

**ORIGINAL RESEARCH**

## **To Evaluate The Prevalence And Risk Factors For Frozen Shoulder In Diabetic Patients**

<sup>1</sup>Dr Karan Alawadhi, <sup>2</sup>Dr Virender Singh Kadyan

<sup>1</sup>Senior Consultant, <sup>2</sup>HOD, Department of Orthopaedics, Malik Hospital Hansi, Haryana, India

### **Correspondence:**

Dr Virender Singh Kadyan

HOD, Department of Orthopaedics, Malik Hospital Hansi, Haryana, India

### **ABSTRACT**

**Background:** Adhesive capsulitis, or "frozen shoulder," is characterised by a variety of problems experienced by the glenohumeral joint, including discomfort, stiffness, and/or a loss of function. It is one of the most disabling consequences of diabetes that affects the muscles and bones. The aim of this study to evaluate the prevalence and risk factors for frozen shoulder in diabetic patients.

**Material and methods:** A total of 100 people with diabetes participated in the research. Patients had input on the study's design and gave their informed permission in writing. Participants have to be diabetic and at least 20 years old. Patients with any additional illnesses or injuries were not considered. The patient's complete medical history was collected and documented. We constructed a survey and gathered the patients' replies. These inquiries were framed with an eye toward the potential contributors to the high prevalence of adhesive capsulitis in diabetics.

**Results:** We discovered that the average age of the 100 individuals was  $46.74 \pm 5.57$  years. Male:female ratio was 2.03:1. The majority of the participants (44%) had been diabetic for more than ten years. Insulin was used by more than 65% of the participants. Others used oral medicines. The FS impacted 30% of the individuals. Pain was present in 30 individuals and was unilateral in 22. The limited mobility was seen in 11 individuals, with the degree of limitation ranging from up to and including the shoulder in 17 and **above the shoulder in 13**

patients. In 65 cases, a family history was discovered. In diagnosed instances, 1 in 20 and 2 in 10 had FS.

**Conclusions:** Shoulder radiography and an initial screening are recommended for diabetic patients who have a suspected case of FS because early diagnosis improves clinical outcomes. In addition, doctors need to be aware of the practical consequences of this link in order to effectively diagnose and treat FS in their diabetic patients. Bigger multicenter studies are required to understand more about FS in these groups.

**Keywords:** Adhesive capsulitis, diabetes mellitus, frozen shoulder, determinants, prevalence

## INTRODUCTION

Pain and limited mobility in the shoulder develop gradually over time in patients with frozen shoulder (FS), adhesive capsulitis, or periartthritis, with no clear cause on radiographic examination. As the condition advances, patients often report increasing shoulder discomfort and an inability to sleep on the afflicted side. The frozen shoulder condition progresses through three distinct clinical phases: the freezing, frozen, and thawing stages. The freezing phase, characterised by moderate to severe shoulder discomfort and stiffness, often lasts for two to nine months. The stiffness peak occurs during the frozen phase. During this period, which typically lasts between 4 and 14 months, you'll have less discomfort overall. The thawing phase lasts anywhere from five to twenty-four months and is characterised by a slow but steady improvement in symptoms and mobility. FS mostly affects the elderly, particularly women. Although the true incidence of FS remains unclear, many writers have put the number between 2% and 5%.<sup>1</sup> Minor upper limb injuries, overuse injury, surgery, and/or neurosurgery may all lead to shoulder immobility, and those with diabetes, thyroid problems, osteoporosis, Dupuytren's contracture, cardiovascular disease, and stroke are at a greater risk.<sup>2</sup> FS has also been linked to Parkinson's disease and HIV/AIDS, but less often.<sup>3</sup> Adhesive capsulitis is linked to an increased risk of developing diabetes mellitus (DM). Diabetics have a 2–4 fold greater risk of developing adhesive capsulitis than the general population.<sup>4</sup> The incidence of FS is increased by 10%–20% in people with diabetes, and by an additional 36% in those who need insulin.<sup>5</sup> One of the most debilitating musculoskeletal signs of DM is FS. NDIC reports that in 2005 there were 1.3 million people in the United States who were 20 or older who were diagnosed with diabetes for the first time. Musculoskeletal problems have become more common as both the prevalence of DM and the life expectancy of individuals with diabetes have risen. The likelihood of microvascular problems and the symptoms of organ involvement are both reduced when diabetes is diagnosed and managed well early on.<sup>5</sup>

Patients with FS are not well addressed in regards to the prevalence of diabetes. This ailment often affects one shoulder at a time and limits the shoulder's range of motion. Of those affected with FS, around 20% will also have symptoms in the opposite shoulder.<sup>5</sup> A person's risk of developing FS increases dramatically between the ages of 40 and 60, making this the most prevalent age range in which FS is diagnosed. There is a 1.6% increased risk for this illness in female patients, according the results of a long-term research.<sup>6</sup>

Concerns remain about the pathogenesis of FS in diabetic people. Collagen, a key component of joint ligaments, tendons, and cartilage, is a key component of this idea.<sup>7</sup> Diabetes causes aberrant collagen deposition in the shoulder's cartilage and tendons because more glucose molecules bond with collagen. The accumulation then leads the afflicted shoulder to become rigid. The roles of inflammation and fibrosis in disease progression cannot be overstated. Patients with FS had a prevalence of diabetes of 71.5%.<sup>8</sup>

Overall, those with diabetes are more likely to be diagnosed with FS (11%-30%) than those without diabetes (2%-10%). Patients who have had a shoulder injury or undergone shoulder surgery are at risk for developing FS. However, the risk of developing FS is greatest when the injury is followed by extended joint immobilisation. In 2007, researchers in Southern California looked at how better glycemic management affected FS.<sup>9</sup>

## **MATERIAL AND METHODS**

It was approved by the institution and carried out, so that should give you an idea of the materials and procedures used. A total of 100 people with diabetes participated in the research. Patients had input on the study's design and gave their informed permission in writing. Participants have to be diabetic and at least 20 years old. Patients with any additional illnesses or injuries were not considered. The patient's complete medical history was collected and documented. We constructed a survey and gathered the patients' replies. These inquiries were framed with an eye toward the potential contributors to the high prevalence of adhesive capsulitis in diabetics.

IBM SPSS version 25.0 was used to analyse the collected data. The Chi-Square test was used to do the comparison, and a significance level of p0.05 was used.

## **RESULTS**

We discovered that the average age of the 100 individuals was 46.74±5.57 years. Male:female ratio was 2.03:1. The majority of the participants (44%) had been diabetic for more than ten years. Insulin was used by more than 65% of the participants. Others used oral medicines. The FS impacted 30% of the individuals. Pain was present in 30 individuals and

was unilateral in 22. The limited mobility was seen in 11 individuals, with the degree of limitation ranging from up to and including the shoulder in 17 and above the shoulder in 13 patients. In 65 cases, a family history was discovered. In diagnosed instances, 1 in 20 and 2 in 10 had FS. Table 1 shows that when the chi-square test was used, there was a significant difference between gender, manner of treatment, family history, and diabetes management.

**Table 1: Comparison of different clinical characteristics among participants**

Age	Number	%
Below 35	8	8
35-45	9	9
45-55	69	69
Above 55	14	14
Gender		
Males	33	33
Females	67	67
Duration of time (in year)		
Below 1	8	8
1-5	19	19
6-10	29	29
Above 10	44	44
Medication		
Insulin	65	65
Oral	35	35
Shoulder pain		
yes	30	30
no	70	70
Location		
Unilateral	22	22
Bilateral	08	08
Restriction of movement		
Yes	11	11
no	20	20
Degree of restriction		
Up to shoulder	17	17

Above shoulder	13	13
Family history		
Yes	65	65
no	35	35
Stage of FS		
1	20	20
2	10	10
Number of frozen shoulder	30	30

**Table 2: Comparison of several settings for the FS**

Age	Number	%	Pain present	Pain absent
Below 35	8	8	5	3
35-45	9	9	6	3
45-55	69	69	29	40
Above 55	14	14	4	10
Gender				
Males	33	33	13	20
Females	67	67	32	35
Duration of time (in year)				
Below 1	8	8	3	5
1-5	19	19	10	9
6-10	29	29	16	13
Above 10	44	44	24	20
Medication				
Insulin	65	65	35	30
Oral	35	35	15	20
Family history				
Yes	65	65	30	35
no	35	35	15	20
Number of frozen shoulder	30	30	-	-

## DISCUSSION

We investigate the correlations between FS and demographic variables including age and gender, as well as non-demographic variables like glucose levels, duration of diabetes, anti-diabetes drug usage, physical activity, and family history. Thirty diabetic patients reporting shoulder pain all had restricted shoulder motion, and all were diagnosed as frozen shoulder (FS) based on these findings. Our results for FS in female diabetics are higher than those seen in other studies and are also higher than the global norms.<sup>10-14</sup> Increased FS prevalence, particularly in women, may result from a combination of factors, including but not limited to low socioeconomic status, late diagnosis, unawareness, absence of screening measures, inadequate glycemic control, and suboptimal therapeutic therapy. Previous studies have shown that the manner in which anti-diabetic medicines are used might affect the development of FS. After accounting for HbA1c, insulin-dependent persons were shown to be at higher risk for FS than non-insulin-dependent patients with diabetes.<sup>15,16</sup> Compared to patients who did not use insulin or oral hypoglycemic medications, those who did were 1.5 times less likely to develop FS.<sup>14-17</sup>

The majority (65%) of our diabetes patients with shoulder discomfort were using insulin, however we found that 35% were using oral medicines for glycemic control. In our patient group, 22 (73.33%) patients had unilateral shoulder discomfort and 8 (26.67%) experienced bilateral shoulder pain. Although the research suggests that FS is mostly unilateral, 42 percent of individuals with bilateral FS also had diabetes.<sup>13</sup>

On the other hand, a recent meta-analysis failed to find a difference in the prevalence of FS between patients with insulin-dependent diabetes mellitus or insulin-treated patients and those without insulin-dependent diabetes.<sup>18</sup> Our results showed that the FS rate was 1.2 times higher in patients on insulin, regardless of whether they were also taking oral hypoglycemic medicines. An association between sugar management and the onset of FS was shown to be marginally significant. Those whose glucose levels were uncontrolled in the preceding three months had a prevalence of FS that was 1.5 times higher than the general population. Thus, additional study is required to verify the association between glycemic control and FS. Although the research suggests that FS is mostly unilateral, 42 percent of individuals with bilateral FS also had diabetes.<sup>16-18</sup> However, the frequency of FS is greater in people with diabetes, and the multifactorial inheritance of diabetes includes a genetic component. Some studies have linked genetic factors to the development of FS, while others have failed to replicate these results. Even while exercise doesn't prevent FS, it helps control symptoms once they manifest. However, there was only a weak correlation between consistent exercise

and improved outcomes for patients who were treated with exercise-based treatments. Individuals with a somewhat acute disease respond better to oral or injectable steroid medication, and a substantial improvement in mobility is achieved. Therefore, steroid treatment has a finite lifespan.<sup>15</sup>

## LIMITATIONS

The small size of our sample is a weakness of our research. Additionally, we found no age-related association in our data. Therefore, we recommend more population-based research to verify our results.

## CONCLUSIONS

An increase in output is possible in diabetic individuals who have their glucose levels under control and who begin therapy for FS promptly. It is important to educate the diabetic community, especially women, about the signs and causes of FS on a regular basis because of its increasing prevalence. Shoulder radiography and an initial screening are recommended for diabetic patients who have a suspected case of FS because early diagnosis improves clinical outcomes. In addition, doctors need to be aware of the practical consequences of this link in order to effectively diagnose and treat FS in their diabetic patients. Bigger multicenter studies are required to understand more about FS in these groups.

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