



Scope and Limitations in the Management of Patients with Frozen Shoulder

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KEYWORDS	ABSTRACT:
Frozen shoulder, adhesive capsulitis, corticosteroid injection, physiotherapy, pain, SPADI, Bangladesh.	<p>Background: Frozen shoulder (adhesive capsulitis) is a disabling condition characterized by pain and restricted shoulder movement, commonly affecting middle-aged individuals. Treatment often includes physiotherapy, oral medications, and intra-articular corticosteroid injections, but their comparative effectiveness remains unclear, especially in low-resource settings. Objective: To evaluate the scope and limitations in the management of frozen shoulder by comparing outcomes between conservative treatment and combination therapy involving corticosteroid injections in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Methods: This cross-sectional study was conducted from January to December 2020 and included 60 patients aged 20–65 years clinically diagnosed with frozen shoulder. Patients were divided into two groups: Group A received conventional medical treatment and physiotherapy, while Group B received the same plus a single dose of intra-articular corticosteroid (Triamcinolone 40 mg). Patients were assessed at baseline, 3 months, and 6 months using the Visual Analogue Scale (VAS) for pain and the Shoulder Pain and Disability Index (SPADI) for functional assessment. Relapse and dropout rates were also recorded. Results: At 6 months, Group B showed significantly greater pain reduction (VAS 2.5 ± 1.1 vs. 3.9 ± 1.4) and improved functional scores (SPADI 35.3 ± 6.8 vs. 49.7 ± 9.1) compared to Group A ($p < 0.05$). Relapse and dropout rates were lower in Group B (6.7% and 6.7%, respectively) than in Group A (16.7% and 13.3%). Combination therapy demonstrated superior clinical effectiveness and better adherence. Conclusion: Intra-articular corticosteroid injection combined with physiotherapy and medical treatment offers superior outcomes in pain relief and functional recovery compared to conservative therapy alone. Incorporating this approach in district-level hospitals may enhance the effectiveness of frozen shoulder management in low-resource settings.</p>

INTRODUCTION

Frozen shoulder, also known as adhesive capsulitis, is a common yet challenging condition characterized by progressive shoulder pain and a significant restriction in both active and passive range of motion. It commonly affects individuals aged 40 to 60 years, with a higher prevalence among females and patients with comorbidities such as diabetes mellitus and thyroid dysfunctions [1,2]. The prevalence of frozen shoulder is

estimated to be 2%–5% in the general population, with the idiopathic type accounting for the majority of cases [3,4]. Clinically, the disease is classified into four progressive stages—painful (freezing), adhesive (frozen), resolution (thawing), and recovery with each stage presenting different therapeutic challenges [5]. The pathophysiology is thought to involve synovial inflammation, fibroblastic proliferation, and capsular fibrosis leading to joint stiffness and chronic pain [6].



Management of frozen shoulder often begins with conservative approaches, including oral non-steroidal anti-inflammatory drugs (NSAIDs), physical therapy, and activity modification [7]. In cases where conservative therapy fails or in severe pain states, intra-articular corticosteroid injections have been shown to provide faster pain relief and improved mobility, particularly during the freezing stage [8,9]. However, the effectiveness of different modalities can vary widely depending on the stage of disease, patient adherence, and access to rehabilitative services, especially in low-resource settings.

In developing countries like Bangladesh, the management of frozen shoulder is often hindered by delayed diagnosis, limited physiotherapy services especially at peripheral hospitals poor treatment adherence, and financial constraints, highlighting the need for early intervention and improved rehabilitation facilities to optimize patient outcomes [10]. Furthermore, recurrence and dropout during follow-up remain significant obstacles in achieving favorable outcomes. While several studies have assessed the efficacy of different treatment modalities, few have addressed the real-world limitations in district-level hospitals where resources and patient follow-up capacities are limited.

This study aims to evaluate the scope and limitations in the management of frozen shoulder patients, comparing the outcomes of conservative treatment alone with those of combined therapy using intra-articular corticosteroid injections in a district-level hospital in Bangladesh.

METHODOLOGY

This cross-sectional study was conducted at Department of Physical Medicine and Rehabilitation, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from January 2020 to December 2020, aiming to assess and compare the effectiveness and limitations of different management approaches in patients with frozen shoulder. A total of 60 patients clinically diagnosed with frozen shoulder (adhesive capsulitis), aged between 20 and 65 years, and without any congenital deformities or structural abnormalities of

the shoulder joint, were included using convenient purposive sampling. Patients with severe systemic comorbidities, terminal illness, traumatic or surgically-induced shoulder stiffness, or incomplete follow-up before two months were excluded. Participants were divided into two equal groups: Group A (n=30), who received conventional medical treatment (oral NSAIDs, activity modification) and physiotherapy; and Group B (n=30), who received intra-articular corticosteroid injection (40 mg Triamcinolone acetate) in addition to the same conventional treatment. Physiotherapy included supervised shoulder mobilization exercises and heat therapy. All patients were followed up for at least six months, with evaluations conducted at baseline, 3rd month, and 6th month using the Visual Analogue Scale (VAS) for pain [11] and the Shoulder Pain and Disability Index (SPADI) for functional limitations [12]. Primary outcome measures included pain reduction and functional improvement, while secondary outcomes assessed relapse and dropout rates during follow-up.

RESULTS

1. Demographic Characteristics

Out of 60 patients diagnosed with frozen shoulder, 38 (63.3%) were female and 22 (36.7%) were male. The most affected age group was 31–40 years (n=20, 33.3%), followed by 41–50 years (n=14, 23.3%). The mean age in Group A (medical treatment only) was 36.1 ± 7.8 years, while in Group B (medical treatment + intra-articular corticosteroid injection), it was 34.6 ± 6.9 years. The table-1 shows that housewives and day labourers were the most commonly affected occupational groups in both treatment arms, together accounting for approximately two-thirds of patients in each group. In Group A, 33.3% were housewives and another 33.3% were day labourers, while Group B had a similar distribution with 30.0% in each of these two categories. Housemaids also made up a notable proportion (16.7% in Group A and 20.0% in Group B), reflecting a higher burden of frozen shoulder among those involved in repetitive or strenuous household and manual tasks. Students and others constituted a minority of the cases. This occupational pattern may suggest a possible association between physical workload and the development of frozen shoulder.

Table-1: Socio-demographic Characteristics of Patients with Frozen Shoulder by Treatment Group (N = 60)

Characteristics	Category	Group A (N=30)	%	Group B (N=30)	%	Total (N=60)	%
Age Group (Years)	<30	4	13.3%	3	10.0%	7	11.7%
	31–40	10	33.3%	10	33.3%	20	33.3%
	41–50	8	26.7%	6	20.0%	14	23.3%
	51–60	6	20.0%	8	26.7%	14	23.3%
	>60	2	6.7%	3	10.0%	5	8.3%
Gender	Female	20	66.7%	18	60.0%	38	63.3%
	Male	10	33.3%	12	40.0%	22	36.7%
Occupation	Housewives	10	33.3%	9	30.0%	19	31.7%
	Housemaids	5	16.7%	6	20.0%	11	18.3%



	Day Labourers	10	33.3%	9	30.0%	19	31.7%
	Students	2	6.7%	3	10.0%	5	8.3%
	Others	3	10.0%	3	10.0%	6	10.0%

2. Pain Assessment using Visual Analogue Scale (VAS)

VAS was used to evaluate pain at baseline, 3rd month, and 6th month of follow-up. Table-2 presents the mean VAS scores for patients in Group A (medical treatment + physiotherapy) and Group B (intra-articular corticosteroid injection + medical treatment + physiotherapy) at three time points: baseline, 3rd month, and 6th month. At baseline, both groups had similar levels of pain, with mean VAS scores of 7.8 ± 1.2 for Group A and 7.5 ± 1.3 for Group B, indicating that

patients in both groups started with moderate to severe pain. By the 3rd month, pain levels had improved in both groups. However, Group B showed a more significant reduction in pain (3.0 ± 1.0) compared to Group A (4.3 ± 1.1), suggesting that intra-articular corticosteroid injection provided faster and more effective pain relief in the early phase. At the 6th month, further reduction in pain was observed in both groups, with Group B maintaining a lower mean VAS score (2.5 ± 1.1) compared to Group A (3.9 ± 1.4). This indicates that the long-term pain control was also better in Group B.

Table-2: Comparison of Mean Visual Analogue Scale (VAS) Scores Between Group A and Group B Over Time

Time Point	Group A Mean VAS \pm SD	Group B Mean VAS \pm SD
Baseline	7.8 ± 1.2	7.5 ± 1.3
3 rd Month	4.3 ± 1.1	3.0 ± 1.0
6 th Month	3.9 ± 1.4	2.5 ± 1.1

Pain improvement was statistically more significant in Group B than in Group A at both follow-up intervals ($p < 0.05$).

3. Functional Assessment using SPADI Score

The Shoulder Pain and Disability Index (SPADI) was applied to measure pain and disability scores at follow-up. At the 3rd month, Group A had a mean SPADI score of 55.4 ± 8.9 , while Group B had a significantly lower score of 42.2 ± 7.6 . This suggests that patients in Group B (who received intra-articular corticosteroid injections in addition to standard therapy) experienced more rapid

functional improvement compared to Group A (medical treatment and physiotherapy alone). By the 6th month, both groups continued to show improvement. Group A's mean SPADI score decreased to 49.7 ± 9.1 , while Group B's score further dropped to 35.3 ± 6.8 . The consistently lower SPADI scores in Group B indicate that these patients had better shoulder function and less disability over time.

Table-3: Comparison of Mean Shoulder Pain and Disability Index (SPADI) Scores Between Group A and Group B at 3rd and 6th Month Follow-Up

Time Point	Group A SPADI \pm SD	Group B SPADI \pm SD
3 rd Month	55.4 ± 8.9	42.2 ± 7.6
6 th Month	49.7 ± 9.1	35.3 ± 6.8

4. Relapse Rate

At the 6-month follow-up, the relapse rate defined as the recurrence of pain and stiffness was significantly higher in Group A (16.7%) compared to Group B (6.7%). This

suggests that intra-articular corticosteroid injection, when combined with conventional therapy, may provide more sustained symptom relief and reduce the likelihood of relapse.

Table-4: Relapse and Dropout Rates at 6-Month Follow-Up

Outcome Measure	Group A (N=30)	Group B (N=30)	Total (N=60)
Relapse Cases	5 (16.7%)	2 (6.7%)	7 (11.7%)
Dropout Cases	4 (13.3%)	2 (6.7%)	6 (10.0%)
Total Completed	21 (70.0%)	26 (86.6%)	47 (78.3%)

5. Dropout Rate

Group A also experienced a higher dropout rate (13.3%) than Group B (6.7%). This could indicate that patients receiving only medical treatment and physiotherapy were less satisfied, experienced slower recovery, or faced greater barriers to continuing treatment. Common reasons for dropout included financial constraints, lack

of motivation, and poor access to physiotherapy services.

6. Completion Rate

Overall, Group B had a better treatment adherence, with 86.6% completing the 6-month follow-up compared to



70.0% in Group A. This further reinforces the acceptability and perceived effectiveness of corticosteroid injection as part of the treatment strategy.

DISCUSSION

This study aimed to evaluate the scope and limitations in managing frozen shoulder patients in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, comparing outcomes between patients receiving conventional medical treatment with physiotherapy and those receiving the same treatment supplemented with intra-articular corticosteroid injections.

Demographic Characteristics and Occupational Factors

The demographic distribution observed in this study aligns with previous research indicating a higher prevalence of frozen shoulder among females and middle-aged adults. Similarly found in another study, shoulder pain and functional disability are significantly high in female [10]. This aligns with the findings of Kraal et al. (2020), who reported that frozen shoulder commonly affects middle-aged adults, particularly those between 40 and 60 years, and noted a slight female predominance. [13]. Our finding that 63.3% of patients were female concurs with literature highlighting a female predominance in frozen shoulder, potentially linked to hormonal and metabolic factors [14-16]. The substantial representation of housewives, housemaids, and day laborers suggests a potential occupational association, likely due to repetitive shoulder strain and physical workload, which has been speculated but less frequently quantified in the literature [17].

Pain Reduction and Functional Improvement

Pain assessment via the Visual Analogue Scale (VAS) demonstrated significant improvement in both groups over six months, with notably greater and faster pain relief in patients receiving intra-articular corticosteroid injections (Group B). These findings are consistent with those of Carette et al., who demonstrated that intra-articular corticosteroid injections significantly reduced shoulder pain during early-stage adhesive capsulitis when compared to physiotherapy alone [19]. A systematic review by Griesser et al. (2011) emphasized the role of corticosteroids in the freezing stage to reduce inflammation and facilitate earlier functional recovery [8].

Functional outcomes, as measured by the Shoulder Pain and Disability Index (SPADI), also favored Group B, showing greater reduction in pain and disability scores at both 3 and 6 months. These results are consistent with studies demonstrating that steroid injections combined with physiotherapy improve shoulder function more effectively than physiotherapy alone [19,20]. The sustained functional gains seen at 6 months suggest that

corticosteroids not only provide symptomatic relief but may also positively influence the natural course of the disease. This is consistent with findings from a study titled "Comparison of corticosteroid injections, physiotherapy, and combination therapy in treatment of frozen shoulder," which reported that combination therapy is significantly more effective than physiotherapy alone in reducing pain and restoring shoulder mobility [21].

Relapse and Dropout Rates

The relapse rate of 16.7% in the conservative treatment group versus 6.7% in the injection group indicates that corticosteroids may reduce symptom recurrence. Previous research indicates variable relapse rates, but overall, intra-articular corticosteroids are associated with lower relapse and better long-term outcomes when appropriately timed [22]. The lower dropout rate and higher treatment adherence observed in Group B may be attributed to the perceived efficacy and rapid symptom improvement, which likely enhances patient motivation to continue therapy [10].

However, the dropout rates in both groups highlight challenges in treatment adherence, particularly in resource-limited settings such as district hospitals in Bangladesh. Financial constraints, limited access to physiotherapy, and poor patient education are recurrent barriers identified in similar contexts [23,24]. Addressing these systemic issues is crucial for improving outcomes and reducing disease burden.

Limitations

While the study provides valuable insights, it has limitations including the relatively small sample size and short follow-up duration. The convenience sampling approach and single-center design limit the generalizability of findings. Additionally, objective measurement of range of motion and imaging studies were not incorporated, which may affect the precision of disease staging and outcome assessment.

Clinical Implications and Recommendations

Our findings advocate for incorporating intra-articular corticosteroid injections alongside standard medical treatment and physiotherapy for managing frozen shoulder, especially in early disease stages. Training healthcare providers in tertiary hospitals to perform injections and ensuring availability of rehabilitation services could enhance patient outcomes. Moreover, strategies to improve patient education and follow-up adherence are essential to minimize dropout and relapse. Future research with larger sample sizes, multicenter designs, and longer follow-up is recommended to further validate these findings and explore the cost-effectiveness of combined treatment modalities in low-resource settings.



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