motivating women, and their self-efficacy should be emphasized in educational programs (35).

Wang et al evaluated the behavioral intention of Taiwanese women for breast cancer screening after implementing an educational program. The results revealed that the mean score of the behavioral intention of women in both test and control groups before the implementation of the educational program did not have a statistically significant difference, but after the intervention, a significant increase was observed in the score of the behavioral intention of women in the test group compared to women in the control group (36). Therefore, based on the results of the present study and what was mentioned, the educational program based on the PMT could successfully improve the protection motivation of women in Yazd in terms of mammography. According to the results of the present study, women have forgotten to pay attention to their health as a priority in their lives. When they are reminded of the extensive consequences of breast cancer in their daily lives in the form of organized educational programs, along with the benefits of early diagnosis and efforts to increase their self-efficacy to overcome perceived barriers, certainly,

their motivation to adopt protective behavior will also be affected. This finding was consistent with other studies such as Ghofranipour et al who conducted a cross-sectional descriptive study on 410 women aged 40-65 and reported a significant positive correlation between breast cancer awareness, self-efficacy, response efficacy, and protection motivation (37).

The mean scores of perceived severity, reward, and fear constructs before the implementation of the designed training program indicated a statistically significant difference ($P<0.05$) in the women in the test and control groups which is consistent with other studies (38). Moreover, the educational program based on the PMT that was implemented in the present study had coherent and effective content to change most of the constructs of the theory. Positive effects of educational programs about breast cancer prevention were also reported by Rakhshani et al (39). The results of Nazari et al's study with the aim to determine the predictors of breast cancer screening behaviors based on the PMT displayed a direct significant relationship between protection motivation with perceived sensitivity and severity, self-efficacy, response cost, and response efficacy; hence, the authors recommended health educators to use the PMT as a framework for designing educational programs (40). The unique feature of the methodology in this study, which makes it different from other studies, is the provision of educational content according to the needs and the culture of the research samples. The members of the research team have a strong understanding of the culture that governs women in Yazd regarding the preventive behaviors of breast cancer. Before conducting the present study, a descriptive-analytical study was conducted on 480 women in Yazd, the results of which introduced their attitudes and perceived cultural barriers to the researchers to be used in setting the educational content (41).

During the training sessions, the researcher tried to identify women's irrational beliefs about breast cancer with the active participation of women and replace them with correct beliefs. The women participating in the research considered adopting preventive behaviors for breast cancer to be impossible and far from their reach, so the researcher tried to explain the recommended behaviors in simple language with easy and practical solutions to maintain breast health.

Breast self-awareness and preventive self-regulation behaviors such as lifestyle, nutrition, and physical activity were introduced to the participants, and they understood and internalized the benefits of these solutions which led to the promotion of their self-efficacy. Zhang et al aimed to determine the determinants of the intention of breast cancer screening behaviors in Chinese women based on the PMT, and their findings showed that self-efficacy is directly related to the intention of mammography behavior (42). Rezaeian et al conducted a study to determine the effect of an educational program based on the Health Belief Model on the knowledge and health beliefs of 290 women

aged 40 and over about breast cancer and mammography in Isfahan and reported a statistically significant difference ($P > 0.05$) in the mean scores of the constructs of perceived sensitivity, perceived severity, perceived benefits and barriers, self-efficacy, and motivation of women in the test group compared to women in the control group after the educational intervention (43).

Since breast cancer survivors have a deep and successful experience of the diagnosis and treatment process, they can be good role models for other healthy women because when they share their experiences with others, their statements will be more acceptable. During the training sessions, the interviewed women were asked to invite breast cancer survivors to share their experiences with healthy women. In the present study, a survivor of breast cancer, who was a university lecturer and had extensive studies related to various aspects of the disease, was invited to attend the training session. Narratives of this woman who survived the experience of her disease, its consequences in daily life, quick and timely follow-up of the disease for diagnosis and treatment, and expressed individual reactions to diagnosis and treatment methods helped the participants. In addition to overcoming their unnecessary and unknown fears, they reduced and eliminated abnormal adaptation patterns, strengthened norm adaptation patterns, and acquired the spirit of problem-solving. Therefore, the exchange of information between the women participating in the research and the women who survived breast cancer had a major impact on their perceptions and intentions. McQueen and Kreuter conducted a study to compare the immediate emotional and cognitive reactions of healthy women to watching two educational films with the same content about breast cancer and mammography but with two different narratives. One video had a woman who survived breast cancer, and the other had a healthy woman who was taught about breast cancer. Women who had seen the film containing stories of survivors of breast cancer experienced more positive and negative emotions, understood its content easily, reported a more positive evaluation of the film, and had a stronger identification with the source of the message. Therefore, researchers suggested presenting stories of breast cancer survivors to encourage healthy women to have a mammogram (44).

Conclusion

The designed educational program could successfully change most of the constructs of the PMT for improvement. For example, regarding the construct of perceived sensitivity, women believed in some kinds of irrational optimism in relation to immunity against breast cancer, but they were extremely worried about the personal, interpersonal, and extra-personal consequences of contracting the disease. Hence, the educational program increased the average score of perceived sensitivity in the post-intervention phase compared to the previous phase, but the perceived intensity score did not change significantly. However, regarding the construct of fear, which showed itself in various forms as a deterrent to adopting mammography behavior in the studied women, there was no statistically significant change between the two stages before and after the program in the test group.

In fact, women's fear of breast cancer is moderate and rising. Based on their personal clinical and professional experiences and existing studies, the researchers found that the constructs of self-efficacy, response efficacy, response cost, and social support should be manipulated to moderate fear. Therefore, the researchers tried to replace logical problem-solving in the minds of the women of the test group in such a way that the behavioral intention or protection motivation of the women of the test group was in the stages of possible or definite referral for mammography, which indicates the effectiveness of the designed educational program. In general, it can be concluded that all constructs of the PMT act as interconnected building blocks with logical action and interaction to promote healthy behavior. Indeed, the main constructs of PMT have additive effects on each other.

Since the present study was conducted only on married women in the age range of 40-65 years, it cannot be generalized to other women in other groups. In addition, conducting a study in a traditional society makes it difficult to generalize it to a more modern society, which is worthy of consideration. Although the women of the study were randomly selected, the residential area is considered one of the low-income areas in terms of socio-economic status, so the results of the study cannot be generalized to other residential areas in Yazd. The mentioned cases are among the limitations of the current research, which will help us in identifying and removing the inhibiting factors in future research.

Authors' Contribution

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Competing Interests
The authors have no conflict of interests associated with the material presented in this paper.

Ethical Approval
The present study was approved by the Ethics Committee of the Research and Technology Vice-Chancellor of Shahid Sadoughi University of Medical Sciences, Yazd (ir.ssu.medicine. rec.1395.108). To comply with the ethical standards before starting the study, research objectives and methods, confidentiality of the information obtained from the participants during the study stages, and the freedom of the participants to withdraw from the study without being penalized were explained. Moreover, written permission was obtained from all participants to participate in the study.

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