

## RESEARCH COMMUNICATION

# Effects of Education Based on the Health Belief Model on Screening Behavior in High Risk Women for Breast Cancer, Tehran, Iran

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### Abstract

**Background:** Breast cancer is the most common malignancy in women. Early diagnosis allows efficient treatment and increases survival, but the efficacy of breast self examination (BSE) is not sufficiently well established. The American Cancer Society aims to give women the opportunity to recognize the utility, limitations and adverse effects of breast cancer screening through education models based on psychological theories. With the Health Belief Model, people's health perceptions and attitudes influence their practices, for example with screening. **Objective:** The purpose of this randomized controlled clinical trial was to determine the effect of education based on this model on breast cancer screening in high risk Iranian women. **Materials and Methods:** Participants were women with a family history of breast cancer (mother, sister, and daughter). After explanation of the study objectives to participants, they were recruited on obtaining oral consent and each filled out the study questionnaire based on the Health Belief Model. Allocation was into two groups by computerized randomization, control and intervention, receiving education on breast cancer screening. Perceived susceptibility to and seriousness of breast cancer, perceived usefulness of and barriers to BSE, clinical breast examination, and mammography, and self-efficacy in the ability to perform these, were assessed, with comparison of scores for BSE practice before and after education and doing mammography and clinical examination by a physician in intervention and control group. **Results:** The mean age was  $37.8 \pm 11.7$  (range 19-60). The mean rank in the intervention group significantly differed before and after the education, but except for "perceived threat" and "perceived usefulness of breast self examination", we did not find any significant differences from the control group. After educational sessions, breast self examination and clinical examination practice rates were elevated. **Conclusion:** Health education based on well known psychological theories for breast cancer screening should be extended to the entire populations in developing countries. In addition, we should pay attention to barriers to women undergoing mammography, such as costs, shame and accessibility, and increase the target population awareness and positive attitudes towards benefits of early breast cancer screening.

**Keywords:** Breast cancer - health belief model - high risk group - Iranian women

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### Introduction

Breast cancer is the most common malignancy among women (DeVita, 2008) and early diagnosis is obviously the effective way for saving patients and plays an essential role to improve prognosis (Yarbrough and Braden, 2001; Lu, 2001). Iranian women are not excepted from this rule, as it has the high prevalence rate in Iran with increasing trend along recent decade (Center for Disease Control and Prevention, Iran, 2007). The results from studies in Iran stated that incidence rate of breast cancer was 17.1 per 100,000 women that mean age was 51.3 years (Mousavi et al., 2008). Stage I was diagnosed in 18%, stage II in 57% and stage III in 25% of the cases (Mousavi et al., 2007), most of tumors occurring in women younger than

40 years old, with a five year survival rate was 75 % (Mousavi et al., 2006).

As primary preventions for most cancers such as breast cancer, step preliminary stages in general population, major efforts should be concentrate on secondary preventions such as breast cancer screening behaviors. On the other hand, as large proportion of breast cancers are preventable and a part of that is curable if diagnosed timely (McTiernan et al., 2008), so actions for cancer management and early screening with suitable planning consider as a rational way in order to achieve the cancer control in country. Meanwhile, according to burden of cancer treatment costs on the health system and society every appropriate prevention programming at primary or secondary level, can not only reduce the disabilities

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arising from breast cancer in patients, but also diminish physical, psychological and economical harms and consequent economical saving can be spent for society health promotion and more development (Center for Disease Control and Prevention, Iran, 2007).

The Cancer Society of America states that women should be given an opportunity to be familiarized with benefits, limitations and potential losses of regular screening and this opportunity can be given by education (Champion, 1999; Petro-Nustus and Mikhail, 2002; Lee, 2003).

Education based on psychological theories are able to impress the knowledge and attitude of people. One of these theoretical models is Health Belief Model that is one of the most commonly used theory in health education and health promotion. It was developed in 1950s in order to be more effective the medical screening programs (Glanz, 2002; U.S. Department of Health and Human Services, 2003). This educational model has been designated based on arousing people's motivation. Based on this model, perceptions and beliefs of people impress on their health behaviors. People will not change their unhealthy behaviors unless they believe that they are at risk, conversely, if they believe are not at risk or have a low risk of susceptibility for a disease, risky behaviors tend to continue (Glanz et al., 2002).

This model has been used in several studies (Foxall et al., 1998; Yarbrough and Braden, 2001; Boxwala and Bridgemohan, 2010, Noroozi et al., 2010) and has made the perceptual framework for breast cancer screening especially in mammography and breast self examination (Lu, 2001; Avci and Gozum, 2009; Gözümlü et al., 2010).

Based on this model, women should believe that they are at risk (perceived susceptibility), then realize the severity of disease (perceived seriousness), with positive events, people or things which move them to change behaviors (cues to action), believe usefulness and feasibility of preventive programs (perceived benefit) and evaluate the obstacles and inhibitors less expensive and dangerous than their benefits (perceived barriers) (Glanz et al., 2002). Indeed a woman needs to believe the usefulness of BSE, CBE and mammography outweigh the consequences of their harms to conduct the screening behaviors (CDC, 2004).

Considering the importance of matter and variation of demographic characteristics of patients in Shohada-E-Tajrish Hospital as one of the great referral cancer centers in Tehran, we carried out this study to educate at risk women and evaluate our interventions. The main goal was to educate at risk women to increase their knowledge on early detection for breast cancer and improve their beliefs and to increase the use of cancer early diagnosis which are available in Tehran. The special objective was to determine the effect of education based on health belief model on breast cancer screening in at risk women.

## Materials and Methods

### *Participants and setting*

All participants were recruited from the first degree female relatives of patients with diagnosed breast cancer

referring to Shohada-e-Tajrish hospital. There is one of the great educational medical centers in north of Tehran. We selected this center because of high variation of socio-demographic characteristics of patients and large number of patients with breast cancer seeking for treatments. At first, researchers stated the study objectives to the patients and asked them to introduce us one of their first degree female relatives (mother, sister, daughter) if they had, who we considered as a high risk person exposes to breast cancer. Then some patients introduced their first female relatives. We selected women who were able to read, write and realizing the Persian sentences, have not been diagnosed for any kind of cancer and residents of Tehran for their convenience to attending the educational classes (if they were allocated in education group). After obtaining oral consent from participants, researchers clarified the main objectives of the study and reminded them that they might be allocated in the education group or control group.

### *Ethical considerations*

In order to reduce the conflict of interest, they were allowed to give up the study whenever they could not continue or were free to refuse the participation irrespective of their patient treatment process. Moreover, researchers reassured them all collected data will be confidential and their identity would be kept anonymous.

### *Sample size and data collection*

Because of the high prevalence of breast cancer in Iran like many other countries and according to the power of study 80%, confidence interval 95% and considering the drop out of participants at least 10%, the sample size was calculated 100 totally and using the randomized computerization 50 people were allocated in two intervention and control arms of study.

A self administered questionnaire was used based on Champion's revised Health Belief Model Scale (CHBMS) developed by Champion (1993). With the exception of socio-demographic and knowledge questions, all of questionnaire phrases for the main variables, were evaluated as 5-point Likert Scale format with point 1 (strongly disagree) and point 5 (strongly agree).

The section one was developed to get the socio-demographic information, section 2 concluded to obtain knowledge about breast cancer causes and risk factors, signs and symptoms, available breast screening methods and the appropriate time for BSE and mammography. Furthermore, cues to action were measured by phrases such as: family history of breast cancer, media, advice from relatives, friends or health care providers, and having symptoms like, painless mass, bloody discharge, skin signs or breast pain. Also they were asked: "have you undergone BES, CBE or mammography?" and "have you faced by a breast problem in your lifetime?", and if response was positive, have they been visited by a physician for their breast problem?

The main dependent variables concluded as: Perceived susceptibility to and seriousness of breast cancer, perceived usefulness of and barriers to breast self examination (BSE), perceived usefulness of and barriers to CBE, perceived usefulness of and barriers to conduct

mammography, self- efficacy in the ability to perform BSE, CBE and mammography, comparison the score of BSE before and after the educations and whether they conducted mammography and CBE in both groups.

However, this instrument was used formerly in a few studies in Iran and found to be valid and reliable for measuring Health Belief Model variables. (Tahvildari et al., 1999; Karimi et al., 2008; Tavafian et al., 2009), but we used the original version of the scale (Champion, 1993) and translated it to Persian using back ward –forward technique by experts in health education and English language again .The reliability coefficient for all subscale was calculated using Cronbach’s alpha that was more than 0.7 for each subscale. Furthermore, we added 6 questions for measuring BSE score of participants at first and second stages. Likewise, we asked all participants whether or not to do mammography or CBE in past 3 months ago.

*Two arms of study*

After selection of eligible participants and obtaining oral consent, the questionnaires were given and completed by themselves. Then, they were allocated in two groups by envelope randomization and 50 women allocated in each group. After preliminary data analysis of the first stage, we contacted to women in intervention group and they were asked to participate in the first session of educational classes. Every woman who was not able to attend at class was invited to another session unless she refused to participate. Each session was held in conference venue of Radiation Oncology Ward of Shohada-e-Tajrish Hospital by one researcher as the consistent educator and took about 60-90 minutes in a single session. Instructions were mainly presented based on question- answer method and lecture using posters, slides and films. Educational content was provided in accordance with HBM mostly to increasing knowledge about breast cancer causes, signs, severity and women’s susceptibility to this malignancy, but our main important part of instructions was to manage the existing threat and overcome to their fear by means of develop their self confidence by promotion of their ability to perform BSE, improve their positive beliefs towards breast screening with the accessible and effective methods such as BSE, CBE and mammography and the benefits of early breast cancer diagnosis. At the end of the classes we donated some education of BSE pamphlets and gifts to appreciate them and as the monthly reminder for BSE.

Women in control group did not get our educations but were authorized to get any information from health providers as routine care.

All participants were informed 3 months after ending the educations to answer the second series of questions but we submitted and got the questionnaires by post to avoid inconvenience.

*Data Analysis*

Data were analyzed using SPSS14 software and the level of significance was set at 0.05. At first, we analyzed initial data from all subjects using descriptive statistics. Then, sample was divided into two parts according to pre-intervention and after intervention. We used non-parametric tests such as Mann-Witney U and Wilcoxon

**Table 1. Demographic Characteristics of the Participants**

Variable	Mean(SD) N	%
Age	37 (11.7)	
Marital status		
Married	21	21%
Single	79	79%
Education Level		
Under diploma	32	32%
Diploma	41	41%
College	27	27%
History of breast problem		
No	72	72%
Yes	28	28%
-Has not gone	4	15%
-Has gone	24	85%
Menstrual status		
Pre menopause	75	75%
Post menopause	25	25%

**Table 2. The Main Mentioned Source of Subjects’ Information about Breast Cancer**

Source of education	N	%
Books	6	6%
Radio	3	3%
TV	41	41%
Friends	17	17%
Magazine	3	3%
Newspaper	3	3%
Health care providers	21	21%
Internet	2	2%
None	4	4%
Total	100	100%

Signed Ranks test and also chi -square test to compare health belief model constructs between women in two groups.

**Results**

Demographic characteristics of participants are demonstrated in Table 1. The youngest participant was 19 and the oldest was 60 years old. Most of women had Fars ethnicity that it did not have any significant difference between two groups. Out of 100 women responded our questions, 72% did not mention any benign problem in breast, whereas 28% did that 85% of them had visited a physician for their problem. The most common of their problem was the breast pain.

In this study, 61% of all responders did not know about exact time of monthly BSE, 48% stated they were unaware from appropriate time for the first mammography before educations. Despite all of them were at high risk women and ad a family history of breast cancer, most of them (more than 70%) had not performed regular BSE in past year. They stated that the main motivation for doing BSE and CBE (cues to actions) was finding a painless mass (84%) in breast or bloody discharge (79%). Out of all responders, 57% had not annual planning for doing mammography. Table 2 indicates that the most usual sources of the responders’ information about breast diseases were television (41%) and health care providers (21%).

**Table 3. Comparison of Mean Rank of Health Belief Model Variables Among Intervention and Control Groups**

Variable		Group					
		Intervention			Control		
		Mean	SD	P *	Mean	SD	P*
Knowledge	Before	10.5	2.31	P<0.0001	6.76	2.37	P=0.58
	After	14.3	2.26		7.02	1.99	
Susceptibility	Before	20.3	1.81	P<0.0001	21.00	1.70	P=0.62
	After	23.5	1.05		21.42	2.90	
Seriousness	Before	9.3	2.08	P<0.0001	8.82	1.95	P<0.0003*
	After	13.3	1.00		11.26	1.58	
Barriers of BSE	Before	13.6	3.4	P<0.0001	13.98	3.77	P=0.89
	After	16.9	2.66		14.22	3.32	
Benefit of BSE	Before	10.9	1.65	P<0.0001	11.10	1.66	P<0.0002*
	After	14.88	0.56		13.49	1.59	
Barriers of clinical exam & mammography	Before	13.78	2.2	P<0.0001	12.94	2.76	P=0.93
	After	16.58	2.00		12.98	2.49	
Benefits clinical exam & mammography	Before	11.14	2.48	P<0.0001	12.76	2.24	P=0.1
	After	15.54	1.48		12.94	2.09	
Self efficacy	Before	10.5	2.09	P<0.0001	12.24	3.47	P=0.44
	After	14.7	2.06		12.18	3.12	
Score of BSE	Before	2.99	1.2	P<0.0001	2.68	1.09	P=0.22
	After	5.22	0.67		2.82	1.04	

\*significant; \*Wilcoxon-signed rank test

**Table 4. Comparison of Breast Screening Behaviors in Women of Two Groups**

Variable	Group				P value*
	Experiment		Control		
	N	%	N	%	
BSE	41	82%	31	62%	P=0.021
Clinical exam	20	40%	9	18%	P=0.014
Mammography	18	36%	15	30%	P=0.52

\*Q- square test

**Table 5. Comparison of Screening Behaviors Among Women Less and more than 40 Year Old**

Screening behavior	BSE		Clinical exam		Mammography		
	Age	yes	no	yes	no	yes	no
Less than 40	43	12	10	45	11	44	
40 and more	29	16	19	26	22	23	
p.value & test	q 2	p=0.17	q 2	p=0.014	q 2	p=0.003	

We analyzed the main variables before and after interventions and compared them in two arms of study.

Further analysis of the data carried out to investigate about the relationship between the performance of breast screening and other studied variables. Table 3 demonstrates the main variables before and after educations in two groups. Surprisingly, all dependent variables show significant differences in intervention group, whereas, these results were not found in the control group except for two variables, perceived threat and perceived benefit of BSE. The mean total score of performing BSE for subjects in experiment arm was significantly more than mean total score before educations (2.99 v.s 5.22) whereas, in control arm the mean total score did not show significant difference (2.68 v.s 2.82).

After educations, we found that most women in experiment group (82%) had performed BSE at least for one time, 40% had been visited by a physician for breast clinical examination and 36% of them underwent a mammography.

The breast screening behaviors in women of two groups have been compared in Table 4 that indicate the significant differences for performing BSE and CBE, in contrast, it was not found for mammography conduction. We also found that breast self examination ( $x^2= 9.2$ ,  $P= 0.073$ ), clinical exam ( $x^2= 25.3$ ,  $P= 0.88$ ) and mammography ( $x^2= 5.6$ ,  $P= 0.12$ ) were not related to education level. Meanwhile, we did not find any relation between screening behaviors and marital status and history of breast problem in each arms of study, in contrast there was a significant difference for variable of age and breast screening (Table 5), as it demonstrates clinical examination and mammography rate in women aged 40 and more occurred significant higher than women younger than 40.

## Discussion

Considering the maximum score 17 for knowledge variable, none of participants got this point, however, mean scores indicated significant differences among women in two groups before and after interventions.

Furthermore, significant differences for main dependent variables among participants in experiment group indicate effectual educations, whereas, we found a noticeable difference for seriousness and benefit of BSE even in control arm. Similarly, effectiveness of educations even in short term and group educations has been reported to improve knowledge and attitudes regarding breast cancer and personal evaluation of severity and physical outcomes of disease has a considerably effect on the perceived severity (Tahvildari et al., 1999; Ahmad et al., 2004; Karimi et al., 2008) .

On the other hand, many responders (47%) stated that they did not know how to do BSE and only 25% of the responders had a regular monthly program for BSE performance. About 22% of women responded that BSE and CBE are embarrassing or consume too much time

behaviors. Tavafian et al., (2009) in a cross-sectional study in, Bandar Abbas Province in Iran found similar results that women who did not perform BSE stated that that regular BSE required too much time or it was difficult to remember to do BSE regularly. Cohen et al., (2005) and Cambula et al., (2008) found similar findings in their studies that indicated such obstacles for breast screening behaviors. Therefore, paying more attention to perceived benefit of screening with emphasizing on convenience, accessibility and low price of BSE and physical examination of breast versus treatment of advanced disease, should be always considered in educational interventions.

Even though women in experiment group acquired higher rate of BSE and clinical examination performance compared with women in control arm, but we did not find this finding for mammography. It may returns to perceived barriers for mammography which were found to have important role to impede women to do that, as the most main inhibitor factors were the relatively high price of (42%), lack of awareness about where to go for mammography (18%), fear from rays arising from mammography (11%) and pain (8%). A study by Fung et al., (1998) in Hong Kong showed that fear from the susceptibility to the breast cancer and barriers of BSE had related to refusing to doing BSE and mammography. So it is important that in women health promotion planning, barriers of breast screening should be detected and efforts should be concentrated on removing obstacles which are more feasible and easier. Moreover, feasibility, availability and accessibility of breast screening methods should be strongly considered for general population with extending health insurance coverage and accomplish free CBE and mammography programs for low income and hard to reach women.

We did not find any significant difference among women with history of breast problem and breast screening behaviors, likewise this finding was reported in another study in Iran (Montazeri et al., 2008 ) whereas findings of a few studies state that women who have history of breast malignancy in family, tend to show better awareness and functions and do more regular breast screening compared with the other women (Banayan et al., 2004; Karimi et al., 2008; Ceber et al., 2009). This finding indicates that as women had inadequate knowledge about their potential risk factor, they did not seek for early breast detection unless they see or feel an abnormal sign that may be a delayed symptom of disease. Regarding the low motivations for breast screening and low proportion of participants as the BSE performers substantiate this claim.

In our results there was not any noticeable difference between breast screening behaviors or other dependent variables and marital status or ethnicity , same to a few studies ' results (Tahvildari et al., 1999; Karimi et al., 2008) but some researchers found direct correlation between education level and HBM factors (Nahcivan and Secginli, 2007; Parsa and Kandiah, 2010) unlike our findings .

In contrast, as far as the subjects' age is rising, screening behaviors are improving that may suggest the women's awareness from relation of breast cancer high

incidence rate and aging likewise some study results (Nahcivan and Secginli, 2007; Ceber et al., 2009).

Meanwhile, higher degree of self-confidence had an effective role on screening practices in our study, as this factor accompanies with higher probability of perceived benefit of BSE and going for clinical breast examination and mammography and women who perceived more self-efficacy and fewer barriers were more likely to perform BSE. Some researchers found such results that indicted women who were more confident in their abilities to perform breast screening behaviors were more likely to engage in this matter (Mason and White, 2008; Ceber et al., 2009; Kara and Acikel, 2009; Satitvipawee et al., 2009; Tavafian et al., 2009).

Finally, television was the main source of health information for women, as in most developing countries mass media has the key role to increase awareness about breast cancer (Montazeri et al., 2008), so health policy makers should pay more attention to these connective channels as an effective and accessible path, especially for women and old people.

In conclusion, our general population of women are greedy to getting knowledge more about their health even if apply it less, but it is important that they should believe their health is the family and society health and besides the routine house works and children care, they must pay more attention to persevere and promote their health, that mostly is forgotten in many families and societies. Instruction opportunities should be created for women better than now and women's health educations should be more effective and objective prior the malignancy disseminates and opportunities loose.

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