

A Systematic Investigation into the Role of Physiotherapy in the Rehabilitation of Breast Cancer Related Secondary Lymphedema

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ABSTRACT

The current systematic investigation seeks to critically examine the role of physiotherapy in the rehabilitation of common occurring Breast Cancer Related Secondary Lymphedema (BRCL) post treatment.

Using Medline, Google Scholar, Cochrane and PubMed databases, a systematic longitudinal research for the period between 2000 and 2020 was conducted. The goal of the examination of previous evidence was to analyze BCRL rehabilitation measures undertaken by medical institutions and professionals with clear assessment of Levels of Evidence (LoEs) in line with PRISMA statement.

A total of 158 women in post breast cancer treatment were included in the study from a total of 13 Randomized Control Trials (RCTs). The article inclusion criterion was 'physiotherapy as an intervention measure' for post breast cancer treatment patients. The articles were found to include multiple physiotherapeutic regimens including swimming, yoga, resistance exercise, aerobics, aqua lymph training and gravity resistance exercise.

The overall findings of the analysis of the multiple evidences of application of physiotherapy for rehabilitation of BRCL is that it significantly helps in improving the quality of life and plays a significant role also in improving objective and subjective parameters among the patients.

Keywords: Physiotherapy; Breast cancer; Rehabilitation; Secondary lymphedema

INTRODUCTION

Medical statistical evidences have it on record that breast cancer is the most common cancer type among women globally [1]. The above in despite, research evidences that there has been a significant increase in the management of breast cancer among women globally with early detection, diagnosis and treatment playing a significant role in ensuring effective management. Nonetheless, there are ensuing complications which are mainly side effects of the disease and of the treatment process which still make breast cancer a menace among women globally [2,3]. According to Coleman et al. some of the yet to be resolved complications related to breast cancer treatment include loss of muscle functionality and extensibility, weaknesses, fatigue, pulmonary complications upper body pain, limited shoulder functionality, neuropathy, concomitant increases in fat, decreases

in lean mass and most commonly, BRCL [1]. This is agreed to by Momenimovahed and Salehiniya, who present an in-depth analysis of the prevalent risks of breast cancer post treatment [4].

Momenimovahed and Salehiniya adduce that BCRL is a common occurrence post breast cancer treatment. In explaining the phenomenon further, the scholars record that BCRL is caused by accumulation of fluids in the interstitial tissues which in itself is caused by the damage of the lymphatic system during the course of the treatment. The lymphatic system damage is induced by surgery, radiation or neo-lymph angiogenesis that is tumor-induced [4-6]. Within two years of the process of breast cancer treatment, majority of women are likely to develop a swelling related to BCRL. If the treatment is still ongoing, the BCRL condition is likely to be exacerbated leading to the swelling of the upper limb with symptoms including sever pain, discomfort,

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heaviness and weakness. This condition is worsened when there are other factors including obesity and radiotherapy to the proximate lymph nodes. According to research evidence, the BCRL status if unattended negatively affects medical prognosis opening the patient up to increased infection and psychological distress that affects the overall quality of life [7]. The treatment of the condition is possible through a multipronged approach that includes skin care, complex decongestive medicine and physiotherapy [8,9]. There has been consensus among previous scholars that physiotherapeutic exercises have been useful in improving physical activity and performance of patients, reduction in chronic and acute pain, improvement of quality of life and overall body composition.

The above being the case, research notes that there has been limited proactive clinical recommendation for physiotherapeutic programs for patients with suspected BCRL [10,11]. According to Pidlyskij et al., this situation has left patients insecure and averse to attempting physical exercise while in actuality, it is a cure for their condition. Supports the above assertion mentioning that the resulting effect of lack of patient education and proactive clinical recommendation as to the effects of exercise in BCRL, leads to sedentary subjects body parts developing fat mass which in itself works to worsen the patient's condition. Indicates therefore that it is imperative that going forward, primary care physicians educate the patients on the risk factors sedentary poise and the importance of using tailored exercise programs to ensure activity of the cured area for purposes of improved prognosis and quality of life. While there have been a number of studies published on the effect of exercise on BCRL with specific focus on the positive impact that resistance exercises have on BCRL, there has been limited evidences detailing the impact of physiotherapy on BCRL [12-14]. This provides sufficient motivation for the investigation of the impact of physiotherapy on breast cancer related lymphedema.

METHODOLOGY

The research conducted a systematic search on authoritative databases including Medline, PubMed, Google Scholar and Cochrane in 2021. The period of focus for the research was January 2000 to January 2020. The key words included 'rehabilitation of breast cancer using physiotherapy, breast cancer and physiotherapy, physiotherapy impact on breast cancer, rehabilitation programs of breast cancer patients post treatment, and side effects of breast cancer treatment and rehabilitative measures.' The studies returned were analyzed and inclusion was done for women of all ages, race and/or nationality provided they were suffering from BRCL post cancer treatment. The research also focused on the intervention measures that were done for the patients undergoing BRCL and these interventions had to involve physical activity. The research therefore excluded studies which were not focused on women experiencing BRCL or those who were undergoing preventive measures or were identified as 'at-risk' of BCRL. The inclusion and exclusion criteria of the studies found are presented as following in Table 1.

Table 1: The inclusion and exclusion criteria of the studies found.

| Inclusion | Exclusion |
|---|---|
| 1. Patients had to have breast cancer diagnosed | 1. Studies published out of the time period selected |
| 2. Patients had to have BCRL as a result of breast cancer treatment | 2. Studies focusing on mixed measures of intervention |
| 3. Studies had to be on women | 3. Studies not including exercise as part of the intervention |
| 4. All studies had to be of randomized control trials (RCTs) | 4. Studies focused on preventive measures against BCRL |
| 5. Intervention measures including exercises of any kind had to be administered on the patients | |

The above study focused on the outcome and their measurement based on the application of physiotherapy for the rehabilitation of patients suffering BCRL post breast cancer treatment. In line with Liberati et al. guidelines on the reporting for systematic reviews (PRISMA), the current review ensured to follow each and every one of the guidelines [15]. The search was performed independently between the Author and Co-author in order to provide room for potential differences in search results and use these as a call for objectivity in the selection of the most appropriate studies for inclusion. The rigorous correspondence process led to concurrence on 13 studies assessed and accepted for use subject to the levels of evidence criterion as supplied by the American Society of Clinical Oncology. The following were the levels of evidences

- Level I - RCTs meta analyses
- Level Ia - Breast cancer survivors RCTs
- Level Ib - Breast cancer survivors RCTs across numerous sites
- Level Ic - RCTs on the general population not necessarily cancer survivors but those experiencing long term effects for instance sexual dysfunction.
- Level II - Breast cancer survivors non-RCTs
- Level IIa - Breast cancer survivors across numerous sites, non-RCTs
- Level IIb - Non-RCTs on the general population not necessarily cancer survivors but those experiencing long term effects
- Level III - Prospective cohort study and case control studies
- 0 - Expert opinion

RESULTS

Initially, a total of 42 studies were identified and concurred upon among the authors. This then led on to the filtration stage where the studies were filtered using key word terms and inclusion specificities including 'women' and 'randomized clinical trials'. This led to the exclusion is a total of 29 studies, leaving only 13 studies suitable for the current systematic review. The total number of patients in the 13 articles selected for full text analysis

on the build up to the systematic analysis was 158. The study sample sizes ranged from between 10 and 150 patients and the period for all the studies selected fell between the years 2002 and 2018. The studies included had all the patients already done with the primary therapy for the treatment of breast cancer and had all developed BCRL which was a key point of focus for the study. Accordingly, the period of time for the intervention for BCRL was between 2 months to 12 months and the research noted that the average age of the women in the studies was 56 years. The interventions in all the studies were supervised in the early stages with the supervision slowing down as the intervention period went on. The intervention frequencies depending on the length of the intervention period varied from once to seven times in a week. The measurements of the efficacy of the intervention were taken at the beginning and at different times during the course of the intervention including after the intervention. Among the key elements of measurement was the arm volume and arm circumference which was measured and regularly recorded in all the studies. In six of the studies, limb circumference measurement was used – the research however notes that at least one parameter of measurement was used in the assessment during the trials while some trials measured multiple parameters. The summary of the articles included in the study are listed in Table 2 [16-22].

Table 2: The summary of the articles included in the study

| Author | Design | Purpose |
|-------------------------|--------|--|
| Baumann et al. (2018) | RCT | The effect of the intervention on the weight of the upper limb on breast cancer post-surgery patients |
| Box et al. (2002) | RCT | The effects of physiotherapy on breast cancer lymphedema post-surgery |
| Cobbe et al. (2017) | RCT | The use of complex decongestive therapy regimen together with physiotherapy for lymphedema suffering patients |
| Devoogt et al. (2018) | RCT | Impact of physiotherapy on the volume of the upper limb on breast cancer patients post-surgery |
| Devoogt et al. (2011) | RCT | Impact of physiotherapy on the weight of the upper limb in breast cancer patients post-surgery |
| Eurertz et al. (2011) | RCT | To determine the effect of physiotherapy on the secondary complication of lymphedema in breast cancer patients after surgery |
| Lacomba et al. (2010) | RCT | Examination of the impact of physiotherapy on BCRL pre and post-surgery |
| Mckenzie, (2014) | RCT | The impact of progressive exercise of the upper limb on BRCL |
| Rafn et al. (2018) | RCT | Examining the impact of physiotherapy on the quality of life of lymphedema patients |
| Schmitz et al. (2010) | RCT | To examine the state of the girth of the upper limb for BCRL patients post-rehabilitation |
| Torres et al. (2010) | RCT | Early pre and post-surgery physiotherapy for BCRL breast cancer patients |
| Zhang et al. (2016) | RCT | Examining the effects of physiotherapeutic intervention on upper limb weight of BCRL patients post-surgery |
| Zimmerman et al. (2012) | RCT | The effects of physiotherapy on the volume of the upper limb in breast cancer patients post-surgery |

DISCUSSION

The current review has made clear the impact of physiotherapy in the rehabilitation of breast cancer patients post-surgery especially as far as the effects of BCRL are concerned. The review has relied on previous studies and sought their valid findings to bring together a study that reaffirms the utility of physiotherapy in the rehabilitation of breast cancer patients post-surgery. The 13 studies that have been shared and used as the primary basis for the review all concur that exercise and physiotherapy are important in breast cancer patients post-surgery. Some of the studies actually highlight that exercise and physiotherapy may be important pre-surgery also as a way of introducing the patient into practice to improve quality of life, alleviate pain and forestall the development of other complications that come from sedentary body parts. Considering the current review's adherence to the PRISMA guidelines, it can be stated that the research findings are sufficient grounds to warrant the proactive use and advocacy of physiotherapy as a clinical tool for breast cancer patients. This will give patients more relief and will lead to better quality of life and care for most of the patients who without effective education on the role of physiotherapy in their condition, remain averse to movement and exercise obviously therefore increasing their chances of negative prognosis through obesity and other related conditions that may arise.

While the above is positive and convincing, the current study is limited in its approach since it for instance, only reviews previous studies and does not conduct its own new study. Further, in the review of the previous studies, while they may be considered as timely owing to the recent nature of its longitudinal approach, it only reviews the positive findings of the previous research regarding the successes of physiotherapy as an intervention. This is partly due to the purpose of the study from the onset which was to highlight the successes of physiotherapy. Notably therefore, the study does not invest time to critic any of the controlled studies selected further and individually in order to consider any other aspects and/or findings of the studies. In future, an approach that considers the actual technical approaches used in each of the studies should provide far better reliable grounds. Consequently, it should be noted that while the studies used in the current review all utilized RCT, their techniques and goals differed.

CONCLUSION

Finally, the limitations notwithstanding, the current study provides sufficient grounds for contradicting ideologies against physical exercise and movement for breast cancer patient's post-therapy by sharing multiple research evidence from previous scholars that indeed, exercise and physical movement is useful as far as rehabilitation of conditions such as BCRL is concerned.

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