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**Original Research Article**

# Factors affecting breast cancer risk level and the prevalence of early diagnosis and screening in a group of Turkish women according to the Gail model

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## ABSTRACT

**Background:** Breast cancer, which is the most prevalent and common cause of death in women in the world and Turkey, is an important public health problem. The aim of this study is to evaluate the level of breast cancer risk according to the Gail model in a group of Turkish women and to determine the factors affecting the rates of early diagnosis and screening.
**Methods:** A cross-sectional study in Turkey. A total of 1332 women who were aged between 40 and 69 participated. The study data were collected by using a questionnaire consisting of questions about sociodemographic characteristics, lifestyle, early diagnosis and screening behaviors, and Gail model questions for determining the breast cancer risk level.
**Results:** The risk was higher in women who had their first childbirth at the age of ≥30 years and had a first-degree relative with a history of breast cancer ($p<0.05$). There was a significant relationship between the breast self-examination behavior of the women and their age, education level, and family history of cancer, between their clinical breast examination behavior and age, education level, employment status, and chronic disease history, and between the behavior of getting a mammogram and age, education level, and chronic disease history ($p<0.05$).
**Conclusions:** Accurate assessment of breast cancer risk and participation of women in screening programs reduce morbidity and mortality rates.

**Keywords:** Breast cancer, Gail model, Risk factors, Risk assessment, Turkish woman

## INTRODUCTION

Breast cancer (BC) is the most common type of cancer in women in developed and developing countries and is an important public health problem, accounting for approximately 15% of all deaths from cancer.[1-3] According to the 2018 data of the World Health Organization (WHO), an estimated 2.1 million women are diagnosed with breast cancer and 627,000 women die from breast cancer every year.[4] In Turkey, BC is seen in one out of every four women, a total of 4264 women died from breast cancer, and the average incidence of BC was 45.6 out of a hundred thousand in 2018.[5] It is known that 45% of the women diagnosed with BC are between the ages of 50-69 and that 40% are between the ages of 25-49.[6]

Many risk factors have been reported to affect the development of BC. These can be classified as familial/genetic and environmental characteristics, reproductive history (age of menarche, and the age and number of childbirth), demographic characteristics (age and gender), sedentary lifestyle, alcohol consumption, postmenopausal obesity, menopausal hormone therapy, and socio-economic level.[7,8] According to a study, the risk of developing breast cancer is two to four times higher among those with BC in their family compared to those

with no BC in their family.[9] The main methods used in the diagnosis of BC include breast self-examination (BSE), clinical breast examination (CBE), breast ultrasound (US), and mammography.[10] Ninety percent of the mass in the breast can be detected by BSE and 26% by CBE. The early diagnosis rate of mammography is 80-90%, and it reduces the death rate from breast cancer by 30%.[11] The national cancer screening program carried out in our country requires monthly BSE and biannual CBE between the ages of 20-40 and monthly BSE, annual CBE, and getting a mammogram between the ages of 40-69.[3] Age, education, family history, having a chronic disease, different demographic, economic, social and cultural factors, occupation and economic status may affect women's participation in BC screening programs.[12,13] In this respect, women should be informed about risk factors and lifestyle changes related to modifiable risk factors, and they should be encouraged to participate in screening programs.[13]

Various models have been developed to predict risk in breast cancer. The Gail model is recognized as the best tool that is widely known and applied in BC assessment in developed and developing countries. In the Gail model analysis, the main determinants for BC risk included the current age of the woman, age of menarche, age of first childbirth, no experience of childbirth, number of first-degree relatives with breast cancer, number of previous benign breast biopsies, atypical hyperplasia in previous breast biopsy, and race.[14] This model calculates a woman's five-year and lifetime risk by using individual risk. In the model, calculations are done according to individual risk factors rather than family history.[15]

In studies conducted in Turkey using the Gail model risk assessment form, the BC risk level of women is low. Despite this, the increasing incidence of BC in Turkey is seen as a serious threat to women's life.[16]

BC mortality rates are high in developing and underdeveloped countries.[1] Therefore, it is highly important to identify BC risk factors and increase early diagnosis and screening programs, especially in developing and underdeveloped countries.[3,17] BC can be calculated with risk calculation models, and the frequency of mammography screening can be increased in high-risk women, and they can be followed up. This study was conducted to determine the BC risk level in a group of Turkish women with the Gail model and identify early diagnosis and screening rates, and influencing factors.

## METHODS

A cross-sectional design was used in this study. The universe of the study consisted of the 40-69 age-group mothers and relatives of the health technician students from Vocational School of Health Services. With the planned education given to the students in this research, the awareness of future health technicians about cancer prevention and early diagnosis was created and it was envisaged that they would convey this awareness to their relatives. The sample of the research consisted of 40-69-year-old female relatives of approximately 1300 students who regularly attended the Vocational School of Health Services. The population of the study was calculated as 1300, based on the assumption that approximately half of the students (n=650) would voluntarily participate in the study and that each student would collect data from at least two volunteer relatives using the questionnaire. We provided the women with information that "the cancer early diagnosis and education centers (in our country work as separate units within state hospitals and conduct screening programs in breast cancer without charge at the community level". BC early diagnosis and screening brochures of the cancer early diagnosis and education centers were distributed to women by health technician students after the application of the questionnaire. The data of the study were collected between January 2019 and March 2020.

The questionnaire consisted of 23 questions to determine women's age, education level, marital and employment status, the status of having undergone a breast biopsy, history of chronic disease, history of breast cancer in first-degree relatives, height, weight, the status of smoking, age at first menstruation, fertility characteristics, performing a BSE, and the status of having CBE and mammograms. The questionnaire was administered in 10-15 minutes. The Gail model applied by the American National Cancer Institute was used to determine the BC risk level.[15] According to this model, those with a higher risk than women in the same age group were classified as "high risk", and those with equal or less risk were grouped as "low risk".

Statistical analysis was performed using the statistical package for the social sciences (SPSS) 24.0 statistical software package. Odds ratio (OR) and 95% confidence interval (CI) were calculated to evaluate the relationship between the independent and dependent variables (BSE, CBE, and mammography). Pearson Chi-square test, Chi-square for trend test, and logistic regression analysis were used for statistical analysis. A logistic regression model was created with age, education, presence of chronic disease, and family history of cancer to examine the factors affecting the BSE behavior, and getting a mammogram. Another logistic regression model was created with age, education, employment status, presence of chronic disease, and family history of cancer to examine the factors affecting the CBE behavior. Statistical significance level was accepted as $p<0.05$.

For research ethics, approval was received from the ethics committee of the Medical Faculty of Dokuz Eylul University (27 September 2018, 23 February 2018). Written informed consent was obtained from the women included in the study.

## RESULTS

A total of 1332 women participated in this study. The mean age of the women was 50.7±7.3 (min=40, max=69). Of the

women in our study, 63.3% had regular BSE, 45.2% had CBE, and 51.4% got a mammogram. Women estimated BC risk was calculated according to the Gail model. Accordingly, 89.3% had a low five-year risk of BC and 10.7% had a high risk. The lifetime risk of BC was found low in 90.6% of women and high in 9.4%.

The relationship between some risk factors of the women and their BC risk level calculated according to the Gail model is shown in Table 1. Both short-term and lifetime risks of BC were found to be significantly higher in women whose age of first childbirth was 30 years or above and who had a first-degree relative (mother, sisters, daughters) with a history of BC (Table 1).

A significant relationship was found between the women BSE behavior and their age, education level, and family history of cancer. Compared to the 40-49 age group, the BSE behavior was significantly higher in the 50-59 age group ($p<0.05$), while it fell by 28% in the 60-69 age group. As the education level increased, the BSE behavior increased, as well ($p<0.01$). BSE behavior was higher in those with a family history of cancer ($p<0.05$) (Table 2). In the logistic regression model created to examine the factors affecting the women BSE behavior, it was found that age, education level, and the presence of a family history of cancer were the most prominent factors ($p<0.05$). The BSE behavior in the 50-59 age group was 1.36 times higher than that of the 40-49 age group (95% CI: 1.06-1.75), while no significant relationship was found in the 60-69 age group. This behavior was 1.78 times higher (95% CI: 1.36-2.32) among those with secondary-high school education than those with primary school or lower level of education, and it was 1.77 times higher (95% CI: 1.20-2.60) in those with university education. Also, it was 1.80 times higher (95% CI: 1.34-2.42) in those with a family history of cancer than those with no family history of cancer (not shown in the tables).

A significant relationship was found between the women behavior of having CBE and their age, educational status, working status, and history of chronic disease (Table 3). Compared to the 40-49 age group, the behavior of having CBE was significantly higher in the 50-59 age group ($p<0.05$), and the behavior was 13% lower in the 60-69 age group. As the education level increased, the behavior of having CBE increased, as well ($p<0.01$). The behavior of having CBE was significantly higher in women who worked compared to those who did not ($p<0.05$). This behavior was higher in patients with chronic disease compared to those with no chronic disease ($p<0.05$) (Table 3). Age, education level, and presence of chronic disease were found to be the most prominent factors in the logistic regression model created to examine the factors affecting the women behavior of having CBE ($p<0.05$). The behavior of having CBE in the 50-59 age group was 1.34 times higher (95% CI: 1.05-1.70) than those in the 40-49 age group, while no significant relationship was found in the 60-69 age group. While the behavior of having CBE did not increase in those with secondary-high school education compared to those with primary school or lower education, it was 2.85 times higher in those with university education (95% CI: 1.89-4.28). The behavior was 1.34 times higher (95% CI: 1.04-1.71) in patients with chronic disease than those with no chronic disease (not shown in the tables).

A significant relationship was found between the women behavior of getting a mammogram and their age and history of chronic disease. Mammography behavior was significantly higher in the 50-59 and 60-69 age groups than in the 40-49 age group ($p<0.01$). This behavior was higher in patients with chronic disease than those with no chronic disease ($p<0.05$) (Table 4). Age, education level, and presence of chronic disease were found to be the most prominent factors in the logistic regression model created to examine the factors affecting the women behavior of getting a mammogram ($p<0.05$). The behavior of getting a mammogram in the 50-59 age group was 3.44 times higher (95% CI: 2.68-4.41) than in the 40-49 age group and 1.94 times higher (95% CI: 1.29-2.93) in the 60-69 age group. While this behavior did not increase in those with secondary-high school education compared to those with primary school or lower education, it was 1.71 times higher in those with university education (95% CI: 1.17-2.49). The behavior was 1.19 times higher (95% CI: 1.48-2.48) in patients with chronic disease than those with no chronic disease (not shown in the tables).

**Table 1: The relationship between some characteristics of women and breast cancer risk level calculated according to the Gail model (n=1332).**

| Factors | 5-year risk* N (%) | | P# | Lifetime risk* N (%) | | P# |
|---|---|---|---|---|---|---|
| | High (n=143) | Low (n=1189) | | High (n=125) | Low (n=1207) | |
| **BMI** | | | | | | |
| Weak | 3 (21.4) | 11(78.6) | | 3 (21.4) | 11 (78.6) | |
| Normal | 49 (13.4) | 317 (86.6) | 0.119 | 40 (10.9) | 326 (89.1) | 0.223 |
| Overweight | 51 (9.3) | 500 (90.7) | | 45 (8.2) | 506 (91.8) | |
| Obese | 40 (10.0) | 361 (90.0) | | 37 (9.2) | 364 (90.8) | |
| **Cigarette** | | | | | | |
| Smoker | 38 (13.2) | 250 (86.8) | | 27 (9.4) | 261 (90.6) | |
| Quit- smoking | 12 (13.2) | 79 (86.8) | 0.089 | 14 (15.4) | 77 (84.6) | 0.121 |
| Non-smoker | 89 (9.3) | 864 (90.7) | | 84 (8.8) | 869 (91.2) | |

Continued.

| Factors | 5-year risk* N (%) | | P# | Lifetime risk* N (%) | | P# |
|---|---|---|---|---|---|---|
| | High (n=143) | Low (n=1189) | | High (n=125) | Low (n=1207) | |
| **Birth** | | | | | | |
| Unborn | 6 (9.0) | 61 (91.0) | 0.629 | 2 (3.0) | 65 (97.0) | 0.051 |
| Giving birth | 137 (10.8) | 1128 (89.2) | | 123 (9.7) | 1142 (90.3) | |
| **First birth age** | | | | | | |
| ≥30 | 86 (81.1) | 20 (18.9) | 0.001 | 78 (73.69 | 28 (26.4) | 0.001 |
| <30 | 50 (4.4) | 1093 (95.6) | | 45 (3.9) | 1098 (96.1) | |
| **Presence of breast cancer in a first-degree relative (mother, sisters, daughters)** | | | | | | |
| Yes | 49 (72.1) | 19 (27.9) | 0.001 | 49 (72.1) | 19 (27.9) | 0.001 |
| No | 94 (7.4) | 1170 (92.6) | | 76 (6.0) | 1188 (94.0) | |

**Comparison of individual risk to same-age population, #Pearson Chi-square

**Table 2: The relationship between some characteristics of women and the calculated risk of breast cancer and BSE status (n=1332).**

| Factors | BSE, N (%) | | P value | Crude OR (% 95 CI) |
|---|---|---|---|---|
| | Yes (n=843) | No (n=489) | | |
| **Age group (in years)** | | | | |
| 40-49 | 344 (62.1) | 210 (37.9) | 0.024* | 1.00 |
| 50-59 | 427 (66.2) | 218 (33.8) | | 1.19 (0.94-1.51) |
| 60-69 | 72 (54.1) | 61 (45.9) | | 0.72 (0.49-1.06) |
| **Educational status** | | | | |
| ≤Primary school | 449 (57.6) | 330 (42.4) | 0.001‡ | 1.00 |
| Middle school-high school | 284 (71.4) | 114 (28.6) | | 1.83 (1.41-2.38) |
| University | 110 (71.0) | 45 (29.0) | | 1.80 (1.24-2.63) |
| **Working status** | | | | |
| Nonemployee | 553 (62.5) | 332 (37.5) | 0.393* | 1.00 |
| Employee | 290 (64.9) | 157 (35.1) | | 1.10 (0.87-1.41) |
| **Marital status** | | | | |
| Single | 154 (58.1) | 111 (41.9) | 0.050* | 1.00 |
| Married | 689 (64.6) | 378 (35.4) | | 1.31 (1.00-1.72) |
| **Chronic disease history** | | | | |
| No | 581 (65.1) | 312 (34.99 | 0.055* | 1.00 |
| Yes | 262 (59.7) | 177 (40.3) | | 0.79 (0.62-1.01) |
| **Family history of cancer** | | | | |
| No | 629 (60.4) | 412 (39.6) | 0.001* | 1.00 |
| Yes | 214 (73.5) | 77 (26.5) | | 1.82 (1.37-2.44) |
| **5-year risk according to the Gail model**** | | | | |
| Low | 748 (62.9) | 441 (37.1) | 0.409* | 1.00 |
| High | 95 (66.4) | 48 (33.6) | | 1.16 (0.81-1.69) |
| **Lifetime risk according to the Gail model**** | | | | |
| Low | 755 (62.6) | 452 (37.4) | 0.083* | 1.00 |
| High | 88 (70.4) | 37 (29.6) | | 1.42 (0.96-2.15) |

‡Chi-square for trend test, *Pearson Chi-square, **comparison of individual risk to same age population

**Table 3: The relationship between some characteristics of women and the calculated risk of breast cancer and the status of having CBE.**

| Factors | CBE, N (%) | | P value | Crude OR (% 95 CI) |
|---|---|---|---|---|
| | Yes (n=602) | No (n=730) | | |
| **Age group** | | | | |
| 40-49 | 234 (42.2) | 320 (57.8) | 0.021* | 1.00 |
| 50-59 | 316 (49.0) | 329 (51.0) | | 1.31 (1.04-1.65) |
| 60-69 | 52 (39.1) | 81 (60.9) | | 0.87 (0.59-1.29) |
| **Educational status** | | | | |

Continued.

| Factors | CBE, N (%) | | P value | Crude OR (% 95 CI) |
|---|---|---|---|---|
| | Yes (n=602) | No (n=730) | | |
| ≤Primary school | 324 (41.6) | 455 (58.4) | 0.001‡ | 1.00 |
| Middle school-high school | 176 (44.2) | 222 (55.8) | | 1.11 (0.87-1.42) |
| **University** | 102 (65.8) | 53 (34.29 | | 2.70 (1.88-3.89) |
| **Working status** | | | | |
| Nonemployee | 377 (42.6) | 508 (57.4) | 0.007* | 1.00 |
| Employee | 225 (50.3) | 222 (49.7) | | 1.36 (1.09-1.71) |
| **Marital status** | | | | |
| Single | 493 (46.2) | 574 (53.8) | 0.138* | 1.00 |
| Married | 109 (41.1) | 156 (58.9) | | 0.81 (0.61-1.06) |
| **Chronic disease history** | | | | |
| No | 387 (43.3) | 506 (56.79 | 0.049* | 1.00 |
| Yes | 215 (49.0) | 224 (51.0) | | 1.26 (1.01-1.58) |
| **Family history of cancer** | | | | |
| No | 460 (44.2) | 581 (55.8) | 0.163* | 1.00 |
| Yes | 142 (48.8) | 149 (51.2) | | 1.20 (0.92-1.56) |
| **5-year risk according to the Gail model**** | | | | |
| Low | 543 (45.7) | 646 (54.3) | 0.317* | 1.00 |
| High | 59 (41.3) | 84 (58.7) | | 0.83 (0.58-1.18) |
| **Lifetime risk according to the Gail model**** | | | | |
| Low | 546 (45.2) | 661 (54.8) | 0.926* | 1.00 |
| High | 56 (44.8) | 69 (55.2) | | 0.98 (0.67-1.42) |

‡Chi-square for trend test, *Pearson Chi-square, **comparison of individual risk to same age population

**Table 4: The relationship between some characteristics of women and the calculated breast cancer risk and the status of having mammography.**

| Factors | Mammography, N (%) | | P value | Crude OR (% 95 CI) |
|---|---|---|---|---|
| | Yes (n=685) | No (n=647) | | |
| **Age group** | | | | |
| 40-49 | 190 (34.3) | 364 (65.7) | 0.001* | 1.00 |
| 50-59 | 423 (65.6) | 222 (34.4) | | 3.64 (2.87-4.63) |
| 60-69 | 72 (54.1) | 61 (45.9) | | 2.26 (1.54-3.32) |
| **Educational status** | | | | |
| ≤Primary school | 395 (50.7) | 384 (49.3) | 0.721* | 1.00 |
| Middle school-high school | 206 (51.8) | 192 (48.2) | | 1.04 (0.82-1.33) |
| **University** | 84 (54.2) | 71 (45.8) | | 1.15 (0.81-1.62) |
| **Working status** | | | | |
| Nonemployee | 458 (51.8) | 427 (48.2) | 0.738* | 1.00 |
| Employee | 227 (50.8) | 220 (49.2) | | 0.96 (0.76-1.21) |
| **Marital status** | | | | |
| Single | 561 (52.6) | 506 (47.4) | 0.092* | 1.00 |
| Married | 124 (46.8) | 141 (53.2) | | 0.79 (0.60-1.04) |
| **Chronic disease history** | | | | |
| No | 400 (44.8) | 493 (55.2) | 0.001* | 1.00 |
| Yes | 285 (64.9) | 154 (35.1) | | 2.28 (1.80-2.89) |
| **Family history of cancer** | | | | |
| No | 534 (51.3) | 507 (48.7) | 0.858* | 1.00 |
| Yes | 151 (51.9) | 140 (48.1) | | 1.02 (0.78-1.32) |
| **5-year risk according to the Gail model**** | | | | |
| Low | 611 (51.4) | 578 (48.6) | 0.935* | 1.00 |
| High | 74 (51.7) | 69 (48.3) | | 1.01 (0.71-1.43) |
| **Lifetime risk according to the Gail model**** | | | | |
| Low | 615 (51.0) | 592 (49.0) | 0.282* | 1.00 |
| High | 70 (56.0) | 55 (44.0) | | 1.22 (0.84-1.78) |

*Pearson Chi-square, **comparison of individual risk to same age population

## DISCUSSION

To reduce the morbidity and mortality rates in breast cancer, the accurate assessment of women's BC risk with risk calculation models is extremely important in terms of planning and delivery of early diagnosis services and encouraging women's participation in screening programs.[17,18] For this reason, there is a need for studies to evaluate the factors affecting the prevalence of screening. In this study, BC risk level was determined by using the Gail model in a group of Turkish women, and early diagnosis screening rates and affecting factors were identified.

Systematic screening for BC is effective in early diagnosis and reducing mortality. For this reason, it is important to evaluate "high-risk" individuals correctly.[19] According to the Gail model in our study, the 5-year and lifetime risk of BC was low. Similar to our study findings, some studies conducted in Iran, Iraq, Bahrain, and Turkey also reported that women in similar age groups had a low five-year and lifetime risk of BC.[14,20-23] In their study conducted by using the Gail model, Acikgoz et al reported that 16% of the women were at high risk.[18] In line with these results, the low risk of BC incidence in women in our study was evaluated as positive. In addition, although the risk assessment showed the risk level of women, it did not give clear information about the probability of developing cancer. For this reason, it was extremely important to apply age-specific screening programs, which is one of the independent risk factors. In addition, it is important to carry out examinations of high-risk women before they reach the screening age to increase early diagnosis and survival.

Seventy-eight percent of breast cancers are seen in women aged 50 years and older, and twenty-two percent in women under 50 years of age.[24] In our study, the BC risk scores of the women increased as the age increased. In similar studies, age was found as an important factor in increasing the five-year and lifetime risk of BC.[25-27] These results emerging in studies suggested that an increase in congenital life expectancy would further increase the risk of BC.

Age of first live childbirth after 30 years of age and a history of BC in first-degree relatives have been reported as risk factors for BC.[25,28] In our study, it was determined that women with a first-degree relative (mother, sisters, daughters) aged 30 years and above and with a history of BC had a higher risk of both short-term and lifetime BC. Similar to our study, in a study conducted in Qatar, a relationship was reported between variables, such as a family history of cancer and age of first childbirth at advanced age and 5-year and lifetime risks of breast cancer.[19] Our study findings were consistent with the findings in the literature.[19-22] Family history and first childbirth after the age of 30 were the most important factors that increased the risk of BC. For this reason, it was thought that these women needed to be followed more closely in terms of breast cancer compared to other women.

Although BSE is easy and free to apply, the application rates in countries are low and vary by country.[5,29-31] According to the results of our study, the majority of women performed BSE regularly, and age, education level, and family history of cancer affected BSE behavior. In a study similar to our study results, it was found that BSE behavior was significantly higher in women who had a family history than those who did not.[29] The reason why age was found to be an effective factor in our study may be because women feel the risk of cancer more as they get older, and therefore they perform BSE regularly. In addition, the genetic risk in women or the presence of a friend with BC in their environment may have made them more susceptible to performing regular BSE. The women with a family history of cancer in the study may have placed more emphasis on BSE because they were afraid of cancer. In another similar study, it was reported that the education level of women increased the frequency of BSE and the status of doing it at the right time.[30] In another study, it was determined that lack of education and awareness were among the most common reasons for women not to perform BSE. In the same study, almost half of the women had insufficient knowledge about BSE.[14] In another study, it was stated that the high education level of women increased their health motivation and positively affected BSE behavior.[32] The high rate of women who regularly performed BSE in our study suggested that women had enough awareness and knowledge about BSE and that education had a positive effect on changing behavior.

CBE plays an important role in the detection of breast mass.[33] In our study, nearly half of the women stated that they had CBE. Mermer and Güzekin found that women had CBE for control purposes.[19] Esen et al determined that 47.0% of the women in their study had CBE, 44.7% had it for control purposes and 27% for palpable mass.[27] In other studies, the rate of women having CBE was not high.[30,31] These results showed that women had CBE when they had complaints, not for screening purposes. When the factors affecting women's CBE rates were examined, it was found that age, education level, and presence of chronic disease were the most prominent factors. In a study conducted in Iran, it was reported that age was an effective variable on the behavior of having CBE and that women, especially at the age of 30-50, had CBE more often.[32] In a study conducted in Turkey, the behavior of having CBE increased with progressing age.[34] The reason why age affected the rate of having CBE in our study results may be because women feel the risk of cancer more with increasing age and therefore use early diagnosis methods more often. In addition, women frequent visits to the doctor due to menopause complaints may have had a positive effect on the high rate of CBE in the 50-59 age group. In a study, as the education level of women increased, the rate of having CBE increased as well.[35] Our study results suggested that women with higher education

levels were more conscious of early diagnosis and screening behaviors to prevent cancer. In addition, it was thought that it would be beneficial to regularly plan and expand education programs to raise awareness about BC in women and to increase their participation in screening programs. In our study, the high rate of CBE in patients with chronic diseases may be because they regularly visited their physician for their chronic diseases, and early diagnosis and screening methods of cancer were applied in this period.

Studies have shown that screening mammography rates vary depending on the development level of countries.[5,36-38] In our study, more than half of the women stated that they got a mammogram. When the factors affecting the mammography behavior of women were examined, it was found that age, education level, and presence of chronic disease were the most prominent factors. In one study, 62.8% of women got a mammogram, and in the same study, 49.7% reported that they got it regularly.[18] These different results in the studies may be due to the age, education level, income level of the women, or the different screening programs applied.[3] In one study, women in the 50-59 age group were found to get a mammogram more than younger and older women. In the same study, it was reported that the education level of women had an effect on the behavior of getting a mammogram.[39] In other studies conducted in our country and abroad, high education and income level, family history of BC, chronic disease history, and similar factors increased the rate of getting a mammogram.[36,38,40] The rates of getting a mammogram in our study were below the national standard targets. For this reason, it was thought that conducting studies to increase community-based awareness of screening programs would be effective in increasing the rates. In addition, as the risk of developing BC will increase, it is extremely important to encourage those with a family history of BC to get a mammogram at an early age and regularly.

### *Limitations*

In this study, the Gail model was used to calculate the BC risk. The Gail model underestimates the risk in women with a gene mutation and a secondary familial history of BC, and it is not efficient in assessing the risk in those who have received radiotherapy to the thorax. Another limitation of the study is that risk factors were collected through a questionnaire based on the statements of individuals. Recall bias may have played a role in some data, as retrospective data were collected to identify some of the BC risk factors.

## CONCLUSION

The majority of the women in this study had a low five-year and lifetime risk of BC. In the study, 63.3% of the women regularly performed BSE, 45.2% had CBE, and 51.4% got a mammogram. It was determined that both short-term and lifetime risk of BC were significantly higher in women who gave their first childbirth at the age of 30 and had a first-degree relative (mother, sisters, daughters) with a history of BC. A significant relationship was found between women's behavior of doing BSE and age, education level, and family history of cancer, between the behavior of having CBE and age, education status, employment status, and chronic disease history, and between the behavior of getting a mammogram and age, education level, and chronic disease history. Within the scope of this study, the prospective health technicians gained awareness about cancer prevention and early diagnosis through the education given. In addition, this education, received by the students, played an active role in the behavior change of their relatives. Moreover, it is necessary to increase the number of studies on the determination of BC risk factors in Turkey and to ensure that women at risk are informed about early diagnosis and that they participate in screening programs.

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