Evaluation of Women over 20 Years Living in the Province of Samsun in Terms of Risk of Breast Cancer

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ABSTRACT

Objective: The purpose of this study was to assess women aged over 20 living in the province of Samsun in terms of risk of breast cancer.

Materials and Methods: The study population of this descriptive research consisted of 410,377 women aged over 20 living within the administrative borders of the province of Samsun. Stratified systematic sampling was employed in the selection of an 800-member sample. A questionnaire was used drawn up by the authors and inquiring into women's demographic characteristics and risk factors for breast cancer. Surveys were performed between 01.04.2013 and 30.06.2013 at face-to-face interviews at individuals' home addresses. The Gail model was used in calculating women's risk levels for breast cancer.

Results: 3.1% of women had a first-degree relative (mother, sister or daughter) with a history of breast cancer; 1.4% of women had a history of breast cancer and 8.0% a history of benign breast changes, while 50.4% of women who had entered the menopause were overweight or obese. We determined that 11.3% of women had a high risk of contracting breast cancer within the following 5 years.

Conclusion: Determining the distribution of risk factors for breast cancer is important in terms of identifying the at-risk group and will represent the basis for developing future programs.

Key words: Breast cancer, risk factors, Gail model

Introduction

Breast cancer is an important public health problem affecting women's health. According to the World Cancer Report published by the World Health Organization in 2008, breast cancer is one of the most common cancers in women globally. It constitutes 23% of all cancers in women with 1.1 million new cases every year (1). Breast cancer is the most commonly diagnosed cancer and the most frequent cause of death in women in Turkey as well as the rest of the world (2, 3). In a study from Turkey, it was estimated that the incidence of breast cancer reached from 24.1/100,000 in 1993 to 50/100,000 by 2010. These results indicate that the incidence of breast cancer in Turkey increased more than twice in the last 20 years (4).

There are some risk factors thought to be effective in the development of breast cancer. These factors include demographic characteristics such as age, sex, race/ ethnicity; reproductive history including age at menarche, presence and the number of childbirth, age at first full-term pregnancy, age at menopause, lactation, infertility; familial / genetic factors such as presence of family history, known or suspected mutations in BRCA1 / 2, p53, PTEN or other genes associated with breast cancer risk; environmental factors such as thoracic radiotherapy before the age of 30, hormone replacement therapy, alcohol use; and other factors like personal history of breast cancer, number of breast biopsies, atypical hyperplasia or lobular carcinoma in situ, dense breast structure, and body mass index (5, 6).

Turkey is a country where the traditional family structure is maintained, women are encouraged for childbearing and breastfeeding, with low alcohol consumption due to social and religious reasons, but with increasing obesity and limited physical activity and exercise among women. All mentioned features are factors that influence the development of breast cancer. Although studies focusing on risk assessment of breast cancer have been carried out in foreign countries, the extent of the risk of breast cancer in Turkish women is unknown due to the differences stated above. In addition, studies conducted on a sample group including all age groups who are selected from a particular area are not sufficient

Identification of women at high risk for breast cancer is important since curative treatment is possible if it can be diagnosed at an early stage. It also enables recommendation of protective treatment methods to some of these women.

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Received: 12.05.2014
Accepted: 01.07.2014

Various tools have been developed for risk assessment. Among all these methods, the Gail model is a widely used risk assessment tool. Gail and colleagues (7) created the model in 1989, based on screening mammography data from 284,780 Caucasian American women. The Gail 1 model that determined the risk for both non-invasive and invasive breast cancer was modified to the Gail 2 model that detected the absolute risk of only invasive breast cancer (8).

This study aimed to evaluate women over the age of twenty years and living in Samsun city in terms of breast cancer risk factors.

The results of this study have answered, although only in part, the question on the extent of breast cancer risk in women aged above 20 years, and it is believed that these results may constitute a basis for screening programs.

Materials and Methods

The study population of this descriptive research consisted of women aged over 20 years and living within the administrative borders of the city of Samsun. The study population consisted of 410,377 women over 20 years of age who were registered to the Family Medicine Information System in Samsun as of 01.01.2013.

Samsun city is the biggest city on the Black Sea coast of Turkey, with a population of approximately 1.250.000.

The minimum sample size was calculated according to the following formula, since assessment of the incidence of the event needed to be evaluated and the number of individuals within the population was known. Because the prevalence of risk factors with different qualities needed investigation, and clear data on the prevalence of risk factors for breast cancer in Turkey were absent, the p-value was accepted as 0.5.

$$n = \frac{n \cdot t^2 \cdot p \cdot q}{d^2 \cdot (n-1) + t^2 \cdot p \cdot q} = \frac{(410377) \cdot (1.96)^2 \cdot (0.5 \cdot 0.5)}{(0.05)^2 \cdot (410377-1) + 1.96^2 \cdot (0.5 \cdot 0.5)} = 383.80$$

Although the minimum sample size was calculated as 384, the sample size was accepted as 800, taking the possible problems into account.

Stratified systematic sampling method was used in the selection of the sample group. The 410,377 women that constituted the study population were classified into age groups according to the decades (21-30, 31-40, etc.). Then, the number of women to be included in the study from all age groups was determined according to the power of that age group within the population. Using their national identity numbers, women of all age groups were ranked from small to large. Then, an initial number was selected by using the Table of Random Numbers, and women who were to be included into the study were identified by systematic sampling method.

A questionnaire that was prepared by the authors, in order to evaluate the demographic characteristics and risk factors for breast cancer, was used as the data collection tool. In the survey, demographic information of women were asked in five questions, and breast cancer risk factors in twenty questions. The questions consisted of open and closed-ended questions. Questions on risk factors for breast cancer after have been created upon a literature review of similar studies (3-6, 8-11).

In this study, the Gail model was used to calculate the risk of breast cancer. In this context, the Breast Cancer Risk Assessment Tool v.2.0.1 software (National Cancer Institute, Bethesda, MD, USA), prepared

by the American National Cancer Institute for breast cancer risk calculation, was used (12). The Gail model questions age, age at menarche, age at first live birth, breast cancer history in first-degree relatives, whether prior breast biopsy has been performed, and if performed the number of biopsies, the presence of atypical hyperplasia and race. The information obtained from women in this study was transferred to the aforementioned computer program, and the five-year and lifetime risk of breast cancer for each individual were calculated by the Gail model. In this model, when calculating the risk of breast cancer, a comparison is made according to the risk level for women within the same age group. If a woman's risk of developing breast cancer in 5 years is calculated over 1.67%, then that woman is at high risk for the development of breast cancer in the next 5 years. A lifetime risk of developing breast cancer over 30.0% translates into high risk of breast cancer during that woman's lifetime (8, 12, 13).

Karakayalı and colleagues (8) conducted a retrospective study with women over the age of 35 years, who they followed-up for at least five years with eligible data on all the risk factors. They calculated individual risk according to the Gail method, created risk groups for breast cancer, and assessed the correlation between risk groups and the development of breast cancer. In this study, Karakayalı and colleagues (8) concluded that the Gail model is a reliable model for the Turkish society in terms of development of breast cancer, and individual risk calculation.

Ethical approval was obtained from both the Office of the Governor of Samsun and Ondokuz Mayıs University Clinical Research Ethics Committee.

The health staff (nurses/midwives) were trained by the investigators prior to the study for the survey application. The surveys were performed between 01.04.2013 and 30.06.2013, on a one-to-one basis by interviews at individuals' home addresses. Verbal informed consent was obtained from the participants.

All women who were selected as a sample and agreed to participate in the study were included. Women who had mental or physical illnesses (mental retardation, severe psychiatric disease, cerebrovascular disease, etc.) that prevented them from answering the questions, those who could not be contacted despite two visits to their residence and office addresses on different dates, those who moved outside the city (emigration, studying at university, etc.), and those who did not agree to participate in the study were excluded from the study.

711 women out of the selected sample of 800 (88.9%) have been reached and completed the questionnaire.

The Gail model does not apply to women under the age of 35, to women previously diagnosed with lobular carcinoma in situ, ductal carcinoma in situ and invasive breast cancer detection, or those who received radiation therapy to the chest for Hodgkin's lymphoma. Thus, breast cancer risk calculation by Gail model was conducted in 483 women who met these requirements (8, 12).

The analysis of the data obtained from participants was performed by Statistical Package for the Social Sciences (SPSS) statistical software package (version 13.0; SPSS, Inc., Chicago, IL, USA). The data are expressed as mean $\pm$ standard deviation, and number (percentage).

Results

Socio-demographic characteristics of the 711 women who agreed to participate in the study are presented in Table 1. 43.5% of women

Table 1. Socio-demographic Properties of the study Group– Samsun 2013

	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
Middle school graduate	61	8.6
Highschool graduate	91	12.8
College graduate	62	8.7
Residence		
Country	240	33.8
City	471	66.2
Occupation		
House wives	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

were primary school graduates, 77.6% were housewives, 81.3% were married, and 66.2% were living in the city.

The incidence of risk factors for breast cancer in women is presented in Table 2. There was a history of breast cancer in first-degree relatives (mother, sister or daughter) of 3.1% women.

Data on women's reproductive life are given in Table 3.

3.5% of women had a history of alcohol use, and all of them stated that they were social drinkers. 18.0% of women had a history of smoking, and the mean duration of smoking was 12.9±8.6 (1-40) years (Table 2). 74.2% of women smoked less than half a pack per day, 24.2% a pack a day, and 1.6% smoked two packs of cigarettes a day.

9.4% of women (67 women) had past history of a breast mass. In 74.6% of these women (50 women), a mass was detected once and in 23.4% (16 women, a mass was detected more than once. 85.1% of these masses (57 women) were benign breast changes. The mass was detected in the last 3 years in 62.7% of women (42 women). Six of these patients underwent mastectomy, 2 had chemotherapy, and 8 were treated with medications.

Table 2. Risk factors for breast cancer - Samsun 2013

Risk Factors	Number	Percentage
Not related to lifestyle (cannot be altered)		
Family history of breast cancer (Genetic susceptibility)		
First degree relative	22	3.1
Second degree relative	26	3.6
Third degree relative	34	4.8
History of breast cancer	10	1.4
History of benign breast disease	57	8.0
Menstrual history		
Early menarche (<12 age)	41	5.7
Late menopause (>55 age)	20	10.0 ^a
Related to lifestyle (can be altered)		
Reproductive life		
Childbirth	101	14.2
Late childbirth (>30 age)	34	6.0 ^b
Breastfeeding (less than 16 months)	276	38.8
Oral contraceptive use	157	21.1
Post-menopausal hormonal therapy	39	14.8 ^c
Radiation to the chest	11	1.5
Overweight or obesity (Post-menopausal)	133	50.4 ^c
Alcohol use	25	3.5
Smoking	128	18.0

^aThe percentage was calculated with women over the age of 55 (number of women >55 years = 200).

^bThe percentage was calculated with women over the age of 30 (number of women >30 years = 562).

^cThe percentage was calculated with menopausal women (number of menopausal women = 264)

It was determined that among women who participated in the study and who met the criteria for calculation of breast cancer risk by the Gail method, 11.3% had an increased risk of breast cancer in the next 5 years, and 0.6% had a high risk during lifetime.

Discussion and Conclusions

Many risk factors can increase the possibility of breast cancer. However, it is not clear how some of these risk factors promote some cells to become cancerous.

In a study by Ozmen and colleagues (3), age over 35 years, having an abortion, multiparity, first birth after the age of 35 years, late menopause (≥55 years), body mass index greater than 25, and the presence of history of breast cancer within first-degree relatives were reported to be risk factors for breast cancer in Turkish women. In another study, the presence of history of breast cancer in first and second-degree relatives, nulliparity, lack of breastfeeding, and advanced age were determined as significant risk factors for breast cancer (8).

Among women who participated in this study, 3.1% had a history of breast cancer in first-degree relatives, and 1.4% in herself. 5.7% of women had their menstrual cycle before the age of 12 years, 10.0% of

Table 3. Reproductive life properties of the study group - Samsun 2013

Reproductive Life	number (percentage)/mean$\pm$ss
Marrieda	649 (91.3)
Pregnancy ^a	622 (87.5)
Childbirth ^a	610 (85.8)
Breastfeeding	580 (95.1) ^b
First menarche age	13.49 $\pm$ 1.39
Number of pregnancies	4.14 $\pm$ 2.46
Number of live childbirth	3.39 $\pm$ 2.99
First childbirth age (year)	21.37 $\pm$ 4.25
Breastfeeding duration (months)	41.25 $\pm$ 34.31
Menopausal age ^c (year)	46.35 $\pm$ 5.90

^aAt least once^bIn women with at least one childbirth^cNumber of menopausal women=264

menopausal patients entered menopause after 55 years. Among women over the age of 30 years, 12.1% did not give childbirth or had their first child after the age of 30 years. 50.4% of menopausal women were either overweight or obese.

In studies conducted in different groups in Turkey, the rate of presence of breast cancer in first-degree relatives was detected between 2.5% to 6.3%, the rate of biopsy between 6.9% and 8.8%, the rate of first birth rate over 30 years of age between 1.6% to 13.0%, and the rate of menstrual age before 12 years between 2.6% and 7.8% (9, 10, 14-17).

In two different studies, 0.3% of women who participated in the study stated that they had a previous history of breast cancer (9, 10). In a study by Tümer and colleagues (17), 0.6% of women had a history of breast cancer. In a study conducted on a population from Istanbul, it was identified that 60.4% of menopausal women gained weight after menopause (10). Another study showed that 1.6% of women received radiation therapy to the chest. In the same study, 3.6% of women experienced menopause after the age of 55 years (14).

The prevalence of risk factors for breast cancer varies with different age groups and different sample studies. This study included a sample that was selected from the city of Samsun and may differ from other studies in Turkey.

The risk of breast cancer is twice higher in women with a history of breast cancer in first-degree relatives (mother, sister or daughter) as compared to those without family history (5). In this study, 3.1% of women had a history of breast cancer in first-degree relatives. It is thought that these women should be followed more closely in terms of breast cancer than other women.

In a woman with breast cancer, regardless of the likelihood of cancer recurrence, the risk of a new breast cancer is three to four times higher (5). In this study, it was determined that 1.4% of women had a history of breast cancer. This rate is higher than the rates from other studies (0.3% and 0.6%). This difference may be due to inclusion of all women over the age of twenty years in the current study.

Being overweight or obese after menopause increases the risk of breast cancer (5). In this study, 50.4% of menopausal women were found

to be either overweight or obese. One of the most important public health problems in our country is obesity. The majority of the women were housewives, mostly did not exercise routinely, and consumed a carbohydrate rich diet. These factors are believed to contribute to weight gain after menopause. Being overweight may lead to many health problems besides being a risk factor for breast cancer. It is thought that women should be monitored carefully for obesity, and should be trained on obesity.

It is well known that long term exposure of the breast tissue to hormones, especially estrogen, increase the risk of breast cancer. Therefore, giving birth before the age of 30 years is thought to decrease the risk of breast cancer (5).

6.0% of women over the age of 30 years gave birth to their first child over the age of 30. According to the Turkey Demographic and Health Survey 2008 (TNSA 2008), the median age at first birth among women aged 25-49 years is 22.3 (18). When the data from Demographic and Health Survey, which is conducted every five years, are analyzed between 1968 and 2008, it is observed that age at first birth is delayed until older ages (18). From this perspective, it can be predicted that the Turkish women will have greater risk for breast cancer in the future.

The mean number of birth was 3.39 in women who participated in this study, and 95.1% of women who gave birth stated that they breastfed their children. The total duration of breastfeeding in these women was 41.25 months. According to TNSA 2008 data the number of live births among women aged 40-49 in Turkey was 3.31, and the mean duration of breastfeeding was 16 months per baby. Although breastfeeding is expressed to reduce the risk of breast cancer, it was found that this situation was associated with the number of children (11). Breastfeeding for longer periods is a natural consequence of having more children, and the debate on whether it is the number of children or the breastfeeding that reduces the risk remains unsettled. As a result, no matter which theory is correct, the traditional family model is preserved in Turkey, and breastfeeding is considered as one of the most important roles in motherhood. These can be considered as influential factors in the protection of women from breast cancer.

It is very difficult to calculate the absolute risk of breast cancer in women. The risk factors must be compiled correctly for the accurate determination of risk (6). The calculation of individual breast cancer risk, by risk calculation methods enables the selection of healthy women at high risk of developing breast cancer as well as the planning and utilization of early diagnostic services.

It is reported that the lifetime absolute risk of developing invasive breast cancer is 13.3% for a woman. This rate, in fact, shows the cumulative lifetime risk for breast cancer in case of a woman's living more than 85 years. However, for a 30-year-old woman, the absolute risk of being diagnosed with breast cancer in the next 10 years is 0.4%, in the next 20 years is 1.85%, and in the next 30 years is 4.54% (8).

In this study, when compared with similar age population, the rate of women with high risk of developing breast cancer in the next 5 years was determined as 11.6%, and the rate of women with a high lifetime risk of developing breast cancer was found to be 0.6%.

A few studies from Turkey calculated the risk of breast cancer in women with the Gail method. In two different studies, the rate of women

with high risk of breast cancer in a 5-year period was reported as 6.2% and 5.8%, respectively (13, 19). In a study by Yılmaz and colleagues (13), the lifetime risk of developing breast cancer was detected as moderate in 10.6%, and high in 0.4%.

In the study by Açıkgöz and colleagues (20), 16,0 % of women who participated in the study had a high risk of breast cancer according to the Gail model when compared with a similar age population.

Kunt and Sel (21) reported that the 5-year risk of developing cancer ranged from 0.5% to 2.9%, and the lifetime risk of developing cancer ranged from 5.0% to 16.9%.

In the study by Murthy and colleagues (22), 6.8% of African-Americans had a high lifetime risk of breast cancer.

In four different studies that calculated breast cancer risk by other methods, it was determined that 0.7% - 7.6% of women were in the intermediate-risk group, 0.3% - 2.6% were at high risk, and 0.3% were at very high risk (9, 10, 17, 23).

The risk level of women varies due to differences in age distribution and calculation methods in different studies. The risk ratios calculated in this study were different from other studies in Turkey. This difference may be due to inclusion of all women over the age of twenty years within the current study.

Further studies that focus on the prevalence of risk factors for breast cancer in our country are required. Parallel to these studies, women should be provided individual counseling services on risk factors and specialized programs for early detection of breast cancer should be established. Efforts that will assist women in adopting healthy lifestyle habits should be continued.

Limitations of the Study

The Gail model was used to calculate the risk of breast cancer in this study. The model is one of the most commonly used breast cancer risk calculation methods in the world, but there are some limitations of the model. In the Gail model, the risk is calculated less than actual in patients with gene mutations or a strong family history of breast cancer, and it is not competent in risk assessment in patients who have received radiation therapy to the chest. Moreover, the model does not include those with a history of second-degree familial breast cancer in the risk calculation (6).

This study was conducted as part of the "Women's Health Education Project" that is being supervised by the Office of the Governor of Samsun.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Ondokuz Mayıs University.

Informed Consent: Oral informed consent was taken from participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - S.A., H.Ö., E.T.; Design - S.A., H.Ö., E.T.; Supervision - S.A., H.Ö., E.T.; Funding - S.A., H.Ö.; Data Collection and/or Processing - S.A., H.Ö., E.T.; Analysis and/or Interpretation - S.A., H.Ö., E.T.; Literature Review - S.A., E.T.; Writer - S.A.; Critical Review - S.A., H.Ö., E.T.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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