RESEARCH ARTICLE

Breast Cancer Risk and Early Diagnosis Applications in Turkish Women Aged 50 and Over

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Abstract

Background: The aim of the study was to determine breast cancer risk and early diagnosis applications in women aged ≥50. Materials and Methods: This cross-sectional, descriptive field study focused on a population of 4,815 in Mansuroğlu with a 55.1% participation rate in screening. In the study, body mass index (BMI) was also evaluated in the calculation of breast cancer risk by the Breast Cancer Risk Assessment Tool (BCRA) (also called the "Gail Risk Assessment Tool") . The interviewers had a three-hour training provided by the researchers, during which interactive training methods were used and applications were supported with role-plays. Results: The mean age of the women participating in the study was 60.1±8.80. Of these women, 57.3% were in the 50-59 age group, 71.7% were married, 57.3% were primary school graduates and 61.7% were housewives. Breast-cancer development rate was 7.4% in the women participating in the study. When they were evaluated according to their relationship with those with breast cancer, it was determined that 73.0% of them had first-degree relatives with breast cancer. According to the assessment based on the Gail method, the women's breast cancer development risk within the next 5 years was 17.6%, whereas their calculated lifetime risk was found to be as low as 0.2%. Statistically significant differences (P=0.000) were determined between performing BSE - CBE and socio-demographic factors. Conclusions: It was determined that 17.6% of the participants had breast cancer risk. There was no statistically significant difference between the women with and without breast cancer risk in terms of early diagnosis practices, which can be regarded as a remarkable finding. It was planned to provide training about the early diagnosis and treatment of breast cancer for people with high-risk scores, and to conduct population-based breast cancer screening programs.

Keywords: Breast cancer - breast cancer risk factors - early diagnosis - breast self examination - mammography

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Introduction

Breast cancer which accounts for about 30% of all cancers and 18% of cancer-related deaths is the cancer type the incidence of which increases with age. On the other hand, it is a known fact that the increase in the number of women's attempts to apply for early diagnosis is not in accordance with the increase in the risk of breast cancer with age. Breast cancer risk in women between the ages of 35-50 is 2.5% if they do not have major risk factors; however, it is known that the risk increases after the age of 50 due to various factors (IARC, 2001; WHO, 2002; Parkin and Fernandez, 2006; NCI, 2012). Therefore, it is of great importance to determine the breast cancer risk in women over the age of 50 and to recognize early diagnosis applications in a society in which healthcare service is provided.

Within the frame of prevention activities which are the first step in the control of cancer, determining the following risk factors are crucial: age, cancer in the other breast, a family history of cancer, benign breast diseases, early menstruation (menarche), late menopause, giving the first birth after age 30, hormonal factors, diet, obesity, alcohol consumption, smoking and environmental conditions. (WHO, 2002; Moore et al., 2003; Bilgiç et al., 2005; Dumitrescu and Cotarla, 2005). The Gail model used to determine the estimated risk of breast cancer in high-risk groups and the Claus model preferred to determine the risk of breast cancer in women with a family history of cancer are important tools in the calculation of the breast cancer risk (Claus et al., 1998; Euhus, 2001; Elmore and Fletcher, 2006). Both models have certain limitations for the detection of the risk; however, it should be kept in mind that detection of cancer risks provides valuable data when the control of cancer is planned (Üskent, 2003).

After the identification of risk factors for breast cancer, it is possible both to prolong life and to improve quality of life by obtaining successful results through early

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diagnosis and screening programs (Aydemir et al., 2003; Moskowitz et al., 2007). Therefore, women should be aware of early detection and prevention methods [breast self-examination (BSE), mammography, clinical breast examination (CBE)] of breast cancer which poses a great risk for them. However, in several studies on the issue, it has been reported that women lack knowledge about the prevention methods and early detection of breast cancer (Aydemir et al., 2003; Seçginli and Nahcivan, 2004; Çeber et al., 2005; Dişcigil et al., 2007; Moskowitz et al., 2007). Since breast cancer risk is not the same for every woman, it is important to determine women's risk for breast cancer by distinguishing which risk group they are in. Then they should be told their risk status and informed about prevention methods and early detection of breast cancer by increasing their awareness about breast cancer. Thus, through risk analysis, planning early diagnosis and screening programs of breast cancer can be ensured (Balducci and Extermann, 2000; Dumitrescu and Cotarla, 2005).

Based on this approach, the present study aimed to determine the breast cancer risk in women aged 50 and older and their awareness to use early diagnosis methods. It was also planned how to widen health education and treatment opportunities to be provided for women after the study.

Materials and Methods

Design, setting and sample

This is a cross-sectional, descriptive field study. Mansuroğlu neighborhood in Bayraklı District of İzmir comprised the universe and sample of the study. This region was preferred because more of the population inhabiting there aged 50 and over. Mansuroğlu has a population of 4,815 and about 52% of this population is women (TUIK, 2012). All the women 50 years and over living in the area (n=2386) were planned to be included in the study. After the objectives of the study were explained, of the women 50 years of age and older who agreed to participate in the study, 1313 who had no hearing problem and were able to communicate verbally were included in the study (55.1% participation rate). Those who did not volunteer to participate in the study or were not at home during the three visits were excluded from the study. In order to conduct the study, necessary permissions were obtained from the mukhtar (the elected head of a neighborhood), municipality and university. For the collection of data, questionnaires prepared by the researchers within the scope of the literature (Çeber et al., 2005; Avcı, 2007; Dişcigil et al., 2007; Karayurt et al., 2009; Demirelöz et al., 2010) were used. Seventeen students took part in the collection of research data as interviewers. The interviewers had a three-hour training provided by the researchers. During the training, interactive training methods were used and applications were supported with role-plays. The questionnaires were first administered to 30 people not participating in the research and ambiguous statements were rewritten. Interviewers visited the participants in their homes every day at 10.00 o'clock and conducted face-to-face interviews along 20 months in between 2007-2008 years. It took about 20-30 minutes to fill in the questionnaire.

Measures

The questionnaire used in this study consisted of two parts. Whereas the first part of the questionnaire included questions about the participants' socio-demographic characteristics, the second part included questions about the risk of breast cancer. The socio-demographic characteristics part questioned the following points about the women aged 50 and older in the study: marital status (1=married, 2=widowed, 3=divorced, 4=single), family type (1=nuclear; 2=extended, 3=fragmented; 4=one-person), education (1=illiterate, 2=5 years, 3=8 years, 4=11 years, 5=15 or more years of education), employment status (1=working (employed) 2=not working (unemployed)), social security, (1=with social security, 2=without social security) and income based on the participants' own statements (1=income less than expenses, 2=income equal to expenses, 3=income more than expenses). In the second part of the questionnaire, questions about breast cancer risk factors of the participants (smoking, alcohol consumption, exercise, exposure to stress in the last five years), reproductive characteristics, estrogen use, personal or family breast cancer history, lifestyle were asked, and their risks for breast cancer were evaluated based on their responses.

In the study, body mass index (BMI) was also evaluated in the calculation of breast cancer risk. For the calculation of the BMI, first the participants' weights and heights were measured. While their weights were measured, they wore light clothing. Their heights were measured with a meter mounted on the wall while they stood barefooted. Then each person's body mass was divided by the square of her height. In line with the classification by WHO, those with BMI less than 18.50 were considered as underweight, between 18.5-24.9 as normal weight, between 25.00-29.99 as overweight, and more than 30.00 as obese.

In order to determine the breast cancer risk for the participants, the Breast Cancer Risk Assessment Tool (BCRA) (also called the "Gail Risk Assessment Tool") was used. The tool was developed by Gail et al. (1989) to assess the risk of breast cancer. This model assesses the five-year and lifetime risk of breast cancer by considering a woman's individual risk factors. The model was developed using the data of the Breast Cancer Detection and Demonstration Project which was conducted with 280,000 women in 28 centers in the US. Within the scope of the Gail model, the questionnaire which included items questioning whether the women aged 35 and above were diagnosed with breast cancer, whether they had breast biopsies and if they did how many times, their age, age at menarche, age they gave the first birth, race, the presence of atypical hyperplasia, the number of the first-degree relatives with breast cancer (sister, daughter and mother) was used as the risk assessment tool (NCI, 2012). Participants' estimated five-year and lifetime risk of developing breast cancer was assessed by filling out the "Breast Cancer Risk Assessment Tool" in the electronic environment (NCI, 2012). According to the Gail model, women with the breast cancer risk of ≥1.67%

were evaluated as "risky" according to the estimated 5-year breast-cancer-risk assessment (Abu-Rustum and Herbolsheimer, 2001; Graubard et al., 2010). Tool is useful to estimate the approximate number of women with a lifetime risk of ≥20% in the general population (Graubard et al., 2010).

In addition, in the second part of the questionnaire, the participants' attitudes towards the methods for early diagnosis of breast cancer (Breast Self-examination, clinical breast examination, mammography) were evaluated.

Data analysis

For the evaluation of the study data, descriptive analyzes were performed by using SPSS 16.0 software package, and the relationship between breast cancer risk and early diagnosis practices were evaluated by using the chi-square analysis.

Results

The mean age of the women participating in the study was 60.1±8.80. Of these women, 57.3% were in the 50-59 age group, 71.7% were married, 57.3% were primary school graduates and 61.7% were housewives. Of the women surveyed, more than half reported that their incomes were lower than their expenses, 31.0% were classified as obese according to the BMI criteria, and most had the social security and a nuclear family structure.

Breast-cancer development rate was 7.4% in the women participating in the study. When they were evaluated according to their relationship with those with breast cancer, it was determined that 73.0% of them had first-degree relatives with breast cancer and 27.0% had second-degree relatives with breast cancer (Table 1).

When the women's reproductive functions were evaluated in terms of the breast cancer risk, it was determined that of them, 53.8% had their menarche at 12-13 years of age, 52.5% got married at 19-25 years of age, 43.4% became pregnant for the first time between the ages of 20 and 24, and 45.3% delivered their first child at the age of 20-24. Of the women, 21.5% experienced three pregnancies, 43.9% gave two births, 21.2% breastfed their children for four or more years, and 32.6% went through menopause between the ages of 50 and 54. Of the women included in the study, 27.0% took birth control pills, 9.7% started taking the pills between the ages of 25 and 29 , and 17.8% took the pills for 1-4 years. Of the women included in the study, 13.2% had hormone replacement therapy (HRT), and 4.8% had HRT more than 25 months.

Breast Cancer Risk status of the women participating in the study is given in Table 2. According to the assessment based on the Gail method, the women's breast cancer development risk within the next 5 years was 17.6%, whereas their calculated lifetime risk was found to be as low as 0.2%. When the life-style behaviors of the women included in the study were evaluated, it was determined that exercise (X^2=0.364, p>0.5), the stress status (X^2=1.019, p>0.5), smoking habits (X^2=3.512, p>0.5) and alcohol consumption habits (X^2=0.271, p>0.5) did not affect their five-year risk of breast cancer.

In the study, while 71.7% of the women performed BSE, only 20.1% of these women performed BSE regularly. Evaluation of the women's practices regarding early diagnosis of breast cancer revealed that of them, 53.2% had CBE, 59.2% underwent mammography. Of the women who underwent mammography, 32.1% underwent it regularly. The women's practices regarding early diagnosis of breast cancer in terms of their socio-demographic characteristics, life styles and breast cancer risk were evaluated and the findings are presented in Table 3.

A statistically significant difference was determined between performing BSE and "the marital status and employment status" of the women participating in the study. Those who were married (p=0.000) and those who were employed (p=0.000) performed BSE more. It was also determined that the higher the income and education level was, the higher the rate of performing BSE (p=0.000) was. However, no statistically significant difference relationship was determined between performing BSE and "family type, social security, BMI, family history of breast cancer, and breast cancer risk". While there was a statistically significant difference between performing BSE and exercise (p=0.000), there was no statistically significant difference between performing BSE and "stress, smoking, alcohol consumption".

Table 1. Socio-Demographic Information about the Women Included in the Study

		No.	%
Socio-Demographic Information (N=1313)			
Age group	50-59	752	57.3
	60-69	343	26.1
	≥70	218	16.6
Marital status	Married	941	71.7
	Single (Widowed/Divorced)	372	28.3
Education	Illiterate	166	12.7
	Primary/Junior High School	753	57.3
	≥High School	394	30.0
Family type	Nuclear	991	75.5
	Others (Extended, Fragmented)	322	24.5
Social security	Yes	1272	96.9
	No	41	3.1
Income status	Income<Expenses,	781	59.5
	Income=Expenses	426	32.4
	Income>Expenses	106	8.1
Employment status	Employed	503	38.3
	Unemployed	810	61.7
BMI (Kg/m^2)	≤29.99	906	69.0
	≥30.00	407	31.0
Family history of cancer	Yes	97	7.4
	No	1216	92.6
	Total	1313	100.0
Degree of the Relationship with the Family Member with Breast Cancer			
* 1st Degree Relatives (Mother, Sisters And Daughter)		71	73.0
2nd Degree Relatives (Aunt)		26	27.0
Total		97	100.0

*Those who had a family member with breast cancer were included (n=97)

Table 2. Socio-Demographic Information about the Women Included in the Study

Breast Cancer Risk Status	No.	%
At Risk	231	17.6
Not at Risk	1082	82.4
Total	1313	100.0

Table 3. The Women's Practices Regarding Early Diagnosis of Breast Cancer in Terms of Their Socio-Demographic Characteristics, Life Styles and Breast Cancer Risk

Socio-demographic characteristics	Those Performing BSE		Those not Performing		Those Having BSE		Those not CBE		Those Undergoing Mammography Having CBE		Those not Undergoing Mammography	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Age Group	*X^2=73.853, p=0.000				*X^2=103.173, p=0.000				*X^2=135.419, p=0.000			
50-59	591	78.6	161	21.4	473	62.9	279	37.1	526	69.9	226	30.1
60-69	248	72.3	95	27.7	175	51.0	168	49.0	198	57.7	145	42.3
≥70	102	46.8	116	53.2	50	22.9	168	77.1	53	24.3	165	75.7
Education	*X^2=30.291, p=0.000				*X^2=75.263, p=0.000				*X^2=105.253, p=0.000			
Illiterate	94	56.6	72	43.4	52	31.3	114	68.7	54	32.5	112	67.5
Primary school/Junior high school	533	70.8	220	29.2	374	49.7	379	50.3	419	55.6	334	44.4
≥Senior high school	314	79.7	80	20.3	272	69.0	122	31.0	304	77.2	90	22.8
Marital Status	X^2=20.861, p=0.000				X^2=13.339, p=0.000				X^2=14.105, p=0.000			
Married	708	75.2	233	24.8	530	56.3	411	43.7	587	62.4	354	37.6
Single (widow/divorced)	233	62.6	139	37.4	168	45.2	204	54.8	190	51.1	182	48.9
Employment Status	X^2=12.901, p=0.000				X^2=28.107, p=0.000				X^2=32.472, p=0.000			
Employed	389	77.3	114	22.7	314	62.4	189	37.6	347	69.0	156	31.0
Unemployed	552	68.1	258	31.9	384	47.4	426	52.6	430	53.1	380	46.9
Family Type	X^2=3.843, p=0.055				X^2=39.964, p=0.000				X^2=15.898, p=0.000			
Nuclear	724	71.7	267	28.3	576	58.1	415	41.9	617	62.3	374	37.7
Others (extended, fragmented)	217	67.4	105	32.6	122	37.9	200	62.1	160	49.7	162	50.3
Income Status	*X^2=10.386, p=0.00127				*X^2=39.424, p=0.000				* X^2=40.205, p=0.000			
Income<Expenses	533	68.2	248	31.8	368	47.1	413	52.9	408	52.2	373	47.8
Income=Expenses	325	76.3	101	23.7	248	58.2	178	41.8	288	67.6	138	32.4
Income>Expenses	83	78.3	23	21.7	82	77.4	24	22.6	81	76.4	25	23.6
Social Security	X^2=3.594, p=0.077				X^2=4.670, p=0.038				X^2=8.942, p=0.003			
Yes	917	72.1	355	27.9	683	53.7	589	46.3	762	59.9	510	40.1
No	24	58.5	17	41.5	15	36.6	26	63.4	15	36.6	26	63.4
Exercise	X^2=12.850, p=0.000				X^2=27.070, p=0.000				X^2=24.286, p=0.000			
Yes	543	75.7	174	24.3	428	59.7	289	40.0	468	65.3	249	34.7
No	398	66.8	198	33.2	270	45.3	326	54.7	309	51.8	287	48.2
Stress	X^2=3.509, p=0.066				X^2=4.194, p=0.042				X^2=6.110, p=0.015			
Yes	691	73.1	254	26.9	519	54.9	426	45.1	579	61.3	366	38.7
No	250	67.9	118	32.1	179	48.6	189	51.4	198	53.8	170	46.2
Risk Status	X^2=0.536, p=0.470				X^2=1.785, p=0.192				X^2=0.237, p=0.658			
At risk	161	69.7	70	30.3	132	57.1	99	42.9	140	60.6	91	39.4
Not at risk	780	72.1	302	27.9	566	52.3	516	47.7	637	58.9	445	41.1
Family History of Cancer	X^2=3.069, p=0.100				X^2=15.192, p=0.000				X^2=11.211, p=0.001			
Yes	77	79.4	20	20.6	70	72.2	2741513		73	75.3	24	24.7
No	864	71.1	352	28.9	628	51.6	588	48.4	704	57.9	512	42.1

*X^2trend

A statistically significant difference was determined between performing CBE and the participants' marital status, employment status, family structure, social security status and family history of breast cancer. The rate of performing CBE was higher among the participants who were married and/or employed or who had a nuclear family structure, social security and/or family history of breast cancer. It was also observed that as the income and education level increased so did the rate of having CBE (p=0.000) and that the rate of having CBE decreased as the age increased. No statistically significant relationship was determined between BMI and having CBE. A statistically significant difference was determined between performing CBE and the participants' exercise status, undergoing stress and alcohol consumption levels. While the rate of having CBE was higher among those who exercised, underwent stress and/or consumed alcohol, there was not a statically significant difference between smoking and having CBE.

In the study, a statically significant difference was determined between undergoing mammography and the participants' marital status, employment status, family structure, social security status and having a family history of breast cancer. The rate of undergoing mammography was higher among those who were married and/or employed or who had social security and/or family history of breast cancer. It was also determined that as the income and education level increased so did the rate of undergoing mammography significantly (p=0.000), and that the rate of undergoing mammography decreased significantly as the age increased. No statistically significant relationship was determined between undergoing mammography regularly and "BMI and breast cancer risk".

While the difference between undergoing mammography regularly and "exercise, suffering stress and alcohol consumption habits" was statistically significant, the difference between undergoing mammography regularly and smoking habits was not statistically significant.

Discussion

At the end of the study, it was determined that 17.6% of the participants had breast cancer risk. There was not a significant difference between the women with and without breast cancer risk in terms of implementing early diagnosis methods.

In this article, we used the NCI's Breast Cancer Risk

Assessment Tool to calculate risk estimates for Turkish women. By applying the Gail model to the research group, we found that 5-year breast cancer risk of women participating in the study was 17.6%. The 5-year breast cancer risk rate was determined as 18.1% among the women over the age of 40 in Mermer et al.'s study whereas it was 2.5% among the women aged 35-60 in Abu-Rustum et al.'s study (Abu-Rustum et al., 2001; Mermer and Meseri, 2011). In another study carried out by Adams-Campbell et al. (2009) in the U.S., 883 women over the age of 35 were compared in terms of breast cancer risk through the Gail and CARE models, and the risk was 7% higher according to the Gail model (Adams-Campbell et al., 2009).

It is known that a lot of factors play a role in the development of breast cancer. Although the risk rate varies from one group to another, breast cancer is a common cancer type which affects 1 out of 8 women and therefore is a public health problem to be dealt with (IARC, 2001; Parkin and Fernandez, 2006; NCI, 2012).

Evaluation of the women participating in the study in terms of practicing methods for early diagnosis of breast cancer (BSE-CBE-Mammography) revealed that: *i*) of the women, 71.7% performed BSE; however, regular practice of BSE was low: 20.1%. In several studies, BSE rates displays a wide range of 21.9% to 61.7% (Ahmad and Stewart, 2004; Davis et al., 2005; Discigil et al., 2007; Slusarska et al., 2010). And the regular practice of BSE rates decrease, which is quite in line with our study results (Dündar et al., 2006; Discigil et al., 2007; Slusarska et al., 2010). It should be kept in mind that BSE would not be effective in the early diagnosis of breast cancer unless it is performed regularly; *ii*) Of the women, 53.2% had CBE, and 67.7% underwent mammography regularly. In other studies conducted on the same issue, the rates for having CBE and undergoing mammography are 25% and 57%, respectively (Davis et al., 2005; Parsa et al., 2008). And are reported to range between 25.5% and 64.8% (Selvin and Brett, 2003; Davis et al, 2005; Slusarska et al., 2010; Al-Naggar and Bobryshev, 2012). In terms of breast health, it is recommended by the American Cancer Society that women over the age of 50 should have CBE and mammography annually; thus, it is essential to provide training for women in order that they can understand the importance of participating in screenings for mammography and CBE.

Statistically significant differences were observed between CBE and mammography both of which provide more objective findings and the variables such as age group, education level, marital status, employment status, family type, income status, and social security.

It was determined that the rates of having CBE and undergoing mammography increased as did the women's age, education and income levels, and that women who were married and/or employed and who had social security had CBE and underwent mammography more than did the other women.

Similarly, in a study conducted by Yavan et al. (2010) a significant relationship was determined between the women's education levels and "CBE and mammography" (Yavan et al., 2010). In another study conducted in Nigeria, women's marital status and education levels were found to be effective in their habits of performing BSE (Oluwatosin, 2010). Similar findings were also determined in other studies, and the researchers found that marital status, education level, health insurance and cultural characteristics affected women's undergoing mammography (Achat et al., 2005; David et al., 2005). In the study, a significant relationship was observed between the women's family type, employment status and social security and the application of the early diagnosis methods.

That the women who were employed, who had social security and who were the members of a nuclear family implemented costly diagnostic methods such as CBE and mammography more than did the other women is an expected result in our country's conditions. These results indicate that women tend to implement early breast cancer diagnosis methods more in addition to obtaining many social benefits if their education levels are increased and if they have social security.

In the women studied, family history of breast cancer was determined. Of all the respondents, 97 (7.4%) had a history of breast cancer in their relatives, 71 (73%) of whom were 1st degree relatives and 26 (27%) of whom were 2nd degree relatives. In our study, a family history of breast cancer and the presence of cancer risk were not found to have a significant influence on the practice of women's mammogram screening, which is in line with the study result of Achat et al. (2005). On the contrary, Discigil et al. (2007), Al-Naggar and Bobryshev (2012) found association between a family history of breast cancer and an increased use of mammography (Discigil et al., 2007; Al-Naggar and Bobryshev, 2012). This difference is thought to stem from the cultural characteristics of the regions where the study was conducted.

When the differences between the women's life-style and their application of the methods of early diagnosis were evaluated, statistically significant differences were determined between their diet, smoking and alcohol consumption status and "BSE, CBE and mammography". It was observed that the women who exercised applied for the early diagnosis of breast cancer more. Exercise is known to protect people against a number of diseases, including breast cancer (Sheppard et al., 2011). This is important because it indicates that women who exercise are health-conscious. In the study, it was found that women whose stress level was high had CBE and underwent mammography more, and that stress did not affect their attitudes towards BSE. In her study, Kelly (2004) stated that stress might be a barrier against performing BSE (Kelly, 2004). It is recommended that the effect of stress on attempts to early diagnosis of breast cancer should be investigated in future studies.

In this study, there was no statistically significant difference between the women with and without breast cancer risk in terms of early diagnosis practices, which can be regarded as a remarkable finding. Yavan et al. (2010) study stated that women who have a high perception of breast cancer risk are more inclined to have early diagnosis practices (Yavan et al., 2010). This difference may have stemmed from the fact that the assessment of the women's breast cancer risk was not based on their perceptions but on the Gail method. Therefore, providing training to increase women's awareness of breast cancer and to help them develop protective behavior is as important as identifying the breast-cancer risks.

At the end of the study, it was planned to provide training about the early diagnosis and treatment of breast cancer for people with high-risk scores, and to conduct community-based breast cancer screening programs.

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