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Interventional modalities on early rehabilitation among patients after breast surgery: A review

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Abstract
Breast cancer is the most frequently diagnosed cancer in women worldwide with more than 2 million new cases in 2020. Breast cancer usually evolves silently. Most of the patients discover their disease during their routine screening. Others may present with an accidentally discovered breast lump, change of breast shape or size, or nipple discharge. According to the World Health Organization, improving breast cancer outcome and survival by early detection remains the cornerstone of breast cancer control. With advances in screening, diagnosis, and treatment, the death rate for breast cancer has declined. Today there are various approaches, which can be made for the treatment of the cancer of breast such as surgery, radiation therapy chemotherapy, hormonal therapy and recently nanotechnology and gene therapy. Mastectomy is a complete surgical removal of the breast glandular tissues with the aim to remove all in-breast neoplasia and/or glandular tissue. There are different types of mastectomy procedures which differ in the extent of resection of additional tissues. Post-operative complications after breast surgery include pain, restriction of shoulder range of motion (ROM), numbness and heaviness, loss of strength, sensory deficit, and poor quality of life. Post-surgery interventions are needed to improve physical, psychological, social, emotional and functional wellbeing of the patient. A search of articles was carried out with no time limit till April 2024 using various databases such as PubMed, Scopus, ProQuest, CINHAL, Semantic scholar and Google scholar. Search terms included-breast cancer, breast surgery, pain, range of motion, muscle strength, quality of life, lymphedema. This is review summarizes the interventional modalities that are being applied for early rehabilitation after breast cancer surgery.

Keywords: Breast cancer, breast surgery, pain, range of motion, muscle strength, quality of life, lymphedema

Introduction
Breast cancer was the most common cancer in women in 157 countries out of 185 in 2022. In 2022, there were 2.3 million women diagnosed with breast cancer and 670 000 deaths globally. Breast cancer occurs in every country of the world in women at any age after puberty but with increasing rates in later life (WHO March 2024) [1]. Surgery has been a mainstay of breast cancer treatment for several decades. It is often the sole treatment in the management of early-stage breast cancer. Multiple trials in the last several decades have led to the evolution away from radical approaches towards less extreme, breast-conserving procedures [2]. Postoperative complications related to breast surgery include seroma, infection, hematoma, mastectomy flap necrosis, wound dehiscence, persistent postsurgical pain, Mondor disease, fat necrosis, reduced tactile sensation after mastectomy, and venous thromboembolism, seroma, infection, lymphedema, nerve injury, and reduced shoulder/arm mobility [3]. Studies have been done to assess the quality of life among breast cancer patients which showed that patients with breast cancer experiences negative quality of life during their treatment phase [4]. From literature it has been found that prevalence of moderate to severe pain after surgery was 27% [5]. An observational study was conducted which showed that shoulder range of motion and strength of affected extremity reduced during the early recovery phase after breast cancer surgery [6]. Social support and exercise have positive effect on quality of life for a person with breast cancer and also spirituality or faith, or a more hopeful view that increases pleasure in your life [7]. This review has been developed after comprehensive research by the team of investigators to sum up various interventional modalities for early rehabilitation among patients after breast surgery.

Searched strategy

We searched English Literature from the inception of the database to April 2024. Pubmed, CINHAL, Scopus, Google Scholar, Research gate, Semantic Scholar, were searched, using keyterms breast cancer, breast surgery, pain, range of motion, muscle strength, quality of life, lymphedema showed in figure 1.

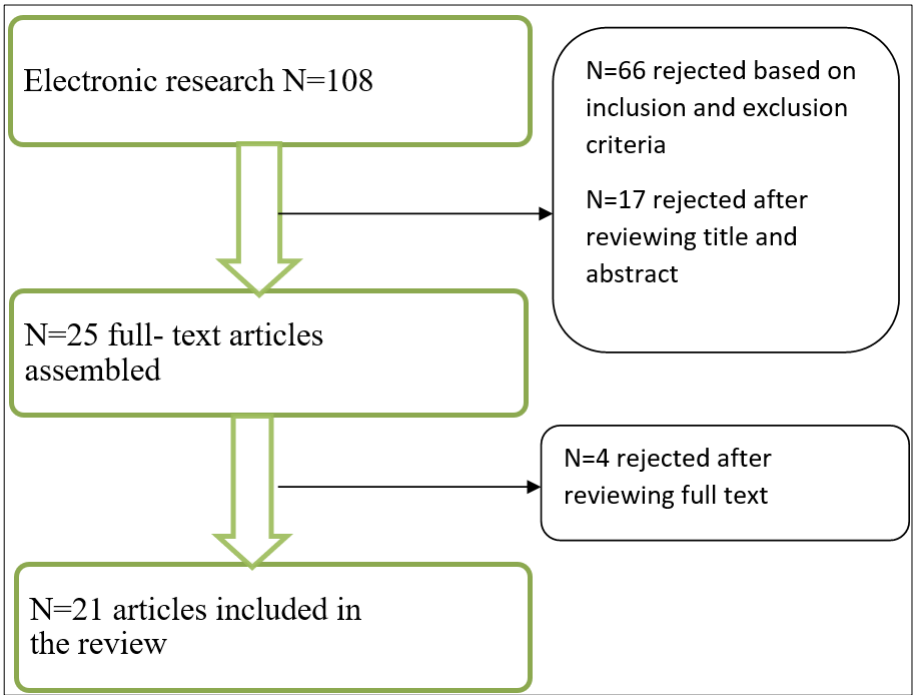

Fig 1: Flowchart of search strategy

Inclusion and Exclusion Criteria

Inclusion and Exclusion Criteria was formed using PICOS (population, intervention, comparison, outcome, study design) format. Participants were patients after breast surgery. Intervention used post mastectomy exercise, Aerobic exercises, Manual Lymphatic drainage, Massage Therapy, Music Therapy, acupuncture, progressive muscle relaxation, baduanjin exercise in the experimental group. Comparison involved no intervention or routine nursing care to control group. Outcome involve assessment of one or more of the following quantitative outcome indicators- pain, arm strength, lymphedema, range of motion, muscle strength, quality of life. Research studies with no clear intervention and result were excluded.

Data extraction

Data was extracted by one investigator and reviewed by all investigators. Information extracted from the studies includes author, publication year, sample size, intervention technique, study design, participants and outcome indicators.

Interventional Modalities

Physical therapy

Exercise following breast surgery help to restore movement of affected extremity and helpful in preventing post-surgery complications [8]. A systematic review was analyzed to review randomized controlled trials (RCTs) evaluating the effectiveness of exercise interventions in improving upper-limb dysfunction due to breast cancer treatment, which concluded that Exercise can result in a significant and clinically meaningful improvement in shoulder ROM in women post-operative phase with breast cancer [9]. Post-surgery pain after breast surgery reduces quality of life by negatively impacting physical autonomy, psychological well-being, and social relationships [10]. A randomized control trial was conducted to determine the effect of exercises program on pain, shoulder disability, and functional outcomes in women after breast cancer surgery and it showed a significant impact of exercise among woman after breast surgery in reducing pain, improving shoulder mobility and functional status [11].

Aerobic Exercises

Aerobic exercise refers to the type of repetitive, structured physical activity that requires the body's metabolic system to use oxygen to produce energy [12]. Studies reported that aerobic exercise can significantly improve the quality of life in breast cancer survivors and also alleviated the symptoms of depression and anxiety [13]. A randomized control trial reported the effectiveness of water therapy program on improving shoulder or axillary pain among breast cancer survivors [14]. Change in the cognitive ability occurs among breast cancer survivors, a study has reported the aerobic exercises have potential to improve the cancer related cognitive impairment [15].

Manual lymphatic drainage

Lymphedema is a common complication after breast cancer surgery. It is characterized by persistent tissue swelling due to abnormal accumulation of lymph in tissues. Breast cancer related post mastectomy lymphedema (BCRL) is the most common chronic condition following mastectomy, with an incidence ranging from 8% to 52% in the first 2 post-operative years. Manual lymphatic drainage is the specific massage technique instructions are summarized as follows: Draw 5 diaphragmatic breaths and massage from under the ipsilateral ear auricle to the bottom of the neck, from

inferior to the lateral aspect of the clavicle to its medial extent, from the operated side to the opposite arm's armpit, and the operated side armpit itself [16]. A pilot randomized trial reported that manual lymphatic drainage is an effective way of reducing limb swelling following breast surgery [17]. It has been suggested that manual lymphatic drainage along with standard treatment could enhance the effectiveness of treating volume reduction of lymphoedema [18]. Positive impact of manual lymphatic drainage also noted in improving the quality of life among women underwent breast cancer surgery [19].

Massage Therapy

Massage as a complementary and alternative therapy has been associated with enhancing health and coping with treatment-related side effects among breast cancer patients and it has been suggested that massage may be a useful intervention in alleviating negative emotions and fatigue among breast cancer patients [20]. In the post-surgery phase massage therapy that consists of stroking, squeezing, and stretching techniques to the head, arms, legs/feet, and back has been effective in reducing anxiety, depressed mood, and anger also long term effect of massage therapy showed reduced depression and hostility and increased urinary dopamine, serotonin values, NK cell number, and lymphocytes [21]. Massage therapy also include classic massage, reflexology, myofascial release aid in reducing pain and anxiety among breast cancer survivors [22].

Music therapy

Music Therapy is the clinical & evidence-based use of music interventions to promote wellness and physical rehabilitation [23]. Studies reported that music therapy is found to be effective in reducing stress, depression, anger, and anxiety among patients who were hospitalized for breast surgery [24]. Music therapy along with routine care has also provided evidence on alleviating pain among patient undergone breast surgery [25].

Acupuncture

Acupuncture is a system of medical treatment and ideology based on the principle of applying small needles or pressure to specific points in the body [26]. A study was conducted to evaluate the effect of acupuncture on motor function, lymphedema, and symptoms of tightness and heaviness in affected arm, which shows Significant improvements in range of movement of shoulder flexion and abduction ($P<0.001$), degree of lymphoedema ($P=0.016$), and sense of heaviness and tightening ($P<0.001$) in the affected limb after six months of therapy [27]. Another study to determine the effect of acupuncture on pain after breast surgery was conducted which shows the significant result of intervention on pain relief [28].

Progressive muscle relaxation

Progressive muscle relaxation (PMR) is an actively engaging relaxation technique that involves actively contracting muscles to create tension and progressively releasing the tension [29]. A study was conducted to examine the effects of progressive upper limb exercises and muscle relaxation training on functions of affected limb and quality of life, and results shows the positive effect of the intervention in improving functional status of limb and also improving in the quality of life [30].

Baduanjin training

Baduanjin exercise is a traditional exercise that combines breathing, body movement, meditation and awareness [31]. From a review analysis it was noted that baduajin exercise is effective in improving post-operative quality of life and reducing depressive episodes among breast cancer patients [32]. It was also found that baduanjin exercise have positive effect on improving cognitive functions among breast cancer patients receiving chemotherapy [33].

Kinesio Taping

The Kinesio Taping Method is a therapeutic taping technique which alleviates pain and facilitates lymphatic drainage by microscopically lifting the skin [34]. Studies have proved that Kinesiotapinf is an effective measure for reducing lymphedema, decreasing level of pain, improving hand grip strength and overall quality of life among breast cancer patients [35].

It has also been noted in the studies that kinesiotaping in combination with decongestive therapy is more efficient in reducing lymphedema [36].

Conclusion

Breast surgery results in the occurrence of various acute and chronic complications that include pain, limited mobility of affected extremity to long term complications like lymphedema. All these complications ultimately affect the overall health related quality of life which can be manifested by impaired physical functional status, poor social relationships, emotional disturbances and low mood. Early intervention following surgery could be beneficial for rapid recovery and also in the prevention of post-operative complications. This narrative review summarizes the interventional modalities for early rehabilitation after breast surgery with their positive effects in decreasing pain, improving range of motion and strength of affected extremity, decreasing anxiety and improving overall health related quality of life. From literature review of previously done studies it is evident that it could be more efficacious to combine all these interventional modalities with routine nursing care and also the applications of more than one intervention have positive effects on the recovery in post-operative phase.

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