RESEARCH ARTICLE

Compliance with Screening Recommendations According to Breast Cancer Risk Levels in Izmir, Turkey

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Abstract

Early diagnosis has a major role in improving prognosis of breast cancer. The purpose of this study was to assess the risk status of women 35-69 years of age using risk assessment models and the prevalence of mammography in a community setting. The sample of this cross sectional study consisted of 227 women, 35-69 years of age residing in Izmir, a city located in western region of Turkey. A questionnaire was used to collect data and the Gail and Cuzick-Tyrer models were applied to assess the risk of breast cancer. In this study, 52.7% of women had mammography at least once, and 41.3% of the women over the age of 40 had mammography screening in the last two years. The five years risk for breast cancer was high in 15.8% of women according to the Gail model and ten years risk was high in 21.7% with the Cuzick-Tyrer model. In the present study, the breast cancer risk levels were assessed in a population setting for the first time in Turkey using breast cancer risk level assessment models. Being in 60-69 age group, having low education and not being in menopause were significant risk factors for not having mammography according to logistic regression analysis. Mammography utilization rate was low. Women must be educated about breast cancer screening methods and early diagnosis. The women in the high risk group should be informed on their risk status which may increase their attendance at breast cancer screening.

Keywords: Breast cancer - cancer risk assessment models – mammography - screening

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Introduction

Breast cancer is the most frequent and most fatal cancer type seen in women both in the world and in Turkey (Ferlay et al., 2010). Breast cancer is a rare disease in women under 40; however, the frequency of the disease increases with age (Thompson et al., 2005). Breast cancer frequency varies between countries, and it is seen more frequent in developed countries than in developing countries. The fatality rate of breast cancer is 30% in developed countries, and 43% in underdeveloped countries. These important differences can be explained by the early diagnosis due to screening mammography and by better treatment possibilities in developed countries (Boyle et al., 2008).

Advanced age, breast cancer history in family, detection of BRCA1 and BRCA2 gene mutation in women, detection of atypical hyperplasia, lobular carcinoma in-situ or ductal carcinoma in-situ in breast biopsy, having first menstruation in early ages (<12), having menopause in advanced age (>55), giving first birth after 30 or not giving any birth, use of combined oestrogen/progesterone Hormone Replacement Treatment (HRT), use of current or recent oral contraceptives, adult weight gain, sedentary life style and using alcohol are listed as risk factors in breast cancer (Thompson et al., 2005).

The most important factor that determines prognosis in breast cancer is diagnosis in the early period. The most effective screening method that decreases mortality rate in breast cancer is mammography (Thompson et al., 2005). There are different practices in what age and how frequent for mammography to be utilized. Although, in Turkey, in the United Kingdom, the Netherlands and Israel mammography after 50 years of age is determined as screening standard; in the USA, Australia and Sweden, starting of mammography is determined as 40 (Boyle et al., 2008). American Cancer Society (ACS) (American Cancer Society, 2012) and National Cancer Institute (NCI) states that mammography screening should be utilized every 1-2 years after 40 (National Cancer Institute, 2012).

Determining breast cancer risk level in women is pretty important for preventing breast cancer. There are various methods to assess the breast cancer risk level (Amir et al., 2003; Evans et al., 2007). Gail model is used in the USA to detect who are suitable for breast cancer prevention (Gail et al., 1989; Ozanne et al., 2006). In Gail model analysis, medical history variables which are the main identifiers for breast cancer risk such as immediate family history,

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advanced age of first birth, having first menstruation in early ages, are used (Gail et al., 1989). This model calculates the five years and lifetime risk of women using the individual risk factors. According to Gail model, women with breast cancer risk over 1.67% are considered as high risk group and it is suggested that the clinically suitable ones use tamoxifen for prophylaxis (Gail et al., 1999; Thompson et al., 2005). In 2003, the previous breast cancer risk calculation models was investigated by Cuzick and Tyrer, and it is found that some of these models were built on individual medical history and family history, and some of them on the existence of genetic mutations. Therefore, the computer-based program was generated by expanding individual and family medical history in order to assess breast cancer risk (Tyrer et al., 2004). This model is considered as the more advanced model which is the most sensitive and ever-revised model (Amir et al., 2003; Lech et al., 2011).

The aim of this study is to assess the risk status of women 35-69 years of age using risk assessment models and its effect on compliance to mammography screening recommendation. Since there is not an effective breast cancer screening programme in Turkey, using mathematical models in referring high risk women to mammography screening might be useful.

Materials and Methods

This was a cross sectional study conducted on women in 35 and 69 years of age living in district of Balçova, İzmir, located in the western part of Turkey. The data were collected by a questionnaire between 30 March 2009 and 30 September 2009.

The sample of the study was calculated as 227, by using the prevalence as 20% from the previous studies conducted in Turkey, precision as 5%,with 95% confidence interval level. In comprising the sample with addition 250 women were selected by simple random sampling.

In order to assess the breast cancer risk levels of women and to assess the factors that affect mammography a questionnaire comprising of 35 questions including sociodemographic features, and questions for assessing breast cancer risk level was prepared. After receiving Dokuz Eylül University Faculty of Medicine Clinical and Laboratory Research Ethics Committee approval and having the participants' verbal consent by face-to-face interview, the questionarries were carried out by the researcher. The questionarries were filled out by interviewing a total of 227 women. In order to assess breast cancer risk levels Gail model (National Cancer Institute, 2012) and Cuzick-Tyrer model (Cuzick et al., 2012) computer-based programmes were used. Risk levels were categorized as low or high. Women were categorized as high risk whose scores are above the average of the same age group.

In data analysis SPSS 15.0 software package and Epi-info Statcalc software were used. Women over 40 who had had mammography examination in the last two years test were considered as "in compliance" with mammography recommendation of NCI. In assessing compiance in mammography, Pearson chi-square, Fisher's exact and Chi-square of trend tests were used as statistical analysis methods. If the p value obtained was smaller than 0.05, the difference was considered significant. The influence of the sociodemographic and individual features of the women on not having mammography examination was analyzed using logistic regression. The age and education of women which were found statistically significant in the analyses of compliance with NCI recommendations in the model built on not having mammography, and menstruation status, breast cancer history in the family and income state of the family which was predicted as affecting not having mammography were taken as variables into the model. Women over 40 were taken for analysis of compliance to screening recommendations (National Cancer Institute, 2012).

Results

Table 1 presents sociodemographic features of women. 44.9% of all the age groups had mammography. Among the women, who had mammography examination, at least once 60.8% had it in the previous year. The proportion of having mammography exam at least once in women over 40 was found 52.2%. Negligence (55.1%) was the first reason of women not having mammography examinations, not knowing that it is necessary to have examinations (33.9%) was the second, and not knowing where the examination is conducted (26.3%) was the third reason. While 97% of 40-49 age group women, and 90% of 50-59 age group women were informed about mammography, in 60-69 age group, this proportion was 76%.

Table 1. Sociodemographic Features of Women (n=227)

Variables		n	%
Age groups	35-39	43	18.9
	40-49	74	32.6
	50-59	60	26.5
	60-69	50	22
Education	No literacy	19	8.4
	Literate but not school	12	5.3
	Primary school	116	51.1
	Secondary school	29	12.8
	High school	32	14.1
	≥ University	19	8.4
Employment status	Hausewives/ non-employee	144	63.4
	Retired	51	22.5
	Government employee	4	1.8
	Worker	11	4.8
	Self-employed	17	7.5
Marital status	Married	178	78.4
	Single	5	2.2
	Divorced	18	7.9
	Widowed	26	11.5
Health insurance	Not have	14	6.2
	Social insurance	208	91.6
	Private insurance	5	2.2
Monthly income of the family (TL)*			
	≤ 500	35	15.4
	501-1000	108	47.6
	1001-1500	61	26.9
	1501-2000	17	7.5
	≥ 2001	6	2.6

*1 US $=approximately 1,8TL

Table 2. In Accordance with NCI's Breast Cancer Screening Recommendation in Terms of Women's Sociodemographic Features and the Results of the Risk Assessment Models (n=184)

Factors		NCI's breast cancer screening recommendation		
		Compliance n (%) (n=76)	Non-compliance n (%) (n=108)	p
Age groups	40-49	32 (43.2)	42 (56.8)	0.007*
	50-59	32 (53.3)	28 (46.7)	
	60-69	12 (24.0)	38 (76.0)	
Education	≤Primary/ secondary school			
		54 (36.7)	93 (63.3)	0.012*
	High school/ University			
		22 (59.5)	15 (40.5)	
Marital status	Married	64 (45.7)	76 (54.3)	0.030*
	Single/widowed/divorced			
		12 (27.3)	32 (72.7)	
Employment status				
	Employee	6 (31.6)	13 (68.4)	0.363*
	Retired/hausewives/ non-employee			
		70 (42.4)	95 (57.6)	
Health insurance	Have	74 (42.5)	100 (57.5)	0.200†
	Not have	2 (20.0)	8 (80.0)	
Monthly income of the family(TL)				
	≤1000	43 (36.4)	75 (63.6)	0.073*
	≥1001	33 (50.0)	33 (50.0)	
Five-year breast cancer risk according to Gail model (according to the 1.67% cut-off point) (n=178)				
	≤% 1.67	64 (40.5)	94 (59.5)	0.636*
	≥% 1.68	7 (35.0)	13 (65.0)	
Five-year breast cancer risk according to Gail model (n=178)***				
	Low	63 (40.6)	92 (59.4)	0.592*
	High	8 (34.8)	15 (65.2)	
Lifetime breast cancer risk according to Gail model (n=178) ***				
	Low	62 (40.3)	92 (59.7)	0.797*
	High	9 (37.5)	15 (62.5)	
Ten-year breast cancer risk according to Cuzick-Tyrer model (n=178)***	Low	59 (41.5)	83 (58.5)	0.369*
	High	12 (33.39	24 (66.7)	
Lifetime breast cancer risk according to Cuzick-Tyrer model (n=178) ***	Low	58 (41.1)	83 (58.9)	0.507*
	High	13 (35.1)	24 (64.9)	

*Pearson Chi-square, †Fisher's exact test, *** Comparison of individual risk with respect to general population

Mean age of menarche was 13.16±1.45. Two thirds (66.1%) of women had their first menstruation at 13 or later. A total of 212 women (93.4%) had live births or stillbirths. 47.6% of the women who had given births had their first birth between ages 21 and 30. 44.1% of the women were in menopause. 80.8% of the women have not used HRT. 35.2% of the women have used contraceptive pills, and 68.8% used the pills less than five years, 28.8% more than five years and 0.9% of were still using.

The risk statuses of 221 women were calculated in terms of Gail and Cuzick-Tyrer models. Calculations were not conducted for 6 women since they already had breast cancer. According to the cut-off point 1.67% suggested by Gail model to start chemoprevention, five-year breast cancer risk levels were high in 9.0% of the women. With respect to Gail model, five-year breast cancer risk was found high in 15.8% of women and lifetime breast cancer risk was found higher in 14.9% than the average risk. The mean ten-year Cuzick-Tyrer breast cancer risk was 1.97%. According to Cuzick-Tyrer model, ten-year breast cancer risk of 21.7% and lifetime breast cancer risk of 22.2% of the women were found higher than the average risk of the same age women.

Women in the 50-59 age group compared to elder and younger age groups; women who are high school and college graduates compared to the ones with secondary school or less education, significantly had their mammography examination in compliance with the screening recommended by NCI ($p<0.007$, $p<0.012$) (Table 2).

Being knowledgable about early diagnosis and screening methods, having information on breast cancer increased the compliance to NCI's breast cancer screening recommendation significantly ($p<0.002$, $p<0.001$) (Not presented in the Table). Any significant difference could not be found in terms of compliance to NCI's breast cancer screening recommend between women with high levels of risk for both short-term risk and lifetime risk compared women with low levels of risk assessed by Gail and Cuzick-Tyrer models (Table 2).

In the logistic model the effects of age, education

Table 3. The Effect of Sociodemographic Features of Women Over 40 on Not Having Mammography Examinations (at least once in two years) in Accordance with NCI's Breast Cancer Screening Recommendation (n=184)*

		Non-compliance n %	Compliance n %	Crude OR (%95 CI)	Adjusted OR (%95 CI)	P
Age groups	40-49	42 56.8	32 43.2	1	1	
	50-59	28 46.7	32 53.3	0.67	1.31 (0.50-3.43)	0.578
	60-69	38 76	12 24	2.41	4.91 (1.62-14.89)	**0.005**
Education	≥High school	15 40.5	22 59.5	1	1	
	≤Secondary school	93 63.3	54 36.7	2.53 (1.14-5.64)	2.82 (1.04-5.00)	**0.040**
Monthly income of the family(TL)						
	≥1001	33 50	33 50	1		
	≤1000	75 63.6	43 36.4	1.74 (0.91-3.37)		
Menstruation state						
Menopause/ menopause due to hysterectomy		67 55.8	53 44.2	1	1	
Premenopause/ in menstrual period		41 64.1	23 35.9	1.41 (0.72-2.77)	3.25 (1.24-8.49)	**0.016**
Breast cancer history in the family						
	Yes	13 50	13 50	1		
	No	95 60.1	63 39.9	1.51 (0.61-3.74)		

*The model was built with age, education, menstruation status, monthly income of the family and breast cancer history in the family

level, menstruation statuses, breast cancer history in the family and the monthly income of the family for compliance to mammography were investigated. Not having mammography examination was higher in 60-69 age group compared to 40-49 age group (OR: 4.91, 95%CI:1.62-14.89), in women with secondary school or less education compared to high school or college graduates (OR: 2.82, 95%CI:1.04-5.00), in women in menopause or in menopause due to surgical reasons compared to the ones in pre-menopausal period or had regular menstruation (OR: 3.25, 95%CI:1.24-8.49) (Table 3).

Discussion

Less than half of the women participated in the study, have had mammography for once or more. This finding is higher than some other studies conducted in Turkey (Dündar et al., 2006; Seçginli et al., 2006; Avcı et al., 2008), and similar to some others (Avcı, 2007; Dişcigil et al., 2007; Guvenc et al., 2012). It is expected that the use of mammography to be higher in the western and urban parts in the country. In studies conducted in various countries, the rate of having mammography examination in the last two years varied between 15% and 76% (Barr et al., 2001; Zhu et al., 2006; Buki et al., 2007; Zackrisson et al., 2007; Couture et al., 2008; Ryerson et al., 2008; Wall et al., 2008; Oh et al., 2011).

In this study, women who had mammography in accordance with NCI's recommendation were more in 50-59 age group than younger and elder age groups. It was found that 43% of the women in 40-49 age group had mammography in compliance with NCI's recommendation. In a cross sectional study in Istanbul similar findings were presented (Özaydın et al., 2009). The rate of having mammography examination in the last two years decreased to 24% in 60-69 age group, whereas it was 53.3% for women in 50-59 age group. In the previous studies conducted in Turkey, having mammography was not investigated for compliance with any recommendation or standard (Dündar et al., 2006; Seçginli et al., 2006; Dişçigil et al., 2007; Avcı, 2007; Avcı et al., 2008; Özaydın et al., 2009; Erbil et al., 2012; Yalcinoz et al., 2012). Very few studies questioned the mammography statuses of the women in the last two years (Dündar et al., 2006; Dişçigil et al., 2007; Özaydın et al., 2009). In our study, the rate of having mammography in women over 50 was found 41.3%. The sample group in our study was comprised using a simple random sampling method, whereas Dişçigil et al.'s sample group was comprised of women who had attended breast cancer seminars (Dişcigil et al., 2007). So, it can be expected that these women had more interest in their health and therefore had more mammography.

In our study, as the age increased the number of women who had information on mammography decreased. This result revealed the fact that the women in 60-and over age group, which is the risk group for breast cancer, should be informed more about breast cancer and screening methods. The proportion of women who had mammography in the last two years increased as the education level increased. Training and support about the importance of having mammography should be given to the women with low levels of education on a regular basis. Having mammography in compliance with NCI's recommendation was found higher in married women.

The employment statuses, social security statuses, monthly income of the family, having a chronic disease and menopause statuses of the women did not affect the compliance with mammography screening. In a study conducted in the USA (Mobley et al., 2009), it was found that women with health security from two different states conformed to the mammography screening; whereas in another study (Barr et al., 2001), women who were under Medicare, a health security provided by the state to the elder one, conformed more to the mammography screening. In a study conducted in France (Pivot et al., 2011), it was found that women with high levels of income, high education level and greater frequency of gynaecological examination conformed to the mammography screening. In a study (Zhu et al., 2006) in which the income levels of the women who had mammography in the last two year was assessed, it was found that women with high levels of income conformed to the mammography screening. In our study, since the prevalance of the women with health incurance is very high, income level might not affected having mammography.

In our study, the effects of sociodemographic and individual features of women over-40 on not having mammography in compliance with NCI's recommendation were assessed using a logistic regression model. Not having mammography examination was found significantly increased in women in 60-69 age group, women who had secondary school and less education and women who had regular menstruation compared to the reference groups. In other studies age and education levels were found as similar risk factors for not having mammography (Buki et al., 2007; Couture et al., 2008; Ryu et al., 2008). In a study by Zackrisson et al. conducted in Sweden, it was fond that as age increased not having mammography also increased, and not having mammography was found significantly high in single, divorced or widowed women (Zackrisson et al., 2007).

It is important to identify the breast cancer risks in order to increase awareness against breast cancer risk factors and to use the early diagnosis and screening methods. In this study, there was no statistically significant difference in terms of having mammography between women with low levels of breast cancer risk and high levels of risk according to Gail and Cuzick-Tyrer models. According to these models, more than half of the women with high levels of breast cancer risk did not have mammography in the last two years. These women might have ignored mammography since they might have not known their individual risk levels. When these women are informed about their risks being high, their compliance to mammography screening may be influenced positively.

Since, in Gail model, the risks are assessed without taking into consideration individual differences such as second degree family breast cancer and genetic features, risk levels may be calculated low in women who have these features. In a case-control study by Ulusoy et al., women with risk over 1.67% were found 13% in case

group and 8% in control group (Ulusoy et al., 2010). In Ulusoy et al. (2010) study, control group was selected from the women who applied to breast and endocrine surgery services and mammography unit. A study conducted on Latin women over-35 (Graves et al., 2008), breast cancer risk levels of 6.9% of the women were found higher than 1.67%. Lin et al. (2007) conducted on women with low socioeconomic conditions, breast cancer risk levels of 21.6% of the women were found higher than 1.67% (Lin et al., 2007). Considering these results, it can be said that Turkish women have lower risk levels than American women. It is also expected since breast cancer incidence is much low in Turkey than the USA. Notwithstanding that this finding is a optimistic one, the necessity of the women with high levels of risk to have early diagnosis and screening services and guidance should not be ignored.

In our study, the mean ten-year Cuzick-Tyrer breast cancer risk was 1.97%. In a study by Evans et al. conducted in the UK the median ten-year Cuzick-Tyrer breast cancer risk was 2.65% (Evans et al., 2012). According to the Cuzick-Tyrer model in this study, ten-year breast cancer risk of 21.7% of the women, and lifetime risk of 22.2% of the women were found higher than the society. None of the studies conducted in Turkey assessed breast cancer risk according to Cuzick-Tyrer model, which is a relatively new model. Mann et al., used Cuzick-Tyrer model in order to assess breast cancer risk levels in women in clinics in Austraila and New Zealand in an epidemiological study conducted by assessing family history, lifestyle and gene screening (Mann et al., 2006).

The reasons for low risk levels of the women participated in the study according to the two models can be due to age at menarche being 13 and later, having first birth before 30, relatively low participant number with breast cancer history in first degree family and lack of women who had breast biopsy. Women with higher breast cancer risk in Gail model compared to Cuzick-Tyrer model are resulted by calculations with the additional variables such as of second degree family history, HRT use and period, menopause age, body mass index level. Cuzick-Tyrer model is recommended in women with high levels of risk of family breast cancer (Evans et al., 2007; Amir et al., 2003); Gail model is suggested to be used to assess the breast cancer risk in the general population (Gail et al., 1989; Ozanne et al., 2006).

In our study the breast cancer risk levels were assessed in a population setting for the first time in Turkey using the breast cancer risk level assessment models.

Data collection by interview and relying on reporting of the women is an important limitation of the study. Recall bias may have played a role in reporting mammography use for different age groups. The results of this study cannot be generalized to the general population in Turkey. However, it can reflect middle socioeconomic level urban areas.

As a result, in this study, the rate of having mammography examination in the last two years for 60-and-over age group which is the risky group for breast cancer was found lower compared to other age groups. Women with low levels of education, single, widowed or divorced women, and women who were in pre-menopausal period or who had regular menstruation were having less mammography examination. These women should be informed on having regular mammography. Since assessment according to Gail model can be conducted in shorter time and includes less variables, it can be suggested to be used in primary health instutions on all women over-30. Individual counselling should be given to the women with high risk by primary care physicians and family physicians. Use of Cuzick-Tyrer model breast cancer risk assessment can be suggested to oncology and breast surgery clinics since it is more extensive and it requires clinical findings. Breast cancer screening service should be a public service fee of charge. Providing these services to everyone will resolve the problems caused by differences in age and education level.

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