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The Role of Self-efficacy, Supportive Systems, and Motivation in Breast Cancer Prevention Behaviours: A Cross-sectional Study

Meme Kanseri Önleme Davranışlarında Öz-yeterlik, Destekleyici Sistemler ve Motivasyonun Rolü: Kesitsel Bir Çalışma

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ABSTRACT

Objective: This study was conducted to identify the socio-demographic, psychosocial, and health-related factors that influence women's breast cancer prevention behaviours.

Methods: Data for this descriptive and cross-sectional study were collected online from 308 women between December 2023 and August 2024. The data were obtained using the "Socio-demographic Information Form" and the "Assessment of Factors Affecting Women's Breast Cancer Prevention Behaviours Scale (ASSISTS)". Descriptive statistics, t-test, ANOVA, Mann-Whitney U, Kruskal-Wallis, and correlation analyses were used, with statistical significance set at $p<0.05$.

Results: The findings indicated that nearly half of the participants (48.38%) were aged 45 years or older. Only a small proportion (13.31%) regularly performed breast self-examination, while 51.30% had a history of mammography and 53.25% had never undergone a clinical breast examination. The mean ASSISTS score was 103.21±21.10, with a Cronbach's alpha coefficient of 0.916. Strong positive correlations were observed between motivation and self-efficacy ($r=0.733$) and between support and self-efficacy ($r=0.712$). Women aged 45 years and older had higher support scores, whereas married and widowed women demonstrated significantly higher levels of motivation and self-efficacy. Awareness and self-care behaviours varied significantly according to education and income levels.

Conclusion: The findings indicate that strengthening awareness, self-efficacy, motivation, and supportive systems is important for improving early detection and preventive behaviours.

Keywords: Awareness, nursing, self-efficacy, women's health, breast neoplasms

ÖZ

Amaç: Bu çalışma, kadınların meme kanserini önleme davranışlarını etkileyen sosyo-demografik, psikososyal ve sağlıkla ilgili faktörleri belirlemek amacıyla yapılmıştır.

Yöntem: Tanımlayıcı ve kesitsel tasarıma sahip araştırmanın verileri Aralık 2023-Ağustos 2024 arasında çevrimiçi olarak 308 kadından toplanmıştır. Veriler, "Sosyo-demografik Bilgi Formu" ve "Kadınların Meme Kanseri Önleme Davranışlarını Etkileyen Faktörleri Belirleme Ölçeği (ASSISTS)" kullanılarak elde edilmiştir. Analizlerde tanımlayıcı istatistikler, t-testi, ANOVA, Mann-Whitney U, Kruskal-Wallis ve korelasyon testleri kullanılmış; anlamlılık $p<0,05$ olarak belirlenmiştir.

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Bulgular: Bulgular, katılımcıların yaklaşık yarısının (%48,38) 45 yaş ve üzerinde olduğunu göstermektedir. Katılımcıların yalnızca %13,31'i düzenli olarak kendi kendine meme muayenesi yapmakta, %51,30'unun mamografi geçmişi bulunmakta ve %53,25'i hiç klinik meme muayenesi yaptırmamıştır. ASSISTS ölçeğinin toplam puan ortalaması 103,21±21,10 olup Cronbach alfa katsayısı 0,916'dır. Motivasyon ile öz-yeterlik (r=0,733) ve destek ile öz-yeterlik (r=0,712) arasında güçlü pozitif ilişkiler saptanmıştır. Ayrıca 45 yaş ve üzerindeki kadınların destek puanlarının daha yüksek olduğu; evli ve dul kadınların motivasyon ve öz-yeterlik düzeylerinin anlamlı olarak daha yüksek olduğu belirlenmiştir. Farkındalık ve öz bakım davranışlarının eğitim ve gelir düzeyine göre anlamlı farklılık gösterdiği bulunmuştur.

Sonuç: Bulgular, farkındalık, öz-yeterlik, motivasyon ve destekleyici sistemlerinin güçlendirilmesinin erken tanı ve önleme davranışlarını geliştirmede önemli olduğunu göstermektedir.

Anahtar kelimeler: Farkındalık, hemşirelik, öz-yeterlik, kadın sağlığı, meme neoplazileri

INTRODUCTION

Women's health is an important area at both individual and societal levels and is influenced by biological, psychological, and sociocultural factors. Women's healthy lifestyle behaviors, awareness of breast cancer, and regular health checkups are critical factors determining both individual quality of life and the overall health of society. Therefore, women's awareness of breast cancer, the frequency of regular breast self-examinations, and their participation in early diagnosis methods such as mammography are considered important indicators for improving health [1-3].

Breast cancer arises from cellular changes in breast tissue and is among the most common malignancies affecting women. Globally, breast cancer ranks as the leading malignancy affecting women, accounting for an estimated 670.000 deaths in 2022 across both high-income and low and middle-income countries [1,3]. These high incidence and mortality rates make breast cancer a significant global public health problem. Breast cancer can profoundly affect not only physical health but also women's psychosocial well-being, body image, and quality of life [4-7]. Increasing women's awareness of breast cancer and general health issues is one of the key factors influencing timely early detection and treatment. In addition, health behaviours and awareness levels may vary according to socio-demographic characteristics and lifestyle factors such as age, marital status, education level, income, and number of children [8-11].

Adopting a healthy lifestyle is considered a fundamental strategy for cancer prevention. Avoiding smoking, staying fit through regular activity, moderating alcohol use, and maintaining a nutritious diet are effective strategies for minimising cancer and chronic disease risk. However, tobacco use, high body mass index, physical inactivity, excessive alcohol consumption, and unhealthy eating habits are among the primary risk factors for cancer development. Current scientific evidence suggests that behavioral changes, particularly those targeting modifiable lifestyle factors, can contribute to the prevention of numerous cancers. Indeed, studies have revealed significant associations between dietary habits and certain types of cancer, such as breast, stomach, and colorectal cancers [12-16]. This study aimed to examine the relationships among participants' socio-demographic characteristics, health behaviors, and breast cancer awareness. Specifically, the relationships between women's breast cancer awareness, health behaviors (e.g., smoking, alcohol consumption, regular physical activity), and frequency of attending various health checkups were evaluated. Furthermore, the relationships between participants' menstrual health characteristics, pregnancy history, and knowledge about breast examinations were examined, as well as psychosocial factors such as self-efficacy, support systems, and stress management.

This study may help demonstrate that women's health behaviours and awareness levels vary by age, marital status, education level, and income. These insights may support the development of more effective early screening strategies and health education policies tailored to specific population groups. In addition, the study explores whether knowledge of breast cancer screening methods is associated with participants' self-care practices, stress management skills, and general health attitudes. Therefore, the findings are expected to contribute to evidence-informed policies and interventions for women's health, to improve the effectiveness of screening programmes, and to increase public awareness.

MATERIAL AND METHOD

Research Design and Sample

This study was designed as a cross-sectional and descriptive research. Data collection was conducted online, and the questionnaire developed by the researchers was distributed through a digital platform. The study data were collected from women reached via social media platforms between December 2023 and August 2024.

The required sample size was estimated through G*Power 3.1.9.7 software [17]. Based on an effect size of 0.20, a type I error rate of 5%, and a statistical power of 95%, the minimum required sample size was determined to be 272 participants. The statistical method used in the calculation was the means: difference from a constant (one-sample case) approach. Following data collection, a post-hoc analysis was carried out with the responses of 308 participants. According to Cohen's (1988) criteria, with an effect size of d=0.5, α=0.05, and power (1-β)=1.00, the achieved statistical power was found to be 1.00, indicating that the sample size was adequate. The inclusion criteria for participation were as follows:

- Participants aged 18 years and above,
- Having no prior diagnosis of breast cancer,
- Voluntarily agreeing to participate in the study,

• Having no physical or mental condition that would prevent understanding or responding to the research questions,

• Having no alcohol or substance dependence, and

• Having access to an internet-enabled device (for instance, a mobile phone, a tablet device, or a personal computer).

Individuals who met these criteria and provided informed consent to participate were included in the research sample.

Ethical Considerations

The study received ethical approval from Pamukkale University's Non-Interventional Clinical Research Ethics Committee (approval no: 20, date: 12.12.2023). Data collection was carried out between December 2023 and August 2024 in alignment with the ethical rules stated in the Declaration of Helsinki. Before starting the online questionnaire, all participants were informed about the purpose, content, and estimated duration of the study. Only individuals who voluntarily agreed to participate and provided electronic informed consent were able to proceed with the survey. Participation was entirely voluntary, and all responses were collected anonymously to ensure confidentiality and data security.

Data Collection Instruments

Socio-demographic Information Form

A researcher-developed questionnaire was designed after reviewing previous studies and related sources. The form collected basic demographic and contextual information, including participants' age, employment status, income group, and residential setting.

Assessment of Breast Cancer Preventive Behaviors Scale (ASSISTS)

To measure psychosocial and behavioral aspects related to breast cancer prevention, the ASSISTS was administered. Originally developed by Khazaee-Pool et al. [18] and consists of seven subscales: attitude, motivation, self-efficacy, support systems, information seeking, self-care, and stress management. It is a five-point Likert-type scale (1=never, 2=rarely, 3=sometimes, 4=often, 5=always) comprising 33 items in total, distributed as follows: attitude (8 items), motivation (4 items), self-efficacy (4 items), support systems (4 items), information seeking (4 items), self-care (6 items), and stress management (3 items) [18]. The scale was adapted into Turkish by Turan and Yiğit [19]. The Cronbach's alpha coefficient for the total scale was reported as 0.76, with subscale reliability coefficients ranging from 0.70 to 0.77. Permission to use the scale was obtained via email communication with the scale author (Zeliha Turan) prior to data collection.

Data Collection

Data were obtained through an online questionnaire administered to individuals who satisfied the study's eligibility requirements. Participants were only able to complete the survey after providing informed consent. The average survey completion time was approximately five minutes. To ensure data security, responses were collected via an email account protected by a unique password and two-factor authentication, accessible only to the researcher. Only the researchers were authorized to access and edit the online survey. Participant responses were collected anonymously, and no personally identifiable information, such as IP addresses, was recorded. Before addressing the research questions, participants were provided with an informational text explaining the purpose, scope, and ethical principles of the study. After data collection, the online survey was closed to further responses.

Statistical Analysis

Statistical analyses were carried out using SPSS software, version 21.0 (SPSS Inc., Chicago, IL, USA). Categorical variables were summarized as frequencies and percentages. When comparing independent groups, the Independent samples t-test was used when parametric assumptions were met, and when not, the Mann-Whitney U test was used. In cases involving more than two groups, the One-Way ANOVA or Kruskal-Wallis H test was employed. Associations between continuous variables were examined using Pearson or Spearman correlation tests. Logistic regression analysis was performed to identify risk factors, but since significant results were not obtained, the results are not reported. Cronbach's alpha coefficients were calculated for all scales used in the study. A post-hoc power analysis was computed via G*Power v3.1.9.2 software. All results were evaluated at a 95% confidence interval, and statistical significance was accepted at $p<0.05$.

RESULTS

The majority of the 308 women included in the study were aged 45 years and older (48.38%). Among the participants, 78.90% were married, 17.53% were single, and 3.57% were divorced or widowed. Regarding education level, the largest group consisted of bachelor's degree holders (45.13%), followed by high school graduates (27.27%) and those with a postgraduate (12.34%). In addition, 8.44% of the participants were primary school graduates, and 5.84% had completed secondary school. In terms of employment status, the highest proportion of participants were employed in the public sector (37.34%), followed by housewives (35.39%). Participants working in the private sector accounted for 8.77%, while 18.51% were employed in other occupations. With respect to place of residence, 54.87% of participants lived in urban areas, 36.04% in towns, and 9.09% in villages. Regarding income level, 73.70% of participants had a moderate income, 22.40% a low-income, and only 3.90% a high income. Concerning the number of children, 66.23% of participants had one or two children, 17.21% had three or four children, and 3.90% had five or more children (Table 1).

Table 2 presents the menstrual characteristics and health behaviors of the participants. The mean age at menarche was 13.27±1.44 years. Examination of menstrual cycle regularity showed that 60.71% of participants had a regular cycle, 11.36% had an irregular cycle, and 27.92% were in menopause. The majority of participants (86.69%) had experienced pregnancy,

while 13.31% had not. Among those with a history of pregnancy, 29.22% reported having experienced a miscarriage. Regarding breast cancer awareness, 64.94% of participants reported having knowledge about breast cancer, whereas 35.06% stated they did not. In terms of breast self-examination practices, 13.31% performed it once a month, 60.39% performed it occasionally, and 26.30% had never performed it. More than half of the participants (51.30%) had previously undergone mammography. Concerning clinical breast examination, 53.25% had never been examined, 16.88% reported having an examination at least once a year, and 29.87% had irregular examinations. With respect to health behaviors, 23.38% of participants were smokers, 9.42% consumed alcohol, and 39.0% engaged in regular exercise. The majority (75%) reported having healthy eating habits, while 25%

Table 1. The Participants' Socio-demographic Characteristics

Socio-demographic characteristic	Mean		SD
Weight (kg)	68.78		12.14
Height (cm)	162.07		6.25
BMI	26.23		4.68
	Category	**Number**	**Percentage**
Age (years)	30-34	76	24.68
	35-39	54	17.53
	40-44	29	9.42
	45 and above	149	48.38
Marital status	Married	243	78.90
	Single	54	17.53
	Divorced/ widowed	11	3.57
Education level	Literate	3	0.97
	Primary school	26	8.44
	Secondary school	18	5.84
	Highschool	84	27.27
	Bachelor's degree	139	45.13
	Postgraduate	38	12.34
Employment status	Housewife	109	35.39
	Private sector employee	27	8.77
	Public sector employee	115	37.34
	Other	57	18.51
Place of residence	City	169	54.87
	Town	111	36.04
	Village	28	9.09
Income level	Low	69	22.40
	Middle	227	73.70
	High	12	3.90
Number of children	0	39	12.66
	1-2	204	66.23
	3-4	53	17.21
	5 and above	12	3.90
Total		308	100

BMI: Body mass index, SD: Standard deviation

Table 2. The Participant' Menstrual Characteristic and Health Behaviors

Socio-demographic characteristic	Mean		SD
Menarche age	13.27		1.44
	Category	**Number**	**Percentage**
Menstrual cycle	Regular cycle	187	60.71
	Irregular cycle	35	11.36
	Menopause	86	27.92
Pregnancy	Yes	267	86.69
	No	41	13.31
Miscarriage	Yes	90	29.22
	No	218	70.78
Breast self-examination knowledge	Yes	200	64.94
	No	108	35.06
Breast self-examination	Once a month	41	13.31
	Sometimes	186	60.39
	Never	81	26.30
Previous mammography	Yes	158	51.3
	No	150	48.7
Clinical breast examination	Never	164	53.25
	At least once a year	52	16.88
	Irregularly	92	29.87
Smoking	Yes	72	23.38
	No	236	76.62
Alcohol use	Yes	29	9.42
	No	279	90.58
Exercise habit	Yes	120	39.0
	No	188	61.0
Healthy nutrition	Yes	231	75
	No	77	25
Presence of chronic disease	Yes	106	34.4
	No	202	65.6
Regular medication use	Yes	99	32.14
	No	209	67.86
Total		308	100

SD: Standard deviation

did not. Additionally, 34.4% of the participants had a chronic disease, and 32.14% reported using regular medication. The remaining 65.6% had no chronic disease history, and 67.86% did not use regular medication.

Table 3 presents the descriptive statistics and reliability analysis of the ASSISTS scale. The mean score of the attitude subscale was 16.91±5.99, while the supportive systems subscale had a mean of 14.36±4.56, and the self-efficacy subscale averaged 14.41±3.79. The self-care subscale showed a mean score of 18.47±5.57, and the motivation subscale had a mean of 14.80±4.21. The information seeking subscale had a mean score of 13.93±4.08, and the stress management subscale had a mean of 10.30±3.05. The overall total score was 103.21±21.10. Cronbach's alpha values indicated high internal consistency for the self-care (0.877) and stress management (0.866) subscales. The overall reliability of the scale was excellent (α=0.916), suggesting that the ASSISTS scale demonstrated strong internal consistency in this sample.

Table 4 presents the correlation coefficients among the subscales of the ASSISTS and the total score. Weak negative correlations were generally observed between attitude and the other variables, ranging from -0.058 to-0.022, indicating that attitude had an inverse but weak relationship with the other factors. Positive and significant correlations were found between motivation and the other subscales, particularly with self-efficacy (r=0.733) and supportive systems (r=0.632), suggesting a strong association. Self-efficacy demonstrated strong and significant positive relationships with all other subscales, especially with supportive systems (r=0.712) and information seeking (r=0.622). Similarly, support showed positive and significant correlations with information (r=0.715), self-care (r=0.587), and stress management (r=0.505). The total score was positively and significantly correlated with all subscales, indicating that higher scores in any sub-dimension were associated with higher overall ASSISTS scores. Strong correlations were particularly observed with motivation (r=0.737), self-efficacy (r=0.809), and supportive systems (r=0.820), highlighting their substantial contribution to the overall scale score.

Table 5 presents the comparison of socio-demographic characteristics with the ASSISTS total and subdimension scores. A significant difference was observed among the age groups in the supportive systems subdimension, where participants aged 45 years and above had significantly higher scores compared to younger groups (F=2.68, p=0.047). When marital status was examined, married and divorced/widowed participants scored higher in the motivation and self-efficacy subdimensions compared to single participants. Notably, divorced/widowed participants had significantly higher motivation and self-efficacy scores than the other groups (F=3.25, p=0.040; F=4.85, p=0.008). Regarding educational level, participants who graduated from primary school obtained higher scores in the Information seeking and self-care subdimensions (F=3.39, p=0.040).

A comparison based on income level revealed significant

Table 3. ASSISTS Descriptive Statistics and Reliability

Subscales	Min-max	Mean ± SD	Median (IQR)	Cronbach's alpha
Attitude	8-40	16.91±5.99	16 (12-21)	0.703
Supportive systems	4-20	14.36±4.56	15 (11-18)	0.785
Self-efficacy	4-20	14.41±3.79	15 (12-18)	0.767
Self-care	6-30	18.47±5.57	18 (14-22.5)	0.877
Motivation	4-20	14.80±4.21	15 (12-19)	0.814
Information seeking	4-20	13.93±4.08	14 (11-17)	0.727
Stress management	3-15	10.30±3.05	11 (8-13)	0.866
Total score	36-153	103.21±21.10	106 (90-119)	0.916

ASSISTS: Assessment of Factors Affecting Women's Breast Cancer Prevention Behaviours Scale, SD: Standard deviation, IQR: Interquartile range

Table 4. Correlation Analysis of ASSISTS Subscales and Total Scores

Variables	1	2	3	4	5	6	7	8
1. Attitude	1							
2. Motivation	-0.052	1						
3. Self-efficacy	-0.022	0.733	1					
4. Supportive systems	-0.058	0.632**	0.712**	1				
5. Information seeking	-0.057	0.524**	0.622**	0.715**	1			
6. Self-care	-0.057	0.465**	0.558**	0.587**	0.679**	1		
7. Stress management	-0.036	0.411**	0.464*	0.505**	0.585**	0.636**	1	
8. Total	0.226**	0.737	0.809**	0.820**	0.813**	0.791**	0.690**	1

*: p<0.05, **: p<0.01, positive correlations indicate a direct relationship, whereas negative correlations indicate an inverse relationship between variables

Table 5. Comparison of Socio-demographic Characteristics and ASSISTS Total and Subdimensions Total Scores								
	Attitude	**Motivation**	**Self-efficacy**	**Self-care**	**Supportive systems**	**Information seeking**	**Stress management**	**Total ASSISTS**
Age category								
30-34	18.35±5.70	14.38±4.24	17.52±5.56	17.53±5.56	13.39±4.68	13.53±3.92	18.36±5.70	100.97±19.18
35-39	16.33±6.12	14.55±3.80	18.35±5.53	18.35±5.53	14.43±4.70	14.11±4.30	16.33±6.12	102.92±21.30
40-44	17.65±6.29	14.44±4.42	18.27±5.45	18.28±5.45	13.38±4.58	13.24±3.45	17.66±6.29	101.51±20.05
45 and above	16.24±5.94	15.18±4.30	19.04±5.59	19.05±5.59	15.03±4.37	14.22±4.21	16.24±4.94	104.79±22.20
	F=2.44 p=0.06	F=0.80 p=0.49	F=0.99 p=0.39	F=1.28 p=0.28	F=2.68 **p=0.047***	F=0.80 p=0.49	F=2.44 p=0.06	F=0.63 p=0.59
Marital status								
Married	16.67±5.76	14.95±4.10	14.68±3.71	18.55±5.34	14.60±4.55	14.07±4.07	16.68±5.76	103.86±20.31
Single	17.33±6.85	13.72±4.70	13.41±4.10	17.89±6.66	13.17±4.71	13.31±4.37	17.33±6.86	98.51±24.73
Divorced/widowed	20±5.94	16.81±2.85	15.36±2.06	19.73±4.75	15.09±3.27	14.00±2.68	20.00±5.95	112±15.23
	F=1.79 p=0.16	F=3.25 **p=0.040***	F=4.85 **p=0.008***	F=0.59 p=0.55	F=2.32 p=0.09	F=0.76 p=0.46	F=1.78 p=0.16	F=2.43 p=0.09
Education level								
Literate	16.33±7.09	16.33±3.78	14.67±2.30	20.00±3.00	13.67±2.08	12.67±1.52	16.33±7.09	104.33±8.62
Primary school	18.65±6.89	15.46±3.61	14.58±3.01	20.27±5.08	15.54±3.15	14.77±2.97	18.65±6.89	109.77±18.16
Secondary school	17.22±5.61	14.11±4.68	14.28±4.28	15.11±4.84	13.33±4.94	11.78±4.12	17.22±5.61	95.72±21.47
Highschool	17.70±6.42	14.38±4.31	13.37±3.88	17.55±5.63	13.55±4.69	13.50±3.95	17.70±6.42	99.77±21.68
Bachelor's degree	15.78±5.41	15.01±3.73	14.98±3.75	19.36±5.55	15.01±4.44	14.68±4.12	15.78±5.41	105.63±23.31
Postgraduate	18.00±6.07	14.76±3.73	14.61±3.73	17.55±5.37	13.53±5.15	12.74±4.42	18.00±6.07	100.97±23.31
	F=2.01 p=0.07	F=0.53 p=0.74	F=1.95 p=0.08	F=3.39 **p=0.040***	F=1.92 p=0.09	F=3.15 **p=0.009***	F=2.01 p=0.07	F=1.88 p=0.09
Employment status								
Housewife	17.58±6.55	14.49±4.18	14.06±3.83	18.52±5.61	14.05±4.58	13.64±4.02	17.58±6.55	102.59±21.51
Private sector	16.89±4.84	14.96±4.44	13.70±3.84	16.59±5.73	14.63±3.86	14.04±2.88	16.89±4.84	100.15±21.41
Public sector	16.44±5.84	15.21±4.15	15.01±3.51	18.91±5.44	14.69±4.54	14.40±4.15	16.44±5.84	105.18±19.48
Other	16.60±5.66	14.54±4.30	14.25±4.15	18.40±5.61	14.19±4.94	13.53±4.54	16.60±5.66	101.91±23.41
	F=0.73 p=0.53	F=0.64 p=0.58	F=1.63 p=0.18	F=1.27 p=0.28	F=0.42 p=0.73	F=0.87 p=0.45	F=0.73 p=0.53	F=0.62 p=0.59
Place of residence								
City	16.82±5.85	14.72±4.29	14.28±3.77	18.71±5.66	14.11±4.69	13.64±4.22	16.82±5.85	102.47±21.46
Town	16.46±6.01	14.60±4.29	14.38±3.85	17.90±5.33	14.52±4.38	14.15±4.03	16.46±6.01	102.35±21.07
Village	19.25±5.99	16.18±3.10	15.39±3.67	19.36±5.93	15.29±4.52	14.86±3.33	19.29±6.38	111.14±14.79
	F=2.49 p=0.08	F=1.66 p=0.19	F=1.04 p=0.35	F=1.09 p=0.33	F=0.90 p=0.40	F=1.29 p=0.27	F=2.49 p=0.08	F=2.18 p=0.11
Income level								
Low	16.25±5.65	15.06±4.26	15.09±4.01	19.43±5.88	14.91±4.76	14.38±4.31	16.25±5.65	105.70±21.78
Middle	16.82±5.75	14.85±4.23	14.25±3.77	18.30±5.54	14.17±4.58	13.38±4.09	16.82±5.75	102.48±21.23
High	22.50±9.33	12.50±3.00	13.67±2.34	16.42±2.93	14.83±2.62	13.42±2.42	22.50±9.36	102.83±13.67
	F=5.85 **p=0.003***	F=1.94 p=0.14	F=1.53 p=0.14	F=1.97 p=0.14	F=0.76 p=0.46	F=0.56 p=0.56	F=5.85 **p=0.003***	F=0.61 p=0.54
Number of children								
0	17.79±6.21	13.82±4.24	13.10±3.85	17.05±5.39	12.15±4.51	12.72±3.91	17.79±6.21	96.60±21.95
1-2	16.54±5.85	14.90±4.36	14.56±3.81	18.89±5.74	14.87±4.49	14.25±4.13	16.54±5.85	104.36±21.32
3-4	17.40±6.45	15.43±3.59	14.92±3.53	18.62±4.76	14.26±4.28	13.91±3.97	17.40±6.45	105.08±18.48
5 and above	18.17±5.60	13.67±3.72	14.00±3.86	15.42±5.36	13.42±5.48	12.83±3.83	18.17±5.60	96.17±21.10
	F=0.82 p=0.47	F=1.43 p=0.23	F=2.04 p=0.10	F=2.48 p=0.06	F=4.17 **p=0.006***	F=1.84 p=0.13	F=0.82 p=0.47	F=1.76 p=0.11

*: One-Way Analysis of Variance, groups with significant differences ($p<0.05$) are shown in bold in the table. This indicates the cases where differences between groups within each subdimension are statistically significant

differences in the attitude and stress management subdimensions, where participants with low-income scored significantly differently compared to those with middle and high-income (F=5.85, p=0.003; F=5.85, p=0.003). According to the number of children, participants with no children and those with four or more children had lower scores in the supportive systems subdimension (F=4.17, p=0.006). No statistically significant differences were found in the other subdimensions (p>0.05) (Table 5).

Table 6 presents the comparison of obstetric history and ASSISTS total and subdimension scores. When the differences between pregnant and non-pregnant participants were examined, significant differences were found between pregnancy status and the subdimensions of self-efficacy, supportive systems, information seeking, and total ASSISTS scores. Pregnant participants had higher scores in self-efficacy (t=2.86, p=0.004), supportive systems (t=2.93, p=0.004), information seeking (t=2.45, p=0.014), and total ASSISTS (t=2.15, p=0.032) compared to non-pregnant participants. A significant difference was found in the attitude (t=-3.71, p<0.001) subdimension between participants who had and had not experienced miscarriage. Participants who had experienced miscarriage had lower attitude scores than those who had not. Participants who had knowledge about breast self-examination scored significantly higher in the self-care (t=3.50, p=0.001), information seeking (t=2.36, p=0.019), and stress management (t=2.55, p=0.011) subdimensions. In addition, participants with breast self-examination knowledge had significantly higher total ASSISTS scores (t=2.68, p=0.008).

Significant differences were observed among participants who performed, sometimes performed, and never performed breast self-examination in the subdimensions of attitude, motivation, self-care, supportive systems, information seeking, and stress management. In particular, participants who performed regular breast self-examination had significantly higher scores in self-care (F=9.01, p<0.001) and information seeking (F=5.17, p=0.006) compared to other groups. Similarly, the total scale scores also showed a statistically significant difference (F=4.21, p=0.016). Participants who had knowledge about mammography had higher scores in attitude (t=-2.37, p=0.018), motivation (t=2.09, p=0.037), self-efficacy (t=2.93, p=0.004), self-care (t=2.94, p=0.003), and supportive systems (t=2.40, p=0.017) subdimensions. A significant difference was also found in total ASSISTS scores (t=2.29, p=0.022). Participants who had previously undergone mammography showed significant differences in almost all subdimensions except for two, with higher scores across most of them. Regarding clinical breast examination status, significant differences were found in the subdimensions of attitude (F=4.06, p=0.018), self-care (F=5.43, p=0.005), supportive systems (F=6.34, p=0.002), and stress management (F=4.06, p=0.018) (Table 6).

DISCUSSION

The findings of this study demonstrate the significant relationships between women's socio-demographic characteristics, health behaviors, awareness levels, and participation in early diagnosis methods. The results should be carefully evaluated for the planning and implementation of health promotion strategies at both the individual and societal levels.

This study found that more than half of the participants had breast cancer awareness, one in ten women performed monthly breast self-examinations, more than half had a history of mammography, and had not had a clinical breast examination. These rates are consistent with studies conducted in Türkiye and similar cultural contexts. For example, the study "Attitudes and Health Beliefs Associated with Breast Cancer Screening Behaviors Among Turkish Women" reported that only 10.1% of participants performed monthly breast self-examinations and 15% had mammograms [20]. These findings suggest that early diagnosis behaviors remain low in Türkiye. Low participation in early diagnosis methods is associated with psychosocial factors such as awareness, perceived self-efficacy, perceived barriers, and motivation, as well as awareness levels. For example, it has been determined that as women's confidence in self-examination increases, their likelihood of engaging in this behavior also increases [20]. The high correlation between the self-efficacy subscale and the other subscales (r=0.809) in our study is consistent with these findings.

This study also demonstrated the significant impact of socio-demographic variables. Participants aged 45 and over scored higher on the support systems subscale, while married and divorced/widowed participants had statistically significantly higher motivation and self-efficacy levels than single participants. Comparisons by educational background revealed that primary school graduates scored higher on the information and self-care subscales, while comparisons by income level revealed significant differences among low-income participants on the attitude and stress management subscales. These findings are consistent with studies in the literature demonstrating that socio-demographic characteristics are important factors influencing screening behaviors [11,20,21]. For example, a study conducted in rural Ankara reported that women who were only literate were approximately 1.9 times more likely to not undergo mammography [21]. Based on these findings, targeted strategies should be developed to increase participation in screening programs for low-income or less educated women.

In terms of health behaviors, this study found that smoking was one in four women, alcohol use was one in ten, regular exercise was four in ten, and healthy eating habits were three in four. These data suggest that overall healthy lifestyle behaviors vary among women and may have an indirect relationship with participation in early diagnosis. The literature reports that women who adopt healthy lifestyle behaviors are more likely to attend health checkups [11,21,22]. Therefore, considering both women's lifestyle behaviors and screening habits together is crucial for developing effective intervention programs.

Strong correlations were found between the subscales of the scale used in this study, such as motivation-self-efficacy (r=0.733) and support-self-efficacy (r=0.712). These findings demonstrate

Table 6. Comparison of Obstetric History and ASSISTS Total and Subdimensions Total Scores

	Attitude	Motivation	Self-efficacy	Self-care	Supportive systems	Information seeking	Stress management	Total ASSISTS
Pregnancy								
Yes	16.79±5.96	14.96±4.20	14.66±3.71	18.71±5.58	14.66±4.54	14.16±4.06	10.29±3.05	104.23±20.97
No	17.68±6.17	13.86±4.21	12.85±3.96	16.95±5.28	12.44±4.30	12.49±4.03	10.39±3.04	96.63±21.05
	t=-0.88	t=1.60	t=2.86	t=1.89	t=2.93	t=2.45	t=-0.19	t=2.15
	p=0.37	p=0.11	**p=0.004****	p=0.06	**p=0.004****	**p=0.014****	p=0.84	**p=0.032****
Miscarriage								
Yes	14.98±5.00	14.79±4.13	14.39±3.79	18.36±5.32	14.16±4.64	14.13±4.26	9.98±3.07	100.78±21.06
No	17.71±6.19	14.82±3.79	14.43±3.79	18.53±5.68	14.45±4.54	13.86±4.02	10.44±3.03	104.22±21.09
	t=-3.71	t=-0.052	t=-0.07	t=-0.24	t=-0.51	t=0.53	t=-1.19	t=-1.30
	p=0.000**	p=0.95	p=0.93	p=0.86	p=0.60	p=0.60	p=0.23	p=0.19
Breast self-examination knowledge								
Yes	16.77±5.97	15.13±4.28	14.71±3.84	19.28±5.32	14.73±4.45	14.34±3.98	10.63±3.04	105.57±20.83
No	17.19±6.03	14.22±4.04	13.87±3.65	16.99±5.73	13.69±4.71	13.19±4.19	9.70±2.99	98.86±21.00
	t=-0.58	t=1.80	t=1.86	t=3.50	t=1.89	t=2.36	t=2.55	t=2.68
	p=0.55	p=0.07	p=0.06	**p=0.001****	p=0.05	**p=0.019****	**p=0.011****	**p=0.008****
Breast self-examination								
Once a month	14.80±5.11	15.27±4.78	15.22±4.24	21.10±5.88	15.68±3.65	15.15±4.50	14.80±5.11	108.02±21.48
Sometimes	17.07±5.93	15.19±4.02	14.64±3.56	18.66±5.25	14.62±4.52	14.02±3.99	17.07±5.93	104.53±20.95
Never	17.62±6.35	13.70±4.19	13.49±3.93	16.74±5.60	13.11±4.84	13.14±3.96	17.62±6.35	97.77±20.43
	F=3.20	F=3.85	F=3.70	F=9.01	F=5.17	F=3.44	F=3.20	F=4.21
	p=0.042*	**p=0.022***	**p=0.026***	**p=0.000***	**p=0.006***	**p=0.033***	**p=0.042***	**p=0.016***
Mammography awareness								
Yes	16.21±6.10	15.25±4.26	14.97±3.72	19.29±5.42	15.14±4.27	14.34±4.13	10.44±3.04	105.63±20.51
No	17.83±5.74	14.24±4.08	13.70±4.75	17.43±5.60	13.36±4.75	13.42±3.98	10.12±3.05	100.09±21.52
	t=-2.37	t=2.09	t=2.93	t=2.94	t=3.44	t=1.96	t=0.92	t=2.29
	p=0.018**	**p=0.037****	**p=0.004****	**p=0.003****	**p=0.001****	p=0.05	p=0.35	**p=0.022****
Previous mammography								
Yes	17.97±6.04	14.45±3.96	13.97±3.64	17.43±5.36	13.60±4.63	13.60±3.89	10.19±3.02	101.23±20.10
No	15.37±4.73	15.48±4.57	15.30±3.69	20.02±5.76	16.22±3.68	15.02±4.01	10.89±3.05	108.29±18.01
	t=3.05	t=-1.64	t=-2.41	t=-3.13	t=-3.98	t=-2.40	t=-1.52	t=-2.41
	p=0.003**	p=0.10	**p=0.017****	**p=0.002****	**p=0.000****	**p=0.017****	p=0.12	**p=0.017****
Clinical breast examination								
Never	17.73±5.92	14.48±3.92	14.07±3.58	17.59±5.41	13.51±4.61	13.61±3.98	17.73±5.92	101.09±20.30
At least once a year	15.19±5.53	14.62±4.86	14.31±4.51	20.27±6.28	15.48±4.23	15.02±4.06	15.19±5.53	105.50±22.55
Irregularly	16.42±5.16	15.49±4.29	15.09±3.65	19.05±5.14	15.25±4.40	13.91±4.22	16.42±6.16	105.72±21.50
	F=4.06	F=1.79	F=2.14	F=5.43	F=6.34	F=2.36	F=4.06	F=1.79
	p=0.018*	p=0.16	p=0.11	**p=0.005***	**p=0.002***	p=0.09	**p=0.018***	p=0.16

*: One-Way Analysis of Variance, groups with significant differences (p<0.05) are shown in bold in the table. This indicates the cases where differences between groups within each subdimension are statistically significant

**: Independent sample t-test, groups with significant differences (p<0.05) are shown in bold in the table. This indicates the cases where differences between groups within each subdimension are statistically significant

a strong relationship between women's awareness-raising, utilization of support systems, and self-care practices. There is also strong evidence in the literature that education and intervention programs are effective in improving women's screening behaviors. For example, specialized interventions for women with low socio-economic status have been shown to significantly increase rates of self-examination, clinical examination, and mammography [11,23]. Therefore, the findings of this study support management strategies focused on education and awareness-raising.

Study Limitations

Several limitations should be acknowledged. First, because the data were collected using a cross-sectional design, it is not possible to directly demonstrate cause-and-effect relationships between variables. Furthermore, because the data were based on participants' self-reports, recall bias or a tendency to provide socially desirable responses may have influenced the results. However, the study also has strengths. It is one of the few to assess women's breast cancer prevention behaviors multidimensionally using the ASSISTS scale. The combined consideration of socio-demographic variables, health behaviors, and awareness levels contributed to a more holistic understanding of the psychosocial factors influencing early diagnosis behaviors. Moreover, the scale's high internal consistency coefficient supports the reliability of the data.

CONCLUSION

The findings highlight the main variables affecting women's preventive actions against breast cancer. The research results indicate that age, education, marital status, and income level have significant effects on women's attitudes and health behaviors toward breast cancer prevention. Women aged 45 and older, in particular, were observed to exhibit more positive behaviors in the subscales of attitude, motivation, self-efficacy, and self-care. Despite the global emphasis on breast cancer screening, participation rates in early diagnosis methods remain below the desired level. Our study found that only a limited number of women regularly perform breast self-examination, have clinical breast examinations, and undergo mammography. This finding clearly demonstrates the need to increase access to screening programs and raise awareness, particularly among women with lower education and income levels. The high level of internal consistency of the ASSISTS scale used in this study demonstrates that it is a reliable tool for assessing factors influencing breast cancer prevention behaviors. Furthermore, the high correlations between the motivation, supportive systems, and self-efficacy subscales demonstrate that behavior change is a multidimensional process requiring both individual and environmental support mechanisms.

Ethics

Ethics Committee Approval: The study received ethical approval from Pamukkale University's Non-Interventional Clinical Research Ethics Committee (approval no: 20, date: 12.12.2023).

Informed Consent: Before starting the online questionnaire, all participants were informed about the purpose, content, and estimated duration of the study. Only individuals who voluntarily agreed to participate and provided electronic informed consent were able to proceed with the survey.

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Footnotes

Author Contributions

Concept: HB, ÇG; Design: HB, ÇG; Data Collection or Processing: HB, ÇG; Analysis or Interpretation: HB, ÇG; Literature Search: HB, ÇG; Writing: HB, ÇG.

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