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The Effect of Education Based on Systematic Comprehensive Health Education and Promotion Model to Health Volunteers on Their Female Clients' Knowledge Regarding Breast Cancer Screening

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ABSTRACT

Background & aim: Despite the importance of screening for early diagnosis of breast cancer, few women have adequate knowledge in this regard. This study was performed to determine the effect of education based on comprehensive systematic health education and promotion model (SHEP model) on breast cancer screening knowledge of women referred to Mashhad health centers.

Methods: This quasi-experimental study with two groups of trainers and audiences was performed at Ab-o-Bargh and Shahid Najafi Health Centers that were randomly assigned to experimental and control centers. The study subjects were 12 health volunteers and 120 audiences (women referred to the health centers). In the case group, the health volunteers received training based on the SHEP model during two four-hour sessions. The control group received the routine training program. In both centers, ten women were randomly allocated to each health volunteer. The trainers of each group held a two-hour training session for the women covered by the health centers. The women's knowledge was assessed before, as well as immediately and four weeks after the intervention using a self-made questionnaire. To analyze the data, Mann Whitney, Friedman, Chi-squared, and Fisher's exact tests were run in SPSS, version 20.

Results: Before the intervention, mean knowledge scores of the experimental and control groups were 16.52 and 16.53, respectively, which were not significantly different (P>0.05). Immediately and four weeks after the intervention, mean scores of knowledge in the experimental group were significantly higher than in the control group (43.13 and 42.38 vs 23.28 and 22.83; P<0.05). In both groups, there were significant differences in mean scores of knowledge at the three time points of before, immediately after, and four weeks post-intervention, but these disparities were greater in the experimental group compared to the control group.

Conclusion: Our outcomes confirmed the effectiveness of training based on SHEP model by matched trainers on women's short- and long-term knowledge promotion as to breast cancer screening.

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Introduction

Globally, breast cancer is the most common type of cancer among female population, such that approximately one million new cases of the disease are reported annually. About 23% of

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new cases diagnosed as cancer and 14% of deaths are due to breast cancer (1). In Iran, breast cancer is suggested as the most common type of cancer among women (2). The incidence of breast cancer in Iranian women is estimated to annually increase by three times until 2030 (3).

Breast diseases, especially breast cancer, which may lead to loss of breast, not only cause mental health problems in women, but also in some cases lead to severe social and family problems and compromise women's normal life (4).

If remained untreated, breast cancer can cause a wide range of problems for patients and their families, but in case of early diagnosis and prompt treatment this disease is curable. Awareness regarding the signs and symptoms of breast cancer is of utmost importance in early detection and timely treatment. With increasing public awareness on early detection and screening methods, especially in high-risk individuals, the risk of mortality due to breast cancer can be diminished (5).

Secondary prevention, such as participation in screening tests, is of great significance in breast cancer and leads to diagnosis of the disease in early stages (6).

Today, in developed countries, promoting women's awareness regarding breast cancer screening methods has led to increased health center referrals for performing diagnostic procedures, and in turn, a reduction in mortality due to breast cancer. Nonetheless, in developing countries such as Iran, the disease is still diagnosed in more advanced stages due to poor knowledge and attitudes of people (4).

Health literacy is a concept often ignored in the realm of cancer awareness (7). Results of studies performed in Iran showed the fact that the level of health literacy is low in Iran and 71.9% of Iranians have inadequate health literacy. Furthermore, women with low health literacy are less likely to perform breast examination than others, which might be due to the fact that those with higher health literacy have greater awareness of screening tests and feel the need to do it (8). In order to improve the level of health literacy, health information should be presented proportional to the health literacy and level of understand of the audience (9).

Currently, most training content in the health system is presented in written form (10). However, the use of media such as pictures is an effective way to deliver health messages to those who have low health literacy, even those who simply prefer non-textual messages (11). These facts pinpoint the need for appropriate training in conjunction with cultural background (12). Accordingly, comprehensive systematic health education and promotion model (SHEP) was developed to enhance health literacy using the strategy of training matched educators. Two important features of this model are its comprehensiveness and systematicity.

Comprehensive means that all the health concepts that play a role in increasing health literacy are involved in the model and the trainer presents the content to the audience according to the characteristics of the target group. Systematic denotes that the program is implemented based on a flowchart characterizing all parts of the model including evaluation, research, developing educational packages, workshops until the stages of monitoring and evaluation.

Training packages are designed in such a way that in addition to health care workers, target groups, especially peer groups, can use them. This model consists of three main stages of evaluation (i.e., literature review, selection of research topics, and providing educational content), implementation (i.e., designing visual training tool, educating the trainer, and training the target audience), and assessment (short-, medium-, and long-term).

As of yet, SHEP model educational packages have been prepared for five health topics of AIDS, diabetes, influenza, cholera, and oral hygiene. Despite multiple reports by health centers of different provinces in Iran regarding increased awareness of trainees using these educational packages (13), few studies were conducted using this model. The only study using this model is the one by Soufizadeh et al. (2013) that aimed to evaluate the effectiveness of SHEP model in training on prevention and control of diabetes and emphasized on the efficiency of this model in promoting the knowledge and modifying the attitude of audience (14).

Given the importance of early detection of breast cancer in promotion of physical and mental health of women and the effective role of health volunteers as matched trainers in raising

awareness of families, interventional training programs held by health volunteers can be of great help. Since so far no study has been performed using this model, we sought to determine the effect of training breast cancer screening based on comprehensive SHEP model on breast cancer screening knowledge in women referred to Mashhad health centers to use these results in developing educational programs.

Materials and Methods

This quasi-experimental, interventional study was performed on 12 health volunteers and 120 women covered by Mashhad health centers who were randomly divided into experimental and control groups. The sample size for the target audience was determined using the sample size formula and according to previous studies (15). Considering the power of 0.80, mean difference of 1.05, standard deviations of 1.75 and 2.1, and the confidence level of 0.95, the standard sample size was estimated 52 cases for each group, and regarding the possibility of subject attrition, the final sample size was considered 60 cases in each group. Since each health volunteer trained 10 cases in each group, six health volunteers were assigned to each group.

To select the study setting, health center No. 1 was first-rated in five healthcare centers of Mashhad since it covers a larger number of healthcare centers and has appropriate educational facilities and adequate space. Afterwards, two urban health centers (Shahid Najafi and Ab-o-Barq) were selected as the research environment via convenience sampling and randomly assigned to the experimental and control groups. These health centers offer proper equipment and educational environments and are at an acceptable distance from each other in order to prevent information exchange during the study. After selecting the health centers, we presented at the health centers and records of the health volunteers and the referred women were evaluated and the eligible individuals were identified. Sampling was performed in two stages at both health centers (first for health volunteers, then for female clients). Simple random sampling without assignment and systematic random sampling were employed to select the health volunteers and women covered by these health centers, respectively.

The inclusion criteria for the health volunteers comprised of a minimum age of 20 years, at least high school education, active participation in training sessions of the selected center within one year before the beginning of the study, completion of the training program for health volunteers, and willingness to participate in the study. Furthermore, the inclusion criteria for the target audience were having Iranian nationality, minimum age of 20 years at the time of the study, having basic education, having active family records in the selected healthcare centers since the beginning of 2015, non-participation in educational programs related to the subject of the study during the six months prior to the study, and willingness to participate in the study.

The exclusion criteria were unwillingness to continue participation in the study, lack of participation in any of the tests, failure to respond to all items of the questionnaire, and absence or attending less than 30 minutes in the training sessions. After selecting the eligible individuals, they were contacted through telephone call, the research objectives were explained to them, and they were invited to refer to the health center at a set time.

Data collection tool was a researcher-made questionnaire designed based the questionnaires used in other studies (2, 16, 17). The questionnaire consisted of two parts: 1) Personal information, including 14 items on age, educational level, occupation, marital status, number of children, personal and family history of breast diseases, contraceptive methods, awareness of breast cancer screening methods and source of knowledge, history of self-examination, clinical breast examination, mammography, close relationship with a person with breast cancer, and duration of cooperation as a health volunteer and 2) knowledge assessment, assessing the subjects' knowledge in four dimensions (breast cancer [four items], risk factors for breast cancer [15 items], signs and symptoms of breast cancer [nine items], and breast cancer screening methods [17 items]).

The questionnaire items were rated using a 3-point Likert scale (agree, disagree, and no idea). For each correct answer, one score and for

wrong answers or do not know, zero scores were assigned. The knowledge scores ranged from 0 to 45. Content validity of the questionnaire was established by a panel of experts and its reliability was confirmed after performing a pilot study on 30 cases using Kuder-Richardson coefficient (α=0.76).

The study was conducted in two stages. In the first stage, the educational intervention was implemented at the selected centers based on SHEP model in the form of workshops during two 4-hour sessions (a total of eight hours) for 12 health volunteers by the researcher. In the first session, a pre-test was performed by using the questionnaire of knowledge assessment; then, education and communication skills were reviewed, and the educational materials were presented in accordance with the prepared training packages. The content of the educational package included familiarity with the general structure of the breast, familiarity with a variety of breast tumors and their characteristics, familiarity with the risk factors, signs, and symptoms of breast cancer, different methods of breast screening, and teaching breast self-examination in the form of images and posters (4, 5).

At the end of the first session of the workshop, each health volunteer was given a package of breast cancer education; the health volunteers were asked to practice presenting the educational package based on the principles in the one-week interval between the first and second sessions of the workshop. In the second session of the workshop, the health volunteers practiced how to hold the class; in doing so, the contents were presented by each health volunteer, and other health volunteers evaluated their presentation by mentioning the limitation and strength points.

At the end of the second session of the workshop, a post-test was taken from the volunteers. Finally, six health volunteers who obtained the highest scores from the post-test were selected as matched trainers. At the second center, the remaining six health volunteers received the routine training. In the second phase, the health volunteers of the experimental and control groups held the training sessions in one hour for the target audience based on SHEP model and the conventional method, respectively (each health volunteer trained 10 target audiences). The questionnaire was completed by the audiences before the intervention, as well as immediately and four weeks after the intervention.

Before initiating the study, we obtained the approval of the Ethics Committee of Mashhad University of Medical Sciences, Mashhad, Iran. In addition, written consent was obtained from the participants. It was explained to the participants that they could withdraw from the study at any time and they were assured of confidentiality of the data.

Statistical analysis

After completion of the data collection process, the data was controlled, coded, and entered into SPSS, version 20. At first, to assess the normality of the data, Kolmogorov-Smirnov test with Lilliefors Correction was used. To further analyze the data, Mann-Whitney U test (to compare the means between the test and control groups), Friedman (to compare the means before and after the intervention in a group), as well as Chi-squared and Fisher's exact tests (to compare the two groups in terms of demographic variables) were run. P-value less than 0.05 was considered statistically significant.

Results

This study was performed with 12 health volunteers (six volunteers in each of the experimental and control groups) and 120 women referred to Mashhad health centers (60 women in each of the experimental and control groups); there was no sample attrition.

The health volunteers were similar in terms of all the personal variables, and there was no significant difference between the two groups in this regard (Table 1; P>0.05). The mean lengths of collaboration of the health volunteers in the experimental and control groups were 5.67±4.45 and 6.67±3.72 years, respectively (P=0.682). Among the women covered by the health centers, Mann-Whitney U test showed significant differences between the two groups in terms of age distribution (P=0.05). We found that 43.3% and 71.7% of the participants in the experimental and control groups had prior knowledge of screening methods, respectively

Table 1. Personal characteristics of the health volunteers in both experimental and control groups

Variable		Experimental group N (%)	Control group N (%)	r	P-value
Age (year)	20-30	0	0	28.-1= Z	0.240
	31-39	2(33.3%)	3(50%)		
	40-49	1(16.7%)	3(50%)		
	≥50	3(50%)	0		
Educational level	High school	2(33.3%)	0	exact test=2.68	0.455
	Diploma	4(66.7%)	5(83.3%)		
	College	0	1(16.7%)		
History of clinical examination	No	5(83.3%)	1(16.7%)	-	-
	Yes	5(83.3%)	1(16.7%)		
History of mammography	No	6(100%)	5(83.3%)	Fisher's exact test	0.999
	Yes	0	1(16.7%)		
Individual history of breast diseases	No	5(83.3%)	6(100%)	Fisher's exact test	0.999
	Yes	1(16.7%)	0		
Family history of breast diseases	No	6(100%)	6(100%)	-	-
	Yes	0	0		
Using contraceptive methods	No	3(50%)	0	Fisher's exact test	0.182
	Yes	3(50%)	6(100%)		
History of self-assessment	No	1(16.7%)	0	Fisher's exact test	0.999
	Yes	5(83.3%)	6(100%)		
Relationship with a cancer patient	No	2(33.3%)	3(50%)	Fisher's exact test	0.999
	Yes	4(66.7%)	3(50%)		

(P=0.002). Moreover, 38.3% of women in the experimental and control groups had prior history of clinical breast examination. Moreover, 23.3% and 16.7% of women in the experimental and control groups had previous history of mammography screening (P=0.361). Personal information of the two groups is presented in tables 1 and 2.

The mean total scores of knowledge among the health volunteers in the experimental and

Table 2. Comparison of personal characteristics of the women covered by health centers in both experimental and control groups

Variables		Experimental group N (%)	Control group N (%)	r	P-value
Age (year)	20-30	8(13.3%)	16(26.7%)	Z=-1.96	0.05*
	31-39	20(33.3%)	20(33.3%)		
	40-49	18(30.1%)	16(26.7%)		
	≥50	14(23.3%)	8(13.3%)		
Educational level	Elementary	13(21.7%)	6(10%)	Exact test=-4.05	0.409
	Junior high school	10(16.7%)	12(20%)		
	Senior high school	2(3.3%)	8(8.3%)		
	Diploma	21(35%)	23(38.3%)		
	College	14(23.3%)	14(23.3%)		
Job	Housewife	30(83.3%)	55(91.7%)	Exact test=	0.146
	Employed	8(13.3%)	2(3.3%)		
	Other	2(3.3%)	3(5%)		
Marital status	Single	2(3.3%)	3(5%)	Exact test=1.21	0.757
	Married	55(91.7%)	56(93.3%)		
	Widow	3(5%)	1(1.7%)		
Individual history of breast diseases	No	51(85%)	48(80%)	Fisher's exact test= 0.52	0.471
	Yes	9(15%)	12(20)		

Continuation of Table 2.					
Family history of breast diseases	No Yes	49(81.7%) 11(18.3%)	54(90%) 6(10%)	Fisher's exact test=1.71	0.191
Using contraceptive methods	No Yes	25(41.7%) 35(38.3%)	25(41.7%) 35(38.3%)	Fisher's exact test=0.00	0.999
History of self-examination	No Yes	38(63.3%) 22(36.7%)	32(38.3%) 28(46.7%)	Fisher's exact test=1.23	0.002**

Table 3. Mean total score of knowledge assessment among women covered by Mashhad health centers between the experimental and control groups

		Group		**r**	**P-value**
		Experimental (n=60)	**Experimental (n=60)**		
		Mean±SD	**Mean±SD**		
Total score of knowledge	Before the study	16.52±5.94	16.53±5.97	Z=-1.35	0.723
	Immediately after the intervention	43.13±2.49	23.28±4.91	Z=-9.47	<0.0001**
	One month after the intervention	42.38±2.57	22.83±4.63	Z=-9.46	<0.0001**
r		Chi-square=103.42	Chi-square=60.3		
P-value		<0.0001**	<0.0001**		

control groups were 20±1.26 and 22.5±2.59, respectively, which were not significantly different (P=0.07). To compare mean scores of knowledge among women covered by health centers between the experimental and control groups in three time points (before training, as well as immediately and one month after training), Mann-Whitney test was used. Friedman test was performed due to non-normal distribution of the data, the results of which are exhibited in Table 3. Comparison of the two groups in terms of mean total score of knowledge according to time is shown in Figure 1. In the experimental group, the mean score of each dimension of knowledge significantly changed after the intervention compared to pre-intervention (P<0.0001). In the control group, the score of knowledge about breast cancer was not significantly different pre- and post-intervention (P=0.05), but mean score of other aspects of knowledge significantly differed after the intervention in comparison with before the intervention (P<0.0001). The results are demonstrated in Table 4.

Discussion

This study was performed to determine the effect of education based on comprehensive SHEP model on breast cancer screening knowledge in women covered by Mashhad health centers. The results showed that before the study, the knowledge of women about breast cancer and its aspects in both experimental and control groups was limited, which is in line with the results of the study by Abedzadeh et al. (2001) entitled as "Evaluation of knowledge, attitude, and performance of women referred to the health care clinics in Kashan towards breast cancer and methods of detection in 2001" (18), and the study by Mazloumi et al. (2005) entitled as" the impact of health education on knowledge, attitude, and practice of female teachers in secondary schools in Yazd about breast cancer" (19), as well as the study by Kashfi et al. (2009) entitled as "the effect of breast self-evaluation on knowledge, attitude, and practice of women covered by the health centers of Nourabad Mamasani in 2009" (20).

In our study, after the intervention, mean scores of knowledge significantly increased in both groups, which is quite consistent with the findings of some other studies on the effect of education on health knowledge and showed that educational interventions can significantly improve women's knowledge (19, 21). Since the health volunteers and women covered by health centers in both groups were initially similar in terms of personal characteristics and mean score of knowledge, and educational content was similar in both groups, the difference is probably associated with the intervention method. In our study, SHEP-based intervention

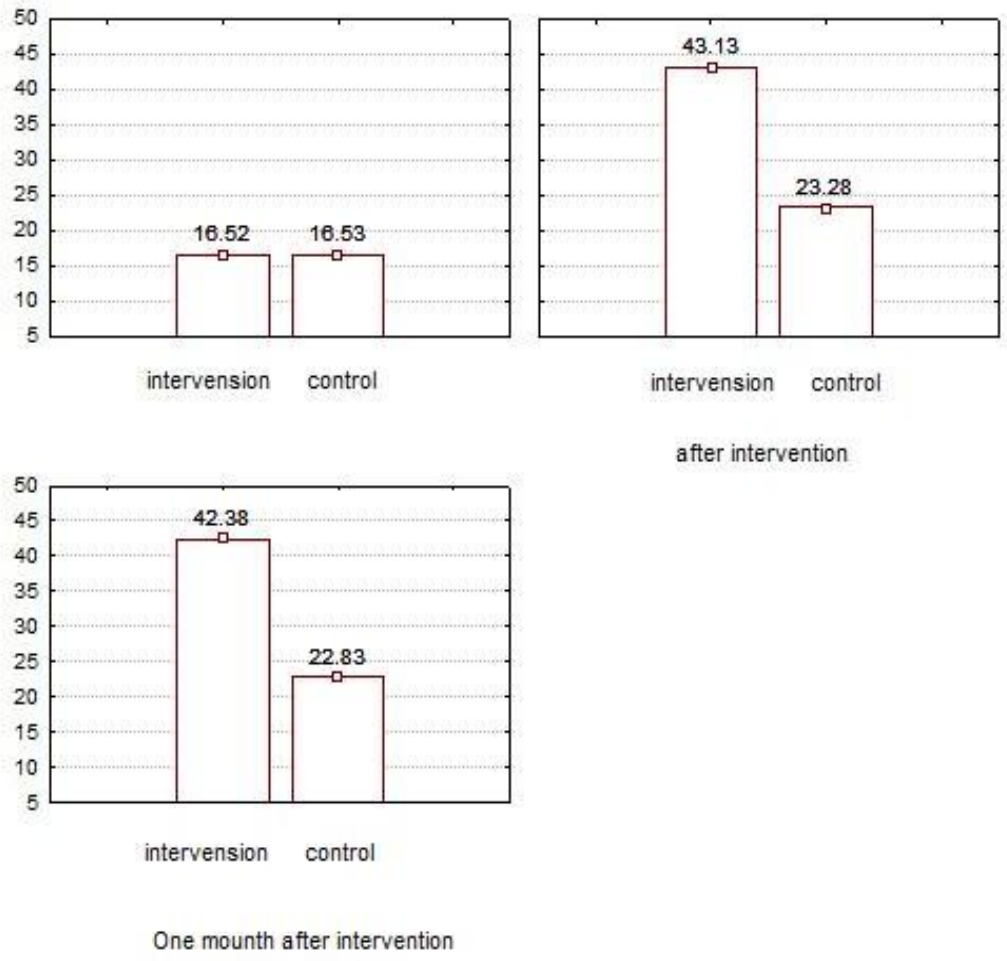

Figure 1. Comparison of the mean total scores of knowledge among women covered by Mashhad health centers between the experimental and control groups

was performed in the case group. SHEP model is a combination of educating matched trainers or health trainers and use of visual tools.

Soufizadeh et al. (2013) in the study entitled as "The application of SHEP model in education of diabetes prevention and control among female students of the Technical University of Khorramabad" found that before the intervention, there was no difference in knowledge score between experimental and control groups, but after the intervention, a significant increase was observed in knowledge score of the audience in experimental group compared to control group (14). Their results with a difference in educational objective were consistent with our findings and indicated better and more effective learning of students by SHEP model. This model is based on the philosophy of knowledge management. An important aspect of knowledge management is appropriate translation and transfer of knowledge.

Educational packages in SHEP model are relied on images (75% is visual), which helps with remembering the content and making the information understandable for audience of all ages and literacy levels (13). Akbarzadeh et al. (2008) in their study entitled as "Comparison of the effect of teaching breast self-examination by peers and health staff on knowledge and attitude of the students" (15), Malak and Dicle (2007) in the study entitled as " Effectiveness of

Table 4. Mean score of all aspects of knowledge among women covered by Mashhad health centers in both experimental and control groups

		Group		r	P-value
		Experimental (n=60)	Control (n=60)		
		Mean±SD	Mean±SD		
Score of knowledge about breast cancer	Before the intervention	2.85±1.09	3.05±0.7	Z=-0.57	0.556
	Immediately after the intervention	4	3.13±0.72	Z=-7.73	<0.0001**
	One month after the intervention	4	3.13±0.74	Z=-7.59	<0.0001**
r		Chi-square=80	Chi-square=0.86	5.52±1.29	
P-value		<0.0001**	0.651		
Score of knowledge about the risk factors for breast cancer	Before the study	4.48±2.6	4.72±2.31	Z=-0.61	0.541
	Immediately after the intervention	14.05±1	6.78±2.53	Z=-9.49	<0.0001**
	One month after the intervention	13.62±1.1	6.6±2.42	Z=-9.46	<0.0001**
r		Chi-square=106.67	Chi-square=22.92		
P-value		<0.0001**	<0.0001**		
Score of knowledge about the signs and symptoms of breast cancer	Before the intervention	3.2±2.17	3.2±2.15	Z=-0.13	0.895
	Immediately after the intervention	8.6±1.65	5.52±1.29	Z=-9.09	<0.0001**
	One month after the intervention	8.6±1.65	5.52±1.29	Z=-9.09	<0.0001**
r		Chi-square=107.23	Chi-square=56.21		
P-value		<0.0001**	<0.0001**		
Score of knowledge about breast cancer screening	Before the intervention	5.98±2.95	5.53±2.4	t=0.91	0.362
	Immediately after the intervention	16.32±0.95	7.95±1.96	Z=-9.58	<0.0001**
	One month after the intervention	16.17±0.9	7.58±1.85	Z=-9.56	<0.0001**
r		Chi-square=109.39	Chi-square=49.62		
P-value		<0.0001**	<0.0001**		

BSE based on the model of matched coaches in female students in Turkey "(22), Malak and Baktash (2008) in the study entitled as "Determining the relationship of education by peer with social support and self-esteem on BSE and female students level of knowledge in Turkey" (23) found similar results and proposed that training through matched trainers is associated with higher knowledge scores in participants.

The strategy of SHEP model is training matched coaches by whom the educational content is presented to the specified audience. Training through matched coaches improves feelings, attitudes, and expression of values; furthermore, this model facilitates free discussion of administrative barriers to breast cancer screening and resolving obstacles (24).

However, Karayurt et al. (2007) undertook a study in Izmir, Turkey, on 500 female students living in dormitory to compare the effect of training by matched coaches and group education on knowledge, practice, and belief of students. They did not show any difference between training by matched coaches and group education (25). This difference despite the

education by matched coaches and using visual tools may be due to the discrepancy in study population. In that study, the study population was students, while in the current study women referred to health centers. Use of visual tools is a beneficial way to deliver health messages to those who have limited health literacy (11).

The strengths of our study are the randomized selection of the subjects and performing the study in two separate centers with acceptable distance from one another, so that there was no possibility of information exchange, which in turn, increases the generalizability of the results. The limitation of the study was selection of health centers trough convenience sampling; thus, future studies are recommended to select health centers based on simple random sampling.

Conclusion

Although breast cancer is the most common type of cancer among Iranian women, women's knowledge regarding breast cancer screening methods is poor, leading to disease diagnosis in advanced stages. To improve the knowledge of women, the health information should be provided according to culture and literacy level in an understandable manner. In this study, the educational content improved the subjects' level of health literacy. The advantage of our educational tool was its applicability in any place with minimal training facilities and low costs. Hence, this training model and educational tool can be employed in all health and training centers. Our findings confirm the effectiveness of implementing educational interventions in increasing women's knowledge as to breast cancer screening. Since the present study was the first attempt in Iran to use SHEP model for training breast cancer screening and the educational tool developed in this study was designed for the first time in Iran, further studies are recommended on this issue to improve generalizability of our findings.

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Conflicts of Interest

None declared.

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