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## Results of breast and cervical cancer Health Promotion Model for older Turkish women

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### Abstract

**Introduction:** Gynecological cancers are an important cause of morbidity and mortality.

**Purpose:** This study was conducted in an attempt to increase the participation of 60-75 year-old women in early diagnosis of breast and cervical cancer and determine the efficiency of nursing interventions on health promotion and development behaviors.

**Method and material:** The sampling of this experimental study consisted of 50 women in the experimental group and 50 women in the control group. The data collection process involved socio-demographic characteristics information form, Standardized Mini Mental State Test, information form regarding previous behaviors, screening behaviors monitoring form, Health Belief Model Scale, Self-Efficacy Scale, and Healthy Lifestyle Behaviors Scale II-Health Responsibility subscale.

**Results:** The study determined that health perceptions in older women increased the rate of Breast Self-Exam, mammography and Pap-smear test utilization, but that the interventions were not effective in Clinical Breast Examination performance.

**Conclusion:** The nursing interventions, which were performed using group health education based on the Health Belief Model and the Health Promotion Model as well as brochures, film displays, breast models and telephone reminders, had positive effects on the behaviors of early breast and cervical cancer diagnosis in older women.

**Keywords:** Health Belief Model; Health Promotion Model; old age; breast and cervical cancer; nursing.

### 1. Introduction

Nearly half of women aged 65 and over develop breast cancer, which is more prevalent with age, and nearly 2/3 of deaths are seen in 13% of the female population aged 65 and over (1). While the incidence of breast cancer in Turkey in 2006 was 37.6 out of 100.000, it has increased to 41.6, and its prevalence is reported to be higher in women aged between 60 and 74 (2). Cervical cancer accounts for 12% of cancer seen in women throughout the world (3). It is more prevalent with age and is in the ninth place in Turkey. According to 2008 data, the prevalence of cervical cancer is 4.4 out of 100.000 (2).

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Although early diagnosis is important in reducing mortality and morbidity from breast and cervical cancer, the lack of health insurance and information, inadequate transportation facilities, lack of support from family, friends and husbands (4-6), fear (losing breast, death, change in body image, etc.), neglect, embarrassment, lack of education and financial issues (7) are barriers to participation in early diagnosis applications. It is emphasized that older women are not generally aware that they are at risk of breast cancer, and therefore they are at greater risk (7,8).

Among the barriers to participation in cervical cancer screenings are the negative experiences of older women with health staff, health beliefs and fear, indifference, shyness, lack of education, difficulties with transportation to health care centers, trouble in getting appointments and waiting in queues, financial problems, lack of a doctor's recommendation (9-11), old age, lack of education, income level, and ethnic structure (12). Health care workers can reduce breast and cervical cancer mortality, improve quality of life, extend life expectancy, and reduce health care costs by knowing which people are in high risk groups in terms of breast and cervical cancer and determining their screening barriers. We need additional approaches to increase participation in breast and cervical cancer screening rather than relying solely on traditional methods. Supporting studies with models, and configuring and implementing training programs based on these models can provide increased awareness of early diagnosis behaviours for breast and cervical cancer and help practice these behaviours regularly for early diagnosis. Among the models used to promote early diagnosis behaviours for breast and cervical cancer are the Health Belief Model (HBM) and the Health Promotion Model (HPM) (13, 14). This study aimed to increase older women's participation in early breast and cervical cancer diagnosis behaviors through nursing interventions based on HBM and HPM and to determine the effect of nursing interventions on health protection and promotion behaviours.

## 2. Materials and methods

### *The place and time of the study*

The universe of the study consisted of 5.192 women aged between 60 and 75 according to address-based population registry data in Balçova region in 2010. Balçova is a county of Izmir province in Turkey. This region includes all socio-economic levels. There is no organized screening program in İzmir and in this region. If women are aware of the need to participate in screening, they have access to hospital for early diagnosis.

### *Population and sample selection*

A total of 100 women aged between 60 and 75, 50 experimental and 50 controls, meeting the sampling criteria from the region were selected using a simple numbers table. Then, the individuals who agreed to participate in the study were randomly assigned to control and experimental groups. The individuals who could not be reached on three visits made at different times were replaced by women from a 25% predefined reserve list. According to the results of a homogeneity test analysis, there was no statistically significant difference between the control and experimental groups in terms of age, the Standardized Mini Mental Test, education level, marital status, income level, and households ( $p > .05$ ) (Table 1). Having a mammogram was used as the primary outcome variable for the power of the study. After the study was completed, G-power 3 software was used for NQuerty and effect size analysis. The statistical power of the study was .95 for mammography ( $\alpha = .05$ , Effect size = .37, Odds Ratio = .13, Confidence Interval = .95,  $n_1 = 50$ ,  $n_2 = 50$ ) (15, 16).

### *Type of study*

An experimental pretest–posttest control group design was used.

### *Dependent and independent variables of the study*

***Dependent variables:*** The dependent variables were having BSE every month on a regular basis, having CBE within three months of follow-up time, having mammography and Pap smear test, Scale of Health Belief Model, Scale of Early Diagnosis Behaviors of Cervical Cancer, Self-Efficacy Scale, and Healthy Lifestyle Behaviors Scale -Health Responsibility Subscale.

**Independent variables:** Nursing interventions (training, film display, brochures, counseling, telephone reminders, and follow-up).

**Exclusion criteria**

Elderly individuals who had Turkish speaking and comprehension problems, serious hearing and sight loss, dementia or Alzheimer's, breast or cervical cancer diagnosis, Standardized Mini Mental Test score of <24, Pap smear test or mammography for the last year, hysterectomy operation or functional failure causing dependency in daily life activities were excluded from the study.

**Table 1. Socio-Demographic Characteristics of the Experimental and Control Groups**

Socio-Demographic Characteristics	Experimental Group		Control Group		Total		Statistics	
	X±SD		X±SD					
Age	65.44±3.41 (Min=60- Max=73)		66.70±4.76 (Min=60- Max=75)				t=-1.523	p= .131
SMMT	27.20±1.50		26.78±1.74				t=1.293	p=.199
	n	%	n	%	n	%		
<b>Education Level</b>								
Not literate	10	20.0	8	16.0	18	18.0		
Primary school	28	56.0	34	68.0	32	62.0	x <sup>2</sup> =3.247	
Secondary school	6	12.0	2	4.0	8	8.0	p= .517	
High school	4	8.0	5	10.0	9	9.0		
University	2	4.0	1	2.0	3	3.0		
<b>Marital Status</b>								
Married	33	66.0	24	48.0	57	57.0	x <sup>2</sup> =3.305	
Single	17	34.0	26	52.0	43	43.0	p= .069	
<b>Income Level</b>								
Income lower than expenditures	31	62.0	28	56.0	59	59.0	x <sup>2</sup> = .372	
Income equal to expenditures	19	38.0	22	44.0	41	41.0	p= .542	
<b>Households</b>								
Alone	12	24.0	15	30.0	27	27.0		
Spouse	19	38.0	17	34.0	36	36.0	x <sup>2</sup> =5.028	
Spouse and children	14	28.0	7	14.0	21	21.0	p= .170	
Children (son and/or daughter)	5	10.0	11	22.0	16	16.0		
<b>Total</b>	50	100.0	50	100.0	50	100.0		

**Data collection tools**

**Socio-demographic characteristics information form**

The form includes items questioning the participants' age, education level, marital status, social security and economic status, number of children, and households.

**Standardized Mini Mental Test (SMMT)**

The SMMT, developed by Folstein et al. (1975), has been used by clinicians to monitor patients during diagnosis and treatment process to measure the degree of cognitive impairment. It consists of 11 items under five main headings, including orientation, registration memory, attention and calculation, recalling, and language. It is evaluated over 30 points. In Turkey, Güngen et al. (2002) determined the threshold score of SMMT as 24 in their study with individuals who received five years of education (17). Ertan et al. from Turkey, using the latter version, adapted the Standardized Mini Mental Test in 1999 for the uneducated as SMMSE. The criteria developed by Molly et al. for the administration of the test in 1997 were translated into Turkish, modified, and incorporated into the test (18).

### ***Information form regarding previous behaviours***

The form created by the researchers consists of six items questioning women's previous behaviors of early breast and cervical cancer diagnosis.

### ***Screening behaviors monitoring form***

This form has a total of six questions associated with BSE, CBE, mammography, and Pap smear test utilization.

### ***Health Belief Model Scale (HBMS)***

The HBMS, which is associated with breast cancer and screening, was developed by Champion (1984). This study used the breast cancer HBM form, whose validity and reliability study was conducted by Gözümlü and Aydın (2004) (19). The Cronbach's alpha coefficient of the scale ranged between 0.69 and 0.83. A five-point Likert-type scale, ranging from (1) strongly disagree to (5) totally agree, was used in the scale. A score close to five means that sensitivity, caring, health motivation, BSE benefits, BSE barriers and BSE self-efficacy have been perceived at a high level (20). The Cronbach's alpha coefficient of the HBMS was found to be 0.70 in this study.

### ***Scale of Early Diagnosis Behaviors for Cervical Cancer (SEDBCC)***

The Cronbach's alpha coefficient for the entire scale and subscales of the scale, developed by Özmen and Özsoy (2009), ranges between 0.89 and 0.70. In this study, the Cronbach's alpha coefficient of the scale was determined to be 0.67. The items in the Likert-type scale consisted of statements from (1) strongly agree to (5) totally disagree. The lowest score that could be obtained from the scale is 30, and the highest is 150 (21).

### ***Self-efficacy Scale***

This scale measures the self-efficacy perceptions of women regarding the early diagnosis of breast and cervical cancer. It was developed by Lechner et al. (1997). In the seven-point Likert-type scale, the items are scored from -3 (absolutely no) to +3 (absolutely yes). The scale has a total score ranging from -21 to +21. A high score is an indication of a higher self-efficacy perception regarding the development of a specific behavior. The Cronbach's alpha reliability coefficient of the scale is 0.90. A validity and reliability study of the scale was conducted in Turkey by Beşer et al. (2012) (22).

### ***Healthy Lifestyle Behaviors Scale II (HLBS-II)***

This scale was developed by Walker et al. (1987) and it was revised in 1996. Consisting of a total of 52 items, the scale has six subscales including moral development, health responsibility, physical activity, nutrition, interpersonal relationships and stress management. It is a four-point Likert-type scale consisting of the following items: (1) never, (2) sometimes, (3) often, and (4) regularly. The lowest score of the scale is 52, and the highest is 208. The Cronbach's alpha value of the scale is 0.94. In this study, the "Health Responsibility" subscale of the Turkish version of the "Healthy Lifestyle Behaviors Scale II" adapted by Bahar et al. (2008) (23) was used. The Cronbach's alpha coefficient of the HLBS-II is 0.92, and it is 0.77 for the Health Responsibility subscale. As the score decreases, health responsibility decreases as well, whereas it increases as the score increases.

### ***Implementation of the study***

A health promotion training program was created for breast and cervical cancer in older women based on the literature review and the qualitative research findings in this region (6,11). Each woman in the control and experimental groups was visited individually at home to collect pre-test data. The women in the experimental group were informed about the training schedule during the data collection process, and they were reminded via phone calls one day before the training program. The training program was conducted as a one day a week session by the researcher for three months. Each session took about 90 minutes. The training was carried out in six Neighbourhood-homes in Balçova region as group education. Neighbourhood-homes is a project carried out by the municipality which aims to provide women with vocational and skills development courses (jewelry-design, embroidery, wood painting, etc.). The groups consisted of 9-11 older women. The training program covered breast and cervical cancer health promotion training (40 min), watching a film about BSE application (10 min), BSE training involving the steps of BSE and a correct examination on a model (30 min), and the distribution and explanation of

written material (an early breast and cervical cancer diagnosis training brochure -BSE calendar) (10 min). The women who participated in the after-training program received phone calls during the second month about their early diagnosis behaviors, and they were asked whether or not they used the BSE calendar. They were given advice regarding their handicaps they mentioned on the phone. In the third month following the training program, the women were visited in their homes by the researchers, and the post-test forms were filled in through face-to-face interviews.

### Limitations of the study

Since previous early diagnostic behaviors of elderly women were collected as retrospective information in their breast and cervical cancer screening behaviors, recalling factor may have played a role in some quantitative data. For this reason, early diagnosis behaviors of women may have yielded different results. In this study, the follow-up period was determined to be three months due to the memory factor and the time limit for conducting the thesis. Three months may be a short period of time for expecting a behavioral change. Another limitation was the fact that the sixth month and yearly follow-ups could not be performed.

### Generalization of the study

These results may be regarded as a sample from the field of study. It cannot be generalized to all elder women.

### Research ethics

Ethical approval for the study was obtained from Balçova Municipality and ethics committee. In addition, the individuals selected for the experimental and control groups were informed about the study, and their written/verbal consent was obtained. Following the study, the control group was given health education and brochures. The control group received no intervention at all.

### Evaluation of data

SPSS for Win 15.0 software was used in the data analysis. The level of significance ( $p$  value) in the analysis of the tests was taken as  $p < .05$ . Chi-square, independent and paired t-test analyses were used for pre-post intervention comparisons in the experimental and control groups.

## 3. Results

There was no statistically significant difference between the experimental and control groups with respect to BSE, CBE, mammography, and Pap smear test use based on breast and cervical cancer screening behavior characteristics of the participants before the nursing intervention ( $p > .05$ ) (Table 2). After the intervention, the rates of regular BSE, mammography and Pap smear tests in the third month follow-up in the experimental group were found to be higher than those of the control group, and the difference between them was determined to be statistically significant ( $p < .05$ ). However, there was no statistically significant difference between the experimental and control groups with respect to CBE use ( $p > .05$ ) (Table 2).

**Table 2. Comparison of Breast and Cervical Cancer Screening Behaviors for Experimental and Control Groups before the Nursing Interventions and in the Third Month Follow-up**

Screening Behavior	BI		BI		Statistics	AI		AI		Statistics
	Experimental Group (n=50)	n (%)	Control Group (n=50)	n (%)		Experimental Group (n=50)	n (%)	Control Group (n=50)	n (%)	
<b>BSE performance</b>										
None	7	14.0	8	16.0	$\chi^2=3.262$	5	10.0	9	18.0	$\chi^2=12.714$ $p=.002$
Irregular	43	86.0	39	78.0	$p=.196$	19	38.0	32	64.0	
Regular	0	-	3	6.0		26	52.0	9	18.0	
<b>CBE performance</b>										
None	36	72.0	30	60.0	$\chi^2=1.114$	42	84.0	47	94.0	$\chi^2=1.634$ $*p=.201$
Yes	14	28.0	20	40.0	$*p=.291$	8	16.0	3	6.0	



<b>Mammography</b>										
None	23	46.0	22	44.0	$\chi^2=3.453$	30	60.0	46	92.0	$\chi^2=12.336$
At least once	27	54.0	28	56.0	$p=.327$	20	40.0	4	8.0	$*p=.000$
<b>Pap Smear Test</b>										
None	25	50.0	26	52.0	$\chi^2=4.245$	35	70.0	50	100.0	$\chi^2=15.373$
At least once	25	50.0	24	48.0	$p=.236$	15	30.0	-	-	$*p=.000$
<b>Total</b>	50	100.0	50	100.0		50	100.0	50	100.0	

\*Yates correction. \*\*BI=Before Intervention AI=After Intervention

The post-nursing intervention mean scores for breast cancer sensitivity perceptions, health motivation perceptions, BSE benefit perceptions, and BSE self-efficacy perceptions in the experimental group were found to be higher than the pre-nursing intervention mean scores. The difference between them was statistically significant ( $p < .05$ ). The post-nursing intervention mean scores for BSE barrier perceptions and mammography barrier perceptions in the experimental group were found to be lower than the pre-nursing intervention mean scores. The difference between them was statistically significant ( $p < .05$ ). The post-nursing intervention mean scores for seriousness perceptions in the experimental group were determined to be higher in comparison with the pre-nursing intervention mean scores; however, the difference between them was not statistically significant ( $p > .05$ ). The mean scores for breast cancer sensitivity perceptions and seriousness perceptions in the control group after the nursing interventions were higher than those obtained before the nursing interventions. The difference between them was not statistically significant ( $p > .05$ ). The post-nursing intervention mean score for breast cancer health motivation perceptions in the control group was found to be lower than the pre-nursing intervention mean score, and the difference between the two was statistically significant ( $p < .05$ ). The post-nursing intervention mean scores for breast cancer BSE benefit perceptions, BSE self-efficacy perceptions, and mammography benefit perceptions in the control group were determined to be lower in comparison with the pre-intervention mean scores, and there was no statistically significant difference between them ( $p > .05$ ). The post-nursing intervention mean scores for the mammography and cervical cancer self-efficacy scale in the experimental group was higher than the pre-nursing intervention mean scores, and the difference between them was found to be statistically significant ( $p < .05$ ). The post-nursing intervention mean score for breast cancer BSE barrier perceptions was higher than the pre-nursing intervention mean score; however, no change was determined in the mean score for mammography barrier perceptions. The difference between them was not statistically significant in control group ( $p > .05$ ) (Table 3).

The post-nursing intervention mean scores for cervical cancer sensitivity and benefit perceptions in the experimental group increased, and the difference was statistically significant ( $p < .05$ ). The difference between the post-nursing intervention mean scores for cervical cancer seriousness perceptions and barrier perceptions in the experimental group and the pre-nursing intervention mean scores were not statistically significant ( $p > .05$ ). It was determined that there was no statistically significant difference between the post-nursing intervention mean scores for cervical cancer seriousness perceptions and barriers and benefit perceptions in the control group and the pre-intervention mean scores ( $p > .05$ ); however, the post-nursing intervention mean scores for sensitivity perceptions were lower than the pre-nursing intervention mean scores, and the difference was statistically significant ( $p < .05$ ) (Table 3). The post-nursing intervention mean scores for the health responsibility scale in the experimental group increased in comparison with the pre-nursing intervention mean scores, and the difference between them was not found to be statistically significant ( $p > .05$ ). The post-nursing intervention mean scores for the self-efficacy scale and the responsibility scale in the control group were low in comparison with the pre-nursing intervention mean scores, and the difference between them was not found to be statistically significant ( $p > .05$ ) (Table 3).

**Table 3. Comparison of Mean Scores for Breast and Cervical Cancer Scales, Self-efficacy Scale and Health Responsibility Scale in Experimental and Control Groups before the Nursing Interventions and in the Third Month Follow-up (n=50)**

	Breast Cancer			Cervical Cancer		Statistics
	Before Intervention X±SD	After Intervention X±SD	Statistics	Before Intervention X±SD	After Intervention X±SD	
<b>Sensitivity</b>						
Experimental G.	6.12±1.65	6.58 ±2.08	<b>t=-2.272 p=.028</b>	25.08±4.46	27.06±4.73	<b>t=-3.530 p=.001</b>
Control G.	6.80±2.28 t=-1.706 p=.092	6.86±2.06 t=-.676 p=.501	t=-.209 p=.836	25.50±4.81 t=-.453 p=.652	24.30±4.77 <b>t=2.904</b> <b>p=.005</b>	<b>t=2.172 p=.035</b>
<b>Seriousness</b>						
Experimental G.	18.02±4.60	18.28±4.73	t=-.475 p=.637	25.62±4.02	24.98±4.07	t=1.096 p=.278
Control G.	18.88±4.77 t=-.918 p=.361	19.80±5.26 t=-1.520 p=.132	<b>t=-2.092 p=.042</b>	26.92±4.92 t=-1.446 p=.151	26.36±5.24 t=-1.470 p=.145	t=1.012 p=.317
<b>Health Motivation</b>						
Experimental G.	20.72±2.47	21.54±2.75	<b>t=-2.293 p=.026</b>	----	----	----
Control G.	20.38±2.55 t=.678 p=.499	19.52±2.68 <b>t=3.719</b> <b>p=.001</b>	<b>t=3.121 p=.003</b>			
<b>BSE Benefit</b>						
Experimental G.	16.22±2.23	17.12±2.45	<b>t=-3.014 p=.004</b>			
Control G.	16.14±2.22 t=.180 p=.858	15.94±1.96 <b>t=2.660</b> <b>p=.009</b>	t=.680 p=.500	-----	-----	-----
<b>BSE Barrier</b>						
Experimental G.	18.86±4.55	16.40±4.96	<b>t=3.631 p=.001</b>	-----	-----	-----
Control Group	19.12±4.52 t=-.287 p=.775	19.24±4.68 <b>t=-2.946</b> <b>p=.004</b>	t=-.271 p=.787			
<b>Benefit</b>						
	<b>Mammography</b>			<b>PAP smear</b>		
Experimental G.	19.42±2.56	20.18±2.61	<b>t=-2.049 p=.046</b>	21.86±3.20	23.28±3.23	<b>t=-4.292 p=.001</b>
Control G.	20.34±2.47 t=-1.830 p=.070	20.30±2.18 t=-.250 p=.803	t=.126 p=.900	21.14±3.45 t=1.083 p=.281	21.16±3.75 <b>t=3.028</b> <b>p=.003</b>	t=-.046 p=.963
<b>Barrier</b>						
	<b>Mammography</b>			<b>PAP smear</b>		
Experimental G.	29.06±5.57	23.68±6.28	<b>t=8.668 p=.001</b>	20.92±3.33	21.24±2.70	t=-.916 p=.364
Control G.	26.96±6.29 t=1.768 p=.080	26.96±6.81 <b>t=-2.504</b> <b>p=.014</b>	t=.000 p=1.000	22.08±2.38 <b>t=-2.006</b> <b>p=.050</b>	21.74±2.38 t=-.982 p=.328	t=.901 p=.372
<b>Self-efficacy</b>						
	<b>BSE</b>			<b>Mammography and Cervical Ca</b>		
Experimental G.	36.84±5.98	41.54±4.48	<b>t=-8.338 p=.001</b>	7.58±12.21	13.10±11.77	<b>t=-5.143 p=.001</b>
Control G.	36.82±6.33 t=.016 p=.987	36.60±5.65 <b>t=4.842</b> <b>p=.001</b>	t=.341 p=.735	6.52±13.85 t=.406 p=.688	5.66±15.28 <b>t=2.727</b> <b>p=.008</b>	t=.572 p=.570
<b>Health responsibility</b>						
Experimental G.	17.54±3.98	18.56±4.62	t=-2.059 p=.045	----	----	----
Control G.	19.42±5.38 t=-1.988 p=.050	18.54±5.20 t=.020 p=.984	t=1.516 p=.136			

Experimental Group=Experimental G.

Control Group= Control G.

#### 4. Discussion

This study determined that the nursing interventions carried out using group health education based on HBM and HPM, film display, breast model and telephone reminder had a positive effect on increasing the rate of BSE, mammography, and Pap smear test in aged women; however, they were not effective in increasing CBE.

Similar to the findings of this study, the interventions performed using brochures, videos, and breast models were found to increase the frequency of BSE (8,24- 29). In line with the findings of this study, two researchers stated that there was no statistically significant difference between the experimental and control groups in terms of having CBE after an intervention (28,29). However, there are studies indicating that intervention is effective in increasing the rate of CBE (30-32). In addition to studies with similar findings reporting that interventions increased mammography screening (4,13), there are also contrary studies stating that interventions were not effective in increasing the rate of mammography use (28,29,32). A meta-analysis study reported that individual specific practice, particularly HBM (3.3 times) and doctor recommendations were effective in increasing mammography screening (33). It has been reported that the rates of cervical cancer screening might be increased with appropriate training through identifying barriers (10,24,34-36). Consistent with HBM and HPM, high cervical cancer sensitivity, self-efficacy and benefit perceptions following nursing interventions in the experimental group in this study were thought to have a positive effect on the behavior of Pap smear test use.

*The perception of sensitivity* has a direct impact on the realization of health behaviors (37). The training, telephone reminders and brochures might have had an increase in sensitivity perceptions in this study; however, there was no significant difference between the groups in terms of seeing breast cancer as a health threatening condition. Studies indicate that an increase in the perception of sensitivity increases participation in screening, and interventions are effective in increasing sensitivity perceptions (28,29,38-40). The perception of breast cancer sensitivity has not been found to be an important determinant in some studies (27,41-43). A few studies have confirmed that not perceiving cervical cancer as a risk causes pap smear tests to be ignored (44,45). Women with high cervical cancer sensitivity perceptions have higher pap smear test rates, yet the difference between them is not significant (46). The existence of a significant difference between post-nursing interventions and pre-nursing interventions in the experimental group in terms of sensitivity perceptions suggests that the implementation of nursing interventions were effective. The existence of a significant difference between post and pre-nursing interventions in the control group regarding sensitivity perceptions may be related to the effect of the questions in the forms on the individuals during the data collection process.

*Seriousness perception* is a term related with women's accepting the change that will occur in their lives after they have developed breast cancer, and HBM and HPM emphasize the seriousness perception regarding the expected health behaviors. We did not obtain an increase in seriousness perceptions in this study. The reason why there was no significant difference between the experimental and control groups in terms of women's post-nursing intervention cervical cancer seriousness perceptions was that cancer is generally considered to be a serious disease in all societies. Since almost all women consider breast cancer to be a serious condition, perceived seriousness has been shown to be the weakest determinant of HBM in other studies (5). Although women perceive cervical cancer to be a serious disease, they do not have Pap smear tests, as they consider it to be incurable (45). Some studies have shown that perceived seriousness is effective in increasing participation in screenings (28,31,46).

*Health motivation* generally shows individuals' behaviour and beliefs regarding a healthy life. High health motivation shows a willingness to realise the behaviours of early breast cancer diagnosis. This willingness can be increased by using nursing interventions such as training and telephone reminders. The increase in women's health motivation following the nursing interventions in this study is an expected outcome of the study. Studies report that health motivation has a positive effect on BSE and mammography utilization (20,40). There are also



studies determining that interventions do not affect women's perceptions of health motivation (5,27).

According to HBM and HPM, whether the behavior occurs or not is determined by the difference between *the perceptions of barriers and benefits*. In this study, the post-interventional perceived benefits for a BSE increased, and the perceived barriers decreased. Highly perceived benefits of participation in early breast cancer diagnosis behaviors and low perceived barriers have been shown to be a major determinant (19,25,38). One study reported that both telephone calls and counseling were successful in creating a change in the perceptions of sensitivity, barriers, benefits, and knowledge (31). Another study determined that the *perception of benefits and self-confidence* was higher in women who perform BSE than in those who do not perform it, yet there was no statistically significant difference between the two groups in terms of their barrier perceptions (5). Avcı, Atasoy and Sabah (2007) (27) found that the post-training BSE benefit and barrier scores of women were higher in comparison with their pre-training scores; however, the difference between them was not statistically significant. When the post-interventional mean score for BSE benefit and barrier perceptions in the sixth month was compared to the mean score of the control group, it was found to be significantly higher in the experimental group. Tanner-Smith and Brown (2010) (14) determined that the perceived benefits and barriers of HBM were the strongest determinant of participation in screening behaviors for both breast and cervical cancer. In this study, the decrease in the perception of mammography barriers and the increase in the perception of benefits in the experimental group may result from identifying the barriers with a qualitative investigation before the study and structuring the nursing interventions based on these findings. The decrease in barrier perceptions influenced mammography behavior positively. Ho (2007) (28) stated that the post-training perceptions of mammography benefits in women regarding screening were higher than the pre-training perceptions of mammography benefits. Champion, Skinner and Foster (2000) (31) reported in their study that the pre-training perceived benefits of women in the experimental group who were interviewed by phone calls and individually increased after the training, and when they were compared to the control group, the post-training difference between the groups was found to be statistically significant in comparison with that of pre-training. In the same study, the pre-training perceived barriers by women in the experimental group decreased both in the telephone interviewed group and the individually interviewed group; however, when compared to the control group, the post-training difference between the groups was not found to be statistically significant compared to that of pre-training. Secginli and Nahcivan (2011) (29) found the perceptions of mammography benefits in the sixth month after the program to be high and statistically significant. However, there was not a statistically significant difference in terms of mammography barrier perceptions. A few studies report that *perceived benefits and barriers* are effective in Pap smear test utilization (46,47). On the other hand, there are studies determining that Pap smear test use and perceived benefits are not correlational (9,45). Lee et al. (2012) (48) determined that perceived benefits were lower and perceived barriers were higher in older people. The post-training benefit perceptions of women in the experimental group in this study were higher than the pre-training benefit perceptions, and there was a statistically significant difference between the groups. The post-interventional score for the Pap smear test barrier perceptions in the experimental group increased in comparison with the pre-intervention barrier perceptions, whereas it decreased in the control group. There was not a significant difference between the experimental and control groups in terms of barrier perception scores following the nursing interventions. This situation may have resulted from some cultural characteristics of women such as preferring female physicians for examinations and inability to overcome feelings of shame and the like.

*Self-efficacy perception* is an individual's personal belief in achieving the behaviors regarding early diagnosis of breast cancer (38,39). An increase in women's self-efficacy perceptions in this study had a positive effect on both mammography and Pap smear test performance. The high post-training perceptions of cervical cancer sensitivity, self-efficacy and benefits and the telephone reminders in women in this study suggests that it might have influenced Pap smear test

performance positively. The intention to engage in BSE was correlational with self-efficacy and having information about breast cancer (49). The perception of self-efficacy has been determined to be effective in increasing mammography (41,42) and Pap smear test use (10,46,47).

*Health responsibility* is an individual's care for his/her health, becoming informed about health and ability to obtain professional help when necessary (23). In this study, there was not a difference between the experimental and control groups in terms of health responsibility following the nursing interventions. Johnson (1998) (50) determined that there was a weak negative relationship between health responsibility and BSE ( $r = -.406$ ), CBE ( $r = -.299$ ) and mammography ( $r = -.231$ ). However, the limited number of studies using HPM on early diagnosis behaviors for breast and cervical cancer suggests that further study is needed to demonstrate the effect of health responsibility perceptions on the behavior.

## 5. Conclusion and suggestions

The results of the study suggest that the nursing interventions based on HBM and HPM were effective in increasing the rates of BSE, mammography, and Pap smear test utilization in older women; however, they were not influential in CBE use. The results also indicated that the nursing interventions were effective in increasing breast cancer health motivation, the perceptions of BSE benefits and BSE self-efficacy in older women, and that they were influential in decreasing the perceptions of BSE barriers and mammography barriers. However, they were not effective in improving the perceptions of sensitivity, seriousness and mammography benefits. There is some documented controversy surrounding BSE (the USPSTF recommends against teaching BSE due to uncertainty that the harms outweigh the benefits) so our paper wouldn't benefit from supporting evidence that screening/early detection (specifically BSE) leads to decreased mortality. But, the breast cancer screening guide suggested by the Ministry of Health in our country requires BSE to be performed monthly by women aged 20 and over (51).

This study found that the nursing interventions were effective in increasing the perceptions of cervical cancer sensitivity and the perceptions of benefits, but they were not effective in increasing the perceptions of cervical cancer seriousness and decreasing the perceptions of barriers.

It was determined that the nursing interventions conducted in this study were effective in developing the perceptions of breast and cervical cancer self-efficacy in older women, yet they were ineffective in increasing health responsibility in them. Since nursing interventions regarding breast and cervix cancer based on HBM and HPM increase early diagnosis behaviors and affect the perceptions positively, nurses working in primary, secondary and tertiary care should use these models in their training, and they should support their training with methods such as BSE video, breast model and written materials. Further studies with long-term follow-up are needed to assess the relationship between the frequency of early diagnosis behaviors for breast and cervical cancer.

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