RESEARCH ARTICLE

Functional limitations in upper extremity and its impact on QOL among post-mastectomy females in Peshawar: A cross-sectional study

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Abstract

Objective: To determine the prevalence of functional limitations in the upper extremity among post-mastectomy patients, and to assess its impact on quality of life.

Method: The prospective, analytical, cross-sectional study was conducted at Hayatabad Medical Complex and Khyber Teaching Hospital, Peshawar, Pakistan, from June to October 2023, and comprised female patients aged at least 18 year who had undergone unilateral mastectomy 3 months before data collection. The impact of demographic variables age, occupation and residence on functional limitations in the upper extremities was explored using the Quick Disabilities of Arm, Shoulder and Hand and Functional Assessment of Cancer Therapy-Breast questionnaires. Data was analysed using SPSS 25.

Results: Of the 123 female, married patients, 31(25.25%) were aged 51-60 years, 3(2.4%) were aged 18-30 years, 75(61%) were living in rural areas, and 103(83.7%) were housewives. Overall, 64(52%) females showed no limitations, 50(40.65%) showed mild, and 9(7.32%) showed moderate functional limitations in the upper extremities. The variation in the quality of life among different functional limitation categories post-mastectomy was not significant (p=0.061). There was no significant association of age (p=0.784), residence (p=0.442) and occupation (p=0.387) with functional limitations in the upper extremities.

Conclusion: Upper extremity functional limitations were not significantly associated with a decline in quality of life among breast cancer survivors.

Keywords: Mastectomy, Quality of life, Post-mastectomy, Functional limitation, Upper extremity. (JPMA 75: 1387; 2025)

DOI: https://doi.org/10.47391/JPMA.21666

Introduction

Breast cancer (BC) is one of the most prevalent cancers in females around the globe.[1] It has been reported as the 2nd most common cause of death among females in terms of mortality rate from cancers. Breast tumours are increasing worldwide with a high incidence rate and increasing mortality rate in developing countries.[2] BC is one the most common cancers with a rate of 43.1 per 100,000 incidence among females, which is about 25% among all cancer types.[3] In comparison with the Western population, BC in the population of Pakistan is more prevalent.[4] BC appears in one out of every nine women in Pakistan, which has one of Asia's highest incidence rates.[4,5] Every year, approximately 90,000 females in Pakistan are diagnosed with BC.[6]

Statistics have shown that among deaths related to cancer, BC is the 2nd most leading cause of death, accounting for 6.6% of all cancer deaths worldwide in 2018.[7] The mortality rate related to BC is high in developing countries, and causes a high mortality rate among females in developing countries.[3] Pakistan has a high mortality rate of about 25.2 and has been ranked 5th among countries having a high death rate.[3]

Among treatment options, mastectomy is indicated in patients having recurrent BC having undergone previous treatment.[8] This surgical procedure is mostly indicated in patients having advanced stage BC, invading multiple foci of the breast.[9] About 46% of patients are treated with mastectomy in the United States, with an increased rate over the past decade.[10] Mastectomy rates are increasing and are estimated to be 45% among women of all ages who have been diagnosed with BC.[11]

In majority of post-mastectomy females, functional impairment is frequently caused by the surgical elimination of tissue from the breast and/or axillary lymph nodes (LNs), resulting in an impairment of the lymphatic system and probable damage to the upper extremity musculoskeletal components.[12] A 2022 study on BC women conducted that about 40% of those diagnosed with the disease showed a minimum of one functional limitation.[13] Patients with functional limitations experience reduced voluntary activity, generalised weakness and tiredness.[14] Long-term

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ORCID ID: 0009-0005-4662-9212

Submission complete: 11-08-2024 **1st Revision received:** 05-11-2024

Acceptance: 18-06-2025 **Last Revision received:** 17-06-2025

motion declines have been reported in women treated for BC, with one study reporting >10% decrease in flexion over a period of five years after treatment, and another investigation identifying losses of 20 degrees of motion within seven years after surgical treatment. Upper extremity strength decreases 10-15% from one to five years after BC treatment. Muscular endurance, or capacity to maintain physical activity for an extended period of time, has received little attention among women with breast tumours, with results varying from no deficits to 20% deficit.[15] Individuals' professional and social participation can be restricted as a result of activity limitations. As a result, their overall quality of life (QOL) might decline.[16]

Patients undergoing mastectomy indicate greater discomfort and decreased mobility than those undergoing wide local excision or controls.[10] Family Caregivers (FCs) may have an impact on a patient's QOL, particularly in those with advanced cancer.[17] Women who have had a mastectomy experience a variety of physical and emotional problems, such as depression, which have serious psychosocial consequences.[18] Pain and limitations of movement of the unilateral upper limb continue to have a negative impact on these women's QOL even after treatment has ended.[19] In Western countries, the overall incidence of depressive disorders after mastectomy varies 1-56%.[20]

The current study was planned to determine the prevalence of functional limitations in the upper extremity among post-mastectomy patients, and to assess its impact on QOL.

Patients and Methods

The prospective, analytical, cross-sectional study was conducted at Hayatabad Medical Complex (HMC) and Khyber Teaching Hospital (KTH), Peshawar, Pakistan, from June to October 2023. After approval from the ethics review boards of the Institute of Physical Medicine and Rehabilitation (IPMR), Khyber Medical University, Peshawar, HMC and KTH, the sample size was calculated using Raosoft calculator[21] with a population size of 180, confidence interval (CI) 95%, and margin of error 5%, with accepted non-response rate of 15. Patients were screened using convenience sampling technique and were randomly selected using simple random sampling technique via OpenEpi software.[22] The sample comprised female patients aged at least 18 years who had undergone unilateral mastectomy 3 months before data collection. Patients with bilateral mastectomy, upper extremity injuries, like stroke, multiple sclerosis, and those with cognitive impairments were excluded.

After taking written informed consent from the participants, the impact of demographic variables age, occupation and residence on functional limitations in the upper extremities for 6 months post-surgery was explored using the Quick Disabilities of Arm, Shoulder and Hand (QuickDASH) and the Functional Assessment of Cancer Therapy-Breast (FACT-B) questionnaires. The QuickDASH had validity >0.70 and reliability 0.94, while FACT-B had reliability 0.9. The QuickDASH consisted of 11 items that were 5=extreme difficulty and 0 = no difficulty. Higher scores indicated a greater level of disability, while lower scores representing better functional outcomes.[23]

The FACT-B questionnaire[24] comprised five health-related QOL (HRQOL) subscales; physical wellbeing (PWB), functional wellbeing (FWB), social/family wellbeing (SWB), emotional wellbeing (EWB), and BC-specific concerns (BCS). The scale had 37 items; 7 each for PWB, FWB and SWB, 6 for EWB, and 10 for BCS. All the subscales were scored on a Likert scale, ranging from 0=not at all to 4=very much. All the scores were added up to have a total FACT-B score ranging 0-148, with higher scores indicating high QOL.

Data was analysed using SPSS 25. The association of demographic variable with functional limitations in the upper extremity was analysed using chi-square test, while QOL was analysed using analysis of variance (ANOVA). $P<0.05$ was considered significant.

Results

Of the 143 patients screened, 123(86%) were analysed (Figure). All 123(100%) were married females. Of them,

Table-1: Patient characteristics (n=123).

Characteristics	n (%)
Age (years)	
18 to 30	3 (2.4)
31 to 40	37 (30.1)
41 to 50	30 (24.4)
51 to 60	31 (25.2)
61 to 70	22 (17.9)
Gender	
Male	0 (0)
Female	123 (100)
Marital Status	
Married	123 (100)
Unmarried	0 (0)
Residence	
Rural	75 (61.0)
Urban	48 (39.0)
Occupation	
Non-Working Women	103 (83.7)
Working Women	20 (16.3)
Data Collection Setting	
HMC	86 (69.9)
KTH	37 (30.1)

KTH: Khyber Teaching Hospital, HMC: Hayatabad Medical Complex.

31(25.25%) were aged 51-60 years, 3(2.4%) were aged 18-30 years, 75(61%) were living in rural areas, and 103(83.7%) were housewives (Table 1).

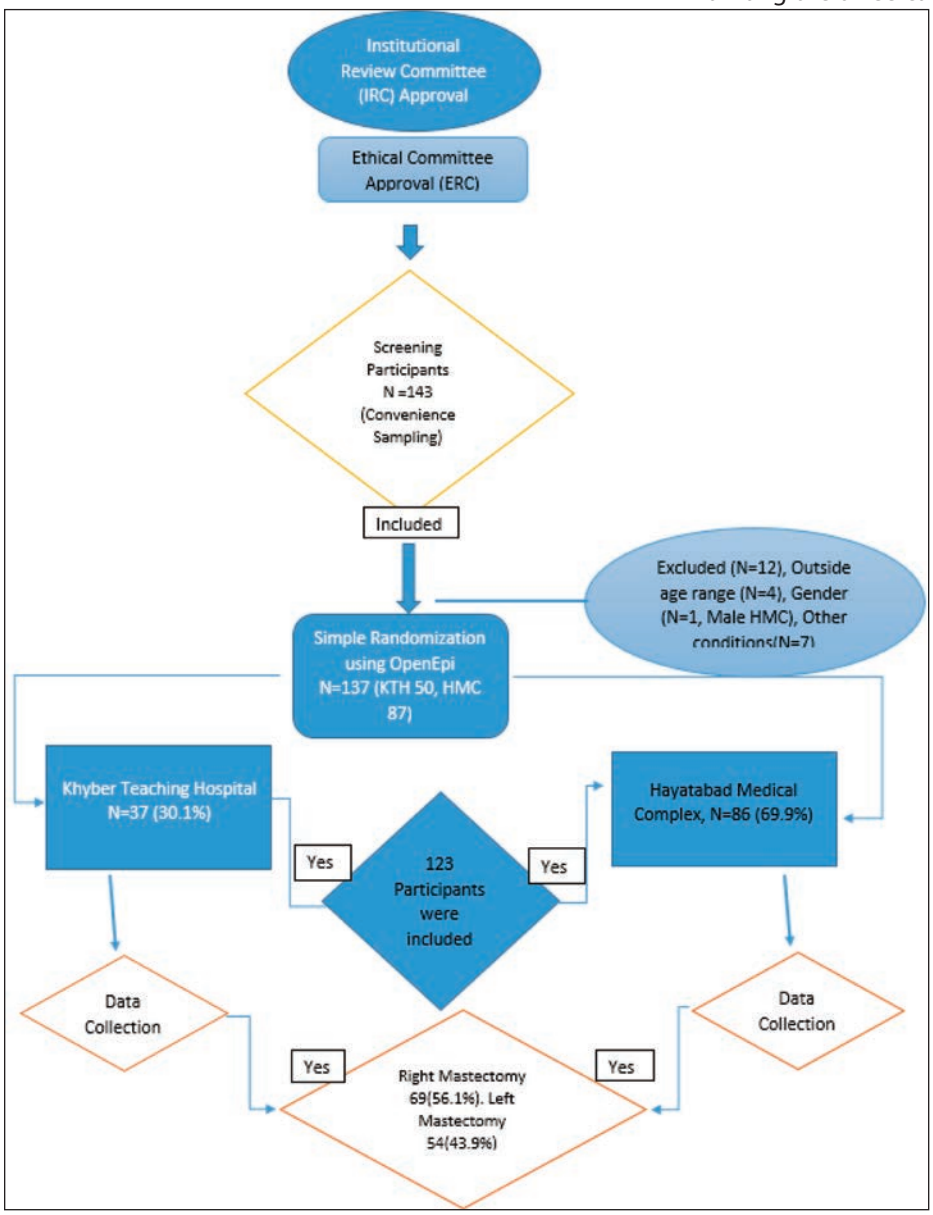

Figure: Flowchart of the study.

Table-2: Association of functional limitation with quality of life in post-mastectomy patients.

QuickDASH			FACT-B		
Quick-DASH Category	Quick-DASH Score Range	Mean	n (%)	*p*-value	F-value
Normal	0-20	88	64 (52)	0.061	2.87
Mild	21-40	82	50 (40.65)		
Moderate	41-60	85	9 (7.30)		

DASH: Disability of Arm, Shoulder and Hand, FACT-B: Functional Assessment of Cancer Therapy-Breast.

Overall, 64(52%) females showed no functional limitations in the upper extremities, 50(40.65%) showed mild, and 9(7.32%) showed moderate limitations. The QOL variation among the three categories was not significant (Table 2). There was a clear but non-significant trend towards an association between increased functional limitation and decreased QOL post-mastectomy (p=0.061 (Table 2).

There was no significant association of age (p=0.784), residence (p=0.442) and occupation (p=0.387) of the patients with functional limitations in the upper extremities Table 3).

Discussion

The current findings revealed that most BC survivors who underwent mastectomy exhibited no functional limitations in their upper extremities, with only a minority experiencing mild to moderate limitations. Notably, the results showed no significant association of age, residency or occupation with upper extremity functionality. Moreover, functional limitations in the upper extremities did not have a significant impact on the overall QOL of these survivors. The findings were consistent with literature,[25]

A systematic review also echoed these results, showing that BC survivors generally reported a high QOL, especially when free of comorbid conditions, chemotherapy and financial instability. Emotional support further enhanced survivors' QOL, despite reports of persistent pain and swelling in the upper limbs due to cancer treatment.[26]

However, conflicting evidence reported that in a cohort of post-mastectomy females, a significant proportion experienced upper extremity disabilities, particularly those who received radiation or chemotherapy.[27] Similarly, a study found a significant association between upper extremity lymphoedema and reduced QOL, particularly in the social, psychological and physical domains. These findings suggest that upper limb disabilities, such as

Table-3: Association of functional limitations with demographic variables (n=123).

	QuickDASH category [n (%)]				
	Normal 0-20	**Mild 21-40**	**Moderate 41-60**	**Total**	***p*-value**
Age (year)					
18 to 30	1 (0.80)	2 (1.60)	0 (0.00)	3 (2.40)	0.784
31 to 40	19 (15.40)	15 (12.20)	3 (2.40)	37 (30.0)	
41 to 50	20 (16.30)	9 (7.30)	1 (0.80)	30 (24.40)	
51 to 60	14 (11.40)	14 (11.40)	3 (2.40)	31 (25.20)	
61 to 70	10 (8.10)	10 (8.10)	2 (1.60)	22 (17.80)	
Residence					
Rural	38 (30.90)	33 (26.80)	4 (3.30)	75 (61.0)	0.442
Urban	26 (21.10)	17 (13.80)	5 (4.10)	48 (39.0)	
Occupation					
Non-Working Women	53 (43.10)	41 (33.30)	9 (7.30)	103 (83.70)	0.387
Working-Women	11 (8.90)	9 (7.30)	0 (0.00)	20 (16.20)	
Data Collection Hospital					
HMC	47 (38.20)	33 (26.80)	6 (4.90)	86 (69.90)	0.675
KTH	17 (13.80)	17 (13.80)	3(2.40)	37 (30.0)	
Mastectomy side					
Right	38 (30.90)	28 (22.80)	3 (2.40)	69 (56.1)	0.337
Left	26 (21.10)	22 (17.90)	6 (4.90)	54 (43.90)	

DASH: Disability of Arm, Shoulder and Hand, KTH: Khyber Teaching Hospital, HMC: Hayatabad Medical Complex.

lymphoedema,, can substantially affect daily functioning and overall wellbeing.[28]

While the current study did not find significant association between functional limitations and QOL, it is essential to acknowledge the variability in BC survivors' experiences. Factors such as the extent of surgical intervention, presence of lymphoedema and receipt of chemotherapy or radiation may influence both physical functionality and QOL. This highlights the importance of individualised patient care and monitoring for functional impairments, even in cases where overall QOL remains unaffected.

The current study has limitations because of its small sample size. The small number of participants as well as the convenience sampling technique could have reduced the generalisability of the findings. Further, the sample was raised from only two tertiary care hospitals in Peshawar, while leaving out two major cancer hospitals in the city. Another significant limitation is the lack of objective assessment of functional limitations, and the usage of self-reported questionnaires. This could have introduced non-differential recall bias in patients' responses.

Conclusion

The majority of BC survivors who underwent mastectomy experienced no functional limitations, while others reported mild to moderate impairments. There was no significant association of age, residency and occupation with upper extremity functionality. Additionally, there was no substantial variation in QOL among those experiencing functional limitations in their upper extremities.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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Author Contribution:
MK: Concept, design, drafting, revision and final approval.
TH, SB & SC: Concept, design and final approval.
SAHD & SMSAN: Concept, design, drafting and revision.