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Araştırma Makalesi/ Research Article

Do Breast Cancer Pre-Risk, Cancer Awareness, Anxiety and Fear of Getting Cancer Affect Early Diagnosis Behaviors of Female Students Studying in the Anesthesia Program of a University?

Bir Üniversite'nin Anestezi Programı'nda Öğrenim Gören Kız Öğrencilerin Meme Kanseri Ön Riski, Kanser Farkındalığı, Anksiyete ve Kansere Yakalanma Korkusu Erken Tanı Davranışlarını Etkiler mi?

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ABSTRACT

Objective: The aim of this study was to determine the pre-risk, knowledge, anxiety and fear of developing breast cancer in university students and to determine how these markers create barriers for early diagnosis and behaviours.

Methods: This study was conducted at a university in Southern Turkey with 234 participants between 05.01.2023 and 01.06.2023. It is descriptive, cross-sectional, and correlational in nature. The individual Characteristic Information Form, the Comprehensive Breast Cancer Knowledge Scale, the Health Anxiety Scale, the Champion Breast Cancer Fear Scale, and the Breast Cancer Risk Score Calculation Model were used to collect data. In the analysis of descriptive statistics, the number, percentage, and mean were used. Independent samples t-test and Kruskal-Wallis test were used. Pearson correlation analysis and regression analysis were performed.

Results: Participants in the study had a low 10-year risk of breast cancer and a low lifetime breast cancer risk. The low-level correlation between the Breast Cancer Fear Scale and the Health Anxiety Scale was positive ($r=0.462$, $p<0.01$). The level of knowledge and the level of fear explain 21% of health anxiety.

Conclusions: It was determined that the university students' risk of getting breast cancer is low, their level of knowledge is medium, their anxiety about getting cancer is low, and their fear of getting cancer is high. The research results showed that the early diagnosis behaviors of the university students were not affected by the level of knowledge and anxiety but were positively affected by the fear of getting breast cancer.

Keywords: Anxiety, breast cancer, cancer screening, fear.

ÖZ

Amaç: Bu çalışmanın amacı, üniversite öğrencilerinde meme kanserine yakalanma ön riski, bilgisi, kaygısı ve korkusunu belirlemek ve bu belirteçlerin erken tanı ve davranışlar için nasıl engeller oluşturduğunu tespit etmektir.

Yöntem: Bu çalışma 5.01.2023- 1.06.2023 tarihleri arasında 234 katılımcı ile Türkiye'nin Güney'indeki bir üniversitede gerçekleştirildi. Tanımlayıcı, kesitsel ve ilişki arayıcı türdedir. Veriler, Bireysel Özellik Bilgi Formu, Meme Kanseri risk puanı hesaplama modeli, Kapsamlı Meme Kanseri Bilgi Ölçeği, Sağlık Kaygısı Ölçeği ve Şampiyon Meme Kanseri Korku Ölçeği kullanılarak toplandı. Tanımlayıcı istatistiklerin analizinde sayı, yüzde ve ortalama kullanıldı. Tanımlayıcı istatistiklerin analizinde sayı, yüzde ve ortalama kullanıldı. Bağımsız örneklem t-testi ve Kruskal-Wallis testi kullanılmıştır. Pearson korelasyon analizi ve regresyon analizi yapıldı.

Bulgular: Çalışmaya katılanların tarama sonucu, 10 yıllık meme kanseri ön riski ve yaşam boyu meme kanseri risk ortalaması düşük risk olarak hesaplandı. Meme Kanseri Korku Ölçeği ile Sağlık Kaygısı Ölçeği arasında düşük düzeyde pozitif korelasyon saptandı ($r=0,462$, $p<0,01$). Bilgi düzeyi ve korku düzeyi sağlık kaygısının %21'ini açıklamaktadır.

Sonuç: Üniversite öğrencilerinin meme kanseri riskinin düşük, bilgi düzeyinin orta, kansere yakalanma kaygısının düşük ve kansere yakalanma korkusunun yüksek olduğu belirlendi. Sonuçlar, üniversite öğrencilerinin erken tanı davranışlarını sadece kansere yakalanma korkusunu olumlu olarak etkilediğini gösterdi.

Anahtar Kelimeler: Meme kanseri, kanser taraması, kaygı, korku.

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Introduction

Breast cancer is one of the most important threats to women's health and lives. Despite promising advances in diagnosis and treatment, the etiology of cancer remains unclear (Akyolcu et al., 2019). According to the World Health Organization (WHO), breast cancer is the fifth leading cause of death in women (WHO, 2020). According to data from the World Health Organization (WHO), in 2022, 2.3 million women worldwide were diagnosed with breast cancer, and 670,000 women died from cancer (WHO, 2024). In Turkey, 164,917 women were diagnosed with breast cancer according to data from 2019 (Health Statistics Yearbook, 2022).

Although the incidence of breast cancer in developing countries is lower than in developed countries, the mortality rate from cancer among newly diagnosed women is higher in developing countries (Akyolcu et al., 2019). There must be close follow-ups of cancers with such high frequency and high risk of mortality. Screening, especially down to young age groups, must be performed and the risk levels must be determined. While many previous studies have determined the risk factors for breast cancer (Akyolcu et al., 2019; Aydoğan et al., 2013; Tuna et al., 2022), studies that have predicted the risk level of cancer are so few studies that have predicted cancer risk levels are limited.

Determining the risk level of breast cancer is extremely important for early-stage detection of cancer and recommending preventive treatment methods to women in the high-risk group (Sohbet and Karasu, 2017). Several non-invasive models have been developed to determine the risk of breast cancer, such as the Gail, Claus and International Breast Cancer Intervention Study (IBIS), and the Tyrer-Cuzick model. These models calculate an individual's pre-cancer risk. Pre-cancer risk is defined as the probability of developing cancer within the next ten years and throughout the individual's lifetime without a cancer diagnosis. The pre-risk of a woman developing breast cancer can be easily determined with these models, and the frequency of follow-ups can be increased according to the level of risk (Demirkazik, 2014).

Women should be aware of cancer risk factors and understand that breast self-examination is the most straightforward diagnostic method. It has been reported in literature that women aged 20-40 years should have a clinical breast examination once every 3 years and should perform self-examination of the breasts monthly (DeSantis et al., 2019). Knowing and being aware of the level of risk increases the frequency of follow-ups in respect of the signs of breast cancer. In the determination of cancer, it has been reported that it is mostly the patient who notices the cancer (Sohbet and Karasu, 2017). For this to happen, the determination of both the level of knowledge and the level of risk of breast cancer of the individual are important. As breast cancer is frequently seen in females and is a fatal disease, it is a source of serious concern and fear in healthy women. The reasons for anxiety and fear are many, including receiving a positive diagnosis, losing a breast, the many problems caused by cancer, diminished quality of life, pain, and thoughts of death (Demirel et al., 2021; Ece et al., 2022).

The anxiety and fear of developing cancer in an individual is one of the most important factors preventing an early diagnosis. An individual with a high level of anxiety and fear may postpone early diagnostic methods such as clinical and self-examination of the breasts (Demirel et al., 2021; Jones et al., 2022). In a study by Öner et al. (2016), it was determined that 23% of the study participants had not been to a doctor because of the fear of being diagnosed with breast cancer (Öner et al., 2016).

Nurses have vital roles in increasing social awareness and sensitivity, eliminating barriers to early diagnosis and treatment (such as anxiety and fear), and providing high-quality care.

This study was planned with the thought that it is important to remove the obstacles to early diagnosis and treatment methods within the framework of the role and responsibilities of nurses. The aim of the study was to determine the level of pre-risk of breast cancer in a young population, knowledge on this subject, and anxiety and fear of developing cancer.

In order to do this, answers to the following questions were sought:

1. What is the preliminary risk for breast cancer in young people?
2. What is the level of knowledge of breast cancer in a young population?
3. Does the young population experience anxiety about receiving a diagnosis of breast cancer according to knowledge levels?
4. Does the young population experience fear about receiving a diagnosis of breast cancer according to knowledge levels?
5. Is there a correlation between young people's knowledge of breast cancer and their fear and anxiety of developing the disease?
6. Does the level of knowledge, fear and anxiety about breast cancer affect the frequency of

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use of early diagnostic methods in the young population?

7. Do an individual's level of knowledge and level of fear predict the presence of health anxiety?

Method

Type of Research

The study was cross-sectional, descriptive, and correlational.

The Study Universe and Sample

In accordance with the assertion that "breast cancer is seen in women of all ages after puberty in every country of the world" (WHO, 2024), the study population consisted of students actively pursuing their studies at the university. Given that one of the post-adolescent periods is the university period, the study population included students of Kahramanmaraş Sütçü İmam University, Vocational School of Health Services. The research was conducted between 5.01.2023 and 1.06.2023. The snowball sampling method was used. Power analysis was performed based on the mean points obtained in the results of the "Clinical Breast Examination Status" study by Ersin and Dedeoğlu (2020); as a result of the analysis, the required sample size was calculated as a minimum of 162 subjects to provide effect size d=1.2100000, α=0.05, and power (1-β err prob)= 0.95 (Ersin and Dedeoğlu, 2020). A total of 234 subjects participated in the study, and all the analyses were completed with this number.

Inclusion Criteria: Being a female student in the institution where the data were collected and agreeing to participate in the study.

***Exclusion Criteria*:** Those who do not want to participate in the study and are not between the ages of 18 and 35.

Data Collection Tools

Data were collected using a Personal Information Form, the International Breast Cancer Intervention Study (IBIS) (Tyrer-Cuzick) model of pre-risk of developing cancer, the Comprehensive Breast Cancer Knowledge Scale, the Health Anxiety Scale, and the Champion Breast Cancer Fear Scale.

Individual Characteristic Information Form

In accordance with the relevant literature, this form included 21 questions to obtain the information of age, age at menarche, height, weight, giving birth status, status of having had a breast biopsy, history of cancer in mother, grandmother, aunt, or sister, education level, employment status, smoking status, alcohol consumption, social security status, diagnosis of breast cancer in a close relative, and if so, the relationship, frequency of clinical breast examination, and frequency of self breast examination (Başak, 2015; Taylan and Küçükakça, 2020).

The Breast Cancer Risk Score Calculation Model

By accessing the pre-risk score for the breast cancer calculation model (IBIS model) at http://www.ems-tri- als.org/riskevaluator The 10-year and lifetime risk of breast cancer can be calculated (Demirkazik, 2014). This is the most appropriate model for the young population in the age range of 20-40 years, as other models (Gail, Claus) are used for individuals aged >35 years. This program is designed for individuals under the age of 35. The calculation model is in English. In the International Breast Cancer Intervention Study (IBIS) (Tyrer-Cuzick) model, variables related to family history, hormonal factors, benign breast disease, BRCA mutation, and low pass genes are entered into the calculation engine. Upon pressing the calculate button, the calculation engine provides the individual's 10-year and lifetime pre-risk rate of developing cancer, expressed as a percentage. A higher percentage indicates a higher risk.

Comprehensive Breast Cancer Knowledge Scale (CBCKS)

The CBCKS was developed by Stager in 1993 (Stager, 1993), and reliability and validity studies of the Turkish version were conducted by Başak et al. in 2015 (Başak et al., 2015). The scale comprises 20 questions assessing knowledge of breast cancer. Responses are scored as 1 point for correct answers and 0 points for incorrect answers. Eight of the 20 questions should be answered correctly, while 12 should be answered incorrectly. Items 1, 2, 5, 6, 11, 12, 14, 15, 17, 18, 19, and 20 are incorrect answers. The scale comprises two sub-dimensions: general knowledge (items 1-12) and treatability (items 13-20). The Cronbach's alpha reliability coefficient for the entire scale was 0.90 (Başak et al., 2015), and in this study, this value was found to be 0.64.

Health Anxiety Scale (HAS)

This scale was developed by Salkovskis et al. in 2002 to evaluate health anxiety (Salkovskis et al., 2002). Aydemir et al. (2013) conducted the reliability and validity studies of the Turkish version . This self-reported scale includes 18 items, of which 14 evaluate mental health status with 4 possible responses. The remaining 4 items aim to obtain an idea of what the mental health status of the subject would be if they thought they had a serious disease. Each item is scored from 0 to 3 points, providing a

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possible maximum of 54 points, with higher points indicating a higher level of health anxiety. The Cronbach's alpha internal consistency coefficient for the scale has been found to be 0.92 (Aydemir et al., 2013) and in this study was determined to be 0.86.

Champion Breast Cancer Fear Scale (CBCFS)

This scale was developed by Champion et al. in 2004 (Champion et al., 2004) and was translated to Turkish by Seçginli in 2012 (Secginli, 2012). The scale consists of 8 items to show the relationships between breast cancer, mammography behaviour, and the emotional responses of women. The items in the scale are scored from 1 to 5 points using Likert-type responses from "I completely disagree" (1 point) to "I completely agree" (5 points). All the items are scored in the same way with no reverse statements. The total scale score ranges from 8 to 40 points, with higher scores indicating a higher level of fear of breast cancer. The scores are evaluated as 8-15 points: low level fear; 16-23 points: moderate level fear, and 24-40 points: high level fear. The Cronbach's alpha value for the scale has been calculated as 0.60 (Ece et al., 2022) and in this study was found to be 0.92.

Data Collection

The research was conducted in two phases. In the initial phase of the study, the researchers collected the data from the students enrolled at the university who consented to participate in the investigation within the classroom setting. The data were entered into the Breast Cancer Pre-Risk Score Calculation Engine (IBIS model), which calculated the pre-risk scores for developing breast cancer. The breast cancer risk score calculation model is in English, and the data of Turkish students were entered by researchers familiar with the English language. Afterwards, the researchers recorded the students' pre-risk scores.

In the second stage, the Individual Characteristic Information Form, the Comprehensive Breast Cancer Knowledge Scale, the Health Anxiety Scale and the Champion Breast Cancer Fear Scale were uploaded to the Google Form. At this stage, snowball sampling was used. The aim of snowball sampling, also known as chain referral sampling or network sampling, is to send the forms created during the online phase to the class representatives, who will then distribute them to the students for completion. Once the necessary controls had been made, the online form link was sent to the participants' mobile phones, and they were asked to fill it out by logging in from the link. The answers were recorded after the filling process.

Data Analysis

Data obtained in the study were analyzed statistically using SPSS vn. 20.0 software (IBM Corp., Armonk, NY, USA). In the evaluation of the conformity of the data to normal distribution, skewness and kurtosis coefficients were used (-2, +2). In the comparisons of numerical variables, the Independent Samples t-test was applied between two groups, and the Kruskal-Wallis test was used for three or more groups. Relationships between numerical variables were examined with Pearson correlation analysis. Multivariate linear regression analysis was performed to determine the level of health anxiety. In the regression model, the independent variables that were hypothesized to affect the dependent variable were initially analyzed using an enter model. The Cronbach alpha coefficient was used in the calculation of the reliability of the scales. Values of $p<0.05$ were accepted as statistically significant.

Results

Individual characteristics of the study participants are shown in Table 1. The study participants were all female with a mean age of 20.82±2.36 years, a body mass index (BMI) of 18.6-24.9 kg/m² in 69.2%, 100% students, 97% were single. 59.4% lived in the provincial centre, and 91% did not work. It was determined that 86.8% of the participants were non-smokers and 97.9% did not consume alcohol. All participants (100%) had health insurance. Of the total sample, 55.6% stated that they did not perform breast self-examination, and 97% stated that they had never undergone a clinical breast examination. It was found that 98.7% of the study participants were not reported to have given birth, and none (100%) underwent a breast biopsy. A total of 99.6% of the participants were free of a history of cancer in their mother, 100% in their sister, 95.7% in their maternal grandmother, 99.1% in their paternal grandmother, 94.4% in their aunt, and 97% in their aunt. The maternal grandmother of the participants was found to have a 1.3% incidence of breast cancer and a 2.5% incidence of ovarian cancer. The paternal grandmother was found to have a 0.4% incidence of breast cancer and a 0.4% incidence of ovarian cancer. The aunt was determined to have a 2.1% incidence of breast cancer and a 3.4% incidence of ovarian cancer. The other aunt was found to have a 2.1% incidence of breast cancer and an 0.8% incidence of ovarian cancer (Table 1).

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Table 1. Sociodemographic characteristics of the study participants

Characteristics			
Age	**Mean±SD**		
	20.82±2.36		
		n	**%**
	≤20 years	128	54.7
	≥21 years	106	45.3
Body mass index	≤18.5 kg/m^2	34	14.5
	18.6 - 24.9 kg/m^2	162	69.2
	25.0 -29.9 kg/m^2	30	12.8
	≥30 kg/m^2	8	3.4
Marital status	Single	227	97.0
	Married	7	3.0
Place of residence for the longest time	Village	27	11.5
	Town	68	29.1
	Provincial centre	139	59.4
Employment status	Yes	21	9.0
	No	213	91.0
Smoker	Yes	31	13.2
	No	203	86.8
Alcohol consumption	Yes	5	2.1
	No	229	97.9
Social health insurance	Yes	234	100
Frequency of Breast Self Examination	Never	130	55.6
	Once a month	41	17.5
	Once every 3 months	19	8.1
	Once every 6 months	18	7.7
	Once a year	26	11.1
Clinical Breast Examination history	Yes	7	3.0
	No	227	97.0
Have you ever given birth?	Yes	3	1.3
	No	231	98.7
Have you ever had a breast biopsy?	No	234	100.0
Does your mother have a history of cancer?	Yes	1	0.4
	No	233	99.6
Does your sister have a history of cancer?	No	234	100.0
Does your maternal grandmother have a history of cancer?	Yes	10	4.3
	No	224	95.7
Does your paternal grandmother have a history of cancer?	Yes	2	0.9
	No	232	99.1
Does your maternal aunt have a history of cancer?	Yes	13	5.6
	No	221	94.4
Does your paternal aunt have a history of cancer?	Yes	7	3
	No	227	97.0

	Breast cancer		Ovarian cancer	
	n	**%**	**n**	**%**
Type of cancer of maternal grandmother	3	1.3	6	2.5
Type of cancer of paternal grandmother	1	0.4	1	0.4
Type of cancer of maternal aunt	5	2.1	8	3.4
Type of cancer of paternal aunt	5	2.1	2	0.8

The breast cancer pre-risk mean points are shown in Table 2. The 10-year risk of breast cancer was determined to be low risk at mean % 0.08±0.07 points and the lifetime risk was low risk at % 12.58±2.25 points. The mean CBCKS was 10.18 ± 3.18, the mean HAS was 18.28 ± 7.79 and the mean CBCFS was 28.43 ± 7.37 (Table 2).

Table 2. Breast cancer pre-risk, knowledge, anxiety and fear mean points of the study participants

Variable	**Mean±SD**	**Min-Max**
10-year pre-risk of breast cancer mean points	% 0.08±0.07	% 0 - %6
Lifetime pre-risk of breast cancer mean points		
CBCKS	10.18±3.18	1-20
Health Anxiety	18.28±7.79	0-48
CBCFS	28.43±7.37	8-40

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Comparisons of the mean scale points with the Individual characteristics of the study participants are shown in Table 3. The statistical difference between age and anxiety and fear is significant ($p<0.05$). The difference is due to the age of 21 years and above. The difference between the frequency of breast self examination and the CBCFS points was found ($p<0.05$) and the difference was seen to be due to those who performed breast self-examination once every 6 months. The statistical difference between smoking status and Health Anxiety Scale scores was significant ($p<0.05$) and the difference was seen to be due to those who did not smoke (Table 3).

Table 3. Comparisons of the sociodemographic characteristics and the mean points of the scales

Characteristics		General knowledge (Mean/SD) Mean rank (Min-Max)	Treatability (Mean/SD) Mean rank (Min-Max)	CBCKS (Mean/SD) Mean rank (Min-Max)	Health Anxiety (Mean/SD) Mean rank (Min-Max)	CBCFS (Mean/SD) Mean rank (Min-Max)
Age	≤20 years	6.53±2.23	3.36±1.40	9.89±3.00	17.15±8.35	26.90±7.85
	≥21 years	6.77±2.28	3.75±1.67	10.52±3.38	19.64±6.85	30.27±6.30
Test/p		-.817/.415	-1.894/.060	-1.508/.33	-2.500/**.013***	-3.636/**.000***
Age at menarche	≤13 years	6.53±2.28	3.57±1.56	10.11±3.29	19.15±8.13	28.83±6.63
	≥14 years	6.76±2.21	3.50±1.51	10.26±3.06	17.25±7.27	27.96±8.16
Test/p		-.803/.423	.392/.696	-.376/.707	1.869/.063	.900/.369
Frequency of Breast Self Examination	Never	115.11(1-12)	121.40(0-8)	118.48(0-48)	119.58(8-40)	112.60(1-20)
	Once a month	113.542-12)	122.94(2-7)	116.27(5-29)	114.56(8-40)	115.24(5-19)
	Once every 3 months	115.66(4-11)	107.47(2-8)	112.24(5-25)	108.97(8-39)	103.89(6-17)
	Once every 6 months	136.72(1-12)	101.33(1-8)	123.08(3-37)	142.69(8-40)	161.92(2-20)
	Once a year	123.73(3-12)	107.96(2-8)	114.52(5-36)	100.50(11-40)	124.75(6-20)
Test/p		2.028/.731	2.782/.595	.332/.988	4.646/.326	9.567/**.048****
Smoker	Yes	7.29±1.81	3.64±1.40	10.93±2.71	15.67±8.99	28.35±8.84
	No	6.54±2.29	3.52±1.56	10.06±3.24	18.67±7.53	28.44±7.14
Test/p		1.731/.085	.396/.692	1.412/.159	-2.011/**.045**	-.053/.958

**Independet t test, **Kruskal Wallis test, p<0.001, p<0.05*

The results of the correlation analyses of the scale points are shown in Table 4. A low-level positive correlation was found between the CBCFS and the HAS ($r=0.462$, $p<0.01$) (Table 4). Table 5 shows the regression analysis. CBCKS, treatability and CBCFS explained 21% of health anxiety (Table 5).

Table 4. Correlation analyses of the scales

Correlations		1	2	3	4	5
1. General knowledge	r	1				
	p					
2. Treatability	r	.391**	1			
	p	**.000**				
3. CBCKS	r	.896	.760	1		
	p	**.000**	**.000**			
4. Health Anxiety	r	.001	.090	.044	1	
	p	.983	.171	.499		
5. CBCFS	r	.010	.025	.019	.462**	1
	p	.880	.700	.770	**.000**	

r= Correlation Coefficient, *Pearson correlation analysis, ** p<0.001.

Table 5. Determinants of health anxiety

Model	β_0 (%95 CI)	S. Hata	β_1	t	p	VIF
(Constant)	3.710 (-0.818-8.237)	2.298		1.614	1.614	
Treatability	0.611 (-0.281- 1.503)	0.453	0.121	1.349	0.179	2.367
CBCKS	-0.138 (-0.569- 0.294)	0.219	-0.056	-0.629	0.530	2.367
CBCFS	0.486 (0.365-0.607)	0.062	0.460	7.894	0.000	1.001

*Dependet variable = Health anxiety, F= 21,698, *p <0.001, Adjusted R2=.210, Multivariate linear regression analysis.*

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Discussion

Breast cancer is the most common and life-threatening type in women in Turkey, as in other countries. Early diagnosis can reduce the risk of death and protect the patient's quality of life (Bray et al., 2018; Gürel, 2022). Literature consistently emphasizes that advanced age heightens the risk of cancer. However, the etiologies causing this rapid increase in breast cancer have not yet been fully clarified (Al-Shiekh et al., 2021). This study was planned with the thoughts of, "Should breast cancer screening be performed at younger ages, and do lack of knowledge and fear and anxiety about developing cancer constitute obstacles to these early diagnosis methods?"

Both clinical and self-examinations of the breasts are extremely important in early detection interventions. The current study results showed that 55.6% of the participants had never undergone a clinical breast examination and 97% had never performed self-examination. These findings were thought to be due to the predominant opinion in Turkish society that cancer emerges at an older age, and therefore the young population do not think they need to check their breasts. The Ministry of Health of the Turkish Republic recommends clinical breast examination once a year and self examination once a month after the age of 20 years (Health Statistics Yearbook, 2021). According to the Ministry of Health annual health statistics for 2021, the diagnostic behaviours of women for breast cancer were not at the desired level. The rate of breast cancer in women increased by 74.84% from 2002 to 2019 (Health Statistics Yearbook, 2021). It has been reported in literature that only 19.7% of females aged ≥15 years performed breast self examination regularly once a month, and 60.9% were never undergone clinical breast examination (Taylan and Küçükakça, 2020). The current study data were found to be similar to those findings. Another reason for this may be lack of knowledge or lack of cancer experience as 94-100% of the participants' close relatives (mother, sister, grandmother, aunt) had not had breast cancer.

The screening results indicated that the 10-year average risk of developing breast cancer was 0.08 ± 0.07%, and the lifetime risk was 12.58 ± 2.25%. Additionally, the data demonstrated that pre-cancer risk environments are low. The risk factors for breast cancer have been reported to include age >40 years, a history of cancer in first-degree relatives, and having given birth at a later age (>35 years) (Kamińska et al., 2015). The results obtained in the current study were thought to have been obtained because the sample did not include the risks stated in the literature.

Eroğlu et al. (2010) examined 5000 cases with cancer, and a high-risk level was not determined in any patient. Although it provides an insight, evaluation of breast cancer risk does not provide definitive information about the probability of breast cancer (Eroglu et al., 2010). Without a clear medical examination of the breast, a definitive diagnosis cannot be made. Risk calculation models can only provide an idea, and it is extremely important that women are informed about screening and referred for diagnosis in the early period. Screening is of great importance in interventions related to the early determination of breast cancer, increasing awareness of risk factors and acquiring regular screening behaviours.

The level of knowledge about breast cancer in the current study was determined to be moderate (10.18±3.18). It is very concerning that this section of society, who are receiving healthcare education, only had a moderate level of knowledge about breast cancer. In countries with insufficient screening programs, such as in Turkey, it is recommended that individuals aged >20 years should perform breast self-examinations regularly once a month and be informed by healthcare personnel of the benefits and limitations (Acikgoz et al., 2015). Taylan and Küçükakça (2020) reported that the knowledge level of the female participants was moderate in the study of breast cancer diagnosis behaviors in women with and without a familial history of breast cancer (Taylan and Küçükakça, 2020). Abo Al-Shiekh et al. (2021) reported that the knowledge of female university students regarding breast cancer was found to be inadequate (Al-Shiekh et al., 2021). Kruppu et al. (2018) found that adults require information about breast cancer (Kruppu et al., 2018). In a study conducted by Makal (2020), it was found that the level of breast cancer knowledge among healthcare workers was relatively low (Makal, 2020). Lessons to raise awareness about cancer should be included in the syllabus of all institutions such as universities that are providing higher education in healthcare. In this way, healthcare personnel can offer counselling to the individual.

The results of the research showed that health anxiety was low (18.28±7.79) and fear of getting cancer was high (28.43±7.37). Moreover, the correlation between fear of breast cancer and health anxiety is positive. This finding showed that as

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anxiety increased, so would fear. These two emotions increased each other. Emotional variables such as anxiety and fear have often been examined in breast cancer screenings. In some studies, comparing women with and without screening, persistent anxiety has been reported to be a barrier to screening (Loving et al., 2021). Bozkurt et al. (2021) reported that the rate of breast self-examination and mammography decreased as health anxiety increased (Bozkurt et al., 2021). In contrast, Flores-Luevano et al. (2020) determined no relationship between fear of breast cancer and diagnostic behaviours (Flores-Luevano et al., 2020). Olçar et al. (2022) reported that there was no link between fear and anxiety and early diagnosis and screening behavior (Olçar et al., 2022). In this study, despite high fear of breast cancer, breast self-examination screening behaviors were found to be statistically significantly lower ($p<0.05$). The difference was due to the participants who performed breast self examination once every 6 months. The fear was thought to be the fear of encountering a bad situation. In one study, the individual's fear of getting cancer was expressed as follows: “People's fears stemmed from the description of cancer as a hidden, indestructible and indiscriminate killer.” (Vrinten et al., 2017). The findings of the study suggest that fear and anxiety are caused by misinformation and lack of awareness, and that inadequate awareness leads to less breast self-examination.

In this study, the difference between health anxiety and fear according to age was statistically significant ($p<0.05$). The level of anxiety and fear was found to be higher in those aged ≥21 years, and especially over the age of 30 years, the level of fear of breast cancer increased. The increasing fear of breast cancer in women over time may be due to advancing age. However, we should not ignore the striking fact that the incidence of breast cancer at an early age has increased recently (Kozan and Tokgöz, 2016). As breast cancer is the most frequent cancer type seen in females and because of the increase in frequency, breast cancer awareness and screening programs in the general population are of great importance. In countries with a low socio-economic level and in developing countries, deaths related to cancer are significantly high because of a lack of screening programs and insufficient societal awareness of breast cancer (WHO, 2024). In a previous study, it was reported that breast cancer mortality could be reduced by 25-35% with community screening mammograms in women over 40 years of age (Duffy et al., 2020).

In the study, it was found that breast cancer knowledge and health anxiety were associated at a rate of 21%. It has been reported that experiencing health anxiety negatively affects early diagnosis behaviors (Demirel et al., 2021). In another study, it was shown that education about breast cancer and breast self examination given to university students decreased levels of anxiety and increased their health beliefs (Doğan et al., 2020). A low level of health anxiety may increase applications for screening and protective methods. Therefore, by informing the current study participants about breast cancer, and providing education on awareness, clinical breast examination, and breast self examination, the anxiety levels could be reduced by 21%.

Limitations

A limitation of the study is that it was conducted at a single center.

Conclusion and Recommendations

The findings of the study showed that the young population had a low risk of breast cancer, moderate knowledge, low anxiety about developing cancer, high fear and low early diagnosis behaviors. Although there was no effect on early diagnostic behaviours of the level of knowledge and anxiety of the participants, the fear of breast cancer was seen to have a positive effect. As the current study participants were students in the field of healthcare, it is concerning that the level of knowledge was only moderate. Students' knowledge must be increased during their education. It is important to increase the levels of knowledge of healthcare personnel so that they can offer correct counselling to other members of society. Insufficient information constitutes an obstacle to early diagnosis, as it results in a lack of awareness and unnecessary fear and anxiety. Within this scope, it is recommended that in addition to ongoing awareness education, there should be mandatory annual follow-up of women aged >18 years by breast screening centres. Under the umbrella of healthcare centres, “Cancer Coaching” centres could be opened to provide sufficient counselling and knowledge transfer. A further measure could be the establishment of a mobile phone follow-up system that could integrate the telephone numbers of all girls when they reach the age of 18 years and then send signals and reminders of early diagnostic behaviours.

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Ethics Committee Approval: Every stage of this work is in line with the principles of the 1964 Helsinki Declaration. Approval for the study was granted by the Ethics Committee of Kahramanmaraş Sütçü İmam University Medical Faculty (session number: 2022/38, decision no: 03, dated: 20.12.2022). Informed consent was obtained from all the study participants and they signed an agreement to participate before completing the questionnaire.
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What did the study add to the literature?

- It was determined that the young population's risk of breast cancer is low, their knowledge level is medium, their anxiety about getting cancer is low and their fear of getting cancer is high.
- The research results showed that the early diagnosis behaviors of the young population were not affected by the level of knowledge and anxiety, but were positively affected by the fear of contracting breast cancer.

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