

## Research Article

## Factors Associated with Mammography Screening Among Women Living in Rural Areas

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## Abstract

**AIM:** This study aims to assess the factors of mammography screening among women living in rural areas.**METHOD:** The study was planned in a cross-sectional type. The sample of the study consisted of 139 women admitted to two family health centers in İstanbul who were aged 40 and over, literate, not pregnant or breastfeeding, and not diagnosed with breast cancer. Data was collected between July and November 2018. Data were collected using interview form, Breast Cancer Health Belief Model Subscales of Susceptibility, health motivation, mammography benefits, mammography barriers, Mammography Self- Efficacy Scale, Breast Cancer Fear Scale, Breast Cancer Fatalism Scale, and Breast Cancer Risk Assessment Form. Data were analyzed with descriptive statistics, Mann-Whitney *U* test, Kruskal-Wallis, chi-square test, and logistic regression analysis.**RESULTS:** Most of the women were in the age group of 40-50 years (66%), graduated primary school (69%), were married (91%), and were not working (80%). Most of the women had middle-income (78%) and health insurance (88%). In the study, the rate of having had mammography in the last 2 years was 25%. The rate of mammography screening was significantly higher in women who knew mammography, who had a referral for mammography screening from health professionals, and who had health insurance ( $p < .05$ ). Perceived benefits to mammography, perceived barriers to mammography, perceived self-efficacy, and perceived health motivation were significantly higher in women having mammography ( $p < .05$ ).**CONCLUSION:** In the study, marital status, receiving health professionals' referral regarding mammography screening, mammography self-efficacy, perceived barriers to mammography, and breast cancer risk level ( $p < .05$ ) were factors associated with having mammography.**Keywords:** Breast cancer, health beliefs, mammography, rural area, women

## Introduction

Breast cancer is an important public health issue affecting women's health. The World Health Organization (WHO) (2021) has reported that 685.000 people died from breast cancer in the world in 2020. It was estimated that 330.840 women will be diagnosed with breast cancer in 2021 (American Cancer Society, 2021). Breast cancer is the most common type of cancer and the most common cause of death in women in Turkey. In national reports, it is reported that the incidence of breast cancer among women was 45.6/100.000 in 2018, and the number of newly diagnosed patients in the same year was 22.500 (T.R. Ministry of Health General Directorate of Health Services, 2020).

Breast cancer is a type of cancer that has a very high chance of being cured when diagnosed early and when appropriate treatment methods are used (Çidem & Ersin, 2019; Duong et al., 2020; Simon, 2018; Turkish Public Health Directorate, 2016). The most effective method to improve health and to reduce morbidity and mortality rates in breast cancer is early diagnosis

of the disease. Mammography is a significant method of diagnosing and screening used in the early diagnosis of breast cancer (American Cancer Society, 2019; Saçıkara & Koçoğlu-Tanyer, 2021; T.R. Ministry of Health General Directorate of Health Services, 2020; World Health Organization [WHO], 2021). Breast cancer can be diagnosed at an early stage by regularly performed mammography by recommended age and frequency characteristics, and breast cancer survival rates of women can be increased (American Cancer Society, 2019; Turkish Public Health Directorate, 2016).

Although the recommendations regarding mammography vary in various countries, according to the National Breast Cancer Screening Program established by the Cancer Control Department of the Ministry of Health, it is recommended that women in Turkey between the ages of 40-69 should have a mammography every 2 years (T.R. Ministry of Health General Directorate of Health Services, 2020). While the importance of mammography in the early diagnosis of breast cancer is known, regular mammography rates in Turkey are not at the desired level. Recent studies reported low mammography rates among

women living both in urban and rural areas (Ersin et al., 2015; Özoğul & Dağ, 2019; Sohbet & Karasu, 2017; Yıldırım & Özaydın, 2014) and rural areas (Duong et al., 2020; Saçıkara & Koçoğlu-Tanyer, 2021; Türk et al., 2017).

Factors that prevent mammography screening are known to play an important role in the low rates of mammography (Aker et al., 2015; Aksoy et al., 2015; Fernandez et al., 2005; Saçıkara & Koçoğlu-Tanyer, 2021; Yıldırım & Özaydın, 2014). For improving mammography screening rates, it is important to identify the relevant factors with having mammography. In studies conducted in recent years among women living in urban and rural areas, it has been found that factors such as health beliefs regarding breast cancer, perceived risk of breast cancer, knowledge about breast cancer and mammography, fear of breast cancer, the presence of family history, age, socio-economic characteristics, education level, health insurance, and transportation are effective on having mammography screening (Aker et al., 2015; Aksoy et al., 2015; Çidem & Ersin, 2019; Colliver, 2016; Ersin et al., 2015; Güzel & Bayraktar, 2019; Sohbet & Karasu, 2017; Taymoori et al., 2015; VanDyke & Shell, 2017). Although studies on mammography screening are more frequent in urban areas, studies in rural areas also showed that factors such as ignorance of breast cancer and mammography, fear of getting cancer, embarrassment, difficulty in reaching a health institution, lack of health insurance and health professionals' referral about mammography screening, low income and education level, distance from health centers, and health beliefs are effective on having mammography screening (Colliver, 2016; Duong et al., 2020; Fernandez et al., 2005; Saçıkara & Koçoğlu-Tanyer, 2021; Tejada et al., 2009; VanDyke & Shell, 2017).

Health Belief Model is frequently used in many national and international studies to predict the health beliefs that influence mammography screening (Champion et al., 2003; Duong et al., 2020; Marmarà et al., 2018; Özoğul & Dağ, 2019; Seçginli & Nahcivan, 2006). It has been reported that among the individual beliefs in the model, perceived susceptibility, perceived benefit, perceived barrier, and perceived health motivation influence having mammography screening (Champion et al., 2003; Ersin et al., 2015; Özoğul & Dağ, 2019; VanDyke & Shell, 2017).

Although there are studies that identify the factors that affect women having mammography screening rates in Turkey, studies that describe the factors that affect women living in rural areas having mammography screening are limited. However, identifying the factors that affect women having mammography screening living in rural areas where mammography rates are relatively low is important for developing programs aimed at increasing mammography rates in these regions. Therefore, this study aimed to determine the factors associated with mammography screening among women living in rural areas.

### Research Questions

1. What is the rate of having mammography screening among women aged 40 years and older living in rural areas?
2. Which factors are associated with mammography screening among women aged 40 years and older living in rural areas?

## Method

### Study Design

The research is a cross-sectional study.

### Sample

The population of the study consists of women aged 40 years and over who came to two family health centers (FHCs) in a rural area in Istanbul, Büyükçekmece district, between July and November 2018. The sample size of the study was calculated with the sampling formula ( $n = p \times (1-p) \times t^2/d^2$ ) used in the studies where "the number of people in the universe is unknown." For this study, the sample size was calculated as 151, where  $p = .50$ , deviation from incidence  $d = .05$ , and  $\alpha = .05$ . The study was conducted with 139 women aged 40 years and over, not diagnosed with breast cancer, literate, not pregnant/breastfeeding, and willing to participate in the study. The statistical power of the research was evaluated post hoc through the ClinCalc program after the study and the power of the study has been found as .95, at 95% CI, 5% significance level.

### Data Collection

The data were collected by the first researcher by face-to-face interviews with the participants between July and November 2018. The participants were informed about the study and asked to complete the data collection tools. At the end of the interview, participants were given a National Cancer Screening Brochure on Breast Cancer Information and Cancer Early Diagnosis Screening and Training Centres drawn by the Ministry of Health, free of charge, and their questions about women's health were answered.

### Data Collection Tools

#### Interview Form

There are 18 questions in the interview form, aimed to define the individuals' age, gender, education level, employment status, marital and income status, perceived health level, and characteristics for mammography. The form was developed by the researcher based on literature (Altıntaş et al., 2017; Champion et al., 2003; Ersin et al., 2015; Kissal & Beşer, 2017; Seçginli & Nahcivan, 2006; Sohbet & Karasu, 2017; Taymoori et al., 2015; Yıldırım & Özaydın, 2014).

#### Breast Cancer Health Belief Model Scale

The Breast Cancer Health Belief Model Scale was developed and revised in English by Victoria Champion (Champion, 1984, 1993). The scale defines the health beliefs that affect women's decision to have mammograms. The adaptation of the scale into Turkish was carried out by Seçginli and Nahcivan in 2002, and the Cronbach's alpha reliability coefficient of the Turkish scale varies between .75 and .87 (Seçginli & Nahcivan, 2004). In this study, perceived susceptibility to mammography (five items), perceived benefits to mammography (six items), perceived barriers to mammography (five items), and health motivation (seven items) of the subscales were used. The scale is a five-point Likert type and consists of options between "1: strongly disagree" and "5: strongly agree." For items in the barriers subscale of the scale, scoring is reversed. A high total score on the other subscales of the scale apart from the barriers indicates that health beliefs on mammography behavior are high,

and the rate of exhibiting the behavior will be high (Seçginli & Nahcivan, 2004). In this study, the Cronbach's alpha coefficient of the scale was found as .98 for the perceived susceptibility, .70 for the perceived benefits to mammography, .64 for the perceived barriers to mammography, and .72 for the perceived health motivation.

#### **Mammography Self-Efficacy Scale**

The Mammography Self-Efficacy Scale was developed in English by Champion et al. (2005) in 2005. The scale defines women's perceived self-efficacy regarding mammography screening. The scale consists of ten items and the scoring is in a five-point Likert type, ranking as "1: strongly disagree" and "5: strongly agree." The total score obtained varies between 10 and 50. A high score means a high perceived self-efficacy to mammography. The Turkish validity of the scale used in the study was checked by Seçginli in 2012 and the Cronbach's alpha coefficient was found to be .90 (Seçginli, 2012). In this study, the Cronbach's alpha coefficient of the scale was found as .92.

#### **Breast Cancer Fear Scale**

The Breast Cancer Fear Scale is an eight-item tool developed in English by Champion et al. (2004) in 2004. The item structure of the scale is a five-point Likert type, ranking as "1: strongly disagree" and "5: strongly agree." The total score obtained varies between 8 and 40. On the scale, 8–15 points indicate a low level of fear, 16–23 points a moderate level of fear, and 24–40 points a high level of fear. The Turkish validity of the scale was checked by Seçginli in 2012 and the Cronbach's alpha coefficient was found as .90 (Seçginli, 2012). In this study, the Cronbach's alpha coefficient of the scale was found as .90.

#### **Breast Cancer Fatalism Scale**

The Breast Cancer Fatalism Scale was developed in English by Powe (1995) in 1995. The scale was revised by Mayo et al. (2001) in 2001 with having 11 items. The scale is answered as "Yes: 1 point," "No: 0 point." The total score obtained varies between 0 and 11, and an increase in the score indicates fatalism increasing of breast cancer. The Turkish adaptation of the scale was carried out by Ersin et al. in 2014 and published in 2018 (Ersin et al., 2018). In the original study, the Kuder Richardson 20 coefficient was determined as .80 (Ersin et al., 2018). In this study, the Kuder Richardson 20 coefficient of the scale was found as .80.

#### **Breast Cancer Risk Assessment Form**

Breast Cancer Risk Assessment Form is a form recommended to be used by the Ministry of Health in Turkey in order to determine the risk of breast cancer (T.R. General Directorate of Maternal and Child Health and Family Planning, 2005). The form consists of 6 sections and 20 items. The form includes statements about the age, familial breast cancer history, personal breast cancer history, childbearing age, menstrual history, and body structure. The total score obtained varies between 40 and 775, and a score over 400 suggests "highest risk" for breast cancer, a score 301–400 indicates "high risk", 201–300 "moderate risk", and 200 and lower scores indicate "low risk" (T.R. General Directorate of Maternal and Child Health and Family Planning, 2005).

#### **Statistical Analysis**

Data were analyzed using Statistical Package for Social Sciences version 21.0 (IBM SPSS Corp., Armonk, NY, USA) statistical package program. Descriptive statistics, Mann–Whitney *U* test, Kruskal–Wallis test, chi-square test, and logistic regression analysis were used in the study. The significance level was considered as  $p < .05$  in the study.

#### **Ethical Consideration**

Institutional permission and approval for the study were obtained from the Istanbul Provincial Health Directorate (No: 16867222/604.01.01) and from the Istanbul University Social and Human Sciences, Committee of Ethics on Non-Interventional Clinical Research (Date: March 9, 2018, No: 93193). Permission to use the data collection tools in the study was obtained. The purpose and procedure of the study were explained by obtaining permission from the administrators of the institution was obtained where the study was conducted. Verbal consent of the participants was obtained and informed that they could leave the study at any time.

#### **Results**

The study was conducted with 139 women aged 40 years and over. Two-thirds of the women included in the study were between 40 and 50 years old and one-third of them were over 51 years (min-max: 40–67). The majority of the participating women were grade school graduates (69%), married (91%), unemployed (80%), with moderate-income (78%) and moderate health status (52%), and overweight (58%). The majority of the women had health insurance (88%), given birth under 30 (95%), did not have a history of breast cancer in their family (mother, sister, aunt, and grandmother) (93%), knew about mammography (76%), and obtained information on mammography mostly from nurses, midwives, and physicians (63%). The majority of women (62%) did not receive health professionals' referral about mammography screening (physicians and nurses), did not have mammography in the last 2 years (76%), and the risk of breast cancer was low (92%).

Among the Breast Cancer Health Belief Model Scale, the perceived susceptibility score was  $12.37 \pm 5.23$  (min-max: 5–25), the perceived health motivation score was  $22.56 \pm 6.07$  (min-max: 7–35), the perceived mammography benefit score was  $22.61 \pm 3.8$  (min-max: 14–30), and the score of perceived barriers to mammography was  $16.23 \pm 4.26$  (min-max: 5–25). In the study, the Mammography Self-efficacy Scale score of the participants was  $40.26 \pm 9.65$  (min-max: 10–50), the Mammography Fear Scale score  $25.37 \pm 10.06$  (min-max: 8–40), Breast Cancer Fatalism Scale score was  $3.82 \pm 2.32$  (min-max: 0–11), breast cancer risk score was  $155.79 \pm 45.06$  (min-max: 70–440), and the majority (68%) had a high level of breast cancer fear.

In the study, when mammography history and descriptive characteristics were compared, the rates of having health insurance, receiving health professionals' referral about mammography screening, and being aware of mammography were found as high in women who had mammography (Table 1). Women's health beliefs of breast cancer and breast cancer risk score

**Table 1.**  
Bivariate Relationship Between Variables and Having Mammography (N= 139)

Variables	Having Mammography, n (%)	Not Having Mammography, n (%)	Statistics		
			$\chi^2$	df	p
<b>Age</b>					
40–50	25 (65.3)	66 (65.8)	.002	1	.961
51 and more	13 (34.2)	35 (34.7)			
<b>Education level</b>					
Literate	5 (13.2)	17 (16.8)	.281	2	.869
1–8 years	27 (71.1)	69 (68.3)			
9 and more	6 (15.8)	15 (14.9)			
<b>Marital status</b>					
Married	35 (92.1)	91 (90.1)	.131	1	.717
Single	3 (7.9)	10 (9.9)			
<b>Working status</b>					
Yes	8 (21.1)	20 (19.8)	.027	1	.870
No	30 (78.9)	81 (80.2)			
<b>Income status</b>					
Very bad/bad	1 (2.6)	13 (12.9)	4.524	2	.104
Middle	30 (78.9)	78 (77.2)			
Good/very good	7 (18.4)	10 (9.9)			
<b>Health status</b>					
Very bad/bad	1 (2.6)	8 (7.9)	1.625	2	.444
Middle	19 (50)	53 (52.5)			
Good/very good	18 (47.4)	40 (39.6)			
<b>Having mammography knowledge</b>					
Yes	38 (100)	67 (66.3)	16.934	1	<b>.000</b>
No	0	34 (33.7)			
<b>Health insurance</b>					
Yes	37 (97.4)	85 (84.2)	4.489	1	<b>.034</b>
No	1 (2.6)	16 (15.8)			
<b>Family history</b>					
Yes	5 (13.2)	6 (5.9)	1.794	1	.160
No	33 (86.8)	95 (94.1)			
<b>Health professionals' referral</b>					
Yes	34 (89.5)	20 (19.8)	59.418	1	<b>.000</b>
No	4 (10.5)	81 (80.2)			

Note:  $\chi^2$  = chi-square test; df = degrees of freedom; n = number of people.  $p < .05$ ;  $p < .001$ .

were compared with those having mammography status, and it was found that perceived benefits score, the score of perceived barriers, and the score of mammography self-efficacy of the women who had mammography were higher than those who did not. Again, the scores of perceived health motivation of women who had mammography were higher than those who did not ( $p < .05$ ) (Table 2).

**Factors Associated with Having a Mammography**

Logistic regression analysis was performed to identify factors associated with mammography. Accordingly, it was found that the rate of women who received health professionals' referral regarding mammography screening was 99 times higher (OR: 99.228 95% CI: 18.640–528.211). However, the rate of having mammography is .104 times higher for married women

**Table 2.**  
Health Beliefs and Breast Cancer Risk Associated with Having Mammography (N=139)

Variables	Having Mammography		Not Having Mammography		Statistics		
	Mean ± SD	(Min-Max)	Mean ± SD	(Min-Max)	U	z	p
Perceived susceptibility	12.86 ± 5.82	5–25	12.18 ± 5.01	5–21	1853.5	–.463	.573
Health motivation	25.18 ± 5.83	13–34	21.58 ± 5.88	7–35	1247.5	–3.304	<b>.002</b>
Perceived benefits to mammography	24.84 ± 3.04	19–30	21.77 ± 3.73	14–30	1068.5	–4.162	<b>.000</b>
Perceived barriers to mammography	18.5 ± 4.36	9–25	15.38 ± 3.92	5–25	1220.5	–3.440	<b>.000</b>
Mammography self efficacy	46.26 ± 4.58	34–50	38 ± 10.09	10–50	870	–5.111	<b>.000</b>
Breast cancer fear	25.55 ± 10.46	8–40	25.30 ± 9.95	8–40	1947	–.014	.989
Breast cancer risk	156.71 ± 41.18	80–275	155.44 ± 46.63	70–440	1919	–.148	.719
Breast cancer fatalism	3.28 ± 1.67	0–8	4.01 ± 2.50	0–11	1682.5	–1.276	.112

Note: U=Mann-Whitney U test; Z=standardized test statistic; SD=standard deviation; mean=average; min-max=minimum-maximum;  $p < .05$ .

(OR: .104, 95% CI: .013–.842), .297 times for women with a higher risk of breast cancer (OR: .297, 95% CI: .107–.830), six times for women with a higher score of perceived self-efficacy to mammography (OR: 6.018, 95% CI: 2.196–16.491), and approximately four times for women with a higher score of perceived barriers to mammography (OR: 3.888, 95% CI: 1.343–11.255) (Tables 3 and 4).

### Discussion

Early diagnosis of breast cancer is the most effective method to reduce mortality. Mammography is one of the most important screening behaviors recommended for the early diagnosis of breast cancer. It is reported that the rate of having mammography among women is low (Çidem & Ersin, 2019; Duong et al., 2020; Emami et al., 2021; Türk et al. 2017). According to the national breast cancer screening program in Turkey, the community-based mammography screening target is 70% (T.R. Ministry of Health Turkish Public Health Directorate Cancer Department, 2016). However, research findings on mammography screening rates indicate that the rate of mammography screening is well below national targets. According to the

2019 health statistics of the Ministry of Health, the rate of having mammograms is 10% (T.R. Ministry of Health General Directorate of Health Information Systems, 2021). Various studies assessing the rate of having mammograms among women in Turkey have also found that the rate of having mammography varies between 20% and 58% (Ersin et al., 2015; Özoğul and Dağ 2019; Saçıkara and Koçoğlu-Tanyer 2021; Sohbet & Karasu, 2017; Yıldırım & Ozaydın, 2014). Mammography rates found in the related studies mostly describe the characteristics of women living in urban areas, whereas studies evaluating having mammography rates among women living in rural areas are extremely limited. In a study conducted in rural areas in Turkey (Turk et al., 2017), the rate of women having mammography was reported as 18%, and in another recent study (Saçıkara and Koçoğlu-Tanyer (2021)), it was reported as 25%. In the present study conducted with women living in rural areas, the rate of having mammography was found as 25%. This rate is similar to the rates found in the studies by Türk et al. (2017) and Saçıkara and Koçoğlu-Tanyer (2021) and is well below the national mammography screening target. The results of these studies indicate that the rate of having mammography among rural women in the sample group is low and highlight the importance of

**Table 3.**  
Logistic Regression Analysis of Descriptive Variables for Having Mammography (N=139)

Variables	B	S.E.	Wald	p	Exp (B)	95% CI
Age	–1.057	.591	3.194	.074	.348	.109–1.108
Marital status	–2.263	1.067	4.469	<b>.034</b>	.104	.013–.842
Working status	–.278	.686	.164	.685	.757	.197–2.906
Income status	–.489	1.343	.132	.716	.614	.44–8.538
Health status	–.831	1.674	.247	.619	.435	.16–11.578
Family history	1.371	.981	1.953	.162	3.938	.576–26.917
Health insurance	2.388	1.438	2.757	.097	10.894	.650–182.596
Health professionals' referral	4.597	.853	29.041	<b>.000</b>	99.228	18.640–528.211
Constant	–1.027	1.028	.997	.318	.358	

Note:  $\chi^2 = 42.789$ ;  $df = 8$ ;  $p = .000$ . Verification rate = 79.1%; B = beta value; S.E. = standard error; exp (B) = odds ratio; 95% CI;  $p < .001$ ;  $p < .05$ .

**Table 4.**  
 Logistic Regression Analysis of Health Beliefs and Breast Cancer Risk for Having Mammography (N= 139)

Variables	B	S.E.	Wald	p	Exp (B)	95% CI
Perceived susceptibility	.217	.475	.209	.648	1.243	.489–3.156
Health motivation	.605	.476	1.615	.204	1.831	.720–4.652
Benefits to mammography	.333	.530	.394	.530	1.395	.493–3.942
Barriers to mammography	1.358	.542	6.270	<b>.012</b>	3.888	1.343–11.255
Mammography self efficacy	1.795	.514	12.174	<b>.000</b>	6.018	2.196–16.491
Breast cancer fear	–.259	.489	.281	.596	.772	.296–2.011
Breast cancer risk	–1.213	.524	5.360	<b>.021</b>	.297	.107–.830
Breast cancer fatalism	–.008	.471	.000	.986	.992	.394–2.496
Constant	–1.476	.292	25.523	<b>.000</b>	.229	

Note:  $\chi^2 = 42.789$ ;  $df = 8$ ;  $p = .000$ . Verification rate = 79.1%; B = beta value; S.E. = standard error; Exp(B) = odds ratio; 95% CI.  $P < .001$ ;  $P < .05$ .

programs to increase mammography rates for this group. In this study it was found that receiving health professionals' referral regarding mammography screening, knowing about mammography, and having health insurance were factors related to having mammography screening. In advanced analysis, it was determined that receiving health professionals' referral regarding mammography screening and marital status were the factors affecting having mammography screening. The results of the present study are supported by the results of studies by Aksoy et al. (2015) and Melvin et al. (2016) reporting that marital status and having health insurance were factors affecting mammography screening and by the results of the study by Güzel and Bayraktar (2019) reporting that knowing mammography has a significant effect in mammography screening. The results of the study are also supported by the result of the study by Gathirua-Mwangi et al. (2018) which found that receiving health professionals' referral regarding mammography screening has a significant effect on having mammography screening among women with low-income levels living in rural areas. In a recent study by Saçıkara and Koçoğlu-Tanyer (2021), it was reported that having knowledge about mammography is effective in having mammography screening among women living in rural areas. In the study of Shirzadi et al. (2020) among Iranian women, it was reported that having knowledge about mammography is effective in mammography screening. Contrary to this study, Kissal and Beşer (2017) and Saçıkara and Koçoğlu-Tanyer (2021) reported that there was no correlation between marital status and mammography screening. These findings may help in developing programs that will increase having mammography screening rates among rural women. It is important to raise the awareness of women on mammography and that having regular mammograms is the gold standard in early diagnosis of breast cancer, and to encourage health professionals to conduct mammography screening on women. However, it is also important for public health nurses who work frequently with women in primary health care institutions to consider every application as an opportunity and inform women about having regular mammograms.

In the present study, the effect of health beliefs on mammography was assessed with HBM and it was found that perceived

health motivation, perceived benefits to mammography, perceived barriers to mammography, and perceived self-efficacy to mammography were associated with having mammography screening. In further analysis, it was found that only breast cancer risk level, perceived self-efficacy to mammography, and perceived barriers to mammography were the factors affecting having mammography screening. The findings of this study are similar to study findings of Çidem and Ersin (2019) and Özoğul and Dağ (2019). The results of the study are supported by the results of other studies reporting that the perceived self-efficacy to mammography is effective on having mammography (Aker et al., 2015; Ersin et al., 2015), that higher perceived self-efficacy is effective on having mammograms (Moshki et al., 2017; Taymoori et al., 2015), and that perceived self-efficacy to mammography and low perceived barriers to mammography are effective on having a mammography (Emami et al., 2021). That low perceived barriers to mammography have a positive effect on having mammogram has also been found in the studies conducted by Marmarà et al. (2018) among women living in the rural area of Malta, by Taymoori et al. (2015) among women over 50 years old, and by Duong et al. (2020) among Vietnamese women living in rural. Unlike findings, in the study on primary school graduate women by Ersin et al. (2015), it was found that the perceived susceptibility and perceived benefits to mammography are effective on mammography screening; in the study by Taymoori et al. (2015) on women over 50 years, effective factors were high perceived susceptibility and perceived health motivation, and in the study by Emami et al. (2021), those were perceived health motivation and susceptibility. It was found that the level of breast cancer risk in women in the present study was low, as in the studies by Türk et al. (2017) and Mermer and Güzekin (2021) and that it had an effect on mammography screening as in the study by VanDyke and Shell (2017) in rural areas. Contrary to the findings of this study, it was reported in the studies by Tejeda et al. (2009) and Melvin et al. (2016) that there was no correlation between breast cancer risk level and having a mammogram. In conclusion, the findings related to the health beliefs of women influencing their decision to have mammography in the present study were consistent with the literature, except for the perceived barriers to mammography (Aker et al., 2015; Çidem & Ersin., 2019; Ersin et al., 2015; Mermer

& Güzekin, 2021; Moshki et al., 2017; Özoğul & Dağ, 2019; Taymoori et al., 2015; Türk et al., 2017; VanDyke et al., 2017). In the present study, it was found that breast cancer risk score and perceived self-efficacy were the factors affecting having mammography screening among women over 40 years living in rural areas. It is crucially important to consider these variables in programs aiming to increase mammography screening rates. To the contrary of the assumption of the Health Belief Model regarding the correlation between having mammograms and perceived barriers to mammography, in this study, it was found that the rate of having mammography screening was higher among women with a high perceived barrier to mammography. In this regard, further studies are required among various sampling groups to better understand the effect of perceived barriers to mammography.

### Study Limitations

The limitations of the study are that the study was conducted in only two FHC regions and in a certain time period, and the rate of mammography screening was assessed based on women's self-reports.

### Conclusion and Recommendation

In this study, the rate of mammography screening was low among women over 40 years, living in rural areas. Women living in rural areas had low breast cancer risk levels and perceived barriers to mammography and perceived self-efficacy to mammography were high. Receiving health professionals' referral regarding mammography screening, marital status, perceived self-efficacy to mammography, perceived barriers to mammography, and breast cancer risk level were found effective on having mammography screening. It is noteworthy to find that the rate of mammography screening among women with high perceived barriers to mammography was also high.

In line with these findings, it is recommended:

- Considering the effective factors in having mammography screening in programs aiming to increase the rate of mammography screening in rural areas.
- Planning breast health promotion programs for women living in rural areas.
- The active role of receiving health professionals' referral regarding mammography screening should be taken into account. At this point, in order to reach women in the target population and living in rural areas, it is important for health professionals working in family health centers to explain the principles of the national breast cancer screening program in each visit and to refer women to Cancer Early Diagnosis, Screening and Training Centers. Indeed, nurses who frequently work with women from all age groups can also play an important role in increasing other breast cancer screening behaviors, especially mammography.
- Mobile mammography screening services can be arranged to promote the rates of mammography in rural areas.

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