

*Systematic Review***Educational programs for post-treatment breast cancer survivors: a systematic review**

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Abstract

Objectives: The purpose of this systematic review was to identify the state of the scientific evidence related to educational programs for post-treatment breast cancer survivors (BCSs) during the last twenty years. **Methods:** A systematic search of PubMed/MEDLINE, CINAHL, EMBASE, Web of Science, and PsycINFO databases from January 2000 through May 2020 included keywords related to research on educational programs for BCSs. Inclusion criteria included: (1) focus on an educational program for post-treatment breast cancer survivors; (2) original research; (3) peer-review journals; (4) English language; and (5) published between January 2000 to May 2020. EndNote X9 (software version: X9, manufacturer: Clarivate, website location: endnote.com) was used as the reference management software package to manage citations from search results. A PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) flowchart of the selection process is presented in this paper. **Results:** A total of 24 educational programs/interventions research studies include one mixed-method study, three qualitative studies, and twenty quantitative studies, were identified and analyzed. Three programs focused on BCSs' self-management and self-efficacy, two programs focused on BCSs' cognitive problems, seven programs focused on BCSs' psychological distress, emotional support, and information seeking. In addition, one program focused on BCSs' body image, body function, and sexual dysfunction issues, five programs focused on BCSs' physical activities, nutritional levels, and normal body weight maintenance, two programs focused on BCSs' supportive care and peer advocate support. Finally, one program focused on BCSs' palliative care and end of life care, and three programs focused on BCSs' post-treatment symptom clusters and overall quality of life. **Conclusions:** After breast cancer treatment ends, BCSs continue to suffer from long-term physical and psychological symptoms and report multiple unmet needs. Research on post-treatment breast cancer educational programs showed that programs assist BCSs with post-treatment symptom management and address their concerns while promoting supportive care and peer support to improve BCS's overall quality of life.

Keywords: education; program; post-treatment; breast cancer

1. Introduction

Due to advanced medical treatment and earlier diagnosis, the number of cancer survivors grows in the United States, with more than 16.9 million cancer survivors in 2019 [1,2]. Breast cancer (BC) is the most prevalent cancer type among women and the most common cancer diagnosis for all the United States population. The potential number of annual new breast cancer cases in the United States in 2020 is around 276,480 invasive breast cancer and approximately 48,530 non-invasive breast cancer in women [2,3]. Early screening and treatment for BC have improved the prognosis for breast cancer survivors (BCSs) compared to other cancers resulting in an increased 5-year survival rate of 91%, a 10-year survival rate of 84%, and a 15 years survival rate of 80% [4]. More women survived breast cancer, which means more women living with the long-term side effects of physical and psychological symptoms caused by cancer itself as well as cancer treatment [5]. A need for follow-up care and long-term symptom management to promote BCSs' physical and psychological wellbeing and quality of

life (QOL) has become an issue based on the increasing survival rate [6,7].

Months after completing primary treatment, BCSs with non-metastatic cancer may suffer physical and psychological symptoms [8]. BCSs with advanced-stage cancer have more needs associated with long-term monitoring, including managing pain, anxiety, depression, and access to new information [8]. The five most common symptoms experienced by early-stage BCSs were systematic therapy side effects, breast and arm symptoms, fatigue, and sleep disturbance [5]. Four post-treatment symptom clusters were identified from the literature review: (1) psychological symptom cluster (depression, anxiety, stress, and fear of recurrence); (2) fatigue symptom cluster (fatigue, sleep disturbance, and drowsiness); (3) pain symptom cluster (somatic pain); (4) cognitive symptom cluster (cognitive impairment in several cognitive domains) [9].

Evidence showed that cancer treatment-related side effects such as central and peripheral neurotoxicity, joint pain, lymphedema, fatigue, depression, and other physical



and psychological signs and symptoms affected breast cancer survivors' quality of life [10,11]. Central neurotoxicity specifically affects the cognitive domains of memory, attention, and executive function [12]. Chemotherapy-induced cognitive dysfunction (CICD) or Chemo-brain may cause weakened cognitive abilities, delayed reaction time, and decreased organization skills. Stress-related to CICD during or after chemotherapy can be a severe detriment to multitasking and work performance in BCSs [13,14]. Peripheral neurotoxicity (neuropathy) causes numbness and tingling of extremities, joint pain, and stiffness of arms and legs [15]. Surgeries may cause altered body image, lymphedema, and breast pain of the affected side [16]. Except for surgery, chemotherapy, radiation, and hormone therapy all can impact a patient's appearance and adversely affect how BCS thinks about her body images [17]. Changes in body image include loss of breast or breast disfigurement, weight gain, loss of hair or change color, altered body composition [18,19]. Hormone therapy can decrease the estrogen level, directly related to cognitive decline in BCSs [20].

BCS have post-treatment needs due to the long-term or late effects of psychological and physical signs and symptoms [21]. The post-treatment unique needs of BCSs include: (1) screening for cancer recurrence; (2) detecting secondary cancer; (3) managing the late physical and psychological side effects; (4) prognosis, exercises, diets, and alternative therapy; (5) promoting routine health care to maintain health [22,23]. Knowing how to prevent cancer recurrence is the highest educational need [24]. Health care providers need to be informed on all aspects of cancer survivorship care to ensure cancer survivors have access to all the care they need to adapt to survivorship. Coordinated interdisciplinary care and psychosocial support are required to help BCSs transfer from active treatment to survivorship [25]. To meet the unique needs of cancer survivors, it's also a public priority to identify modifiable and practical methods to reduce BCSs' longer-term side effects and increase their quality of life [26].

Studies have documented the insufficiency in the current cancer survivorship health care system [27]. Compared with the considerable research and medical attention women received at the time of breast cancer diagnosis and treatment, minimal attention was paid to BCSs during the period immediately following their completion of treatment when they were free from regular interaction with their health care providers [28]. Once the treatment was over, some BCSs feel abandoned by their healthcare providers while needing additional support and help during this transition [29]. The phenomenon of insufficient understanding of BCSs' post-treatment symptoms and inadequate educational programs for BCSs needs to be highlighted [30]. Due to the lack of enough medical attention and professional support to BCSs during their post-treatment survivorship, BCSs have specific unmet healthcare needs after cancer treatment [27]. Ellegaard *et al.* [31] conducted a cross-

sectional study of BCSs five years after completing primary treatment to determine their frequency of needs and fear of cancer recurrence (FCR) and the association between those two variables. The Cancer Survivor's Unmet Needs (CaSUN) questionnaire and Concerns About Recurrence of Cancer (CARQ-4) were used as instruments in this study. They found that almost all the BCSs reported at least one unmet need, and more than half of them are rated as strong unmet needs. The most frequent unmet needs identified by breast cancer patients were: (1) the need for doctors to collaborate and coordinate care services; (2) receiving up-to-date, understandable information; (3) managing side effects of cancer treatment; (4) ongoing communication with health care providers, and (5) feeling assured of receiving the best medical care [31].

Even though the American Cancer Society (ACS) and American Society of Clinical Oncology (ASCO) had published survivorship care guidelines for BCSs in 2016, the field of oncology is still struggling with how to meet those recommendations [32]. How can BCSs manage the different post-treatment physical and psychological side effects and improve their self-management and self-efficacy in the survivorship phase? The development of breast cancer support programs and educational programs are needed [27]. Psychoeducational support, group therapy, cognitive rehabilitation strategies, and E-learning are recommended for BCSs in the survivorship care guideline by ACS and ASCO [32]. Educational programs need to be developed to inform BCSs and encourage their active participation during the survivorship phase of care. It can also notify health care providers of the BCSs' post-treatment unique needs. The educational program can work as a potential lever to improve surveillance for recurrence of breast cancer and secondary cancer. At the same time, it will help BCSs manage long term, late side effects, and comorbid conditions [33]. BCS reported that their quality of life was mainly affected by the symptoms of pain, lymphedema, and altered body image, which highlighted the need for education of symptom management and interventions to these issues [34].

There is limited research about BCSs' post-treatment symptoms and unmet needs. And the lack of enough education and support programs to help BCSs' adaptation to their cancer survivorship. There is a need for a systematic review to target the research gaps in this area. This systematic review will review the most recent 20 years clinical studies about educational programs for post-treatment BCSs. The result of this review will highlight the roles of education for BCSs during their transition to long-term survivorship. It will also help change current cancer survivorship care and encourage more educational and support programs for BCSs.

2. Methods

2.1 Search strategies

A systematic search of PubMed/MEDLINE, CINAHL, EMBASE, Web of Science, and PsycInfo databases from January 2000 through May 2020 included keywords related to the educational program for breast cancer survivors. Keywords utilized were education, program, post-treatment, and breast cancer. All publications were checked to retrieve the abstracts and full-text articles by using inclusion and exclusion criteria. The search strategy for PubMed/MEDLINE was also used for other databases. Additional related published articles were identified by reviewing the reference lists from eligible full-text articles.

2.2 Study selection

EndNote X9 was used as the reference management software package to manage citations from search results. Screening by study title and abstract was completed for potential inclusion, followed by full-text article reviews to determine if all criteria were met for inclusion. Inclusion criteria included: (1) focus on an educational program for post-treatment breast cancer survivors; (2) original research; (3) peer-review journals; (4) English language; and (5) published between January 2000 to May 2020. Exclusion criteria included: (1) non-research articles; (2) research not focused on an educational program for post-treatment breast cancer survivors; and (3) research focused on an educational program for breast cancer survivors published before January 1, 2000.

Study designs eligible for inclusion were randomized controlled trials (RCTs), cohort studies (prospective observational study), cross-sectional studies, and retrospective analytical studies. The entire study population was restricted to breast cancer among women who completed primary treatment. Studies included research conducted in the United States and other countries if published in English. Studies were not eliminated if they meet the inclusion criteria as described. Studies were excluded if they meet the exclusion criteria mentioned above.

After applying the inclusion and exclusion criteria to the titles and abstracts of the initial search, 31 articles meet the requirements. The full-text PDF format was obtained for all the articles and was reviewed carefully by the author. The total number of articles included were 24. A PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) flowchart of the selection process is presented in Fig. 1 in this paper.

2.3 Data extraction

A literature review table was used to extract data identifying the first author, year published, study design, study setting, research aims and interventions, sample characteristics, outcome measures, data analysis, and research findings and implications for future studies (see Appendix Table 1, Ref. [7,9,21,24–28,30,33,35–48]). The data extrac-

tion focuses on educational programs for post-treatment breast cancer survivors' physical and psychological needs found in different studies.

3. Results

A total of 24 research studies related to educational programs/interventions were identified and analyzed in this paper. Both qualitative and quantitative research designs were included. There was one mixed-method study [26] and three qualitative studies [25,35,36]. For the 20 quantitative studies, there were five randomized controlled trials [9,28,37–39], one longitudinal study [27], six prospective studies [7,24,30,40–42], one cross-sectional studies [33], two cohort studies [43,44], two quasi-experimental studies [21,45], one secondary data analysis [46], one pilot study [47] and one non-experimental study [48]. The eight focuses of the 24 programs were concluded from all the 24 educational programs related to post-treatment survivorship care and BCSs' unique needs [7,9,24,26,30,35,36,39,40,42,44,47,48]. Improving BCSs' self-management, knowledge of care options can help patients with goal setting and managing cancer care [44]. The post-treatment cognitive issues were addressed by the Think Well educational program [7]. Several educational programs focused on BCSs' psychological distress and emotional support [30,47]. A web-based educational program focused on BCSs' information seeking [24]. One educational program focused on the body image, body function, and sexual dysfunction issues for BCSs [35]. Several educational programs focused on helping BCSs increase their physical activities, nutritional levels [26,42] and maintain healthy body weight [38,40]. One educational program focused on supportive care for BCSs [25] and one focused on peer advocate support [36]. One educational program focused on palliative care and end of life care for BCSs [48]. One program focused on Mindfulness-Based Stress Reduction for Breast Cancer (MBSR (BC)) program to manage BCSs' post-treatment symptom clusters [9] and one program focused on improving the overall QOL for BCSs [39].

3.1 Three educational programs focused to improve BCSs' self-management and self-efficacy

Results showed that three programs focused on self-care management and self-efficacy [28,44,49]. Self-management is usually recommended for cancer survivors to identify and manage cancer-related signs and symptoms [50]. Self-management is patients engage in dealing with different aspects of their health conditions along with family and healthcare providers [51]. Self-efficacy theory assumed that higher confidence or perceived self-efficacy leads to a higher probability that the desired goal will be obtained [52]. Cancer patients with higher coping self-efficacy are more likely to achieve desired medical and psychosocial outcomes [53].

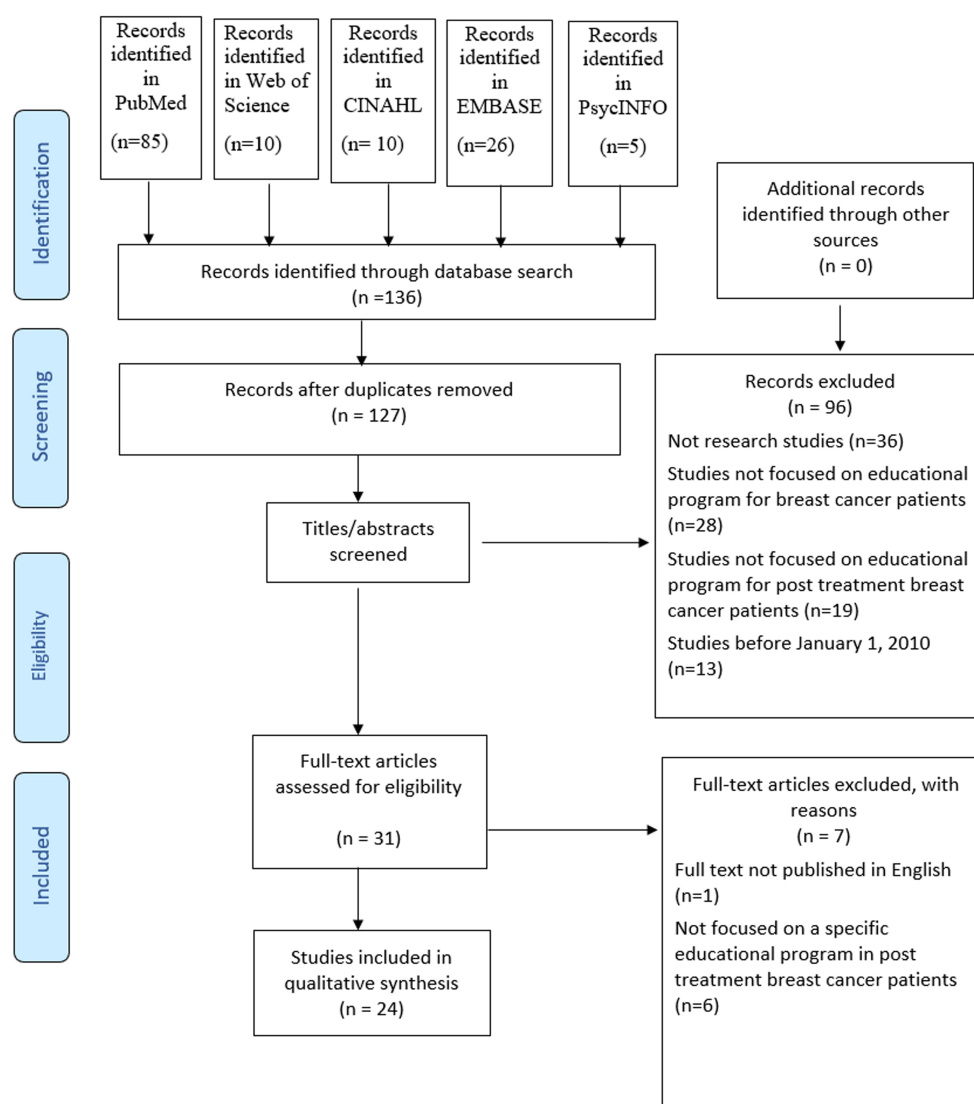


Fig. 1. A PRISMA flowchart of the selection process.

Ellegaard, Jensen, and Lomborg [27] conducted a study in Denmark to describe the development and testing of a Cancer Self-management Education (CSME) program to improve breast cancer patient-reported self-management and self-efficacy at the end of primary treatment [49]. The program development was guided by a systematic approach of the Plan-Do-Study-Act (PDSA) cycle framework to improve the CSME program continuously. The primary principle of the PDSA is to test an intervention by promoting the use of small-scale, iterative approaches that enables a quick assessment to adapt to changes to ensure fit-for-purpose solutions according to participants' feedback. This study found that the development of a CSME program using the PDSA approach resulted in a person-centered education program that can improve breast cancer survivors' self-management and self-efficacy in the aftercare of the post-treatment phase [49]. Besides the CSME program, a psycho-educational intervention of Managing Cancer Care

(MCC): A Personal Guide was an excellent means to help BCSs' self-management. The MCC was targeted to improve the self-management of medical, behavioral, and emotional aspects. Knowledge of care options was the central concept of this program, which was foundational to help BCSs with goal setting and decision making. Increase patient's understanding of care options is critical to improving patient's overall self-management. The seven MCC modules were based on patients' self-management experience, their perceived barriers, and the Self-and Family Management Framework [44]. Cimprich *et al.* [28] conducted a study to develop and test a Taking CHARGE program built on self-regulation principles to determine if it was useful to deal with BCSs' concerns following breast cancer treatment. The research result showed that the Taking CHARGE program equipped women with self-management and provided information on common cancer survivorship [28].

3.2 Two educational programs focused on BCSs' cognitive problems

Results showed that two programs were focusing on BCSs' cognitive problems [7,43]. Changes to cognitive function or cognitive impairment happen in BCSs before, during, and after cancer treatment [54]. Cognitive impairment affected BCSs' work, social, family roles, and community engagement [55]. Chemotherapy-related cognitive impairment (CRCI) or chemo-brain was frequently reported by BCSs and affected up to 83% in this population [56]. Many BCSs assert that cognitive impairment was the most troublesome and devastating side effects of the cancer experience and negatively affected their personal and professional lives [11]. CRCI may cause weakened cognitive abilities, delayed reaction time, and decreased organization skills. Stress-related to CRCI during or after chemotherapy can be a severe detriment to multitasking and work performance in BCSs [13]. Research showed that CRCI might last more than a decade in some breast cancer survivors [57].

The Breast Cancer Survivorship Rehabilitation Initiative Community Report (BCSRI) in 2015 indicated BCSs expressed a strong desire to improve cognitive function [7]. To address this concern from BCSs, Bail *et al.* 2018 [7] developed an educational program of Think Well: Healthy Living to Improve Cognitive Function to promote healthy living and increase understanding of cognitive changes in BCSs after primary treatment. The Think Well nurse lead team conducted a 45 minutes face-to-face seminar to 172 BCSs and their co-survivors in urban African American churches. Four modules were included in the Think Well curriculum: post-treatment cognitive changes, strategies for healthy living and cognitive function improvement, brain exercises, and compensatory strategies. Except for the face-to-face seminar, participants also received a 6-page pamphlet with the content of education on cognitive changes and tips about making a healthy living. Participants reported the Think Well program was culturally relevant and high quality to help breast cancer patients and their co-survivors. An occupation-focused cognitive self-management program increased BCSs' self-perceived daily performance and cognitive function, which had positive effects on the patient's occupational performance. It also promoted the participants' physical and functional wellbeing [43].

3.3 Seven educational programs focused on BCSs' psychological distress, emotional support and information seeking

Results showed seven programs focused on BCSs' psychological distress, emotional support, and information-seeking [21,24,30,33,37,46,47]. As the most prevalent type of cancer among women, breast cancer diagnosis keeps being a significant stressor, which causes more considerable distress in women [58]. The distress caused by the breast cancer diagnosis may cause posttraumatic stress disorder

(PTSD), depression, and anxiety. This psychological distress occurs in the first year of diagnosis between 22% and 66% of BCSs [59]. The symptoms of anxiety, depression, and low social support may predict poor breast cancer adjustment, which warrants investigation to promote social support and modify coping styles [60].

Cheon *et al.* [30] conducted a prospective study in 100 Korean BCSs. They found that compared with the control cohort, education effectively reduced anxiety and depression levels in the education cohort and increased BCSs' physical and functional wellbeing [30]. Wu *et al.* [37] conducted a randomized controlled trial to investigate the impact of a psychoeducational intervention (PEI) on BCSs' anxiety, depression, self-efficacy, resilience, QOL, and knowledge disease-specific care. The study results showed that in the experimental group with face-to-face PEI, BCSs' anxiety, depression, resilience, and QOL were improved after chemotherapy. PEI significantly reduced chemotherapy-related discomfort, improved patients' disease care techniques, resilience, and QOL [37]. A case study also showed that a cognitive-behavioral stress management (CBSM) group program could effectively reduce BCSs' traumatic stress [61].

The physical and functional problems caused by a cancer diagnosis and treatment increase BCSs' risk for emotional wellbeing challenges [62]. This challenge may further decrease the emotional domain of health-related quality of life (HRQOL) [46]. To assess the effect of a telephonic psycho-educational program on improving African American breast cancer survivors' (AABCS) emotional wellbeing, Ashing and George conducted a secondary data analysis study in 2020. They found the psycho-educational program significantly improved the AABCS's emotional wellbeing, and it was an effective adjunctive therapy to cancer medical treatment to help BCSs with psychological difficulties [46]. Research also found that BCSs' symptom distress, anxiety level, unmet supportive care needs significantly improved in an education and psychological support program three months post-surgery [21].

Emotional support from a spouse will help BCSs promote mental health and role adjustment, which play a crucial role in maintaining satisfying marital relationships. Social support is essential for BCSs' posttraumatic growth [63]. Experiencing cancer is a shared experience that integrates the patient's cancer experience and the spouse's caregiving experience and allows essential interaction with the patient [64]. Mutual support between patient and spouse during the disease healing period could reduce an illness's negative effect, which addresses the focused or counseling programs for couples [65]. Lewis *et al.* [47] conducted a study to assess the impact of a clinic-based educational counseling intervention of Helping Her Heal for spouses whose wife was recently diagnosed with early-stage breast cancer. The aims of the Helping her Heal program was to enhance spouses' skills and confidence to communicate and

support the breast cancer patient. It also targeted to improve spouses' self-care, anxiety, depression, and marital adjustment. The result showed positive changes in the spouse's communication and support to the breast cancer patient. It also decreased tension in the spouse and increased the couple's relationship.

More than 42% BCSs in the United States use the internet as a source to seek information about cancer care. The web-based educational program can be beneficial and efficient in providing information, emotional support, and helping BCSs with decision making [24]. Yi *et al.* [24] conducted a study to assess a web-based educational program for BCSs in Korea. They found that it is highly imperative to develop a web-based educational program that is sensitive to the needs of BCSs. The web-based educational program had rich resources and useful functions to meet BCSs' specific needs, such as health information consumption and online patient community support [24]. O'Malley *et al.* [33] conducted a cross-sectional study to identify the specific BCS characteristics that motivate her to seek additional information to guide follow-up care. The research results addressed the need to develop educational strategies for cancer survivors responsive to specific population needs and psychosocial profiles that could motivate patients' requests for follow-up guidance [33].

3.4 One educational programs focused on BCSs' body image, body function, and sexual dysfunction issues

Results showed one program focusing on BCSs' body image, body function, and sexual dysfunction issues [35]. All breast cancer treatments affect patients' appearance and may further change their body function. For BCSs, the changes related to body image due to cancer treatment include hair loss, weight gain, breast loss or disfigurement, and altered body composition. Body function change about cancer treatment includes changes in breast sensitivity, infertility, sexual dysfunction, etc. [18]. The body image changes adversely affect how BCSs perceive their bodies and personal image, which can be a persistent issue that affects 75% BCSs [17]. Research showed that body image and body function changes in BCSs were associated with mental distress and decreased QOL. Women with body image issues have higher depressive symptoms than women without body image issues [66]. These changes may lead to fear of rejection from a partner, change couple relationships, and embarrassment or discomfort with partners [67].

Body image and function change related to women's perceptions of loss of physical integrity, interrupted femininity, low self-esteem, and confidence [68]. Emotionally, it can cause feelings of vulnerability and shame [69]. The physical changes that went through by BCSs may affect their sense of self as sexual beings [70]. Treatment-induced sexual loss becomes a significant theme for women [71]. This issue can further challenge women's core values and prior beliefs and lead to feelings of disruption of a

continued sense of self-identity [72]. To help resolve this issue, Espen *et al.* [35] conducted a study to explore the effect of an 8-week restoring body image after cancer (ReBIC) group intervention to target stress-related to body image issues in BCSs. Principles of group psychotherapeutic, exercises of guided imagery, and psychoeducation related to Western countries' social and gender-based messages internalized by women have been incorporated in the ReBIC program, supporting and effective in helping BCSs address body image issues. It also helped women gain insight into socio-cultural impacts on body image issues [35].

3.5 Five educational programs focused on BCSs' physical activity, nutritional levels and normal body weight maintenance

Results showed that five programs focused on BCSs' physical activity (PA), nutritional levels, and normal body weight maintenance [26,38,40–42]. Breast cancer diagnosis and treatment caused weight gain, which increased the risk of chronic disease and cancer re-occurrence in BCSs [73]. Healthy body weight maintenance affects not only BCSs' quality of life but also their survival [73,74]. So maintaining healthy body weight is a high priority for cancer survivors [75]. Regular exercise and proper nutrition are prerequisites for the maintenance of a healthy body weight [38]. To help BCSs manage the post-treatment side effects, the research found that physical activity is a cost-effective, practical, safe, and effective way [26]. BCS has been benefited from physical activity [76]. A longitudinal study showed that physical activity could decrease the risk of cancer recurrence, secondary cancers, and mortality rates in BCSs [77]. Randomized controlled trials also indicated that physical, mental, social, health, and overall wellbeing could be improved by physical activity. It can also help manage body weight and improve patients' quality of life [76,78]. With the benefits of physical activity being documented, only 10% to 50% BCSs met the guideline of having 150 minutes of vigorous PA weekly [79].

The research reported several advantages of community-based physical activity programs to help BCSs engage in PA. For example, the positive social influence of staff members in the program, the proper physical and mental health outcomes of participating in this program. The most common PA barriers included lacking social influences, fatigue, lacking motivation, and pain [26]. Stoutenberg, Cutrono, and Perry (2011) found a From Surviving to Thriving (FST) Colloquium event increased BCSs knowledge of exercise and nutrition by about 44%. The one-and-a-half-day Colloquium event significantly influenced BCSs' planned and actual behavior changes. The event was welcomed by BCSs and their health care providers [42]. Spector *et al.* [41] 2012 found that establish a network of collaborative partners can help BCSs increase their PA. Study Showed that the Mediterranean diet pattern effectively reduced BMI and waist

circumference and promoted a healthy lifestyle to BCSs [40]. A web-based self-management exercise and diet intervention (WSEDI) program was sufficient to change BCSs' exercise and dietary behaviors and increased their self-efficacy based on the transtheoretical model (TTM) [38].

3.6 Two educational programs focused on BCSs' supportive care and peer advocate support

Results showed two programs focused on BCSs' supportive care and peer advocate support [25,36]. Usually, after completing active treatment, BCSs still have essential unmet needs, and they may feel lost during the transition to survivorship [80]. Compared with patients who did not want more information, research showed that BCSs who want additional information to guide their post-treatment follow-up care had more fears of cancer recurrence and worries about the future. BCSs with higher comorbidity usually want more information to guide their follow-up care [33]. Due to the lack of clear guidance for cancer survivor's ongoing care after primary treatment, the assessment of adult survivorship care was released by the American Society of Clinical Oncology (ASCO) in 2013 to address clinical practice guidelines in this area need to be established [81]. To make primary care providers (PCPs) aware of continuing cancer surveillance requirements and meeting patient needs, the Institute of Medicine recommended patients and primary care providers use the survivorship care plans (SCPS) as a useful tool for communication [80]. The SCPS is helpful for cancer survivors' supportive care. The content of SCPS described disease-site-specific guidelines for follow-up tests recommended, appointment frequency, how to manage late and long-term effects of cancer treatment for patients, how to address patient's psychosocial concerns, and non-cancer health maintenance [25]. The SCPS increased PCPs' knowledge of cancer survivors' needs, improved their communication and coordination of care. The ASCO recommended using SCPS to enhance education for PCP and help with cancer survivorship [25].

An interdisciplinary approach is needed to make cancer survivorship a health care priority and enhance survivorship care. An interdisciplinary team published a paper to describe the development and evaluation of a unique survivorship program of Wellness Beyond Cancer Program (WBCP) in Canada. This program used innovative solutions to satisfy cancer-specific guidelines and cancer patients' individual survivorship needs. The WBCP consisted of the multidisciplinary health care team and incorporated SCPS and education classes to ensure that BCSs can access resources and the most appropriate care provider to meet their specific individual needs. Patients and PCPs were satisfied with the content of this program one year after discharge [25]. Peer support is essential for BCSs. A primary source of support for BCSs could be another patient who had a similar experience and intuitively understood

their feelings [82]. Besides supportive care from health care providers, the patient survivor advocate program may also offer supportive care to BCSs. A peer support program found that training BCSs as peer advocates provided critical psychosocial and emotional support to women who were newly diagnosed to have breast cancer. Peer advocates can also help newly diagnosed women to understand the steps involved in cancer care [36].

3.7 One educational program focused on BCSs' palliative care and end of life care

Results showed one program focused on BCSs' palliative care and end of life care [48]. Compared with curative care, the goal of palliative care is to offer relief from pain, symptoms, and stress for patients with advanced progressive disease. Palliative care can occur at the same time as curative care. It can also be embedded in hospice care to provide comfort care to patients who have a terminal disease in the last six months of their life [44]. End of life (EOL) planning and communication are still one of the essential components of care for BCSs with advanced-stage cancer. But it is not a standard practice in our current health-care programs. This resulted in BCSs with metastatic breast cancer neither had advance directives nor talking with their family and loved ones about their wishes to end of life care plan. Formal discussion of EOL decisions with physicians was less frequent than an informal discussion with friends and family [83]. Younger age BCSs with metastatic cancer feel less prepare for EOL care [84]. Interventions to increase BCSs' EOL knowledge is needed [85]. Compared with patients who do not participate in hospice or palliative care, evidence showed that patients who do that might live longer [86].

Strategies are needed to decrease the barriers between advanced-stage breast cancer patients and their families and physicians regarding EOL care [48]. Rowe and Schapmire (2020) conducted a study to assess the effect of The Shady Pink Elephant EOL educational series on young BCSs' knowledge, attitudes, and behaviors towards EOL wishes and palliative care. This educational program focused on EOL topics in a three-part online series of interactive and live-streaming events. The first event focused on the benefits of introducing palliative care at the beginning of one's cancer journey. The second event focused on initiating EOL communication and social action. The last event focused on the legal decision and documents needed for EOL planning. This educational series showed it was beneficial to increase BCSs' knowledge, attitudes, and behavior about EOL care [48].

3.8 Three educational programs focused on BCSs' post-treatment symptom clusters and overall quality of life

Results showed three programs focused on BCSs' post-treatment symptom clusters and overall quality of life [9,39,45]. BCS's post-treatment overall QOL is a newly

emerging area of investigation [39]. Rather than just a single symptom, the symptoms of breast cancer patients usually appear simultaneously. Simultaneously, more than two signs are called symptom clusters, significantly impacting BCSs' QOL [87,88]. Research showed that BCSs with higher-scoring symptoms in psychological and physical symptoms clusters have a more inferior quality of life [34].

A large randomized controlled trial by Reich *et al.* [9] found that among post-treatment BCS, physical (fatigue, pain, sleep, and drowsiness), psychological (depression, anxiety, stress, and fear of recurrence), and cognitive symptom clusters exist. These symptom clusters' existence is closely related to multiple dimensions of QOL and negatively affected BCSs' QOL and functional status [9]. This study was trying to investigate if the Mindfulness-Based Stress Reduction for Breast Cancer (MBSR (BC)) program improved those symptom clusters. Three components were included in the MBSR (BC) program: (1) educational material was given to participants which covered the topics of relaxation, meditation, the connection of mind-body and a healthy lifestyle for BCSs; (2) group practice of meditation and homework of a daily diary to record their meditation practice time at home; (3) supportive group interaction and group process regarding barriers of practicing meditation at home. The study results showed that the MBSR (BC) program improved BCSs' psychological and fatigue symptom clusters immediately during the six-week MBSR (BC) training period, and improvements were generally sustained to 12 weeks [9].

The major functional domains of quality of life (QOL) include physical, psychological, cognitive, social family roles, and spiritual well-being [39]. The physical and mental disorders during and after breast cancer treatment affected BCSs' QOL [11]. Meneses *et al.* [39] conducted a randomized controlled trial in 256 BCSs to assess a psychoeducational breast cancer intervention program on overall QOL and the patient's wellbeing in specific domains of physical, psychological, social, and spiritual area. They also wanted to know if patients retained the intervention effects over time. The research results showed that patients in the intervention group reported significant improvement of QOL at three months and six months compared with the control group. The Breast Cancer Education Intervention (BCEI) was sufficient to help BCSs improve their overall QOL, and the intervention effects were durable over time [39]. Research also showed that mindfulness-based stress reduction (MBSR) treatment and metacognition treatment were sufficient to help BCSs improve their global and specific life quality. Using MBSR treatment, research showed that BCSs' global life quality scores in emotional, cognitive, and social functions increased in experimental groups from pre-test to post-test and stable in follow-up [45].

4. Discussion

The overall findings of this systematic review concluded the eight themes of educational programs for post-treatment BCSs. The eight themes include the need to improve BCSs' self-management and self-efficacy, the need to manage cognitive issues, the need to address psychological distress, offer emotional support and information support, the need to help BCSs with their body image and sexual dysfunction issues, the need to increase BCSs' physical activity, nutritional level and maintain normal body weight, the need to help BCSs to promote supportive care and peer support, the need to address palliative care and end of life care, and to help BCSs improve their overall quality of life. The current educational program didn't cover all the unmet needs for BCSs, and the limitations of previous studies indicate the need for future studies. These findings highlighted the importance of educational programs for BCSs.

After primary treatment, BCSs still have health care needs for their post-treatment physical and psychological signs and symptoms [21]. The post-treatment needs of BCSs cancer recurrence screening and secondary cancer-detecting, manage late physical and mental side effects, and routine health care to maintain health [22]. Insufficient in current cancer survivorship health care system and insufficient understanding of BCSs' long term signs and symptoms, and inadequate educational programs for BCSs have been documented in the literature [27,30]. Inform health care providers of cancer survivorship care needs, identify modifiable and practical methods, offer coordinated interdisciplinary care, and psychosocial support are needed to help BCSs' unmet needs [25,26].

To provide supportive care, the survivorship care plans (SCPs) were recommended by the Institute of Medicine as a useful communication tool between cancer survivors and primary care providers to address post-treatment concerns and health maintenance needs [25]. With a comprehensive summary of cancer care and follow-up care recommendations, the SCPs are the most widely promoted education tool for patients to facilitate their transition to cancer survivorship [89]. Criticisms of SCPs pointed out the long time needed for their preparation, and it has been poorly used by PCPs [90]. And there was no specific funding for the preparation of this document [25]. Several reasons have been identified for the slow adoption of SCPs in practice: (1) resource intensity for SCPs development; (2) a fewer health care provider buy-in about the utility of SCPs; (3) issues about reimbursement [91]. With support from leading oncology professional organizations in the U.S, the SCPs are anticipated to become the standard of care for cancer patients soon [91]. For peer-to-peer support, match volunteer BCS peer advocates and train them to help women who were newly diagnosed to have breast cancer is an excellent method. A Patient Survivor Advocacy program offered psychosocial and educational support for women newly diagnosed with cancer; it also helped the

peer advocates gained a sense of achievement in this experience [36]. Educational counseling intervention for BCS's spouse may positively change the spouse's communication and offer support to help his wife heal from breast cancer [47].

To help BCSs decrease psychological distress and promote emotional well-being, education reduced anxiety and depression levels in BCSs and increased their physical and functional well-being [21,30]. A psychoeducational intervention (PEI) effectively decreased BCSs' anxiety and depression and improved their self-efficacy, resilience, QOL, and knowledge of disease-specific care [37,46]. Body image issues have bothered many BCSs and adversely affected how women perceive their bodies and self-image [17]. It was also associated with mental distress and decreased quality of life [66]. It can further challenge women's core values and interrupt a continued sense of self-identity [72]. A restoring body image after cancer (ReBIC) group intervention applied principles of group psychotherapeutic, exercises of guided imagery and psychoeducation related to the specific cultural, social, and gender-based information were effective to help BCSs address body image issues [35].

Cognitive impairment was the most troublesome post-treatment symptom for BCSs [11]. Breast cancer survivors have a strong desire to improve their cognitive functions [7]. An educational program of Think Well: Healthy Living to Improve Cognitive Function has successfully increased patients and their co-survivors' understanding of BCSs' post-treatment cognitive changes. The culturally relevant Think Well program was beneficial for BCSs and their co-survivors, understanding cognitive changes and making a healthy living [7]. An occupation-focused cognitive self-management program was sufficient to support BCS, who was living with cancer-related cognitive impairment. It also increased the participants' occupational performance and promoted their physical and functional wellbeing [43]. MBSR intervention has immediate and sustained effects on improving BCSs' symptom clusters and cognitive functions [9].

Increase BCSs' self-management and self-efficacy are essential to help them manage post-treatment signs and symptoms. A Cancer Self-management Education (CSME) program by using the Plan-Do-Study-Act (PDSA) cycle framework resulted in a person-centered education program to improve BCSs' self-management and self-efficacy in the aftercare [27]. Physical activity is a cost-effective, practical, safe, and effective way to help BCSs manage long-term side effects [26]. PAs can decrease cancer recurrence risk, secondary cancers, and cancer survivors' mortality rate [77]. It can also improve physical, mental, social health, and overall wellbeing and help manage patients' body weight and improve their quality of life [76,78]. Community-based women-only PA programs and community-based wellness workshops helped refine BCSs' physical activity [26,41]. A one-and-a-half-day From Sur-

living to Thriving (FST) Colloquium event significantly increased BCSs knowledge of exercise and nutrition [42]. Mediterranean diet pattern was found to help BCSs effectively reduce their BMI and waist circumference [40]. BCSs with advanced-stage cancer feel less prepared for EOL care [84]. The Shady Pink Elephant EOL educational series showed it beneficial to promote BCSs' knowledge, attitudes, and behavior about EOL care [92].

5. Clinical and research implications

5.1 Clinical implication

A lot of BCSs suffered persistent post-treatment physical and psychological decrements. Emotional support can be a protective factor for adverse psychosocial outcomes [93]. Evaluate BCSs' unmet needs at baseline can decrease the gap between provided and expected supportive care [21]. Routinely querying for patient emotional concerns, facilitating BCSs' access to psychosocial care, and linking them to appropriate healthcare providers' resources for a patient's emotional wellbeing [46]. Development of patient-centered, culturally responsive cancer survivorship care and implementing community-based, efficient, professionally delivered psychosocial services to minority and underserved patients are needed [46]. Future educational programs for BCSs may include co-survivors to increase a patient's support network [7]. Nurses should consider helping their families' concerns to provide individualized, culturally sensitive information to patients [21]. Educate PCPs to increase their awareness of cancer patients' survivorship needs is crucial. Education seminars can be beneficial to both BCSs and PCPs [27]. The group therapy intervention of Restoring body image after cancer (ReBIC) can be used to address body image issues in breast cancer and other cancer populations [35]. Patient's self-care efficiency should be enhanced by health care provider-patient communication and interactive education [21]. The Risk-stratification model may be used to refer cancer patients to specific post-treatment care to meet patients' individual needs [25]. SCP can be used as a communication tool between cancer patients and PCPs [25]. Health care providers need to discuss EOL care with BCSs with advanced-stage cancer as early as possible [92]. Identify BCSs' symptom clusters may lead to better symptom management strategies [34].

5.2 Research implications

Due to previous studies' methodological limitations, future longitudinal, double-blinded randomized controlled trials with diverse patient populations from different geographical areas focused on BCSs' post-treatment signs and symptoms is needed. Future research studies with a control group(s) to invest the various components of the group therapy intervention components of Restoring body image after cancer (ReBIC) are needed. To identify best practices in tailoring information to guide BCSs' follow-up care, further research is required for those with higher burdens of

comorbidity. New research is also needed to help people understand the relationship between BCSs' cancer recurrence worries about the future and their post-treatment coping styles and preferences for information. Future longitudinal studies with a large sample size are required to investigate BCSs' QOL following their physical and psychological symptoms.

6. Conclusions

After the active cancer treatment, BCSs are still suffering many long-term physical and psychological side effects and have unmet needs that need to be addressed by the health care system. It is anticipated that the SCPs can be used as standard care to help BCSs transition to their cancer survivorship. Health care providers need to be more aware of cancer patients' survivorship needs, and a multidisciplinary approach is required to meet cancer survivors' unique individualized needs.

Author contributions

KJL is the first author who developed the concept, wrote the draft, edited the draft, and finalized the draft of this manuscript. CAL is a co-author who participated in developing the concept, writing and editing the draft, developing the inclusion and exclusion criteria, reviewing all the articles that met the inclusion criteria as the second reviewer, and finalizing the draft of this manuscript. CSR is a co-author who participated in developing the concept, helped with the drafting, and edited the draft of this manuscript. LAS is a co-author who participated in developing the concept, helped with the drafting, and edited the draft of this manuscript. JW is a co-author who participated in developing the concept, helped with the drafting, and edited the draft of this manuscript.

Ethics approval and consent to participate

Not applicable.

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Conflict of interest

The authors declare no conflict of interest.

Appendix

See Table 1.

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Table 1. Summary of the studies related to educational program for breast cancer survivors.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
Cimprich, 2005 [28]	A randomized controlled trial. Participants were recruited from an academic cancer treatment center and community oncology treatment clinics.	The purpose of the present study was to develop and test Taking CHARGE, a self-management intervention designed to facilitate successful transitions of survivorship after breast cancer treatment.	BCS intervention (n = 22)	The outcome evaluation involved a telephone-administered questionnaire of all participants of three-time points: before the intervention, immediately following completion of the response, and three months following end of the intervention. The telephone questionnaire included several generic and condition-specific measures addressing the specific study objectives and content areas.	The findings indicated that intervention group participants found the Taking CHARGE program to be timely, relevant, and to have high utility in dealing with concerns that exist following breast cancer treatment. The process evaluation findings provide early evidence of the usefulness of the Taking CHARGE intervention for a successful transition to survivorship following breast cancer treatment.
			Mean age: 48 years old (SD: 8) White: 92% Other: 8% Cancer stage I: 48% Cancer stage II: 52% Completed primary treatment. No history of cognitive impairment or affective disorder within the previous year.		
			BCSs control (n = 24)	Descriptive statistics were used to examine responses related to the level of participation in intervention activities, the usefulness of the self-regulation approach, and an assessment of the program's content, including breadth and depth of information provided, workbook, and intervention materials, and perceived support in the group sessions.	The program needs to be further tested for efficacy in a larger randomized clinical trial involving more diverse populations of women completing breast cancer treatment.
Schulman-Green, 2017 [44]	A one-group, pre-post-test study. Participants were recruited from the breast center infusion clinic at a cancer hospital in Connecticut, U.S.A.	The purpose of this study was to test the feasibility and acceptability of a psycho-educational self-management intervention, Managing Cancer Care: A Personal Guide (MCC), to improve knowledge of care options among a range of breast cancer self-management skills.	BCSs (n = 105)	An 11-item knowledge test was used to assess knowledge of curative, palliative, and hospice care using a true-false format. An adapted version of the Control Preferences Scale was used to measure desired, and actual roles played in self-management. The patient subscale of the Medical Communication Competence Scale was used to measure participants' perceptions of their medical communication. Participants completed the Measurement of Transitions in Cancer Scale to first-rate the degree or quantity of change they felt they experienced for various transitions and then rate how well they managed each change. The Hospital Anxiety and Depression Scale was used to measure anxiety and depression. The Uncertainty in Illness Scale was used to assess uncertainty. The Chronic Disease Self-Efficacy Scale was used to measure self-efficacy.	MCC is a feasible and acceptable means of improving knowledge of care options and other aspects of breast cancer self-management. The combination of modules offered in MCC appears to have beneficial interactive effects.

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
			<p>Mean age: 52.3 years old (SD 10.4)</p> <p>Stage I cancer: 19.0%</p> <p>Stage II cancer: 56.2%</p> <p>Stage III cancer: 24.8%</p> <p>White: 78.1%</p> <p>Black: 9.5%</p> <p>Hispanic: 5.7%</p> <p>Other: 6.7%</p>		<p>Future testing of MCC should include objective measures of self-management. Besides, MCC should be tested over a more extended period of time and among a more extensive and more diverse sample that provides for men.</p>
		<p>Following pre-test data collection, research staff gave participants MCC and a very brief orientation to the models. One month later, research staff phoned to check in about participants' use of MCC to answer any questions and to set a time for post-test data collection one month following the phone call. Research staff conducted a semi-structured interview with each participant immediately following post-test data collection.</p>		<p>Paired <i>t</i>-tests and a generalized linear model were used for data analysis.</p>	
Ellegaard, 2018 [27]	A longitudinal study. The participants were recruited from the Department of Oncology, Aarhus University Hospital, Denmark.	<p>This study aims to describe the process of developing and testing a novel Cancer Self-management Education program (CSME program) to improve patient-reported self-management and self-efficacy in patients with breast cancer at the end of primary treatment.</p> <p>Implementation of dialogue-based tools was used as an educational learning instrument in the Cancer Self-management Education (CSME) Programme.</p>	<p>Nine oncology healthcare providers, two external experts in patient education, and five breast cancer patients were involved between November 2014 and December 2015. Between June 2015 and June 2016, 93 breast cancer women participated in the CSME program. Inclusion criteria were women above 18 years of age, diagnosed and treated for primary breast cancer with curative intent who had to receive chemotherapy.</p>	<p>In May 2015, five breast cancer women participated in a pre-test for the CSME program. After the pre-test, a 2 hours semi-structured focus group interview was conducted and audio-recorded to evaluate the CSME program. Between June 2015 and June 2016, a questionnaire was administered at baseline, 3 months, 6 months, and 12 months to the 93 breast cancer women in the CSME program. The questionnaires included socio-demographic characteristics, the Health Education Impact Questionnaire (HEIQ), and the Cancer-related Self-efficacy Questionnaire (CBI-B).</p>	<p>The Plan-Do-Study-Act (PDSA) approach to the development of the CSME program resulted in a person-centered program that could improve self-management and self-efficacy in the survivorship phase with breast cancer.</p> <p>In future research in the field of patient education, the potential for involving more and more patients who request to be more involved in their treatment and aftercare in planning both the research and education program should be used.</p>

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
Bail, 2018 [7]	A prospective study. Participants were recruited from three identified African American (AA) churches in central Alabama, U.S.A.	This study aimed to address the cognitive concerns identified by AA BCS; the researchers developed an educational and supportive cognitive health program Think Well: Healthy Living to Improve Cognitive Function, to increase awareness of cognitive changes after treatment and to promote healthy living to address those changes among BCS.	172 participants (40 BCS, 98 co-survivors). The BCS mean age is 59 years old. The co-survivors' mean age is 51 years old. BCS participants had an average of 10 years of survivorship (SD = 8.2).	The evaluation consisted of a 22-item survey and a sociodemographic questionnaire. Following each Think Well seminar, participants were asked to complete the Think Well survey. Data obtained from the responses of African American (AA) participants were analyzed via the IBM SPSS statistics version 21 (Armonk, New York, United States). Data obtained from the responses of AA participants were analyzed via the IBM SPSS Statistics version 21.	Respondents reported Think Well to be culturally relevant (90%) and of high quality (94%). Engaging church leaders facilitated the reach of AA BCS. Assessing and tailoring to congregation preferences and cultural relevance was key to the success of Think Well. Partnership facilitated a culturally relevant, high-quality program for AA BCS and co-survivors. AA BCS were willing to discuss cognitive concerns and to seek guidance for improving cognition. Co-survivors are an essential support network for AA BCS. Future educational programs targeted to AA BCS may consider including co-survivors, including co-survivors in future programs, may serve as a teaching moment for cancer-risk reduction and provide needed support for co-survivors.
Newman, 2019 [43]	A cohort study with a pre- and post-test research design. Participants were recruited from the outpatient oncology clinic of an urban hospital serving a racially and socioeconomically diverse patient population in Boston, U.S.A.	The primary goal of this study is to evaluate the feasibility and acceptability of this hybrid individual and group-based occupation-focused self-management program for an urban underserved and culturally diverse breast cancer population living with cancer-related cognitive impairment (CRCI). The secondary goal was to explore the potential effects of the program on occupational performance, quality of life, activity level, and perceived cognitive function.	BCSs (n = 15) Mean age: 60.1 years old (SD: 12.3) Black: 74% White: 13% Other: 13% Cancer stage 0: 13% Cancer stage I: 33% Cancer stage II: 47% Cancer stage III: 7%	Canadian Occupational Performance Measure (COPM) is a measure designed to help participants identify and evaluate occupational performance in the areas of self-care, productivity, and leisure. The Activity Card Sort measures levels of engagement in a variety of occupations in the domains of instrumental activities, low-physical demand leisure, high-physical demand leisure, and social events. The Functional Assessment of Cancer Therapy (Fact-G) is a patient report measure that assesses health-related quality of life for cancer survivors in the areas of physical, social, emotional, and functional wellbeing, with a recall period of the past 7 days. The Functional Assessment of Cancer Therapy-Cognition (FACT-Cog) was used to measure patient-perceived cognitive functions.	Participants reported high satisfaction with the program and high confidence in their problem-solving and goal-setting skills. Participants who completed the post-program assessment showed significant increases in self-perceived performance and comfort in daily living, participation, physical and functional wellbeing, and perceived cognitive impairment. The program was feasible for a vulnerable, socio-economically diverse patient population, acceptable to participants, and may have positive effects on occupational performance. Further research of this program is warranted, with a particular focus on culturally diverse and low-income cancer survivors.

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
		The program included six 90-minute sessions, two of which were individual (Session 1 and Session 6) and four of which were group sessions. Each session had specific topics and tasks. A workbook was given to each participant.		Paired samples <i>t</i> -tests, repeated measures ANOVA were used for data analysis.	
Liao, 2014 [21]	Two groups, non-randomized quasi-experimental design. Participants were recruited from the general surgical outpatient department of two branches of a medical center in northern Taiwan.	This study aimed to investigate the effects of education and psychological support on anxiety, symptom distress, social support, and unmet supportive care needs of Taiwanese women newly diagnosed with breast cancer over three months after surgery.	Experimental group: (n = 40)		The levels of symptom distress and unmet needs for participants in the experimental group were lower at 1 and 3 months after surgery than for those in the control group, with the results at 3 months achieving significance. However, the sexuality needs for both groups were not significantly different at 1 and 3 months. Furthermore, levels of state anxiety were substantially lower for the experimental group at 1 and 3 months than for the control group. The education and psychological support components of our intervention program effectively improved the unmet supportive care needs of patients newly diagnosed with breast cancer 3 months after surgery. Following prolonged treatment, women with breast cancer still have physical, psychological, and information care needs.
			Mean age: 50.7 years old	Participants' anxiety was assessed using the Chinese version of the State-Trait Anxiety Inventory (STAI). Patients' symptom distress was assessed using the Chinese version of the Symptom Distress Scale modified for breast cancer (SDS- <i>mbc</i>). Social support was assessed using the Chinese version of the Social Support Scale-modified (SSS-m). Patients' supportive care needs were assessed using the Chinese version Supportive Care Needs Survey-Short Form (SCNS-SF34).	
			Married or living with partners: 80% Stage I BC: 37.5% Stage II BC: 42.5% Stage III BC: 20%		

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
		This study included a control group and an intervention group. The intervention was offering education and psychological support in five sessions: three individual face-to-face educational and psychological support sessions and two telephone follow-up sessions. The five sessions were guided and supplemented by a standardized education booklet.	Control group: (n = 40) Mean age: 50.74 years old Married or living with partners: 85% Stage I BC: 42.5% Stage II BC: 40% Stage III BC: 17.5%	Chi-square test, Fisher's exact test, independent <i>t</i> -test, two way repeated measures ANOVA and ANCOVA were used for data analysis.	Future double-blinded, randomized controlled trials have a bigger sample size, and recruiting patients from different hospitals and geographical areas is needed.
Yi, 2008 [24]	A prospective cohort study. Participants were recruited from those breast cancer patients who visited Korea Breast Cancer Cyber Center (KBCCC), the subjects were those who logged in more than three times with a total visiting period of at least 30 minutes and those who consented to participate in the study.	The primary goal of this study is to develop and test a web-based educational program for WBC in Korea: (1) assess the educational needs of WBC in Korea; (2) construct and develop a web-based educational program based on these needs. The program will include a self-learning program using a decision tree model; (3) evaluate the satisfaction and usefulness of the web-based educational program.	BCSs (n = 147) Mean age: 46.6 years old (range from 29 to 65) Cancer stage 0: 6.2% Cancer stage I: 35.2% Cancer stage II: 37.2% Cancer stage III: 17.9% Cancer stage IV: 0.0%	Items measuring satisfaction of the website: a questionnaire consisting of a total of 16 questions was developed to evaluate the functions of the website, with the highest possible score being 4.0 per item. The sub-categories consisted of 2 items of System Efficiency, 3 items of System Convenience, 1 item of Design, 7 items of Adequacy of Information, and 3 items of Usefulness of information. Items measuring the usefulness of the website: there is a total of 7 questions evaluating the contents of the website, and a maximum of 4.0 points indicate the highest satisfaction. The sub-categories consisted of cancer chemotherapy and hormonal therapy, and the lowest possible score is 1.0 and the maximum of 4.0 points.	It is highly imperative for the development of educational websites that are sensitive to the needs of health information consumers and especially the online patient communities that are specific to certain conditions. Through this study, there will be many useful improvements in terms of richness of resources and valuable functions in the web-based educational program geared towards breast cancer patients in the future. Follow-up research is needed to test whether women who have used the web-site are better off by measuring whether they are better-informed long-term, or assessing whether they check themselves more effectively and so on. The research design would be post-treatment and long-term outcomes evaluation.

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
		The subjects were those who logged in more than three times with a total visiting period of 30 minutes or longer and those who consented to participate in the study.	Others: 3.5%	<i>t</i> -test, ANOVA, and multiple regression were used for data analysis.	
O'Malley, 2016 [33]	A cross-sectional study. Participants were recruited from four community oncology hospitals that are a part of the Rutgers Cancer Institution of New Jersey's network of affiliated hospitals in the U.S.A.	There are three aims in this study: (1) Identify patient-level characteristics (i.e., sociodemographic and medical history) that motivate patients' requests for additional information to guide follow-up care. (2) Delineate which psychosocial aspects (i.e., worries about the future, fear of disease recurrence and patient activation) and process of care factors (i.e., coordination of care, satisfaction with cancer-related information provided by oncology and primary care providers) are associated with a patient desire for information to guide follow-up care. (3) Describe the informational modalities preferred for the delivery of follow-up care. (4) Describe the informational modalities preferred for the delivery of follow-up care guidance among the cancer survivor information seekers.	Breast cancer patients (n = 189)	The outcome variable was measured using a single question (yes/no). Socio-demographic information was collected. Co-morbidity was measured using the Charlson Comorbidity Index. Length of time since treatment was assessed. The type of treatment site (academic vs. community) was coded. Patient activation was measured using the Patient Activation Measure. Two Likert scale single item questions were used to assess worries about the future and fear of disease recurrence. Satisfaction with cancer-related information was evaluated using two single-item frequency question. Coordination of care was measured by calculating the mean for the five items on the coordination of care subscale in the Components of Primary Care Instrument. Informational modality preference was measured using a multiple-response, forced-choice item.	African American survivors and survivors with higher comorbidity were more likely to want additional information to guide follow-up care. Survivors who wanted more information to guide their follow-up care reported more significant worries about the future and fears about disease recurrence compared to those who did not want additional information. Results emphasize the need to develop cancer survivorship educational strategies that are both responsive to the needs of specific populations (e.g., African American survivors and patients with multiple comorbidities) and the psychosocial profiles that motivate requests for more extensive follow-up guidance.
			Prostate cancer patients (n = 89) Mean age: 64 years old (SD: 10.8) Race/ethnicity: White: 86% African American/Black: 14% Years after cancer treatment: Early (2–5 years): 57% Mid (6–10 years): 31% Long (10+ years): 12%		Future studies should utilize measures that are more sensitive about the different types of information that might be appropriate to guide follow-up care information to provide a broader understanding of different strategies that support patients during this phase of care.
Wu, 2018 [37]	A randomized controlled trial. Participants were recruited from a cancer medical center located in southern Taiwan.	This study aimed to evaluate the effects of the psychoeducational interventions (PEIs) which encompassed a broad range of activities, including education and other activities addressing anxiety, depression, disease-specific care knowledge, quality of life, self-efficacy, and resilience in patients with breast cancer undergoing chemotherapy compared with a control group.	Experimental (n = 20)	The Chinese version of the Hospital Anxiety and Depression Scale (HADS) was used to test general clinical patient symptoms of anxiety and depression and to assess the severity of emotional impairment. This study used the disease-specific care knowledge scale developed by Li (1990). Two different questionnaires European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30 (EORTC QLQ-C30) and European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-breast cancer module 23 (EORTC QLQ-BR23) were used in this study as disease-specific quality-of-life questionnaires.	

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
		The experimental group received six sections of PEI before and during five rounds of chemotherapy, with each section lasting at least 1 hour. Each session had defined goals and content. All of the eligible patients with breast cancer were randomly assigned to either the experimental group or the control group using sealed envelopes, in which the designated method or treatment was noted.	Mean age: 51.2 years old (SD 9.18)	This study used the self-efficacy scale created by Cheng (2000). Finally, this study used the resilience scale designed by Wagnild and Young (1993).	Anxiety, depression, resilience, and quality of life in the experimental group showed significant differences at T4. Significant differences became apparent at T2 for knowledge and T3 for self-efficacy. The effects of knowledge, resilience, and quality of life remained significant when group and time interactions were included in the model, showing a positive relationship between PEI and the variables of knowledge, resilience, and quality of life. Face-to-face PEI for patients with breast cancer is potentially useful in improving knowledge, resilience, and quality of life during and after chemotherapy. In the current study, PEI significantly improved disease care techniques, reduced chemotherapy-related discomfort, and improved quality of life for participants in the experimental group.
			Stage I cancer: 35.1% Stage II cancer: 40.0% Stage III cancer: 15.0% Stage IV cancer: 10.0% Chemo Never: 95.0% Chemo 1–2 times: 5.0% Control (n = 20) Mean age: 51.2 (SD 10.71) Stage I cancer: 22.5% Stage II cancer: 35.0% Stage III cancer: 25.0% Stage IV cancer: 17.5% Chemo Never: 95.0% Chemo 1–2 times: 5.0%	Fisher's exact test, Mann-Whitney U test, Wilcoxon signed-rank test, and mixed model were used for statistical analysis.	Future double-blinded randomized controlled trials with larger samples and explore more deeply all of the relationships among the clinical variables to obtain more conclusive claims regarding the treatment mechanism, psychological and quality-of-life-related changes, and the efficacy of the evaluation.

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
Ashing, 2020 [46]	A secondary data analysis study. Participants were recruited from the Los Angeles County and Desert Sierra Cancer Registries (CCR) and the City of Hope Cancer Registry, as well as from breast cancer survivor support groups in California, U.S.A.	The purpose of this study was to identify specific areas where the intervention of a telephonic psycho-educational intervention trial on improving emotional well-being (EWB) in a sample of African American breast cancer survivors (AABCS). The study also tried to identify gaps that need to be further addressed in future studies. Further, it sought to determine whether pre- to post-intervention score changes differed significantly between the intervention and control groups.	BCS participants were eligible for study participation if they were aged 18 years and older, self-identified as African American (AA), and were diagnosed with stage 0-III breast cancer within the past six years.	<p>The researchers used Wilcoxon signed-rank tests to measure pre- to post-intervention score changes in individual EWB items (FACT-G) and subscales. Independent <i>t</i>-test compared differences in mean scores between the intervention and control group.</p> <p>Chi-square analyses and <i>t</i>-tests examined differences in demographic and clinical characteristics between the control and intervention groups at baseline. Wilcoxon signed-rank tests evaluated pre- to post-intervention changes in scores for individual items within the EWB subscale of the FACT-G, as well as for standardized subscale total scores. These changes were compared between control and intervention groups.</p>	<p>Overall emotional well-being, as well as emotions about sadness, coping, and nervousness, showed some improvements as a result of the intervention. This study results and approaches advance supportive care interventions by illuminating the benefits and limitations of a paraprofessional delivered, licensed professional supervised psycho-educational intervention. It facilitates the development of culturally responsive and patient-centered survivorship care to medically vulnerable and underserved patients.</p> <p>A future implementation and dissemination study is needed to test the utility and effectiveness of this intervention with a large, ethnically diverse population.</p>
Lewis, 2008 [47]	A pilot study with a pre-post-test. Participants were recruited from multiple provider sites in the Pacific N.W.	<p>Participants completed the study questionnaire at baseline and 4–6 months after study randomization.</p> <p>The purpose of this study was to evaluate the short-term impact of a 5-session, clinic-based, educational counseling intervention of Helping Her Heal (HHH) program for spouses whose wife was recently diagnosed with early-stage breast cancer. The goal of the intervention was to enhance spouses' skills and confidence to communicate and interpersonally support his wife about breast cancer as well as improve spouse's self-care, depressed mood, anxiety, and marital adjustment.</p>	<p>Spouse (n = 20)</p> <p>Spouses were eligible if they were married or co-habiting with an intimate female partner who was diagnosed with local or regional breast cancer (Stage 0-III) within the past 6 months.</p>	<p>Standardized questionnaires were used to evaluate the impact. The Spouse Skills Checklist was developed to assess the effect of the intervention on the spouse. Depressed mood was measured by the Center for Epidemiological Studies-Depression Scale (CES-D). Anxiety was measured by the state anxiety subscale of Spielberger's State-Trait Anxiety (STAI-Y) Scale. The Cancer Self-Efficacy Scale-Spouse Version (CASE-S) was used to measure the spouse's confidence in managing the impact of breast cancer. The marital adjustment was measured by both a general measure of marital quality, the Dyadic Adjustment Scale (DAS), and a cancer-specific measure, the Mutuality and Interpersonal Sensitivity Scale (MIS).</p>	<p>Pre-post-test results obtained from 20 spouses from valid and reliable standardized questionnaires showed significant improvement in spouses' depressed mood, anxiety, skills, self-confidence, and self-care. Confidential post-intervention interviews with spouses and wives included detailed examples of positive changes in the spouse's communication and support to his wife about the breast cancer, diminished tension in the spouse, and improved quality in the couple's relationship.</p> <p>Further research is needed to assess the impact of HHH on couples from other ethnic and cultural groups as well as spouses in less well-adjusted or shorter-term marriages. It is also required to evaluate the efficacy of the HHH within a clinical trial using more specific measures of marital adjustment, not the global measures used in this study. It should also include evaluating the impact of HHH on wives' change, not just spouses.</p>

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
Cheon, 2019 [30]	A prospective study. Participants were recruited from the survivor clinic in Korea.	<p>The purpose of this study is to investigate the improvement of knowledge and quality of life (QoL) through education among BCSs.</p> <p>The education cohort (EC) who received the educational program. Breast cancer survivors who visited the survivor clinic during the same period were retrospectively enrolled as a control cohort (CC).</p>	<p>BCSs (n = 100)</p> <p>Mean age: 52.7 years old Married: 86% High school or college graduates: 75% Employed: 78% The economy was in the middle or better: 94%</p>	EC was pretested for knowledge on breast cancer survivorship, and a trained nurse conducted a 30-minute individual education program, which was based on the ASCO survivorship guideline, with post-test knowledge assessment to measure changes in this aspect. To measure QoL change, the researchers conducted a QoL survey at the time enrollment and six months later in both groups. Hospital Anxiety and Depression Scale was used to measure anxiety and depression levels. The Functional Assessment of Cancer Therapy-Breast Cancer (FACT-B) was used to measure physical and functional well-being.	<p>While there was no statistically significant difference among the CC, EC showed substantial improvement in anxiety and depression. The FACT-B test showed statistically significant improvement in physical and functional well-being for EC. This study found education effective in reducing stress and depression as well as physical and technical well-being in breast cancer survivors. There was no significant difference in lifestyle change for either group.</p> <p>Future study needs to demonstrate significant intervention effects in lifestyle change. To elicit lifestyle changes, more active intervention is required, along with education.</p>
Esplen, 2020 [35]	A qualitative study. Participants were recruited from the Princess Margaret Cancer Centre and the Odette Cancer Centre, Canada.	<p>The object of this study is to develop and test an 8-weekly (90-minute) group therapy intervention-restoring body image after cancer (ReBIC)-designed to specifically address body image (BI) disturbance among breast cancer (BC) survivors.</p> <p>The body image scale with a cutoff >5 to identify BC survivors with BI-related issues. The intervention incorporates three active components: psychotherapeutic group principles, guided imagery exercises to address BI, and psychoeducation on relevant socialization factors and gender-based messages internalized by women in Western society.</p>	<p>Two pilot groups were delivered (n = 18) before the randomized controlled trial (RCT) (n = 194).</p> <p>The average age of the BC survivors in interviews and pilot groups was 47 years. 73% had partners, and all had completed treatments for stage I-III BC.</p>	Interviews were conducted with BC survivors who expressed concerns around their BI to identify themes associated with BI distress. A content analysis was conducted from the transcribed interviews. A descriptive exploratory approach was used to adapt existing guided imagery exercises to address BI and identity issues that could be incorporated into a group therapy model. The book Too Good For Her Good was chosen to provide reading material that would generate group discussions on gender role and sociocultural influences that contribute to BI and self-esteem, to facilitate reflection on prior histories. Weekly videotaped sessions were reviewed by the study team for consensus-building around emerging themes. Data collection was ended when theme saturation was reached, and a draft therapy manual was developed for the study.	Specific themes included negative emotions associated with an altered body and self, grief and loss, isolation, difficulties with sexual intimacy, relationship challenges, and uncertainty around a sense of self and future. ReBIC is a group therapy intervention addressing BI challenges following BC. Its benefits are supported by evidence from an RCT. The intervention can be considered as an offering within programs of survivorship care.

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
				A content analysis was conducted from the transcribed interviews.	Future studies with a control group(s) evaluating various intervention components are required to identify specific mechanisms of change associated with the intervention.
Sabiston, 2019 [26]	A mixed-method study. Participants were recruited from a breast cancer clinic through a physician chart review in a large urban city in Canada.	The purpose of this study was to evaluate a community-based physical activity program (Curves) as physical activity (PA) program for BCS.	<p>Study 1 (n = 30)</p> <p>Mean age: 55.7 years old (SD 8.9)</p> <p>Caucasian: 87%</p> <p>Weight: 70.79 kg (SD 13.54)</p> <p>BMI: 26.5 (SD 5.2)</p>	Study 1: women self-reported PA using Short Questionnaire to Assess health-enhancing PA (SQUASH), which is designed to assess daily PA during leisure time, work, school, daily transportation, or other regular activities by indicating the frequency, duration, and intensity of each bout.	The provision of memberships to a community-based physical activity program did not improve physical activity levels beyond educational and information resources. However, there are several advantages to community based physical activity programs, and the women offer several suggestions for improvements for community physical activity opportunities aimed at BCSs. Women-only community-based physical activity programs may be a viable option to help introduce women to get active after treatment. Future work is needed to better understanding the integration of BCS into a PA program from the program provider perspectives.
		This purpose is addressed with three interrelated studies focused on a sample of BCS who were eligible for Curves memberships. Study 1 is to compare two ecologically valid programs for changes in PA levels in BCS. Study 2 is to evaluate attendance, attitudes, and beliefs about the characteristics of the Curves program. Study 3 is to explore experiences of BCS who attended Curves through interviews.	<p>Breast cancer stage diagnosis \leq II: 66.7%</p> <p>Study 2 (n = 66)</p> <p>Mean age: 59.1 years old (SD 10.9)</p> <p>Caucasian: 80%</p> <p>Weight: 74.21 kg (SD 18.39)</p> <p>BMI: 27.9 (SD 6.7)</p> <p>Breast cancer stage diagnosis \leq II: 74.2%</p> <p>Study 3 (n = 6)</p>	<p>Study 2: frequency of program attendance was assessed to examine the use of memberships. Additionally, participants were asked to describe their program participation. Curves' PA engagement was dichotomized as either no or little involvement compared to the regular participation to further explore predictors of behavior.</p> <p>Study 3: qualitative research among women who attended Curves and who were purposefully selected to participate in individual semi-structured interviews aimed at understanding the experience of participating in the Curves PA program.</p> <p>t-test and Chi-square test were used for data analysis.</p>	

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
			Women who had attended Curves at least once a month for the duration of the membership and that they had been diagnosed with breast cancer within five years before the study.		
Lee, 2014 [38]	A randomized controlled trial. Participants were recruited from 4 hospital cancer registries in Seoul, Korea.	The current study aimed to investigate whether the Web-based Self-management Exercise and Diet Intervention (WSEDI) was a feasible and primarily effective method for promoting exercise and dietary behaviors and dietary quality and an effective secondary way for addressing HRQOL, anxiety, depression, fatigue, motivational readiness, and self-efficacy in breast cancer patients.	WSEDI intervention group (n = 30)	The exercise was measured in minutes per week of at least moderate aerobic exercise that consumed at least 4 metabolic equivalents. The number of fruits and vegetables (F & V) servings consumed per day and initial food intake were assessed and averaged using a 3-day dietary recall. Initial Dietary quality was measured using the diet quality index (DQI). All nutrition intake data were estimated using the Korean Nutrition Society computer-assisted nutritional analysis program and were scored regarding the recommended daily allowance (RDA) by a dietician. The European Organization for Research and Treatment of Cancer (EORTC) was used to measure HRQOL. The Hospital Anxiety and Depression Scale (HADS) was used to measure anxiety and depression. The Brief Fatigue Inventory (BFI) was used to measure fatigue. Staging items derived from the TTM theory were domain-specific and explored goal behavior. Participants were asked in terms of each goal behavior to assess perceived self-efficacy.	The proportion of subjects who performed at least moderate-intensity aerobic exercise for at least 150 min per week; ate 5 servings of F & V per day; and had overall improvements in dietary quality, physical functioning and appetite loss (HRQOL), fatigue, and motivational readiness was more significant in the intervention group than in the control group. The self-efficacy concerning exercise and F & V consumption was higher in the intervention group than in the control group. A Web-based program that targets changes in exercise and dietary behaviors might be sufficient for breast cancer survivors if the TTM theory has been used to inform the program strategy.
		The efficacy of WSEDI was evaluated by a randomized controlled trial with a control group. The intervention group was expected to a 12-week WSEDI aimed at enhancing exercise and dietary behaviors tailored according to the principal constructs of the transtheoretical model (TTM) theory.	Mean age: 41.5 years old (SD: 6.3) Cancer stage 0: 6.7% Cancer stage I: 40% Cancer stage II: 43.3% Cancer stage III: 10% Control group (n = 29)		
			Mean age: 43.2 years old (SD: 5.1) Cancer stage 0: 0% Cancer stage I: 37.9% Cancer stage II: 51.7% Cancer stage III: 10.3%	t-test, Chi-square test, an ordinal logistic regression model, logistic regression model, ANCOVA was used for statistical analysis.	Future research with larger sample size is required to make conclusive claims.

Table 1. Continued.

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Finocchiaro, 2016 [40]	A prospective study. Participants were recruited in a single-center—the Department of Clinical Nutrition of Hospital Citta della Salute of Turin in Italy.	<p>This study aimed to evaluate the effects of a specific educational intervention based on group meetings conducted by dietitians, nutritionists, physicians, oncologists, and sports physicians and individualized follow-up aimed to promote health in breast cancer survivors.</p> <p>The intervention program consisted of four meetings once a week, including lectures, training sessions, and workshops lasting over all a month. Dietary recommendations were provided based on WCRF/AICR guidelines and were modeled on the Mediterranean diet pattern. Sports physician recommended adapted physical activity, based on clinical experiences and scientific evidence.</p>	100 breast cancer women previously treated for nonadvanced breast cancer. The mean age at inclusion was 55.5 years. Approximately one third was overweight (35%), and about one third was obese (35%). Mean BMI at inclusion was 28.7, and mean body weight differs significantly with weight before the disease (71.8 kg vs. 67.4). Mean waist circumference at inclusion was above the cut-off used in diagnostic criteria for metabolic syndrome (95.3 cm, SD 13.1). The majority of patients were sedentary with insignificant time spent in physical activity (mean hour nil, SD 0.8) at baseline.	Food Frequency Questionnaire was used to assess dietary habits and food intake patterns. The increase of adherence to Mediterranean diet measured by the Italian Mediterranean Index. To assess physical activity, including recreational, occupational, and household activities, the interview administered the IPAQ questionnaire. Height, weight, and waist circumference were given at the first session and after two and six months from the beginning of the study. Height and weight were measured to the nearest 0.1 cm and 0.1 kg, respectively, using a balanced rocker fitted with a stadiometer. Patients were weighed without shoes and light clothing. Waist circumference was measured to the nearest 0.1 cm with a tape measure.	A significant decrease in BMI and waist circumference was observed after two months (T1) and six months (T2). The mean rate of weight loss was 4.2% at the end of follow up, and 43% of patients had lost >5% of initial weight. The mean percentage of waist circumference loss >10% was reached in 19% of women at the end of follow up. Physical activity was significantly increased at the end of follow up. Adherence to the Mediterranean diet was improved considerably. This study found this dietary intervention effective in reducing BMI and waist circumference and enhancing a healthy lifestyle to BCSs. It has undoubtedly contributed to achieving these results besides the change in diet quality, mostly a marked reduction in sedentary habits.
Spector, 2012 [41]	A prospective study. Participants were recruited through word of mouth, flyers, emails, and news releases from partner organizations in the Department of Exercise and Sport Science at the University of North Carolina at Chapel Hill, U.S.A.	<p>To achieve the goal of improving both physical and psychological quality of life among BCSs, this study aimed to establish a network of collaborative partners in four North Carolina counties identified to be high-need areas for health education for BCSs.</p> <p>In partnership with the collaborative networks, five wellness workshop series were developed to meet the needs of BCSs in the designated counties.</p>	<p>A total of 73 BCSs and 8 co-survivors attended at least one of the workshops. Most women were married, 45 years of age, or older and unemployed.</p> <p>Caucasian: 42.5%</p> <p>African American: 31.5%</p> <p>Hispanic Latina: 15.1%</p> <p>Asian: 1.4%</p> <p>Native American: 1.4%</p> <p>Other: 1.4%</p>	<p>Sociodemographic information only from BCSs. Physical activity was measured both at baseline and one month after the exercise workshop using the short form of the International Physical Activity Questionnaire (IPAQ). The Centers for Disease Control's HRQOL instrument was used to measure participant's health-related quality of life (HRQOL) at baseline and from 2 to 4 weeks following the emotional and stress management portion of the workshop series. All participants were asked to complete anonymous workshop evaluations at the end of each workshop.</p> <p>Paired sample <i>t</i>-tests and a Wilcoxon signed-rank test were used for data analysis.</p>	<p>More extensive and longer clinical trials are needed to investigate the lasting effects of the intervention and their relation with prognosis.</p> <p>There was an increase in physical activity and improvements on several HRQOL domains such as mental health, pain, sleep, energy, and being worried one month following the exercise workshops. However, the results were not significant; they are encouraging.</p> <p>Future research may examine whether any specific sociodemographic factors were related to physical activity behavior and HRQOL to help determine which subgroup may have the highest need for future wellness workshops.</p>

Table 1. Continued.

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Stoutenberg, 2011 [42]	A prospective study. Participants were recruited from the South Florida community in the U.S.A.	From Surviving to Thriving (FST) colloquium was developed to address the need for better health and wellness education in BCSs and associated health care providers (HCPs).	BCSs (n = 59) Mean age: 52 years old Caucasian: 44.1% African American/Black: 16.9% Hispanic: 32.2% Asian: 3.4% White Hispanic: 3.4%	Attendees were asked to fill out anonymous demographic questionnaires. They were also asked to complete a brief questionnaire to determine their baseline self-perceived knowledge of exercise, nutrition, and wellness and to assess the short-term efficacy of the Colloquium in increasing self-perceived knowledge and promoting planned future behavior change. Colloquium feedback and evaluation using five-point Likert scales. Knowledge acquisition using a five-point Likert scale, all attendees were asked to rate their knowledge of exercise and nutrition before and after the Colloquium. Planned behavior change using five-point Likert scales. Colloquium follows up to assess the impact of the Colloquium on the exercise and nutrition practices of attendees.	Overall, the FST Colloquium was well received by BCSs and HCPs. The majority of BCSs (84.4%) and HCPs (93.3%) rated their Colloquium experience as very good. Before attending the Colloquium, only 8.9% of BCSs rated their self-perceived knowledge of exercise and nutrition as excellent. After participation in the Colloquium, this increased to 44.4%. The Colloquium was also successful in influencing planned and actual behavior changes in BCSs.
		The FST Colloquium was designed to educate HCPs and empower BCSs, from diagnosis onward, to make positive choices in their physical activity, nutrition, and lifestyle choices by featuring a range of speakers who presented practical approaches for improving fitness, functionality, daily life activities, and quality of life in BCSs.	HCPs (n = 17) Caucasian: 29.4% African American/Black: 23.5% Hispanic: 23.5% Asian: 11.8% White Hispanic: 11.8%		Not only are future educational efforts essential, but implementation procedures and follow-up programs are equally important.
Rushton, 2015 [25]	Qualitative research. The multidisciplinary team of health care providers in the Wellness Beyond Cancer Program (WBCP) was recruited from The Ottawa Hospital Cancer Center. All cancer patients were referred to the WBCP by their oncologist in The Ottawa Hospital Cancer Centre in Canada.	The purpose of this paper is to describe the development and evaluation of WBCP.		Qualitative surveys with Likert scale questions were mailed to patients and PCPs 1 year after patients had been referred to the WBCP. The surveys addressed knowledge of the program content, satisfaction on the part of patients and providers, and whether SCP recommendations were followed. At the time of referral, patients complete a needs assessment to self-identify their outstanding physical and psychosocial needs.	

Table 1. Continued.

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		The WBCP program was launched in 2012, first accepting patients with colorectal cancer (CRC), then taking patients with breast cancer (BCa) to standardize and streamline the discharge process from The Ottawa Hospital Cancer Center. Patients were discharged either to the WBCP nurse practitioner or to their primary care provider (PCP). The program incorporates survivorship care plans (SCPs) and education classes; it also has a rapid re-entry system in case of recurrence.	Breast cancer patients: (n = 1821) Colorectal cancer patients (n = 809)	The completed needs assessment is forwarded, with the program referral, to the WBCP. All referred patients are invited to attend a 2-hour survivorship education class and are given educational booklets. Appointments with the WBCP RN lasted approximately 30 minutes. At this visit, the SCP is reviewed in detail, and symptom management to help address the patient's out-standing self-identified needs.	At one year after discharge, patients and PCPs were satisfied with program content, but there is an opportunity to improve on communication and provision of cancer-specific information to the PCPs. Using the WBCP to ensure a safe transition to the most appropriate health care provider, this study has standardized the discharge process for CRC and BCa patients.
Mirriclees, [36]	2017 A qualitative study. Peer advocated they were recruited from the practices of the University of Wisconsin Breast Center (UWBC), U.S.A.	The primary purpose of this study was to provide and evaluate a peer psychosocial support and education program to decrease anxiety in newly diagnosed breast cancer patients, as well as improve patient-physician interactions and understanding of the steps involved in cancer care.	Forty patients have been matched with 77 advocates. The mean age of patients was 49.06 years old (SD 12.63)	Survey assessment tools were distributed to assess peer advocate and patient satisfaction, as well as clinician experience.	Advocate training themes included: breast cancer diagnosis and treatment, breast cancer and emotions, survivorship and self-care, listening and communication skills, confidentiality, and ethics. Patient/peer advocate contact themes included: pre- and post-procedure care, complementary medicine, emotions, anxiety, and uncertainty, information overload, balancing treatment with work, life, and relationships. Patients and peer advocates reported satisfaction with the program. The majority of patients (92.9%) said that the program was "helpful" and that they would recommend the PSA program to another woman with breast cancer. All peer advocates (100%) responded with a sense of achievement in their advocate roles. Clinicians noted challenges in referral to the program. Peer advocates can provide critical emotional and psychosocial support to newly diagnosed breast cancer patients.

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
			<p>African American 6.1%</p> <p>Hispanic 3.0%</p> <p>Asian 6.1%</p> <p>Caucasian 84.9%</p> <p>Invasive cancer 93.9%</p> <p>In situ 6.1%</p> <p>The mean age of peer advocates was 50.10 years old (SD 12.22)</p>	<p>Training for peer advocate occurred over 2 days. Themed sessions explored each of 6 After Breast Cancer Diagnosis (ABCD) topics (diagnosis, treatment, listening/communication skills, emotions, ethics/confidentiality, survivorship) and were presented by UWBC clinicians. ABCD training materials were tailored to provide advocates with guidance for one-on-one telephone and face-to-face support. To evaluate intervention outcomes, surveys were planned from program conception to assess the Patient Survivor Advocacy (PSA) program's impact upon three groups: peer advocates, patients, and clinicians. Student's <i>t</i>-test and content analysis were used for data analysis.</p>	
		<p>This program matching volunteer peer advocates at least one year removed from primary treatment with newly diagnosed patients who had completed primary treatment was developed. Peer advocates received in-person training on six dimensions of peer advocacy. Trained advocates were then paired based on demographic and medical history with new patients referred to the program.</p>	<p>African American 14.3%</p> <p>Hispanic 7.1%</p> <p>Caucasian 78.6%</p> <p>Invasive cancer 92.9%</p> <p>In situ 7.1%</p>		<p>Future directions of this program include increased recruitment of advocates and referral of patients, and raising awareness of the PAS program among clinicians at our institution.</p>
Rowe, 2020 [48]	Non-experimental, pre/post survey, participants were recruited from the Interdisciplinary Program for Palliative Care & Chronic Illness, University of Louisville School of Medicine, U.S.A.	The objectives of this study include: (1) to implement the end of life (EOL) education series for young women affected by breast cancer and (2) to evaluate the impact of the curriculum on participants' knowledge, attitudes and behavior regarding understanding and accessing palliative care as well as for deciding upon and communicating EOL wishes.	<p>36 English-speaking women who were diagnosed with any stage of breast cancer at the age of 41 or younger and who were between the ages of 18 and 50 years at the time of the study.</p> <p>Mean age 40.4 years old (SD 0.50)</p> <p>Breast cancer stage</p> <p>Stage I: 27.8%</p> <p>Stage II: 30.6%</p>	<p>The education Series was a three-part online series of interactive, live-streaming events about EOL topics. Each online event was 60 minutes in length. The event was delivered through the Young Survival Coalition (YSC)'s Facebook page as a live video event. All three events were recorded and are housed on YSC's YouTube channel. Pre and post surveys were developed by the researchers in conjunction with the series presenters and included questions specific to the learning objectives of each part in the series. They included 12 true/false or yes/no questions and 11 Likert-scaled statements exploring knowledge, attitudes, and behaviors related to EOL issues.</p>	<p>A total of 36 individuals participated in the first online event and completed the post-survey. Twenty-four completed the post-survey in the second online event, and 22 finished the post-survey in the third online event. A total of 20 completed the 6-month post-survey. The Shady Pink Elephant EOL educational series is a promising intervention for improving young breast cancer survivors' EOL knowledge, attitudes, and behavior regarding understanding and accessing palliative care as well as for deciding and communicating EOL wishes.</p>

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
		This education series was a three-part 60 minutes online series of interactive, live-streaming events about EOL topics. The first one focused on the benefits of introducing palliative care at the beginning of or earlier in a cancer survivor's journey regardless of stage. The second one focuses on initiating EOL discussions and social action over dinner. The third one focused on the legal decisions and documents suggested to have in place for EOL planning.	Stage III: 11.1% Stage IV: 25% Unknown: 5.6%	Paired sample <i>t</i> -tests, McNemar's chi exact tests were used for statistical analysis.	Further research with a larger patient population is needed regarding young cancer patients' views and experiences with palliative care and EOL planning; access to that information may require more global marketing efforts and grass-roots sharing.
Reich, 2017 [9]	A two-armed randomized controlled trial. Participants were recruited from the Moffitt Cancer Center, Carol and Frank Morsani Center for Advanced Healthcare and the Life Hope Medical Group, located in Tampa, FL, U.S.A.	This study aimed to identify symptom clusters among post-treatment BCS and test whether these symptom clusters improved following the Mindfulness-Based Stress Reduction for Breast Cancer (MBSR(BC)) program at the six- and 12-week follow-up compared with usual care (UC). This purpose fits well with the central aim of this clinical trial: to determine the efficacy of MBSR(BC) in improving outcomes.	MBSR (n = 167); UC (n = 155) Mean age: 56.5 years old White non-Hispanic: 69.4% Cancer Stage: 0-III Mastectomy: 53.4% Radiation & Chemotherapy: 35.7%	The Concerns About Recurrence Scale was used to measure worry and fear of cancer recurrence. The Center for Epidemiological Studies Depression Scale was used to measure depressive symptoms. State-Trait Anxiety Inventory was used to measure state or situational anxiety. The Perceived Stress Scale was used to assess how often in the past month, the subject appraised life situations as "stressful." Cognitive and Affective Mindfulness Scale-Revised was used to measure mindfulness and four domains of attention, present-focus and awareness, and acceptance/non-judgment. Symptom severity was measured using the M.D. Anderson Symptom Inventory. The Pitts-burgh Sleep Quality Index measured sleep quality. Fatigue was measured using the Fatigue Symptom Inventory. The pain was measured by the Brief Pain Inventory. The Everyday Cognition (ECOG) scale was used to measure impairment and change of everyday functioning relevant to several neuropsychological domains. Health-related QOL was measured by the Medical Outcomes Studies Short-Form General Health Survey (SF-36).	Four symptoms clusters were identified from the literature review: (1) psychological symptom cluster (depression, anxiety, stress, and fear of recurrence); (2) fatigue symptom cluster (fatigue, sleep disturbance, and drowsiness); (3) pain symptom cluster (somatic pain); (4) cognitive symptom cluster (cognitive impairment in several cognitive domains). The study results identified that immediate symptom cluster improvement occurred during the six-week MBSR (BC) training period. Although it generally did not increase after the six-week time point, improvements were usually sustained to 12 weeks. The MBSR (BC) intervention had a positive effect on the improvement of BCS-specific symptom clusters, the psychological and fatigue clusters with medium-sized effects.

Table 1. Continued.

First author and year published	Study design and setting	Specific aims and interventions	Sample characteristics	Outcome measures and data analysis	Findings/Results and implications for future studies
		The MBSR (BC) intervention consists of three components: (1) educational material related to relaxation, meditation, the mind-body connection, and a healthy lifestyle for survivors, (2) practice of meditation in group meetings and homework assignments, and (3) group processes related to barriers to the practice of meditation and supportive group interaction.	Within two weeks to two years off treatment, no history of severe mental disorder and BC recurrence.		The relationships observed for the cognitive cluster can be considered preliminary data for future randomized controlled longitudinal studies with larger sample size.
Meneses, 2007 [39]	A randomized controlled longitudinal study. Participants were recruited from a regional cancer center and private oncology offices in the southeastern United States.	The primary aims of this study are: (1) assess the effects of the Breast Cancer Education Intervention (BCEI) on BCSs' overall QOL; (2) examine whether the intervention effects are retained over time; and (3) to assess the differential effects of the BCEI on QOL in the domains of physical, psychological, social and spiritual well-being.	BCSs (n = 256)	Exploratory factor analysis and structural equation modeling (SEM) were used for statistical analysis. The Breast Cancer Treatment and Sociodemographic Data Tool were used to capture breast cancer treatment variables and sociodemographic characteristics. Quality of Life-Breast Cancer Survivors was used to measure QOL in women with breast cancer. It was adapted from the QOL-Cancer Survivors Scale, which was used to describe overall QOL problems or concerns within four identified domains-physical, psychological, social, and spiritual well-being.	The experimental group reported improved QOL at three months, whereas the wait control group reported a significant decline in QOL. No differences at baseline. The experimental group said continued maintenance of QOL at six months. Although the wait control group reported improved QOL at six months, significant differences continued to exist between the groups. The BCEI was effective in improving QOL during the first year of breast cancer survivorship. Treatment effects were durable over time.
		The BCEI is a QOL survivorship intervention delivered using psychoeducational support and targeting women with early-stage breast cancer in the first year of post-treatment survivorship.	Women at least 21 years of age, with histologically confirmed stage 0-II breast cancer and no evidence of local recurrence or metastatic disease, within one year of diagnosis, who had surgery at least one month before, who received radiation therapy or chemotherapy to recover from acute treatment side effects, and who were able to communicate in English.	The generalized estimating equation (GEE) method for longitudinal data, two-sample <i>t</i> -tests and paired <i>t</i> -tests were used in the data analysis.	Future cancer survivorship research combining a theoretical or conceptual framework needs to determine what proportion of education or emotional support contributed to improved outcomes. Additional modes or delivery systems for providing psychoeducational support interventions tailored to the target population should be examined. The intervention dose for each education and support component can be measured.
Rahmani, 2014 [45]	A quasi-experimental design with pre-test and control group. Participants were recruited from the Division of Oncology and Radiotherapy of Imam Hossein hospital in Tehran, Iran.	This study aimed to compare the effectiveness of metacognition treatment and the mindfulness-based stress reduction treatment on the global and specific life quality of women with breast cancer.	Control (n = 12) Mean age: 44.08 years old (SD: 3.28) Stress reduction (n = 12) Mean age: 43.25 years old (SD: 3.08)	A questionnaire measuring the global "quality of life" in patients with cancer (QLQ-C30): to measure life quality, the third version of life quality measurement questionnaire in patients with cancer was used that belongs to the European Organization for Research and Treatment of Cancer. Specialized supplemental questionnaire to measure specific "quality of life" of patients with breast cancer (QLQ-BR23) was used for patients with breast cancer in disease stages and different treatments. Demographic information questionnaire was used to collect needed demographic data.	Findings showed both treatments were effective in improving global and specific quality of life in patients with breast cancer. The mindfulness-based stress reduction treatment excelled in functions and roles, fatigue, pain, future perspective, and treatment side effects symptoms at the end of the procedure and follow-up in comparison to the metacognition treatment. The results of this research showed that mindfulness-based stress reduction treatment could be useful in improving the global and specific life quality of women with breast cancer and is a selective method for improving the quality of life in patients.

Table 1. Continued.

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		Participants were examined in 3 stages, in baseline before intervention in experimental groups, after the intervention, and two-month follow-up. Treatment was implemented for the first experimental group during 8 group sessions, once a week and for two hours, and based on a mindfulness-based stress reduction program. Metacognition treatment was implemented based on "step by step guide," a practical guide in 8 treatment sessions.	Metacognitive (n = 12) Mean age: 44.92 years old (SD: 1.83)		Future studies with larger sample sizes, with contextual and individual factors control and control groups, to implement these two treatment methods on similar patients in other hospitals and Iranian samples to expand the findings of this study.