



## Prevalence of Adhesive Capsulitis in Diabetic Patients in a Tertiary Care Centre – An Observational Study

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### Abstract

**Introduction:** Adhesive capsulitis (frozen shoulder) is a clinical condition characterized by painful, restricted range of motion of the shoulder. It is more common in patients with type 2 diabetes mellitus. We aim to study the prevalence of adhesive capsulitis in type 2 diabetes mellitus patients and to study its relationship with age, gender, duration of diabetes, glycaemic control and BMI.

**Methods:** An observational study was done in 300 patients with type 2 DM. Patients with shoulder pain and restricted active and passive shoulder joint movements were diagnosed as having frozen shoulder (adhesive capsulitis). The data were statistically analysed.

**Results:** Adhesive capsulitis was present in 32.3% of patients with type 2 diabetes. It was also found that there was a statistically significant association between occurrence of adhesive capsulitis and increasing age, duration of diabetes and poor glycaemic status.

**Conclusion:** Adhesive capsulitis was seen to be the most commonly prevalent musculoskeletal disorder among patients with type 2 diabetes. Its occurrence was found to be more prevalent with increasing age, greater duration of diabetes and poorly controlled glycaemic status.

**Keywords:** Type 2 diabetes mellitus, adhesive capsulitis, age, gender, duration of diabetes, glycaemic status, BMI.

### Introduction

Diabetes mellitus is a condition characterized by an increased concentration of glucose in the blood mainly due to impaired insulin secretion, insulin resistance, excessive hepatic glucose production and abnormal fat metabolism. Diabetes mellitus can

cause chronic irreversible damage to many organs and systems. Musculoskeletal conditions are common among patients with diabetes mellitus and their prevalence has increased in the recent years, significantly affecting the health status and quality of life<sup>[1],[2]</sup>.

Adhesive capsulitis or frozen shoulder, is characterized by painful and restricted shoulder ROM in patients whose X-ray films of the glenohumeral joint are normal<sup>[3]</sup>. Histopathology of adhesive capsulitis is characterised by perivascular inflammation and fibroblastic proliferation. Among the four stages described, stage 1 occurs for the first 1 to 3 months and is characterized by painful but minimally restricted joint ROM<sup>[4]</sup>. The ensuing stage 2 characterized by painful, progressive loss of shoulder joint motion, lasts for 3 to 9 months. In stage 3, the symptoms include a significant reduction in pain with marked reduction of ROM which may last 9 to 15 months. In stage 4, lasting for approximately 15 to 24 months, the glenohumeral ROM gradually improves. Arthrography of the glenohumeral joint shows a reduction in the capsular volume. Management includes physical modalities, analgesics, activity modification, ROM exercises, scapular stability exercises and intraarticular corticosteroid injections<sup>[5]</sup>. Procedures such as capsular hydrodilatation, manipulation under anaesthesia, and arthroscopic lysis of adhesions are reserved for shoulders resistant to more conservative methods<sup>[6]</sup>,<sup>[7]</sup>,<sup>[8]</sup>,<sup>[9]</sup>. The prevalence ranges from 10% to 25%<sup>[10]</sup>,<sup>[11]</sup>,<sup>[12]</sup>. In this study, we aim to find out the prevalence of adhesive capsulitis in patients with type 2 diabetes mellitus and to study its relationship with age, gender, duration of diabetes, glycaemic control and BMI.

### Materials and Methods

A cross-sectional study was conducted in 300 patients diagnosed as having type 2 diabetes mellitus, who attended the Diabetes Clinic at a tertiary centre and included males and females aged 18 to 65 years. Patients with deformities due to trauma or surgery, those with medical disorders like cerebrovascular accidents, thyroid disorders, liver disorders, malignancy, patients with cognitive deficits, pregnant patients and those who could not give consent for the study were excluded. Informed written consent was obtained from all the participants, prior to the study. The study was

approved both by the Institutional Research Committee and the Institutional Ethics Committee. Patient characteristics like age, gender, BMI, glycaemic status and duration of diabetes mellitus were recorded. A detailed clinical history was taken followed by examination. Patients in the study population with shoulder pain and restricted active and passive shoulder joint movements were diagnosed as having adhesive capsulitis.

### Statistical Analysis

All the data were coded and entered in Microsoft excel sheet, rechecked and analyzed using statistical package for social sciences (SPSS 18.0) software. Quantitative variables are presented as mean and standard deviation. Qualitative variables are presented as frequency and percentages. Comparison is done using Chi square test.

### Results and Discussion

In our study, we observed that 97(32.3%) patients had adhesive capsulitis out of the 300 studied. In the study conducted by Ramchurn et al<sup>[10]</sup> in diabetic patients, the prevalence of adhesive capsulitis was 25%. Other studies conducted by Sarkar RN et al<sup>[11]</sup> and by Ray et al<sup>[12]</sup> showed 17.9% and 18% of diabetic patients as having adhesive capsulitis respectively.

**Table 1** Association between gender and adhesive capsulitis

	Adhesive capsulitis		Total n (%)
	Present n (%)	Absent n (%)	
Males	30(27.5%)	79(72.5%)	109(100%)
Females	67(35.1%)	124(64.9%)	191(100%)
Total	97(32.3%)	203(67.7%)	300(100%)

Chi - square= 1.811; df=1; p value= 0.178;

OR (95% CI) =1.423 (0.850- 2.381).

No statistically significant association was found between gender and adhesive capsulitis (p value = 0.178).

## Distribution of selected variables in subjects with Adhesive Capsulitis

**Table 2** Mean (SD) of selected variables in subjects with adhesive capsulitis

	Adhesive capsulitis		p value
	Present Mean (SD)	Absent Mean (SD)	
Age	52.06(7.68)	48.76(10.18)	0.005
Duration of diabetes in years	18.42(6.11)	13.78(7.06)	<0.001
FPG	176.57(51.34)	150.61(54.24)	<0.001
PPPG	252.69(71.75)	220.10(71.94)	<0.001
HbA1c	9.81(1.78)	9.10(1.75)	0.001
BMI	24.97(3.17)	24.96(3.32)	0.993

It was found that the prevalence of adhesive capsulitis in diabetics increases with increasing age. This finding is consistent with the study of Perttu E T Arkkila et al<sup>[13]</sup>.

In our study, the mean duration of diabetes mellitus was 18.42 years. The study showed strong association between longer duration of diabetes mellitus and incidence of adhesive capsulitis. Studies by Sattar MA et al<sup>[14]</sup> also showed a highly significant association between the duration of diabetes and occurrence of adhesive capsulitis.

Our study also found that adhesive capsulitis was significantly associated with poor glycaemic control in diabetic patients. Mean HbA1c of patients with adhesive capsulitis was 9.8. A study conducted by Ramchurna et al<sup>[10]</sup> which was published in the European Journal of Internal Medicine also found strong association between poor glycaemic control and incidence of adhesive capsulitis.

There was no statistically significant association between BMI and adhesive capsulitis among diabetic patients. The findings obtained were similar to the findings of Perttu E T Arkkila et al<sup>[13]</sup>.

## Conclusion

The study was done to find the prevalence of adhesive capsulitis in 300 patients with Type 2 DM and its relationship with age, gender, duration of diabetes, glycaemic control and BMI. Recognition of adhesive capsulitis of the shoulder is important as it affects the individual's Activities of Daily Living and Quality of Life. We conclude that adhesive

capsulitis is common in patients with type 2 DM and is significantly associated with increasing age, longer duration of diabetes and poor glycaemic status.

## Limitation of Study

The major limitation of our study was the absence of a control group for comparison.

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### Abbreviations

BMI- Body mass index

DM-Diabetes mellitus

FPG- Fasting plasma glucose

PPPG- Postprandial plasma glucose

ROM- Range of motion