

# Evaluation of the Effectiveness of Web-based Intervention for Patients with Breast Cancer

Birgül Özkan<sup>1</sup>, Reyhan Eskiurt<sup>1</sup> , Dilek Öztaş<sup>2</sup> 

<sup>1</sup>Department of Nursing, Ankara Yıldırım Beyazıt University School of Health Science, Ankara, Turkey

<sup>2</sup>Department of Public Health, Ankara Yıldırım Beyazıt University School of Medicine, Ankara, Turkey

## ABSTRACT

The study was conducted to define web-based patient education programs and to evaluate the effectiveness of a web-based intervention for patients with breast cancer. In this systematic review, we searched the Web of Science, Wiley Online Library, PubMed, and MEDLINE electronic databases for abstracts using the keywords “breast cancer,” “web-based intervention,” “online intervention,” and “web-based intervention.” There was no date limitation in the study, and the reviews were completed in December 2016. We identified 15 articles within the scope of this review. Web-based intervention included social support, exercise and dietary practices, self-help guides, self-management, and symptom management, which were detected to have a positive effect on quality of life, fatigue, pain, self-sufficiency, depression, and stress management. In conclusion, this systematic review showed that web-based interventions are effective in psychosocial treatment and care process and that they are eligible for use in this area.

**Keywords:** Breast cancer, web-based intervention, patient, psychoeducation

## INTRODUCTION

Breast cancer, the most frequently diagnosed cancer in women, has been identified as the second leading cause of deaths from cancer in women. More than a million women are annually diagnosed with breast cancer (1, 2). The survival rate is increasing; however, patients may have to deal with not only the disease itself but also the adverse effects of treatments (3). In this context, the internet can be a way to overcome the problems experienced. Individuals with the disease can refer to the internet for health information (4). In the 2011 Pew Report, 80% of online users stated that the internet is an important source of information for them, after physicians (5).

Web-based support groups have several advantages compared with those of face-to-face support groups. First, web-based methods are very flexible. This is because the transfer of information can be synchronous or asynchronous. Second, web-based systems have several convenience features. In comparison with face-to-face interventions, they facilitate access to care services for individuals that cannot join face-to-face groups due to distance, social anxiety, or health problems, and they make scheduling easier. The cost is low because relatively fewer resources are required for the management of a group. On the other hand, the disadvantages are that individuals should know how to use the computer and internet and have good reading and writing skills in the language spoken by the group. It was also suggested that the participant can become more dependent on web-based relationships, resulting in increased social isolation (6). Web-based

programs are being developed for the management of adverse effects of the disease to provide informative and emotional support, to help in the planning of cancer treatment care, and to develop psychological and emotional coping abilities. It was observed from previous studies that all web-based programs improve the quality of life, increase social support, decrease anxiety and depression, and encourage patients to participate in health management (7-9).

This systematic collection was compiled to define the web-based patient education programs available for individuals with breast cancer and to assess the efficacy of the intervention.

## METHODS

### Investigation Strategies

Several studies on the evaluation of the effectiveness of physical, psychological, social, and spiritual interventions conducted on individuals with breast cancer were found in the literature. This systematic collection was compiled to define the web-based patient education programs available for patients with breast cancer and to assess the efficacy of the intervention. The electronic databases, including Web of Science, Wiley Online Library, and PubMed, were reviewed for the articles dating up until December 2016 using the keywords “meme kanseri,” “web tabanlı,” “müdahale,” “breast cancer,” “web-based intervention,” “online intervention,” and “Internet-based intervention.” The review was divided into five categories: 1. study design (e.g., intervention and

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**ORCID IDs of the authors:** R.E. 0000-0003-0421-4914; D.Ö. 0000-0002-8687-7238.

**Corresponding Author:** Reyhan Eskiurt **E-mail:** reyhan.ryhn.reyhan@gmail.com

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psychoeducation), 2. the focus of the intervention (e.g., to provide information or social support or to improve the quality of life), 3. the type of cancer (e.g., breast cancer), 4. patients or survivors, and 5. Web-based or online access management.

Inclusion criteria were;

1. Written in English or Turkish,
2. Published as a full-text,
3. Sample comprising individuals with breast cancer, and
4. The application of web-based intervention.

Exclusion criteria comprised periodicals and unreported intervention results. In total, 15 studies were reviewed for the purpose of this systematic collection.

## RESULTS

### Properties of Web-based Interventions

The web-based “cancer management” programs are designed to improve the health-related quality of life. In this context, it was seen that web-based interventions are used to improve the management of the adverse effects of the disease; to provide emotional, informational, and social support; and to develop coping abilities (7, 8).

### Web-based Self-control Intervention Programs

Web-based self-control intervention programs are designed to change daily diet and exercise behaviors. These programs can provide an alternative method effective in terms of weekly exercises, improving the daily intake of vegetables and fruits, diet quality, physical functionality, and avoiding the loss of appetite and fatigue (10). A web-based program (WSEDI, web-based exercise and diet intervention, self-control program) comprises evaluation, education, action plan, and automatic feedback sections (10). The educational content in diet and exercise intervention programs comprises the information aimed at improving the diet and exercise behaviors of patients, highlighting the importance of maintaining a normal weight, addressing obstacles in exercise and diet behaviors, providing exercise and diet guidelines for patients with cancer, and describing the effects of regular exercise and balanced diet on the quality of life (10). The Telerehabilitation program developed by Galiano-Castillo et al. (11) comprises general and special access interfaces (e-CUIDATE). The general section is the main page of the website and includes the latest information about breast cancer, whereas the special access section can be accessed with a username and password. The exercise program comprises three sessions, each of which lasts for a maximum of 90 min/day, and includes 1) warm-up, 2) resistance/aerobic exercises, training, and 3) cooling down. The web-based system allows participants to send a message and log in to video chat sessions (11).

Lately, most women are living with breast cancer as a chronic disease and are exposed to drug treatments. After breast cancer treatment, women with the disease can switch from being patients to being survivors. During this switch-over process, these women may face various issues regarding physical and emotional improvement, including their return to work and the

fear of disease relapse (12). In this scope, BREATH (Breast cancer e-health), a web-based self-control intervention, was developed to enable women to psychologically adapt to the primary treatment by reducing stress and increasing their strength. Communication with an advisor is not available in the Self-help Program, which is the continuation of BREATH Intervention comprising cognitive-behavioral therapy modules. New materials will be sent weekly by a standard e-mail reminder so that psychological support previously obtained can be sustained. The elements of the intervention are based on cognitive-behavioral therapy and comprise homework, evaluation, and video sections (13). WebChoice, created to develop self-control in individuals with cancer, is a disease management support system based on patient-oriented principles and includes evaluation, recommendations, information, and contact sections. Patients can observe their symptoms and problems and can share their experiences through the system. Internet-based patient-provider communication is a program wherein patients can ask questions to oncology nurses, obtain a recommendation, and share their experiences (14). Psychological and cognitive properties of the patients have been determined through interactive empowerment intervention to improve the interaction between patients and physicians by providing recommendations specific to the coping abilities of each patient (3).

### Web-based Psychoeducation Intervention Programs

During the care period of patients with breast cancer, their expectations as to how much information they need may vary. While in the early phase, patients may want to learn the effects the treatment will have on their body and eventually become interested in self-care methods (15). Furthermore, they desire to learn about the effectiveness of a treatment, the phases of the disease, treatment options, and the prognosis of the disease (16).

The Breast Cancer Patient Pathway program, patient training program, was developed by Ryhänen et al. (17) to inform patients about their own treatment and care following the diagnosis of cancer. The program provides all the information about cancer and includes biophysiological, functional, experience, ethical, social, and financial sections. The biophysiological section contains physiological indicators and symptoms and the information on how these are managed; the functional section includes the information on how a patient can secure functional control of the condition and that on the control methods for health problems; the experience section comprises the information on how to use previous experiences to help control health problems; the ethical section discusses how every patient’s experience is unique and how it should be respected; the social section emphasizes on how one must feel part of a social support group rather than focusing on health problems; and the financial section contains the information on how to manage finances while facing a health problem (17). Johnson-Turbes et al. (18) provided psychoeducation on the genetic tests related to cancer and its treatment via online intervention, the information about how to cope with the emotional burden of the disease and treatment, and sexual and reproductive health problems that might eventually occur in the course of the disease. The-Optimal-Lymph-Flow health system, a web-based intervention, has a patient-oriented

design and focuses on developing self-care abilities that are research-based, innovative, reliable, applicable, and easily adaptable to daily life to decrease the burden on the lymphoedema symptoms (18). Self-care methods for managing lymphoedema symptoms include symptom assessment, daily lymphatic exercises, the strategies for optimal body mass index, and situational self-care strategies (19).

#### **Web-based Psychosocial Support Intervention Programs**

When women are diagnosed with breast cancer, they usually experience psychological stress, and the symptoms of stress can persist for a long time. Most women join breast cancer support groups to cope with the disease, which ranks third among the online support groups related to breast cancer (20).

Participants can learn novel methods of coping with the disease, how to receive support, how to offer support, and how to honestly and openly express their thoughts via web-based intervention (6). It was stated that adjuvant psychological therapy, developed by Owen et al. (9), was commonly used among patients with cancer; it reduces emotional stress and improves the quality of life. The CHES online program was developed to provide social support and information services and to help patients make decisions while coping with a health crisis (9). Intervention was provided to the online support group using a cognitive adaptation and emotional exposure-habit models, and it was suggested that this can be beneficial for providing an insight into stress and negative emotions (21). Web Choice was designed to provide self-control in patients with cancer and to improve patient-oriented care. The website allows patients to monitor their health problems and symptoms and provides various services, including the information on how to manage disease-related problems and symptoms, an e-mail function that allows them to ask personal questions, a diary for writing personal notes, and participatory group sessions with other patients with cancer (22). The training on self-coping abilities comprises a series of websites and symptom management training and contains educational topics entitled active and passive coping methods, communication with families and friends, the identification of the relationship among stress, emotions, and behaviors, stress management programs, assertiveness training, and structured problem-solving training (23).

#### **Web-based Cognitive-Behavioral Intervention Programs**

The cognitive-behavioral stress management intervention approach by Carpenter et al. (24) comprises an introductory section and 10 other sections covering subjects, including cognitive-behavioral coping strategies and supportive interactive exercises, relaxation training, meditation techniques, expressive writing exercise, and weekly assignments aimed for developing new coping methods in daily life. BREATH Intervention, a self-control program based on cognitive-behavioral therapy elements, comprises psychoeducation, cognitive reconstruction, target planning, and process evaluation elements. Intervention is structured according to four different post-breast cancer recovery stages and comprises forgetting the past, emotional process, empowerment, and looking forward to the future sections (25).

### **Results of the Web-based Interventions**

#### **Quality of life**

In terms of the quality of life, it was found that there was an improvement in the areas of physical functionality and the loss of appetite as a result of the improvement in the frequency of exercise and the quality of nutrition encouraged through web-based intervention (10). In the study conducted by Galiano-Castillo et al. (11), it was seen that web-based intervention is a beneficial tool for changing health-related behaviors and cognitive development and that it improves the quality of life. Owen et al. (9) observed that online intervention affects the quality of life in the areas of dysfunctional thoughts related to cancer, symptom prevalence, the assessment of health status, and the concerns about breast cancer.

#### **Fatigue**

It is suggested that exercise training and a high protein diet can be effective in reducing fatigue in patients with cancer (26). Lee et al. (10) found that the severity of fatigue decreases if patients exercise and improve their diet quality. Galiano-Castillo et al. (11) noted that the intervention group participants' perception of fatigue declines as a result of the physical activity program provided in 10 sessions through their telerehabilitation program and that this decline was maintained for six months. It was determined that the severity of fatigue among the patients participating in the online self-help program is reduced (13).

#### **Physiological symptoms**

In the study by Galiano-Castillo et al. (11) wherein a telerehabilitation program was applied, it was observed that web-based programs had an effect on the severity of pain. It was identified that at the end of the study, the participants in the intervention group had less severe pain than those in the control group (11). In the study conducted by Fu et al. (19), online self-care intervention was applied to patients with breast cancer to enable them to manage their symptoms following surgery. It was found that online self-care had a positive effect on reducing pain, aches, sensitivity, and lymphoedema symptoms in patients.

#### **Self-sufficiency**

It was found that self-sufficiency improves as a result of the web-based intervention (10, 24). Carpenter et al. (24) concluded that cognitive-behavioral stress management intervention is effective in enabling patients to cope with cancer, manage negative emotional states, and improve their independence. It was determined that online intervention improves motivational readiness and perceived independence in terms of exercise and nutrition (10). Additionally, it was stated that applying self-regulation strategies, maintaining a diary, emphasizing targets, and receiving feedback regarding progression can improve motivation and perceived independence (27). In online groups, revealing insights became more effective at improving health benefits than revealing emotions (21). The revelation of insights is related to the improvement of emotional wellness and the reduction of negative emotions and concerns related to cancer (28). Shim et al. (21) achieved significant results related to independence in terms of health, emotional wellness, functional wellness, and de-

creased concern about breast cancer as a result of the revelation of insights through online group intervention.

### Expectation of information

It was stated that online intervention provides helpful information (18). The areas wherein patients largely expect information before web-based intervention have been identified as biophysiology and function, whereas the information on social aspects the least expected. It was found that there is an improvement in the areas of social and experience. A conclusion was reached that the intervention group is better informed about breast cancer (17). The stress caused by lymphoedema symptoms and concerns about the development of lymphoedema is defined as daily concerns for women with breast cancer (29). Online health-care intervention performed by Fu et al. (19) was found to be beneficial by patients with breast cancer and was detected to be effective and convenient in teaching patients self-care strategies about lymphoedema and its symptoms.

### Psychosocial problems

It was suggested that web-based support programs are effective in reducing depression, anxiety, and symptom stress in patients with cancer (30, 31). In a study on web-based programs, these programs were found to be effective in reducing depression, perceived stress, and cancer-related trauma in patients (6). It was suggested that web-based intervention provides an online group environment, thus being effective in reducing the social isolation of patients. In a support group, participants can easily express their life problems and provide specific coping recommendations. In the online intervention applied by Ruland et al. (22) for patients with breast cancer, it was concluded that stress about symptoms is reduced. It was suggested that reduced stress is a key finding as patients first experience their disease through symptoms. Patients who participate in online patient management programs for breast cancer are less stressed about their symptoms (14).

## DISCUSSION

In this systematic collection, the web-based interventions applied for breast cancer were reviewed, and the effect of web-based intervention programs on the care of patients with breast cancer was assessed. Internet and communication technologies are becoming increasingly important in healthcare. The internet can be an important tool in educating patients with breast cancer because, in places where breast cancer prevalence is high, women's skills regarding the use of the internet are also high (32, 33). We should take advantage of this option and find the best way to educate patients with breast cancer via the internet.

There are some limitations in the articles reviewed within the scope of this systematic collection. They include the characteristics of the individuals included in the study, the technical features of the website, and the features of the web-based interventions. It was stated in studies that individuals with advanced age, low education level, and low income cannot independently use websites effectively. The fact that the time between the diagnosis of individuals who agreed to participate in the study and the beginning of their treatment process is different affects the psychological functions of individuals, and different drug

adverse effects are observed in different phases of treatment. Therefore, the resulting findings cannot be generalized to the whole group. The technical problems experienced such as the disruption of the internet connection during education and the short duration of the programs such as exercise and diet programs provided through web-based intervention are the other limitations of the studies.

It is plausible to suggest that there is a positive relationship among the level of knowledge, the satisfaction of patients with cancer, and the patient education provided through web-based interventions. The results show that web-based interventions are associated with a competent knowledge of the subject of health and that online chat groups increase social support among patients. It is thought that interventions can be made more effective and beneficial through the planning of all elements such as the characteristics of an individual and disease, treatment process, and website design in such programs.

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