


The Effect of Educational Intervention Based on Trans-theoretical Model on the Correct Behavior of Breast Self-Examination Among Health Volunteers in Rafsanjan City, Iran

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ABSTRACT

Background & Objective: Breast cancer is considered to be one the most preventable types of cancer in women. In this regard, one of the most important self-care techniques for women is breast self-examination. The main objective of the present study was to determine the effect of educational intervention based on trans-theoretical model on the correct behavior of breast self-examination among health volunteers in Rafsanjan city, in 2017.

Materials & Methods: This semi-experimental study was performed on 92 health volunteers who were assigned to two intervention and control groups in Rafsanjan, Iran. The required data was collected through a valid and reliable questionnaire. After the pretest analysis and determination of the participants' educational needs, the educational program was implemented in six sessions. The effect of the training program was evaluated immediately and eight weeks later. Data analysis was performed using SPSS 16; the significance level was considered 0.05.

Results: Mean age of the volunteers was about 46 years. After the implementation of the educational program, there was a significant difference between the two groups in terms of movement in the stages of change during three interval periods ($P < 0.05$). Also, there was a significant difference between mean scores of the two groups in all structures (except for perceived barriers) after the intervention ($P < 0.05$).

Conclusion: The use of educational methods, such as demonstration, role-playing, and the use of Molding (Moulage), has had an impact on the empowerment of health volunteers as health promoters. Regarding the effectiveness of the educational intervention based on trans-theoretical model in performing the correct behavior of breast self-examination, it is recommended to use this model in other areas and topics.

Keywords: Trans-theoretical model, Breast self-examination behavior, Health volunteers, Stage of change



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Introduction

According to the WHO report, cancer was the second leading cause of death and accounted for 9.6 million deaths around the world in 2018. Also, breast cancer (BC) was found to be the most common cause of cancer death among women accounting for the death of 627000 people in the same year (1). The total BC patients in Iran is 40000 people, which increases by 7000 new cases per year (2). The most significant risk factors for BC include age, race, genetic factors, dense breast tissue, family background, health history (e.g., early menarche and late menopause), insufficient physical activity, obesity, a poor diet, poor breastfeeding, contraceptive pills, and the person's lifestyle (3). Anxiety and fear resulting from cancer and its intervention procedure lead to reduction in the patient's hope for recovery. In addition, images of body deformation, pain, financial and social problems,

dependence, family breakdown, and death create deep emotional problems among patients and their families (4).

The American Cancer Society (ACS) guidelines suggests breast self-examination (BSE) to be taken on a monthly-basis by all women from the age of 20, clinical breast examination (CBE) from the age of 20 to 40 preferably every three years and after the age of 40 every year, and mammography, for the first time at the age of 40-49 years and for women at the age 49 and older on an annual basis (5,6). About 70% of Iranian women are at the advanced stage of BC when referring to healthcare centers; thus, the early diagnosis of the disease can significantly affect its intervention (2). Among diagnosis measures, BSE which is a simple, safe, personal, inexpensive technique (7) and a health and self-care behavior whose efficacy depends on its correct

performance (8, 9), is used extensively in rural and deprived areas. Currently, the number of women who perform BSE, is few in Iran. This unpopularity can be attributed to several factors including, the lack of proper education on how to do it, economic problems, mental disorders, depression, and unreasonable fear and shame (10). One of the most important strategies for self-care behavior empowerment is to provide training on how to perform BSE correctly (11).

Given the effective role played by health volunteers in promoting the family awareness and attitudes, the volunteers themselves must be aware of the details of this health behavior so that they could highlight its necessity and even be able to educate it to other people (12). Theory-based training programs are the most effective programs that have been originated from behavior change models (13).

Trans-theoretical model is a comprehensive model in health behavior research that was developed by James Prochaska (1970), stating that nobody is ready to be changed or at least not all of people are at the same level of preparation for change (14,15). One of the constructs of this model is the stages of change that focuses on perception and prediction of the intention of health behaviors (14,15).

According to this model, change stages include pre-contemplation, contemplation, preparation, action, and maintenance. Decision-making balance as one of the construct of the model has been defined as benefits, barriers, and costs associated with behavior change, assuming that a person does not change their own behavior, unless perceives the benefits of such change outweigh its barriers. Self-efficacy, as another construct, indicates of the confidence people have in their ability to cope with risky situations. Change processes include ten (cognitive and behavioral) processes (14, 15). Considering the development of severe complications of BC among women and the key role of health volunteers in promoting self-care programs, the present study attempted to determine the effect of educational intervention based on trans-theoretical model on the correct behavior of BSE among health volunteers in Rafsanjan, Iran, in 2017.

Materials and Methods

Study Design and Population

This quasi-experimental study was conducted on two (intervention and control) groups. The groups were selected randomly and took pretest and posttest plus an 8-week follow-up period. The research population included all health volunteers (350 women in total) working in healthcare centers in Rafsanjan in 2017. The sample size was determined based on Pourhaji's notion (16) and using the following equation:

$$n = \frac{2(z_{1-\alpha/2} + z_{1-\beta})^2 \sigma^2}{(\mu_2 - \mu_1)^2}$$

The number of participants in each group was estimated to be 41 members Predicting a dropout rate of 20%, 50 persons were selected as the members of each group through the multi-stage random sampling. To this end, 4 centers were selected randomly from 9 healthcare centers. Then, 2 centers were selected randomly as the intervention group and 2 centers as the control group. The selected participants were placed in two groups of intervention (50 women) and control (50 women) through simple random sampling. During the course of studies, 4 people from each group were excluded from the study due to long-term trips, non-attendance in training sessions, and having the history of surgical operations. Accordingly, the final number of participants during all stages of the interventional course in each group was 46 people.

The Inclusion and Exclusion Criteria

The inclusion criteria were being native, age of at least 20 years, having the minimum literacy, and willingness to participate in the study. The exclusion criteria were having the history of suffering from breast problems, mental illnesses, attending similar courses, and being absent in more than 2 sessions during the courses.

Measuring Tools

The research instrument was a 4-part questionnaire developed based on trans-theoretical model for BSE adopted from a study by Ghahremani *et al.* (2016). The validity of the questionnaire was evaluated based on the opinions of 6 health experts. Besides, the reliability of the questionnaire was evaluated based on the results of a pilot study on 25 people and the resulting Cronbach's alpha values for the whole questionnaire, and its constructs including stages of change stages, self-efficacy, and decision balance were 0.9, 0.8, 0.9, and 0.8, respectively (17). The first part of the questionnaire measured the participants' demographic characteristics using 5 items (age, marital status, job, number of children, and menstruation age). The stages of changes were assessed through a 5-choice question in which the respondent was asked to select only one option concerning the frequency of performing BSE: Do you usually do breast self-examination (BSE)?"

- 1) No, I am not going to do BSE within the next 6 months (pre-contemplation stage).
- 2) No, but I'm going to do BSE in the coming 6 months (contemplation stage).
- 3) No, but I tend to do BSE next month (preparation stage).
- 4) Yes, the last BSE I did was less than 6 months (action stage).
- 5) Yes, it is more than 6 months since my last BSE (maintenance stage).

Self-efficacy construct was measured through 7 items and decision balance using 12 items (7 items for perceived barriers and 5 items for perceived benefits). The items were scored using a 5-point Likert scale ranging from

strongly agree (5) to strongly disagree (1) based on the self-report answers provided by the respondents. A higher score indicated a higher perception while this was opposite in case of perceived barriers.

-The direct BSE checklist included 19 three-point items (correct, incomplete, and incorrect) that was administered by a trained midwife. In this checklist, the correct behavior was scored 2, incomplete response was scored 1, and incorrect behavior scored 0. The total score in the checklist ranged 0-38.

Educational Intervention

Upon completing and scoring the questionnaires that were administered on 100 respondents in the pretest stage, the intervention group members attended 6 educational sessions (each lasting 45-55 minutes) in the form of

theoretical and practical sessions using lectures, group discussions, and role-plays (Table 1). The participants in the pre-contemplation and contemplation groups were divided into smaller groups based on the nature of the stages of behavior change and were then invited to attend the educational sessions. Then, other groups (preparation, action, and maintenance) with an equal number of participants were invited to the sessions (4 members of the intervention group and 4 members of the control group were excluded from the study in this stage). The control group did not receive any intervention during the educational program. The same questionnaire was distributed among the participants of both groups once immediately upon the completion of the educational session, and once again 8 weeks after that.

Table 1. Protocols of the educational program

Session	Description
First	Increasing the participants' awareness of early cancer diagnosis based on instructional approaches providing new information, motivating communications, and expressing feelings accompanied by images using the PowerPoint.
Second	The preparation group participants were equally added to intervention groups in order to increase their knowledge of possible risks of BC, behaviors to reduce such risks, and BC screening programs. Some instructional approaches employed in the first session were used in this session too.
Third	Promoting perceived benefits of BSE by presenting theoretical issues using images and PowerPoint presentations. The participants in the action and maintenance groups were equally invited to the sessions.
Fourth	Enhancing decision-making power based on attitude change and skill development approaches and providing elaborate explanations about BSE benefits.
Fifth	Developing skill and promoting self-efficacy in performing BSE. The practical approach to BSE was instructed using moulage (imitative learning) and feedback was received through role-plays. At the end of the program, a colored pamphlet and instructional CD illustrating BSE method were given to the members of all groups.
Sixth	Changing behavior and maintaining healthy behavior by teaching the skills and self-management approaches. In this session, the participants in action and maintenance stages discussed their experiences and BSE behaviors. Then, the correct BSE behavior was taught and each member performed it individually.

Data Analysis

After entering the data into SPSS 16 (SPSS Inc., Chicago, Illinois, USA) and checking their normality, the collected data were analyzed using statistical techniques including t-test and, Chi-square. The same procedure was taken after two months to analyze the data collected through the repeated measure. The results were then presented in the form of tables, figures, and textual explanations at the significance level of 0.05.

Results

The mean age of participants was 46.84 ± 10.67 (intervention group = 49.2 ± 10.5 & control group = 44.4 ± 10.3) with the age range of 20-75. There was not any significant difference between the two groups in terms of

demographic variables, marital status, job, number of children, and menstruation age ($P > 0.05$). Health workers served as the most important source of information in both groups. There was no significant difference between the two groups in terms of the stages of change before the intervention. However, the number of participants in intervention group during action stage increased by 39.1% (compared to 19.6% in the control group) 8 weeks after the intervention, showing a significant difference ($P < 0.05$). Generally, participants in the intervention group showed a significant difference in their progress in the stages of change compared to control group after the intervention ($P = 0.03$) (Table 2).

After classifying the participants of in the two groups, the preparation group (pre-contemplation, contemplation, and preparation) and the action group indicated that about

half of the members in intervention group were in the preparation stage and the rest in the action stage before attending the intervention sessions. However, these figures reduced to 6.5% in the preparation stage and increased to 93.5% in the action stage in the post-intervention stage, showing a significant difference ($P=0.006$) (Table 3). The results showed no significant

difference ($P>0.05$) between the mean scores and standard deviations in terms of BSE behavior, self-efficacy, and perceived benefits and barriers between the two groups in the pre-intervention stage. In contrast, there was a significant difference ($P<0.05$) between the two groups after the intervention in all variables except for the perceived barriers (Table 4).

Table 2. Comparison of the frequency distribution of stages of change in breast self-examination behavior

Time Stage of Change	Pretest		Post-test 1		Post-test 2	
	Intervention group N(P)	Control group N(P)	Intervention group N(P)	Control group N(P)	Intervention group N(P)	Control group N(P)
Pre-contemplation	1(2.2)	1(2.2)	1(2.2)	3(6.5)	0(0)	2(4.3)
Contemplation	8(17.4)	3(6.5)	0(0)	3(6.5)	0(0)	3(6.5)
Preparation	14(30.4)	12(26.1)	18(39.1)	9(19.6)	3(6.5)	8(17.4)
Action	7(15.2)	6(13.0)	7(15.2)	8(17.4)	18(39.1)	9(19.6)
Maintenance	16(34.8)	24(52.2)	20(43.5)	23(50.0)	25(54.3)	24(52.2)
P-value	0.392		0.122		0.036	

Table 3. Comparison of the frequency distribution of stages of preparation and practice in breast self-examination behavior

Time Stage of Change	Pretest		Post-test 1		Post-test 2	
	Intervention group N(P)	Control group N(P)	Intervention group N(P)	Control group N(P)	Intervention group N(P)	Control group N(P)
Preparation	23(50)	16(34.8)	19(41.3)	15(32.6)	3(6.5)	13(28.3)
Action	23(50)	30(65.2)	27(58.7)	31(67.4)	43(93.5)	33(71.7)
P-value	0.103		0.259		0.006	

Table 4. Comparison of the mean score of the structures of the Trans-Theoretical Model between two groups

Structure	Time	Pretest Mean±SD	Post-test 1 Mean±SD	Post-test 2 Mean±SD	P-value**
	Self-efficacy	Intervention group	25.41±6.19	33.47±2.12	33.73±1.92
Control group		26.36±5.09	26.23±5.10	26.71±5.17	0.743
*P-value		0.421	0.001	0.001	
Perceived benefits	Intervention group	21±3.33	24.47±1.04	24.58±0.90	0.001
	Control group	21.93±2.61	21.78±2.77	21.71±2.68	0.843
	*P-value	0.332	0.001	0.001	
Perceived barriers	Intervention group	14.43±5.51	11.36±7.36	8.76±2.57	0.001
	Control group	13.13±4.64	9.73±4.17	8.06±3.83	0.001
	*P-value	0.223	0.184	0.310	
Behavior	Intervention group	13.21±6.29	35.21±3.09	35.10±3.48	0.001
	Control group	13.76±6.46	15.45±5.79	15.86±6.03	0.028
	*P-value	0.684	0.001	0.001	

* t-test

** repeated measure

Discussion

In BC is the most prevalent cancer in women leading to 571000 deaths in 2015 (1). Individual, environmental, and ecological factors along with the disease background in relatives play a vital role in this regard (4,18,19) so that the delayed diagnosis may cause various negative complications such as reduced life expectancy and reduced survival in women (5,20). Monthly BSE is a highly recommended technique to prevent breast cancer (6). The process of behavioral adaptation is associated with increased awareness, changes in attitudes and behaviors, and facilitation and instruction of behavioral skills (14). The empowerment of health volunteers and health ambassadors is a key point in promoting the community health. Instruction is the most inexpensive and basic strategy used to empower people to adopt health behaviors. Besides, understanding the reasons behind people's performance and recognizing factors affecting behavior change are significant steps taken in designing behavior change programs (14). Therefore, the present study aimed determining the effect of educational intervention based on trans- theoretical model on the correct behavior of BSE among health volunteers in Rafsanjan city.

Progress through the stages of change was regarded as a measure of intervention success. There was no significant difference between the two groups in terms of their progress through the stages of change before the intervention. However, a positive significant progress through the stages of change was observed among the members of the intervention group after they attended the intervention sessions. In contrast, the participants in the control group did not show any progress during the educational course. This finding was in line with the observations reported by Ghahremani *et al.* (17) and Pourhaji *et al.* (21). Before the intervention, most of the participants were placed in the preparation and maintenance stages. In contrary, the participants in the studies conducted by Pourhaji *et al.* (16), Vahedian Shahroodi *et al.* (21), and Elcazeh and Elsie (22) were at preparation stage. Such difference may be attributed to the target group under study (health volunteers as promoters of health information compared to women referring to healthcare centers). In their study, Ghahremani *et al.* (17) managed to reduce the number of patients in pre-contemplation stage and increase them in the preparation and action stages. However, the number of patients in the maintenance group remained the same (17). The present study showed that after the intervention, the number of patients in the intervention group within the action stage after the intervention increased two times compared to the pre-intervention stage. The classification of the

participants and the use of various educational methods such as speech, group discussion, question and answer, practical show and role-play by each participant can be regarded as the possible success factors.

Prior to the intervention, about half of the participants in both groups were in the preparation group or the pre-behavior group (precontemplation, contemplation, and preparation) and they did not perform BSE, while there was a considerable reduction in the number of participants in the preparation groups and a significant increase in the action group after completing the intervention. However, the control group did not show such progress. This finding is consistent with the results of the study conducted by Pourhaji *et al.* (16). The establishment of an efficient relationship between the researcher and volunteers, encouragement, providing detailed information about the early BC diagnosis and risks caused by non-performance of BSE were some factors affecting the patients' progress.

Another factor affecting behavior adaptation in this model is self-efficacy. Bandura stated that self-efficacy can considerably affect health behaviors; thus, people with higher self-efficacy are most likely to experience maximum behavior change (14). Furthermore, having the skills to do a behavior is one of the factors leading to self-efficacy. Therefore, self-efficacy can be promoted through successful and active involvement in BSE (23). There was not any significant difference between self-efficacy mean scores gained by the two groups before the intervention, but the intervention group showed a positive and significant increase in their self-efficacy scores compared to the control group immediately and 8 weeks after the intervention. This was in line with the observations made in the literature (Ghahremani *et al.*, (17); Pourhaji *et al.*, (16); Khyali *et al.*, (24)). Khyali *et al.* (2017) reported self-efficacy as the most important predictor of BSE behavior adoption in women living in Fasa, Iran (24). This successful intervention can be attributed to the application of instructional strategies such as role-plays, practical shows, and correct BSE behavior through moulage (with BC tubers and cysts) by the instructors and consequently by the learners.

According to trans-theoretical model, people will change when they perceive that benefits of engaging in a particular behavior outweigh its barriers. Therefore, people's attitudes toward potential benefits and barriers plays a key role in adopting health behaviors (14, 15). The mean score of perceived benefits in the intervention group increased positively and significantly immediately and 8 weeks after the intervention and this led to the increased number of participants in the action group and the

decreased number of participants in the pre-contemplation and contemplation groups. This finding is in line with the results reported by Masoudi Yekta *et al.* (25). Moreover, explaining the importance of the topic, physical, mental and social benefits of adopting a behavior by the participants were discussed in this study. Considering the role of the target group as health promoters and instructors in training the community members, a comprehensive instructional program based on the existing scientific evidence is required to empower them because these groups can play a model role in the community when they have high self-efficacy as pioneers in adopting the considered behaviors. Accordingly, it is recommended that the role of these groups in the community as the role models, instructors, and directors for action to be taken into account. Some barriers such as the skills required for doing the correct behavior, the sense of embarrassment and shame of performing it, pain, forgetting the time of do a behavior, and the time-consuming process were examined in this study. There was not any significant difference before the intervention between the perceptions of the two groups in terms of potential benefits of the behavior in question. The intervention group's mean score significantly reduced after implementing the educational program, discussing and undervaluing the behavioral barriers, and teaching the correct self-examination behavior. However, this difference was not significant immediately and 8 weeks after the intervention. Although this finding is in line with the results obtained by Bakhtari Moghadam *et al.* (26), Nahidi *et al.* (27), and Yan-Qion (28), it is not consistent with the results of some other studies (24,25). Such discrepancies can be explained by the characteristics of the target group (health volunteers) and the fact that 16 members in the intervention group were at the maintenance stage before the intervention. In addition, they possibly overcame some of the barriers in question but did not perform the behavior correctly. The skill needed for doing the technique correctly and the time-consuming nature of the behavior were the most important barriers to adopting the behavior. It is recommended to examine other barriers to self-examination. In the mentioned cases, the focus was on doing the correct behavior to increase self-examination sensitivity.

In this study, the BSE mean score in the intervention group increased significantly immediately after intervention, while such progress was not observed in the control group. The BSE mean score decreased slightly 8 weeks after the intervention, demonstrating the importance of the instructional programs. In studies conducted by Ghahremani *et al.* (2016) and Tozcu *et al.* (2016), successful results were obtained in adopting the BC screening behaviors among Iranian and Turkish

women after implementing the theory-based intervention (17,29). Accordingly, the use of theory-based interventions to adopt health behaviors and promote self-efficacy in other female groups is recommended.

The strategies used in the educational sessions for health volunteers appeared to be very inspirational and stressful, which increased their interest in and the ability to carry out the intended behavior, as well as the transfer of information to other women. The remarkable thing was that people had a better sense of responsibility in maintaining and improving their health through proper BSE and observing its effects. Therefore, the use of theory-based behavioral change interventions for adopting health behaviors and promoting self-efficacy can be effective in early diagnosis and prevention of BC deaths.

Limitations of the Study: This study was conducted with some shortcomings such as the small size of the research sample and the way the participants answered the questionnaire items (self-report). Therefore, it is suggested to use interviews as a complement to the questionnaire.

Conclusion

This study was conducted to empower health volunteers in Rafsanjan by implementing a theory-based instructional program that lasted 6 sessions using various instructional methods such as practical shows and role-plays within three stages. The empowerment program led to the participants' positive and significant progress during stages of change and enhanced their correct BSE behavior. Intervention techniques such as empowerment and correct BSE behavior were found to promote the perceived benefits, reduce the perceived barriers, and increase the participants' self-efficacy. Since most of the participant were categorized in the preparation or pre-contemplation stages and poor BSE behavior, it is required to implement trans-theoretical-based interventions to increase the chance of correct BSE behavior for the early diagnosis of issues associated with health, promote women's health, and reduce complications in various cases caused by BC. As women play a vital role in the community health, further comprehensive studies are recommended to consider other variables affecting the self-examination behavior.

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Conflict of Interest

Authors declared no conflict of interests.

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