

THE EFFECT OF A 10-WEEK YOGA BASED INTERVENTION ON IMPROVING HAND GRIP STRENGTH OF AFFECTED ARM IN WOMEN AT RISK FOR BREAST CANCER RELATED LYMPHEDEMA: A RANDOMIZED CONTROL TRIAL

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Abstract

Background: Decrease strength, swelling, pain, and stiffness in the arm caused by breast cancer related lymphedema can make everyday activities challenging and hinder both fine and gross motor skills. This study aims to investigate whether a yoga-based intervention is practical, safe, and potentially beneficial for women who have had surgery and are at high risk of developing lymphedema after breast cancer treatment. **Method:** A pre – post control experimental random group research design was used. 40 samples (≥ 40 to ≤ 50) years were taken from HCG cancer hospital of Ahmedabad and randomly assigned to control ($n=20$) and experimental ($n=20$) group. The experimental group participated in a 10-week yoga-based intervention, with sessions held 5 days a week. Both groups had their hand grip strength of affected arm measured using a GBEX Hand Dynamometer. **Results:** Collected data were analysed through dependent sample (paired) 't'-test. Result of hand grip strength of affected arm of experimental group was very statistically significant (at $p=0.0034$) but in control group there was not statically significant (at $p=0.5906$) among women at risk for breast cancer related lymphedema. **Conclusion:** Experimental group has shown statistically significant improvement in hand grip strength of affected arm in women at risk for breast cancer related lymphedema.

Key words: Breast cancer, Breast cancer related Lymphoedema, Yoga based intervention, Hand Grip strength

INTRODUCTION

Patients with cancer struggle with a wide range of psychological and physical problems brought on by the illness itself as well as the radiation or chemotherapy that is used to treat it. The debilitating disease can cause a variety of symptoms, but common ones include fatigue, nausea, vomiting, constipation, diarrhoea, loss of appetite, anaemia, bleeding, fever, weakness, confusion, lymphedema, skin changes, infertility, sexual dysfunction, pain, anxiety, and depression. Additional symptoms like anaemia, hair loss, infection, mouth and throat troubles, nerve discomfort, weight gain or loss, and bladder or kidney problems can also be brought on by chemotherapy and radiation treatments. (A to Z List of Cancer Types - NCI, 2013)

With 21% of all cancers diagnosed in women, breast cancer is by far the most common illness among them worldwide. Breast cancer is currently the most common cancer among Indian women, surpassing cervical cancer in all cancer registries, rural and urban.

Although breast cancer treatments have become more effective and survival rates have improved globally, there are significant disparities in survival between developed and developing nations. Many survivors also face long-term side effects from treatment. These side effects can include persistent fear that the cancer will return, exhaustion, challenges with sexual function, and difficulty with thinking and memory. Breast cancer-related lymphedema (BCRL), a

condition where fluid builds up causing swelling, is a particularly concerning side effect of treatment. (Wanchai & Armer, 2018)

Breast cancer-related lymphedema occurs in 5% to 42% of women after therapy, depending on the harshness of the treatment. Lymphedema is the buildup of protein-rich interstitial fluid caused by decreased lymphatic function. Lymphedema caused by breast cancer therapy may occur as a consequence of surgical excision of lymph nodes and lymphatic drainage routes. Soft tissue fibrosis caused by inflammation, infection, or radiation may cause further lymphatic system damage. Breast-cancer-related lymphedema is a serious issue for patients since it may limit upper extremity function. (Sayegh et al., 2017)

In the study of Vries et al., It was found that two years following the patients' sentinel lymph node biopsy, there was a significant reduction in hand grip strength of 3.4 kg (Vries et al., 2018). Another study discovered that sentinel lymph node biopsy produced less weakening than axillary lymph node dissection (Sagen et al., 2014).

Lymphedema management continues to be extremely difficult for both patients and medical providers. Frequent check-ups for managing lymphedema, prolonged physical therapy, management equipment (bandages, compression garments, specific lotions), and recurrent infections, cellulitis, and lymphangitis place a financial and economic strain on the health care system as well as survivors. Compared to individuals who do not have lymphedema, breast cancer survivors with lymphedema incur far greater health care expenditures, spend more days each year in hospitals or seeing doctors, and miss more work days, which may have a negative impact on their ability to find employment. Breast cancer patients frequently complain that they were not aware that lymphedema may result from their treatment and that medical staff did not know enough to assist them manage this crippling illness or lower their chance of developing lymphedema. (Fu, 2014)

The purpose of this research is to evaluate at the effectiveness of a yoga-based programme that combines customised asanas, Pranayama, relaxation (savasan), and meditation in enhancing arm strength and range of motion. This research looks at arm strength and shoulder range of motion in women with BCRL.

OBJECTIVES

To evaluate the effect of a 10-week yoga-based intervention on improving hand grip strength of affected arm in women at risk for breast cancer related lymphedema

LITERATURE REVIEWS

(Mazor et al., (2018a) studied on The Effect of Yoga on Arm Volume, Strength, and Range of Motion in Women at Risk for Breast Cancer-Related Lymph edema. There were Seventeen of the twenty women who finished the yoga intervention came back for the last evaluation. The body mass index was 24.8 (± 5.1) kg/m², and the mean age was 52 (± 9.1) years. The at-risk UE's mean volume decreased somewhat after the surgery ($p = 0.397$). Bilateral ROM increased considerably for shoulder flexion ($p < 0.01$) and external rotation ($p < 0.05$). For the unaffected limb, shoulder abduction range of motion significantly increased ($p = 0.001$). After the intervention, bilateral elbow flexion strength, grip strength, and shoulder abduction strength on the afflicted side all showed improvement ($p < 0.05$ for all).

Mistry et al.,(2021a) studied on Assessment of hand function in women with lymphadenopathy after radical mastectomy. Cross-sectional data on 31 women with and 31 without BCRL were obtained. A dynamometer and the Jebsen-Taylor test were used to assess hand functions and handgrip strength. According to this study, age-matched healthy adult women did not have handgrip strength as much as women with BCRL ($p < 0.05$). In addition, hand functions were lower in BCRL women than in healthy women ($p < 0.05$). With the exception of power handgrip strength in the left hand (Cohen's $d = 0.38$), all outcomes showed moderate to large effect sizes (Cohen's $d = 0.61$ to 0.99 and 0.54 to 3.02 , respectively) in favour of clinically significant handgrip strength and hand function in women with BCRL. They discovered that the hand function and grip strength of women with BCRL were diminished.

Eyigor et al., (2018) investigated the benefits of yoga on shoulder and arm pain, as well as quality of life (QOL) in breast cancer patients. There were 42 individuals in this prospective, randomized research. Group 1 participants participated in a 10-week Hatha yoga fitness program. Group 2 patients were included in a 10-week follow-up program. The severity of arm and shoulder discomfort was their major aim. The group who received yoga demonstrated a substantial reduction in their pain intensity from baseline to post-treatment, and these effects were sustained 2.5 months later. Pain severity (both shoulder and arm) improved from baseline to post-treatment ($p = 0.01$, and $p = 0.01$; respectively), and these improvements were sustained 2.5 months later ($p = 0.01$, and $p = 0.01$; respectively). Only at month 5 did the functional and symptom QOL ratings of the yoga group patients exhibit a significant improvement when compared to the baseline. Only symptom ratings showed statistical significance in the improvement of outcomes following therapy. There were no statistically significant differences between the two groups in terms of the parameters measured at the end of week 10 when compared to the control group. They determined that yoga was an effective and safe practice for relieving shoulder and arm discomfort, which is a common consequence in breast cancer patients.

MATERIALS AND METHODS

Ethical consideration

The study was approved by Research Ethics Committee of Gujarat Vidyapith, Ahmedabad for the present research. The participants were informed about the scope and procedures of the study. Written informed consent was obtained from all participants.

Table: 1

Criteria	Inclusion	Exclusion
Age	≥ 40 to ≤ 50	≤ 39 - ≥ 51
Medical status	Completed all Cancer therapy	Any critical situation as patient cannot do yoga
For Intervention	Able to participate yoga. Able to attend all data collection meetings. Able to attend intervention classes.	Already involved in any exercise therapy or unable to participate in yogic intervention. Unable to attend any data collection meetings.

40 samples (≥ 40 to ≤ 50 years) were taken from HCG hospital of Ahmedabad and randomly assigned to control (n=20) and experimental (n=20) group by using concealed methods. A t-test calculator graph pad was used to do statistical analysis prior to the commencement of the intervention. Between the pre data of the experimental group and the pre data of the control group, an unpaired t test of arm strength was conducted. This change was deemed not statistically significant by conventional standards. The research employed a randomised-control trial design.

Assessment

Assessment of Lymphoedema Associated with Breast Cancer (BCRL) hand grip strength was measured using by GBEX Grip Hand Dynamometer Strengthening Power Metre Force Gauge Capacity: 0-130 kilogramme Utilised was Grip Reader Strength Counter Fitness Equipment. The hand dynamometer was to be held by the participants with the elbow at 90 degrees flexion and the shoulder in neutral. The hand dynamometer was pushed as strongly as possible three times by the participants, and the maximum value from the afflicted hands was noted (Smoot et al., n.d.).

Both groups attended a lymphoedema education session prior to the intervention. A 10-week yoga based intervention that includes modified asanas, pranayama, savasana and meditation were given to the experimental group. This yoga based intervention was held by researcher for 5 days a week and each session was 60 minutes. The attendance at the group yoga sessions was high (98%).

Table: 2 Yoga protocol for 10-weeks intervention: Plan for yoga Intervention program

Sr. No.	Yoga Practice	Time Duration
1	Starting prayer	5 minutes
2	Gentle yogic exercises	10 minutes
3	Yogasanas	25 minutes
4	Pranayama and or savasana or meditation or Visualization	15 minutes
5	Omkar and discussion	5 minutes
	Total	60 minutes

The procedure was evaluated by a lymphedema specialist and a physiotherapist. Yoga was practiced in the morning with empty stomach. Participants dressed comfortably for yoga. Breathing was incorporated during each motion, which was a break from prior examples.

Post-intervention data were collected for both groups after the 10-week intervention.

RESULTS

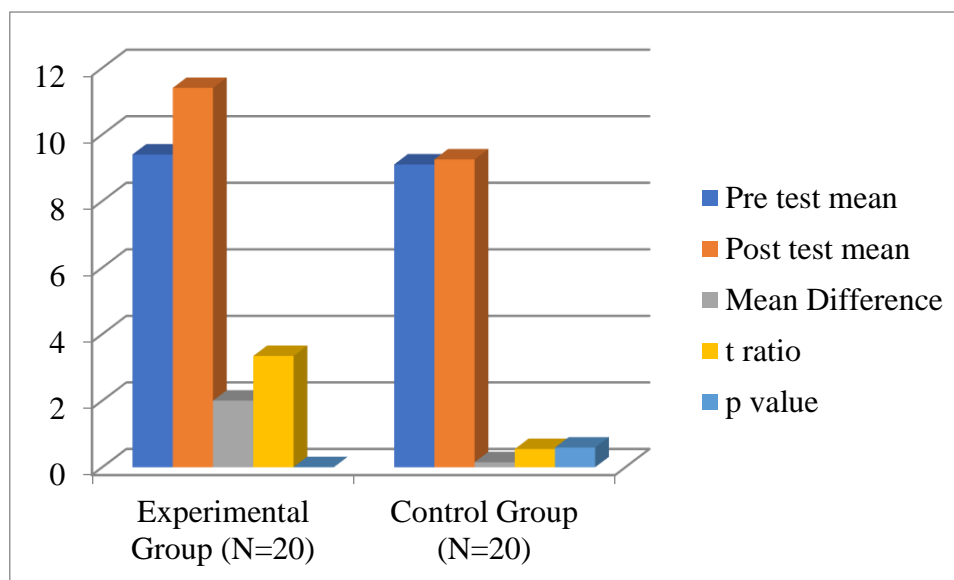
A t-test calculator graph pad was used to do statistical analysis. The dependent sample (paired) 't'-test was used to examine the collected data.

Table:3 Result of hand grip strength of affected arm of experimental group and control group:

Group	Pre-test mean	Post test mean	Mean Difference	t ratio	p value
Experimental Group (N=20)	9.4	11.4	2.0	3.343	0.0034
Control Group(N=20)	9.1	9.25	0.15	0.547	0.5906

*Significant Level at 0.05, $t(19)1.729$

Tabel -3 indicates that the received 't' ratio of the experimental group is 3.343, which is >1.729 and considered to very statistically significant (at $p=0.0034$), while the control group's 't' ratio was 0.547 which is <1.729 , which was not statistically significant (at $p=0.5906$).



DISCUSSION

As a means of preserving a healthy weight and reducing the risk of cancer recurrence, regular exercise is now advised for all cancer survivors. Despite evidence that exercise improves quality of life and symptoms, most breast cancer survivors do not follow regular exercise regimes following treatment (Mazor, Lee, Peled, Zerzan, et al., 2018b).

The results of this study indicate that special yoga based intervention enhanced by progressive muscular relaxation and yogasanas are effective on arm strength in women after mastectomy.

Data of present research confirmed the results of a previous study by Smoot et al., on Upper extremity impairments in women with or without lymphedema following breast cancer treatment. There were 144 breast cancer survivors completed demographic, symptom, and DASH questionnaires. Lymphedema patients had more lymph nodes excised ($p<.001$), more UE symptoms ($p<.001$), a higher BMI ($p=.041$), and higher DASH scores (more restriction) ($p<.001$). Lymphedema grip strength, shoulder abduction ROM, and comorbidities affected DASH ratings (R^2 of 0.463, $p<.001$). Survivors' implications After BC therapy, women develop UE. Lymphedema causes UE impairment and inactivity limitations in women. Early diagnosis by doctors is crucial. (Smoot et al., n.d.)

CONCLUSION

The result of this randomized controlled trial shown that a 10-week yogic intervention based on guidelines for yogic practices and lymphatic drainage did not aggravate lymphedema and hand grip strength of affected arm was increased.

LIMITATIONS OF THE STUDY

- The study's findings may have been influenced by factors such as their habits, diet, life style, daily routine and family environment.
- Data collection and training did not focus temperature, humidity, or other meteorological characteristics.

RECOMMENDATION

It is therefore recommended that:

- This study can help to educate breast cancer survivor women of different areas like rural,

urban, hilly, and coastal.

- The study's findings can help yoga therapists and yoga trainers on how to priorities health.
- In future other study can conduct for longer interventions, larger sample sizes with different variables.

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