

## EFFECTIVENESS OF MANUAL LYMPHATIC DRAINAGE IN IMPROVING QUALITY OF LIFE AMONG WOMEN WITH BREAST CANCER RELATED LYMPHEDEMA

### ABSTRACT

#### BACKGROUND & AIM

The body of evidence related to higher incidence of breast cancer related lymphedema after breast surgeries concluded compromise Quality of Life (QoL) among women over the past decade. The aim of this study is to evaluate the effectiveness of Manual Lymphatic Drainage (MLD) in improving QoL among women with Breast cancer related Lymphedema.

#### STUDY DESIGN & PARTICIPANTS

A Quasi-Experimental study was conducted on women of the age 36-60 years with stage I and II breast cancer related lymphedema at Rehabilitation Department of a tertiary care Hospital.

#### METHODS

Total 70 women recruited with lymphedema were assessed at base-line and after treatment on Lymphedema Life Impact Scale. Manual lymphatic drainage technique was applied for 3 days in a week for 6 weeks with a compression bandage for first 4 weeks.

#### RESULTS

The findings showed that Manual Lymphatic Drainage (MLD) technique significantly improves the Lymphedema Life Impact Scale score after intervention  $p < 0.05$  notably in psychological domain of the scale  $p = 0.0001$  furthermore, the percentage of impairment was also reduced significantly from 75.98% to 44.18%.

#### CONCLUSION

MLD is found to be more effective treatment for improving the overall Quality of Life among women with Breast cancer related lymphedema

#### KEYWORDS

Manual Lymphatic Drainage (MLD), Quality of Life (QoL), Breast Cancer, Compression Bandage, Impairment, Lymphedema Life Impact Scale.

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## INTRODUCTION

Globally, the most frequent malignancy among women is breast cancer<sup>1</sup>, which is accounted as 23% of all the cases and its frequency is increasing day by day<sup>2</sup>. In 2002, the incidence of breast cancer worldwide was estimated 1.1 million; 641,600 cases were reported more in developed countries and 509,700 reported in less developed countries. Due to breast cancer, the death rate was found higher in under developed countries<sup>3</sup>. In Korea over the past 14 years there has been 3.3% of population is diagnosed with Breast Cancer but the mortality rate has been reduced since the year 2002, while incidence and survival has improved because of great advances in treatment approaches<sup>4</sup>. While in Pakistan 1 in 9 females are diagnosed with breast cancer<sup>5</sup>.

According to Shaukat Khanum Memorial Cancer Hospital (the leading cancer care Hospital in Pakistan) statistics, 45.9% are women, out of which 21.5% are diagnosed with Breast Cancer. In 2010 Age-Standardized Incidence Rate (ASR) An annual report from Asia showed 69 per 1 lac women diagnosed with breast cancer in Karachi South that is second highest in Asia. There is lack of cancer data registries region wise in Pakistan which makes it difficult to report the overall incidence of the disease in the country<sup>6</sup>.

Women who have underwent to breast cancer related treatment including surgeries, radiotherapy, chemotherapy or other hormonal therapies are at continuing risk of producing breast cancer related lymphedema<sup>7</sup>. It is an untreatable lifelong medical condition occurs due to damage in lymphatic system during treatment<sup>8</sup>. The lymphatic system fails to remove excess accumulation of protein rich fluid manifested as tissue swelling present in one or both arm<sup>9</sup>. The most common symptom experienced by women is arm swelling other include the warm extremity, heaviness, tightness, stiffness, tingling and restricted range of motion on shoulder, elbow, wrist and even small joints of fingers<sup>10</sup>.

The Quality of Life is severely compromised in women with unilateral arm lymphedema after breast surgery because the condition may cause significant psychological, physical, functional, and social morbidity thus downgrading Health Related Quality of Life. Physiological manifestations and loss of function in lymphedema is harder to hide by the patients. Lymphedema is more distressing than breast cancer surgery<sup>11-12</sup>. Therefore, an effort required to implement the effective treatment approach to minimize the psychological, physical and functional disturbances in women with breast cancer related lymphedema<sup>13-15</sup>.

Lymph edema Functioning, Disability and Health questionnaire (Lymph ICF) and lymphedema quality of life (LYMQOL) are the widely available tools to assess the Quality of Life among lymphedema patients moreover, Lymphedema Life Impact Scale (LLIS) is a collective tool to inquire the incidence of infection, impairment and measurement of lymph-edema which is contributing significantly in examining the participation restriction<sup>16</sup>.

The primary directing component for current standard therapeutic approaches in the management of lymphedema is Knowledge of anatomy and physiology of the lymphatic system. However, for more exploration in scientific world an improved understanding of

the embryonic formation of the lymphatic system is also important in managing secondary lymphedema<sup>17</sup>.

There is no cure for this condition once established; the options available for alleviating the symptoms include drugs, surgery and conservative treatment including Complex Decongestive Therapy (CDT), Pneumatic Compression Therapy and Manual Lymphatic Drainage (MLD). Little evidence is also found on low dose laser Therapy but its efficacy is still questionable<sup>18</sup>.

Now a days, MLD has become popular in European countries for managing lymphedema. Gentle massage techniques are applied to cause lymphatic flow, thereby increasing the lymphatic drain-age<sup>19</sup>.

Therefore, the aim of this study is to provide the most effective treatment approach that may not only prevent or reduce the volume of limb but should also address psychological, physical and functional parameters of health-related Quality of life among women with unilateral arm lymphedema after treatment of breast cancer.

## METHODOLOGY

### Study Design

Quasi Experimental Study

**Sampling Technique** Convenient Sampling Technique

### Study Setting

The study was conducted in the Outpatient Department of Physical Therapy at a tertiary care hospital.

### Target Population

Women with unilateral arm lymphedema and age range from 36 to 60 years were included after treatment of breast cancer.

### Duration of Study

Six months

### Sample Size

A Sample size of 70 has been selected using WHO Software.

### Sample Selection

#### Inclusion criteria

Women of age 36-60 years with Breast cancer identified unilateral arm lymphedema. Stage I & II lymphedema.

Radiotherapy and chemotherapy sessions were completed before the study begins<sup>1</sup>.

#### Exclusion criteria

Bilateral arm Lymphedema.

Evidence of recurrence and metastases.

Infection in affected limb.

Heart and Renal insufficiency.

DVT in the upper limb<sup>1</sup>.

### **Interventional Strategies**

The study was conducted on 70 females reported to Physiotherapy Department after breast cancer treatment. In first four week of treatment, Females receiving Manual Lymphatic Drainage followed by multilayered short-stretch compression bandaging with appropriate padding, each participant under-went 3 days for 4-week cycle. Then MLD continues for two more weeks without the bandage. All sessions consist of 45 to 60 minutes performed by a trained physiotherapist. The technique included three basic lymphatic drainage strategies that were Stationary circles, Rotary technique and Thumb Circle. The patients were called a total of three days per week for the duration of six weeks. The intervention includes following phases<sup>20-21</sup>.

#### **Preparatory Phase**

The preparatory phase included the detail description of the intervention given to the patient also mentioned time given for wearing loose and comfortable clothing. The purpose of preparatory phase was to provide ample time for self-acclimatized with the environment of treatment area.

#### **Treatment Phase**

This phase comprised of three different treatment strategies that were given to the patient in a single session.

#### **Stationary Circles**

The technique involved the use stationary circle technique of massage to be applied to the patient using elbow. The therapist applied the massage on the neck and shoulder area of the patient. Zero phase strategy was used to induce lymphatic drain-age. For Zero phases the therapist hands were in complete contact with the patient body with full stretch and light touch. Stationary circles massage was given for the duration of 10 to 15 minutes.

#### **Rotary Technique**

The technique was applied on flat body surface such as on the back of the patient. It was a two-handed technique in which therapist applied massage in the oval direction parallel to the spine the technique of zero phase was applied to make patient feel comfortable and relax during treatment. Rotary technique was applied for the duration of 15-20 minutes.

#### **Thumb Circles**

Thumb circles were provided on the periphery of the patient. The massage was given towards the direction of drainage; thumb movement during the therapy was spirally in direction towards the center of the body, the technique was given for the duration of 10 minutes.

#### **Outcome Measure Lymphedema Life Impact Scale**

The scale was based on Physical, psychological and Functional Concern of the patient. It is a Likert scale comprised of 18 items divided into three categories. The patient were asked to complete the scale twice once before the start of the session and second after the completion of six weeks of the session. The intraclass correlation coefficient value for this scale was calculated 0.687 and Cronbach  $\alpha$  coefficient for internal consistency were recorded as 0.84716.

### Data analysis

For storage purpose, Data were entered in Excel 2016 spreadsheets. Further, the Statistical Analysis was done on SPSS software, version 20.

Data were first described in terms of percentage, mean and standard deviation. However, inferential analyses were performed using Paired T-test, for the lymphedema life impact scale variables, in order to compare the pre-post analysis within the group.

### Ethical Considerations

The study was ethically approved by Hospital Ethical Committee. Informed consent was obtained from all participants before enrolling into the study and the data was kept confidential and secure.

## RESULTS

A total of 70 females included in the study had developed lymphedema after mastectomy (n=56) and axillary lymphadenectomy (n=14) illustrated in figure-1. The participants mean age was  $49.6 \pm 1.9$ , whereas most of the lymphedema cases were seen in the age range of 51-55 (36%) and 36-40 (22%). The age-wise distribution of the participants is shown in figure-2.

Figure 1. showing the type of Breast Surgeries

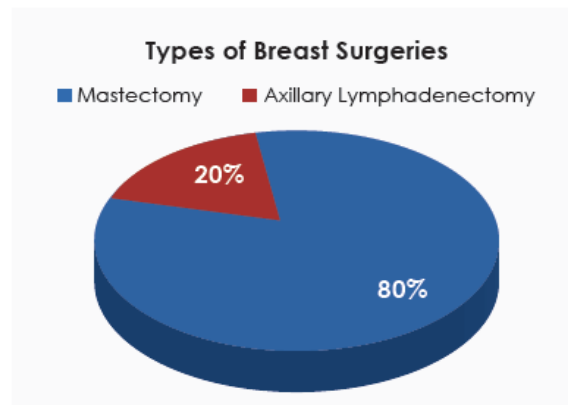
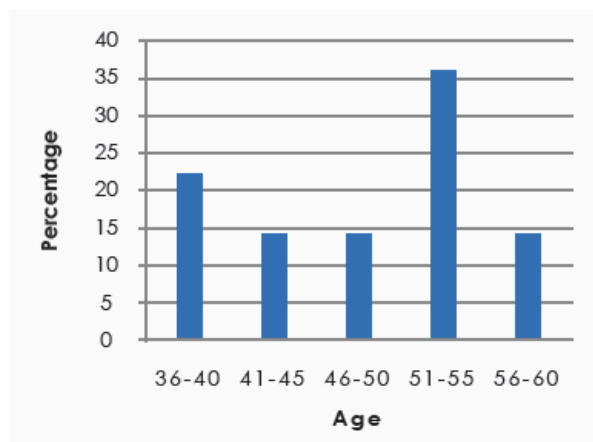


Figure 2. showing the Distribution of Age



At baseline, most of the participants (n=49) reported left sided lymphedema whereas (n=21) participants had right sided lymphedema. However, maximum of the cases (n=47) were presented with stage-II lymphedema classification. Detailed information of participants characteristics is represented in table-1.

Table 1. showing the detail of Participants	
Mean Age	49.6(1.9)
Since diagnosed with cancer (months)	101.3 (16.4)
Lymphedema duration (months)	53.7 (11.2)
<b>Lymphedema classification</b>	
Stage I	n=23
Stage II	n=47
<b>Arm side</b>	
Left	n=21
Right	n=49
<b>Breast cancer treatment</b>	
Radiotherapy	n=43
Chemotherapy	n=52

After intervention for the duration of 6 weeks' significant improvement ( $P < 0.05$ ) was observed in overall Quality of Life among women participated in the study, the outcome measure was assessed using Lymphatic Life Impact Scale both at baseline and after intervention. (Table-2)

Table 2. Showing the pre-post mean of Lymphedema Life Impact Scale			
	Pre Mean $\pm$ S.D	Post Mean $\pm$ S.D	P-value
LLIS Scores	51.67 $\pm$ 4.21	21.62 $\pm$ 3.51	<0.05
*Significant p-value <0.05			

The domain wise pre and post mean values of LLIS are depicted in table 3, the results indicated that there is highly significant reduction was recorded in psychological domain after Manual

Lymphatic Drainage ( $p < 0.05$ ) with a mean difference of 11.84. The mean difference of each domain is shown in table 3.

**Table 3. Showing the pre-post mean of Lymphedema Life Impact Scale according to domain**

	Pre (Mean ± S.D)	Post (Mean ± S.D)	Mean df	P-value
Physical	18.41±2.30	12.08±2.24	6.33	0.001
Psychological	19.52±2.24	7.68±2.26	11.84	0.0001
Functional	13.72±2.1	10.27±2.3	3.45	0.05

The severity of impairment was calculated by impairment score calculator, there were statistically significant improvement reported by the participant after 6 weeks of Manual Lymphatic Drainage. The graphical representation of percentage difference at baseline and after intervention is represent-ed in figure 3.

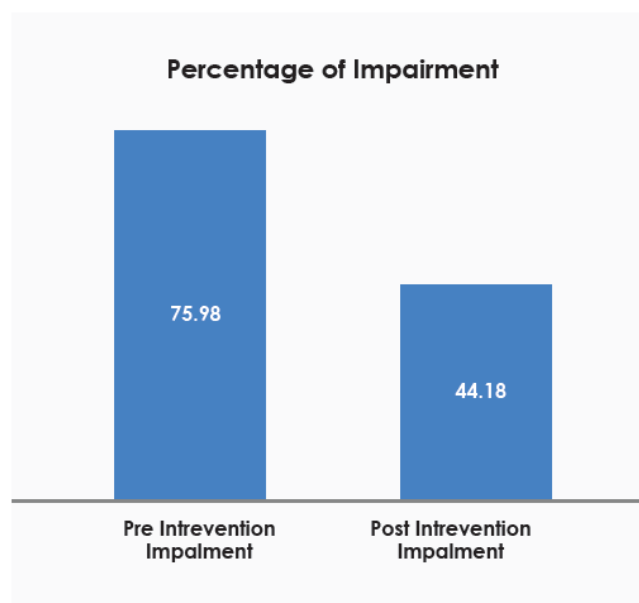


Figure 3. showing the Percentage of Impairment before and after treatment

## DISCUSSION

This study evaluated the effectiveness of manual lymphatic drainage in improving the Psychological, physical and functional domains of lymphedema life impact scale among women with breast cancer related lymphedema and attended the Rehabilitation Clinic at tertiary care Hospital in Karachi. After 6 weeks of intervention, the result suggests that Manual lymphatic drainage technique was found to be effective in improving the patient perception towards Lymphedema life impact scale. The three domains of the scale that are physical, psychological and functional were improved significantly. Our finding shows that the risk of lymphedema may increase after 50 years of age similarly one study conducted

in 2014, revealed that the risk of lymph-edema is found to increase 3.3 times in women more than 50 years of age with the reason unknown<sup>22</sup>. On the contrary, another study concluded that lymphedema is more prevalent among young adult women with obesity in com-mon<sup>23</sup>.

According to our baseline assessment, most of the women had undergone mastectomy. Left sided arm edema was found significantly with stage II lymphedema. The psychological well-being of the participant was significantly improved with 6-weeks of MLD with  $P=0.0001$ .

Previous studies showed the effectiveness of MLD in addressing Quality of Life in lymphedema among systemic sclerosis, reflex sympathetic dystrophy, and psoriatic arthritis patients furthermore, in fibromyalgia syndrome it reduces pain threshold and intensity thus, improves the overall QoL and disability<sup>24</sup>. Our findings also support these results among breast cancer related lymphedema women by reducing the scores of Lymphedema life impact scale after 6-week of intervention with com-pression bandage ( $p<0.05$ ).

Williams and Szolnoky et al in a study conducted on patient having greater than 10% of volume difference in the circumference of the arm among patient age 63 and above revealed that Manual lymphatic drainage technique applied for three weeks significantly reduced the lymph circumference<sup>25-26</sup>. However, a meta-analysis conducted on the effects of manual lymphatic drainage on the breast cancer patient suggested that manual lymphatic drainage alone did not provide significant result in the management of lymphatic drain-age<sup>27</sup>.

According to the results of our study we found that Manual Lymphatic drainage techniques effectively reduced the lymphedema of the effected limb, 45-60 minutes of session given to the patient based on three different lymph drainage techniques improved the patient perception towards developed lymphedema, however other studies also suggested that no such significant difference in term of reduction of circumference has been noticed while applying the Manual Lymphatic drainage technique alone. Jeanette Ezzo et al in 2016 revealed that MLD with standard physiotherapy does not reduce the lymph circumference whereas MLD with compression bandage reduces 30% to 38.6% post treatment<sup>28</sup>.

A study conducted by Sheila H et al in 2013 MLD alone is beneficial in reduction of volume however alone it was a time-consuming process and that if the technique used in conjunction with other physical therapy management approached the same result could be achieved much earlier<sup>29</sup>. Similarly, it was also evident from researches that Manual lymphatic drainage effectively reduced the volume of the underlying lymph but the technique in combination with other approaches like Low level laser therapy could turn out to be more effective<sup>30</sup>. Further in two studies the incidence of lymphedema was determined among breast cancer patients who underwent manual lymphatic drainage and it was found that a high relative risk 0.63 was found with the reoccurrence occur in just 1 to 3 months after the completion of the session that suggested that weak long-term effect of the effect of the technique in the management of lymphedema<sup>31-32</sup>.

The finding of our study was in consistent with the finding of the study conducted in the various time periods however authors believed that more studies in this regard are required for further confirmation of the findings. Our study had some limitations six weeks of training protocol with the frequency of three days per week was not fully appropriate for

measuring the acute effects of the therapy minimum 5 to 6 days per week of intervention is required but MLD is an expensive treatment proto-col as well as there was no follow-up to check the prolong effects of MLD. Furthermore, MLD can only be provided by trained physiotherapist that may limit the intervention done in any other setting. Due to lack of time the study was done in a single hospital. Moreover, for the purpose of the generalizability of the methodology equipped lab with trained personnel is required along with the collection of data from multiple physical therapy setups is also needed therefore authors recommend a large-scale study with bigger effects size to be done in order to get more preciseness in the results.

The strength of the study includes use of standard scale which can evaluate the Quality of life as well as determine the impairment level among the participants.

Hence, the favorable effects of Manual Lymphatic Drainage in the improvement of psychological, physical and functional component of Lymphatic life impact scale which ultimately improve the Quality of Life among women with breast cancer related lymphedema. This allows us to assume that MLD is an effective method complementing the methods of lymphedema treatment that have been used till now.

## CONCLUSION

Our study concluded that six weeks of Manual Lymphatic drainage was found to be effective in improving the Quality of life among women with breast cancer related lymphedema measured on Lymphedema Life Impact Scale furthermore, it is also helpful in decreasing impairment among the population. Future researches are still required to get more concrete results.

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