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LEVEL OF PAIN AND DISABILITY AMONG PATIENTS WITH FROZEN SHOULDER

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CONFLICT OF INTEREST
None declared.

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ABSTRACT

Background: Frozen shoulder is characterized by painful restriction of active and passive shoulder movement and can substantially limit activities of daily living. Quantifying symptom severity with a standardized patient-reported outcome measure can help characterize the clinical burden of the condition.

Objective: To determine the level of pain and disability among patients with frozen shoulder.

Methods: A descriptive cross-sectional observational study was conducted over six months following synopsis approval at the physiotherapy departments of Services Hospital Lahore and Jinnah Hospital Lahore. A non-probability purposive sample of 185 male and female patients aged 22–75 years with frozen shoulder related to pathological conditions was enrolled; patients with trauma, diabetes, or post-surgical stiffness were excluded. Pain and disability were assessed using the 13-item Shoulder Pain and Disability Index (SPADI). Data were analyzed descriptively in SPSS version 25 using frequencies, percentages, means, and standard deviations.

Results: The mean age was 45.12 ± 13.12 years and 102 participants (55.1%) were female. Chronic onset was reported in 102 (55.1%) participants. The reported mean SPADI pain-domain score was 69.84 ± 10.19 and the disability-domain score was 68.06 ± 8.70. Pain severity was classified as no pain in 13 (7.0%), mild in 36 (19.5%), moderate in 63 (34.1%), and severe in 73 (39.5%) participants. Disability was mild in 44 (23.8%), moderate in 81 (43.8%), and severe in 60 (32.4%) participants. Thus, 136/185 (73.5%) had moderate-to-severe pain and 141/185 (76.2%) had moderate-to-severe disability.

Conclusion: Patients with frozen shoulder in this clinical sample had a substantial burden of pain and functional limitation. Severe pain was the most frequent pain category, whereas moderate disability was the most frequent disability category, supporting routine assessment of both symptom domains in rehabilitation practice.

Keywords	Activities of Daily Living; Adhesive Capsulitis; Functional Status; Pain Measurement; Shoulder Pain; Surveys and Questionnaires
Acknowledgement	The research team acknowledges the participants and the physiotherapy departments of Services Hospital Lahore and Jinnah Hospital Lahore for their cooperation during data collection.
Imtiaz H et al. Short Title	Pain and Disability in Frozen Shoulder

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INTRODUCTION

Frozen shoulder, also termed adhesive capsulitis, is a painful shoulder disorder characterized by progressive restriction of both active and passive glenohumeral motion. It commonly follows a prolonged clinical course and can interfere with sleep, self-care, work, and other activities of daily living (1,2). The condition is usually described as primary when no clear precipitating cause is identified and secondary when associated with systemic, intrinsic shoulder, or extrinsic factors (1,2). Current evidence supports a fibroinflammatory process with capsular fibrosis, altered extracellular-matrix biology, and contracture contributing to stiffness and pain, although the underlying mechanisms remain incompletely defined (3). Metabolic comorbidity is clinically important; diabetes is associated with increased risk of developing frozen shoulder and may also influence prognosis (4). These factors reinforce the need to characterize pain and disability rather than relying only on joint-motion findings.

Patient-reported outcome measures provide a direct estimate of the functional impact of shoulder disorders. The Shoulder Pain and Disability Index (SPADI) is a 13-item instrument with five pain items and eight disability items developed specifically for shoulder-related symptoms (5,6). Subsequent work has supported the measurement properties of translated SPADI versions across shoulder conditions (7). Because pain intensity and perceived disability may be influenced by physical and psychosocial factors, evaluating both domains is clinically relevant in frozen shoulder (8–11). Quantifying the distribution and severity of pain and disability in local clinical populations can support rehabilitation planning, communication of disease burden, and selection of outcomes for future intervention studies. Therefore, the objective of this study was to determine the level of pain and disability among patients with frozen shoulder.

MATERIALS AND METHODS

Study design and reporting

This was a descriptive cross-sectional observational study. The manuscript was structured in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) principles for cross-sectional studies (12).

Setting and duration

Data were collected from the physiotherapy departments of Services Hospital Lahore and Jinnah Hospital Lahore. The study was completed within six months after approval of the research synopsis.

Participants and sampling

A total of 185 participants with frozen shoulder were recruited using non-probability purposive sampling. Eligible participants were men and women aged 22–75 years with frozen shoulder associated with pathological conditions, including osteoarthritis, bursitis, or tendinitis. Patients with a history of trauma, diabetes, or post-surgical stiffness were excluded.

Sample size

The thesis reports a final calculated sample size of 185 participants using WHO Sample Size Determination in Health Studies software (version 2.0.21), with a 95% confidence level and a 5% margin of error.

Outcome measure

Pain and disability were assessed with the SPADI, a self-administered shoulder-specific questionnaire comprising five pain items and eight disability items (5). Each item is rated from 0 (best) to 10 (worst), with higher values indicating greater symptom severity. The study summarized pain and disability domains and categorized symptom severity for descriptive reporting.

Data collection procedure

Potential participants were screened against the eligibility criteria. The study procedure was explained before data collection, and written informed consent was obtained. Participants then completed the SPADI and study proforma. Data were recorded for analysis after completion of the questionnaire.

Statistical analysis

Data were analyzed using IBM SPSS Statistics version 25. Analysis was descriptive. Categorical variables were summarized as frequencies and percentages, while quantitative variables were summarized using means and standard deviations; observed minimum and maximum values were also reported where available.

Ethical considerations

The study was conducted in accordance with the ethical rules and regulations of the Lahore College of Pharmaceutical Sciences ethical committee. Written informed consent was obtained from all participants, confidentiality was maintained, and participants were informed about the study procedures before enrollment.

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RESULTS

A total of 185 participants were included. Their mean age was 45.12 ± 13.12 years (range, 22–72 years). Females comprised 102 (55.1%) of the sample and males 83 (44.9%). Chronic onset of pain was reported by 102 (55.1%) participants, while 83 (44.9%) reported acute onset. Mean body mass index was 22.16 ± 3.15.

Table 1. Participant characteristics (N = 185)

Characteristic	n (%) or mean ± SD	Minimum	Maximum
Age, years	45.12 ± 13.12	22	72
Female	102 (55.1)	—	—
Male	83 (44.9)	—	—
Acute onset	83 (44.9)	—	—
Chronic onset	102 (55.1)	—	—
Body mass index	22.16 ± 3.15	16.90	37.40

The mean reported pain-domain score was 69.84 ± 10.19 and the disability-domain score was 68.06 ± 8.70. Severe pain was the largest pain category, affecting 73 (39.5%) participants, followed by moderate pain in 63 (34.1%). Moderate disability was the largest disability category, affecting 81 (43.8%) participants, followed by severe disability in 60 (32.4%). Overall, 136 (73.5%) participants had moderate-to-severe pain and 141 (76.2%) had moderate-to-severe disability.

Table 2. SPADI pain and disability domain results

Outcome	n (%) or mean ± SD	Observed range
Pain-domain score	69.84 ± 10.19	32.00–94.00
No pain	13 (7.0)	—
Mild pain	36 (19.5)	—
Moderate pain	63 (34.1)	—
Severe pain	73 (39.5)	—
Disability-domain score	68.06 ± 8.70	38.75–92.50
Mild disability	44 (23.8)	—
Moderate disability	81 (43.8)	—
Severe disability	60 (32.4)	—

Abbreviation: SPADI, Shoulder Pain and Disability Index.

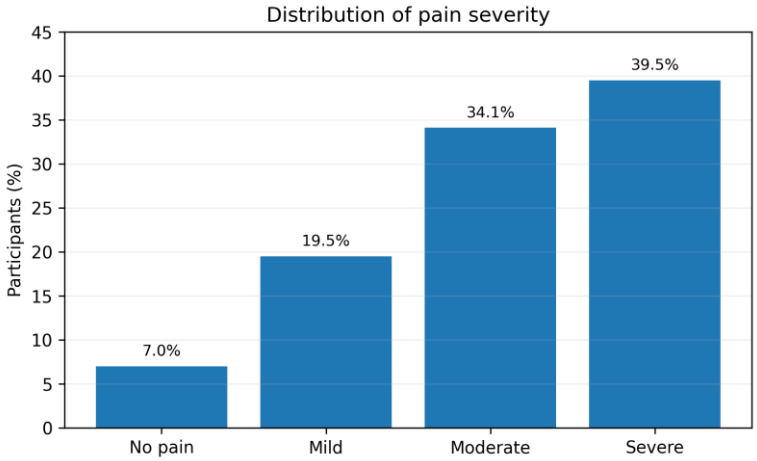


Figure 1. Distribution of pain severity according to the study SPADI categorization (N = 185).

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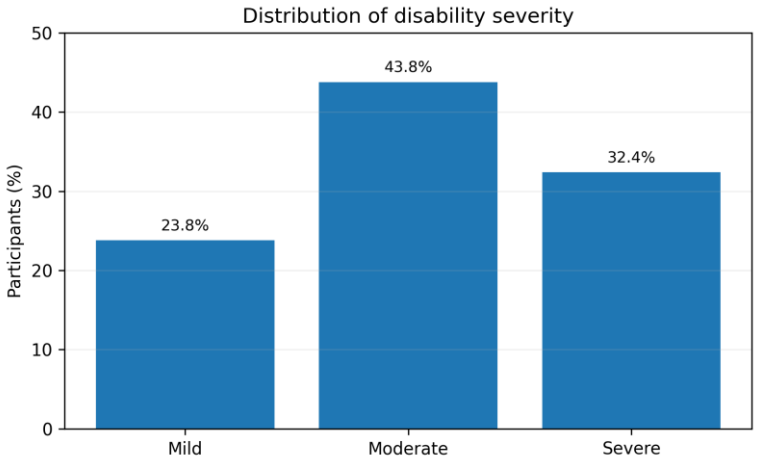


Figure 2. Distribution of disability severity according to the study SPADI categorization (N = 185).

At the item level, the greatest concentration of severe responses occurred for pain at its worst: 116 (62.7%) participants rated this item in the severe range. Pain while lying on the involved side, reaching for a high shelf, and pushing with the involved arm was most commonly moderate. Functional difficulty was also prominent across self-care and load-related activities; moderate disability predominated in all selected activity items, while washing the hair and carrying a 4.5-kg object showed comparatively high proportions of severe disability.

Table 3. Selected item-level pain and disability severity distributions

SPADI item	Mild, n (%)	Moderate, n (%)	Severe, n (%)
Pain at its worst	5 (2.7)	64 (34.6)	116 (62.7)
Pain when lying on the involved side	11 (5.9)	117 (63.2)	57 (30.8)
Pain reaching for something on a high shelf	6 (3.2)	118 (63.8)	61 (33.0)
Pain pushing with the involved arm	13 (7.0)	118 (63.8)	54 (29.2)
Disability while washing hair	9 (4.9)	95 (51.4)	81 (43.8)
Disability while washing back	3 (1.6)	122 (65.9)	60 (32.4)
Disability while carrying 4.5 kg (10 lb)	6 (3.2)	107 (57.8)	72 (38.9)
Disability while removing an item from back pocket	6 (3.2)	132 (71.4)	47 (25.4)

Item-level categories followed the study scoring: mild = 1–4, moderate = 5–7, and severe = 8–10.

DISCUSSION

This descriptive cross-sectional study found a substantial symptom burden among 185 patients with frozen shoulder. Nearly three quarters of participants had moderate-to-severe pain and more than three quarters had moderate-to-severe disability. Severe pain was the single largest pain category, while moderate disability was the largest disability category. Mean reported SPADI pain and disability domain scores were approximately 70 and 68, respectively, indicating that pain and functional limitation were both prominent in this clinical population. The parallel elevation of pain and disability is clinically plausible because frozen shoulder affects both symptom intensity and the performance of ordinary upper-limb activities. Cross-sectional work in people with frozen shoulder has shown that pain intensity and pain-related beliefs are associated with arm function (8), while higher pain intensity, catastrophizing, and lower self-efficacy can coexist and shape the patient experience (9). Pain distribution and sensitization-related features may also contribute to symptom severity in some patients (10). These findings support assessment strategies that capture both pain and activity limitation rather than relying on range of motion alone.

The present results also fit with evidence that psychological symptoms can accompany a greater subjective symptom burden. A systematic review reported associations between depression or anxiety and worse subjective and functional baseline scores in frozen shoulder (11), while a clinical cross-sectional study found greater pain and disability among patients with anxiety or depression symptoms despite weaker relationships with objective range-of-motion findings (13). Such evidence does not imply that pain is primarily psychological; rather, it highlights the multidimensional nature of pain and disability in a condition characterized by both tissue restriction and persistent symptoms. Slightly more than half of participants were women, consistent with the commonly

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reported demographic pattern of frozen shoulder (1,2). Importantly, patients with diabetes were excluded from this study. This limits direct generalizability to a clinically important subgroup because diabetes is associated with increased risk of frozen shoulder (4) and may be associated with a less favorable clinical course (14). Future studies should therefore stratify or separately analyze patients with diabetes and other systemic comorbidities instead of treating frozen shoulder as a single homogeneous population.

From a clinical perspective, the high frequency of moderate-to-severe symptoms supports systematic measurement of pain and disability during assessment and follow-up. Current evidence-based guidance describes a range of nonoperative options, including patient education, exercise or physiotherapy, corticosteroid injection, and hydrodilatation, with treatment selection influenced by stage, symptom irritability, patient preference, comorbidity, and response to prior care (2,15–17). Physiotherapy programs can improve pain and function in primary frozen shoulder (18), and randomized or comparative evidence has also evaluated mobilization, nerve block, intra-articular injection, hyaluronic acid, and platelet-rich plasma approaches (19–22). Because the present study was descriptive and did not compare treatments, its results should be used to characterize symptom burden rather than to infer superiority of any intervention. The study has several strengths. It included 185 participants from two large hospitals, used a standardized shoulder-specific outcome measure, and provided both domain-level and activity-level descriptions of pain and disability. The item-level results are clinically informative because they show where symptom burden is especially pronounced, including worst pain and difficulty with self-care or load-carrying tasks.

Several limitations should be considered. The cross-sectional design does not establish causation, prognosis, or change over time. Non-probability purposive sampling may have introduced selection bias and limits population-level generalizability. The study used descriptive statistics without multivariable analysis, so potential relationships between symptom severity and age, sex, chronicity, body mass index, or other clinical factors were not estimated. Patients with diabetes, trauma, and post-surgical stiffness were excluded, narrowing the population to which the findings apply. In addition, outcomes were not stratified by frozen-shoulder stage, and participants were not followed longitudinally. Future research should use multicenter prospective designs with standardized diagnostic and staging criteria, representative sampling, and longitudinal follow-up. Analyses should examine how symptom severity varies by disease stage, etiology, metabolic comorbidity, psychosocial characteristics, and treatment exposure. Consistent SPADI scoring and prespecified analytic plans would also improve comparability across studies and strengthen interpretation of treatment-related changes.

CONCLUSION

Frozen shoulder was associated with a substantial burden of pain and functional disability in this sample of 185 patients. Severe pain was the most frequent pain category, and moderate disability was the most frequent disability category; approximately three quarters of participants had moderate-to-severe symptoms in each domain. These findings support routine assessment of both pain and activity limitation in clinical rehabilitation and provide a descriptive basis for future longitudinal and intervention studies.

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