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Women's Participation in Mammography Screening, Breast Cancer Risk Levels and Its Relationship with Death Fear and Anxiety

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ABSTRACT: Aim: This study aimed to evaluate the relationship between women's participation in mammography screening, breast cancer risk levels, and death anxiety.

Materials and Methods: This cross-sectional study was held between January and April 2023, to 305 women aged over 40 in to family health centers. A face-to-face survey included sociodemographic characteristics, their breast cancer risk factors, whether they have undergone mammography and their beliefs related to mammography screening was applied to the participants. All of the participants GAIL score calculated and they answered Templer's Death Anxiety Scale (TDAS) .

Results: The mean age of the participants was 54,14±9,30 years, 66,90% were housewives, 48,90% were obese, and 66,9% were in menopause. According to the Gail model, the mean percentage risk of developing breast cancer at five years was 1.42±0.46%; and the mean percentage of lifetime risk as 10,0±2,02. The mean death anxiety score of the participants was found to be 8.47±2.39. 68.90% of the participants participated in at least one mammography screening while 23.0% of them had regular screens. In a binary logistic regression model in which the dependent variable was being in study group (Participants who had regular mammography screening), age (OR=0,929 %95 CI 0,898-0,960), and positive score of the beliefs about mammography (OR=1,154 %95 CI 1,099-1,211) are found as independent variables for being in the study group.

Conclusions: The positive beliefs of the participants and age were found as independent variables for regular mammography screening while we failed to find TDAS is ineffective.

Keywords: Breast cancer, mammography, Death anxiety, Gail model

I. INTRODUCTION

According to the GLOBOCAN (2020), breast cancer ranks second after lung cancer and has a rate of 11.7% among all cancer types (1). Worldwide, there were more than two million new registered breast cancer cases in 2020 while there were approximately 24.000 new breast cancer cases with a rate of 10.3% among all cancer types in Turkey (2). It has been stated that 12.9 out of every hundred thousand registered breast cancer cases in the world in 2021 resulted in mortality (3). When compared to developed countries, an increase in both breast cancer rates and mortality from breast cancer is observed in developing countries in recent decades (4). Various factors such as more effective chemotherapy protocols, the use of aromatase inhibitors, increased use of the use of tamoxifen, and as well as prophylactic mastectomies, and an increase in the number of people leading a healthy lifestyle with a decrease in the rates of hormone replacement therapy are listed. However, the main reason for the decrease in mortality was linked (> 70% of all cases) with the detection of cancer in cases in a very early stage when it is non-palpable (<1,5 cm) with mammography. The best health strategy to decrease morbidity and mortality from breast cancer is to provide cost-effective and available early cancer screening methods as a part of integrated primary care intervention (5). Among several other options for breast cancer screening in large populations such as self-breast examination (monthly), and clinicalbreastexamination by a physician (annually), USG mammography has been identified as the most effective method although its sensitivity (75%) and reliability (25%) are far from perfect (6).The United States Preventive Services Task Force (USPSTF) states that mammography is the only evidence-based breast cancer screening method and it is recommended for women between the ages of 50 and 74 every two months as a Grade B recommendation (7). USPSTF also stated that the decision to perform mammography at earlier agesshould be evaluated by the physician evaluating the patient according to the cancer risk profile of the patient (Grade C recommendation). In our country, Turkey, mammography for women between the ages of 40 and 74, whomprimary health care institutions evaluate, is performed free of charge in special health units. Although these services are provided equally and accessible to all women in our country, the rates of mammography among women in the target age range are surprisingly low (8).The low rates of women receiving this service, which provides effective screening and treatment for the most lethal cancer they face, deserve a serious investigation into the barriers to mammography. Around the world, there are several barriers to mammography have been discussedso far (10). Factors in this regard are grouped into two different groups: patient's beliefs with demographic and socio-economic reasons. Among the demographic and socio-economic reasons age, working women not being able to spare time for screening due to their busy schedules, lack of information, lack of transportation opportunities, and financial difficulties can be listed (11). Concerns related to patient beliefs about mammography lie on a wide spectrum (12). This group includes some ideas that are insensitive to health risks, such as the idea that mammography is useless and the idea of not caring about personal health. A group of women are afraid of the procedure itself. In addition to those who think the procedure is painful, the number of people who are embarrassed by the presence of a male attendant during the procedure is considerable. Another group includes the difficulty of accepting bad news after having a mammogram. Many patients may believe that getting cancer will eventually result in death and constantly delay getting their mammograms (13).

Apart from all of these factors mentioned above fear or anxiety of cancer needs a more complex approach. The Turkish Society of Gynecological Oncology (TJOD) has defined anxiety and fear of breast cancer as the negative, psychological, and physiological warnings that occur against the perceived threat of breast cancer and the response that individuals exhibit against this threat(14). The impact of cancer fear or anxiety on a person can be highly individual. (10). It has been claimed that the anxiety and fear of having breast cancer do not always have a negative effect on individuals' approach to cancer screening. Some studies are showing that cancer anxiety or fear of being diagnosed with cancer can be a motivation in cancer screening(15). It has also reported that fear that prevents performing breast cancer early detection behavior occurs because of thoughts such as being diagnosed with breast cancer, losing the breast, feeling of pain, and, death (16).Studies conducted so far have examined the negative impact of cancer fear or anxiety on cancer screening. Death is an inevitable phenomenon and a direct threat to existence. While some individuals may develop adaptive coping mechanisms to deal with such fears, in some individuals death anxiety may also trigger maladaptive coping strategies such as avoiding situations that remind them of mortality.Some authors state that some patients

perceive cancer as a death sentence and that this affects healthcare-seeking behavior (17). However, there is not enough data on the effects of fear of death, which is an important component of cancer fear or anxiety, on mammography screenings.

In this study, we first wanted to investigate the rates of regular mammography as recommended by our research group. Then, the relationship between personal socio-demographic and obstetric factors and mammography was evaluated. Finally, the main goal of this study is to examine the relationship between fear of death and mammography rates.

II. MATERIAL and METHODS

2.1. Study Design

This study is designed as descriptive-analytic research. The study was carried out in OndokuzMayis University Medical Faculty Family Medicine Department's two different family health centers (FHC) located in Samsun between January and April 2023. Sampling calculations were made using the G-Power 3.1 program. The sample size was calculated as 305 with a 5% margin of error within the 95% confidence interval ($\alpha = 0.05$). Women aged 40 and over who were listed in these FHCs were accepted as study universe (A total of 6200). These individuals were called for a meeting by phone randomly and 305 participants who agreed to participate in the study voluntarily, without any communication disabilities (individuals with mental disabilities, hearing problems, language problems)were included in the study. All interviews were conducted face-to-face by the same researcher. This research was conducted by the principles of the Helsinki Declaration of Human Rights. Ethics committee approval was obtained before starting the study (OMÜKAEK 2022/421). All of the participants answered the standard questionnaire, Templer's Death Anxiety Scale (TDAS) while their GAIL score was calculated.The participant's status about their mammography screening had been checked from E-Nabiz System (Official main electronic data base of the patients). The participants who had regular mammography screening according to the Turkish Ministry of Health are accepted as study group (n=70, 23%). The other participants were accepted as control group (n=235, 77%).

2.2.Data Collection Tools

2.2.1. Standard Form

The questionnaire used for the study was created by scanning the literature. (7, 8). The questionnaire consisted of 31 items, including the participant's sociodemographic data (12 items). In the sociodemographic part age, height, weight, marital status, income, educational status, occupation, presence of chronic disease, and presence of cancer diagnosis were questioned.The questionnaire also included breast cancer risks (16 items). In this term, every participant's gynecological and obstetric features such as the age of first menstruation, number of pregnancies and births, age at giving first birth, menopausal status (If yes, the age at menopause) whether having ever been diagnosed with any benign or malignant cancer were questioned. The participation in mammography screening (3 items)was evaluated.

Lastly, each of the participants rated their beliefs about mammography screening with eight items. These items evaluate the participant's beliefs about mammography in a 5-point Likert style (1=I strongly disagree, 5=I strongly agree). The participants' answers to these eight questions were added together and their opinions about mammography were calculated as a single score. This single score, participants' beliefs about mammography is accepted as a term PBAM. As the score the participants received from this main score decreased, they were considered to have a positive opinion about mammography, and as the score increased, they were considered to have a negative opinion about mammography.

Templer's Death Anxiety Scale (TDAS, 1970)

It is the most well-known death anxiety scale developed by Donald I. Templer in 1970. It is a one-dimensional, double-Likert-type scale consisting of 15 items that assess the individual's anxiety about his death and risk of death. Trueanswers in 9 items and falseanswers in 6 items get 1 point. A total of 0-15 points can be obtained from the scale. The higher the score, the higher the death anxiety. The internal consistency of the scale calculated with the Kuder-Richardson formula was 0.76. The reliability coefficient found by the test-retest

method in three weeks is 0.83 (18).TDAS was translated into Turkish in the study carried out to determine fear and anxiety about death in the elderly; The validity and reliability of the scale were found to be 0.86 with face validity and test-retest methods (19). In this study, the Kuder-Richardson (KR-20) value of Templer's Death Anxiety Scale was found to be 0.76.

1.2.2. GAIL Score

The Gail model incorporates six breast cancer risk factors, namely: age, age at menarche, age at first live birth, number of breast biopsies, history of atypical hyperplasia, and number of first-degree relatives with breast cancer (20). To score annual and five-year risk of having breast cancer this model smoking status, presence of breast cancer or ductal carcinoma in situ (DCIS) or lobular carcinoma in situ (LCIS), receiving radiation therapy to the chest area, a mutation in the BRCA1 or BRCA2 gene or a genetic syndrome associated with an increased risk of breast cancer, breast biopsy status, the number of biopsies performed with a benign diagnosis and the number of biopsies performed with atypical hyperplasia, the number of people diagnosed with breast cancer in their first-degree relatives were asked from each participant.

1.3. Statistical analysis

Data were analyzed with IBM SPSS Statistics version 21. Categorical data were given as numbers and percentages. Continuous variables were given as mean standard deviation. The chi-square test was used to compare categorical data. The distribution of the data was evaluated with tests and graphs. Independent sample t-test and ANOVA were used to compare normally distributed continuous variables. Logistic regression analysis was performed between participation in mammography screening and age, mammography expression total score, and death anxiety. A p-value of <0.05 was considered statistically significant.

III. RESULTS

3.1. Demographic,Anthropometric, and Obstetric Variables of the Study Universe

A total of 305 women over the age of 40 with a mean age of 54.14±9.30 years mean education year. The mean education time of these participants was 6.66±4,57 years. The height of the group was 158,56±5,97 cm, weight was 75,37±13,38 kg, BMI was 29,4±2,9 kg/m^2, waist circumference was 91,79±13,47 cm.

The mean age of the first menstruation was 13,36±1,37 years (min=9, max=18), mean number of pregnancy 3,12±1,58 (min=0, max=8), mean number of giving birth (2,62±1,34) (min=9, max=1814-49), mean age of first birth 22,13±4,18 (min=14, max=49), mean age of menopause 46,8±4,79 (min=26, max=58) among our participants. Some of the demographic variables of the study group are presented at Table 1.

Table 1: Some of the demographic variables of the study group

Variable	Category	n (%)
BMI Classification	Normal (≤25 kg/m^2)	52 (17,0)
	Overweight (≥25 and ≤30 kg/m^2)	104 (34,1)
	Obese (≥30 kg/m^2)	149 (48,9)
Marital Status	Single	5 (1,6)
	Married	242 (79,3)
	Divorced/Widowed	58 (19,0)
Education Status	Illiterate	25 (8,2)
	Literate	15 (4,9)
	Primary	169 (55,4)

	Lycée	44 (14,4)
	University	52 (17,0)
Occupation	State Worker	55 (18,0)
	Worker	21 (6,9)
	Housewife	204 (66,9)
	Unemployed	13 (4,3)
	Other	12 (3,9)
Income	<Minimum wage	83 (27,2)
	=Minimum wage	112 (36,7)
	>Minimum wage	110 (36,1)

1.2. The variables about the risk factors for breast cancer and getting mammography status

The variables about some of the risk factors for breast cancer and the status of getting mammography in our study group are represented in Table 2.

Table 2: Variables about some of the risk factors for breast cancer and the status of getting mammography in our study group

Variable	**Category**	**n (%)**
Do you have a chronic disease?	Yes	205 (67,20)
	No	100 (32,80)
Have ever gotten a cancer diagnosis?	Yes	8 (2,60)
	No	297 (97,40)
Have ever got a mammography before?	Yes	210 (68,90)
	No	95 (31,10)
Do have regular mammography screening? (Once every two years)	Yes No	70 (23,0) 235 (77,0)
	No	235 (77,00)
Menopause	Yes	204 (66,90)
	No	101 (33,10)
Biopsy from breast (non-malign)	Yes	25 (8,20)
	No	280 (91,80)
Cancer in first-degree relatives	Yes	109 (35,70)
	No	196 (64,30)
Breast cancer in first-degree relatives	None	285 (93,40)
	1	20 (6,60)
	>1	0 (0,00)
Cancer in second-degree relatives	Yes	95 (31,10)
	No	210 (68,90)
Cancer in third-degree relatives	Yes	187 (61,30)
	No	118 (38,70)
Smoking Status	Yes	55 (18.0)
	No	222 (72.8)
	Ex-Smoker	28 (9,2)
DCIS/LCIS or radiation therapy to the chest	Yes	0
	No	305 (100)

BRCA1/BRCA2 mutation or other related genetic malformation	Yes	0 (0)
	No	305 (0)
DCIS: Ductal carcinoma in situ LCIS: Lobular carcinoma in situ		

1.3. Participants Beliefs About Mammography (PBAM)

When the scores of these items were evaluated, the highest mean score was seen in the category of "I'm afraid of getting bad news" with a score of 3.70±1.60. The lowest mean score was seen in the category of "I think it would not be beneficial to have a screening done" with a score of 1.44±1.01 The mean scores for these statements are presented in Table 3.

Table 3: The mean scores for each of thesestatements for the mammography.

Statement	**Mean**
1. I'm afraid of getting bad news	3,70±1,60
2. I feel ashamed of healthcare professionals when I have an examination.	2,37±1,59
3. I can't find time to get a mammography	1,77±1,23
4. I don't know about scans	2,59±1,52
5. I think it is not easy and attainable.	2,24±1,35
6. I think it would not be useful to have mammography.	1,44±1,01
7. I don't get mammography because I think I'm healthy.	1,64±1,11
8. I think getting mammography will be expensive.	1,80±1,16

The mean score of the PBAM was 32.7±1,8 points. There was a statistical difference between the mean PBAM scores of the study group (Participants who had regular mammography) (19,25±1,7) and the control group (Participants who did not have regular mammography) (38,2±1,8) (t= 2,225, p<0,005)

1.4. Gail Scores and the risk factors between the participants who had regular mammography screens and others.

Each of the participant's five-year risk of having breast cancer and life-long risk of having cancer was calculated. Our results indicated that the five-year risk of having cancer was 1,42±0,46 (min=0,6, max=2,2) and the life-long risk was 10,0±2,02 (min=2,5, max=12,4). There was no statistical difference between the participants who had regular mammography screenings and others (p>0,005). Our results indicated that 26 (8,8%) of the participants were in the high and 279 (91,5%) were in the low-risk group to have breast cancer in five years. Also, 46 (15,1%) participants were in the high and 259 (84,9%) were in the low-risk group to have breast cancer life-long period.

1.5. The TDAS Scores

The mean death anxiety score of the participants was found to be 8.47±2.39 points. There was no statistical difference between the participants who had regular mammography screenings and others (p>0,005).

1.6. The comparison of features of the participants who had regular mammography screening and others

The participants who had regular mammogram screening were younger than the others (55,73±8,95 vs 50,62±9,14, t=9,587, p<0,001). However, there were no statistically significant differences between mean education time, mean age of menarche, mean total number of pregnancies, mean number of given births, mean age when the first birth is given, mean age of menopause (p>0,05 respectively). Also we failed to find any

statistical difference between two groups in terms of having a first or second degree relative who has cancer (p>0,05 respectively).

1.7. The Correlation Between the mean scores of TDAS and Other Variables

The correlations between TDAS scores, five-year cancer risk, life-long cancer risk, total number of pregnancies, mean age of the first birth, the age of menopause, and the mean negative statements about mammography are shown in Table 4.

Table 4: The correlations of several variables with TDAS

	1	2.	3	4.	5.	6.	7.	8.
1.TDAS#	1							
2.Five-year total risk (GAIL)	r= 0,096 p= 0,096	1						
3.Life-long total risk (GAIL)	r= 0.209 p= <0,001	r= 0.473 p= <0,001	1					
4.Age	r= -0.141 p= 0,013	r= -0.428 p= <0,021	r= -0,531 p= <0,001	1				
5.Total number of pregnancies	r= -0.056 p= 0,328	r= 0.032 p= 0,528	r= -0,164 p= 0,004	r= 0,201 p= 0,013	1			
6. First birth age	r= 0.084 p= 0.162	r= 0,038 p= 0,503	r= 0,337 p= <0,001	r= 0,124 p= 0,087	r= 0,213 p= 0,025	1		
7. Age of menopause	r= 0,045 p= 0.528	r= 0,055 p= 0,440	r= 0,018 p= 0,798	r= 0,658 p= 0,127	r= 0,322 p= 0,233	r= 0,152 p= 0,108	1	
8. PABM*	r= 0.229 p= <0,001	r= 0,037 p= 0,524	r= 0,089 p= 0,121	r= ,206 0,085	r= 0,451 p= 0,227	r= 0,258 p= 0,133	r= 0,325 p= 0,096	1

TDAS#: Templer's Death Anxiety Scale
PBAM*: The total score of participants' beliefs about mammography items

1.8. Binary Logistic Regression Model for Being in Study Group.

In a binary logistic regression model in which the dependent variable was being in study group (Participants who had regular mammography screening), age (OR=0,929 %95 CI 0,898-0,960), and positive score of the beliefs about mammography (OR=1,154 %95 CI 1,099-1,211) are found as independent variables for being in the study group. The binary logistic regression model is presented in Table 5.

Table 5: The Binary Regression Model investigating the independent variables to be in Study Group (Participants Who Had RegularMammographyScreening)

Variables	**B**	**S.E.**	**df**	**p**	**Exp(B)**	**B(%95 CI)**
Constant	0,756	1,011	1	0,455	2,130	
Age	-0,074	0,017	1	**<0,001**	0,929	0,898 - 0,960

TDAS#	-0,031	0,043	1	0,481	0,970	0,891 - 1,056
PBAM*	-0,143	0,025	1	**<0,001**	1,154	1,099 - 1,211

TDAS#: Templer's Death Anxiety Scale
PBAM*: The total score of participants' beliefs about mammography items

IV. DISCUSSION

Important results were obtained in the study in which we examined the frequency of mammography in our region and the factors affecting it. Also, we evaluated the relationship between some known factors related to breast cancer and mammography. Our results indicated that although 68,9% of our sample had participated in at least one mammography screening before only 31,1% of them had regular screening as recommended. To see the positive effect of mammography on mortality and morbidity, it should be performed every 24 months on average within a certain age range. While shorter-term examinations unnecessarily increase the radiation exposure to the breast, the chance of early diagnosis and cure may be missed in examinations performed at intervals longer than 24 months (21). Different results are evident in studies conducted in different regions of our country. For instance, in a descriptive study by Mermer et al (22),it was found that 32.0% of women regularly performed breast self-examinations once a month, 57.8% had clinical breast examinations, and 49.7% had regular mammography. A statistically significant relationship was found between mammography, menopause, and breast cancer risk perception with risk score ($p<0,005$). In different descriptive study it was reported that only half of the target population had mammography screening (23). In a descriptive study which was held in a very low socio economical group it was found that only two women from a sample of 220 had mammography screening (24). Although this situation showed us that the relationship between low socioeconomic status and mammography was very striking, no relationship was found between both education level and income level in our analysis.

In our study, we also calculated the mean 5-year and life-long breast cancer risk score in every participant with BRCATS or GAIL method. Our results (1,42±0,46 and 10,0±2,02 respectively) were similar to other studies which were held in Turkey (25,26). Bener et al. (27)found these two values lower than our results in their study. However, they explained these results with theyounger age of the first birth and menarche age of their participants. participants.Calculating breast cancer risk percentages according to the GAIL calculation may not be sufficient to determine the threat that patients face. This situation can actually be understood by the discrepancy between the number of breast cancer cases encountered annually and the risk percentages. An important factor in GAIL risk calculation is BRCA 1 and 2 gene research. In our study, there were no patients who had the BRCA gene checked before. The benefits of BRCA gene screening, which is a very expensive and sensitive procedure, to developing countries is a highly controversial issue. In a recent systemic analysis, it was revealed that population-based BRCA testing can prevent an additional 2319 to 2666 breast cancers and 327 to 449 ovarian cancer cases per million women than the current clinical strategy. Findings suggest that population-based BRCA testing for countries (US, UK, India, China, Holland and Brazil) evaluated is extremely cost-effective and can prevent tens of thousands more breast cancer cases (28)

In our study we studied the relation between having regular mammography with the fear and anxiety of death. The breast cancer fear scale, which has been used previously on the same subject, is similar to the main study question of our research. (29). However, our study may confirm that death is not the only underlying cause of fear of cancer.Our data show that there is no statistical relationship between our participants' regular mammography behavior and fear of death. On the other hand, in the binary regression analysis, age and the

participants' opinions about mammography were determined as independent variables for regular mammography.As age increases and negative opinions about mammography decrease, the frequency of mammography increases. Understandably, age is an independent variable. It can be speculated that as women get older, their awareness and knowledge about breast cancer increases. However, lack of knowledge about mammography or having a negative opinion is an important hindering factor for all ages. In our study, unlike previous studies, we tried a method that evaluates the different opinions that patients may have about mammography. We evaluated patient beliefs about the eight main issues that have prevented mammography so far and examined them as a single variable. When all opinions were examined separately, it was observed that some beliefs stood out more clearly than others. In our study, the four most important reasons given by the patients were: "I'm afraid of getting bad news", "I don't know about scans.", "I feel ashamed of healthcare professionals when I have an examination" and, "I think it is not easy and attainable". Similar to our results Uguret al (30) stated that being afraid of receiving bad news was the most frequent reason why the participants stated that why they didn't have mammography among their study population. They also identified the most common barriers to screening as the participant's beliefs as they were healthy, limited time, and lack of knowledge about screenings respectively.

V. Conclusion

In summary, this study found that age and having positive beliefs about mammography are important variables for having regular mammography screening. Although we found a negative correlation between death fear and beliefs about mammography statements, we failed to find any relation between having regular mammography and death-related mammography screening. It can be predicted that the number of women benefiting from this cancer screening will increase by combating false beliefs about mammography in primary care physicians. In this respect, knowing which beliefs to give priority to women can be of great importance. However, more studies are needed to better understand the negative thoughts that can be considered as an obstacle to participation and the role of death anxiety in this issue.

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B.M.Y.: Study design, data analysis, and writing the first draft of the manuscript,

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