

# Effects of Health Belief Model-Based Education on Health Beliefs and Breast Self-Examination in Nursing Students

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## ABSTRACT

**Objective:** This study was carried out to investigate the effect of an education program based on the health belief model (HBM) on nursing students' health beliefs and on their practices of breast self-examination (BSE). **Methods:** This research was a semi-experimental intervention study with a single group, pretest and posttest design. The sample of the research consisted of 48 students in the 3<sup>rd</sup> year of study. Data were collected before the education program and 6 months and 1 year after the training. A sociodemographic information form, the breast cancer knowledge form, the HBM scale, and the BSE proficiency rating instrument were used. Descriptive statistics and repeated measures ANOVA

were used to examine the relationships among the variables. **Results:** Implementing the educational program was found to be statistically insignificant for the HBM. Knowledge about breast cancer and BSE skills increased after the training. The percentage of students practicing regular BSE was determined as 14.6% before training, 45.8% after 6 months, and 28.1% after 1 year. **Conclusions:** The education provided to the students increased their HBM scores, knowledge about breast cancer, and BSE skills. However, the frequency of regular BSE was still quite low after training.

**Key words:** Breast self-examination, education, nursing student

## Introduction

Incidences of cancer are increasing worldwide, and this is also the situation in Turkey. The International Cancer Agency has drawn particular attention to the rise in the number of diagnoses of breast cancer. The rate of breast cancer is reported to be 92.6 cases per 100,000 people in

Western Europe, while it stands at 45.3 cases per 100,000 population in the Western Asian countries that include Turkey.<sup>[1]</sup>

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It may not be possible to prevent cancer; however, early diagnosis is vital for better outcomes.<sup>[2]</sup> Breast self-examination (BSE), clinical breast examination (CBE), and mammography are the main methods for an early diagnosis of breast cancer. BSE is a simple, rapid, and cost-free practice. By practicing BSE, a woman can recognize and evaluate any changes to her own body and receive the necessary treatment and care at an early stage. Nowadays, although there are opposing views about the influence of BSE on life span, it is usually women who are the first to detect a lump in their breast through BSE.<sup>[3]</sup> Moreover, taking into account that “gold-standard” mammography is not performed on young women, the importance of BSE has become more obvious.<sup>[3]</sup> The American Cancer Society recommends that all women should be familiar with the known benefits, limitations, and potential harms associated with breast cancer screening. Although BSE is optional, women should be told about the benefits and limitations of BSE. They should report any new symptoms to their health-care professional. CBE is part of a periodic health examination, which should occur preferably every 3 years in women aged 20–39 years and preferably every year in women aged 40 and over. Women who have a particularly high risk as a result of specific factors should get a magnetic resonance imaging and a mammogram every year.<sup>[4]</sup>

Even though BSE is an easy method to perform and is highly recommended, studies conducted with women of all age groups show that BSE is either carried out irregularly or not at all.<sup>[2,5-7]</sup> Investigations report that education about BSE increases women’s knowledge and understanding of breast cancer, their confidence/self-efficacy, and the number of examinations they have.<sup>[6-9]</sup> Another factor that increases participation in breast cancer screenings is an individual’s beliefs about her/his health.

Health beliefs play an important role in leading people to engage in preventive health behaviors. The health belief model (HBM) is the model most frequently utilized for breast cancer screenings in the literature. The main constructs and assumptions of the HBM include (1) perceived threat, which consists of (a) perceived susceptibility: a person’s subjective perception of the risk of acquiring a disease and (b) perceived severity: a person’s feelings about the seriousness of contracting a disease; (2) perceived benefits: a person’s perception of the effectiveness of various actions available to reduce the threat of a disease; (3) perceived barriers: a person’s belief about the potential negative aspects of taking a particular health action; and (4) cue to action: internal or external cues that determine a person’s readiness for action and trigger the decision-making process.<sup>[10,11]</sup>

Nurses and undergraduate nurses should have acquired basic knowledge about and skills in how to practice BSE.

They should pay attention to their own health and be a role model for their patients. Educating nursing students about methods for diagnosing breast cancer at an early stage will enhance their awareness of breast cancer and help them to initiate BSE at younger ages. Previous health behaviors might be a key factor in whether preventive health behaviors continue to be practiced in the future. In addition, educators also need to evaluate the effectiveness of breast cancer education and reexamine the content of any training. The syllabi used in our department include various topics focusing on BSE and breast cancer in the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> years of the study. However, the practice of BSE is not allocated much time due to the intensity of the curriculum, and students tend only to study the theoretical aspects of the topic for a short period. However, it is expected that the 4<sup>th</sup> year students will be able to transfer this training in public health and clinical practice to the patients they encounter in practice. Educating students about breast cancer and BSE will also affect their knowledge and practices and their health beliefs. This is important in terms of assessing the educational competence of the students before graduation, recognizing their deficiencies and trying to overcome them. In our first study, we evaluated students’ knowledge of breast cancer, their skills, and their ability to apply these in terms of their standard education, and we found that these were inadequate. For this reason, it was decided to create new educational content and to use two training sessions to educate those participating in the study. The study was thus conducted to investigate the effects of education based on the HBM on nursing students’ health beliefs and their own practice of BSE.

### *Hypothesis of the study*

Breast cancer education based on the HBM will positively change the knowledge, practice, and health beliefs of nursing students.

## **Methods**

### *Study design and sampling method*

This study was carried out as a single group, semi-experimental intervention study with a pre- and posttest. The research was conducted in a University Faculty of Health. The universe of the research was composed of 82 3<sup>rd</sup> grade students studying in the spring semester in 2015. We conducted the first descriptive study with the participation of 61 students and published it in 2017. We aimed to reach the whole universe without selecting a sample. After the first study, we invited all our students to continue to participate in our research. We also told them that it would require additional time to do this training. For this reason, the sample of the study consisted of 48

students who agreed to participate in the training unless they were unwell or absent. For the 1-year follow-up, 32 students participated in the study because it was the end of the academic semester. The power of the study was 99% ( $\alpha = 5\%$ , confidence interval = 95%, and the effect size = 11.12) ( $n_1$ : 48 and mean:  $53.13 \pm 16.13$ ;  $n_2$ : 48 and mean:  $73.96 \pm 13.1$ ;  $n_3$ : 48 and mean:  $78.75 \pm 12.1$ ).<sup>[12]</sup>

### Summary of breast cancer education program

#### Explanation of breast cancer and general learning objectives

##### Perceived susceptibility

Perceived susceptibilities are discussion of health awareness, breast health awareness, anatomy of the breast, knowledge of breast cancer, breast cancer epidemiology, people likely to have cancer, "Why is breast cancer important?" and symptoms of breast cancer.

##### Perceived seriousness

To explain the life changes that occur due to breast cancer or the possibility of breast cancer.

##### Health motivation

Discussion of how to detect health problems early and the wish to maintain health, discussion of responsibility for one's own health.

##### Confidence/self-efficacy

BSE and CBE were taught. Students were informed how they could successfully perform BSE and CBE. BSE was demonstrated using the breast model. Students were encouraged to engage in BSE, and their questions were answered.

##### Perception of benefits

The benefits of BSE and CBE (quality of life, early diagnosis and benefit of treatment, cost, and body image) were discussed.

##### Perception of barrier

Students were advised how to deal with issues such as lack of knowledge, shame, neglect, fear, being young, forgetfulness, lack of time, and previous experience.

##### Cue to action

Students were shown news about breast cancer in the media. A video about breast cancer was also played. Finally, students were given leaflets about BSE to refer to in future.

##### Data collection tools

The data for this research were collected using forms prepared by the researchers. These were the sociodemographic characteristic information form, the breast cancer information form, the HBM scale (HBMS), and the BSE proficiency rating instrument (BSEPRI).

### Sociodemographic characteristics form

This form consists of 17 questions covering characteristics such as age, marital status, employment status, health insurance, economic status, family type, family history of breast cancer, education about breast cancer, performing BSE, and receiving CBE. We also asked the following questions in this form: "Do you have any problems with your breasts?" "Do you know how to perform BSE?" "Do you perform BSE?" "If you do not perform BSE, briefly explain why not," "How confident are you about your ability to perform BSE?" "If you are confident, please tell us where you learned how to do it?" and "In your opinion, how important is BSE for early diagnosis of breast cancer?"

### Breast cancer information form

The breast cancer information form consists of 35 items: knowledge of breast cancer risk factors (13 items), knowledge of symptoms of breast cancer (9 items), knowledge about and ability to perform BSE (11 items), and CBE and mammography (2 items). This form was created by reviewing the relevant literature.<sup>[5,7,8]</sup> Expert opinion was sought and obtained to design this information form (one assistant professor in the field of public health nursing, one expert in nursing in women's health and disease, and one instructor in midwifery). The form was then tested on five students, and a final information form was subsequently created.

Each question on the form has three options: "Yes," "No," and "I don't know." Students were given 1 point for each question they answered correctly and 0 point for each question they answered incorrectly or if they left a blank space. The lowest possible score obtainable from the form was 0 and the highest score was 35. It was assumed that the higher the score is the higher the level of knowledge.

### Health Belief Model Scale

Champion's HBMS (1984) was developed based on breast cancer and screenings for breast cancer. In this research, the validity and reliability study of the HBMS was carried out using the form designed by Gözümlü and Aydın.<sup>[13]</sup> Cronbach's alpha coefficient of the scale ranged between 0.69 and 0.83. The HBMS is a five-point Likert scale with scores ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The answers show the extent to which the participants agree with each item, with higher numbers, suggesting higher levels of agreement with that item. Each dimension of the scale is evaluated separately, and the scores for the different dimensions are not added together. Thus, a number of scores are obtained, equaling the number of dimensions used for each individual. The scale for the "beliefs about mammography" dimension and the "beliefs about BSE" dimensions can be combined or used separately.

It has been reported that scale can be applied to women of all educational levels.<sup>[13]</sup> In this study, the subdimensions of the scale relating to breast cancer and BSE were used.

### Breast self-examination proficiency rating instrument

The BSEPRI was created with the goal of evaluating the ability of women to perform BSE at the appropriate time and their ability to detect lumps in the breast. It was developed by Robin Wood in 1994. The form contains ten statements which cover the stages involved in performing BSE. Ten points are given for each step correctly carried out, and 0 point are given for steps which are not carried out correctly or not carried out at all. As a result, a minimum score of 0 and a maximum score of 100 are obtainable from the form. A score of 90 or more indicates that “the BSE was performed correctly,” whereas a score of 80 and below indicates that “the BSE was not performed correctly.”<sup>[14]</sup>

A suitable time for the training program was decided on, and the program was delivered. We sought to evaluate the students' level of knowledge about breast cancer based on the HBM (preeducation) and to assess the effectiveness of the training in breast cancer screening in terms of the constructs of the HBM, namely perceived susceptibility, perceived seriousness, perceived benefits and barriers, confidence/self-efficacy, and health motivation. A specialist researcher in the field of breast health studies provided group training for 90 min. The program was divided into two sessions (45 min of training, a 15-min break, 45 min of training) on both breast cancer and BSE. The breast cancer screening training was conducted based on perceived susceptibility and perceived seriousness, confidence/self-efficacy and with a focus on the benefits of BSE, and the removal of barriers. Videos, PowerPoint presentations, and breast models were used during the program. In addition, leaflets about BSE were given to the students to improve their retention of information. The final tests were applied 6 months and 1 year after this educational program. After the training, the researcher used the BSEPRI to assess the students. The other forms were completed by the students themselves.

### Breast video film

The English BSE film version from Bristol-Myers Squibb Oncology was used. All conversations in the film were translated into Turkish, and the film was obtained from the Ministry of Health. The film simplifies the practice of BSE using diagrams, which highlight the area of breast to be checked. Simple instructions are given about how to move the fingers over the breast and which fingers should be used. Furthermore, the film also depicts CBE and mammography.

### Dependent and independent variables

The independent variables of this study were the sociodemographic characteristics of the women and the

BSE training program, while the dependent variables were their knowledge of breast cancer, how to perform BSE and CBE, and their health beliefs.

### Statistical analysis

Data were gotten and analysed using Statistical Package for Social Sciences (SPSS) for IBM (version 20, SPSS Inc, Chicago, IL, USA). The statistical significance of the data was assessed at  $P < 0.05$ . Data were analyzed using descriptive statistics (percentage, average, and standard deviation) and repeated measures ANOVA.

### Ethical approval

This study was approved by the Ethics Committee of the institution (Approval No. 41230746-044). All participants were orally informed about the study, and their consent was received. The forms were filled in by researchers using the face-to-face interview method.

## Results

As shown in Table 1, the average age of nursing students was  $21.21 \pm 0.90$ . About 97.9% were single, 91.7% were unemployed, 89.6% had health insurance, 45.8% were high school graduates, 72.9% of them had an income equal to their expenditure, and 81.3% lived in a nuclear family [Table 1]. It was found that 95.8% of the students did not have any breast problems, 85.4% had received previous information about

**Table 1: Demographic characteristics of participating students (n=48)**

Characteristics	n (%)	Mean $\pm$ SD
Age (years)		21.21 $\pm$ 0.90
Marital status		
Married	1 (2.1)	
Single	47 (97.9)	
Working status		
Yes	4 (8.3)	
No	44 (91.7)	
Health insurance		
Yes	43 (89.6)	
No	5 (10.4)	
Last graduated school		
Health of vocational high school	5 (10.4)	
High school	22 (45.8)	
Other (Anatolian high school, etc.)	21 (43.8)	
Economic status		
The income is less than the expenditure	7 (14.6)	
Income is equal to expenditure	35 (72.9)	
The income is high than the expenditure	6 (12.5)	
Family type		
Nuclear family	39 (81.3)	
Broad family	7 (14.6)	
Broken family	2 (4.1)	
Total	48 (100.0)	

SD: Standard deviation



breast cancer, 100% knew about BSE, and finally, 91.7% of them understood the significance of performing BSE.

The difference between the preeducation, 6 months, and 1<sup>st</sup> year follow-ups of the students was found to be statistically insignificant in terms of scores for beliefs about breast cancer, and knowledge about and having the skills to perform BSE ( $P > 0.05$ ). Scores for susceptibility, seriousness, health motivation, confidence/self-efficacy, benefits, and barriers to performing BSE were found to be statistically insignificant in the preeducation, at the 6-month and 1-year follow-ups ( $P > 0.05$ ). Scores for knowledge of breast cancer and having the skills to perform BSE increased ( $P < 0.05$ ) in the preeducation, 6-month, and 1-year follow-ups of students [Table 2].

The preeducation, 6-month, and 1-year follow-up scores for how frequently the students performed BSE are compared in Table 3. The percentage of students performing regular BSE was reported to be 14.6% before education, 45.8% after 6 months, and 28.1% after the 1-year follow-up [Table 3].

## Discussion

It has been reported that BSE increases the number of benign mass biopsies, causes unnecessary expenditure of health-care resources, and causes stress in the individual.<sup>[3]</sup> It has also been suggested that women should be encouraged to perform BSE although there is no evidence that BSE reduces breast cancer mortality.<sup>[3,15]</sup> By practicing BSE, women take responsibility for themselves, become familiar with their breasts at different times, can see and feel changes over time and as they age, and can immediately report any abnormal changes.<sup>[3,15]</sup> One of the main challenges in this regard is to educate young women about breast cancer and to promote their participation in health promotion behaviors.<sup>[2,15]</sup> Although the findings of this study conducted to investigate the effects of HBM-based education on the health beliefs and practices of BSE among nursing students indicate positive changes in their health beliefs, knowledge of breast cancer, and skills

at performing BSE, the frequency of BSE reported at the 1-year follow-up had decreased.

The differences between the students' scores for perceived susceptibility, seriousness, health motivation, benefits of BSE, barriers to BSE, and confidence/self-efficacy before the training program and at the 6-month and 1-year follow-up were found to be statistically insignificant. A study conducted by Gürsoy *et al.* found that although peer education practiced individually or as a group positively affected health beliefs, there was no statistically significant difference.<sup>[2]</sup> A study by Karayurt *et al.* investigated the effects of peer and group education on knowledge and beliefs about breast cancer and BSE.<sup>[16]</sup> They confirmed that health beliefs were positively affected by both peer and group education. They found that there was a statistically significant difference in perceptions of benefits, barriers, and confidence/self-efficacy in students after education compared to their perceptions before education. In contrast to this study, Akhtari-Zavare *et al.* found differences between experimental and control groups in the perception of benefits, barriers, and confidence/self-efficacy but not in perceived susceptibility, seriousness, and health motivation at the 6-month and 1-year follow-ups.<sup>[15]</sup> In the study by Attia *et al.* examining the effects of an educational film on the practice of BSE and the HBM, it was stated that positive effects were observed in terms of the perceived susceptibility to BSE, of its benefits, barriers to it, and the frequency with which it was practiced at the 1-year follow-up.<sup>[17]</sup> However, no differences were found in any of the subdimensions of the HBM except for the perception of confidence/self-efficacy after education. Similar findings were obtained by Moodi *et al.*, who found that after 1 week of education, the average scores for all the components of the HBM increased.<sup>[18]</sup> In the literature, it appears that health education based on the HBM has been effective in increasing knowledge about breast cancer and the frequency of BSE. On the other hand, it is difficult to change any behavior and it may take a long time for change to occur.

Table 2: Comparison of breast cancer belief, knowledge, and breast self-examination skills scores at preeducation, posttraining 6<sup>th</sup> month, and 1<sup>st</sup> year follow-up of students

Breast cancer belief and knowledge/BSE skills	Score range of scale	Mean $\pm$ SD			P
		Preeducation (n=48)	6-month follow-up (n=48)	1 <sup>st</sup> year follow-up (n=32)	
Susceptibility	3-15	7.96 $\pm$ 2.44	8.79 $\pm$ 2.33	8.5 $\pm$ 2.23	0.723
Seriousness	6-30	20.96 $\pm$ 5.39	21.04 $\pm$ 3.82	21.63 $\pm$ 3.43	0.346
Health motivation	5-25	20.90 $\pm$ 5.1	21.65 $\pm$ 3.8	22.28 $\pm$ 2.62	0.163
Confidence/self-efficacy	10-50	37.46 $\pm$ 10.43	40.71 $\pm$ 9.15	41.88 $\pm$ 6.33	0.058
Benefits (BSE)	4-20	16.58 $\pm$ 3.86	17.60 $\pm$ 3.17	16.75 $\pm$ 2.78	0.204
Barriers (BSE)	8-40	16.88 $\pm$ 7.53	14.71 $\pm$ 5.38	15.72 $\pm$ 4.57	0.304
Knowledge of breast cancer	0-35	27.19 $\pm$ 5.29 (A)	29.33 $\pm$ 1.63 (AB)	30.09 $\pm$ 1.67 (B)	0.001
Skills to perform BSE	0-100	53.13 $\pm$ 16.13 (A)	73.96 $\pm$ 13.17 (B)	78.75 $\pm$ 12.12 (B)	0.001

A,B: The common letter as a line means statistical insignificance. We were used repeated measures ANOVA for data. BSE: Breast self-examination, SD: Standard deviation

**Table 3: Comparison of students' performance of breast self-examination in pretraining, posttraining 6<sup>th</sup> month, and 1<sup>st</sup> year follow-up**

Variable	Preeducation (n=48), n (%)	6-month follow-up (n=48), n (%)	1 <sup>st</sup> year follow-up (n=32), n (%)
BSE frequency			
Regularly	7 (14.6)	22 (45.8)	9 (28.1)
Irregularly or never	41 (85.4)	26 (54.2)	23 (71.9)

BSE: Breast self-examination

As expected, the results of this study support the results of the previous literature by suggesting that health education has a positive effect in improving perceptions.

### Perceived susceptibility and seriousness

Perceived susceptibility is the perception of the threat to one's health from a specific disease. This perception refers to the acceptance of a diagnosis, the probability of falling ill, and one's general susceptibility to the disease. The higher the perceived susceptibility, the higher the likelihood of taking preventive action. For this reason, it is necessary to convince a patient that she/he may well develop a disease and for them to understand whether there is a high or low probability of this.<sup>[10,11]</sup> Perceived seriousness is the perception of the consequences of a person's illness if it is left untreated. Certain individuals may have organs or parts of the body that are particularly susceptible to disease. This may be the result of an individual's own life experiences, or they may believe that they are susceptible due to their family history. Sometimes, people are more sensitive about certain diseases because they are more conscious of the disease's risk to life. If the level of perceived seriousness is high, the probability of engaging in preventive health behaviors is also high.<sup>[10,11]</sup> In one study, there was a decrease in the levels of perceived susceptibility and seriousness as a result of training given, yet this result was not determined to be significant.<sup>[9]</sup> In the study by Attia *et al.*, which was similar to our study, it was shown that perceived susceptibility increased after education.<sup>[17]</sup> However, this result was not statistically significant. In the research conducted by Akhtari-Zavare *et al.*, students' scores for perceived susceptibility were higher and those for perceived seriousness were lower than those found in our study.<sup>[15]</sup> Moreover, their study found that the scores for both perceived susceptibility and seriousness were increased by education, but the difference between experimental and control groups was not found to be statistically significant. This may be because this study involved students who believed that younger women were not likely to get breast cancer. They may have thought that they only needed to learn about breast cancer rather than consider it a true risk.

### Health motivation and confidence/self-efficacy

Health motivation and confidence/self-efficacy play a crucial role in initiating changes in preventive health

behaviors and sustaining those behaviors.<sup>[10]</sup> Health motivation is defined as the willingness to actually engage in a behavior to maintain and improve health. Confidence/self-efficacy is the engagement and self-reliance that one must practice to obtain results.<sup>[11]</sup> In our study, health motivation and the perception of confidence/self-efficacy gradually increased. Nonetheless, no significant statistical difference was found between the situation before and after training. Similar to our findings, perceived seriousness and health motivation scores increased over time in other studies, but no statistically significant difference was measured.<sup>[8,9]</sup> For instance, Secginli and Nahcivan<sup>[19]</sup> and Ceber *et al.*<sup>[8]</sup> found that women with a high level of knowledge about BSE had high confidence/self-efficacy. Akhtari-Zavare *et al.* demonstrated that students who performed BSE had higher health motivation and confidence/self-efficacy than those who did not perform BSE.<sup>[20]</sup> These findings confirm the positive effect of education. Students' seeing BSE being performed on a model breast, watching a video, and getting information through a PowerPoint presentation increased their confidence in being able to perform BSE and their motivation to do it. The reasons we were not able to replicate this desired effect may have been that the students did not receive individual training, and there was not enough time for to adequately practice BSE.

### Perception of benefits and barriers

With regard to beliefs about health, it is important that people have a perception of benefits rather than of barriers for them to adopt new behaviors and to change existing ones. The likelihood that people will engage in protective health behaviors increases if the benefits are more clearly perceived than the barriers.<sup>[10]</sup> Many studies have demonstrated that the perception of benefits increases after education, whereas the perception of barriers decreases.<sup>[16,21]</sup> Conversely, in research conducted by Avci *et al.*, an increase was observed in the perception of barriers, but no statistically significant difference was found when this was compared to preeducation perceptions.<sup>[9]</sup>

All these results demonstrate that, despite the different educational methods, education can positively change individuals' health beliefs. It is possible, however, that Turkish students may have a very traditional understanding of health derived from Turkish culture and that this may affect their health beliefs over a longer period. Efforts should be made to address the students' perceptions of susceptibility to illness and barriers to health prevention through better education.

### Breast self-examination knowledge

In this study, students' scores for knowledge of breast cancer increased following the education program.

Likewise, it has been found in many studies that education increases students' knowledge levels.<sup>[6,15,16,18,22]</sup> This result was expected.

### **Breast self-examination skills**

A BSE score of 90 or more indicates that "the BSE is performed correctly," whereas a score of 80 and below indicates that "the BSE is not performed correctly." In this study, the number of correct steps taken during BSE had increased at the 6-month and 1-year follow-ups. Our findings demonstrate that education contributes to an individual's ability to perform BSE but does not necessarily mean that BSE will be properly performed. Malak and Dicle found that the skill scores of the students they studied were  $91.5 \pm 7.25$  in the 1<sup>st</sup> month after education; their scores were higher than those we obtained.<sup>[22]</sup> It might be more beneficial for students if they were to learn how to perform BSE through individual BSE education.

### **Breast self-examination frequency**

Many studies have emphasized that the frequency of BSE was insufficient.<sup>[7,23-27]</sup> It has been shown that education has a positive influence on the practice and frequency of BSE.<sup>[2,8,16,18,22]</sup> Furthermore, studies show that the rate of performing BSE is higher in individuals with a knowledge of BSE than those without this knowledge.<sup>[6,20]</sup> Many sources in the literature have investigated students' understanding of and practices regarding breast cancer in Turkey.<sup>[16,25]</sup> Nevertheless, the number of studies demonstrating lasting changes arising from education and training, especially after 1 year, is limited in Turkey and worldwide. Avcı *et al.* found that there was a statistically significant increase in women's knowledge and practice of BSE after 3 months of education.<sup>[9]</sup> In research conducted by Ceber *et al.*, the frequency of BSE, the practice of BSE, and the level of knowledge were stated to be higher at the 1-year follow-up in the experimental group than in the control group.<sup>[8]</sup> In this research, it was found that the frequency of regular BSE increased by 31.2% 6 months after education, when compared to its preeducation frequency (14.6%), whereas the increase was only 7.2% 1 year after education. As this research shows, despite the increase in the level of knowledge and skills, the frequency of BSE decreased after 1 year. In young people, in particular, the perception of being in good health and a fear of being diagnosed with cancer make them less likely to go for a scan.<sup>[20,24]</sup> The belief that they might develop breast cancer which was less common in younger women than in elderly women.<sup>[15]</sup> As women's perception of benefits and their health motivation increase, and as their perception of barriers decreases, they perform BSE more often.<sup>[28]</sup> These findings suggest that it is vital to ensure

that positive health beliefs continue, even if there is already sufficient knowledge and understanding. The negative change in perceptions over time should be strengthened by repeated education. Time lost before diagnosis and in treatment delays should be specifically addressed in any education or training, especially taking into account that breast cancer is an aggressive disease. Specific ways to increase the frequency of BSE in young women should also be discussed. Our findings suggest that the students were knowledgeable about breast cancer to some extent, but, because they were young, they did not think that they would develop it.

## **Conclusion**

This study shows that the positive change in the students' perceptions of susceptibility, benefits, and barriers was not sustained and that the frequency of BSE fell after 1 year, in comparison to its increase in the 6<sup>th</sup> month after education. On the other hand, the students' scores for knowledge of breast cancer and ability to perform BSE increased posteducation. However, the practice of proper and efficient BSE did not attain the level desired to for breast cancer to be diagnosed at an early stage. It is vitally important that students should be educated to improve their awareness of breast health and so that they can correctly perform BSE.

## **Recommendations**

### **Nursing practice**

All students should participate in breast cancer education programs. In addition to their responsibility to protect their own health, their role as nurses in cancer treatment programs should be emphasized. Effort is required to ensure that BSE is conducted properly so that it can detect breast cancer at an early stage. It takes time for regular BSE to become a habit. It is important, both for the health students themselves and for public health in general that they receive proper education about breast cancer. In this regard, the curricula should be reviewed so that future health workers are better trained in this area.

### **Nursing education**

Educators should work to increase students' awareness of breast cancer through various methods (peer education, individual, or group education) and should encourage them to perform BSE regularly. Education and training should focus on why students do not perform BSE. It may be useful to focus in particular on students' perceived susceptibility to breast cancer and barriers to conducting BSE.

### **Nursing research**

For education to be successful, the barriers to beginning to practice BSE should be examined before any training



takes place. Further studies should be conducted to investigate the reasons for the gap between the knowledge of BSE and its practice.

This research has some limitations. First, because the participation of the nursing students in the School of Health was voluntary and the sample size was small, the study only represents some of the students. The results cannot be generalized to all the students. Second, the level of knowledge about breast cancer was not assessed using a comprehensive, structured scale. Third, the data were based on the students' own statements, which may have affected the objectivity of data.

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### Conflicts of interest

There are no conflicts of interest.

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