

# Exploring the Long-Term Consequences of Lymphedema on Functional Capacity and Daily Activities in Cancer Survivors

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## ABSTRACT

**Aim:** The aim of this study to explore the Long-Term Consequences of Lymphedema on Functional Capacity and Daily Activities in Cancer Survivors.

**Methods:** A personal data form, Katz's index and Lawton's index to measure functional capacity, and the EORTC QLQ-C30 and EORTC QLQ-BR23 to assess quality of life were utilized in this descriptive, exploratory, cross-sectional, and quantitative investigation. 300 women were participated among which only 250 women responded.

**Results:** Functionally speaking, daily activities were impaired for women with breast cancer as a result of the detrimental effects of cancer treatment on instrumental activities. In addition, the recreation activities and social engagement of these women were profoundly impacted by physical and psychosocial impairments. Life quality deteriorated in tandem with these occurrences.

**Conclusion:** This research found that functional capacity alterations in breast cancer patients had a detrimental impact on patients' ability to participate in everyday activities and social events. Their quality of life was negatively impacted by this predicament.

**Keywords:** Breast cancer-related lymphedema; Cancer; Daily activities; Quality of life; Qualitative methods

## INTRODUCTION

Breast Cancer-Related Lymphedema (BCRL) is a kind of secondary Lymphedema (LE) that arises as a result of injury to the lymphatic system during the treatment of breast cancer. BCRL is a persistent and currently untreatable disease [1]. The BCRL presentation include physiological symptoms, such as swelling of the arm, changes in feelings, discomfort, restrictions in range of motion, and exhaustion. Equally worrisome are the psychiatric symptoms associated with BCRL. Individuals who have survived Breast Cancer-Related Lymphedema (BCRL) experience emotions of anguish, disruptions in their perspective of their own physical appearance, and alterations in how they see their societal roles [2]. BCRL may function as a constant reminder of cancer and the anxiety around its potential recurrence. The population afflicted with lymphedema, especially secondary lymphedema, is troubled by the insufficient recognition of their persistent medical condition. BCRL is often identified after a period of

two years after the conclusion of breast cancer therapy, as shown by estimates. Although breast cancer continues to be the most prevalent kind of cancer among women in several nations, people who are diagnosed with this illness should anticipate much higher relative survival rates compared to those diagnosed with other prevalent malignancies, such as lung and bronchus or colon and rectum. The increased frequency of occurrence, together with the positive outcome in terms of survival, suggests that the well-being experienced by individuals after being diagnosed and treated is becoming a matter of growing significance [3]. Since physical functioning is highly connected with quality of life and the capacity to live independently, it is vital to establish the amount of physical issues encountered by women after treatment for breast cancer. People undergoing cancer treatment may experience fatigue, anxiety, sadness, and changes in weight, which are often reported issues. Breast cancer survivors often have physical symptoms such as pain, lymphoedema, heaviness, tightness, numbness, and stiffness in the afflicted upper limb. Among these symptoms,

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lymphoedema is considered one of the most troublesome and feared sequelae. Although the level of impaired function is most significant during the first year after therapy, almost 40% of women still have some impairment in upper-body function even after 5 years of treatment. This is the case even after considering particular patient, treatment, and disease factors [4].

The occurrence of any of the aforementioned physical symptoms might potentially have a negative effect on the functioning of the upper body, thereby affecting one's overall quality of life. In addition, those who have developed Breast Cancer-Related Lymphedema (BCRL) have a decrease in their overall Quality of Life (QOL) and an increase in the amount of money they have to spend out-of-pocket compared to those who do not have BCRL. The significance of accurately evaluating upper-body functionality in women after breast cancer therapy is apparent. Regrettably, there are various constraints that define the present research approaches utilized to evaluate upper body function. Most research use a checklist consisting of 10-12 or even fewer activities. Only the level of work complexity is considered, rather than considering both complexity and frequency. The frequency of a task is a crucial factor as it determines the level of load, which is the result of the work's complexity and frequency combined. For instance, an activity that is seldom done yet challenging would be less onerous compared to a task that is regularly performed but equally challenging [5]. Furthermore, a number of the activities included in the checklists have identical functional criteria, including the musculature engaged in generating the movement, the kind of muscle contraction necessary, and the sort of activity generated. The selection of these activities was mostly based on research conducted in the late 1970s, taking into account either theoretical concerns or empirical evidence from an older population, rather than specifically focusing on women with breast cancer. To ensure that future findings are not unnecessarily constrained by research methods, it is crucial to conduct a thorough assessment of the impact of breast cancer on daily activities that involve upper-body function [6]. Hence, The aim of this study to explore the Long-Term Consequences of Lymphedema on Functional Capacity and Daily Activities in Cancer Survivors.

## METHODOLOGY

### Study design

Women undergoing physical and psychological rehabilitation after breast cancer were the subjects of this quantitative, exploratory, cross-sectional research.

### Participants

The study included 300 cancer survivors who were selected as a convenience sample from individuals who were receiving services from a cancer hospital specializing in supportive care. Senior management of the hospital was contacted and they agreed to assist in distributing the questionnaire. In order to maintain anonymity in the surveys and to facilitate the identification of those who did not reply, each person was granted a unique Identification (ID) number by the secretary of the organizations. A total of 300 women started therapy in the program between January and July of 2023, but only 250 were asked to participate

in the research when the sample size was determined. Most of the persons on this list were female breast cancer patients who had received diagnosis and treatment. But it also included individuals who provided care, those who worked in the area of breast cancer, and others who were just curious to learn more about the disease. At first, the percentages of cases (those who had previously had breast cancer) and non-cases were unclear.

### Measures

The questionnaire was developed from a qualitative study that used Social Cognitive Theory ideas and pertinent research to investigate what supports, inhibits, and facilitates exercise along the course of a cancer patient's journey. The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-C30 (EORTC QLQC30) was used to evaluate the quality of life. The Lawton's index was used to evaluate instrumental daily living tasks, while the Katz's index was used to evaluate functional capabilities for fundamental daily life activities.

### Procedures

Two hundred and fifty of the 300 survivors listed in the database were randomly selected to receive the questionnaire. Twenty out of the respondents said the questionnaire was simple to understand, didn't think it was too lengthy, and didn't hate any of the questions. The self-administered questionnaire inquired about the respondent's age, medical history (including the age at breast cancer diagnosis, therapy kinds received, treated side in relation to dominance and lymphoedema diagnosis), and task burden for 48 daily chores. The to-do list was developed in three phases. First, lists of everyday activities requiring upper body function for sedentary and physically demanding work and leisure days were produced by the study team, which included members with expertise in public health and human movement studies. Second, 24 women who had undergone breast cancer treatment during the previous 18 months participated in semi-structured focus groups to identify everyday chores that these women either had found troublesome or were finding problematic. Ultimately, a full list of daily activities requiring upper-body function was formed by combining previously recognized tasks from the daily task analysis and focus groups with tasks from earlier studies. The list includes activities that have comparable functional needs but are done at different frequency or take longer to complete, as well as tasks that demand various kinds of muscular contractions and distinct musculature to create the motion. There were no preconceived notions about task groups based on physiological and/or functional criteria when it came to the several tasks specified throughout the questionnaire (available upon request). Participants rated the physical demands of these 48 everyday chores on five-point Likert scales: No difficulty, slightly difficult, moderately tough, extremely difficult, and unable. They also rated how often they considered them to be physically demanding.

### Data analysis

For categorical variables, frequency analysis, descriptive statistics, and percentage analysis were used to characterize the data, while Standard Deviation (SD), mean, and Standard Error of Mean (SE) were employed for continuous variables. SPSS Statistics

Software version 23.0 and MedCalc Statistical Software version 19.1.3 were used for statistical analysis. A minimum of 50% of the subscale data has to be provided in order to impute the EORTC QLQ-C30 using simple mean imputation.

## RESULTS

### Participant characteristics

A total of 250 cancer survivors responded. 48 questionnaires were identified as invalid (19 deceased, 5 not addressee and 31 healthcare professionals or cancer survivor’s relative), providing a valid response rate of 52.3%. Table 1 details participants’ medical and demographic information. The median age of the respondents was 61 years (IQR 15), and the majorities of the sample were female, married (38.4%) and retired (32%). The most common diagnoses were breast cancer. A total of 38.6% were unaware of their cancer staging, whereas the remaining sample reported to have Stage I (14.8%) or Stage II (16.4%) disease. The respondents’ median BMI was 29.04, and the majority were classified as either overweight (15.2%) or obese, class I–III (18.8%). A total of 19.6% had completed treatment and 17.2% had undergone surgery plus anti-cancer treatments (Table 1).

**Table 1:** Demographic variable with frequency and percentage.

Demographics	Frequency	Percentage
<b>Marital status</b>	Married	38.4
	Widow	22.4
	Divorced	21.6
	Single	17.6
	Retired	32
<b>Employment status</b>	Part-time	7.6
	Full-time	13.2
	Long-term sick leave	13.2
	Homemaker	14
	Unemployed	8.4
Others (Disabled)	11.6	

  

Body Mass Index	Frequency	Percentage
Normal	59	23.6
Overweight	38	15.2
Obese class I	64	25.6
Obese class II	47	18.8
Obese class III	42	16.8

  

Diagnosis	Frequency	Percentage
Breast	17	6.8
Prostate	19	7.6
Throat	15	6
Non-Hodgkin’s lymphoma	20	8
Lymphoma	16	6.4
Multiple myeloma	14	5.6
Colorectal	24	9.6
Ovarian	19	7.6
Leukemia	16	6.4
Myeloma	21	8.4
Hodgkin’s lymphoma	11	4.4
Sarcoma	20	8
Cervical	21	8.4
Brain	17	6.8

  

Staging	Frequency	Percentage
Stage I	37	14.8
Stage II	41	16.4
Stage III	54	21.6
Stage IV	62	24.8
Don’t know	56	22.4

Treatment received	Surgery alone	43	17.2
	Chemotherapy alone	43	17.2
	Radiotherapy alone	36	14.4
	Chemotherapy and radiotherapy	36	14.4
	Surgery and chemotherapy ± radiotherapy	49	19.6
	Others (Disabled)	43	17.2
Time since completion of treatment	<1 years	33	13.2
	1-2 years	45	18
	3-4 years	55	22
	5-7 years	44	17.6
	8-10 years	34	13.6
	>years	39	15.6

**Quality of life**

A mean score of 68.5 and 64.5, respectively, indicated that participants exhibited impairments in the physical and social function domains. At a mean of 50.4, the emotional function domain had the most meaningful change. There were little alterations in the other domains (Table 2).

**Table 2:** Distribution of mean and standard deviation of participants in EORTC-QLQ-C30.

Scale	Domain	Mean ± standard deviation
Quality of life	Global health status	85.1 ± 21.6
	Global QoL status	82.9 ± 20.2
Functional scales	Physical function	68.5 ± 23.9
	Performing roles	87.5 ± 20.6
	Emotional	50.4 ± 22.2
	Cognitive	76.8 ± 20.2
	Social	64.5 ± 30.9

Symptom scales/ items	Fatigue	42.9 ± 26.3
	Nausea/vomiting	18.5 ± 23.8
	Pain	23.9 ± 31.7
	Dyspnea	30.9 ± 31.5
	Insomnia	9.5 ± 10.6
	Appetite loss	5.5 ± 9.8
	Constipation	22.6 ± 9.8
	Diarrhea	16.7 ± 27.4
	Financial difficulties	27.9 ± 31.7

**Physical or daily activity levels**

The respondents were asked to evaluate their frequency of engaging in vigorous, moderate, and light exercise (>15 minutes during leisure time) using the Godin Leisure Time Exercise Questionnaire's LSI. Table 3 demonstrates that the impairments were moderate, but we also noticed that all domains had significant standard deviations, which suggests that there was more variation in the number of points attained between the highest and minimum scores. While some women described these sensations with great severity, others did not (Table 3).

**Table 3:** Descriptive analysis of domains of functional scale and symptoms of EORTC-QLQ-BR23.

Scale	Domain	Mean ± standard deviation
Functional scales	Body image	35.6 ± 37.1
	Sexual function	42.7 ± 23.1
	Sexual satisfaction	49.2 ± 17.1
	Future perspective	37.1 ± 24.7
Symptom scales/ items	Adverse effects of systemic therapy	28.8 ± 17.9
	Breast symptoms	41.9 ± 23.1
	Arm symptoms	30.1 ± 21.4
	Hair loss	9.7 ± 13.4

Following a correlation analysis, we found that the physical and emotional function domains of the EORTC-QLQ-C30 showed a positive functional capability and a moderate correlation with quality of life. This suggests that greater impairment in these

domains results in more challenges with instrumental activities of daily living. Furthermore, it was shown that dyspnea and sleeplessness had a somewhat negative association. As shown in Table 4, there was a stronger correlation between Lawton's index and EORTC-QLQ-BR23 than EORTC-QLQ-C30. In the areas of hair loss, breast symptoms, and future views, there was a somewhat positive link; that is, more impairment in the categories translated into greater challenges with functional abilities. When it came to sexual pleasure, there was a modest link with an inverse function. These findings suggest higher functional capacity impairment in women who reported poor sexual pleasure. Such relationships were modest in other categories. The absence of impairments in the participants' functional competence was the reason for the non-performance of correlation analysis for questions connected to Katz's index. Functional capacity scale readings for Lawton's index were 0.97 and for Katz's index were 1.0.

**Table 4:** Correlation between Lawton's index and EORTCQLQ-C30 and EORTC-QLQ-Br23 questionnaires.

	Lawton's index	Pearson`s coefficient
Functional scale	Global mean/QL	0.134808
	Physical function	0.532253
	Performing roles	0.061642
	Emotional function	0.490271
	Cognitive function	-0.1812
	Social function	0.344095
	Symptoms scale	Fatigue
Loss of appetite		-0.13584
Insomnia		0.289297
Pain		-0.50237
Nausea and vomiting		-0.51012
Dyspnea		-0.35604
Constipation		-0.4105
Diarrhea		-0.44809
Financial difficulties		-0.1207

Functional scale	Body image	0.196379
	Sexual function	0.168403
	Sexual satisfaction	-0.41742
	Future perspective	0.621042
Symptoms scale	Secondary symptoms of cancer treatment	-0.30179
	Breast symptoms	0.735816
	Arm symptoms	0.324909
	Hair loss	0.696261

## DISCUSSION

Breast cancer is the most prevalent kind of cancer that affects women globally, and its occurrence has increased twofold in recent decades [7]. As a result of early identification and enhanced medical care, there has been a rise in the population of individuals who have successfully overcome breast cancer and are living long-term. Consequently, there is a heightened emphasis on the Quality of Life (QoL) [8]. Furthermore, it is crucial to assess the impact of certain therapies on many aspects of Quality of Life (QoL) in long-term breast cancer survivors. Women diagnosed with breast cancer had impairments in carrying out routine activities of daily life, including household chores, personal care, and other tasks. Essential daily activities include self-care tasks such as dressing, eating, and maintaining personal hygiene. Instrumental activities refer to tasks that require significant physical exertion as they contribute to the functioning of everyday life both at home and in society. These activities often need greater use of emotional, cognitive, and physical faculties.

The aim of this research was to evaluate the frequency and physical demand of everyday chores (task load) in women who had recently had breast cancer therapy that required upper-body function. The tasks that cause women the most difficulty after undergoing treatment for breast cancer have been discovered.

The presence of breast cancer significantly impacts women's emotional well-being since it alters their sense of self-reliance and freedom. Another contributing aspect is the proximity, whether actual or romanticized, of mortality and incompetence, which elicit dread, anxiety, humiliation, and sentiments of prejudice. These many causes have the potential to cause emotional deficits. Approximately one third of patients undergoing cancer therapy may experience discomfort, which will have a detrimental impact on their quality of life.

According to Courneya et al., exercise obstacles should be evaluated while motivation is high and in cancer survivors who are attempting to work out in order to identify "true" hurdles

as opposed to “reasons or excuses.” Although such hurdles may not be typical of the whole cancer population, this may still be a pertinent topic [9].

The findings of our research may enhance the management of challenges encountered by women with breast cancer in a more comprehensive manner. Furthermore, it may assist healthcare providers in gaining a more comprehensive understanding of the repercussions that this illness and its treatment have on women’s everyday activities, particularly when these women completely cease their activities, hence leading to a decline in their quality of life. Our research demonstrates that mitigating the detrimental impacts of breast cancer therapy may result in successful and efficient restoration of women’s working life after undergoing cancer treatment.

The effects of lymphedema in the upper limbs on sleep, everyday functioning, and quality of life were examined in this extensive population-based study of breast cancer survivors who had either chemotherapy alone or a combination of treatments for treatment. Similar worries and misunderstandings about physiological sensations as indicators of cancer recurrence plagued most of the cancer survivors studied. Study observed significant diversity in the quality of life among patients who did not experience overall changes in their global quality of life, but did exhibit changes in specific components of their quality of life. The results may have been impacted by the fact that all participants were part of a rehabilitation facility where self-care was readily available and they received advice that allowed them to modify their experiences, so facilitating their bio psychosocial recovery. One potential constraint of our investigation is the possibility of time limitations. Time constraints may impact the findings by introducing short and long-term negative effects of therapy, which may become more apparent as the study progresses. According to Hormes et al., a higher number of self-reported BCRL symptoms, including pain, functional change, edema in the arm, and arm symptoms, were associated with a worse quality of life [10]. Comparably, 337 breast cancer survivors experiencing arm and shoulder pain 3.9 years after surgery in addition to adjuvant radiation, chemotherapy, and hormone treatment were the subjects of Dahl et al., investigation on sleep and lymphedema. The greatest significant correlation was seen between pain and arm/shoulder discomfort, followed by lymphedema and decreased mobility among breast cancer survivors who had insomnia [11].

In the postoperative phase, it is important for participants to be a member of a rehabilitation center and get assistance on how to continue with their fundamental daily tasks. Furthermore, these methods encourage continuing to take care of oneself. The fact that woman could start rebuilding their lives and gaining independence once cancer treatment ended also contributed to an improvement in their quality of life.

## CONCLUSION

People with breast cancer have negative effects on their everyday

activities and performance at work. Recreational activity participation by participants was also hindered. To provide breast cancer patients with therapeutic suggestions that are educated and help them manage the symptoms of lymphedema, it is essential to comprehend the experiences of women within the framework of their daily life. Understanding the situational, attributive, and temporal aspects of symptom distress may help create more focused treatments that target each element. Prospective studies are necessary to examine these characteristics of symptom discomfort and the relationship between symptom distress and psychological distress after breast cancer treatments.

## ETHICAL APPROVAL

Ethical approval was granted by the University, Research Ethical Committee.

## CONFLICT OF INTEREST

None.

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