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Practice of Breast Cancer Early Diagnosis Methods among Women Living in Samsun, and Factors Associated with This Practice

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ABSTRACT

Objective: The purpose of this study was to assess practice of breast cancer early diagnosis methods among women and the factors associated with this practice.

Materials and Methods: The population of this cross-sectional study consisted of 410,377 women over the age of 20, living within the administrative borders of Samsun province. Stratified systematic sampling was used in the selection of the 800-member sample. The Health Belief Model Scale, a questionnaire consisting of open and closed-ended questions, was used to elicit women's demographic data and determine their awareness on early diagnostic techniques. The questionnaires were administered face-to-face by visiting individuals' addresses.

Results: 80.5% of women had knowledge on breast self-examination (BSE). 12.6% of the women who were aware of BSE stated that they regularly performed BSE. 30.4% of women had clinical breast examination (CBE) by health personnel at least once, while 36.8% of women over 40 years of age obtained mammography at least once. Factors associated with women's performance of BSE were age, having received education about breast health, perception of severity, barriers for BSE and self-efficacy. Factors affecting CBE included age, presence of history of breast cancer in a relative or friend, having received education about breast health; while factors associated with women's undergoing mammography were identified as age, a family member with a history of breast cancer and barriers for mammography.

Conclusion: Determination of the factors associated with practice of breast cancer early diagnosis methods, and implementation of planned training programs based on these results is important in increasing compliance with these methods.

Keywords: Breast cancer, breast self-examination, physical examination, mammography

Introduction

Breast cancer is a major public health problem affecting women's health. According to the World Health Organization World Cancer Report released in 2008, breast cancer is the most common cancer among women globally. It constitutes 23% of all cancers in women, with 1.1 million new cases of breast cancer each year (1). Breast cancer is the most common type of cancer in women and the most frequent cause of cancer related death in Turkey, as is the case throughout the world (2). It is estimated that the incidence of breast cancer that was previously reported to be 24.1/100,000 in 1993 has reached to 50/100,000 by 2010. These results suggest that the incidence of breast cancer has increased more than twice in Turkey in the last 20 years (3).

The most effective method to preserve/improve breast health, and reduce morbidity and mortality is early diagnosis. Clinical breast examination (CBE) and mammography are the main recommended methods for early diagnosis of breast cancer (4, 5). Although there are different opinions and studies on the effectiveness of breast self-examination (BSE) (6, 7), it is recommended for the detection of breast tumors and is indicated especially in developing and underdeveloped countries to raise breast health awareness (8, 9).

The American Cancer Society recommends regular monthly BSE in women over 20 years of age, CBE once in every three years between the ages of 20-40, and annually from the age of 40 along with annual mammography (10).

The Turkish Ministry of Health stated that women should obtain a mammogram every two years starting from the age of 40. In addition, it is emphasized that; BSE is an important tool in increasing the awareness of breast cancer in women, CBE should be performed in women under the age of 40, and CBE and mammography obtained over the age of 40 years may contribute to early diagnosis of breast cancer (11).

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Individuals naturally seek healthcare when they are sick. However, according to modern public health philosophy, the main issue is to maintain and improve an individual's health while they are healthy, before getting sick. Many factors affect well-being. Some of these factors are related to individual characteristics. These include genetic factors, as well as person's knowledge, attitudes and behaviors.

The Health Belief Model (HBM) is often used to explain preventive health behaviors in recent years. The model was developed in the early 1950s to explain lack of participation in disease prevention and screening programs. The main concept of the model is to predict the determinants of preventive health behaviors. The model is an active guide to explain and assess behaviors that protect and improve well-being as well as what motivates or blocks compliance to treatment in many health problems (12).

It is important to know the factors that are associated with the behavior of women on early diagnosis of breast cancer. However, the exact causes of compliance/non-compliance with early diagnosis behavior on breast cancer are not yet completely known. Factors other than socio-economic and cultural characteristics may be involved in individual behavior on health. Identification of these factors can guide preparation of a more comprehensive and efficient program directed for these patients.

The aim of this study was to evaluate practice of breast cancer early diagnosis methods among women and the factors associated with this practice.

Material and Methods

This cross-sectional study included women over the age of 20 who reside within Samsun constitute administrative boundaries. As of 01.01.2013, 410,377 women over the age of twenty years were registered to Samsun Family Medicine Information System.

Samsun is the largest city on the Black Sea coast of Turkey, with a population of about 1,250,000 people.

The minimum sample size has been determined in accordance with the following formula according to the specific number of individuals in the study group. The p-value was accepted as 0.5 since three different methods of early diagnosis were to be investigated, and due to lack of clear data on the implementation of breast cancer early diagnostic methods in Turkey.

$$n = \frac{n \cdot t^2 \cdot p \cdot q}{d^2 \cdot (n-1) + t^2 \cdot p \cdot q} = \frac{(410377) \cdot (1.96)^2 \cdot (0.5 \cdot 0.5)}{(0.05)^2 \cdot (410377-1) + 1.96)^2 \cdot (0.5 \cdot 0.5)} = \underline{383,80}$$

Although the calculated minimum sample size was 384, the sample size was accepted as 800 in order to overcome possible obstacles.

Stratified systematic sampling method was used for sample selection. The 410,377 women who constituted the study population were separated into groups according to age (21-30, 31-40, etc.), and the number of women from each group to be included into the study was identified according to the weight of their age group within the study. Women were ranked according to their national identification number. Then, the starting number was selected from the Random Number Generator and systematic sampling was applied within each age stratum.

The researchers prepared a questionnaire that addressed women's demographic information and their use of breast cancer early detection methods. Additionally, the Health Belief Model Scale (HBMS), which was developed by Champion (13) and was translated into Turkish by Gözüm and Aydın (14), was used as the second data collection tool in the study. The validity and reliability of the Turkish version has been previously analyzed.

The questionnaire included five items related to demographic information, and 12 questions on using early detection methods for breast cancer. The form consisted of open and closed-ended questions. Women's status regarding mammography and CBE was questioned by asking if they ever had a mammography and CBE at least once in their life.

The basic components of HBMS are the following:

Susceptibility refers to the belief in the possibility of developing a disease or exposure to an impact on health. Individuals with higher perceived susceptibility will decrease their risk related behavior.

Severity refers to perception of the consequences of a serious illness by an individual. This perception is particularly influenced by the individual's knowledge on the topic. If they are informed about the disease, their perception will be affected accordingly. For example, severity perception of flu will be different in a healthy individual from a patient with severe asthma.

Health motivation is the willingness to maintain health and behavior towards its improvement.

Perceived benefits refer to how valuable an individual believes the behavior changes are, and how much he/she believes that the behavior change can prevent disease risk.

Perceived barriers are factors that make it difficult to achieve the recommended behavior or the undesirable consequences a behavior is thought to result in. It is the perception that prevents or reduces engaging in health-related protective behavior. The individual evaluates both positive and negative consequences of the behavior. Consequently, he/she takes an action or not.If perceived benefits are higher than perceived barriers then preventive health behaviors are used more. Many authors state that perceived barriers are the most important factors in behavior.

Perceived self-efficacy refers to an individual's perception, desire and will of his/her competence to successfully perform a behavior. Believing that he/she can perform the behavior and may take results will motivate them. Therefore, individual's with self-efficacy takes actions more easily (12).

The entire evaluation on using early diagnosis methods was performed by HBMS sub-items on *Susceptibility*, *Severity* and *Health motivation*. In addition to these sub-items, *BSE perceived benefits*, *BSE perceived barriers* and *BSE self-efficacy* subunits have been used in the assessment of BSE performance status. *Mammography benefits* and *Mammography barriers* sub-items have been used in the evaluation of mammography.

Ethical approval was obtained from both Governor's Office and Ondokuz Mayıs University Clinical Research Ethics Committee.

The medical staffs (midwife / nurse) have been trained by the researchers before the application of questionnaires. The surveys were made by face-to-face interview technique, by visiting their address, between 01.04.2013 and 30.06.2013. Informed consent was obtained from all participants.

All women who were selected as part of the sample and agreed to participate were included in the study. Women with mental or physical illness severe enough to prevent them from responding to questions (mental retardation, severe psychiatric disease, cerebrovascular disease, etc.), those who could not be reached despite being visited twice on different dates at their residence and business address, those who can not be contacted with communication tools, those who were out of the city (emigrated, college education, etc.), and those who did not agree to participate in the study were excluded.

Out of the 800 women selected for sampling, the questionnaire was applied to 711 (88.9%). In the study, the term city refers to the city and its districts, while the term country refers to villages.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) statistical software package (version 13.0; SPSS, Inc., Chicago, IL, USA) was used for data analysis. Logistic regression analysis using the enter method was usedfor assessing factors associated with practice of early diagnosis methods. Women's status on using early detection methods was accepted as the dependent variable, while socio-demographic characteristics and HBMO scale was accepted as independent variables that influence dependent variable. The impact of independent variables on mammography was only evaluated in women over 40 years of age (399 women).

Results

The distribution of 711 women who agreed to participate in the study based on some features are presented in Table 1. 43.5% of women were primary school graduates, 77.6% were housewives, 81.3% were married, and 66,2% lived in the city.

9.4% of women (67 women) had a history of breast mass, 85.1% (57 women) of these lesions were benign breast changes. 3.1% of women had a first-degree relative (mother, sister or daughter) with breast cancer, and 31.5% knew someone (friends, neighbors, distant relatives etc.) who had breast cancer.

80.5% of the women stated that they heard about BSE (Table 2). 63.5% of the women who had heard of BSE (572 women) obtained this information from health personnel, 48.1% from television / radio, and 10.8% from friends / relatives.

Open-ended questions were asked to women who knew about BSE (572 women). Based on their responses to these questions, it was identified that 25.3% knew the correct frequency of BSE, 37.8% knew the correct relationship between menstrual cycle and BSE, and 28% knew how to perform BSE correctly (Table 2). 12.9% of women who participated in the study (92 women) correctly answered all three questions on the frequency of BSE, its relation to menstrual cycle, and how it should be performed.

Table 1. Socio-demographic properties of the study group - Samsun 2013

Variable	Number	Percentage
Age groups		
21-30 age	149	21.0
31-40 age	163	22.9
41-50 age	146	20.5
51-60 age	124	17.4
61-70 age	78	11.0
71+ age	51	7.2
Education status		
Illiterate	144	20.3
Literate	44	6.2
Primary school graduate	309	43.5
Junior high graduate	61	8.6
Highschool graduate	91	12.8
College graduate	62	8.7
Residence		
Country	240	33.8
City	471	66.2
Occupation		
Housewives	552	77.6
Employed	129	18.2
Retired	19	2.7
Student	11	1.5
Marital status		
Married	578	81.3
Single (never married)	62	8.7
Single (divorced, widow)	71	10.0
TOTAL	711	100.0

12.6% of women who knew BSE (572 women) performed monthly regular BSE, 55.1% with irregular intervals whenever it came to their mind, while 21.5% stated that they never performed BSE (Table 2).

72% of women participating in the study stated that they heard about mammography. 32.2% of women who were informed on mammography (512 women) had at least one mammography (Table 2). Out of women who had mammography, 58.8% had only one evaluation while 41.2% underwent mammography more than once. The rate of having at least one mammography was 54.9% within the group of women over forty years of age and who were informed about the method (268 women), whereas this rate was %36,8 in all women over the age of forty (399 women). Women underwent mammography either due to physician recommendation (66.1%) or voluntarily (33.9%). Mammography was taken for screening in 61.8%, for a breast mass in 24.3%, and due to breast complaints not related to mass in 13.9% of women.

30.4% of women stated that they had CBE by health personnel at least once (Table 2). 71.3% of women who had CBE (216 women)

Table 2. Status of women on knowledge and practice of early diagnostic methods - Samsun 2013

	Age					
	≤40 years (n=312)		41+ (n=399)		TOTAL (n=711)	
Early diagnosis methods	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**
Breast Self-examination						
Informed	273	87.5	299	74.9	572	80.5
Correct knowledge[a]						
Knowing the frequency	92	33.7	53	17.7	145	25.3
Knowing the relation to menstrual cycle	125	45.8	91	30.4	216	37.8
Knowing how to perform	86	31.5	74	24.7	160	28.0
Practice status[a]						
Irregular, whenever it comes to mind	136	49.8	179	59.9	315	55.1
Never performed	69	25.3	54	18.1	123	21.5
Regular, once a month	46	16.8	26	8.7	72	12.6
Regular, once a week	13	4.8	31	10.4	44	7.7
Performed only once	9	3.3	6	2.0	15	2.6
Regular, once every three months	-	-	2	0.7	2	0.3
Regular, annual	-	-	1	0.3	1	0.2
Mammography						
Heard of	244	78.2	268	67.2	512	72.0
Obtained[b]	18	7.4	147	54.9	165	32.2
Clinical breast examination						
Obtained	80	25.6	136	34.1	216	30.4

[a]Within women who heard of BSE
[b]Within women who heard of mammography

underwent the examination in a hospital, and 14.4% in a public health center. CBE was performed for screening in 67.7%, for a breast mass in 22.7%, and due to breast complaints not related to mass in 9.7% of women.

44.8% of women stated that they had been trained on breast health and early detection methods. These women (318 women) gained information by training seminars/training through conferences (50.5%), from public health centers (27.9%), hospitals (12.5%), or Cancer Early Detection, Screening and Education Centers (9.1%).

The results of logistic regression analysis, which was used to define the relationship between compliance with early diagnosis methods and socio-demographic characteristics and HBMS scores are presented in Table 3. The analysis results indicate that age, being educated in breast health, severity,BSE barriers and self-efficacy were effective on BSE performance. Age, family history of breast cancer, and being educated on breast health were effective on CBE performance; while age, family history of breast cancer and mammography barrierswere factors associated with mammography (Table 3).

Discussion and Conclusions

The rate of participants who have heard of BSE and mammography were 80.5%and 72%, respectively. 12.6% of women who have heard of BSE indicated that they regularly performed BSE once a month. 30.4% had at least one CBE by health care professionals, and 36.8% of women over 40 years of age had mammography at least once.

The rate of being informed on BSE was identified between 17.9% and 47.5%, while the rate of performing regular BSE was between 4.3% and 32.1% in various regions of our country, within different age and professional groups. The rate of CBE ranged between 19.8% and 42.7%, and having at least one mammography was found as 12.5% and 40.6% (15-27).

In a 1955 study of women from 20 European countries, it was identified that 54% never performed BSE, 8.0%performed BSE on a monthly basis at regular intervals, while 36% performed the examination irregularly (28). On the other hand, recent rates of regular BSE are reported between 7.7% and 36.7% (29-34).

The rates of performing CBE and mammography have been reported within a broad range of 33.0% to 81.0% in various international studies (35-38).

Rates on breast cancer awareness and application of early detection methods vary in studies with different age and sample groups. This study was conducted on a sample group selected out of Samsun, and shows differences from other studies in Turkey.

Table 3. Effect of variables on practice of early diagnostic methods - logistic regression analysis results

	BSE performance				Obtaining mammography*				CBE performance			
Variables	**B[a]**	**p**	**OR**	**%95 GA**	**B[a]**	**p**	**OR**	**%95 GA**	**B[a]**	**p**	**OR**	**%95 GA**
Age	0.33	0.010	1.03	1.00-1.05	0.14	0.032	1.04	1.00-1.08	0.25	0.001	1.02	1.01-01.04
Education status												
Illiterate (R)		0.569				0.091				0.148		
Literate	0.10	0.882	1.10	0.28-4.35	0.21	0.797	1.24	0.23-6.54	-0.61	0.214	0.54	0.20-1.42
Primary school graduate	-0.47	0.552	0.62	0.12-2.99	0.89	0.318	0.40	0.07-2.37	-0.33	0.547	0.71	0.24-2.10
Junior high graduate	0.40	0.467	1.50	0.50-4.49	0.43	0.561	1.54	0.35-6.79	0.13	0.740	1.14	0.51-2.52
College graduate	0.44	0.400	1.55	0.55-4.33	0.90	0.241	2.47	0.54-7.25	-0.07	0.840	0.92	0.42-1.99
Residence (R: city)	0.33	0.279	1.39	0.76-2.53	0.67	0.064	1.95	0.96-3.97	0.40	0.056	1.50	0.98-2.27
Occupation (R: working)	0.55	0.236	1.74	0.69-4.39	-0.16	0.764	0.85	0.29-2.44	-0.12	0.684	0.88	0.47-1.62
Marital status (R: married)	0.52	0.130	1.69	0.85-3.32	0.36	0.373	1.44	0.64-3.23	0.02	0.908	1.02	0.63-1.67
History of breast cancer												
Family (R: presence of history)	0.29	0.544	1.33	0.52-3.41	0.73	0.047	2.07	1.08-5.05	0.57	0.035	1.78	1.04-3.04
Friends (R: presence of history)	0.14	0.624	1.15	0.64-2.09	0.37	0.239	1.45	0.77-2.72	0.56	0.004	1.75	2.35-4.95
Education (R: had education)	1.33	0.000	3.81	2.16-6.72	0.10	0.734	1.02	0.49-1.64	1.22	0.000	3.41	0.20-0.42
Susceptibility	0.03	0.554	1.03	0.92-1.14	0.01	0.830	1.01	0.90-1.13	0.04	0.204	1.04	0.97-1.12
Severity	0.07	0.018	1.09	0.87-0.98	0.02	0.482	1.00	0.92-1.04	0.02	0.144	1.02	0.93-1.01
Health motivation	0.03	0.324	1.03	0.96-1.12	0.00	0.873	1.00	0.90-1.12	0.04	0.086	1.05	0.99-1.10
BSE benefits	0.02	0.958	0.99	0.91-1.09								
BSE barriers	-0.08	0.000	0.92	0.87-0.96								
BSE Self-efficacy	0.08	0.000	1.09	1.05-1.13								
Mammography benefits					0.05	0.923	1.00	0.90-1.12				
Mammography barriers					-0.06	0.004	0.93	1.00-1.08				

*In women older than 40 years old; [a]B: coefficient; R: reference group

Our study showed that the frequency of mammography in our country is lower than the reported rates from foreign countries.

In this study, 63.5% of women who stated that they heard about BSE identified their source of information as medical staff. In some studies, women stated television or media tools as their main source of information about breast cancer and early detection methods (19, 22, 39-42). However, there are other studies indicating the most common source of information as health professionals, similar to our study (27, 43, 44). In these studies, the rate of information obtained from health staff ranged from 35.4% to 47.7%. The health personnel's being the main source of information in our study is important to show that the medical staff in Samsun were able to reach women regarding breast cancer.

According to logistic regression analysis results, age is an effective variable on performance of BSE, CBE and mammography. In two different studies, age was not identified as a significant factor in application of early diagnosis methods (45, 46). The identification of age as an effective factor in our study might be related to an increase in breast cancer risk with advanced age, higher perception of risk of breast cancer, and thus more compliance with early diagnosis methods.

According to logistic regression analysis, presence of family or friend history of cancer was effective on CBE performance, while having a family history of breast cancer was a significant variable on mammography. Patients with family history of breast cancer had mammography 2.07 times more. This is an expected condition. In a study conducted in Istanbul, presence of breast cancer in a first or second-degree relative was an effective factor for obtaining mammography in women aged 40-49 years (47). The presence of a genetic risk or a relative with breast cancer will make women more aware of breast cancer.

In this study, women who received education on breast health performed BSE 3.81 times, and CBE 3.41 times more than women who were not informed. It has been shown in many studies that lack of knowledge on early detection methods for breast cancer is an obstacle for the implementation of these methods (23, 27, 48-50). Education increases awareness, which in turn leads to higher compliance with early diagnosis methods (23, 43, 46, 48, 51, 52).

Most studies support the positive effect of training. This study is consistent with other reports that identified positive improvement in individual behavior after training on early diagnosis methods. However,

it must be underlined that education alone will not be effective on application of early diagnosis methods in all cases (53). In their study on women over the age of 50, Vazquez et al. identified that providing information did not ensure compliance with screening, while providing means of accessing these methods (transportation, appointment, etc.) were beneficial (53).

In this study, according to logistic regression analysis, severity, BSE barriers and self-efficacy were identified as factors associated with BSE performance.

It is stated that women who have higher susceptibility to breast cancer (23, 54, 55), severity (14), health motivation (56-58), self-efficacy (29, 46, 54), BSE perceived benefits and low BSE perceived barrier (59, 60) performed BSE at higher rates. On the other hand, Jirojwong and MacLennan (54) stated that perceived BSE benefit and barriers did not influence rates of BSE performance.

In the very first study with logistic regression analysis from Turkey, susceptibility to BSE, BSE barrier and self-efficacy (23) were found to be influential, while another study found only BSE self-efficacy to be effective (46). Both of these two studies showed similar results to our study.

It is stated that women with high health motivation who understand the severity of breast cancer and who perceives herself under threat of the disease tend to perform more BSE, CBE and mammography as compared to other women of the same age (61).

In this study, according to logistic regression analysis, barriers for mammography were found to be effective on obtaining mammography.

The perception of health motivation has a positive impact on obtaining mammography (56, 57), and the rate of mammography increased parallel to an increase in self-efficacy (62-64).

Similar to our study, Russell and colleagues (65) determined that perceived benefits was not influential on routine mammography screening and that only low barriers increased mammography rates. In another study, there was no correlation between perceived benefits and mammography behavior, while a low barrier was reported to be effective in mammography (62).

According to a study from eastern Turkey, scores for susceptibility, severity, health motivation, and mammography benefits were higher, and mammography barrier scores were lower in women who had mammography as compared to those who did not undergo mammography (66).

In this study, according to logistic regression analysis, susceptibility, severity and health motivation were not found to be effective on CBE performance. Yılmaz et al. (46) also reported that these variables had no effect on CBE performance status.

The risk of breast cancer increases with age. The average life expectancy of women in Turkey was reported as 79.4 years in 2013, and it is expected to increase in time (67). Therefore, breast cancer will likely remain as a major public health concern in the future. The most important intervention in improving people's health level is the development of positive health behavior. Early diagnosis methods and prevention from breast cancer continue to be most important tools in reducing morbidity and mortality. Identification of the factors influencing behavior on breast cancer early diagnosis methods, implementation of planned training programs based on these results and supporting training with reminders are valuable in generalized use of application of these methods.

Ethics Committee Approval: Ethics committee approval was received for this study.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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