An examination of variables associated with breast cancer early detection behaviors of women

Sultan Kayan¹, Ilgun Ozen Cinar²

¹. Faculty of Health Science, Public Health Nursing Department, Bilecik Seyh Edebali University, Bilecik, Turkey.
². Faculty of Health Science, Public Health Nursing Department, Pamukkale University, Denizli, Turkey.

This study was produced from the master thesis.

Abstract

Background: Breast cancer is a worldwide common public health problem, and it is quite important to know the factors preventing the early detection behaviors to fight against it.

Objective: The aim of the study was to examine the effect of some sociodemographic variables associated with women's breast cancer detection behaviors and their breast cancer knowledge and fear levels.

Methods: The cross-sectional study was conducted with 363 women aged 40-69 who had presented to Cancer Early Diagnosis and Education Centers (CEDEC).

Results: The average age of women is 54.8±7.1. The mean score of breast cancer knowledge (CBCKT) was found as 10.72±2.34, and the breast cancer fear score was found as 27.6±6.5. The percentage of women who regularly breast self-examination (BSE) was 17.4%, clinical breast examination (CBE) was 13.5% and mammography was 42.7%. BSE and having a higher education correlated 6.25-fold. A 6.5-fold correlation was found between BSE and having a family history of breast cancer, and a 6.24-fold correlation between BSE and having information about breast cancer. In CBE, the related variables that affected women receiving information 4.42 times and going to CEDEC 5.3 times. It was found that employment (4.58) of women affected the mammography detection behavior mostly. While women's CBCKT score affected BSE behavior 1.16 times, fear of breast cancer was a variable that affected mammography behavior 2.1 times. It was determined that high CBCKT scores of women increased BSE behaviors 1.16 times, and high breast cancer fear scores increased mammography behavior 2.1 times.

Conclusions: Early detection practices of women are not sufficient in our study. An increase in the knowledge level of women and consideration of the variables determined to be effective in early detection behaviors will allow increasing detection behavior.

Keywords: Breast cancer fear, breast cancer knowledge, early detection, mammography.

DOI: https://dx.doi.org/10.4314/ahs.v22i3.16

Cite as: Kayan S, Cinar IO. An examination of variables associated with breast cancer early detection behaviors of women. Afri Health Sci. 2022;22(3): 133-144. https://dx.doi.org/10.4314/ahs.v22i3.16

Introduction

Breast cancer is an important health problem with high mortality and morbidity rates among females in developed and developing countries.¹-² While about 2.1 million women are newly diagnosed with breast cancer every year all over the world, breast cancer constitutes 24.2% of all female cancer types.³ Breast cancer is one of the most common cancers among women in Turkey and its incidence is 45.6 per hundred thousand.⁴ Early screening to improve breast cancer outcomes and survival rate is the cornerstone of breast cancer control.² Thanks to breast cancer detection methods, 63.7% of breast cancer diagnoses can be made during the early localized stage.⁵ In the related studies, attention is drawn to early detection methods such as mammography, clinical breast examination (CBE) and breast self-examination (BSE).⁶-⁷-⁸-⁹-¹⁰-¹¹ Mammography is the only breast cancer detection method with proven effect. Studies reveal that screening mammography provides an early diagnosis of 80-90% and reduces the mortality rate by 23-49%.¹²-¹³-¹⁴

Corresponding author:
Sultan Kayan,
Faculty of Health Science, Public Health Nursing Department, Bilecik Seyh Edebali University, Bilecik, Turkey.
Email: skayan88@gmail.com

African Health Sciences © 2022 Kayan S et al. Licensee African Health Sciences. This is an Open Access article distributed under the terms of the Creative commons Attribution License (https://creativecommons.org/licenses/BY/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.
CBE is used as a remarkable method due to the fact that it does not require any tools, it is low cost and accessible and it detects about 26% of breast cancers, 5-7% of cancers missed in mammography.\textsuperscript{10-15} Even though there is no evidence that BSE is an effective detection method, it is recommended to encourage women to take responsibility for their health and to increase their awareness level.\textsuperscript{3} In the related studies, it is stated that 80% of the masses in the breast are noticed by women themselves and 20% of them are malign.\textsuperscript{5,15-16,9} Cancer Early Diagnosis and Education Centers (CEDEC), established to carry out the cancer control program in Turkey, run these scans free of charge. The recommended detection program; BSE once a month for every woman over the age of 20, once every two years for over 20 years old, CBE once a year for over 40 years old and a biennial mammogram between the ages of 40 and 69.\textsuperscript{17}

It has been shown in studies evaluating women's knowledge levels that they do not have adequate knowledge about breast cancer and early detection behaviors.\textsuperscript{18-19,20} Studies to measure the breast cancer knowledge level of women show that women with low levels of breast cancer knowledge are less likely to participate in early detection behaviors.\textsuperscript{18-19,20} Fear of breast cancer is another factor that negatively affects early detection behaviors.\textsuperscript{21-22,23} It is quite important to know the fear and inadequate knowledge levels of women at risk of breast cancer which prevent early detection behaviors in terms of planning the interventions to be performed.\textsuperscript{24} In studies revealing that some socio-demographic characteristics are also effective in breast cancer detection behaviors of women, it is stated that age, education level, marital status, income status, employment status and family history of breast cancer are all effective in general.\textsuperscript{25-26,27-28,29}

Even though there are studies in the literature evaluating factors affecting early detection behaviors, the present study aimed to determine the variables affecting breast cancer knowledge and fear levels and early detection behaviors of women in the 40-69 age group. Although there are studies evaluating the factors affecting the early detection behaviors in the literature, this study aimed to determine the breast cancer early detection behaviors of women aged 40-69 who are at risk for breast cancer, and the variables affecting it, as well as their breast cancer knowledge and fear levels.

**Methods**

**Study design and sample**
The present study is a cross-sectional study. The universe is made of 174,008 women between the ages of 40-69 living in a city of the country.\textsuperscript{30} The sample formula with a known universe was used so as to determine the sample.\textsuperscript{31} According to the calculation, the rate of women with no knowledge of breast cancer, 37.5%\textsuperscript{19}, the alpha value is 0.05, the t value is 1.96, and the deviation amount (d) is 0.05, and the sample size is 359. Considering the risk of sample loss, more participants were included in the study in order to have a strong sample. While collecting the data, a total of 363 women were included in the study using the random sampling method, one of the non-probability sampling methods. The researchers collected data between the dates 21 May and 21 September 2018.

**Study population**
The research included women (1) between the ages of 40-69, (2) no history of breast cancer, (3) no communication problems, and (4) who volunteered for the study.

**Assessment tools**
The data were collected with the following forms.

**Information Form About Women**
The said form consisting of 22 questions prepared in line with the literature,\textsuperscript{19-33,34,35} comprises questions on socio-demographic characteristics of women (age, marital status, educational status, place of residence) breast cancer and early screening practices (breast cancer history in the family, getting information about breast cancer, performing BSE, having CBE, having mammography, applying to CEDEC).

**The Comprehensive Breast Cancer Knowledge Test (CBCKT)**
The scale was developed by Stager (1993). Reliability & Validity was performed by Basak in Turkey (2015). There are 20 information questions in total and it has two dimensions: general information (questions between 1 and 12) and treatability (questions between 13 and 20). The scale evaluates general information on breast cancer and information on the treatability level of breast cancer. The Cronbach Alpha coefficient for the whole scale was found as 0.90. The scale is answered as Correct-Incorrect. Questions answered as correct are evaluated by 1 point while the questions that are answered as incorrect and the questions that are not answered are evaluated by 0 points. There are 8 correct and 12 incorrect statements in the questions. While questions 1, 2, 5, 6, 11, 12, 14,
The Breast cancer fear scale developed in 2004 by Champion et al. was adapted to Turkish by Secginli and the Cronbach Alpha coefficient of the scale was found as 0.85. The scale consisting of eight items determines the correlation between breast cancer, mammography behavior, and emotional responses of women. The scale is scored from 1 to 5; "strongly disagree" (1), "disagree" (2), "undecided" (3), "agree" (4), "strongly agree" (5). The highest score that can be achieved from the scale is 40 and the lowest score is 8. According to the evaluation, 8-15 points indicates low-level fear, 16-23 points moderate fear and 24-40 points high-level fear. In the present study, the Cronbach Alpha coefficient of the scale was found as 0.89.

Data Collection Procedures
There are two CEDECs (Pamukkale and Merkezefendi) in the city where the study to be conducted. The population registered in Pamukkale CEDEC is higher. The women who applied to these centers were interviewed right after the registration before the screening practices and training activities. Data were collected from women who met the inclusion criteria in a quiet environment using the face-to-face interview method. Of the research sample, 61.1% (n=222) was from Pamukkale CEDEC, 38.9% (n=141) was from Merkezefendi CEDEC data. Since the number of applying to Pamukkale CEDEC is higher, more participants from there were included in the sample. 60 women from Pamukkale CEDEC and 25 women from Merkezefendi CEDEC were excluded since they did not want to participate in the study.

Statistical Analysis
Statistical analysis was done with SPSS 24.0 software. The mean, standard deviations are given for descriptive continuous variables while frequency and percentage distributions are given for categorical variables. The compliance of the scales to the normal distribution was evaluated with the Kolmogrov Simirnov test, and the mean scores and standard deviations were also calculated. Significantly related variables on BSE, CBE and mammography behaviors were separately included in the logistic regression (LR) model after the basic analysis (age, education, marital status, employment status, menopause, breast cancer history in the family, getting information, applying to CEDEC, CBCKT and fear scale score averages). Statistical significance value was taken as p<0.05.

Results
The distribution of women according to their socio-demographic characteristics, medical histories and early detection behaviors are presented in Table 1. It was found that 82.9% of the women had 8 years or less education, 74.7% were married, 74.1% were in menopause and their mean age was 54.8±7.1. The regular BSE rate was 17.4%, the regular CBE rate was 13.5% and the regular mammography rate was 42.7%. It was determined that 52.6% of the women applied to CEDEC for the first time. The total score average of women from CBCKT was 10.72±2.34, while breast cancer fear scores were 27.68±6.50 (Table 2).
Table 1. Descriptive characteristics of participants

| Demographics and Medical History | Number | %   |
|---------------------------------|--------|-----|
| **Age**                         |        |     |
| 40-54                           | 153    | 42.1|
| 55-69                           | 210    | 57.9|
| **Mean (SD)**                   | 54.8±7.1|
| Educational status              |        |     |
| 8 years & less                  | 301    | 82.9|
| 8 years & over                  | 62     | 17.1|
| Marital Status                  |        |     |
| Married                         | 271    | 74.7|
| Single                          | 92     | 25.3|
| Employment Status               |        |     |
| Unemployed                      | 295    | 81.3|
| Employed                        | 68     | 18.7|
| Menopause                       |        |     |
| Yes                             | 269    | 74.1|
| No                              | 94     | 25.9|
| Family history of BC            |        |     |
| Yes                             | 82     | 22.6|
| No                              | 281    | 77.4|
| BSE                             |        |     |
| Done regularly (monthly basis)  | 63     | 17.4|
| Done never or irregularly       | 300    | 82.6|
| CBE                             |        |     |
| Done regularly (annual basis)   | 49     | 13.5|
| Done never or irregularly       | 314    | 86.5|
| Mammography                     |        |     |
| Done regularly (every 2 years)  | 155    | 42.7|
| Done never or irregularly       | 208    | 57.3|
| Got information about breast cancer |    |     |
| Yes                             | 253    | 69.7|
| No                              | 110    | 30.3|
| CEDEC applying                  |        |     |
| First applying                  | 191    | 52.6|
| Twice and more applying         | 172    | 47.3|
| **Total**                       | 363    | 100|

Table 2. Women's breast cancer knowledge and fear mean scores

|                          | Mean±SD | Median | Min-Max |
|--------------------------|---------|--------|---------|
| General Knowledge Sub-Dimension | 6.47±1.60 | 6.00   | 2-11    |
| Treatability Sub-Dimension | 4.26±1.47 | 4.00   | 0-8     |
| CBCKT Total Score        | 10.72±2.34 | 11.00  | 5-19    |
| Breast Cancer Fear Score | 27.68±6.50 | 29.00  | 8-40    |
In the logistic regression model, the age variable BSE and CBE had an effect increasing the detection behavior about one fold (p<0.01). The fact that women had 8 years or more education was determined as a statistically significant variable affecting BSE behavior 6.25 times (p<0.001), CBE behavior 2.5 times (p<0.01), and mammography behavior 4.07 (p<0.05) times. It was determined that being married 3.81 times (p<0.01), being in menopause 3.64 times (p<0.001), and having a family history of breast cancer were 6.5 times (p<0.001) effective variables in the BSI behavior of women. Women's employment status was found as a statistically significant variable affecting BSE behavior 4.31 times (p<0.001) and CBE behavior 4.58 (p<0.05) times. The fact that women got information on breast cancer affected BSE behavior 6.54 times (p<0.001) and CBE behavior 4.42 (p<0.01) times. The fact that women made more than one application to CE-DEC was determined as a statistically significant variable that was 2.21 times (p<0.01) in BSE behavior, 5.30 times (p<0.001) in CBE behavior, and 2.10 (p<0.05) times in mammography behavior. CBCKT score, BSE behavior 1.16 times (p<0.01), breast cancer fear score was found as statistically significant variables affecting mammography behavior of women 1.05 (p<0.05) times (Table 3).

Table 3. The factors affecting early detection behaviors according to the LR model

| Variables                        | BSE          |   | CBE          |   | Mammography  |   |
|----------------------------------|--------------|---|--------------|---|--------------|---|
|                                  | p           | OR (95%CI) | p           | OR (95%CI) | p           | OR (95%CI) |
| Age (Mean)                       | 0.000        | 0.90 0.86-0.94 | 0.019        | 0.95 0.91-0.99 | 0.298        | 0.97 0.92-1.02 |
| Education (1)                    | 0.000        | 6.25 3.39-11.54 | 0.008        | 2.50 1.26-4.95 | 0.048        | 4.07 0.95-17.39 |
| Marital Status (1)               | 0.003        | 3.81 1.58-9.18 | 0.617        | 1.20 0.58-2.46 | 0.303        | 0.63 0.27-1.50 |
| Menopause (1)                    | 0.000        | 3.64 2.06-6.42 | 0.269        | 1.49 0.73-3.04 | 0.039        | 4.58 1.07-19.54 |
| Family history of BC (1)         | 0.006        | 6.50 1.72-14.52 | 0.263        | 0.63 0.28-1.41 | 0.865        | 0.93 0.42-2.06 |
| Got information about BC (1)     | 0.000        | 6.24 2.43-16.05 | 0.002        | 4.42 1.70-11.48 | 0.098        | 1.78 0.89-3.55 |
| CEDEC applying (1)               | 0.006        | 2.21 1.26-3.88 | 0.000        | 5.30 2.55-11.01 | 0.043        | 2.10 1.02-4.30 |
| CBCKT Fear Scale                 | 0.013        | 1.16 1.03-1.30 | 0.143        | 0.90 0.79-1.03 | 0.101        | 1.13 0.97-1.31 |
|                                  | 0.545        | 1.01 0.97-1.06 | 0.052        | 0.95 0.91-1.00 | 0.040        | 1.05 1.00-1.11 |
Discussion

In the present study, women had low rates of regular BSE and CBE, while rates of mammography in the last two years were moderate (Table 1). While the women's total CBCKT score was determined at a moderate level, the fear of breast cancer was found to be high (Table 2).

According to Eurostat (2017) data, the rate of women showing early detection behavior varies by 20-80%, this ratio is high in developed countries and low in developing countries. In another study carried out in low and middle-income countries, early detection behaviors were determined as 22%. Studies have revealed that performing BSE varies by 9-36%, CBE by 4-26% and mammography by 5-39%. Even though breast cancer is the most common, deadly and preventable problem, the early detection behaviors and implementation efforts of women are still inadequate.

When the factors affecting the BSE behavior of the participants are examined with LR, women's age, education status, marital status, employment status, menopausal status, family history of breast cancer, getting information about breast cancer and previous application to CE-DEC were found associated. Even though the evidence of BSE in terms of breast cancer mortality in developed countries is insufficient, it is suggested in developing countries to increase awareness of breast cancer. In the present study, the age variable associated with BSE was found in other studies, and it was emphasized that women in the younger age group form BSE more frequently. It is observed that there is a positive correlation between education level and BSE. Women with higher levels of education perform BSE more frequently. It is reported that breast cancer perception and health beliefs of women with a higher level of education have a positive correlation.

In our study, when the marital status variable with BSE is evaluated following the LR model, it was found that married women performed more BSE behavior. It is further emphasized in the studies of the literature that married women perform BSE more frequently. The social support that married women receive from their spouses and children has a positive effect on detection behaviors. The employment status of women, which we specified as another variable that affects BSE, has a positive effect on studies in the literature.

Women's education status, marital status and employment status are modifiable factors in terms of increasing early diagnosis behaviors and they affect women's life positively.

In the present study, a correlation was found between performing BSE and the fact that women have not gone through menopause. Yilmazel (2013) found that women who have not gone through menopause are more likely to perform BSE than those who have already in menopause. The fact that women who are not in the menopause period are in the younger age group may be effective in this. In the present study, it was determined that having a family history of breast cancer is also associated with BSE. Different studies have further revealed that family history is effective in BSE behavior.

The fact that women with a family history see themselves at risk for breast cancer and know that they are prone to have breast cancer makes it more likely for them to perform BSE more regularly.

It is further emphasized by studies conducted in Turkey and other countries that women who know about breast cancer perform BSE more frequently. Further, in the present study, it was determined that getting information about breast cancer increased BSE and CBE but did not affect mammography behavior. Hajian Tilaki and Auladi further emphasize that getting information about breast cancer increases CBE. Even though one-third of the participants stated that they did not receive any information, the CBCKT total score of the women in our study was determined to be moderate. Information points in two studies conducted on the same scale in Turkey were detected to be moderate. In other studies in which women's breast cancer knowledge levels were evaluated with different scales, it was stated that their knowledge level was moderate. In two studies conducted on young women in Ethiopia, the breast cancer knowledge level of women was found as low. Remarkably, the studies in which the knowledge level of breast cancer was determined as low and moderate level was in developing or underdeveloped countries.

Due to the fact that increasing the awareness level of breast cancer among women will increase early detection behaviors, it is an issue that should be emphasized. It was found in the present study that the knowledge level of women increased their rate of doing BSI 1.16 times. Studies in the literature further reveal this correlation between knowledge level and BSE behavior. It is essential for women to get information about breast cancer,
to participate in early detection practices by transforming the information they receive into behavior and perform it regularly. Women should be informed in a planned and continuous manner by healthcare personnel. We determined a correlation between women's previous application to CEDEC and their BSE, CBE and mammography. This situation reveals that the services provided in diagnostic centers are significant. Women who apply to CEDEC are informed about early screening behaviors and detection practices are performed for women in Turkey. It is quite essential to spread such centers and to make sure that they provide continuous service.

Even though fewer studies are examining the effect of CBE on breast cancer mortality, it is known that it is important in terms of the diagnosis of masses that cannot be visualized by mammography or that do not fall within the limits of mammography in women with dense breast tissue. In the present study, the age variable affects about one-fold the behavior of having CBE. Other studies in the literature reveal that the younger age group of women raises the CBE rates. In our study, a correlation was found between the education level of women and their CBE application. As women's educational level increases, CBE behavior increases. It is further considered that increasing the education level of women also increases their knowledge and awareness of breast cancer.

When the factors affecting the participants' having mammography are examined with LR, it was detected that women's educational status, employment status, getting information about breast cancer and applying to CEDEC before were all related. In the present study, when the age variable was considered together with other variables, it was not effective on mammography. In the studies, it has been reported that women in the age group above the age of 40 usually perform more mammography behavior. In the studies in the literature, it was revealed that women with higher education level perform higher mammography behavior. It was further revealed that unemployed women have more mammograms than employed ones, and part-time workers have more mammograms than full-time workers. Women with a higher level of education have more opportunities to find a job. For this reason, these two are variables that positively affect women's early detection behavior and require effort from women.

While fear of breast cancer was found high in our study and fear of breast cancer in women was found related to mammography behavior in LR analysis, BSE and CBE were not found related to detection behaviors. Generally, fear of breast cancer was found high in studies. Studies are revealing the correlation between breast cancer fear and having mammography and BSE behavior. There are also some studies revealing that the fear of breast cancer is not effective on mammography behavior and that it is an obstacle to perform BSE behavior. Tuzcu et al. stated that the fear of breast cancer is both a motivating and a hindering factor in detection behavior. Individuals may present compatible or incompatible responses to fear. Regarding the fear of breast cancer, it can be assumed that women's approaches to early detection behaviors are individual. While evaluating women's early detection behaviors, variables determined to be effective should be taken into consideration.

Conclusion
Early detection behavior practices of women are not at a sufficient level. In this study, the effective variables of women's breast cancer detection behaviors were evaluated. The high education level of women in BSE, CBE, and mammography behaviors and their previous application to CEDEC were determined as common effective variables. Factors affecting BSE behavior include age, education, being married or single, employment, menopause, family history of cancer, and information retrieval variables. Fear of breast cancer was found effective only on having a mammography.

It is essential to inform women with regular breast cancer education programs, to turn the repetitive information given into behavior and to ensure early detection behaviors. CEDECs, which are effective in screening behaviors of women, are quite noteworthy centers in terms of both screening and informing them. Women should be informed about these centers and it should be ensured that they use these centers effectively. All healthcare professionals should provide training on this subject in the field they work.

Acknowledgment
The authors are grateful to all study participants. This study was presented as an oral presentation in the 3rd International – 21st National Public Health Congress. Antalya, Turkey (27–30 November 2019).
List of abbreviations
BC: Breast Cancer, BSE: Breast Self-Examination, CBE: Clinical Breast Examination, CEDEC: Cancer Early Diagnosis and Education Centers, SD: Standard deviation, CBCKT: Comprehensive Breast Cancer Knowledge Test, CI: Confidence interval, OR: Odds ratio

Ethical approval
Written approval was obtained from the Non-interventional Clinical Research Ethics Board of a University (dated 21.12.2017 and issued 60116787-020 / 85552) and institutional approvals were obtained from the centers where the data were collected. Women were informed about the objectives of the study and their verbal consents were taken.

Conflicts of interest
The authors declare that there is no conflict of interest.

Limitations
The data includes women who applied to CEDEC units of a city in the country.

References
1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: A cancer journal for clinicians 2018; 68(6): 394-424.
2. World Health Organization. Breast Cancer. World Health Organization; 2019. Available from: https://www.who.int/cancer/detection/breastcancer/en/index5.html. [Last accessed on 2020 Sep 20].
3. Global Cancer Statistics 2018: GLOBOCAN. Available from: https://www.uicc.org/news/global-cancer-data-globo-can-2018. [Last accessed on 2019 May 11].
4. International Agency for Research on Cancer. Global Cancer Observatory 2018. Available from: https://gco.iarc.fr/today/online-analysis-map. [Last accessed on 2019 Nov 26].
5. American Cancer Society. Breast Cancer Facts & Figures 2015. Available from: http://www.cancer.org/research/cancerfactsstatistics/breast-cancer-facts-figures. [Last accessed on 2018 Feb 21].
6. T.C. Sağlık Bakanlığı. Sağlık İstatistikleri Yıllığı 2015. Available from: https://www.saglik.gov.tr/TR,12280/saglik-istatistikleri-yilligi-2015.html. [Last accessed on 2018 Apr 18].
7. Bueno ATP, Capelasso VL, Pacheco RL, et al. What do Cochrane systematic reviews say about the clinical effectiveness of screening and diagnostic tests for cancer? Sao Paulo Med J. 2017; 135(4):401-410.
8. Yigit A, Erdem R. Mamografi sağkalım teknolojisi ile meme kanseri tarama programının klinik etkiliğinin meta analiz yöntemiyle değerlendirilmesi. Journal of Suleyman Demirel University Institute of Social Sciences 2017; 28(3): 27-35.
9. Gonzales A, Alzaatreh M, Mari M, Saleh AA, Alloubani A. Beliefs and Behavior of Saudi Women in the University of Tabuk Toward Breast Self Examination Practice. Asian Pacific journal of cancer prevention 2018; 19(1): 21.
10. Masoudiyekta L, Bayatiyani HR, Dashtbozorgi B, Gheibizadeh M, Malehi AS, Moradi M. Effect of education based on health belief model on the behavior of breast cancer screening in women. Asia Pacific Journal of Oncology Nursing 2018; 5(1): 114-120.
11. Bashirian S, Mohammadi Y, Barati M, Moaddabshoar L, Dogonchi M. Effectiveness of the Theory-Based Educational Interventions on Screening of Breast Cancer in Women: A Systematic Review and Meta-Analysis. International Quarterly of Community Health Education 2020;40(3):219-236.
12. Coldman A, Phillips N, Wilson C, Decker K, Chiarelli AM, Brisson J, Ahmad R. Pan-Canadian study of mammography screening and mortality from breast cancer. JNCI: Journal of the National Cancer Institute 2014; 106(11): 1-7.
13. Lauby-Secretan B, Scoccianti C, Loomis D, Benbrahim-Tallaa L, Bouvard V, Bianchini F, et al. Breast-cancer screening-viewpoint of the IARC Working Group. New England journal of medicine 2015; 372(24): 2353-2358.
14. Sankatsing VD, van Ravesteyn NT, Heijnsdijk EA, Looman CW, van Luijt PA, Fracheboud J, et al. The effect of population-based mammography screening in Dutch municipalities on breast cancer mortality: 20 years of follow-up. International journal of cancer 2017; 141(4): 671-677.
15. Kozan R, Tokgöz VY. Türkiye’de Meme Kanseri Farkındalığı ve Tarama Programı. ACU Sağlık Bil Derg 2016; 7(4): 185-188.
16. Deger VVB. Üniversite Öğrencilerin Kendi Kendine Meme Muayenesi Bilgi Düzeyleri. STE'D/Sürekli Tıp Eğitimi Dergisi 2018; 27(5): 343-351.
17. T.C. Sağlık Bakanlığı. Halk Sağlığı Genel Müdürlüğü. Kanser Kontrol Programı, 2016. Available from: https://hsigm.saglik.gov.tr/depo/birimler/kanser-db/yayinlar/Kitaplar.pdf. [Last accessed on 2018 Feb 24].
18. Kolutek R, Avcı İA. Eğitim ve Evde İzlenin, Evli Kadınların Meme ve Serviks Kanseri İle İlgili Bilgi Düzenlerine ve Uygulamalarına Etkisi. *Meme Sağlığı Dergisi / Journal of Breast Health* 2015; 11(4): 155-162.

19. Hossain SZ, Robinson L, Clarke J. Breast cancer knowledge and participation in breast screening practices among Southeast Asian women living in Sydney. *GSTF Journal of Nursing and Health Care* 2016; 3(2): 23-27.

20. Shirzadi S, Allahverdipour H, Sharma M, Hasankhani H. Perceived barriers to mammography adoption among women in Iran: a qualitative study. *Korean Journal of Family Medicine* 2020; 41(1): 20.

21. Oner E, Girgin S, Uslukaya Ö, Bozdağ Z, Gümüş H, Urakçi Z, et al. Güneydoğu Anadolu bölgesinde meme kanseri aile ve evde geçkim sebeplerine yönelik anket çalışması. *J Clin Exp Invest* 2015; 6(4): 375-381.

22. Silva RM, Pinheiro CPO, Bezerra IC, Caldas JMP, Brasil CCP. Mastectomy and the meaning attributed by patients to delay in early diagnosis of breast cancer. *Asian Pacific Journal of Cancer Prevention* 2018; 19(8): 2083.

23. Somayyeh N, Aydogdu NG. The Effect of Breast Cancer Fear on Early Detection Behaviors of Women. *International Journal of Caring Sciences* 2019; 12(2): 649-657.

24. Al-Zalabani AH, Alharbi KD, Fallatah NI, Alqabshi RI, Al-Zalabani AA, Alghamdi SM. Breast cancer knowledge and screening practice and barriers among women in Madinah, Saudi Arabia. *Journal of Cancer Education* 2018; 33(1): 201-207.

25. Ersin F, Polat P. Examination of factors affecting women’s barrier perception to participate in breast cancer screenings in a region affiliated with a family health center in Turkey. *Turkish Journal of Medical Sciences* 2016; 46(5): 1393-1400.

26. Gueye M, Gueye SMK, Diallo M, Thiam O, Mbodji A, Diouf A, et al. Sociodemographic factors associated with delays in breast cancer. *Open Journal of Obstetrics and Gynecology* 2017; 7(04): 455.

27. Chaka B, Sayed AR, Goeieman B, Rayne S. A survey of knowledge and attitudes relating to cervical and breast cancer among women in Ethiopia. *BMC Public Health* 2018; 18(1): 1072.

28. Parambil NA, Philip S, Tripathy JP, Philip PM, Duraisamy K, Balasubramanian S. Community engaged breast cancer screening program in Kannur District, Kerala, India: A ray of hope for early diagnosis and treatment. *Indian Journal of Cancer* 2019; 56(3): 222.

29. Cinar IO, Tuzcu A. Comparison of the Levels of Fear and Perceived Social Support Among the Women Having and Not Having Mammography. *Erciyes Medical Journal* 2020; 42(3): 306-312.

30. Türkiye İstatistik Kurumu. Nüfus İstatistikleri 2016. Available from: http://www.tuik.gov.tr/PreTablo.do?alt_id=1083. [Last accessed on 2017 Nov 14].

31. Sümbülüoğlu V, Sümbülüoğlu K. Klinik ve Saha Araştırmalarında Örnekleme Yöntemi ve Örneklem Büyüklüğü, Hattıboğlu Yayınevi, Ankara; 2019: 215.

32. Nahcivan N. Hemsirelikte Araştırma: Sürec, Uygulama ve Kritik, Nobel Tıp Kitapevi, Ankara; 2017: 237.

33. Norouznia S. Meme kanseri korkusunun kadınlarnın erken tanı davranlarını üzerinde etkisinin incelenmesi. Yüksek Lisans Tezi, Dokuz Eylül Üniversitesi Sağlık Bilimleri Enstitüsü, İzmir, 2014: 72.

34. Copurlar C. Kadınlarnın sağlık okuryazarlık düzeyi ile meme kanseri bilgi ve tarama davranışlarının incelenmesi. 'Tıpta Uzmanlık Tezi, Dokuz Eylül Üniversitesi Tıp Fakültesi Aile Hekimliği Anabilim Dalı, İzmir, 2016: 67.

35. Acar U. Elazığ İlî Fırat Üniversitesi Hastanesi'nde çalışan hemsirelerin meme kanseri konusunda bilgi ve davranışlarının değerlendirilmesi. Tıpta Uzmanlık Tezi, Fırat Üniversitesi Halk Sağlığı Anabilim Dalı, Elazığ, 2017: 130.

36. Stager JL. The comprehensive breast cancer knowledge test: validity and reliability. *Journal of Advanced Nursing* 1993; 18(7): 1133-1140.

37. Başak ŞC. Üniversite Öğrencilerinde Meme Kanseri Bilgi Seviyesi: Genç Kapsamlı Meme Kanseri Bilgi Testi’nin Geçerlik ve Güvenirlik Çalışması. Yüksek Lisans Tezi, Okan Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul, 2015: 53.

38. Champion VL, Skinner CS. Menon U, Rawl S, Giesler RB, Monahan P, Daggy J. A breast cancer fear scale: psychometric development. *Journal of Health Psychology* 2004; 9(6): 753-762.

39. Seçginli S. Mammography self-efficacy scale and breast cancer fear scale: psychometric testing of the Turkish versions. *Cancer Nursing* 2012; 35(5): 365-373.

40. SPSS 24, Inc., Chicago, IL, ABD.

41. Eurostat Statistic Explained 2017. Available from: http://ec.europa.eu/eurostat/statistics-explained/index.php/Cancer_statistics. [Last accessed on 2019 Sept 19].

42. Gutnik LA, Matanje-Mwagomba B, Msosa V, Mzumara S, Khondowe B, Moses A, et al. Breast cancer screening in low-and middle-income countries: a perspective from Malawi. *Journal of Global Oncology*, 2016; 2(1): 4.

43. Bahrami M, Taymoori P, Bahrami A, Farazi E, Far-
hadifar F. The Prevalence of breast and Cervical Cancer screening and related factors in woman who refereeing to health center of Sanandaj city in 2014. Zanko Journal of Medical Sciences. 2015; 16(50): 1-12.
44. Ahmadipour H, Sheikhizade S. Breast and cervical cancer screening in women referred to urban healthcare centers in Kerman, Iran, 2015. Asian Pacic Journal of Cancer Prevention. 2016; 17: 143-147.
45. Farzaneh E, Heydari H, Shekarchi AA, Kamran A. Breast and cervical cancer-screening uptake among females in Ardabil, northwest Iran: a community-based study. OncoTargets and therapy 2017; 10: 985.
46. Sohbet R, Karasu F. Kadınların meme kanseri yönelik bilgi, davranış ve uygulamalarının incelenmesi. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi 2017; 6(4): 113-121.
47. Mahmoudabadi M, Sacidifar A, Sazadeh H. Breast cancer screening behavior among nurses in kerman teaching hospitals and its relationship with the health beliefs model scales. Iranian Quarterly Journal of Breast Disease. 2018; 11(2): 56-65.
48. Nikpour M, Haji-Tilaki K, Bakhtiairi A. Risk Assessment for Breast Cancer Development and Its Clinical Impact on Screening Performance in Iranian Women. 2019; 11: 10073-82.
49. Kwok C, Lee MJ, Lee CF. Breast cancer perceptions and screening behaviours among Korean women in Australia. Journal of immigrant and minority health 2020; 22(1): 126-133.
50. El Asmar M, Bechnak A, Fares J, Al Oweini D, Alrazim A, El Achkar A, et al. Knowledge, attitudes and practices regarding breast cancer amongst Lebanese females in Beirut. Asian Pacific journal of cancer prevention: APJCP 2018; 19(3): 625.
51. Mohd S, Raahim O. Determinants of breast self-examination (bse) once a month regularly in women of childbearing age in Kubutambahan Village. Journal Ilmu Kesehatan 2020; 8(2): 103-113.
52. Valderrama-Urreta AL, Jiménez-Báez MV, Rodríguez, JCE. Social and demographics factors associated with the breast self-examination (BSE) in women in primary care. J Fam Med Dis Prev 2018; 4: 1-6.
53. Kursun OE, Süzen S, Yildirim, Ö. Alterations Of Aldose Reductase Activity By Indole-3-carboxaldehyde Derivatives. Communications Faculty of Sciences, University of Ankara Series C Biology 2021; 30(1): 13-24.
54. Ahmed K, Asaduzzaman S, Bashar MI, Hossain G, Bhuiyan T. Association assessment among risk factors and breast cancer in a low income country: Bangladesh. Asian Pacific Journal of Cancer Prevention 2015; 16(17): 7507-7512.
55. Ektir B, Yılmaz M. Breast Cancer-Related Knowledge Levels and Health Literacy in Working Women.
89. Gebresillassie BM, Gebreyohannes EA, Belachew SA, Emiru YK. Evaluation of Knowledge, Perception, and Risk Awareness About Breast Cancer and Its Treatment Outcome Among University of Gondar Students, Northwest Ethiopia. *Frontiers in Oncology* 2018; 8: 501.

90. Hasan TN, Shah SA, Hassan MR, Safian N, Azhar ZI, Syed Abdul Rahim SS, Ghazi HF. Poor knowledge and practice towards breast cancer among women in Baghdad City, Iraq. *Asian Pac J Cancer Prev* 2015; 16(15): 6669-72.

91. Kissal A, Ersin F, Koç M, Vural B, Çetin Ö. Determination of Women’s Health Beliefs, Breast Cancer Fears, and Fatalism Associated with Behaviors Regarding the Early Diagnosis of Breast Cancer. *International Journal of Cancer Management* 2018; 11(12): 1-9.

92. Lee CH, Kim YI. Effects of attitude, social influence, and self-efficacy model factors on regular mammography performance in life-transition aged women in Korea. *Asian Pac J Cancer Prev* 2015; 16: 3429-34.

93. Gang BP, Dilda PJ, Hogg PJ, Blackburn AC. Targeting of two aspects of metabolism in breast cancer treatment. *Cancer Biology & Therapy* 2014; 15(11): 1533-1541.

94. Labrie NH, Ludolph R, Schulz PJ. Investigating young women's motivations to engage in early mammography screening in Switzerland: results of a cross-sectional study. *BMC Cancer* 2017; 17(1): 209.

95. Polat P, Ersin F. The Effect of Breast Cancer Fear Levels of Female Seasonal Agricultural Laborers on Early-Diagnosis Behaviors and Perceptions of Breast Cancer. *Social Work in Public Health* 2017; 32(3): 166-175.

96. Kissal A, Beşer A. Results of breast and cervical cancer Health Promotion Model for older Turkish women. *Journal of Human Sciences* 2017; 14(3): 2374-2385.

97. Öz F. Sağlık alanında temel kavramlar. Mattek Yayıncılık, Ankara, 2010: 157-179.