Scholar Publishing Group
International Journal of World Medicine
https://doi.org/10.38007/IJWM.2023.040104
ISSN 2789-7133 Vol. 4, Issue 1: 21-34

A Scoping Review of the Effectiveness of Complementary and Alternative Medicine on People with Breast Cancer

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Keywords: Complementary and Alternative Medicine, Breast Cancer, Scoping Review, CAM

Abstract: This scoping review set out to summarize the research literature describing complementary and alternative medicine in breast cancer. Searches were conducted of 5 electronic databases, relevant journals (hand searched), and conference abstracts. Researchers screened titles and abstracts for papers describing examples of complementary and alternative medicines and its approaches in cancer care. English-language articles were included, and papers were published in the past 10 years. From the articles located, descriptive data were extracted according to two main concepts: psychological and physical benefits of complementary and alternative medicine (CAM) in breast cancer patients and survivors and the effect of complementary and alternative medicines (CAM) on quality of life among breast cancer patients and survivors. Of the 1,453 studies through various search strategies, 11 were relevant to our objectives and included in a final analysis. The studies reviewed suggests that complementary and alternative medicine and its relevant approaches are potentially beneficial to people' psychological and physical well-being, as well as their quality of life in the breast cancer population. Research on CAM suggests its potential effectiveness on people's psychological and physical well-beings. To test out the effectiveness of CAM in a comprehensive manner, more rigorous research is needed.

1. Introduction

People with cancer are at higher risk of getting chronic conditions compare with the general population [16]. Furthermore, conventional treatments, such as surgery, chemotherapy, radiotherapy, and hormone therapy, are proved to have beneficial consequences on people with breast cancer; however, they are also reported to have resulted in a number of adverse effects [17]. The common side effects include anxiety, depression, pain, fatigue *etc*. [68]. A variety of medical and health care practices, products and techniques, which were not concluded in conventional medicines, have been

defined as complementary and alternative medicine (CAM). Such CAM techniques include mind-body medicine, nutritional supplement, exercise, traditional medicines (e.g. Chinese, Indian), *etc.*[53]. CAM was shown have been primarily used by cancer patients, in order to help them alleviate cancer- or treatment-induced adverse effects [10].

2. Search Strategy

To examine existing literature on, the researcher conducted a review based on English-language based scientific literature by searching MEDLINE, British Nursing Index, PubMed, ASSIA, and CINAHL, over two decades ranging from 2003 to 2023. Terms being used in the search included: *cancer, CAM, complementary* and *alternative medicine, effect, breast cancer, self-management, oncology programs, side-effects, self-efficacy, and quality of life.* Sources were located from meta-analyses and literature reviews which addressed the effects of CAM. Of the 1,453 studies through various search strategies, 11 were relevant to our objectives and included in a final analysis.

3. Theoretical Foundation

3.1. Bandura's Theory of Behavioral Change

Recently, patients' empowerment has been paid growing attention, as an increasing number of people are now living with one or more chronic conditions, such as cancer. An effective and proactive behavior to self-manage the symptoms is believed to help prevent or reduce sufferings of complex chronic illness [26]. However, according to Sanders and associates (2010), although people with some chronic conditions, such as cancer, are expected to be equipped with some self-management skills and/or ability to cope with the symptoms, few of them are capable to do so. For instance, cancer patients with the same cancer type and similar demographics may posses different abilities for symptom management. The reason contributing to this phenomenon is assumed to be an individual's perceived self-efficacy (PSE) [4].

The well-known term 'self-efficacy' is positively associated with 'optimism', which refers to one's belief that one has the capability to implement situation specific behaviors in order to achieve certain goals. People with higher self-efficacy are believed to be more likely to put more efforts in coping with problems and difficulties [2]. It is believed that, PSE forms the basis of any decision to act. PSE beliefs determine the degree of effort an individual exerts, the course of action a person selects, and his/her perseverance to continue with the tasks in the face of difficulties [37].

A number of previous sources have reported the influential impact of self-efficacy on behaviors among the cancer population. To illustrate, positive association was found between self-efficacy and people's emotional and physical well-being [29]. However, contrary to this finding, a longitudinal study conducted among a sample of 684 breast cancer patients found no association between participant's self-efficacy and their physical well-being. Nonetheless, results from a randomized trial conducted among a group of breast and prostate cancer patients suggested that, changes in an individual's confidence in his/her ability to engage in behaviors(i.e. self-efficacy) was a potential mediator of the diet and exercise intervention's effect on dietary outcomes. Additionally, although no significant effect was found on the change in self-efficacy for the total minutes of exercise per week, a positive correlation was observed between self-efficacy for exercise and exercise duration at follow-up period [51]. Moreover, positive effect of self-efficacy was obtained on people's emotional well-being, and it was found to be a predictor of an active adjustment style among these female breast cancer participants [59]. Further, a recent study suggested that, enhancing people's self-efficacy is likely to help them rebuild a higher level of quality of life [28].

3.2. Psychological and Physical Benefits of Complementary and Alternative Medicine(CAM) in Breast Cancer Patients and Survivors

Following cancer diagnosis and treatment, the survivorship requires people to adjust continuously to emotional stressors, psychological concerns and physical challenges. There are some ways in which people can enhance their psychological adjustment and physical well-being. Numerous studies have documented the psychological and physical effects of CAM for people in the cancer survivorship, specifically for breast cancer patients and survivors [64].

3.3. Cancer- and/or Treatment-Related Anxiety and Depression

Antidepressant therapy is usually used to treat varying degrees of depression in conventional Western medicine. Its adverse reactions to patients, however, especially to cancer patients with organ damage, are apparent [20] Acupuncture, which derives from traditional Chinese medicine and is considered as a series of process involving thin needle insertion through the skin or stimulation on specific points on human body [54], has been found efficient to attenuate psychological symptoms, such as anxiety, depression and stress, among healthy elderly [57]. Studies among cancer population have reported mixed evidence regarding the effect of acupuncture on people's cancer-related concerns, such as pain-induced anxiety and depression. In a randomized trial of female breast cancer patients who self-reported joint pain due to Arthralgia, electro-acupuncture and sham acupuncture were assigned to participants. Compared with the wait-list control group, participants in the electro-acupuncture group had noticeable reduction in the level of anxiety and depression during the 12-week intervention and follow-up. By comparison, no significant improvement was found in people's anxiety symptoms in the sham acupuncture group, but a reduction was obtained in depression condition [20]. Similarly, in a randomized controlled trial of 302 breast cancer patients, anxiety symptom was measured by the Hospital Anxiety and Depression scale (HADs). Findings of the study revealed that, comparing with only using usual care; participants' anxiety condition was reduced by using acupuncture [52]. Another randomized clinical trial that compared acupuncture with antidepressant(i.e. fluoxetine) among 80 cancer patients illustrated that, although acupuncture and fluoxetine were both found beneficial in reducing cancer patients' depression conditions, acupuncture was found more effective [27]. A recent review of CAM interventions (i.e. acupuncture, Tai Chi, herbal products, exercise) reported significant benefits of these interventions on tackling anxiety associated with hot flushes [5], depression and cancer-related stress among breast cancer patients and survivors [10].

The term 'mindfulness-based stress reduction' has been gaining increasing popularity among breast cancer patients. It is a range of mind-body practices which refers to body functions being influenced by the mind [10]. It derives from the early works done by Kabat-Zinm who introduced and applied meditation techniques to treat stress [35]. The American Society of Clinical Oncology and the Society for Integrative Oncology recommend mind-body therapies for treating cancer-related anxiety [43]. Similarly, Mind-body therapies, such as meditation, yoga, and tai chi, have been shown to reduce stress and anxiety in patients with cancer and enhance their quality of life [42].

Further, psychological distress can be demonstrated as other symptoms, such as anxiety and depression [71]. Breast cancer survivors were showed to have had more psychological distress and cancer-related fatigue during the first year after cancer treatment than their healthy counterparts. A supervised multi-modal intervention consisted of core stability physical training and massage was revealed to be helpful in addressing participants' cancer-related symptoms and reducing their disturbed mood status, such as depression [10]. Other researchers who evaluated anxiety and distress among breast cancer patients and survivors also found promising outcomes after

undergoing massage therapy. For instance, one study conducted in a private hospital branch in Turkey among people with breast cancer found positive outcomes in people's psychological problems. In this study, participants were randomly assigned into three separate intervention groups and one control group. Results showed that, interventions (i.e. massage, aromatherapy massage and fragrance) could all produce positive effects, while aromatherapy massage was significantly effective in reducing people's psychological concerns, such as chemotherapy related anxiety [56]. However, as the study was only conducted among female breast cancer survivors (stage I-III), future studies are needed to include people of other cancer types. Similarly, the anxiolytic effect of aromatherapy massage in breast cancer was documented in a previous open semi-comparative study. In this trial, 12 participants received a 30 minutes aromatherapy massage twice a week for four weeks. Parameters were compared between one month prior to the aromatherapy massage treatment with those during the intervention session, and one month following the completion of the intervention. Anxiety and depression levels were assessed by using the HADS. It found that, patients' anxiety scores reduced significantly from one month before to one month after the intervention. Although no significant difference was found in the depression scores, anxiety levels decreased gradually over the sessions, which indicated long-term effect of the treatment. However, the lack of control group with a suitable therapy to compare with aromatherapy massage may lead to a reduction in results efficacy.

During the past couple of decades, a variety of behavioral interventions have been introduced and developed. In general, behavioral techniques involve cognitive behavioral therapy, relaxation, counselling, physical training and stress management practices [11]. A previous meta-analysis that investigated the effectiveness of a number of studies on behavioral interventions indicated that, significant effects were found on people's anxiety and depression status among the breast cancer population.

3.4. Cancer-related Pain and Disrupted Mobility

Cancer-related pain has been recognized as one of the most common complications among the breast cancer population [55]. A significant proportion(ranging from 11% to 50%) of breast cancer survivors have been suffering from pain, such as joint pain, muscle pain, bone pain [33], aromatase inhibitor-related pain (Hershman, *et al.*, 2018), chronic pain [37], postoperative pain [39] and even treatment-induced pain (e.g. radiation-induced skin reactions) [23]. Among which, bone pain is often considered the most common sort of cancer-related pain [36]. Study also showed that breast cancer survivors are likely to suffer from persistent breast pain than their non-cancer counterparts [8]. The aforementioned different types of cancer-related pain are likely to result in a series of detrimental effects on individuals with breast cancer, such as reduced mobility, impaired daily activities, psychological concerns, and ultimately a lower quality of life [3]. It is said that, cancer-related pain is difficult to control and the need for pain management is often left unmet [6]. The current conventional treatment for cancer-related pain is drugs (e.g. opioids). However, the use of drugs has been reported to cause a number of adverse effects on individuals, such as dizziness, vomiting, constipation etc [60].

With its wide availability and general affordability, CAM has been widely applied in cancer-related pain management [44]. Nowadays, the most commonly used CAM therapies for pain-manaement among the cancer population include: acupuncture/acupressure, aromatherapy massage, hypnosis, meditation, yoga, Tai chi, reflexology and music therapy [5].

A recent pilot study assessed the feasibility of acupuncture therapy for some subsequently reported symptoms (e.g. aromatase inhibitor-related pain and postoperative pain) among breast cancer patients. Participants received scheduled acupuncture sessions for 4 weeks and a follow-up

session for another 4 weeks. At the end of the study, positive effects were found, and most participants felted that they had benefited from the acupuncture treatment. However, there are several limitations should be considered. First, with only six people enrolled in the study, any definitive conclusions are being prevented. Second, due to the nature of the study, this feasibility pilot study lacks a control group. It is likely to result in a high risk of bias and a lacking in the testing of efficacy. Finally, only short-term effects of acupuncture were evaluated in the study due to the inherent difficulties of collecting long-term data among breast cancer survivors. Thus, longer term follow-up research is required to fully evaluate an intervention [39]. In another pilot randomized controlled trial for female breast cancer patients who were undergoing surgery, a total of 30 women were randomly assigned to either the acupuncture intervention or usual care with 15 in each group. Numeric rating scales were used to measure the levels of pain and other symptoms. Results revealed that, compared to the control group, participants in the intervention group reported a statistically noticeable reduction in pain, as well as an improvement in the ability to cope with their cancer and/or treatment-induced adverse symptoms. However, a couple of limitations are noted. First of all, small sample size may be less convincing. Moreover, although it is challenging, the acupuncture therapy was not blinded [58]. By contrast, a post hoc exploratory analysis that examined the differential effects of self-administered stimulating acupuncture, self-administered relaxing acupuncture and usual care based on secondary data among breast cancer patients suggested that, the two different types of acupuncture may had differences in how they affected pain. For instance, relaxing acupuncture was found having association with a reduction in pain severity than usual care, and stimulating acupuncture was reported to be related to a decrease in pain interference. However, these effects were only found immediately after the 6 weeks of intervention, no statistically difference was observed in these two intervention groups from the usual group in the following period. It means that, the persistence of the effects of acupuncture is low. Finally, this study may be limited to generalizability of the findings, as the study participants only involved white breast cancer women. Also it may involve operating errors, as the two types of acupuncture therapies were self-administered by the participants [74].

Skin reactions are a common side-effect following radiation therapy among the cancer population. Such reactions may result in mild or severe pain, as it can cause erythema, desquamation, or even worse, ulceration. The psychological and physical benefits of aromatherapy on cancer complications have been recognized for a long time [17][13]. In order to compare the effects of aromatherapy and standard care on skin reactions among breast cancer patients who undergone radiation, Halm, Baker and Harshe (2014) used a two-group experimental design to randomly assigned 24 participants to either an essential oil mixture(n=13) or the standard care (n=11). Products were applied to the participants three times daily till one month post-radiation and their skin assessments were recorded weekly. It was hypothesized that, aromatherapy would provide significant beneficial effects over usual care. However, the results were different from the hypothesis. No difference was found for skin reactions at interim or follow-up between the two groups. Nonetheless, this may be resulted from the small sample size (n=24), as it is insufficient to determine a true treatment effect. Furthermore, because of the uneven group sizes of the experimental and control groups, the power of the study may be reduced. Likewise, 50 patients who were undergoing breast biopsy surgery were randomly divided into two separate groups, with the intervention group receiving oxygen with a facial mask coated with two drops of 2% lavender oil, the other group receiving oxygen with a facial mask without lavender oil. Pain intensity was assessed by a numeric rating scale. Results illustrated that, although participants in the intervention group had a higher satisfaction with pain control than their control group counterparts, aromatherapy did not produce an analgesic effect [35]. However, it deserves to be mentioned that, it lacked professional consultation on the dose of lavender oil used in the study. Thus, it left a

possibility that, the dose of lavender oil applied was insufficient to impact pain responses.

Massage has been widely used for pain management. Oncology massage is a specific type of massage that is designed to meet cancer patients' unique needs, and it has been widely used for treating cancer-related pain [66]. A recent observational retrospective study conducted among breast cancer outpatients found promising results regarding pain improvement. In this study, participants were self-referred or referred by a healthcare professional to receive either oncology massage or healing touch therapy. Pain scores were calculated pre- and post-therapy. Results demonstrated that, both healing touch and oncology massage were significantly effective in reducing pain. Evidence was apparent that, 88.7% of the total participants had immediate reduction in pain scores(pre- to post-treatment time-frame of about 45 minutes), with 65.7% patients from the healing touch group and 69% patients from the oncology massage group, respectively [21]. Although the scientific insights were achieved, there are a few limitations that worth mentioning. To begin with, the study lacks assessment of etiology of pain, meaning it is unclear whether or not the pain was related to cancer. Second, a potential bias may exist, as the reports of pain were subject to patients' self-perception. Moreover, although immediate pain improvements were achieved, the continuing effects of these two treatments on pain management were unknown. Likewise, a trial conducted among 46 female breast cancer patients who received mastectomies also found positive effects of massage on surgery-related pain, muscle tension scores and relaxation. In this study, the session was individualized for each person and a manual massage was administered to the area according to participants' choices (e.g. neck, shoulder, hand, or foot massage) [16]. However, the outcomes of the study were based on patients' self-reporting. This may be regarded as a limitation, as self-reporting based results may reduce the possibility of blinding of outcome assessment [40].

Hypnosis, which refers to a process that the individuals' changes in perception, mood, sensation and/or behavior according to the hypnotist's suggestions, has been widely applied in people with metastatic cancer for pain relief [7][69]. A recent observational, non-randomized trial in Belgium examined the anesthetic effects of hypnosis on different modalities of the conventional breast cancer treatment, and breast surgery. A total of 300 people were included in the trial, with 150 of them who underwent breast surgery received hypnosis sedation in the intervention group, while the other 150 participants who underwent the same surgical procedure only had general anesthesia in the control group. Joint pain is a highly prevalent symptom associated with the use of aromatase inhibitors. Unfortunately it may lead some patients to disturbed daily life activities. Findings of this study observed encouraging benefits of hypnosis sedation on cancer-related pain, with evidence suggesting that, participants' joint or muscle pain noticeably reduced by using hypnosis therapy. Results were promising, yet the non-randomized design may become its limitation [7]. Previously, there was also evidence that, hypnosis therapy was effective in alleviating cancer-related chronic pain among breast cancer patients and survivors for both short- and longer-term periods. In a pilot trial conducted in the U.S.[33], eight females who were undertaking breast cancer treatment (or cancer survivors) presented with one or more cancer- or treatment-related symptoms, such as ongoing pain, fatigue and sleep difficulties, joined the self-hypnosis training for symptom management. Among the eight participants, five presented with ongoing pain. The hypnosis suggestions were given according to the individual's symptom presentation. At the end of the treatment, there was an immediate decrease in patients' pain intensity, and the effects continued for another one month for four patients. The results were positive, however, due to the small sample size, it added difficulties to the implement of the statistical analysis for differences in the outcomes.

On the contrary to the above two studies, a randomized clinical trial in France found different results. This multi-center, single-blind clinical study recruited a total of 150 breast cancer patients, and randomly assigned 73 and 77 of them to the control and hypnosis arms, respectively. One 15-minute hypnosis session was administered to participants in the intervention group before

general anesthesia. No beneficial effect of perioperative hypnosis was found on post-operative pain among the participants in the intervention group [1]. However, the reason contributing to this result is possibly being the lack of hypnosis suggestions attributed to the blinding design. Also, the uneven group sizes of the intervention and control arms may reduce the power of the study.

3.5. The Effect of Complementary and Alternative Medicines(CAM) on Quality of life among Breast Cancer Patients and Survivors

Quality of life, which is believed to affect a patient's prognosis, is manifold. It involves both psychological factors and physical complications [72]. Many cancer patients feel abandoned and/or isolated following the end of their primary treatment. These negative feelings may exacerbate into some psychological stressors, such as anxiety and depression, leading to a decline in their quality of life [50].

Despite the great diversity in the type of CAM, QoL assessment tools, and study design, numerous articles have demonstrated the positive outcomes of CAM on QoL among people with breast cancer. The mind-body techniques including acupuncture, yoga, and cognitive-behaviral stress management were more common among the breast cancer population as CAM interventions [52].

Previous published data showed, an expert guided integrative therapy concept among patients with breast or gynecological cancer can help improve patients' subjective health condition [62]. In this study, an integrative medicine (IM) program (i.e. ZIGG program) which consists of biological based CAM, exercise, relaxing therapy, nutritional counseling, and psycho-oncological treatment, was offered to each and every patient who was being treated in the outpatient department. Patients were able to choose different IM treatment according to their own medical needs. Among these patients, 84% had breast cancer. Results indicated that, 80% of the patients who received CAM and 86% of the patients who attended the psychological therapy enjoyed an improvement in health conditions. Furthermore, 64% of the patients who attended CAM therapy felt more energetic. Similarly, promising results were also being found among breast cancer patients who attended a hospital-based integrative medicine program which was incorporated into routine clinical work in Germany. It was found that, over 50% of the patients attended in the study had reduction in conventional treatment-induced side effects [48]. In the final analysis, 76.7% of the patients who were hoping to reduce side-effects of conventional oncology treatment found promising results. While, 82% of the patients who had the treatment goal of improving cancer-related quality of life (QoL) self-reported that they were satisfied with the results after being treated by the integrative medicine consultancy service. However, one area with high risk of bias was self-reporting based blinding of outcome assessment in the study of QoL. It is said that, when assessing outcomes that are self-reported, the possibility of blinding of outcome assessment is reduced [40]. Similarly, a non-randomized controlled trial that investigated the impact of CAM on QoL-related health outcomes among breast cancer patients who were undergoing chemotherapy found positive results. In the recruitment of the study, 70 patients were referred to the intervention arm, and 71.4% (50) of them were seen by an integrative physician and provided with the patient-tailored CAM program. At the meanwhile, 38 participants enrolled in the control group. People in both groups received the standard care. The CAM program mainly included acupuncture, nutritional consultation, music therapy, reflexology *etc*. QoL was assessed by using the European Organization for Research and Treatment of Cancer QLQ C-30 (EORTC QLQ-C30) questionnaire [13]. At the 6-week visit following the intervention, between-group analysis revealed that, an increase was observed for EORTC global health status/QoL and sleep-associated symptoms among participants in the intervention arm. Again, the 12-week assessment also witnessed a noticeable improvement for

EORTC global health status/QoL in the treatment group, but none changes in the control arm. Further, the within-group analysis illustrated a significant increase for social functioning in the EORTC scores from 6 weeks to 12 weeks visits for the treatment group participants [61]. Despite the convincing results, there are a couple of weaknesses that need to be addressed in the future. First, there is likely a bias existing in the recruitment period, as patients were actively referred to the program by their physicians, thus there is possibility that the referral was too subjective. Second, the non-randomized trial design may reduce the power of the study.

Aromatherapy massage is one of the most commonly used CAM therapies among people with breast cancer. In a recent study evaluating the effects of massage therapy on breast cancer survivors' quality of life status, it was found that, aromatherapy massage was especially effective in improving their quality of life and provided a long-term improvement in some of the QoL scale subdomains [56][35][68].

Among the various CAM techniques, acupuncture plays an important role in the treatment of breast cancer side effects. A randomized controlled trial conducted among 30 female breast cancer patients reported that, when randomly assigning participants to either experimental or control group, the outcomes vary. Compared to the control group which implied diosmin treatment, the experimental group which used warm acupuncture for its participants showed effectiveness in reducing lymphedema, as well as promoting self-reported QoL [72]. However, due to the fact that the outcome assessment of QoL was based on self-reporting, a bias is likely to occur.

The conventional breast cancer treatment, neoadjuvant chemotherapy, has long shown promising effects, yet its detrimental effects on people nutritional status were also apparent [70]. It is said that, neoadjuvant chemotherapy can cause gastrointestinal toxicities which leads to decreased food intake, and ultimately result in reduction in people's overall quality of life [12]. In order to address this, it is suggested to adopt beneficial lifestyle changes based on people's needs. A recent RCT among breast cancer patients who were undergoing neoadjuvant chemotherapy was conducted to examine the effect of the nutritional intervention. In this trial, 34 females participated, with 19 randomly assigned to the intervention arm that received an individualized diet plan along with nutritional advice on healthy eating, and the other 15 enrolled in the control group that only had nutritional advice on healthy eating practices. QoL was assessed by using the European Organization for Research and Treatment of Cancer QLQ C-30 (EORTC QLQ-C30) questionnaire [65]. In the final results, compared with the control arm, the role function of patients was better preserved throughout the chemotherapy session. A better maintained role function means better performance of daily activities, and consequently related to QoL. Additionally, the findings also showed that, the nutritional intervention was helpful to alleviate symptoms like nausea, vomiting and loss of appetite [15].

Furthermore, psycho-social factors can exert detrimental impact on cancer outcomes; hence, psycho-social support is quite popular among the cancer population. A previous meta-analysis showed that, physical exercise intervention and behavioural techniques improve QoL among breast cancer patients and survivors, however, no significant effects were observed among early stage breast cancer patients for QoL by using psycho-social support interventions [12][14].

4. Summary

Fortunately, with the advances made in medical treatments, therapeutic progress, early cancer diagnosis and screening, breast cancer has become a highly survivable disease with an increase in survival rates. However, some physical and psychological concerns and problems have been found among these people in their survivorship. Complementary and alternative medicines have been reported to be effective in addressing these physical and psychological concerns, leading to an

improved quality of life. More rigorous research is needed.

Funding

If any, should be placed before the references section without numbering.

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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