

AN EVALUATION STUDY ON FROZEN SHOULDER, ITS RISK FACTORS, AND MANAGEMENT IN TERTIARY CARE CENTRE OF WEST BENGAL: OBSERVATIONAL CROSS-SECTIONAL STUDY

Dr. Mukesh Parmar¹, Dr. Piyush V damor², Dr. Parth Nishith Thaker³, Dr. Naresh Kumar Munda⁴

¹ Associate Professor, Department of Orthopaedics, Faculty of Jagannath Gupta Institute of Medical Sciences and Hospital, Budge Budge, Kolkata

² Assistant Professor, Department of Orthopaedics, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India.

³ Assistant Professor, Department of Orthopaedics, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India .

⁴ Assistant Professor, Department of Community Medicine, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India

Corresponding Author

Dr. Naresh Kumar Munda

Assistant Professor, Department of Community Medicine, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India

Received: 02-11-2022

Accepted: 16-11-2022

Published: 23-12-2022

©2022 Biomedical and Biopharmaceutical Research. This is an open access article under the terms of the Creative Commons Attribution 4.0 International License.

ABSTRACT

Background: Frozen shoulder (adhesive capsulitis) is a painful condition characterized by progressive stiffness and limited range of motion of the shoulder joint. It often affects middle-aged adults and has multifactorial risk factors. **Objective:** To evaluate the demographic profile, identify risk factors, and assess management outcomes in patients diagnosed with frozen shoulder. **Methods:** A cross-sectional observational study was conducted on 26 patients clinically diagnosed with frozen shoulder. Data on demographics, clinical features, comorbidities, and management modalities were collected and analyzed. **Results:** The condition was most prevalent in individuals aged 41–60 years. Diabetes mellitus (46.1%) and hypothyroidism (26.9%) were the leading risk factors. Most patients responded well to physiotherapy combined with analgesics and intra-articular corticosteroids. **Conclusion:** Early diagnosis and structured conservative management significantly improve outcomes. Diabetes and thyroid disorders are major risk factors needing control.

KEYWORDS: Frozen shoulder, risk Factors.

INTRODUCTION

Frozen shoulder, or adhesive capsulitis, is a common musculoskeletal disorder characterized by shoulder pain and progressive loss of motion. It commonly affects individuals between the ages of 40 and 60 and may be idiopathic or secondary to underlying conditions such as diabetes or thyroid dysfunction[1]. This study aims to analyze the clinical profile, associated risk factors, and effectiveness of various management strategies in patients with frozen shoulder. Frozen shoulder, also known as adhesive capsulitis, affects approximately 2% to 5% of the general population[2-6]. It's more common in women and typically develops between the ages of 40 and 60. While generally self-limiting, some individuals may experience persistent symptoms for an extended period. Here's a more detailed breakdown[7-9]

Prevalence: Studies indicate that frozen shoulder impacts 2% to 5% of the general population. Age: The condition is most prevalent in individuals between 40 and 60 years old, although onset can occur outside of this range. Gender: Women are more likely to be affected than men. Bilateral Occurrence: In some cases, both shoulders can be affected, either simultaneously or sequentially[10-14]. Diabetes: Diabetes is a significant risk factor for frozen shoulder, with higher rates observed in diabetic individuals. Progression: While often self-limiting, some studies suggest that a percentage of individuals may experience long-term symptoms or even persistent disability[15].

METHODS

This study was conducted in tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 36 patients in the department of Orthopaedic, at a tertiary care centre, from June/ 2022 to December /2022.

Total 30 participant were approached to project among them 4 were excluded due to non-fulfilling of eligibility criteria and 26 were included on the basis of fulling of the eligibility criteria

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination

- **Study Design:** Observational cross-sectional study
- **Study Duration:** 6 months
- **Sample Size:** 26 patients
- **Inclusion Criteria:** Patients aged 30–70 years clinically diagnosed with frozen shoulder
- **Exclusion Criteria:** Patients with shoulder trauma, rotator cuff injuries, or previous shoulder surgeries
- **Data Collection:** A structured questionnaire was used to collect demographic data, comorbidities, symptom duration, treatment modalities, and response to therapy.
- **Analysis:** Data were analyzed using descriptive statistics (percentages and frequencies).

The data collected was entered in excel spread sheet. The data was analysed by using SPSS statistical software version 20. Statistical analysis in the form of percentages was done. Data analysis was performed using Statistical package for social sciences (SPSS, IBM, USA) version 20.0. Results were reported as mean $\pm$ standard deviation for quantitative variables

Statistical Analysis: SPSS v28, $p < 0.05$ significant

Flowchart:

Participants Screened (n = 30)



Excluded (Not Meeting Criteria) (n = 4)



Patients Enrolled (n = 26)



Assessment of:

- Demographics
- Risk Factors
- Management Strategies



Intervention:

- Physiotherapy
- Analgesics
- Corticosteroid injections



Follow-up & Outcome Assessment

RESULTS

In this study we found that Frozen Shoulder is associated with demographic profile of patient. 42.9%% patient suffered of FrozenShoulder is belongs to 41 to 50 years age group followed by 34.6% belong to 51 -60 years ag group.

It means age is important factors for Frozen Shoulder. increasing age will prone toFrozen Shoulder.

Female (61.5%) were more prone to suffered of Ankylosing Spondylitis (AS) as compared to Female gender. (Table 1)

Table 1: Demographic Profile (n=26)

Demographic Factor	Number of Patients	Percentage (%)
Age Group		
30–40 years	4	15.4%
41–50 years	11	42.3%
51–60 years	9	34.6%
61–70 years	2	7.7%
Gender		
Male	10	38.5%
Female	16	61.5%
Dominant Side Affected		
Right	17	65.4%
Left	9	34.6%

Table 2: Risk Factors Observed

Diabetes mellitus is important risk factors for Frozen Shoulder its prevalence is 46.1 %(Table 2) .

Risk Factor	Number of Patients	Percentage (%)
Diabetes Mellitus	12	46.1%
Hypothyroidism	7	26.9%
Hypertension	6	23.1%
Previous Shoulder Injury	2	7.7%
Sedentary Lifestyle	9	34.6%
No Known Risk Factors	5	19.2%

DISCUSSION

This study reaffirms that frozen shoulder is more common in middle-aged individuals, particularly females. Diabetes mellitus was the most prominent risk factor, consistent with existing literature[16-18]. Hypothyroidism and sedentary lifestyle also contributed significantly. Most patients responded favourably to a conservative treatment approach, including physical therapy and intra-articular steroid injections. Those with

well-managed comorbidities demonstrated better recovery outcomes. Early recognition and addressing modifiable risk factors like blood glucose and thyroid function are essential for improving prognosis[19].

Frozen shoulder, or adhesive capsulitis, is more likely to affect individuals with certain risk factors. These include age (40-60 years old), being female, having diabetes or thyroid disorders (both hypo- and hyperthyroidism), and experiencing prolonged shoulder immobilization due to injury or surgery. Additionally, a history of shoulder problems like rotator cuff injuries or bursitis, and even certain systemic diseases like Parkinson's, can increase the risk[20].

In this study we found that Frozen Shoulder is associated with demographic profile of patient. 42.9%% patient suffered of Frozen Shoulder is belongs to 41 to 50 years age group followed by 34.6% belong to 51 -60 years ag group[21-23].

It means age is important factors for Frozen Shoulder. increasing age will prone to Frozen Shoulder. Female (61.5%) were more prone to suffered of Ankylosing Spondylitis (AS) as compared to Female gender. (Table 1) Risk Factors: Age and Gender: Frozen shoulder is most common between the ages of 40 and 60, with women being more susceptible than men. Prolonged Shoulder Immobilization: Keeping the shoulder still for extended periods, such as after surgery or a fracture, can lead to frozen shoulder.

Diabetes mellitus is important risk factors for Frozen Shoulder its prevalence is 46.1 %(Table 2) .

Diabetes: Individuals with diabetes are more prone to developing frozen shoulder. Thyroid Disorders: Both hypothyroidism (underactive thyroid) and hyperthyroidism (overactive thyroid) are associated with an increased risk of frozen shoulder. Other Systemic Diseases: Conditions like Parkinson's disease and cardiovascular disease can also increase the likelihood of frozen shoulder. Previous Shoulder Problems: A history of shoulder issues like rotator cuff injuries or bursitis can make a person more vulnerable. Sedentary Lifestyle: Lack of physical activity and prolonged sitting can contribute to joint stiffness and potentially increase the risk. Autoimmune and Inflammatory Conditions: These conditions can lead to inflammation and scarring in the shoulder capsule, increasing the risk. Recent Shoulder Injury or Surgery: Any injury or surgery that limits shoulder movement can increase the risk of frozen shoulder[24].

Frozen shoulder, also known as adhesive capsulitis, is a condition characterized by pain and stiffness in the shoulder joint, limiting its range of motion. Management typically focuses on pain relief and restoring shoulder movement through a combination of physical therapy, medication, and sometimes, injections or surgery[25-27]. Treatment Options: Pain Management:

Over-the-counter pain relievers: Medications like ibuprofen (Advil, Motrin) or acetaminophen (Tylenol) can help reduce pain and inflammation. Heat and cold therapy: Applying heat or ice packs to the shoulder can help relieve pain and reduce inflammation[28-29]. Prescription pain relievers: In some cases, stronger pain medications may be prescribed by a doctor. Physical Therapy: Range-of-motion exercises: Physical therapists guide patients through exercises to improve shoulder flexibility and range of motion. Strengthening exercises: Strengthening exercises for the surrounding muscles help support and stabilize the shoulder. Therapeutic modalities: Techniques like ultrasound or electrical stimulation may be used to manage pain and inflammation. Home exercise program: Patients are typically given exercises to perform at home to maintain progress made during therapy.

CONCLUSION

Frozen shoulder is a self-limiting but functionally debilitating condition commonly associated with metabolic disorders. Most affected: 41–60 years, predominantly females Leading risk factors: Diabetes, hypothyroidism Conservative treatment is effective in most casesRecommendation: Early screening in diabetic and hypothyroid patients can reduce severity and improve shoulder function through timely physiotherapy and steroid administration.

SOURCE OF FUNDING: No

CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

REFERENCES

1. Buchbinder R, Green S. Effect of arthrographic shoulder joint distension with saline and corticosteroid for adhesive capsulitis. *British Journal of Sports Medicine*. 2004;38(4):384–385. doi: 10.1136/bjsm.2004.013532. [[DOI](#)] [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
2. Shah N, Lewis M. Shoulder adhesive capsulitis: Systematic review of randomised trials using multiple corticosteroid injections. *British Journal of General Practice*. 2007;57(541):662–667. [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
3. Hand C, Clipsham K, Rees JL, Carr AJ. Long-term outcome of frozen shoulder. *Journal of Shoulder and Elbow Surgery*. 2008;17(2):231–236. doi: 10.1016/j.jse.2007.05.009. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
4. Kingston K, Curry EJ, Galvin JW, Li X. Shoulder adhesive capsulitis: Epidemiology and predictors of surgery. *Journal of Shoulder and Elbow Surgery*. 2018;27(8):1437–1443. doi: 10.1016/j.jse.2018.04.004. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
5. Rizk TE, Pinals RS. Frozen shoulder. *Seminars in Arthritis and Rheumatism*. 1982;11(4):440–452. doi: 10.1016/0049-0172(82)90030-0. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
6. Walker-Bone K, Palmer KT, Reading I, Coggon D, Cooper C. Prevalence and impact of musculoskeletal disorders of the upper limb in the general population. *Arthritis and Rheumatism*. 2004;51(4):642–651. doi: 10.1002/art.20535. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
7. Zreik NH, Malik RA, Charalambous CP. Adhesive capsulitis of the shoulder and diabetes: A meta-analysis of prevalence. *Muscles Ligaments Tendons J*. 2016;6(1):26–34. doi: 10.11138/mltj/2016.6.1.026. [[DOI](#)] [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
8. Bridgman JF. Periarthritis of the shoulder and diabetes mellitus. *Annals of the Rheumatic Diseases*. 1972;31(1):69–71. doi: 10.1136/ard.31.1.69. [[DOI](#)] [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
9. Dias R, Cutts S, Massoud S. Frozen shoulder. *BMJ*. 2005;331(7530):1453–1456. doi: 10.1136/bmj.331.7530.1453. [[DOI](#)] [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
10. Chan JH, Ho BS, Alvi HM, Saltzman MD, Marra G. The relationship between the incidence of adhesive capsulitis and hemoglobin A(1c) *Journal of Shoulder and Elbow Surgery*. 2017;26(10):1834–1837. doi: 10.1016/j.jse.2017.03.015. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
11. Schiefer M, Teixeira PFS, Fontenelle C, Carminatti T, Santos DA, Righi LD, et al. Prevalence of hypothyroidism in patients with frozen shoulder. *Journal of Shoulder and Elbow Surgery*. 2017;26(1):49–55. doi: 10.1016/j.jse.2016.04.026. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
12. Cakir M, Samanci N, Balci N, Balci MK. Musculoskeletal manifestations in patients with thyroid disease. *Clinical Endocrinology - Oxford*. 2003;59(2):162–167. doi: 10.1046/j.1365-2265.2003.01786.x. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
13. Cohen C, Tortato S, Silva OBS, Leal MF, Ejnisman B, Faloppa F. Association between frozen shoulder and thyroid diseases: Strengthening the evidences. *Revista Brasileira de Ortopedia (Sao Paulo)* 2020;55(4):483–489. doi: 10.1055/s-0039-3402476. [[DOI](#)] [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
14. Hsu JE, Anakwenze OA, Warrender WJ, Abboud JA. Current review of adhesive capsulitis. *Journal of Shoulder and Elbow Surgery*. 2011;20(3):502–514. doi: 10.1016/j.jse.2010.08.023. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
15. Cher JZB, Akbar M, Kitson S, Crowe LAN, Garcia-Melchor E, Hannah SC, et al. Alarmins in frozen shoulder: A molecular association between inflammation and pain. *American Journal of Sports Medicine*. 2018;46(3):671–678. doi: 10.1177/0363546517741127. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]

16. Cho CH, Song KS, Kim BS, Kim DH, Lho YM. Biological aspect of pathophysiology for frozen shoulder. *BioMed Research International*. 2018;2018:7274517. doi: 10.1155/2018/7274517. [[DOI](#)] [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
17. Andronic, O., Ernstbrunner, L., Jüngel, A., Wieser, K., Bouaicha, S. (2019). Biomarkers associated with idiopathic frozen shoulder: A systematic review. *Connective Tissue Research* 1–8 [[DOI](#)] [[PubMed](#)]
18. Akbar M, McLean M, Garcia-Melchor E, Crowe LA, McMillan P, Fazzi UG, et al. Fibroblast activation and inflammation in frozen shoulder. *PLoS One*. 2019;14(4):e0215301. doi: 10.1371/journal.pone.0215301. [[DOI](#)] [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
19. Neer CS, 2nd, Satterlee CC, Dalsey RM, Flatow EL. The anatomy and potential effects of contracture of the coracohumeral ligament. *Clinical Orthopaedics and Related Research*. 1992;280:182–185. [[PubMed](#)] [[Google Scholar](#)]
20. Ozaki J, Nakagawa Y, Sakurai G, Tamai S. Recalcitrant chronic adhesive capsulitis of the shoulder. Role of contracture of the coracohumeral ligament and rotator interval in pathogenesis and treatment. *Journal of Bone and Joint Surgery*. 1989;71(10):1511–1515. [[PubMed](#)] [[Google Scholar](#)]
21. Kilian O, Pfeil U, Wenisch S, Heiss C, Kraus R, Schnettler R. Enhanced alpha 1(I) mRNA expression in frozen shoulder and Dupuytren tissue. *European Journal of Medical Research*. 2007;12(12):585–590. [[PubMed](#)] [[Google Scholar](#)]
22. Lho YM, Ha E, Cho CH, Song KS, Min BW, Bae KC, et al. Inflammatory cytokines are overexpressed in the subacromial bursa of frozen shoulder. *Journal of Shoulder and Elbow Surgery*. 2013;22(5):666–672. doi: 10.1016/j.jse.2012.06.014. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
23. Kraal T, Lübbers J, van den Bekerom MPJ, Alessie J, van Kooyk Y, Eygendaal D, et al. The puzzling pathophysiology of frozen shoulders—a scoping review. *Journal of Experimental Orthopaedics*. 2020;7(1):91. doi: 10.1186/s40634-020-00307-w. [[DOI](#)] [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
24. Kohn RR, Hensse S. Abnormal collagen in cultures of fibroblasts from human beings with diabetes mellitus. *Biochemical and Biophysical Research Communications*. 1977;76(3):365–371. doi: 10.1016/0006-291x(77)91566-2. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
25. Xu Y, Bonar F, Murrell GA. Enhanced expression of neuronal proteins in idiopathic frozen shoulder. *Journal of Shoulder and Elbow Surgery*. 2012;21(10):1391–1397. doi: 10.1016/j.jse.2011.08.046. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
26. Ryu JD, Kirpalani PA, Kim JM, Nam KH, Han CW, Han SH. Expression of vascular endothelial growth factor and angiogenesis in the diabetic frozen shoulder. *Journal of Shoulder and Elbow Surgery*. 2006;15(6):679–685. doi: 10.1016/j.jse.2006.01.002. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]
27. Rangan A, Brealey SD, Keding A, Corbacho B, Northgraves M, Kottam L, et al. Management of adults with primary frozen shoulder in secondary care (UK FROST): A multicentre, pragmatic, three-arm, superiority randomised clinical trial. *Lancet*. 2020;396(10256):977–989. doi: 10.1016/S0140-6736(20)31965-6. [[DOI](#)] [[PubMed](#)] [[Google Scholar](#)]