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Breast Cancer Prevention Behaviors Among Women: A Cross-Sectional Study

Kadınların Meme Kanseri Önleme Davranışları: Kesitsel Bir Çalışma

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ABSTRACT

Introduction: The most commonly encountered type of cancer among women worldwide is breast cancer. Early detection of breast cancer plays a major role in cancer treatment. This study aimed to determine the factors affecting breast cancer prevention behaviors among women working as the academic and administrative staff of a university.
Methods: This cross-sectional study was conducted with 430 women. The data were collected via an online survey (Google Forms) between May 26, 2022, and July 18, 2022. The questionnaire included a form regarding the descriptive characteristics of individuals and a Scale of Factors Affecting Women's Breast Cancer Prevention Behaviors.
Results: The women's mean total Scale of Factors Affecting Women's Breast Cancer Prevention Behaviors score was 117.02±17.51. Considering that the minimum score that can be obtained on the scale was 33 and the maximum score was 165, it can be interpreted that the breast cancer prevention behaviors of women were above the moderate level. The factors affecting behaviors to prevent breast cancer were age, age at first birth, education level, alcohol consumption, body mass index, menopause, receiving a treatment containing estrogen hormone, radiotherapy to the chest area, having a cancer history, having a family history of breast cancer, receiving education on prevention of breast cancer, and performing breast self-examination.
Conclusion: Although the breast cancer prevention behaviors of the women who participated in this study were above the moderate level, they were not sufficient. To develop positive behaviors to prevent breast cancer, health professionals should identify women's information needs and provide training and counseling in line with these needs.

Keywords: Behavior, Breast cancer, Primary health care, Preventive measures, Women

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ÖZET

Giriş: Dünya genelinde kadınlar arasında en sık rastlanan kanser türü meme kanseridir. Meme kanserinin erken tespiti, kanser tedavisinde büyük bir rol oynamaktadır. Bu çalışmanın amacı, bir üniversitede akademik ve idari personel olarak çalışan kadınların meme kanseri önleme davranışlarını etkileyen faktörleri belirlemektir.
Yöntem: Bu kesitsel çalışma, 430 kadın ile gerçekleştirildi. Veriler, çevrimiçi bir anket (Google Forms) aracılığıyla 26 Mayıs 2022 ile 18 Temmuz 2022 tarihleri arasında toplandı. Anket, bireylerin tanımlayıcı özelliklerine ilişkin bir form ve Kadınların Meme Kanseri Önleme Davranışlarını Etkileyen Faktörleri Belirleme Ölçeği'ni içermektedir.
Bulgular: Kadınların Meme Kanseri Önleme Davranışlarını Etkileyen Faktörleri Belirleme Ölçeği toplam puan ortalaması 117.02±17.51 olarak bulundu. Ölçekten alınabilecek minimum puanın 33 ve maksimum puanın 165 olduğu göz önüne alındığında, kadınların meme kanseri önleme davranışlarının orta düzeyin üzerinde olduğu söylenebilir. Meme kanserini önleme davranışlarını etkileyen faktörler arasında yaş, ilk doğum yaşı, eğitim düzeyi, alkol tüketimi, beden kitle indeksi, menopoz durumu, östrojen hormonu içeren tedavi alma, göğüs bölgesine radyoterapi uygulanması, kendisinde kanser öyküsü, ailesinde meme kanseri öyküsü, meme kanserinden korunmaya yönelik eğitim alma ve kendi kendine meme muayenesi yapma yer almaktadır.
Sonuç: Çalışmaya katılan kadınların meme kanseri önleme davranışları orta düzeyin üzerinde olmasına rağmen yeterli değildir. Meme kanserini önlemeye yönelik olumlu davranışların geliştirilmesi için sağlık profesyonelleri, kadınların bilgi ihtiyaçlarını belirlemeli ve bu ihtiyaçlara uygun eğitim ve danışmanlık sağlamalıdır.

Anahtar Kelimeler: Davranış, Meme kanseri, Temel sağlık hizmeti, Önleyici tedbirler, Kadın

1. Introduction

Breast cancer is the most common type of cancer among women globally and in our country, resulting in the highest number of deaths (WHO, 2020). It is possible to diagnose and treat breast cancer in the early stages using screening methods (Emami et al., 2021). Early detection of breast cancer plays a major role in cancer treatment, potentially reducing mortality (Assefa et al., 2021). Despite this, many patients have been diagnosed with breast cancer in the terminal stage owing to their late admission to health centers (Shalihin et al., 2021). Secondary prevention, which includes breast self-examination (BSE) and diagnostic tests, such as mammography, ultrasonography, and magnetic resonance imaging, helps in the early detection of tumors or lesions that are predisposed to cancer (Kolak et al., 2017).

Precautions that can be taken to change the associated risk factors in breast cancer, rather than early diagnosis, are very important. It is known that lifestyle and environmental factors affect the development of breast cancer. Changing these factors within the scope of primary prevention may contribute to the reduction in morbidity and mortality (Bertoni et al., 2019; Kolak et al., 2017). Breast cancer prevention behaviors need to be supported to reduce the risk of breast cancer. Raising awareness in individuals and ensuring that individuals adopt healthy lifestyle behaviors are recommended strategies (Hoseini et al., 2019).

Because breast cancer is associated with a high rate of mortality and morbidity among women, it is important to determine breast cancer prevention behaviors to increase the level of knowledge and to make behavioral changes. Breast cancer prevention behaviors are an easy, effective, and economical way to help prevent breast cancer. In a recent study, it has been observed that women who are illiterate exhibit insufficient levels of positive behavior in preventing breast cancer (Gül and Büyükbayram, 2022). Different studies in the literature have reported that women with higher education levels had higher scores regarding breast cancer prevention behaviors (Abdelaziz et al., 2020; Abeje et al., 2019; Assefa et al., 2021; Wu et al., 2019). However, in the meta-analysis of a cohort study conducted by Dong and Qin to determine education level and breast cancer incidence, a higher education level was found to be associated with an increased risk of developing breast cancer (Dong and Qin, 2020). In line with this information, it may be useful to learn about breast cancer prevention behaviors and causes of women with a high level of education in preventing breast cancer. This study aimed to determine the factors affecting breast cancer prevention behaviors among women working as the academic and administrative staff of a university.

Research Questions

Among women working as academic and administrative staff at a university:

1. What is the level of breast cancer prevention behaviors?

2. What is the rate of regularly performing breast self-examination?

3. What are the factors affecting breast cancer prevention behaviors?

2. Methods

2.1. Study Design and Participants

This study, which involved women working at a university, was a cross-sectional study. Inclusion criteria for the study were being 18 years or older, working at the mentioned university, and agreeing to participate in the research. The rationale for conducting this research with women working at a university is to more clearly and distinctly examine the impact of their high education levels on breast cancer prevention behaviors.

The study population consisted of a total of 3678 women, who were among the administrative and academic staff of a university. In the study, 430 women were reached. The women who agreed to participate in the study were selected from among those mentioned earlier using the improbable random sampling method.

2.1. Data Collection

The questionnaire form to be used in the research was designed as an online survey (Google Forms) that can be accessed by clicking a link. The questionnaire form was distributed by the researchers via e-mail. The response time for the questions on the form, which consisted of 54 items, was 5–10 min. The data were collected between 26 May 2022 and 18 July 2022.

2.2.1. Data collection instruments

The questionnaire included a 21-item form regarding the descriptive characteristics of individuals prepared by the researchers in line with the literature, and a 33-item “Scale of Factors Affecting Women’s Breast Cancer Prevention Behaviors (ASSISTS)” to identify the factors affecting breast cancer prevention behaviors.

Scale of Factors Affecting Women’s Breast Cancer Prevention Behaviors – ASSISTS: The scale was developed by Khazaee-Pool et al. in 2016 to determine women’s breast cancer preventive

behaviors and factors that affected them (Khazaee-Pool et al., 2016). The Turkish validity and reliability study was conducted by Turan and Yiğit. The Cronbach's alpha coefficient of the scale was 0.76. In this study, we found the Cronbach's alpha coefficient to be 0.89. The scale has 33 items with 7 subscales, namely ''attitude'', ''motivation'', ''self-efficacy'', ''supportive systems'', ''information seeking'', ''self-care'', and ''stress management'', and is a 5-point Likert type scale (1=never, 2=rarely, 3=sometimes, 4=often, and 5=always). The lowest score that can be obtained on the scale is 33, and the highest score is 165. The participants were asked to mark the extent to which the expressions in the items reflect their situation. A high average taken from the relevant dimension of the scale indicated that the participant exhibited positive behavior in that direction (Turan and Yiğit, 2021). Permission was obtained from the responsible author via e-mail for this scale, which was planned to be used in the research.

2.3. Ethical Approval

Ethical approval was obtained from the Health Research and Publication Ethics Committee of Bursa Uludag University (Date: 27.04.2022, REF: 2022/04) before data collection. Permission to use the aforementioned questionnaire was obtained from the respective individual who developed the scale. Informed consent was collected from all participants in the study. All procedures involving human participants were conducted in line with the ethical standards of the relevant institutional and national research committees, as well as the 1964 Helsinki Declaration and its subsequent amendments or similar ethical guidelines.

2.4. Statistical Analysis

In this study, the subdimensions of the scale were derived by performing the necessary calculations based on the explanations provided by the ASSISTS scale. The data were analyzed using IBM Statistical Package for Social Science (SPSS) version 28.0. Continuous variables were presented as mean, standard deviation, and median, while categorical variables were presented as numbers and percentages. The Kolmogorov–Smirnov test was employed to assess the normality of the data distribution. For comparisons involving two independent groups, the Mann–Whitney U test was utilized and for comparisons involving more than two independent groups, the Kruskal–Wallis test was applied. Correlation analysis was conducted to examine the relationships between continuous variables. A significance level of 0.05 was set for statistical tests.

3. Results

The descriptive characteristics of women are given in Table 1. The mean age of the women participating in the study was 41.11±9.02 years and their mean age at the first menstrual period was 13.17±1.30 years. The mean age of 283 women with children at first birth was 28.38±4.73 years, and the mean age of 96 women who entered menopause at the onset of menopause was 46.56±4.91 years. Of women diagnosed with cancer (n=17), 8 patients were diagnosed with breast cancer, 4 patients with thyroid cancer, 1 patient with ovarian cancer, 1 patient with stomach cancer, 1 patient with colorectal cancer, and 1 patient with skin cancer. One participant stated that she was diagnosed with cancer but did not remember the type. The rates of relatives diagnosed with cancer (n, %) of the women with a family history of breast cancer (n=91) were mother's/father's sister (44, 10.2%), mother (21, 4.9%), cousin (16, 3.7%), mother's/father's mother (15, 3.5%), and sibling (6, 1.4%).

Table 1. Distribution of the Descriptive Characteristics of the Participants

Descriptive Characteristics	n	%
Staff		
Academic	286	66.5
Administrative	144	33.5
Educational Level		
High School and Lesser	56	13.0
Bachelor's Degree	83	19.3
Master's Degree	80	18.6
Doctorate	211	49.1
Smoking		
Yes	97	22.6
No	333	77.4
Alcohol Consumption		
Yes	101	23.5
No	329	76.5
Marital Status		
Married	313	72.8
Single	117	27.2
BMI		
Underweight (<18.50)	11	2.6
Normal (18.50-24.99)	266	61.9
Overweight (>25.00)	114	26.5
Obese (>30.00)	39	9.1
With a Child		
Yes	283	65.8
No	147	34.2
Menopause		
Yes	96	22.3
No	324	77.7
Using Oral Contraceptive Pills		
Yes	114	26.5
No	316	73.5
Receiving a Treatment Containing Estrogen		
Yes	50	11.6
No	380	88.4
Radiotherapy to the Chest Area		
Yes	11	2.6
No	419	97.4

History of Cancer		
Yes	17	4.0
No	413	96.0
Family History of Breast Cancer		
Yes	91	21.2
No	339	78.8
Breast Cancer Prevention Education		
Yes	94	21.9
No	336	78.1
Perform BSE		
Never	72	16.7
Sometimes	324	75.3
Regularly Every Month	34	7.9

BMI: Body Mass Index, BSE: Breast Self Examination.

The women's mean total ASSISTS score, mean subscale score, median, interquartile range (IQR), and the analysis of the variables that may affect the breast cancer prevention behaviors of the participants in this study are shown in Table 2.

The mean total ASSISTS score of the participants differed according to education level, body mass index (BMI), and BSE ($p<0.01$). A pairwise comparison made using Dunn's test was used to analyze the group that caused the difference (Table 2). As a result of the Kruskal-Wallis test, it was observed that there was a difference between the perceived social support and educational level, but as a result of the Dunn test, it was revealed that there was no difference between pairwise comparisons.

Table 2. Comparison of the Mean Total ASSISTS and Subscale Scores According to the Descriptive Characteristics of the Participants

	Attitude	Motivation	Self-efficacy	Perceived Social Support	Information Seeking	Self-care	Stress Management	ASSISTS Total
$\bar{x}$ (σ)	31.33±4.81	15.62±2.99	14.67±2.37	13.58±4.07	13.33±3.20	18.19±4.86	10.31±2.50	117.02±17.51
Median (Q1-Q3)	32.00 (28-35)	15.00 (14-18)	15.00 (13-16)	14.00 (11-17)	13.00 (11-15)	18.00 (15-21)	10.00 (9-12)	115.50 (104-130)
Descriptive Characteristics								
Staff								
Academic	31.64±4.80	15.34±2.94	14.82±2.30	13.53±4.18	13.37±3.22	18.60±4.70	10.31±2.30	117.60±17.65
Administrative	30.72±4.79	16.18±3.02	14.36±2.50	13.67±3.85	13.25±3.17	17.38±5.10	10.30±2.88	115.87±17.23
z	-1.777	-2.926	-1.969	-0.002	-0.451	-2.725	-0.1	-1.079
p	0.076	0.003	0.049	0.998	0.652	0.006	0.920	0.281
Educational level								
High School and Lesser	29.13±4.74^{b}	16.64±2.99^{b}	13.98±2.73	12.54±3.64	12.45±3.16	15.09±4.20^{a}	9.20±2.99^{a}	109.02±15.63^{b}
Bachelor's Degree	32.12±3.97^{a}	16.00±3.02^{ab}	14.64±2.37	14.19±3.88	13.71±3.13	18.45±5.08^{b}	10.72±2.55^{b}	119.83±16.67^{a}
Master's Degree	30.60±5.41^{ab}	15.11±2.83^{a}	14.50±2.50	13.20±4.01	12.90±2.80	17.95±4.94^{b}	10.60±2.32^{b}	114.86±18.09^{ab}
Doctorate	31.89±4.71^{a}	15.39±2.98^{a}	14.92±2.20	13.75±4.23	13.58±3.33	19.01±4.60^{b}	10.33±2.34^{b}	118.86±17.47^{a}
$\chi 2$	16.404	12.523	7.589	7.864	7.751	34.851	13.296	17.893
p	<0.001	0.006	0.055	0.049	0.051	<0.001	0.004	<0.001
Smoking								
Yes	31.09±4.72	15.30±2.97	14.23±2.35	13.42±4.19	13.16±3.02	16.73±5.05	9.91±2.70	113.85±16.80
No	31.40±4.84	15.71±3.00	14.79±2.37	13.62±4.04	13.38±3.25	18.62±4.73	10.42±2.43	117.95±17.63
z	-0.479	-1.17	-2.066	-0.44	-0.487	-3.234	-1.348	-1.814
p	0.632	0.242	0.039	0.660	0.626	0.001	0.178	0.070
Alcohol Consumption								
Yes	32.24±4.52	15.49±2.72	14.91±2.12	14.15±4.08	13.61±2.83	18.70±4.77	10.68±2.21	119.78±16.02
No	31.05±4.87	15.66±3.08	14.59±2.45	13.40±4.06	13.24±3.30	18.04±4.89	10.19±2.58	116.18±17.88
z	-2.254	-0.517	-1.209	-1.787	-1.307	-1.151	-1.796	-2.149
p	0.024	0.605	0.227	0.074	0.191	0.250	0.073	0.032
Marital Status								
Married	31.36±4.72	15.79±3.00	14.76±2.39	13.78±4.02	13.49±3.14	18.34±4.76	10.26±2.53	117.79±17.48
Single	31.25±5.07	15.17±2.93	14.40±2.32	13.03±4.18	12.91±3.33	17.79±5.13	10.43±2.43	114.79±17.48
z	-0.254	-1.884	-1.552	-1.594	-1.818	-0.792	-0.531	-1.278
p	0.799	0.060	0.121	0.111	0.069	0.428	0.596	0.201
BMI								
Underweight (<18.50)	31.82±3.57	14.55±2.66^{ab}	15.27±1.85^{ab}	9.73±4.29^{b}	13.09±2.43	16.27±2.97^{ab}	9.00±2.28^{ab}	109.73±12.25^{ab}
Normal (18.50 - 24.99)	31.39±4.92	15.58±2.97^{ab}	14.88±2.30^{b}	13.89±4.00^{a}	13.50±3.15	18.98±5.01^{b}	10.60±2.51^{b}	118.81±17.52^{b}
Overweight (> 25.00)	31.61±4.68	16.19±2.92^{b}	14.48±2.46^{ab}	13.53±4.07^{a}	13.16±3.34	17.38±4.63^{a}	10.14±2.47^{ab}	116.49±17.62^{ab}
Obese (> 30.00)	29.95±4.64	14.51±3.11^{a}	13.59±2.47^{a}	12.69±3.97^{ab}	12.74±3.31	15.77±3.53^{a}	9.18±2.20^{a}	108.44±15.55^{a}
$\chi 2$	2.876	12.057	11.218	11.191	1.735	27.442	14.245	13.503
p	0.411	0.007	0.011	0.011	0.629	<0.001	0.003	0.004
With a Child								
Yes	31.34±4.77	15.87±2.99	14.80±2.46	13.58±4.02	13.39±3.27	18.32±4.90	10.19±2.59	117.50±17.99
No	31.31±4.92	15.14±2.94	14.40±2.19	13.56±4.18	13.21±3.06	17.95±4.81	10.54±2.32	116.11±16.56

z	-0.112	-2.492	-1.811	-0.102	-0.312	-0.605	-1.361	-0.511
p	0.911	0.013	0.070	0.919	0.755	0.545	0.174	0.609
Menopause								
Yes	32.34±5.04	16.30±2.77	15.09±2.36	14.19±4.24	13.63±3.47	19.70±5.15	10.81±2.58	122.06±18.40
No	31.04±4.71	15.42±3.03	14.54±2.37	13.40±4.01	13.24±3.11	17.75±4.70	10.16±2.46	115.56±16.99
z	-2.421	-2.475	-2.063	-1.727	-0.886	-3.512	-2.375	-2.816
p	0.015	0.013	0.039	0.084	0.376	<0.001	0.018	0.005
Using Oral Contraceptive Pills								
Yes	31.54±4.76	15.37±2.80	14.88±2.24	13.27±3.84	13.44±2.97	18.77±4.79	10.21±2.39	117.47±17.54
No	31.26±4.84	15.71±3.06	14.59±2.42	13.69±4.15	13.29±3.28	17.98±4.88	10.34±2.55	116.86±17.52
z	-0.454	-1.280	-1.203	-1.041	-0.516	-1.509	-0.418	-0.310
p	0.650	0.200	0.229	0.298	0.606	0.131	0.676	0.757
Receiving a Treatment Containing Estrogen								
Yes	32.28±4.46	16.22±2.79	15.60±2.42	14.70±4.11	14.20±3.27	20.12±5.34	10.64±2.31	123.76±18.16
No	31.21±4.85	15.54±3.01	14.54±2.34	13.43±4.05	13.22±3.18	17.94±4.75	10.26±2.53	116.14±17.25
z	-1.467	-1.357	-2.918	-2.044	-1.808	-2.350	-0.929	-2.698
p	0.142	0.175	0.004	0.041	0.071	0.019	0.353	0.007
Radiotherapy to the Chest Area								
Yes	35.91±3.73	17.55±2.07	16.45±2.62	16.55±3.11	16.00±2.41	24.18±3.57	11.27±1.79	137.91±14.12
No	31.21±4.78	15.57±3.00	14.62±2.35	13.50±4.07	13.26±3.19	18.04±4.80	10.28±2.52	116.47±17.26
z	-3.219	-2.160	-2.339	-2.444	-2.864	-3.924	-1.346	-3.733
p	0.001	0.031	0.019	0.015	0.004	<0.001	0.178	<0.001
History of Cancer								
Yes	33.47±5.46	17.00±2.94	15.59±2.92	16.88±3.77	14.94±3.73	21.47±5.86	11.88±2.42	131.24±19.67
No	31.24±4.77	15.56±2.99	14.63±2.35	13.44±4.03	13.26±3.16	18.06±4.78	10.24±2.49	116.44±17.19
z	-1.724	-1.812	-1.529	-3.435	-1.925	-2.653	-2.485	-2.915
p	0.085	0.070	0.126	<0.001	0.054	0.008	0.013	0.004
Family History of Breast Cancer								
Yes	32.86±4.31	16.10±2.86	15.09±2.24	14.52±4.06	13.47±3.28	18.80±5.28	10.02±2.36	120.86±17.23
No	30.92±4.86	15.49±3.02	14.55±2.40	13.32±4.05	13.29±3.18	18.03±4.74	10.38±2.54	115.99±17.46
z	-3.337	-1.877	-2.116	-2.591	-0.700	-1.407	-1.123	-2.483
p	< 0.001	0.060	0.034	0.010	0.484	0.159	0.262	0.013
Breast Cancer Prevention Education								
Yes	32.65±4.67	15.98±2.51	15.39±2.20	15.15±3.40	14.33±3.02	20.23±4.68	10.57±2.42	124.31±15.66
No	30.96±4.79	15.52±3.11	14.46±2.38	13.14±4.14	13.05±3.20	17.62±4.77	10.23±2.53	114.99±17.47
z	-2.936	-1.025	-3.251	-4.220	-3.352	-4.794	-0.978	-4.488
p	0.003	0.305	0.001	<0.001	<0.001	0.001	0.328	<0.001
Perform BSE								
Never	29.33±5.42[a]	14.56±3.26[a]	13.46±2.53[a]	12.08±4.41[a]	11.75±3.20[a]	15.53±4.00[a]	9.76±2.53	106.47±15.90[a]
Sometimes	31.53±4.55[b]	15.64±2.86[b]	14.74±2.21[b]	13.66±3.95[b]	13.48±3.11[b]	18.39±4.76[b]	10.39±2.43	117.84±16.52[b]
Regularly Every Month	33.65±4.51[c]	17.68±2.63[c]	16.50±2.19[c]	15.91±3.19[c]	15.29±2.63[c]	21.94±4.64[c]	10.65±2.98	131.62±17.35[c]
$\chi 2$	19.205	25.347	35.486	19.99	31.026	42.153	5.094	46.606
p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.078	<0.001

ASSISTS: Scale of Factors Affecting Women's Breast Cancer Prevention Behaviors, BMI: Body Mass Index, BSE: Breast Self Examination, Q1: Quartile 1, Q3: Quartile 3.
a-b-c: There is no difference between groups with the same letter for each column. z: Mann-Whitney U test $\chi 2$: Kruskal-Wallis test

The age of women had a positive correlation with the mean total ASSISTS score (r:0.261, p<0.01) and the mean subscale scores, except the information-seeking subscale. The age of women with a child at first birth was statistically positively and significantly correlated with attitude (r:0.180, p<0.01), self-care (r:0.132, p<0.05), and mean total ASSISTS score (r:0.126, p<0.05). The BMI was statistically negative and significantly correlated with attitude (r:-0.098, p<0.05), self-efficacy (r:-0.166, p<0.01) self-care (r:-0.189, p<0.01), and mean total ASSISTS score (r:-0.122, p<0.05) (Figure 1).

	Age	Age at the first menstrual period	Age at first birth	Age at menopause	BMI	Attitude	Motivation	Self-efficacy	Perceived social support	Information seeking	Self-care	Stress management	ASSISTS total	
Age														
Age at the first menstrual period														1
Age at first birth														0.75
Age at menopause	**													0.5
BMI	**		**											0.25
Attitude	**		**		*									0
Motivation	**					**								-0.25
Self-efficacy	**				**	**	**							-0.5
Perceived social support	**					**	**	**						-0.75
Information seeking						**	**	**	**					-1
Self-care	**		*		**	**	**	**	**	**				
Stress management	**					**	**	**	**	**	**			
ASSISTS total	**		*		*	**	**	**	**	**	**	**		

ASSISTS: Scale of Factors Affecting Women's Breast Cancer Prevention Behaviors, BMI: Body Mass Index. **p<0.01 *p<0.05

Figure 1. Correlation Analysis (n=430)

4. Discussion

Behaviors to prevent breast cancer, which is the most common cancer and results in the highest number of deaths among women in the world, are effective and important in the prevention of breast cancer (Hoseini et al., 2019; WHO, 2020). In this study, breast cancer prevention behaviors of women working at a university were investigated using ASSISTS and were found to be above the moderate level. The factors affecting behaviors to prevent breast cancer were age, age at first birth, education level, alcohol consumption, BMI, menopause, receiving a treatment containing estrogen hormone, radiotherapy to the chest area, having a cancer history, having a family history of breast cancer, receiving education on prevention of breast cancer, and performing BSE.

In this study, it was determined that the breast cancer prevention behaviors of women were above the moderate level. Similarly, a study conducted by Gül and Büyükbayram in southeast Türkiye to determine women's breast cancer prevention behaviors and related factors reported comparable findings (Gül and Büyükbayram, 2022).

One of the factors affecting the mean total ASSISTS score of the participants was the level of education. The participants with high school and lesser level of education had significantly lower scores than other participants with higher education levels ($p<0.001$). While the result that women with higher education levels had higher scores regarding breast cancer prevention behaviors was similar to that observed in the literature (Abdelaziz et al., 2020; Abeje et al., 2019; Assefa et al., 2021; Wu et al., 2019), it is not a surprising finding. A high level of education can increase women's knowledge about breast cancer and prevention behaviors against it. The fact that the participants who received breast cancer training had a higher mean total ASSISTS score than those who did not also show the importance of educational interventions in behavior change and is compatible with the literature (Jabeen et al., 2021).

The mean total ASSISTS score of the participants who consumed alcohol was found to be higher than those who did not. Alcohol consumption is a risk factor for breast cancer. The greater the amount of alcohol consumed, the higher the risk of breast cancer (Hashemi et al., 2014). Although women who consumed alcohol exhibited more breast cancer prevention behaviors, it is essential to support women to know that alcohol consumption is a risk factor and to develop and maintain healthy behaviors.

When BMI was evaluated, the mean total ASSISTS score of the participants in the obese group was lower than those in the normal weight group. Considering that obese individuals' health-promoting behaviors are inadequate, this inadequacy may have affected both weight control and breast cancer prevention behaviors. Obesity, a risk factor for breast cancer, reportedly increases the risk of breast cancer-specific death by 18% for every 5 kg/m^2 increase before cancer diagnosis (Chan et al., 2014). Comprehensive weight loss interventions, including healthy diet, exercise, and psychosocial support for obesity risk factors, are recommended for the prevention of breast cancer (Shaikh et al.,

2020). The fact that people with risk factors for breast cancer, such as those experiencing menopause, receiving a treatment containing estrogen hormone, and undergoing radiotherapy to the chest area, have more positive behaviors toward cancer prevention, suggests that people have a high awareness of breast cancer risk.

Those with a family history of breast cancer had statistically significantly higher breast cancer prevention behavior scores. Different studies in the literature have reported that having a family history of breast cancer increases awareness and sensitivity about breast cancer (Abdelaziz et al., 2020; Abeje et al., 2019; Emami et al., 2021; Khazaee-Pool et al., 2016; Wu et al., 2019). Women with a family history of breast cancer are aware of the benefits of early diagnosis and screening methods, and health-seeking behaviors may increase in line with this information (Abdelaziz et al., 2020; Abeje et al., 2019). With this awareness, it is believed that women will be able to practice more positive behaviors to prevent breast cancer. The fact that participants with a history of cancer have more positive behaviors in terms of breast cancer prevention can also be explained by this awareness.

Monthly BSE is an important screening activity for the diagnosis of breast cancer. The vast majority of breast cancers are detected by patients who know the usual structure of their breasts (Che Mohamed et al., 2019). When the literature was examined, it was observed that while the rate of performing BSE among women varied between 11.8% and 53.6% (Abeje et al., 2019; Abo Al-Shiekh et al., 2021; Shallo and Boru, 2019; Tarı Selçuk et al., 2020; Toan et al., 2019), the rate of regular monthly BSE was between 7.2% and 15.2% (Assefa et al., 2021; Dagne et al., 2019; Fondjo et al., 2018; Gül and Büyükbayram, 2022). In this study, it was found that an extremely small percentage of participants (7.9%) performed BSE regularly every month. The participants who regularly performed BSE every month had more positive attitudes toward breast cancer prevention behaviors. This low rate found in our study, which was conducted with a sample having a high level of education, mostly academicians, is relatively remarkable. In addition, the participation of volunteers in the online research via e-mail suggests that the participants' perspective on health research was positive. Despite this, it was observed that the positive behaviors of women to prevent breast cancer are insufficient. It is believed that the barriers to these behaviors may be variables that were not taken into consideration. It is important to plan studies to determine unknown variables and to design approaches toward them.

4.1. Limitations

The results of this study cannot be generalized to all women because women working in a single institution were included in the study. The use of an improbable random selection method in the sample selection of the study and sending e-mails to all personnel working at the university can be considered as limitations. It can be suggested that the study be repeated across countries with the probabilistic sample selection method.

5. Conclusion

As a result, although the breast cancer prevention behaviors of the women who participated in this study were above the moderate level, they were not sufficient. Women with a high level of education, with a normal BMI, who consume alcohol, who experience menopause, who take estrogen-containing hormone therapy, who have been diagnosed with cancer, who have a family history of breast cancer, who receive breast cancer prevention education, and who regularly perform BSE exhibit more positive behavior. As the age and age of the women at first birth increase, these positive behaviors increase. In this study, which was conducted using a sample with a high level of education, the majority of which were academicians, an extremely low percentage of the participants regularly performed BSE every month. It is important to plan studies to determine the obstacles in these behaviors and to design approaches to the determined factors. In this context, it is recommended that breast cancer awareness campaigns should be increased, to actively use social media for the dissemination of information, and to conduct necessary studies to provide women with easier access to screening. To develop positive behaviors to prevent breast cancer, health professionals should identify women's information needs and provide training and counseling in line with these needs. Additionally, collaborations with community organizations can enhance outreach efforts, and integrating breast cancer prevention education into existing health services can further support these initiatives.

Article Informations

Evaluation: Two External Reviewers / Double Blind

Ethical Consideration: Ethical approval was obtained from the Health Research and Publication Ethics Committee of Bursa Uludag University (Date: 27.04.2022, REF: 2022/04) before data collection. Permission to use the aforementioned questionnaire was obtained from the respective individual who developed the scale. Informed consent was collected from all participants in the study. All procedures involving human participants were conducted in line

with the ethical standards of the relevant institutional and national research committees, as well as the 1964 Helsinki Declaration and its subsequent amendments or similar ethical guidelines.

Similarity Screening: Done – iThenticate and intihal.net

Ethical Statement: health@artuklu.edu.tr

Authorship Contribution:

Research Design (CRediT 1)	DAD (%50) - AS (%50)
Data Collection (CRediT 2)	DAD (%40) - AS (%60)
Research - Data Analysis - Verification (CRediT 3-4-6-11)	DAD (%50) - AS (%50)
Writing the Article (CRediT 12-13)	DAD (%70) - AS (%30)
Development and Revision of the Text (CRediT 14)	DAD (%80) - AS (%20)

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