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Disability of Arm, Shoulder and Hand Using Dash Scoring System after Axillary Dissection for Breast Cancer at Tertiary Care Hospital, Karachi

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ABSTRACT

Background: Many women experience upper limb dysfunction after axillary dissection for breast cancer. However, the extent and contributing factors remain under examined in local clinical settings. We aimed to assess the level of arm, shoulder, and hand disability using the DASH (Disabilities of the Arm, Shoulder and Hand) score. We will also identify patient and surgical factors associated with increased impairment. **Methods:** We carried out a cross-sectional study involving 131 women treated with axillary dissection at a tertiary care hospital in Karachi. We recorded demographic data, cancer stage, surgical duration, and employment status. We then categorized DASH scores into mild, moderate, or severe disability and used chi-square tests to explore associations between disability level and clinical variables. **Results:** Most patients reported moderate (38.9%) or severe (37.4%) disability. Those who underwent shorter surgeries (≤ 2 hours) were more likely to report mild disability (p = 0.01), although moderate disability was also common in this group (p = 0.02). Patients with Stage III breast cancer showed significantly higher rates of severe disability (p = 0.03). We found no significant links between disability and age or employment status, though we observed non-significant trends in both. **Conclusion:** Upper limb disability remains a frequent outcome after axillary surgery, particularly among women with advanced-stage disease. Shorter operative times may help limit long-term impairment. Routine use of tools like the DASH score and early referral to rehabilitation services may improve functional outcomes and support recovery in this high-risk population

INTRODUCTION

Chronic upper extremity disability (UED) is one of the most troublesome long-term complications of breast cancer treatment.[1-3] Persistent arm and shoulder impairments, defined as restricted shoulder mobility, lymphedema, and arm/shoulder pain, occur in 30–50% of breast cancer survivors. [4] It is now well established that breast cancer survivors have a high prevalence of arm/shoulder impairments that may persist for many years, and are associated with long-term activity limitations, participation restriction, and general quality of life (QoL) impact. [5] Most studies have been limited to lymphedema, even though long-lasting post-operative pain and problems with shoulder joint mobility may be as frequent or disabling. [6-8]

The DASH is being increasingly used in cross-sectional studies. To enhance the use of the DASH in prospective studies (such as assessment of effectiveness of different treatment methods) further studies of the instrument's ability to detect change over time would be helpful both for interpretation of score changes and for sample size calculations. Different aspects of an instrument's ability to measure change have been highlighted including studying changes over time for groups or individuals and comparing groups at one occasion. [9]

Differences attributed to surgery and radiation treatment could occur through wound healing, surgical site infections, additional reconstruction and surgical procedures, and recovery time. Complications from additional treatments, and additive symptomatology including fibrosis, cording, neuropathy and lymphedema are all plausible explanations for the observed treatment effects on UED and QoL. [10-12] They may also have important psychologic or indirect effects. Since upper extremities are needed for so many daily activities, it would not be surprising that any symptoms are particularly intrusive, increasing their effect on QoL. [13] Riaz et found grade of disability to be mild, moderate and severe disability to be 48%, 31% and 21%.[14]

Upper extremity morbidity is modifiable, but not without cost and effort; thus, data quantifying its role in explaining effects of contemporary treatment practices on QoL are needed. Studies of treatment factors related to upper extremity morbidity have largely focused on comparing different types of axillary or breast surgery. However, the profile of the breast cancer patient has

changed over the last 10 years. The impact of these modern treatment trends on the incidence and severity of upper extremity morbidity is as yet poorly studied. Data from this study will help us in improving the surgical outcome.

MATERIAL AND METHODS

This cross-sectional study was carried out at the Department of General Surgery, Jinnah Postgraduate Medical Centre (JPMC), Karachi, over a period of four months from February 2025 to June 2025, following the approval of the study synopsis. A sample size of 131 patients has been determined using WHO software, based on a 21% prevalence of severe disability, 7% margin of error, and a 95% confidence interval.[14] Participants were selected through non-probability consecutive sampling. Eligible participants included women aged between 20 and 40 years with histopathologically confirmed breast cancer, at stage I or higher, and classified as ASA physical status I or II. Patients were excluded if they have a history of polycystic ovarian syndrome, cervical hyperplasia, liver disease, inflammatory breast conditions, or chronic comorbidities such as seronegative arthropathy, osteopenia, osteoporosis, congestive heart failure, chronic renal or liver disease, asthma, COPD, or acute coronary syndrome. Pregnant patients were also excluded, with all exclusions determined through clinical history.

Following approval from the College of Physicians and Surgeons Pakistan and the institutional ethics review committee, eligible patients were enrolled after obtaining informed written consent. Demographic data such as age was collected through history taking. Staging of breast cancer was performed in accordance with the American Joint Committee on Cancer (AJCC) 8th edition, categorizing patients into early breast cancer (EBC: stages IA to IIB) and locally advanced breast cancer (LABC: stages IIIA and IIIB). Each case was reviewed in a multidisciplinary team (MDT) meeting, involving surgical and clinical oncologists, radiologists, and histopathologists, to formulate an individualized treatment plan.

Patients diagnosed with early-stage breast cancer were evaluated for the feasibility of breast-conserving surgery (BCS). All patients received counseling regarding their diagnosis and treatment options prior to obtaining consent. Surgeries were performed by an experienced surgeon with over five years of operative practice. During surgery, flap dissection was done using diathermy, and hemostasis was secured with diathermy and sutures. For patients undergoing modified radical mastectomy (MRM), two closed suction drains were placed—one in the axilla and one under the flap—while in BCS cases, a single axillary drain was inserted. The flap drain was removed at discharge, while the axillary drain was retained until drainage falls below 30 ml over a 24-hour period, at which point it was removed during follow-up visits.

At the end of the fourth postoperative week, patients were assessed for arm, shoulder, or hand disability using the standardized DASH (Disabilities of the Arm, Shoulder and Hand) questionnaire. Scoring was carried out according to the established DASH grading system, and results were recorded in a structured proforma. Data was entered and analyzed using SPSS version 20. Continuous variables such as age, duration of surgery, and DASH scores was evaluated for normality using the Kolmogorov–Smirnov test. Normally distributed data was reported as mean ± standard deviation, while non-normally distributed data will be presented as median and interquartile range. Categorical variables, including stage of breast cancer, occupational status, and DASH disability grade, was expressed as frequencies and percentages. To control for effect modifiers, data was stratified based on age, cancer stage, occupational status, and duration of surgery. After stratification, statistical significance will be assessed using the Chi-square test or Fisher's exact test where appropriate, with a p-value ≤ 0.05 considered statistically significant.

RESULTS

This study included 131 women who underwent axillary dissection for breast cancer at a tertiary care hospital. Most participants (67.9%) were between 31 and 40 years of age, while (32.1%) were aged 20 to 30 years. A slightly higher proportion of patients (53.4%) underwent surgical procedures lasting more than two hours. Unemployment was more common among participants (60.3%), and the most frequent cancer stage at presentation was Stage II (35.9%), followed by Stage I (30.5%), Stage III (19.1%), and Stage IV (14.5%).

When assessed using the DASH scoring system. There were (38.9%) of patients who had reported moderate disability, (37.4%) experienced severe disability, and (23.7%) had mild disability following surgery **(Table 1).**

Table 1

Distribution of baseline characteristics among the study participants.

Variables	n (%)
Age	
20 to 30 years	42 (32.1)
31 to 40 years	89 (67.9)
Duration of surgery	
≤ 2 hours	61 (46.6)
> 2 hours	70 (53.4)
Occupational status	
Employed	52 (39.7)
Unemployed	79 (60.3)
Stage of breast cancer	
I	40 (30.5)
II	47 (35.9)
III	25 (19.1)
IV	19 (14.5)
Grade of disability	
Mild	31 (23.7)
Moderate	51 (38.9)
Severe	49 (37.4)
Total	**131 (100)**

Patients with mild disability were significantly more likely to have undergone shorter surgical procedures (≤ 2 hours) (p = 0.01). Among these, (34.3%) had longer surgeries, compared to just (11.5%) with shorter durations, indicating a potential protective effect of shorter operative times. Although mild disability appeared more frequently in younger and unemployed participants, these associations were not statistically significant (p = 0.17 and p = 0.16, respectively). No significant relationship was observed between mild disability and cancer stage (p = 0.22) **(Table 2)**.

Table 2

Distribution of patient characteristics according to the Mild disability.

Variables	Mild disability Yes n (%)	Mild disability No n (%)	P value
Age			
20 to 30 years	13 (31)	29 (69)	0.17
31 to 40 years	18 (20.2)	71 (79.8)	
Duration of surgery			
≤ 2 hours	07 (11.5)	54 (88.5)	0.01
> 2 hours	24 (34.3)	46 (65.7)	
Occupational status			
Employed	09 (17.3)	43 (82.7)	0.16
Unemployed	22 (27.8)	57 (72.2)	
Stage of breast cancer			
I	13 (32.5)	27 (67.5)	0.22
II	12 (25.5)	35 (74.5)	
III	03 (12)	22 (88)	
IV	03 (15.8)	16 (84.2)	

In the moderate disability group, patients who had shorter surgical durations again showed a significantly higher frequency of disability (49.2% vs. 30%; p = 0.02). Age, employment status, and cancer stage did not show significant associations with moderate disability. The highest proportion of moderate disability occurred in patients with Stage II cancer, though this trend did not reach statistical significance **(Table 3)**.

Table 3

Distribution of patient characteristics according to the Moderate disability.

Variables	Moderate disability Yes n (%)	Moderate disability No n (%)	P value
Age			
20 to 30 years	17 (40.5)	25 (59.5)	0.80
31 to 40 years	34 (38.2)	55 (61.8)	
Duration of surgery			
≤ 2 hours	30 (49.2)	31 (50.8)	0.02
> 2 hours	21 (30)	49 (70)	
Occupational status			
Employed	22 (42.3)	30 (57.7)	0.52
Unemployed	29 (36.7)	50 (63.3)	
Stage of breast cancer			
I	18 (45)	22 (55)	0.65
II	19 (40.4)	28 (59.8)	
III	08 (32)	17 (68)	
IV	06 (31.6)	13 (68.4)	

Among those with severe disability, the cancer stage demonstrated a significant association (p = 0.03). Patients with Stage III breast cancer had the highest prevalence of severe disability (60%), suggesting that more advanced disease may contribute to worse post-operative outcomes. However, duration of surgery (p = 0.08), occupational status (p = 0.59), nor age (p = 0.78) showed a significant association with severe disability, although trends indicated slightly higher rates among unemployed and older patients **(Table 4).**

Table 4

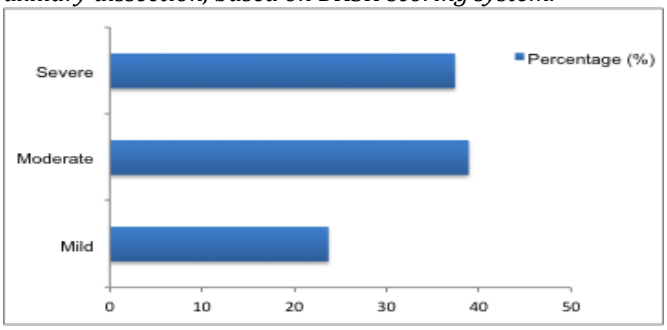
Distribution of patient characteristics according to the Severe disability.

Variables	Severe disability Yes n (%)	Severe disability No n (%)	P value
Age			
20 to 30 years	15 (35.7)	27 (64.3)	0.78
31 to 40 years	34 (38.2)	55 (61.8)	
Duration of surgery			
≤ 2 hours	18 (29.5)	43 (70.5)	0.08
> 2 hours	31 (44.3)	39 (55.7)	
Occupational status			
Employed	18 (34.6)	34 (65.4)	0.59
Unemployed	31 (39.2)	48 (60.8)	
Stage of breast cancer			
I	10 (25)	30 (75)	0.03
II	18 (38.3)	29 (61.7)	
III	15 (60)	10 (40)	
IV	06 (31.6)	13 (68.4)	

Taken together, the findings suggest that surgical duration and cancer stage play important roles in post-operative upper limb function. While occupational status and age may influence outcomes, their associations were not statistically significant in this data set.

Figure 1

Distribution of upper extremity disability levels (mild, moderate, severe) among breast cancer patients following axillary dissection, based on DASH scoring system.



DISCUSSION

Our results show that a majority of patients reported moderate or severe disability, with only about one-quarter experiencing mild functional limitations. This finding aligns with earlier studies indicating that upper limb dysfunction remains common even when surgical practices evolve to minimize morbidity[15-16]. Patients whose surgeries lasted two hours or less were more likely to report mild disability.

This suggests that shorter procedures may contribute to better functional outcomes. This pattern supports the idea that minimizing operative time can reduce tissue trauma and nerve irritation, leading to fewer complications. However, we also observed a paradox. We noted moderate disability appeared more frequently in the same group of shorter surgeries. This unexpected trend suggests that factors beyond surgical duration. For instance, that intraoperative technique, lymph node dissection extent, and immediate postoperative care, may influence recovery more than duration alone. Researchers have previously noted that surgical extent, particularly involving level II or III axillary dissection, plays a more significant role in postoperative impairment than time spent in surgery. [17]

We also found a strong association between Stage III breast cancer and severe disability. This underscores the influence of disease burden on functional recovery. Patients with advanced-stage cancer often undergo more extensive node dissection and receive adjuvant radiotherapy. Both of which may compound postoperative complications. Other researchers have reported a similar pattern, with higher cancer stage independently predicting poorer upper limb function. [16] This finding reinforces the need to closely monitor and support

patients with advanced disease during the postoperative period.

Although we did not observe statistically significant associations between age or employment status and disability level, we noted a non-significant trend toward higher disability. This was noted among younger and unemployed women. This differs from previous findings, where older age and lower physical activity levels correlated with greater impairment. [17-18] In our setting, younger patients may face different daily physical demands or may report dysfunction more acutely due to lifestyle needs. Moreover, psychosocial factors such as distress or anxiety may influence how patients perceive and report disability, though we did not measure these variables in our study.

Unlike data from another research, [16] we did not assess preoperative grip strength, which they identified as a reliable predictor of postoperative function. [16] Their findings suggest that grip strength reflects general musculoskeletal fitness and could serve as a practical, low-cost tool for identifying patients at risk of delayed recovery. Incorporating this measure into preoperative assessment protocols may help tailor interventions more effectively. [19]

We found the DASH questionnaire useful in identifying different levels of disability. It not only captures physical limitations but also reflects psychosocial effects and the impact on daily activities. Researchers have demonstrated the high internal consistency of the DASH scale in breast cancer survivors, reinforcing its validity for this population. [20] In our study, it served as a reliable tool to classify functional limitations and support decision-making regarding rehabilitation needs.

Our findings also support the broader literature advocating for early, structured rehabilitation. Previous studies have shown that postoperative physiotherapy improves shoulder range of motion, reduces pain, and prevents long-term complications. [21-22] Researchers emphasized that women who receive radiation or experience persistent pain post-surgery are particularly vulnerable to chronic impairment without early intervention. [21-24] In our data set, the high rates of moderate and severe disability suggest that physical therapy referrals should become a routine part of postoperative care. This is particularly for patients undergoing extended axillary procedures or presenting with advanced-stage disease.

LIMITATIONS

We conducted a cross-sectional study. This prevented us from tracking functional recovery over time or identifying causality. We also did not collect data on adjuvant treatments or psychosocial factors. Both of which may have influenced patients' reported levels of disability in our study.

CONCLUSION

Our study shows that upper extremity disability remains a significant concern after axillary dissection for breast cancer, with most patients experiencing moderate to severe impairment. We observed that shorter surgical duration tended to lower the risk of disability, while patients with Stage III disease faced markedly worse functional outcomes.

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