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The effectiveness of a nurse-delivered breast health promotion program on breast cancer screening behaviours in non-adherent Turkish women: A randomized controlled trial

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ABSTRACT

Background: Few studies have investigated breast health programs to promote rates of having a mammography, clinical breast examination and breast self-examination among non-adherent Turkish women.
Objectives: To determine the effectiveness of a breast health promotion program on mammography and clinical breast examination use, breast self-examination frequency and proficiency (breast self-examination skills and lump detection), breast health knowledge and health beliefs about breast cancer screening in a sample of Turkish women.
Design: Experimental (pretest–posttest control group).
Setting: A community-based setting in Istanbul, Turkey.
Participants: 190 Non-adherent women (intervention group = 97, control group = 93) aged 41 and older, residing in Istanbul, Turkey.
Methods: The intervention group ($n = 97$) received a 120-min breast health promotion program based on health belief model including a breast health education, film, breast self-examination instruction, and a booklet, a calendar, a card designed specifically for the study. The control group ($n = 93$) received general information except breast health. Data were collected before the program, immediately after the program, and at 3- and 6-month post-program. The outcome measures are the mammography, clinical breast examination, and breast self-examination frequency, breast self-examination proficiency, breast health knowledge, and health beliefs (perceived susceptibility to breast cancer, benefits to mammography and breast self-examination, barriers of mammography and breast self-examination, confidence in performing breast self-examination).
Results: The breast health promotion program significantly increased breast self-examination frequency and proficiency and breast health knowledge. No significant differences existed in mammography and clinical breast examination rates between the two groups at 6 months. The program was effective in increasing perceived susceptibility to breast cancer, perceived benefits of mammography and breast self-examination, and confidence of breast self-examination. No significant difference was found between the two groups for perceived barriers to mammography.
Conclusions: The breast health promotion program was effective in increasing breast self-examination frequency and proficiency in a sample of Turkish women. In addition, it appears to be useful in raising the knowledge of breast health, enhancing confidence in performing breast self-examination, and increasing most health belief levels.

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What is already known about the topic?

- Turkish women have a higher risk of breast cancer death, partially because the disease is diagnosed at later stages.
- Breast cancer screening modalities are still under-utilized by the majority of Turkish women; under-utilization is partially related to lack of appropriate breast health programs.
- Various strategies separately or in combination have been used to improve mammography, clinical breast examination, and breast self-examination rates in the general population with varying degrees of success. In Turkey, many studies have examined the influence of interventions on breast self-examination frequency, but the effectiveness of these interventions in terms of BSE proficiency and frequency of mammography and CBE have not been confirmed.
- There is a substantial body of research that has failed to show any benefits of BSE and that also indicates that BSE may produce harm in the form of unnecessary biopsies for benign breast lumps. However, its potential as a method of early detection should be maximized if the procedure is to be performed proficiently.

What is the paper adds?

- A nurse-delivered breast health promotion program based on HBM and included breast health education, BSE instruction, and a booklet, a calendar, and a card designed specifically for the study was successful in promoting both BSE frequency and proficiency as means of skills and detection of lumps in non-adherent Turkish women aged 41 and older with middle income level.
- Breast health promotion program was also successful in increasing breast health knowledge and increasing perceived susceptibility to breast cancer, perceived benefits of mammography and breast self-examination, and confidence of breast self-examination. However, the program was not successful in decreasing perceived barriers to mammography and breast self-examination.
- A nurse-delivered breast health promotion program was not a strong enough intervention to increase mammography and clinical breast examination rates. Future research should consider cultural barriers to screening and strategies such as reduced cost mammograms, facilitated scheduling, and transportation to appointments. And breast health programmes should consider the health system infrastructure and the lack of access to available health care issues for Turkish women.

1. Introduction

Breast cancer is a major health concern and remains the most common malignancy in women worldwide (American Cancer Society, 2009; Khatcheressian et al., 2006). In Turkey, it is the most common type of cancer and the second leading cause of cancer death for women, with an incidence of 35.5 cases per 100,000 (Ministry of Health, 2005). Breast cancer incidence in Turkish women has increased three-fold in last decade, with an estimated 47,205 breast cancer deaths in 2009 (Ozmen, 2008).

Mammography, clinical breast examination (CBE), and breast self-examination (BSE) are recommended methods to detect early breast cancer in women (American Cancer Society, 2009; Khatcheressian et al., 2006). The effectiveness of mammography is well established and considered to be the most important and specific method of detecting breast cancer early. The BSE and CBE remain additional methods to detect breast cancer and represent noninvasive options. Related with BSE, there is consistent evidence that it has important limitations as a screening strategy for breast cancer (Semiglazov et al., 1993; Thomas et al., 2002). On the other hand, it is pointed that BSE instruction may raise breast cancer awareness and contribute to earlier identification and reporting of symptoms (Anderson and Jakesz, 2008). Moreover, BSE training and adherence is a gateway health promotion behaviour that gives women knowledge and sets for adherence to CBE and mammography screening guidelines later in life (Anderson et al., 2003; Secginli and Nahcivan, 2006a). Although mammography, CBE, and BSE assumed as screening behaviours are key to lowering mortality from breast cancer in women, screening modalities are still under-utilized by the majority of women (Allen and Bazargan-Hejazi, 2005; American Cancer Society, 2009; Hall et al., 2007; Han et al., 2009; Kim and Menon, 2009; Secginli and Nahcivan, 2006b).

Factors such as health beliefs and attitudes to breast cancer, breast cancer knowledge, access to a usual source of care, socio-economic status, level of education, health insurance coverage, family history of breast cancer, having a regular physician, and lack of physician recommendation have been linked with BSE and mammography use (Barr et al., 2001; Champion et al., 2003; Garza et al., 2005; Kim and Menon, 2009; Nahcivan and Secginli, 2007; Oliver-Vazquez et al., 2002; Secginli and Nahcivan, 2006b). In addition, cultural factors such as a fatalistic view toward cancer, perception of screening as unnecessary in the absence of symptoms, strong sense of modesty, placing a priority on the needs of their children, and the prohibiting Islamic rule of self-exposure in front of any man other than one's husband have also been linked with mammography, CBE, and BSE in the literature (Lu, 2001; Soskolne et al., 2007). Therefore, strategies to increase mammography, CBE, and BSE utilization must consider these variables.

Many interventions have been developed to increase mammography, CBE, and BSE rates. In general, significant increases in screening behaviours were reported in the studies (Champion et al., 2003, 2007; Coleman et al., 2003; Fry and Prentice-Dunn, 2006; Han et al., 2009; Janda et al., 2002; Legler et al., 2002; Luszczynska, 2004; Oliver-Vazquez et al., 2002; Reuben et al., 2002; Rimer et al., 2002; Roetzheim et al., 2004; Sørensen et al., 2005; Wood et al., 2002). In many studies aiming to promote breast health, BSE frequency has been the outcome used to measure increases in BSE practice and less attention has been given to BSE proficiency. Proficiency addresses the ability of a woman to use the correct tactile techniques or skills, and to detect abnormal breast tissue or lumps when they are present. Both frequency and proficiency are important aspects of BSE and measuring frequency of BSE without considering proficiency of skills used in the exam is less

value laden (Funke et al., 2008; Luszczynska, 2004; Mitchell et al., 2005; Pinto and Fuqua, 1991; Rao et al., 2005; Sørensen et al., 2005; Taylor, 2002; Wood et al., 2002).

In Turkey, BSE and mammography promotion efforts have been examined but women were usually asked only how often they perform BSE (Avci and Gozum, 2009; Budakoglu et al., 2007; Gursoy et al., 2009; Hacihasanoglu and Gozum, 2008; Karayurt et al., 2009). Evidence that evaluates the proficiency of BSE technique is lacking. The purpose of this study was to determine the effects of a breast health promotion (BHP) program on BSE frequency and proficiency (BSE skills and lump detection), and mammography and CBE use in a sample of Turkish women. The effects of the BHP program on breast health knowledge and health beliefs about breast cancer screening were also evaluated. The hypotheses were that women who received BHP program would exhibit (1) increased rates in mammography, CBE, BSE, and BSE proficiency; (2) increased levels of breast health knowledge, perceived susceptibility to breast cancer, confidence of BSE, and benefits of BSE and mammography; (3) decreased levels of perceived barriers to BSE and mammography.

2. Literature review

The effectiveness of interventions designed to increase uptake of breast cancer screening has been systematically reviewed by several researchers. Various strategies separately or in combination were used to improve mammography, CBE, and BSE rates in the general population with varying degrees of success. Overall, interventions showing significant effects in increasing breast cancer screening behaviours include physicians' recommendations, in-person counseling by a health care provider, tailored telephone counseling, individualized risk assessments, mass media campaigns, post cards and telephone reminders, letters of invitation, pamphlets, brochures, booklets, reminder cards such as shower cards, mini lump models, and video presentation (Allen and Bazargan-Hejazi, 2005; Avis et al., 2004; Bodurtha et al., 2009; Bonfill Cosp et al., 2001; Burgess et al., 2008; Champion et al., 2003, 2007; Hall et al., 2007; Janda et al., 2002; Lee et al., 2003; Luszczynska, 2004; Michielutte et al., 2005; Rao et al., 2005; Rimer et al., 2002; Sørensen et al., 2005; Taylor, 2002; Wood and Duffy, 2004; Wood et al., 2002). There was some evidence that costly strategies, such as a home visit and a letter of invitation, were not effective (Bonfill Cosp et al., 2001). Interventions designed to increase screening mammography among low-income women were more likely to be successful if they included access-enhancing interventions, such as the use of vouchers or mammography vans, and individual-directed approaches, such as one-on-one counseling or tailored messages (Bailey et al., 2005; Legler et al., 2002). Reuben et al. (2002) found that women offered access to on-site mammography and health education were significantly more likely to undergo mammography within 3 months than those offered health education only. Tailored telephone counseling, in-person counseling, physician letter, and combinations of telephone with letter and in-person with letter have also been shown to increase mammography adherence in two studies conducted with African-American women (Champion et al., 2003, 2007).

In a study of women in Hong Kong, those who had received video instruction on BSE and practiced lump detection in simulation models were more likely to perform BSE (Chan et al., 2007). Fry and Prentice-Dunn (2006) suggested that a multifaceted educational intervention on breast cancer can initiate adaptive coping reactions and decrease maladaptive reactions over a 3-month period. That intervention included an essay, lecture, video portraying young survivors of breast cancer, group discussions, self-test and instructions on performing BSE. Several studies found that the multifaceted, culturally sensitive breast cancer education program can have significant impact on the differences in knowledge and beliefs about breast cancer (Hall et al., 2005, 2007; Kim and Menon, 2009). Han et al. (2009) found that a 120-min, in-class education combined with follow-up counseling significantly increased mammography, CBE, and BSE rates at 6 months. However, no significant effect was found in breast cancer knowledge and beliefs after the intervention. Besides the strategies widely used in programs, it is reported that designing interventions in stimulating awareness through essential and accurate knowledge of breast cancer is important, because tailored education rather than general information were effective in changing attitudes and behaviours (Burgess et al., 2008; Chan et al., 2007; Fry and Prentice-Dunn, 2006; Garza et al., 2005; Oliver-Vazquez et al., 2002).

3. Methods

3.1. Design

An experimental pretest–posttest control group design was used. Participants were randomly assigned to an intervention group or control group. Participants in the intervention group received a breast health promotion (BHP) program. Control group participants received usual care from the health center. In Turkey, the health centers provide basic treatment, immunization, mother and child services, family planning, environmental health services, promote breastfeeding, monitor the growth of children, prevent and treat communicable diseases; and collect health-related statistical data (Savas et al., 2002). In Turkey, the health centers offer health education and counseling about cancer with a pamphlet and poster in only the national cancer week. And screening mammography, CBE and BSE are not offered as part of health care services in the health centers. Breast cancer screening activities are carried out through Cancer Early Diagnosis and Screening Centers (KETEMs) established by the Department of Cancer Control in Turkey. However, organized population-based screening program is not established and there are problems related to the general accessibility of the health care system and problems related with financial, human resources management, and organizing the KETEM's activities (Hatipoglu, 2007).

In the study, after the data collection ended at 6 months, the BHP program is implemented to women in the control

group. Outcome measures consisted of changes in the frequency of BSE, proficiency of BSE, frequency of mammography, frequency of CBE, changes in breast health knowledge, and in health beliefs.

3.2. Participants

Eligible women were 41 years of age and older, had not had a mammography or CBE within the previous 12 months, were not practicing regular BSE, and had no history of breast cancer. History of mammography, CBE, and BSE were determined by self-report. The study was conducted from January 2005, through April 2006, in a health center in Istanbul. The study sample included mothers of the students at a primary school near to the health center. In the health center, there was not a list of the women who receive health care to do sample selection. However, all of the women in the study receive health care from the health center. BHP was held in the school library where women could gather in a comfortable and trusted setting. All follow-ups were held in the health center. Names, addresses and telephone numbers of women aged 41 and older were acquired from the records of the school guidance center. Initial contacts were made with 365 women and 149 women were not eligible to participate in the study due no response to telephone calls or unwillingness to participate. In the study, 216 eligible participants were successfully recruited. A numbered list of names was made and used for random assignment of participants to intervention or control groups (the first woman went to the intervention group, the second to the control group, and so on).

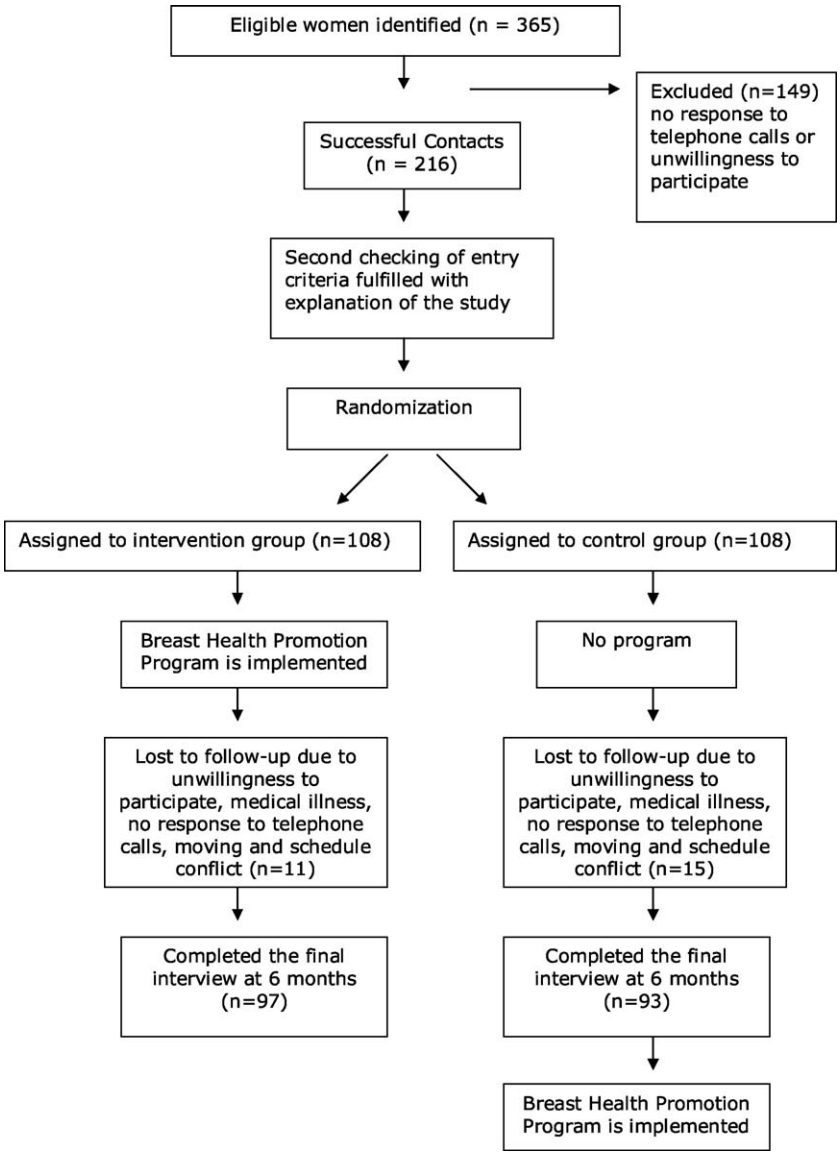

Fig. 1. Flow diagram of study participants.

A sample size of 98 women in each group would be needed to demonstrate a minimum significant improvement in breast cancer screening of 20%, a power of 80% with a 0.05 two-sided significance level. On the basis of a predicted attrition rate of 10%, our goal was to randomly assign 108 women in each group. Of those who initially agreed to participate in the study, 26 dropped out for a variety reasons (e.g. unwillingness to participate, medical illness, no response to telephone calls, moving and schedule conflict). In addition, one woman was excluded due to having breast cancer after the intervention began. As a result, 97 women in the intervention group and 93 women in the control group completed the final interview at 6 months (Fig. 1).

3.3. Procedures

All study activities were approved by the University Health Institutional Review Board. Ethical approval was received from the city provincial health director, the director of health center and the primary school from where the participants were recruited. Informed consent was obtained in a face-to-face interview from all participants before initiation of the study. The women took part in the study on a voluntary basis and did not know which group they had been assigned to until the intervention session began.

An introductory letter explaining the purpose of the study, and a questionnaire including eligibility criteria was sent to the women identified from the school guidance records. The letters were collected in 2 weeks and reviewed for the initial eligibility. The researcher then called the women to reconfirm eligibility and explain the study. Forty-three women were not able to be reached by letter and these women were contacted by phone. Then, the BHP program was given to women in the intervention group after the pretest questionnaires were administered. At the conclusion of the BHP program, the women were administered the posttest questionnaires. All participants were provided with drinks and snacks and were not paid for their participation. Approximately 3 and 6 months after the BHP program, each participant was called and set up a time to meet in the health center, to complete the follow-up surveys.

3.4. The breast health promotion program

The BHP program aims to promote breast health knowledge and beliefs conducive to improve BSE, CBE, and mammography behaviours. The first author presented the program that included a breast health education (teaching session and film), BSE instruction, and a booklet, a calendar, a card designed specifically for the study.

Several studies have shown that interventions which incorporated components to address health beliefs significantly increased breast cancer screening rates (Champion et al., 2000, 2003, 2007; Garza et al., 2005; Hall et al., 2005; Sohl and Moyer, 2007). In this study, the health belief model (HBM) was used to develop educational interventions in a BHP program designed to promote breast cancer screening behaviours (Fig. 2). The HBM constructs used were perceived susceptibility, perceived benefits, perceived barriers, and confidence. These constructs were reported to be strong predictors of BSE and mammography in prior studies (Champion and Scott, 1997; Garza et al., 2005; Nahcivan and Secginli, 2007; Norman and Brain, 2005; Secginli and Nahcivan, 2006b). The perceived seriousness of disease, which is another construct of HBM, was not assessed in the study. It was often excluded because most researchers assumed that women would perceive breast cancer as a serious disease (Champion, 1993; Fung, 1998; Nahcivan and Secginli, 2007).

According to the model, practicing BSE and having mammography is more likely if a woman feels susceptible to breast cancer, perceives more benefits than barriers to the behaviours such as BSE and mammography. The model also suggests that, in addition to the health beliefs, sociodemographic background and knowledge are related with increasing the chances of performing certain behaviour (Mikhail, 1994; Rosenstock, 1965).

Health education: The health education consisted of a teaching session followed by a film. A 35-min teaching session was conducted with small groups of five to eight women using a flip chart. The session included information on breast anatomy, incidence, mortality, risk factors for breast cancer development, breast changes, BSE, CBE, and mammography, the importance of early detection of breast cancer and treatment options of breast cancer, and messages related to susceptibility to breast cancer,

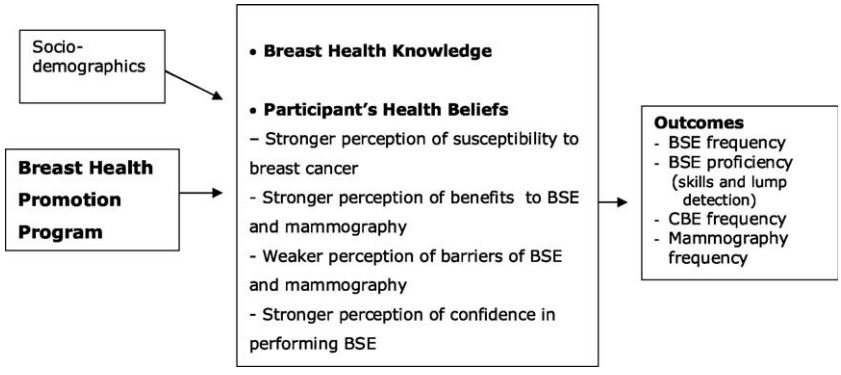

Fig. 2. Conceptual framework of the constructs of the health belief model: perceptions of susceptibility, benefits, barriers, and confidence.

confidence for BSE, the perceived benefits and barriers to BSE, and the perceived benefits and barriers to mammography, and access to screening services. The flip chart had pages with graphics and the typeface at least 20–24 points. Therefore, the participants could look at the graphics while the educator read the written message. At the end of the session, the researcher reviewed the major themes of the session and women were encouraged to ask questions about having mammography and CBE, and practicing BSE. The addresses and telephone numbers of the appropriate breast health resources where women have a mammography and CBE in the study area were distributed.

In a ~~15-min film,~~ The English version of MammaCare Corporation BSE film titled, "Instructions for Breast Self-Examination" that provided BSE instruction was viewed. In the film, the BSE was simplified by diagrams, which highlighted the area of breast to be covered. Simple instructions were given on how to move the fingers over the breast; and which parts of the fingers should be used. The instructor translated all spoken information from English to Turkish.

BSE instruction: The individual BSE instruction (15 min) was held in a separate room that was quiet, private and free from interruption. The content of this session included building confidence to complete all steps of BSE, observation of a researcher performing BSE, silicon breast model exercises, and followed by feedback. The breast model used is a standard size five lumps version available from Health Edco, WRS Groups Ltd., Waco, TX, USA. The researcher demonstrated proper palpation using the breast model. Participants then practiced the skills on the breast model with corrective feedback and reinforcement given from the researcher. Then, each woman was required to demonstrate BSE and asked to find the lumps in the model. The instruction was repeated until all participants demonstrated proficient BSE skills.

Booklet: The booklet is a 27-page booklet entitled "Breast Cancer: Being Healthy is in Your Hands" and includes same contents with the health education that focused on the importance of mammography, CBE, and BSE. All participants were given a booklet as reminders for BSE practice.

Calendar: The calendar entitled "Three Steps for *Breast Health*" is an educational calendar designed to address key points about BSE, CBE, and mammography. The calendar provides remembering the right days of performing BSE as the women can easily draw attention on the suitable days of practicing BSE.

Card: The BSE card was a one page, color card and titled "*Steps to Breast Self-Examination*" was based on the card obtained from Susan G. Komen Breast Cancer Foundation (2007). It provides an example of the correct method for performing a BSE and was designed to pictorially depict the procedure for completing the BSE that gave directions for performing BSE in one side. In other side, the addresses and telephone numbers of the appropriate breast health resources in the study area were depicted. The card was designed not only for improving recall of the correct BSE technique but as a cue to action since it could be positioned permanently in a place where the woman was likely to perform her self-examination.

3.5. Instruments

Five tools were used for data collection in this study:

(1) The demographic data questionnaire obtained information about the participants' socio-demographic characteristics (age, current marital status, years of education, employment status, income level, having children, length of residence in Istanbul, and health insurance coverage), and other factors (having knowledge of breast cancer, BSE, and mammography, having a family history of breast cancer, gynaecologist as a regular physician).

(2) The follow-up questionnaire was designed to assess the primary outcomes of the study which were obtaining mammography, CBE, and BSE in the follow-up period (6 months). Data regarding mammography use were collected via self-report. The participants were asked if they ever had a mammography and CBE since the BHP program on (the date of the program)?" Frequency of BSE was assessed by asking each participant to identify the number of times BSE was practiced in the 3-month post-intervention period. A woman who performed at least three BSEs was categorized as practicing "regular BSE", and a woman who performed less than three BSEs was categorized as practicing "irregular BSE".

(3) Breast Self-Examination Proficiency Rating Instrument (BSEPRI) was used to measure BSE proficiency (skills and lump detection). Developed by Wood (1994), it is a checklist with ten items measuring BSE inspection and palpation skills as the subject demonstrates BSE on a simulated breast model embedded with five lumps. The BSE skill scores are formed by summing the number of correct responses then converting that score to 100. For the lump detection skill, participants were asked to identify the number of breast lumps in the model, and a point was given for each lump found during BSE palpation. The BSE proficiency was measured at 3- and 6-month post-intervention.

(4) Champion's Health Belief Model Scale (CHBMS) of breast cancer screening was used to measure health beliefs of susceptibility (5 items), benefits of BSE (6 items), benefits of mammography (6 items), barriers to BSE (6 items), barriers to mammography (5 items), and confidence (11 items) by using five-point Likert responses. The CHMBS, developed by Champion (1993) was adapted for Turkish women by Secginli and Nahcivan (2004). Higher scores reflect a higher degree of health beliefs. In this sample, Cronbach alpha for internal consistency ranged from 0.73 to 0.88, indicating good levels of internal consistency. Health beliefs were assessed at baseline and 6-month post-intervention.

(5) The breast health knowledge (BHK) form was used to measure knowledge about breast cancer. The 22-item form was based on common knowledge of breast cancer risk factors, symptoms, and screening practices and composed specifically for this study based on an extensive review of the literature. All the items were true–false or do not know response. To obtain an

overall knowledge score, one point is added for each correct response and with scores ranging from 0 to 22. A high score is associated with greater knowledge. The instrument was pilot tested for comprehension with a sample of 15 women that was not included in the study sample. On average, the participants were able to complete the instrument in less than 10 min. For the current study, the Kuder–Richardson reliability was 0.79. The BHK was assessed at baseline, immediate post, and 3- and 6-month follow-up period.

3.6. Statistical analysis

The data were analyzed by using SPSS, version 11. Descriptive statistics were used to assess the distribution of socio-demographic characteristics of the intervention and control groups. To test homogeneity of the sample, Chi-square tests for categorical data and independent *t*-tests for continuous data were used. And chi-square test, *t*-test, and Mann–Whitney *U*-test were used to assess changes in mammography, CBE, and BSE rates. The *t*-tests were used to assess changes in health beliefs from pre- to post-intervention. Repeated measures analysis of variance (ANOVA) was used to evaluate the changes in knowledge of breast health over time within the intervention and control groups. Adjusted odds ratios and 95% confidence intervals (CI) are reported for practicing BSE at the 3- and 6-month follow-ups. All tests of significance are evaluated at the $p < 0.05$ level.

4. Results

One hundred and ninety women participated in the study, 97 in the intervention group, 93 in the control group. The mean age of the sample was 46.59 years (range = 41–59; SD = 4.23). The majority were married (92%) and not working (73%). Fifty-four percent of the sample had attended school for 1–8 years, and 46% had attended school for more than 9 years. Most participants perceived income level middle (75.8%), bad/very bad (8.4%) and good/very good (15.8%). With regard to health status perception, 44% reported being in good to excellent health, and 56% reported fair health. Ninety-two percent of women had health insurance, and all the participants were residing in Istanbul at least 5 years. There were no significant differences between participants' characteristics at baseline among the two groups (age, marital status, years of education, employment status, income level, having children, length of residence in Istanbul, and health insurance coverage).

4.1. Change in BSE frequency and BSE proficiency

Women in the intervention group were compared to women in the control group for performing BSE at 3- and 6-month follow-ups. At the 3-month data collection, the two groups differed significantly in terms of the BSE performance and BSE proficiency (Table 1). Among those who never performed BSE before the BHP program, 36.1% ($n = 35$) of the intervention group and 11.8% ($n = 11$) of the controls initiated to perform BSE in the 3 months. Likewise, 26.8% ($n = 26$) of the intervention group, and 9.7% ($n = 9$) of the control group performed regular BSE at the 6 months after the BHP program. The differences were significant between the two groups both at 3- and 6-month follow-up ($p < 0.001$). At the 3 months after the BHP program, women in the intervention group were over four times more likely to perform regular BSE than women in the control group (OR = 4.21, 95% CI 1.98, 8.94). At the 6 months after the BHP program, women in the intervention group were over three times more likely to perform regular BSE than women in the control group (OR = 3.42, 95% CI 1.50, 7.77).

Table 1
Changes in breast self-examination behaviour and BSE proficiency (skills and lump detection).

Variable	Intervention group ($n = 97$) *n* (%)	Control group ($n = 93$) *n* (%)	OR (95% CI)	Statistics
BSE frequency (3 months)				
Regular	35 (36.1)	11 (11.8)	4.21	$\chi^2 = 15.22$
Irregular	62 (63.9)	82 (88.2)	(1.98–8.94)	$p = 0.00$
BSE frequency (6 months)				
Regular	26 (26.8)	9 (9.7)	3.42	$\chi^2 = 9.27$
Irregular	71 (73.2)	84 (90.3)	(1.50–7.77)	$p = 0.00$
Variable[a]	Mean (SD)	Mean (SD)		
BSE skills (100)				
3 Months	80.0 (13.8)	24.2 (18.4)	–	$t = 23.76$ $p = 0.00$
6 Months	69.5 (13.3)	27.2 (17.8)		$t = 18.56$ $p = 0.00$
Lump detection (5)				
3 Months	3.9 (0.8)	1.4 (0.8)	–	$Z = -11.53$ $p = 0.00$
6 Months	3.3 (0.7)	1.7 (0.8)		$Z = -10.28$ $p = 0.00$

BSE: Breast self-examination; OR: odds ratio; CI: confidence interval; χ^2: chi-square test; *t*: *t*-test; *Z*: Mann–Whitney *U*-test.
[a] Numbers in parentheses in this column indicate maximum scores.

Table 2
Changes in mammography and clinical breast examination behaviours.

Variable	Intervention group ($n = 97$) n (%)	Control group ($n = 93$) n (%)	Statistics
Mammography			
Yes	15 (15.5)	9 (9.7)	$\chi^2 = 1.44$
No	82 (84.5)	84 (90.3)	$p = 0.23$
Clinical breast examination			
Yes	11 (11.3)	6 (6.5)	$\chi^2 = 1.39$
No	86 (88.7)	87 (93.5)	$p = 0.24$

χ^2: Chi-square test.

Changes in BSE proficiency (skills and lump detection) over time are summarized in Table 1. At 3-month follow-up, BSE skills mean scores were significantly higher for the intervention group ($x = 80$ out of 100, SD = 13.8) compared with control group ($x = 24.2$ out of 100, SD = 18.4) ($p < 0.001$). At 6-month follow-up, BSE skills mean scores were 69.5 (SD = 13.3) for the intervention group, and 27.2 (SD = 17.8) for the control group ($p < 0.001$). At 3-month follow-up, mean lump detection scores were higher for the intervention group (3.9 out of 5, SD = 0.8) than for the control group (1.3 out of 5, SD = 0.7). It was 3.3 (SD = 0.7) for the intervention group and 1.6 (SD = 0.8) for the control group at 6-month follow-up ($p < 0.001$).

4.2. Change in mammography frequency and clinical breast examination frequency

At baseline, women were non-adherent with respect to mammography and CBE guidelines. Although rates of self-reported mammography and CBE use were higher in the intervention than the control group, there was not a statistically significant difference between the two groups in the mean of mammography frequency ($p = 0.230$) and CBE frequency ($p = 0.238$) (Table 2). Rates of mammography use in the intervention versus control group were 15.5% versus 9.7%, and rates of CBE use in the intervention versus control group were 11.3% versus 6.5%.

4.3. Change in breast health knowledge

Before the BHP program, the intervention group's mean level of knowledge (8.85 ± 2.40) was essentially the same as the control group (8.98 ± 2.45) and there was not a statistically significant difference between the two groups in the mean breast health knowledge scores ($p = 0.73$). At the 3-month data collection, the mean knowledge score of 18.16 ± 1.47 for the intervention group was significantly higher than the mean score of 9.96 ± 2.69 for the control group ($p < 0.001$). At the 6-month data collection, the intervention group's knowledge scores ($x = 16.46$) had decreased, while the control group's knowledge scores ($x = 10.13$) had increased from the 3-month measurement and the mean knowledge score of the intervention group was significantly higher than the mean score of control group ($p < 0.001$). Repeated measures ANOVA showed that the change in knowledge of breast health differed between the intervention and control groups. The intervention group had a significantly greater increase in breast health knowledge scores over time (df = 3; $F = 789.86$; $p < 0.001$).

4.4. Changes in health beliefs

The mean scores on the CHBMS are presented in Table 3. For the intervention group, significant changes were seen from pre- to posttest in perceived susceptibility, perceived benefits of BSE and mammography, and confidence (all increased), perceived barriers to mammography (decreased). No significant changes were seen in the intervention group for perceived barriers to BSE. For the control group, significant changes were seen from pre- to posttest in confidence, and perceived barriers to mammography (all increased), and perceived susceptibility, perceived barriers to BSE, and perceived benefits of mammography (all decreased). In addition, there were no baseline differences in perceived susceptibility, benefits of BSE, and barriers to BSE between the two groups. At 6-month data collection, the mean scores were significantly higher in the intervention group for all the health belief scales ($p < 0.05$) except barriers to mammography. No

Table 3
Comparison of the mean scores of the champion's health belief model scales between the intervention and the control groups.

Variables	Intervention group ($n = 97$) Mean (SD)	Control group ($n = 93$) Mean (SD)	Statistics
Baseline			
Perceived susceptibility	12.8 (3.6)	12.3 (3.1)	$t = 1.11$, $p = 0.27$
Benefits of BSE	20.3 (3.7)	20.4 (3.6)	$t = -0.07$, $p = 0.95$
Barriers to BSE	18.7 (4.8)	18.7 (4.5)	$t = -0.08$, $p = 0.94$
Benefits of mammography	20.8 (2.8)	21.7 (3.2)	$t = -2.26$, $p = 0.03$
Barriers to mammography	17.24 (3.5)	14.6 (3.7)	$t = 5.02$, $p = 0.00$
Confidence	31.8 (6.3)	29.3 (6.2)	$t = 2.78$, $p = 0.00$
6 Months			
Perceived susceptibility	16 (2.9)	11.2 (3.1)	$t = 11.16$, $p = 0.00$
Benefits of BSE	21.8 (2.8)	19.5 (4.9)	$t = 3.77$, $p = 0.00$
Barriers to BSE	18.6 (3.9)	17.2 (3.3)	$t = 2.78$, $p = 0.00$
Benefits of mammography	22.2 (1.9)	20.6 (2.5)	$t = 5.05$, $p = 0.00$
Barriers to mammography	23.9 (2.9)	23.8 (4.9)	$t = -1.58$, $p = 0.12$
Confidence	39.9 (2.9)	31.3 (6.4)	$t = 11.72$, $p = 0.00$

BSE: Breast self-examination; t: t-test.

significant difference was found between the two groups for barriers to mammography ($p = 0.116$).

5. Discussion

Unlike most studies investigating only one of the breast cancer screening measures, this study investigated the effect of a BHP program to improve mammography, CBE, and BSE. It was designed in a positive manner by systematically modifying specific health beliefs, and increasing breast health knowledge in a sample of Turkish women aged 41 and older. In this study, the BHP program significantly improved BSE rates among women. However, it did not have the anticipated effect on CBE and mammography rates.

In the current study, BSE performance was evaluated with both BSE frequency and BSE proficiency (skills and lump detection). Results of the study clearly showed that teaching BSE significantly improves the BSE performance. Before the BHP program, the participants were non-performers. Three and six months after the program, 36% and 27%, respectively, of the intervention group carried out BSE monthly. This shows that the BHP program successfully motivated the women toward BSE performance. The results of the current study can also be interpreted another way, nearly one-third of the women who had participated in the training program performed regular BSE, and this result was actually better than expected when the program was planned. BSE is difficult to learn and requires thoroughness and a high level of motivation. The results are in line with those of several earlier studies reporting that BSE training increases the frequency of BSE and increases women's understanding of the technique (Avci and Gozum, 2009; Budakoglu et al., 2007; Coleman et al., 2003; Funke et al., 2008; Hacihasanoglu and Gozum, 2008; Lee et al., 2003; Lu, 2001; Luszczynska, 2004; Sørensen et al., 2005; Taylor, 2002; Wood and Duffy, 2004; Wood et al., 2002). On the other hand, women in Taylor's study (2002) did not improve their BSE technique after participation in a 2-h BSE education program.

In addition to BSE frequency, the woman's ability to perform BSE correctly is at least equally important. In the current study, women who had participated in the BHP program were more likely to perform BSE proficiently at 3 and 6 months after the program. The significant difference between the groups in terms of BSE skills and lump detection suggests that using a breast model may be an effective way to teach BSE. It appears that instructional methods such as didactic presentations, procedural demonstrations, practice opportunities with breast models, and the provision of written materials for learner review may have affected this finding. Other materials such as booklet, calendar and BSE reminder card also may have been helpful because they addressed many issues with BSE procedure. The findings of the current study are congruent with several researchers (Funke et al., 2008; Hall et al., 2007; Pinto and Fuqua, 1991; Sørensen et al., 2005; Taylor, 2002; Wood and Duffy, 2004) who found that women who were taught BSE individually using a breast model performed BSE proficiently. Previous studies (Funke et al., 2008; Hall et al., 2007; Lu, 2001; Mitchell et al., 2005; Pinto and Fuqua, 1991; Wood et al., 2002; Wood and Duffy, 2004) indicate that using breast models containing lumps are important teaching aids in measuring BSE proficiency. Pinto and Fuqua (1991) pointed out that there is evidence those trainees who practice on simulated breast models display greater BSE proficiency than trainees who receive BSE instruction via pamphlets or films. Further, other studies have demonstrated the favorable impact of video instruction and return demonstration on enhancing a woman's confidence in performing BSE, thus increasing both frequency and proficiency (Champion, 1995; Hall et al., 2007; Janda et al., 2002; Wood, 1996; Wood and Duffy, 2004; Wood et al., 2002). Therefore, the BHP program may be appropriate to increase both BSE frequency and proficiency for future samples with similar demographic characteristics.

In the current study, although, there was a significant difference in lump detection scores between the groups, women in the intervention group nevertheless failed to find all lumps in the breast model. Five lumps were embedded in the breast model, but mean number of lumps found by the intervention group at first posttest was 3.88, and 3.31 at the second posttest. Therefore, further studies linking BSE skill deficits to lumps not found is needed to clarify present findings. Future studies may require BSE training sessions with a focus on the most essential components to achieve criterion levels of BSE skill competency. Wood et al. (2002) stated that missing key BSE skills, such as pressing lighter to deeper breast tissue or failing to cover all areas of the breast, would result in finding fewer lumps when they are present.

One of the study hypotheses was that there will be a significant difference in mammography and CBE adherence rates between women in intervention and control groups at 6-month post-intervention. However, there was no evidence to support this hypothesis. It should be noted that this result was achieved in a shortened follow-up period of only 6 months in this study. Thus, the result might be due to the short-term follow-up period. A longer follow-up period of 1 or 2 years, which would have been consistent with current screening mammography recommendations, would have been ideal. Another reason for the insignificant difference in mammography and CBE adherence rates in this nurse-led study may be the absence of an opportunity to schedule a mammogram and physician recommendation. Physician recommendation to obtain mammography has been found to be associated with women's use of mammography (Champion et al., 2003; Michielutte et al., 2005; Sohl and Moyer, 2007; Soskolne et al., 2007). It could also be argued that the barriers such as access, availability, and affordability of services may have affected the CBE and mammography behaviours. Tejeda et al. (2009) reported that a combination of access-enhancing strategies such as reduced cost mammograms, facilitated scheduling, mobile clinics, vouchers, and transportation to appointments were effective in increasing rates of mammography use. Such strategies should provide an immediate opportunity for participants to change their behaviour and to overcome the difficulties of locating and scheduling a mammography. Champion et al. (2003) made a plausible explanation to low mammogra-

phy adherence of women and stated that scheduling a mammogram and taking the necessary steps to complete the test requires planning and fitting a new routine activity into a sometimes hectic life. Also, the remarkable changes in mammography screening rates were reported in several interventions where free or low-cost mammograms were available (Bailey et al., 2005; Reuben et al., 2002). Further, it is stated that non-adherent women are less responsive to interventions to increase screening than are women who have had prior mammograms (Champion et al., 2003). In the current study, women were non-adherent upon entry and access-enhancing strategies were not used. As in a study by Aiken et al. (1994), women in this study would have had to overcome the barriers typically associated with the medical system to obtain a mammogram (such as getting a referral from a physician, going to a separate site for the screening, and paying for the procedure). Thus, coordination and assistance with services to facilitate CBE and mammography screening may be preferable strategies for future interventions. In the current study, the narrative reasons given by intervention group participants for not having a post-study mammography and CBE were that the doctor did not tell woman to need mammography, and CBE; the waiting times for mammography appointments were too long; and the mammography machine was out of order in one hospital that was in the study area. Thus, emphasis should be placed on revealing the existing health care system and preventive service delivery barriers within this population's health system.

On the other hand, a possible explanation of the women's decision about mammography and CBE might be influenced by cultural factors. In a study with Turkish women (Tanriverdi et al., 2007), it was found women are reluctant to be examined by the male health care personal. In another study (Arikan and Aktas, 2008), it was emphasized that male heads of households have a significant influence over Turkish women's health care decisions, Turkish women did not give their attention to the symptoms they were experiencing and they placed a priority on the needs of other family members, especially their children. Indeed, a more intensity intervention that empower women toward action might be needed. This may be also interpreted as an educational intervention that considers cultural barriers to screening in addition to the health beliefs may be needed in this population.

In the literature, health beliefs and the breast health knowledge have been shown to correlate significantly with having a mammography, CBE, and practicing BSE (Allen and Bazargan-Hejazi, 2005; Champion et al., 2003; Garza et al., 2005; Hall et al., 2007; Han et al., 2009; Lu, 2001; Secginli and Nahcivan, 2006b; Sohl and Moyer, 2007; Wood et al., 2002). The increases in perceived susceptibility, benefits of BSE and mammography, and confidence in this study is consistent with past literature demonstrating that breast cancer education programs influence women's health beliefs (Avci and Gozum, 2009; Garza et al., 2005; Gursoy et al., 2009; Hacihasanoglu and Gozum, 2008; Hall et al., 2007; Han et al., 2009; Lu, 2001).

We have little explanations as to why the levels of perceived barriers to BSE of the intervention group were increased at posttest and no significant difference was found in the levels of perceived barriers to mammography between the two groups. This finding shows the BHP program failed to produce an overall effect on perceived barriers. One reason why participants in the intervention group demonstrate increased barriers to BSE may be that negative side effects of the BHP program such as increased risk perception, provoked anxiety about what they are feeling is normal breast tissue or is indeed a mass that needs further investigation. It may also likely that after the intervention, the participants became more aware that BSE is difficult to do correctly, it is time consuming, the procedure is unpleasant and embarrassing. There may be other salient factors operating to influence perceived barriers that may not be detected by the health beliefs model. The cultural variables may be an important component of Turkish women's decision about breast screening and should be confirmed in future research.

In the current study, the intervention was successful and appears to be associated with producing significant increases in breast health knowledge as well. Also knowledge is an important element in the HBM. Although mean pretest scores for breast health knowledge of two groups were similar, the intervention group significantly differed from the control group at all posttests. This finding is consistent with previous studies that breast health interventions significantly improve the breast health knowledge (Garza et al., 2005; Lee et al., 2003; Rao et al., 2005; Wood et al., 2002).

Women's confidence level increased over time in the study. BSE confidence positively correlates with the frequency of carrying out BSE (Fry and Prentice-Dunn, 2006; Janda et al., 2002; Luszczynska, 2004; Park et al., 2009). For this reason informing women about breast cancer, promoting breast awareness and teaching them how to perform BSE correctly is important. Strategies used in the BHP program such as practice with a BSE model, and prompt feedback may have fostered confidence. In the literature, it is reported that such strategies increased the likelihood of learning accurate BSE skills. For example, Park et al. (2009) reported that women's confidence in performing proper BSE was improved by teaching breast awareness and BSE. Findings in the current study support the premise that a targeted intervention that correlates with women's health beliefs can help women carrying out monthly BSE.

6. Limitations

The study relied on a small sample of women in one region, and thus it has limited generalizability. The study should be replicated with a larger and more diverse sample. The one-off brief nature of the intervention and the short-term follow-up period (only 6 months after the intervention) are also substantial limitations. Although, in the study, the reliance on self-reports of mammography and CBE behaviours is a limitation, self-report of mammography use has been validated previously and appears relatively accurate (Caplan et al., 2003; Vacek et al., 1997). A final limitation of the study involves the fact that the HBM does not consider the role of culture on health behaviours, and therefore, was not assessed in this study.

7. Conclusion

The results indicate that a nurse-delivered breast health program was successful in increasing BSE frequency, proficiency of BSE, knowledge and beliefs about breast cancer. The HBM was successfully used as a theoretical framework to improve breast health by promoting the BSE compliance and increasing breast health knowledge. In addition, findings of the study suggest that BSE practices of Turkish women can be enhanced after one educational encounter. The BHP program may be appropriate for future samples with similar demographic characteristics to improve BSE in low-resource area. However, it is not a strong enough intervention to overcome barriers to having a CBE and mammography for this population. Breast health programmes should consider the health system infrastructure and the lack of access to available health care issues.

8. Implications

Advice from health care professionals is effective in raising public awareness of the importance of mammography, CBE, and BSE, as well as a key predictor of BSE practice. Nurses comprise the largest group of health care professionals and have the most frequent contact with patients in a variety of health care settings. Nurses have been known as change agents and advocates for clients. One way that nurses can work as change agents in the community is in educating women about the importance of practicing proficient BSE, having regular CBE, and mammography. Correct instruction of women in BSE by public health nurses remains an important breast health promotion initiative.

Future research should consider cultural barriers to screening and strategies such as reduced cost mammograms, facilitated scheduling, and transportation to appointments for promoting participation in mammography and CBE screening programs among Turkish women.

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