TOBİDER

International Journal of Social Sciences

ISSN:2587-2591
DOI Number:http://dx.doi.org/10.30830/tobider.sayi.23.20

Volume 9/3
2025 p. 337-351

THE EFFECT OF SIMPLE SIMULATION-BASED BREAST CANCER AWARENESS TRAINING ON WOMEN BREAST CANCER KNOWLEDGE AND FEAR LEVELS*

BASİT SİMÜLASYON TEMELLİ MEME KANSERİ FARKINDALIK EĞİTİMİNİN KADINLARIN MEME KANSERİ BİLGİ VE KORKU DÜZEYLERİNE ETKİSİ

Yasemin AYDIN KARTAL[1] Sema AKER[2]
Aleyna BULUT[3] İlayda ORMAN[4]

ABSTRACT

Aim: The aim of this study is to examine the effects of a simple simulation-based breast cancer awareness training on womens knowledge and fear levels regarding breast cancer.

Materials and Methods: This study, conducted with a pretest-posttest control group experimental design, was conducted with female cleaning staff working at a state university. Participants were divided into intervention (n=40) and control (n=40) groups using a simple random sampling method. Both groups received a two-hour theoretical training aimed at raising breast cancer awareness. This training included lectures, case examples, and video demonstrations. In addition to the intervention group, the intervention group received hands-on training using a simple reality breast simulator. Data collection included the **"**Descriptive Information Form**"**, the

* This article was presented as an oral presentation at the 1st International Cyprus Congress of Scientific Research, held on 21–23 March 2025 in Nicosia, Turkish Republic of Northern Cyprus, and hosted by Near East University.

[1] Prof. Dr., University of Health Sciences, E-mail: yasemin.aydinkartal@sbu.edu.tr, ORCID: 0000-0001-7464-945X, Istanbul, Türkiye.
[2] Ress. Ass., University of Health Sciences, E-mail: semanuraker@gmail.com, ORCID: 0000-0002-5872-8067, Istanbul, Türkiye.
[3] Ress. Ass., University of Health Sciences, E-mail: aleyna.bulut@sbu.edu.tr, ORCID: 0000-0002-2373-4133, Istanbul, Türkiye.
[4] Midwife Student, University of Health Sciences, E-mail: ilaydaorman2003@gmail.com, ORCID: 0009-0005-6783-6958, Istanbul, Türkiye.

"Comprehensive Breast Cancer Knowledge Test**"**, the **"**Breast Cancer Fear Scale**"**, and the **"**Breast Cancer Awareness Scale**"**.

Results: The mean age of the participants was calculated as 32.03±5.20. No significant difference was observed between the intervention and control groups in terms of demographic characteristics. Both groups showed a significant increase in knowledge following the theoretical training. No statistically significant difference was found in the within-group and between-group comparisons regarding breast cancer fear levels. However, women in the intervention group had significantly higher awareness levels than the control group.

Conclusion: The findings suggest that simple reality simulation-assisted training can be effective in raising womens breast cancer awareness. Following the hands-on training, significant improvements were observed in womens knowledge of breast cancer symptoms, breast self-examination, and the importance of early diagnosis. However, no significant change was observed in their fear levels after the training. Future follow-up studies are needed to assess the long-term effects of the training and to provide individual counseling when necessary.

Keywords: *Awareness, Breast Cancer Fear, Simple Simulation, Women*

ÖZ

Amaç: Bu araştırmanın amacı, basit simülasyon temelli bir meme kanseri farkındalık eğitiminin kadınların meme kanserine ilişkin bilgi düzeyleri ile korku düzeyleri üzerindeki etkisini incelemektir.

Yöntem: Ön test-son test kontrol gruplu deneysel desenle yürütülen bu çalışma, bir devlet üniversitesinde görev yapan kadın temizlik personelleriyle gerçekleştirilmiştir. Katılımcılar basit rastgele örnekleme yöntemi kullanılarak müdahale (n=40) ve kontrol (n=40) gruplarına ayrılmıştır. Her iki gruba, meme kanseri farkındalığını artırmaya yönelik teorik içerikte iki saatlik bir eğitim sunulmuştur. Bu eğitim; konu anlatımı, vaka örnekleri ve video gösterimlerini içermektedir. Müdahale grubuna ek olarak, basit düzeyde gerçeklik sunan meme simülatörü aracılığıyla uygulamalı eğitim gerçekleştirilmiştir. Veri toplama sürecinde "Tanıtıcı Bilgi Formu", "Genişletilmiş Meme Kanseri Bilgi Testi", "Meme Kanseri Korku Ölçeği" ve "Meme Kanseri Farkındalık Ölçeği" kullanılmıştır.

Bulgular: Katılımcıların yaş ortalaması 32,03±5,20 olarak hesaplanmıştır. Müdahale ve kontrol grubu arasında demografik özellikler açısından anlamlı bir fark gözlenmemiştir. Her iki grupta da teorik eğitimin ardından bilgi düzeylerinde anlamlı bir artış görülmüştür. Meme kanseri korku düzeyleri bakımından grup içi ve gruplar arası karşılaştırmalarda istatistiksel olarak anlamlı bir fark bulunmamıştır. Bununla birlikte, müdahale grubunda yer alan kadınların farkındalık düzeyleri, kontrol grubuna kıyasla anlamlı düzeyde daha yüksek çıkmıştır.

Sonuç ve Öneriler: Elde edilen bulgular, basit gerçeklikli simülasyon destekli eğitimin, kadınların meme kanseri farkındalığını artırmada etkili olabileceğini göstermektedir. Uygulamalı eğitimin ardından kadınların meme kanseri belirtilerini tanıma, kendi kendine meme muayenesi yapabilme ve erken tanının önemine ilişkin bilgilerinde belirgin bir gelişim olduğu görülmüştür. Ancak eğitim sonrası korku düzeylerinde anlamlı bir değişiklik saptanmamıştır. Eğitimlerin uzun vadeli etkilerinin

değerlendirilebilmesi ve gerektiğinde bireysel danışmanlık sağlanabilmesi için ileriye dönük izlem çalışmalarına ihtiyaç duyulmaktadır.

Anahtar Kelimeler: *Basit Simülasyon, Bilgi, Farkındalık, Korku, Meme Kanseri*

Introduction

Breast cancer is among the leading causes of death in women globally (Nsaful et al., 2022). It is responsible for 25% of cancer cases and 15% of cancer-related deaths in women (Torre et al., 2015). Data published by the World Health Organization on global cancer rates reported that there were approximately 2.3 million new breast cancer cases and 685,000 women lost their lives due to breast cancer in 2020 (The Global Cancer Observatory, 2020). The incidence of breast cancer in Turkey is 40 per 100,000, and approximately 15,000 women are diagnosed with breast cancer each year (Republic of Turkey, Ministry of Health, General Directorate of Public Health, 2017). Although the incidence of mortality is decreasing, it is estimated that the incidence of breast cancer will increase further by 2040 (Barrios et al., 2018; Sung et al., 2021).

Breast cancer is a complex disease resulting from the interaction of environmental, genetic, and physiological factors. Therefore, primary prevention is not possible. Early diagnosis is a promising approach to breast cancer treatment for better prognosis management (Biswas et al., 2020). The American Cancer Society recommends screening with clinical and self-examination of the breast instead of mammography. It is emphasized that self-examination helps identify any changes in breast tissue at an early stage by familiarizing oneself with their breast tissue (Smith et al., 2020). It is considered an important diagnostic method, especially in regions with limited resources where mammography screening is not readily available (Nsaful et al., 2022).

Early detection and treatment of breast cancer is widely advocated as a strategy to reduce breast cancer-related morbidity and mortality in developing countries (El Saghir et al., 2011). Unfortunately, most patients in developing countries seek care for advanced breast cancer. Low education levels and low income are the primary reasons for late presentation (Sharma et al., 2012). A 2017 study conducted in India by Gadgil et al. found that breast self-examination aids in early diagnosis of breast cancer, while womens inadequate knowledge and awareness about breast self-examination were identified as the biggest obstacle to early diagnosis (Gadgil et al., 2017). While breast self-examination alone is considered ineffective in reducing mortality, it is an important approach because it increases breast health awareness in women and facilitates early detection (Biswas et al., 2020).

The literature includes studies evaluating the effects of breast cancer awareness training on individuals' knowledge levels. However, no studies have been found comparing simple simulation-based breast cancer awareness training with a control or intervention group on womens breast cancer knowledge, awareness, and fear levels. This study design provides

originality. This study was designed to determine the effects of simple simulation-based breast cancer awareness training on the breast cancer knowledge and fear levels of female service personnel working at a public university.

Methods

Population and Sample

This randomized controlled experimental study was conducted with a sample of female service workers employed at a state university (n=114)

The sample size was calculated using the G* Power 3.1.9.7 program. The calculation was made assuming that comparisons of scale mean scores would be made using a t-test. When the calculation was performed with a two-sided hypothesis, Cohen's d (standard effect size) of 0.64, α error of 0.05, β error of 0.20, and power of 80%, it was determined that the total sample size for each group (n=40) should be (n=80).

This randomized controlled trial was conducted in accordance with the Consolidated Standards of Reporting Trials (CONSORT) 2010 guidelines (see Figure 1).

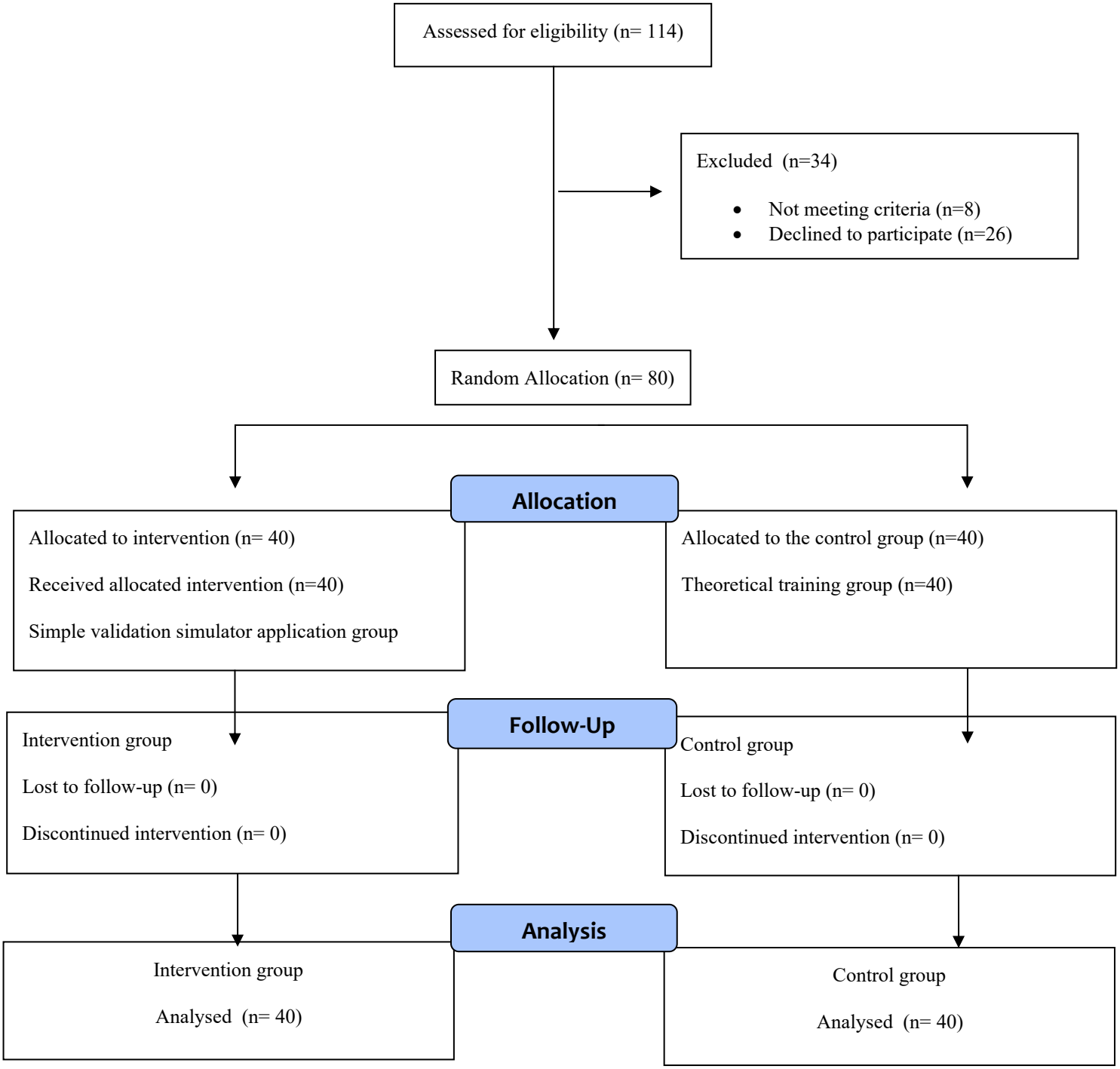

Figure 1. CONSORT flow diagram

Preparation Phase of the Study

During the preparation phase of the study, a PowerPoint presentation was prepared, including breast cancer diagnosis methods and the core teaching content of this study. The two-hour training included case discussions and video presentations. The training content covered breast cancer risk factors, symptoms, early diagnosis, prevention methods, diagnosis and treatment methods, and breast self-examination. As part of the preparation process, preliminary interviews were conducted with womens service personnel, and each phase of the study and the proposed procedures were explained. Each woman provided informed consent.

Implementation of the Study

The implementation phase of the study was conducted in the conference hall and simulation laboratory of a public university's Midwifery Department. An informational meeting was held with the women in the intervention group regarding the simulator and model, the training plan flowchart, the content of the training plan, the environment, and the location of the materials.

Before the implementation, all groups received theoretical training, including a two-hour case presentation on breast cancer awareness, which was determined to be the core teaching content. A five-page training booklet, compiled from breast health and cancer awareness content and finalized after consultation with experts, was distributed to the participants to support the training content.

After completion of theoretical training, women were randomly assigned to intervention and control groups using computer-assisted randomization through the program whose URL address is https://www.randomizer.org. After the theoretical training, the women in the intervention group underwent breast self-examination and practiced breast abnormalities using a simple reality breast simulator. The control group received no practice after the theoretical training. The simulations were conducted by a consultant experienced in simulation, and the other researcher administered the pretest and posttest forms. The researcher who administered the forms was blind to the womens groups.

Data Collection Instruments

The data collection instruments administered to the participants included the "Descriptive Information Form", the "Comprehensive Breast Cancer Knowledge Test", the "Breast Cancer Fear Scale", and the "Breast Cancer Awareness Scale". Data were collected both before (pre-test) and after (post-test) the intervention. Prior to the implementation, informed consent was obtained from all participants using the "Informed Voluntary Consent Form".

***Descriptive Information Form*:** This form, created by researchers based on literature (Suh et al., 2012; Hadi et al., 2010), includes questions about the participants' age, obstetric history (number of pregnancies, number of births, breastfeeding status, etc.), breast self-examination status, etc.

Comprehensive Breast Cancer Knowledge Test (CBCKT): Originally developed by Stager in 1993, the scale comprises 20 knowledge-based items. The Turkish validity and reliability study of the instrument was carried out by Başak in 2015. The items are answered using a true-false response format, with 8 statements being accurate and 12 inaccurate. In scoring, each correct response receives 1 point, while incorrect or unanswered items receive 0 points, according to the scale's original key. Thus, the total possible score ranges from 0 to 20. In Başak's (2015) study, the internal consistency coefficient (Cronbach's Alpha) was reported as 0.71, while in the present study, this value was calculated as 0.72.

Breast Cancer Fear Scale: The scale was originally developed by Champion in 2004 to assess womens fear of breast cancer by evaluating their emotional reactions toward the disease and related screening practices. The Turkish adaptation and reliability analysis were performed by Seçginli in 2012. Comprising eight items, the scale employs a five-point Likert-type format. The total score ranges from a minimum of 8 to a maximum of 40, with higher scores reflecting greater levels of breast cancer fear. Specifically, scores between 8–15 denote low fear, 16–23 indicate moderate fear, and 24–40 represent high fear of breast cancer. The internal consistency of the scale, as measured by Cronbach's alpha, was reported as 0.90 in Seçginli's (2012) study. In the present study sample, Cronbach's alpha was calculated as 0.92.

***Breast Cancer Awareness Scale*:** Developed in 2010 by the United Kingdom's Cancer Research Center in collaboration with King's College London and University College London, this scale was designed to assess individuals' awareness of breast cancer. The Turkish adaptation and reliability analysis of the scale were completed by Baş and Ursavaş in 2022. The instrument includes 13 items in total: 11 items related to breast cancer symptoms, 1 item concerning the recommended frequency of breast self-examination, and 1 item addressing the typical age of breast cancer onset. The scale does not have a cut-off score. One point is assigned for each correct identification of the five key symptoms, for selecting 70 years as the typical age of onset, and for choosing monthly breast self-examination as the appropriate frequency. Incorrect responses are scored as zero. Therefore, the total score ranges from 0 to 3, with higher scores reflecting greater breast cancer awareness. The scale demonstrated good internal consistency, with a Cronbach's alpha of 0.89 reported by Baş (2022). In the current study sample, this value was found to be 0.87.

Data Analysis

The data obtained from the study were analyzed using SPSS version 22.0. Descriptive statistical methods were utilized to provide an overview of the dataset. For comparisons of

categorical variables across independent groups, Chi-square and Fisher's exact tests were employed. Independent samples t-test was used to assess differences in continuous variables between groups, whereas paired samples t-test was applied to examine within-group changes over time. Data distribution was evaluated based on skewness and kurtosis values, indicating normal distribution for all variables. The associations between the scale scores were analyzed using Pearson correlation coefficients. Statistical significance was considered at both $p < 0.01$ and $p < 0.05$ thresholds.

Ethical Aspect of the Study

Ethical approval for the study was granted by the Scientific Research Ethics Committee of the university where the research was carried out (Approval No: 24157, Date: 29.12.2023). Additionally, institutional permission was secured from the affiliated public university. Prior to data collection, all participants were thoroughly informed about the purpose and procedures of the study, and their voluntary participation was confirmed through both written and verbal consent. Throughout the research process, participant confidentiality was strictly maintained, and the study was conducted in accordance with the principles outlined in the Declaration of Helsinki.

Results

The mean age of the women participating in the study was determined to be 32.03±5.20 (range: 26-56). No significant differences were found between the groups in terms of age, age at menarche, income, marital status, smoking status, regular physical exercise, previous breast health problems, family history of breast cancer, breast self-examination, and clinical breast examination ($p>0.05$) (Table 1).

Table 1. Descriptive Characteristics of Womens'

Descriptive Characteristics		Intervention Group (n=40)		Control Group (n=40)		p
		Mean	Sd	Mean	Sd	
Age		30.62	2.66	33.45	6.60	0.15
Age of Menarche		13.27	1.13	13.25	0.70	0.90
		n	%	n	%	Test/p
Income Status	Income less than expenses	11	27.5	8	20	x^2:-2.172 p:0.33
	Income equals expenses	27	67.5	21	52.5	
	Income more than expenses	2	5	11	27.5	
Marital status	Married	5	12.5	11	27.5	x^2:1.686 p:0.90
	Single	35	87.5	29	72.5	
Education Status	Primary Education	0	0	4	10	x^2:-2.242 p:0.29

	High School	5	12.5	3	7.5	
	Bachelor's degree	35	87.5	33	82.5	
Smoking Status	**Yes**	3	7.5	5	12.5	x^2:0.739 p:0.46
	No	37	92.5	35	87.5	
Regular Physical Activity Status	**Yes**	9	22.5	9	22.5	x^2:0.000 p:1.000
	No	31	77.5	31	77.5	
Having had breast-related health problems before	**Yes**	1	2.5	3	7.5	x^2: 1.020 p:0.31
	No	39	97.5	31	77.5	
Presence of a family member diagnosed with breast cancer	**Yes**	4	10	3	7.5	x^2:-0.391 p:0.69
	No	36	90	37	92.5	
Breast self-examination status	**Yes**	25	62.5	14	35	x^2:-2.527 p:0.14
	No	15	37.5	26	65	
Clinical breast examination status	**Yes**	9	22.5	17	42.5	x^2:1.930 p:0.57
	No	31	77.5	23	57.5	

No significant difference was found between the groups in terms of the womens pre-test and post-test mean scores on the comprehensive breast cancer knowledge test ($p>0.05$) (Table 2). A significant increase in post-test measurements compared to pre-test measurements was found in the women in the intervention and control groups ($p<0.05$) (Table 2).

Table 2. Distribution of Womens Comprehensive Breast Cancer Knowledge Test Pre-test and Post-test Score Averages by Groups

	Intervention Group (n=40)		**Control Group (n=40)**		**Statistical analysis**	
	Mean	**Sd**	**Mean**	**Sd**	**t[a]**	**p**
Pre-test	10.27	1.85	10.35	2.42	-0.156	0.877
Post-test	11.82	2.11	11.87	2.07	-0.107	0.915
t[b]	-3.873		-2.859			
p	**0.000**		**0.007**			

[a]Independent-Samples T-Test; [b]Paired-Samples T-Test

No significant difference was found between the groups and within the groups in terms of the pre-test and post-test mean scores of the breast cancer fear scale of the women in the intervention and control groups ($p>0.05$) (Table 3).

Table 3. Distribution of Womens Breast Cancer Fear Scale Pre-test and Post-test Scores Averages by Group

	Intervention Group (n=40)		Control Group (n=40)		Statistical analysis	
	Mean	**Sd**	**Mean**	**Sd**	**t[a]**	**p**
Pre-test	24.00	6.63	23.10	6.51	0.612	0.542
Post-test	24.35	6.63	22.47	7.22	1.208	0.231
t[b]	-0.234		0.421			
p	0.816		0.676			

[a]Independent-Samples T-Test; [b]Paired-Samples T-Test

No significant difference was found between the groups in terms of the womens pre-test mean scores on the Comprehensive Breast Cancer Awareness Scale ($p>0.05$). A significant difference was found between the groups in terms of the womens post-test mean scores on the Comprehensive Breast Cancer Awareness Scale ($p<0.05$) (Table 4).

Post-test awareness measurements of women in the intervention group were higher than those of women in the control group. The increase in post-test measurements was found to be significantly higher compared to the pre-test measurements of women in the intervention and control groups ($p<0.05$) (Table 4).

Table 4. Distribution of Womens Breast Cancer Awareness Scale Pre-test and Post-test Scores Averages by Group

	Intervention Group (n=40)		Control Group (n=40)		Statistical analysis	
	Mean	**Sd**	**Mean**	**Sd**	**t[a]**	**p**
Pre-test	1.05	0.84	1.10	0.63	-0.299	0.765
Post-test	1.70	0.64	1.37	0.54	2.436	**0.017**
t[b]	-4.106		-1.863			
p	**0.000**		**0.070**			

[a]Independent-Samples T-Test; [b]Paired-Samples T-Test

In the correlation analysis performed with the post-test measurements of the Breast Cancer Awareness and Breast Cancer Fear Scale of the women in the intervention and control groups, no significant relationship was determined between the post-test score averages of the scale ($r=0.058$, $p=0.607$).

Discussion

Breast cancer, with its increasing incidence and mortality, is among the most significant threats to womens health. A cancer diagnosis causes fear and uncertainty in individuals. A Cochrane systematic review indicates that providing information about breast cancer increases their awareness and helps them cope with it (O'Mahony et al., 2017). This study evaluated the effects of simple simulation-based breast cancer awareness training on womens breast cancer knowledge and fear. A study conducted by Açıkgöz and colleagues in Izmir (n=152) determined that women lacked sufficient knowledge about cancer

symptoms, early diagnosis, and screening (Açıkgöz et al., 2011). Many studies have also found that womens knowledge about breast cancer is low (Edirne & Kaya, 2014; Hossain et al., 2016). Our study revealed a significant increase in post-test knowledge levels compared to pre-test measurements in the intervention and control groups.

Breast cancer is a health problem that profoundly affects individuals not only physically but also emotionally and psychologically. Experiencing this disease or learning about it can often trigger feelings of fear and anxiety. In a study conducted with Turkish women, the mean breast cancer fear scale score was found to be significantly higher in women who had a mammogram compared to women who had not (Ersin & Bahar, 2011). A study conducted by Koçak et al. (n: 108) found that women with a mother who had breast cancer had higher levels of fear of breast cancer compared to other women (Koçak et al., 2022). In our study, no significant differences were found between the groups and in the pre-test and post-test mean breast cancer fear scale scores of women in the intervention and control groups. Therefore, the lack of a difference between the groups may be due to factors that can influence fear levels, such as family history, personal experience, or mammography history. It is recommended that this study be repeated with larger samples and in different age groups, taking into account the womens socio-demographic characteristics and breast cancer experience.

It has been determined that breast cancer awareness education provided to women using different teaching techniques has a positive effect on their knowledge and awareness levels (Hossain et al., 2016). In a study examining the educational intervention for breast cancer awareness in adolescent girls by Ekim et al., it was determined that the educational intervention positively affected individuals' awareness levels (Ekim et al., 2024). In a study evaluating the effects of a theoretical education intervention on breast cancer levels in Iranian women, Rakhshani et al. found that the knowledge, attitude, and awareness levels towards breast cancer screening in the experimental group were higher compared to the control group (Rakhshani et al., 2022). In a study examining the effect of an online educational game on the breast cancer awareness levels of female students by Andrew Tong & Hee, it was found that the digital educational game significantly improved students' breast cancer awareness, including general knowledge, risk factors, signs and symptoms, and breast cancer screening and treatment (Andrew Tong & Hee, 2023). In our study, a significant difference was found between the groups in terms of womens post-test mean scores on the comprehensive breast cancer awareness scale ($p<0.05$). Women in the intervention group had higher post-test awareness measurements than those in the control group. The use of interactive methods such as simulation in breast cancer education plays a significant role in increasing individuals' awareness and early diagnosis competencies by reinforcing both theoretical knowledge and developing practical skills.

Limitations and Strengths of the Study

One of the strengths of this study is its use of a randomized parallel control group

experimental design. Assigning participants to groups via computer-assisted randomization and blinding the data collector to group information contributed to the reduction of methodological biases. The training content, which included case discussions, video demonstrations, and simulation-based exercises alongside theoretical presentations, provided a multidimensional and interactive learning environment.

However, the study has several limitations. First, the impact assessment was conducted only in the short term; post-test measurements were administered immediately after the training. This limits the ability to observe changes over time, particularly in emotional components such as fear levels. Furthermore, because the sample consisted of only female service personnel working at a public university, the generalizability of the results to different socioeconomic and cultural groups is limited. Future studies should replicate this intervention in broader and more diverse populations to strengthen the generalizability of the findings. Finally, the moderate-to-high baseline scores on some measured variables may have limited the effectiveness of the intervention. These findings suggest the need for more long-term and structured interventions, particularly those targeting emotional responses.

Conclusion and Recommendations

This study evaluated the effects of a simple simulation-based breast cancer awareness training program on womens knowledge and awareness levels. The training intervention was found to significantly increase women's breast cancer awareness levels. In particular, the higher post-test awareness scores of women in the intervention group compared to those in the control group demonstrate that simulation-based training is an effective tool. Simulation-based training programs should be encouraged to be more widely used in health education programs to increase women's breast cancer awareness. Simple simulation methods are particularly advantageous in resource-limited settings, as they are cost-effective, easier to implement compared to high-fidelity simulations, and still provide significant educational benefits. Long-term follow-up studies are needed to assess the longevity of the awareness gained through the training and to provide training and counseling when necessary.

Acknowledgements

We thank TUBITAK for their contributions. The authors thank the womens who volunteered to participate in the study.

Disclosure statement

No potential conflict of interest was reported by the authors.

Financing

This research has received financial support from TUBITAK 2209-A Research Projects Support Programme for University Students.

Trial registration

ClinicalTrials.gov identifier: NCT06528808.

References

Açıkgöz, A., Cehreli, R., & Ellidokuz, H. (2011). Women's knowledge and attıtude about cancer and the behavıour for early dıagnosıs procedures. *Dokuz Eylul University Faculty of Medicine Journal*, 25(3), 145–154.

Andrew Tong, J. W., & Hee, M. Q. (2023). The impact of an online educational game on breast cancer awareness among university female students, Malaysia: a pilot study. *BMC cancer*, *23*(1), 947.

Barrios, C., Reinert, T., Werutsky, G. (2018). Global Breast Cancer Research: Moving Forward. American Society of Clinical Oncology educational book. American Society of Clinical Oncology. Annual Meeting. 38:441–450.

Baş, S. (2022). *Validity and reliability of the Breast Cancer Awareness Scale* (Master's thesis, Çankırı Karatekin University, Institute of Health Sciences, Department of Nursing). Advisor: Assoc. Prof. Dr. Figen Erol Ursavaş. Retrieved from https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Başak, S. C. (2015). *Breast cancer knowledge level among university students: A validity and reliability study of the Comprehensive Breast Cancer Knowledge Test* (Master's thesis, Istanbul Okan University, Institute of Social Sciences, Clinical Health Psychology Program). Advisor: Assist. Prof. Dr. Ahmet Tosun. Retrieved from https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Biswas, S., Syiemlieh, J., Nongrum, R., Sharma, S., & Siddiqi, M. (2020). Impact of Educational Level and Family income on Breast Cancer Awareness among College-Going Girls in Shillong (Meghalaya), India. *Asian Pacific journal of cancer prevention : APJCP*, *21*(12), 3639–3646. https://doi.org/10.31557/APJCP.2020.21.12.3639

Edirne, T., & Kaya, A. (2014). *Evaluation of knowledge, attitudes, and behaviors regarding breast cancer and screening methods among women aged 20–70 attending the Pamukkale University Honaz Organized Industrial Zone Primary Care Clinic* (Specialization thesis). Pamukkale University Faculty of Medicine, Department of Family Medicine.

Ekim, A., Subaşı, D. Ö., & Ocakçı, A. F. (2024). Effect of Breast Cancer Awareness Education in Adolescent Girls: A Quasi-Experimental Study. *Journal of Education & Research in Nursing/Hemşirelikte Eğitim ve Araştırma Dergisi*, *21*(2).

El Saghir, N. S., Adebamowo, C. A., Anderson, B. O., Carlson, R. W., Bird, P. A., Corbex, M., ... & Cazap, E. (2011). Breast cancer management in low resource countries (LRCs): consensus statement from the Breast Health Global Initiative. *The Breast*, *20*, S3-S11.

Ersin F, Bahar Z. (2011). Inhibiting and facilitating factors concerning breast cancer early diagnosis behavior in Turkish women: A qualitative study according to the health belief and health development models. Asian Pacific Journal of Cancer Prevention,, 12, 1849-1854

Gadgil, A., Sauvaget, C., Roy, N., Muwonge, R., Kantharia, S., Chakrabarty, A., ... & Sankaranarayanan, R. (2017). Cancer early detection program based on awareness and clinical breast examination: Interim results from an urban community in Mumbai, India. *The Breast*, *31*, 85-89.

Hadi, M. A., Hassali, M. A., Shafie, A. A., & Awaisu, A. (2010). Evaluation of breast cancer awareness among female university students in Malaysia. *Pharmacy practice*, *8*(1), 29.

Hossain, S. Z., Robinson, L., & Clarke, J. (2016). Breast cancer knowledge and participation in breast screening practices among Southeast Asian women living in Sydney. *GSTF Journal of Nursing and Health Care (JNHC)*, *3*(2).

Koçak, H. S., Olçar Ece, Z., & Güngörmüş, Z. (2022). A the effect of fear level on early diagnosis behaviors of women with first degree relative with breast cancer. *Journal of Nursing Science*, 5(1), 22–29. https://doi.org/10.54189/hbd.1049877

Nsaful, J., Dedey, F., Nartey, E., Labi, J., Adu-Aryee, N. A., & Clegg-Lamptey, J. N. (2022). The impact of a breast cancer educational intervention in Ghanaian high schools. *BMC cancer*, *22*(1), 1-10.

O'Mahony, M., Comber, H., Fitzgerald, T., Corrigan, M. A., Fitzgerald, E., Grunfeld, E. A., ... & Hegarty, J. (2017). Interventions for raising breast cancer awareness in women. *Cochrane Database of Systematic Reviews*, (2).

Rakhshani, T., Dada, M., Kashfi, S. M., Kamyab, A., & Jeihooni, A. K. (2022). The effect of educational intervention on knowledge, attitude, and practice of women towards breast cancer screening. *International Journal of Breast Cancer*, *2022*(1), 5697739.

Republic of Turkey Ministry of Health, General Directorate of Public Health. (2017). *Turkey cancer statistics 2017*. Retrieved from https://hsgm.saglik.gov.tr/depo/birimler/kanser-db/istatistik/Turkiye_Kanser_Istatistikleri_2017_OZETLI.pdf (Date of access: November 4, 2024).

Secginli, S. (2012). Mammography self-efficacy scale and breast cancer fear scale: psychometric testing of the Turkish versions. *Cancer Nursing*, *35*(5), 365-373.

Sharma, K., Costas, A., Shulman, L. N., & Meara, J. G. (2012). A systematic review of barriers to breast cancer care in developing countries resulting in delayed patient presentation. *Journal of oncology*, *2012*.

Smith, R. A., Andrews, K., Brooks, D., DeSantis, C. E., Fedewa, S. A., Lortet-Tieulent, J., Manassaram-Baptiste, D., Brawley, O. W., & Wender, R. C. (2016). Cancer screening in the United States, 2016: A review of current American Cancer Society guidelines and current issues in cancer screening. *CA: a cancer journal for clinicians*, *66*(2), 96–114. https://doi.org/10.3322/caac.21336

Suh, M. A. B., Atashili, J., Fuh, E. A., & Eta, V. A. (2012). Breast self-examination and breast cancer awareness in women in developing countries: a survey of women in Buea, Cameroon. *BMC research notes*, *5*, 1-6.

Sung, H., Ferlay, J., Siegel, R.L., Laversanne, M., Soerjomataram, I., Jemal, A. et al. (2021). Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 71:209-249.

The Global Cancer Observatory. (2020). "Breast Fact Sheet". İnternational Agency for Research on Cancer, Word Health Organization. https://gco.iarc.fr/today/data/factsheets/cancers/20-Breast-fact-sheet.pdf (Date of access: November 04, 2024).

Torre, L. A., Bray, F., Siegel, R. L., Ferlay, J., Lortet-Tieulent, J., & Jemal, A. (2015). Global cancer statistics, 2012. *CA: a cancer journal for clinicians*, *65*(2), 87-108.