Araştırma/Research Article

The effect of web-supported breast cancer education on screening behaviors, health beliefs, knowledge level and early diagnosis behaviors

Web destekli meme kanseri eğitiminin tarama davranışlarına, sağlık inançlarına, bilgi düzeyine ve erken tanı davranışlarına etkisi

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Özet:

Amaç: Meme kanserine ilişkin sağlık inançları, bilgi düzeyi ve davranışlar dünyada istenilen düzeyde değildir. Bu çalışmanın amacı, web destekli meme kanseri eğitiminin tarama davranışlarına, sağlık inançlarına ve bilgi düzeylerine etkisini incelemektir.

Yöntem: Bu girişimsel ön test-son test çalışması, meme kanseri tarama programları hakkında web destekli meme kanseri eğitimi alan ve üç ay boyunca her ay hatırlatma yapılan yirmi yaş ve üstü Türk kadınlarına odaklandı. Araştırma sosyal medya aracılığıyla ulaşılan 455 gönüllü kadın ile tamamlandı. Hatırlatma yöntemi olarak e-broşür, e-posta ve cep telefonu mesajları kullanıldı. Girişimi takiben birinci ay ve üçüncü ay tarama davranışları, sağlık inançları ve bilgi düzeylerindeki değişiklikler online veri toplama aracılığıyla elde edilen bilgiler doğrultusunda değerlendirildi. Veriler istatistik yöntemleri kullanılarak yorumlandı.

Bulgular: Meme kanseri eğitimi sonrası tarama davranışlarında önemli değişiklikler oluştuğu gözlendi. Meme kanseri erken tanı davranışlarında da meme kanseri bilgi düzeyi ve duyarlılık algısında da anlamlı bir artış bulundu. Bariyer alt boyutunda anlamlı bir azalma olduğu saptandı. Web destekli meme kanseri eğitimi, bireylerin engel ve duyarlılık algılarında olumlu değişiklikler sağladı.

Sonuç: Hatırlatmalar meme kanseri erken tanı davranışlarına olan inançta anlamlı bir artışa fırsat oluşturdu.

Anahtar Kelimeler: Meme kanseri; erken tanı; hemşirelik; sağlık inanç modeli; web destekli meme kanseri eğitimi

Abstract:

Aim: Health beliefs, level of knowledge, and behaviors related to breast cancer are not at the desired level in the world. The objective of this study is to provide web-based support for education on breast cancer, with an emphasis on screening initiation, health beliefs, and knowledge levels.

Method: The study involved a pretest-posttest intervention and focused on Turkish women aged twenty and above. Participants received web-based breast cancer education that covered screening programs and monthly reminders for three months. A total of 455 volunteer women were recruited for the study through social media. E-brochures, e-mail, and mobile phone messages were used as reminder methods.

Results: The screening concluded in the first and third months after the intervention, and the changes in health beliefs and knowledge levels were assessed as year-old data through online data collection. Statistical methods were employed to interpret the data and it was observed that there were significant changes in screening behaviours following breast cancer education. There was a notable rise in breast cancer awareness and shifted attitudes towards early detection behaviors. The data indicated a considerable reduction in the barrier threshold. Internet-based breast cancer education led to favorable outcomes in disability and self-perception.

Conclusion: It is important to note that timely diagnosis of breast cancer has opened the door for a substantial increase in the awareness of mortality.

Key Words: Breast cancer; early detection; nursing; health belief model; web-assisted breast cancer learning

Introduction

Developed countries exhibit a higher prevalence of breast cancer, whereas developing countries face higher mortality rates [1]. This disparity is attributed to the presence of barriers impeding breast cancer detection, screening, and treatment services in underdeveloped regions [2]. Studies focusing on early detection place significant emphasis on the potential for favorable prognosis and effective therapeutic interventions in cases where breast cancer is detected at an early stage. Breast cancer represents one of the malignancies with more favorable outcomes when identified early. Early detection methods, along with improved quality of life and prolonged survival, collectively contribute to reducing mortality and morbidity rates [3].

The American Cancer Institute and the American Cancer Association recommend that asymptomatic women undergo annual mammograms starting at the age of 40. Additionally, they advocate for Clinical Breast Examinations (CBE) conducted by qualified healthcare professionals every two decades between the ages of 20 and 40, followed by annual examinations thereafter [4]. In contrast to Turkiye, their guidelines propose monthly breast self-examinations (BSE) for women aged 20-40, CBE once a year, and biennial mammography for women aged 40-69 [5, 6].

Various approaches are being explored to enhance global breast cancer awareness. Studies have compared strategies such as learning programs, distribution of informative brochures, and engagement through social media platforms [2, 7]. Diverse methods are employed to raise awareness regarding early diagnostic procedures, both within our country and internationally [8]. Consequently, our country currently exhibits a 50% awareness rate of early detection methods, with a 20% rate of regular implementation. Failure to ensure timely early detection results in treatment delays, limited options, and unfavorable outcomes [9]. Based on the study findings, novel strategies, and behavioral adjustments are required to enhance breast cancer awareness [3, 10]. This study aims to examine the impact of web-assisted and breast cancer

learning based on the health belief model on enhancing individuals' awareness of breast cancer, as well as their health beliefs, knowledge level, and engagement in early detection practices.

In this context, we are evaluating the following hypotheses: web-assisted breast cancer learning on breast cancer will (a) improve individuals' knowledge of breast cancer screening methods, (b) enhance individuals' perception of their health, (c) lower the barriers to breast cancer screening methods and (d) increase participation in screening.

Methods

This longitudinal study employed a quasi-experimental research design, evaluated through pre/post-test assessment. The research sample comprised nursing students and mothers studying at three universities within the Eastern Black Sea Region, who participated voluntarily. The sample included 455 individuals who joined the group by scanning QR codes on posters issued to nursing students. The power analysis, conducted using the G-POWER package software, employed the average scores from the dependent variable scale for the study. Results indicate 99.9% sample power at the 0.05 level of significance. Participants were included if they were aged 20 or over, used Ethernet, had not had training on breast cancer early diagnosis methods, and volunteered to participate. Exclusion criteria were also evaluated to identify factors that were not included.

Data Collection Tools

The breast cancer early detection methods information form and the Champion's Health Belief Model Scale for Breast Cancer Screening (CHBM) Scale were used to collect data. Additionally, a form was employed that comprised the identifying characteristics of the participants. This form was distributed digitally to participants using digital forms.

Information form: After reviewing the literature, the researcher developed a form that included 14 questions on descriptive information such as age, educational status, and a family history of breast cancer [3, 10].

Champion's Health Belief Model Scale for Breast Cancer Screening Scale: This Likert scale was developed by Champion based on the "Health Belief Model" and has been used to evaluate women's health beliefs that may affect early detection behavior [11]. The CHBM Scale was adapted to Turkish through three different studies in Turkiye. The current study used the version adapted by Gözüm and Aydın. Higher scores indicated increased susceptibility and seriousness as well as increased perceived benefits, perceived barriers, perceived self-efficacy, and health motivation [12]. There was no total score for the scale; each subscale's scores were considered. The reliability coefficient for internal consistency of the scale ranges from 0.69 to 0.83. CHBM-Turkiye scales have been deemed safe for use in research on the factors influencing breast cancer and breast cancer screening behaviors among Turkish women [12]. In this research, Cronbach alphas were 0.71 for susceptibility, 0.72 for seriousness, 0.78 for health motivation, 0.77 for BSE benefits, 0.55 for BSE barriers, 0.74 for BSE self-efficacy, 0.78 for mammography benefits, and 0.83 for mammography barriers. Necessary permissions were taken for using this tool.

The intervention of the research

Pre-test; the research sample comprised 455 women who accessed the QR code and completed the pre-test of the study. The forms were scrutinized by the researcher, who excluded students outside of the nursing department and women whose children did not attend this department (n = 15).

Breast cancer learning

For the purposes of this study, a social network was established amongst the nursing students involved in the research, which comprised a website link and reminders on usage frequency. Additionally, the researcher facilitated the sharing of information between breast cancers within the network. The group sent regular reminders and questions highlighting information on the website at consistent intervals during the duration of the study. The website was subject to

breast cancer review for accuracy and clarity. The website contains information used by the Ministry of Health to promote breast cancer to the public. After the website was created, it was shared with two academicians working in the field of breast cancer, in addition to the researchers, and their opinions were received.

The website provided objective information on the causes, risk factors, symptoms, prevention methods, and early detection methods of breast cancer. The content was tailored to cognitive, affective, and psychomotor behavior targets, with informative, supportive, summative, and evaluative features. Animations were utilized for information presentation purposes. The website contained dedicated interfaces for each of the available breast cancer early detection techniques. It also featured instructional videos detailing the correct application frequency and methodology.

The Reminder Intervention

Monthly reminders were sent to participants via email and the established social network, including details for when to repeat breast cancer screenings according to their age group. In order to encourage early detection methods, a monthly reminder was made every month for three months. All correspondence successfully reached users with a 100% connection rate.

Post-test; the test was conducted three months after the pre-test. During this period, the CHBM scale was repeated. Also, the researchers assessed whether participants had undergone mammograms, clinical breast exams, and the frequency of BSE.

Statistical analysis

The study data were processed using the SPSS (Statistical Package for Social Sciences) 25.0. Data assessment was conducted using percentages, paired-samples t-test, Chi-Square test, and percentages test. Results were considered significant at $p<0.05$ and the confidence interval was set at 95%. Statistical significance was accepted as $p <0.05$.

Ethical considerations

Approval (Approval date: 02/2023) was granted by the administrator of the XX University Ethics Committee for the conduction of the research. As all participants had voluntary access to and filled in the data collection forms, they were regarded as volunteers for the study.

Results

The study revealed that the participants had a mean age of 33.9 ($\pm$14.1) years, with 59.9% of them being married. Furthermore, it was determined that 66.4% of the individuals held a bachelor's degree, and 5.3% reported experiencing breast-related issues. The prevalence of a family history of breast cancer was found to be 11.9%, while 2.9% reported a cancer history specifically in their grandmothers. Notably, 58.0% of the participants indicated prior knowledge of breast cancer, with 29.2% acquiring this information from healthcare professionals. Regarding familiarity with early detection methods, 54.5% were aware of BSE, 16.5% were aware of CBE, and 10.1% were aware of mammography.

Table 1. Distribution of Individuals Applying Breast Cancer Early Detection Methods (N=455)

	Pre-test n (%)	Post-test n (%)	*p*-value*
BSE	248 (54.5)	358 (78.7)	<0.0001
CSE	75 (16.5)	153 (33.6)	<0.0001
Mammography	46 (10.1)	140 (30.8)	<0.0001
*paired sample t test			

The findings revealed that 54.5% of the participants engaged in BSE, although only 12.3% performed it regularly. Moreover, 10.1% of the participants underwent mammography, while 16.5% underwent CBE. Substantial changes were observed in the utilization of all early detection methods following the intervention (Table 1).

Table 2. Comparison of pre-test and post-test CHBM Scale Sub-dimensions

Subgroup scale	Possible range	Pre-test*	Post-test*	p-value**
Susceptibility	3-15	6.0±0.3	7.2±2.1	<0.0001
Severity	6-30	16.1±4.1	17.9±5.9	<0.0001
Health motivation	4-20	16.3±4.9	21.5±0.8	<0.0001
BSE-Benefits	4-20	8.7±3.1	9.4±2.8	<0.0001
BSE-Barriers	8-40	31.5±1.5	21.8±6.1	<0.0001
BSE- Confidence	10-50	31.1±9.4	47.8±1.3	<0.0001
Mammography-benefits	5-25	11.8±4.6	19.1±6.1	<0.0001
Mammography-barriers	11-55	42.9±5.7	32.2±8.3	<0.0001

*: Mean (SD), **:paired samples t test

Significant changes were observed in all sub-dimension scores of the CHBM scale before and after the intervention (Table 2). There was a decrease in the sub-dimensions related to mammography and barrier perception towards BSE, while all other sub-dimensions showed an increase.

Significant changes were observed in the sub-dimensions of the scale among participants according to their characteristic features (Table 3). It was determined that women with knowledge about breast cancer exhibited significant changes in all sub-dimensions of the scale (p<0.05). Similarly, individuals with a family history of breast cancer showed significant changes in all sub-dimensions except for the BSE barrier. Women with knowledge about CBE demonstrated significant changes in all sub-dimensions except for the susceptibility sub-dimension. Among women who practiced CBE, significant changes were found in the susceptibility, BSE barrier, and BSE self-efficacy sub-dimensions. Women with knowledge about mammography showed significant changes in the seriousness and health motivation sub-dimensions, while women with knowledge about mammography exhibited significant changes in all sub-dimensions except for susceptibility and BSE self-efficacy.

Furthermore, a positive and highly significant correlation was observed between the pre-test and post-test CHBM total scale scores of the participants (r=0.97, p=0.0001). Additionally, it was found that both the pre-test and post-test CHBM total scores significantly increased with advancing age (r=0.88, p=0.007 and r=0.56, p=0.02, respectively).

Table 3. The Subscale Scores of the CHBM According to Characteristics with Participants in the post-test (n= 455)

Breast cancer characteristics	Susceptibility of the CHBMS							
	Susceptibility	Severity	Health motivation	BSE-Benefits	BSE-Barriers	BSE-Confidence	Mammography-benefits	Mammography-barriers
Information breast cancer								
Yes	6.03±0.44	16.37±4.24	21.51±0.86	9.63±2.99	31.62±1.69	47.92±0.99	13.54±6.37	43.29±5.96
No	6.01±0.02	15.80±3.83	21.63±2.99	9.28±2.71	31.51±1.19	47.86±1.80	12.65±5.76	42.49±5.36
p-value	0.01	0.003	0.001	0.007	0.02	0.03	0.002	0.002
Breast cancer in their family history								
Yes	6.18±0.97	15.44±3.42	21.66±0.77	8.85±2.46	31.01±2.60	47.61±4.18	12.07±5.15	41.85±4.87
No	6.00±0.12	16.24±4.16	21.55±0.83	9.57±2.92	31.65±1.27	47.93±1.25	13.33±6.25	43.12±5.83
p-value	<0.0001	0.002	0.04	<0.0001	0.08	0.002	0.001	0.002
Information BSE								
Yes	6.02±0.38	15.94±3.95	21.60±0.79	9.33±2.79	31.56±1.20	47.97±0.38	12.89±5.94	42.68±5.56
No	6.01±0.27	16.36±4.22	21.51±0.86	9.66±2.98	31.59±1.79	47.80±2.02	13.50±6.36	43.28±5.92
p-value	0.05	0.03	0.01	0.03	0.03	0.01	0.03	0.04
BSE Practice								
Yes	6.10±0.74	16.23±4.12	21.52±0.86	9.47±2.93	31.43±2.23	47.77±1.66	13.30±6.21	43.03±5.84
No	6.01±0.02	16.11±4.07	21.57±0.81	9.48±2.86	31.61±1.24	47.93±1.31	13.14±6.12	42.94±5.70
p-value	<0.0001	0.07	0.30	0.06	0.03	0.04	0.07	0.06
Information CSE								
Yes	6.00 ±0.01	15.73±3.81	21.65±0.76	9.21±2.66	31.52±1.14	48.00±0.01	12.60±5.71	42.42±5.33
No	6.02±0.36	16.21±4.13	21.55±0.83	9.53±2.92	31.59±1.56	47.87±1.52	13.28±6.21	43.06±5.80
p-value	0.21	0.04	0.03	0.05	0.16	0.16	0.05	0.06
Information mammography								
Yes	6.01±0.01	15.30±3.40	21.73±0.68	8.91±2.38	31.39±1.02	4.01±0.02	11.95±5.10	41.82±4.76
No	6.02±0.35	16.22±4.14	21.54±0.83	9.55±2.92	31.60±1.54	47.88±1.46	13.31±6.23	43.08±5.81
p-value	0.35	0.001	0.001	0.001	0.02	0.29	0.001	0.001

Discussion

The primary objective of this study is to examine the impact of web-assisted and breast cancer learning on health beliefs, knowledge levels, and behaviors regarding breast cancer screening. It is hypothesized that web-assisted and breast cancer learning have the potential to enhance awareness of breast cancer screening, promote the adoption of early detection methods, and induce positive changes in health beliefs.

Early diagnosis of breast cancer is associated with BSE, CBE, and mammography screenings. In the research, it is seen that the behaviors in all screening methods show significant changes (Table 1). Many studies show that breast cancer screening behaviors increase after education[13]. Unlike the methods used in breast cancer education, breast cancer early diagnosis methods are a new approach to developing application behavior [14]. Similarly, in a study on stoma care using web-supported breast cancer learning, a significant change in knowledge and skill scores was noted [15]. The research results are similar in terms of education type. This similarity shows that the type of training used was successful in creating knowledge change at the breast cancer level. It can be concluded that it is an effective educational approach that can be used in other studies aimed at changing, such as cancer screening behaviors.

In this study, significant results were obtained in all sub-components of the health belief model. Similar measurement tool results for breast cancer indicate that effective results are achieved in other sub-dimensions except Susceptibility. In the study in which the results after the learning were shared, the significant change in the sub-dimensions was similar to our study [16]. In another study conducted in Turkiye with a similar measurement tool, significant changes were observed in all sub-components [17]. The results of the study include different interventions. The significant difference in the sub-dimensions of the intervention results offers new researchers common results in planning the interventions while planning their research. No data could be

found to distinguish the resulting significance. It is recommended to pay attention to this issue in the planning of new studies.

It has been found that utilizing web-based breast cancer education notably enhances the implementation of all early breast cancer detection strategies. Therefore, it can be concluded that web-assisted breast cancer education is a proficient tool for enhancing breast cancer awareness. Upon analysis of research with a comparable profile, it was observed that sensitivity, seriousness, benefit, self-efficacy, and health motivation perceptions improved following the training, while perceptions of obstacles decreased [17-19]. Further comparison of studies indicates education plays a crucial role in managing perceptions of disability, highlighting the need for tailored guidance for specific research groups. The study indicates a noteworthy alteration in all subcomponents of individuals with a family history of breast cancer, which should be duly noted. It is noteworthy that both the website and reminders can be efficacious in enhancing cancer awareness education for this research cohort.

Significant changes in the presence of breast cancer knowledge were found across all sub-dimensions of the scale, except for the sensitivity sub-dimension. The lack of significant change in sensitivity may be attributed to participants being under 40 years old, whereas mammography is recommended for women 40 years or older. Mammography is considered a critical imaging modality for detecting breast cancer and is directly linked to risk. Therefore, mammography is of utmost importance in breast cancer screening. Research conducted employing similar measurement techniques suggests that sensitivity for breast cancer rises, and the outcomes significantly improve at the conclusion of training [18-20]. Nonetheless, the results of studies pertaining to this sub-dimension of the scale demonstrate variability. This disparity could be influenced by cultural attributes exclusive to the geographical areas in which the investigation was carried out.

The results of the study indicate that web-supported breast cancer education can effectively improve awareness of breast cancer. The results of the study indicate that web-supported breast cancer education can effectively improve awareness of breast cancer. Additionally, educating relatives of those with breast cancer can have a significant impact. The training method appears to be an accurate way of reducing barriers to breast self-examination and improving practice. It was discovered that the implementation of all early detection methods can modify behavior. These findings demonstrate that online breast cancer education bolstered by reminders can deliver efficacious outcomes in teaching early detection of breast cancer. Research planners can strive to achieve the required objectives by consistently aligning with these outcomes.

Online methods such as web-assisted and breast cancer learning can have important results in increasing the knowledge and awareness of breast cancer early detection methods. The widespread use of the Internet makes web-assisted education accessible and effective, enabling it to reach wider audiences. With this method, awareness of health awareness increases, especially among the younger generations. Breast cancer education, on the other hand, can contribute to women's access to more information and the use of early detection methods by providing solidarity and support within the community. Sharing experiences among breast cancers helps them better assimilate knowledge and motivate behavior change.

Conclusion

Our research has revealed that the web-supported breast cancer education strategy yields significant results in promoting early detection methods for breast cancer. The application rates of all breast cancer early detection methods significantly increased through web-supported breast cancer education. These findings imply that this educational approach is a crucial tool in overcoming obstacles to the promotion of early breast cancer detection and in implementing these essential interventions. Significant results were achieved in the majority of the sub-dimensions pertaining to healthy lifestyle behaviors. This indicates that web-based breast cancer education facilitates early diagnosis of breast cancer and promotes the adoption of healthy lifestyle behaviors.

The findings of this study hold important implications for the formulation of public health policies and breast cancer early-detection education programs. Further research is required to investigate additional subcomponents of this approach, as well as to conduct studies with larger sample sizes and evaluate long-term effects. This research method appears to be a promising way for researchers to enhance the implementation of breast cancer early detection methods. Ultimately, web-supported breast cancer education could be employed as a strategy to improve the quality of life for society.

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