RESEARCH ARTICLE

Self-Care Education Programs Based on a Trans-Theoretical Model in Women Referring to Health Centers: Breast Self-Examination Behavior in Iran

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Abstract

Background: Breast cancer is one of the most common cancers and a major public health problem in developing countries. However, early detection and treatment may be achieved by breast self-examination (BSE). Despite the importance of BSE in reducing the incidence of breast cancer and esultant deaths, the disease continues to be the most common cause of cancer death among women in Iran.This study aimed to determine the effects of self-care education on performance of BSE among women referring to health centers in our country. **Materials and Methods:** This quasi-experimental interventional study with pretest/posttest control group design was conducted on 168 women referred to health centers. The data were collected using a validated researcher-made questionnaire including demographic variables and trans-theoretical model constructs as well as a checklist assessing BSE behavior. The instruments were administered to groups with and without self-care education before, a week after, and 10 weeks after the intervention. Then, the data were entered into the SPSS statistical software (version 19) and analyzed using independent sample t-tests, paired sample t-test, repeated measures ANOVA, Chi-square, and Friedman tests ($p<0.05$). **Results:** The results showed an increase in the intervention group's mean scores of trans-theoretical model constructs (stages of change, self-efficacy, decisional balance, and processes of change) and BSE behavior compared to the control group ($p<0.001$). **Conclusion:** The study confirmed the effectiveness of aneducational intervention based ona trans-theoretical model in performing BSE. Therefore, designing educational interventions based on this model is recommended to improve women's health and reduce deaths due to breast cancer.

Keywords: Self-care- breast self-examination- Trans-theoretical model- women

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Introduction

Self-care is a new trend in health care and includes activities done by individuals themselves to promote and maintain health and prevent or limit diseases (Mirzaeian et al., 2013). In fact, self-care has been placed at the beginning levels of health continuum for each individual (Gibson and III, 2013). World Health Organization (WHO) has also encouraged self-care education as a way for prevention and treatment of chronic diseases (Gomides et al., 2013).

Breast cancer is one of the chronic non-communicable diseases. It is the most common malignancy among women after skin cancer (Ghodsi and Hojjatoleslami, 2012) and is the second most frequent cancer among both males and females (Alharbi et al., 2012). It is also the most common cause of death among women in both developed and developing countries (Kommula et al., 2014).

The National Cancer Registries for Asian countries reported that the incidence rate of breast cancer was 21.4% in Iran (Ahmadian and Samah, 2013). Besides, statistics have shown an increase in the incidence of breast cancer in Iran (Hajian Tilaki and Ahangar, 2011). Breast cancer is also the most common cancer in Fars province, Iran, with an incidence rate of 11.58% and the 5-year survival rate of 58% (Mehrabani et al., 2012). It has the fourth rank among the most prevalent cancers in this province (Kashfi et al., 2012).

Despite the reduction in breast cancer mortality rates, especially in developed countries, the disease is still a major challenge for health policymakers in developing countries, including Iran. The high and increasing incidence of the disease and the difficulties in its treatment in advanced stages impose a huge burden on health systems in different countries (Shams et al., 2014). Thus, timely detection of cancers is vital, especially for breast cancer as one of the few cancers whose early detection is possible. If breast cancer is detected at early stages, it can be cured in more than 90% of patients. Screening is one of the best ways for early detection of breast cancer

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(Naghibi et al., 2013). Mammography, Clinical Breast Examination (CBE), and Breast Self-Examination (BSE) are important screening methods for early detection of breast cancer. Among these screening methods, BSE seems to be an appropriate procedure in Iran due to the country's facilities (Naguib et al., 2009).

BSE has many economic and social advantages over the other two methods. For instance, it can be done at no cost and is available everywhere. However, it is done infrequently due to women's lack of time, lack of confidence in their ability to do it correctly, fear of the possible discovery of a lump in the breast, and embarrassment and shame associated with breast manipulation (Kommula et al., 2014). Hence, women have to be empowered regarding BSE and educational measures should be taken to promote this behavior among women. Health education plays an important role in institutionalization of this behavior among women in the society (Shams et al., 2014). The most effective training programs are based on theory-driven approaches, and selecting the appropriate model or theory of health education is the first step in the process of planning a training program (Ghahremani et al., 2014).

According to the literature, the "stages of change model" has been used as a new intervention in promoting BSE behavior (Pourhaji et al., 2014). Trans-theoretical model, which includes the theory of stages of change, was first proposed by Prochaska and Di Clemente in 1983 for quitting smoking. It described how motivation could increase the likelihood of behavior change. Up to now, this model has been widely used to study health-promoting behaviors, such as exercise, quitting smoking, substance and alcohol abuse, stress management, limiting sun exposure, AIDS prevention, colon and breast cancer screening, and mammography (Evers et al., 2012). This model includes four constructs, namely stages of change, processes of change, self-efficacy, and decisional balance (Moazzami and Soltanian, 2013).

Considering breast cancer as one of the health priorities in Iran (AshrafiAsgarabad et al., 2012), importance of BSE and its crucial role in reducing the mortality rate, and low age of breast cancer in the country (VahedianShahroodi et al., 2013), this study aims to determine the effects of self-care education on doing BSE among women referring to health centers in Nurabad Mamasani. The results of the study can be used to develop training programs and the right strategies to increase women's awareness, promote their attitudes, and improve their performance in preventing cancer.

Materials and Methods

This quasi-experimental interventional study with pretest/posttest control group design aimed to investigate the effect of self-care education on doing BSE by married and single women over 25 years of age referring to health centers in 2015 . The inclusion criteria of the study were referring to health centers in Nurabad Mamasani, being at most 50 years old for married women and > 25 years old for single ones, did not have breast cancer and continuous presence in the educational program. On the other hand, the exclusion criteria of the study were being diagnosed with breast cancer based on self-report and medical records, being pregnant, breast-feeding, and not attending more than 10 training sessions.

Based on the previous studies conducted on the issue and using comparison of means based on power of 80% and alpha = 0.05, a 140-subject sample size was determined for the study (Pourhaji et al., 2014). Given the loss rate of 20%, the sample size was increased to 168 subjects. The participants were selected through multistage random sampling. In doing so, 2 out of the 4 health centers in Nurabad Mamasani were randomly selected. Then, these 2 centers were randomly considered as intervention and control groups. The researchers referred to the centers and selected all the women who met the inclusion criteria of the study. In this way, 84 women were assigned to the intervention group and 84 were allocated to the control group.

The study data were collected using a questionnaire developed based on the trans-theoretical model for BSE behavior. Due to lack of a standardized questionnaire, the study instrument was developed using resources, reference books, and studies in the field. The validity of the questionnaire was measured using the opinions of six experts in the field of health education. Its reliability was also assessed through a pilot study on 25 subjects with a 10-day interval. Accordingly, Cronbach's alpha was 0.9 for the entire questionnaire and 0.8, 0.9, 0.8, and 0.8 for stages of change, self-efficacy, decisional balance, and processes of change, respectively.

The first part of the questionnaire consisted of 22 questions on demographic characteristics, such as age, marital status, weight, height, education level, history of breast pain, family history of breast cancer, husband's education level, occupation, husband's occupation, family income, and age at menarche, the way they found about BSE and how it is done, willingness to learn BSE. The second part of the questionnaire measured the constructs of the trans-theoretical model and contained one question on stages of change, 7 questions on self-efficacy, 12 questions on decisional balance, and 15 questions on processes of change. Stages of change construct was measured using the following question: "Do you usually do BSE". This questions could be answered using five choices as follows: 1) No, I do not want to do BSE in the next 6 months (precontemplation), 2) No, but I'm going to do BSE in the next 6 months (contemplation), 3) No, but I'm going to do BSE in the next 30 days (preparation), 4) Yes, I did BSE less than 6 months ago (action), and 5) Yes, I did BSE more than 6 months ago (maintenance). The items on other constructs were responded based on a 5-point Likert scale ranging from strongly agree (1) to strongly disagree (5).

The third part of the questionnaire was a seven-stage direct observation checklist for assessing the BSE behavior to Complete by Reasercher (Kashfi et al., 2012).

After initial completion of the questionnaire, as the pre-test, by both groups, the educational program was designed based on the trans-theoretical model in four 45-minute sessions. The subjects in the intervention group attended the program once a week.The educational content of the training sessions included introduction to Breast

Table 1. Comparison of the Intervention and Control Groups Regarding Demographic Variables

Variable/Group		Intervention group		Control group		P- value
		Frequency	Percent	Frequency	Percent	
Marital status	Single	8	9.5	8	9.5	0.77
	Married	63	75	64	76.2	
	Widowed	7	8.3	4	4.8	
	Divorced	6	7.1	8	9.5	
Education level	Illiterate	5	6.0	10	11.9	0.2
	Primary school	4	4.8	10	11.9	
	Middle school	8	9.5	10	11.9	
	High school/ Diploma	18	21.4	16	19.0	
	Academic	49	58.3	38	45.2	
Occupation	Unemployed	58	69.0	66	78.9	0.35
	Self-employed	9	10.7	7	8.3	
	Employee	17	20.2	11	13.1	

cancer, signs and risk factors, introduction to breast self examination , importance of Breast self-examination in early detection and treatment Breast cancer and Training breast self examination. The education included theoretical and practical training using direct teaching methods, such as presentation, question and answer, BSE training videos, slideshows, and flip charts. At the end of the training sessions, pamphlets were also distributed among the participants in the intervention group.

The questionnaire was administered to the women in both groups one week and 10 weeks after the intervention and the results of the three administrations were compared.

After all, the data were entered into the SPSS statistical software, version 19 and were analyzed using descriptive statistics, independent and paired samples t-tests, repeated measures ANOVA, Chi-square, and Friedman test. $P<0.05$ was considered as statistically significant

Results

The mean age of the subjects was 35.3±7.5 years in the intervention group and 36.6±8.5 years in the control group. Besides, the mean weight of the participants was 73.9±9.8 kg in the intervention group and 72.9±11.6 kg in the control group. Their mean height was also 160.8±5.6 and 156.0±6.0 cm in the intervention and control groups, respectively. The participants had averagely 1.8±1.4 children in the intervention group and 1.9±1.4 children in the control group. Additionally, the mean age at menarche was 12.1±1.4 and 12.0±1.5 years in the intervention and control groups, respectively. Moreover, the income of the majority of the subjects (67.9% in the intervention group and 52.4% in the control group) was more than 10 million Iranian Rials (IRR) per year. The results of independent t-test showed no significant differences between the two groups in terms of age, weight, height, number of children, and age at menarche. The results of Chi-square test also revealed no significant differences between the two groups regarding marital status, education level , and occupation,. The results have been presented in Table 1.

The participants mainly provided negative responses to the items on history of the disease (82.1% in the

Table 2. Women's Stages of Change Regarding Doing BSE in the Pre-Test, the First Post-Test, and the Second Post-Test

Group		Intervention group						Control group					
Stages of change		Pretest		First post-test		Second post-test		Pretest		First post-test		Second post-test	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Precontemplation		0	0.0	0	0.0	0	0.0	4	4.8	16	15.4	13	12.5
Contemplation		0	0.0	0	0.0	0	0.0	20	23.8	13	12.5	13	12.5
Preparation		4	4.8	2	2.4	1	1.2	60	71.4	53	51.0	51	49.0
Action		20	23.8	13	15.5	2	2.4	0	0.0	0	0.0	0	0.0
Maintenance		60	71.4	68	81.0	81	96.4	0	0.0	0	0.0	0	0.0
P-value		<0.001						0.8					

Table 3. Comparison of the Intervention and Control Groups' Mean Scores of the Constructs of Trans-Theoretical Model and BSE Behavior in the Pre-Test, the First Post-Test, and the Second Post-Test

Variable	Group	Pretest	First post-test	Second post-test	P-value
		Mean ± SD	Mean ± SD	Mean ± SD	
Self-efficacy	Intervention group	4.7±19.5	4.9±29.2	6.3±31.1	<0.001*
	Control group	5.5±16.6	5.6±16.6	6.3±16.9	0.6
Decisional balance	Intervention group	6.1±40.0	5.6±52.2	4.8±54.0	<0.001*
	Control group	6.5±37.8	6.9±37.5	7.7±36.5	0.188
Processes of change	Intervention group	10.7±40.2	8.2±60.6	9.7±62.5	<0.001*
	Control group	9.7±40.9	10.5±40.8	11.9±40.6	0.344
BSE behavior	Intervention group	1.6±19.8	6.8±54.1	5.2±54.9	<0.001*
	Control group	2.6±20.4	2.9±20.6	2.2±20.3	0.638

*, Significant at p=0.05

intervention group and 2.70% in the control group), history of breast pain (76.2% in the intervention group and 83.3% in the control group), current breast pain (81% in the intervention group and 86.9% in the control group), and history of chest pain among friends and acquaintances (56% in the intervention group and 3.64% in the control group).

Most of the study women (69% in the intervention group and 65.5% in the control group) were unaware of BSE. On the other hand, 90.5% of the women in the intervention group and 96.4% of those in the control group deemed BSE training as essential. Moreover, 96.4% of the women in the intervention group and 91.7% of those in the control group were interested in learning BSE.

The results of Friedman test showed a significant difference in the intervention group's scores of stages of change construct in the first post-test compared to pretest, in the second post-test compared to pre-test, and in the second post-test compared to the first post-test ($p<0.001$). However, these differences were not statistically significant in the control group ($p>0.05$) (Table 2).

Repeated measures ANOVA (Table 3) was used to compare the mean scores of self-efficacy, decisional balance, processes of change and BSE behavior in the pre-test, the first post-test, and the second post-test. The results showed a significant difference in this regard in the intervention group, but not in the control group.

Discussion

The findings of the present study showed that using trans-theoretical model increased the subjects' scores on the model's constructs and BSE behavior. Besides, the results indicated a significant difference in the intervention group's scores of stages of change construct before, a week after, and 10 weeks after the intervention ($p<0.001$). However, this difference was not significant in the control group. The results also demonstrated that the educational program was effective in promoting BSE.

Considering the stages of change with respect to performing BSE, both groups' participants were in precontemplation, contemplation, and preparation stages in the pre-test. After the educational program, however, a significant improvement was observed in this regard in the intervention group compared to the control group. The increase in the number of intervention group subjects in the action stage could also be related to the used educational strategies. It should be noted that the constructs of stages of change were proposed based on the assumption that education is capable of improving individuals through these stages (Jalilian et al., 2013). These findings are consistent with those of similar studies conducted by Mohsen Nejad, Pur Haji, Entisar Abo and Carol Strong (Mohsennejad et al.,2016; Pourhaji et al., 2014; Elkazeh and Elsaay, 2012; Strong and Liang, 2009).

The results of the current study indicated a significant increase in the intervention group's mean scores of self-efficacy after the intervention compared to the control group. In the same line, Bandura and Adams stated that self-efficacy was among the most important prerequisites for changing behavior. They also reported that self-efficacy had a significant impact on health behaviors. Accordingly, individuals with low self-efficacy were less likely to adopt new health behaviors. Furthermore, being skillful in doing a behavior is one of the most powerful factors in increasing self-efficacy (Jalilian et al., 2013). Thus, self-efficacy can be improved via successful and active participation in BSE.

Previous studies also disclosed a positive relationship between self-efficacy and BSE behavior. This implies that BSE behavior increased by increasing self-efficacy (VahedianShahroodi et al., 2013). These results were in agreement with those of the researches by Sahraei, Piraste, Hazavehei,Huang (Sahraee et al., 2013; Pirasteh et al.,2013; Hazavehei et al., 2016 ; Huang et al., 2013).

The results of our study showed a significant difference in the intervention groups' mean score of decisional balance after the intervention. However, no significant difference was found in this regard in the control group. Generally, decisional balance is determined by two important factors, namely perceived benefits and perceived barriers. According to the trans-theoretical model, individuals create changes when their perceived benefits outweigh their perceived barriers. Therefore, individuals' attitudes towards benefits and barriers play a crucial role in adoption of health behaviors (Moodi et al., 2014). Our study results indicated that perceived benefits increased but perceived barriers decreased in the intervention group after the intervention. Thus, if women are aware of the benefits of BSE, they will be

more likely to do this behavior. The studies by Moodi, Ghahremani, Hazavehei and Huang also concluded that the scores of decisional balance significantly increased after the intervention. (Moodi et al., 2014; Ghahremani et al., 2008; Hazavehei et al., 2016; Huang et al., 2013).

The present study findings showed a significant difference in the intervention group's mean scores of processes of change in the post-test compared to the pre-test. However, no significant difference was observed in this regard in the control group. The studies by Moodi and Jalilian (Moodi et al., 2014; Jalilian et al., 2013) also revealed a significant increase in the processes of change after the educational intervention. These findings are, too, consistent with those obtained by Hazavehei and Yasin. (Hazavehei et al., 2016; Yasin et al., 2013) . The processes of change include strategic activities or processes that help individuals advance through stages. These processes consist of two main categories, namely cognitive processes (associated with contemplation and how people feel about unhealthy behaviors) and behavioral processes (that cause change in unhealthy behaviors). Thus, the important point in designing educational interventions is that the weight of benefits should be increased at early stages and the disadvantages and barriers should be decreased at the final stages in order to maintain health behavior change (Jalilian et al., 2013).

In our study, the effectiveness of the educational intervention might be attributed to the fact that the program and materials were designed by considering the influence of personal and environmental factors on doing and improving BSE. Also, group discussion sessions changed the subjects' attitudes and created a supportive atmosphere. The use of educational approaches, such as providing new information, persuasive communication, expression of feelings, and provision of educational materials via photos and stories, were also effective. In the educational sessions, the subjects talked about their experiences and reasons for their BSE behaviors. They were also asked to explain about their BSE experiences during the past week. Then, the correct way to do BSE was taught to the subjects again and they attempted to do BSE independently. The study results showed a significant difference in the intervention group's mean scores of BSE behavior after the intervention compared to the pre-test. However, this difference was not significant in the control group. These findings reflected the positive impact of educational interventions on promoting BSE behavior among women. This can be justified by the fact that awareness directly affects the formation of correct attitudes (Kashfi et al., 2012). Similarly, the studies by Piraste and Pourhaji showed improvements in doing BSE among women in the intervention groups after the interventions. (Pirasteh et al., 2013; Pourhaji et al., 2014) Similar results were also obtained by Omyeni and Naghibi (Omoyeni et al., 2014; Naghibi et al., 2013).

The results of this study demonstrated the effectiveness of the educational intervention based on the trans-theoretical model in performing BSE by the women referring to health centers in Nurabad Mamasani. Hence, this model can be used as a framework for designing educational programs in order to improve women's health and reduce deaths due to breast cancer.

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