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Prevalence Of Adhesive Capsulitis Among Diabetic Population In Puducherry

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ABSTRACT

Background: An inflammatory condition leading to stiffness and pain in the shoulder joint, adhesive capsulitis is associated with condition is associated with condition such as diabetes mellitus, cervical spondylosis, thyroid dysfunction, autoimmune rheumatic disease, and shoulder injury due to trauma, fracture, rotator cuff tear, surgery, or immobilization. Diabetics have a higher prevalence of adhesive capsulitis than the general population, and these individuals are less responsive to therapy and have a larger range of motion limitations.

Objectives: To find out the prevalence of adhesive capsulitis among diabetic population.

Methods: The present cross-sectional study was carried out at the Department of General medicine and diabetic OPD in MGMCRI. Type 2 diabetes mellitus was labeled by HbA1c of more than 7.0%, or two random blood glucose levels of 200 mg/dL or more, or an existing diagnosis of diabetes mellitus, and/or use of anti-hyperglycemic therapy. Adhesive capsulitis was diagnosed clinically based on history (gradual onset shoulder pain with limitation of movements) and examination (reduction in active and passive range of motion (ROM) of the shoulder, especially abduction, internal rotation, and external rotation) in the absence of significant abnormalities on shoulder X-ray.

Result: The prevalence of diabetes in patients with adhesive capsulitis was 40% (34 of 88). The total prevalence of a diabetic condition in patients with adhesive capsulitis was 71.5% (63 of 88). Previous literature fails to reveal the incidence of newly diagnosed diabetes, 2 of 88 (2%), and prediabetes, 25 of 88 (28.4%) in patients presenting with adhesive capsulitis.

Conclusion: The prevalence of adhesive capsulitis among diabetic mellitus female is high in Puducherry.

Keywords: Adhesive capsulitis, shoulder pain, diabetes, prevalence.

1. INTRODUCTION

The ailment known as adhesive capsulitis (AC) resolves on its own. Patients usually have an atraumatic history of progressively painful Gleno-humeral joint range of motion restrictions. Their restriction pattern is capsular, with external rotation being the most restricted, followed by flexion and abduction in the scapular plane. With a normal radiograph1, Codman (1934) outlined a diagnostic criterion that included idiopathic onset, painful restriction of all Gleno-humeral movements, and limitation of flexion and external rotation.

Jayasri Dhanasekaran, Mohamed Shafiulla Inayathulla, Shanmugananth
Elayaperumal, Yogiswari Gunasekaran, Sindhuja Ravi

An initial inflammatory phase marked by pain and tenderness, a fibrotic phase marked by stiffness and range of motion (ROM) limitations, and a regression phase where the shoulder thaws and mobility gradually improve comprise the development and progression timeline of adhesive capsulitis. Clinically, frozen shoulder can be divided into three phases. During the first stage, known as freezing, shoulder stiffness and discomfort range from moderate to severe and continue for two to nine months.

The shoulder becomes more rigid, but the level of discomfort lessens. The second stage of the illness, known as the frozen period, lasts between four and fourteen months. The third stage, known as thawing, is when the shoulder joint's restricted mobility starts to mend, and the symptoms gradually go away. About five to twenty-four months pass during this time. Between 2% and 5% of people in the general population, 30% of people with diabetes, and roughly 58% of women have AC.

According to estimates, 13.4% of people with diabetes develop adhesive capsulitis, meaning that those who have the disease are five times more likely to get it than those who do not. Although the precise relationship between diabetes and adhesive capsulitis is still unclear, it is possible that glycation processes could change the capsule's tissues, which would then lead to the onset of frozen shoulder. Diabetes affects about 30% of people with adhesive capsulitis. The sudden start of symptoms like pain, stiffness, and a progressive decrease of joint mobility are indicative of adhesive capsulitis. Even though AC typically goes away on its own, multiple studies have revealed that 7–15% of patients experience some form of irreversible functional loss, and 40% of patients still experience pain.

Because scapula-thoracic motions can sometimes compensate and mask the diagnosis, holding the scapula is essential for detecting glenohumeral external rotation. Further testing for rotator cuff pathology, impingement, and other soft tissue pathologies may be restricted by pain and reduced range of motion; if these conditions are discovered, they are usually brought on by stiffness [8]. Numerous studies have demonstrated that individuals with type 2 diabetes mellitus, particularly those with long-standing diabetes mellitus, not only have a higher chance of developing adhesive capsulitis but also have poor results even after receiving treatment.

Risk Factors for Developing Adhesive Capsulitis in Diabetics

Hyperglycemia: Persistent high blood sugar levels can contribute to the thickening of the joint capsule. **Age:** The risk increases with age, particularly for those over 40. **Gender:** Women, particularly those in midlife, are at a greater risk. **Duration of Diabetes:** The longer someone has diabetes, the higher the risk. **Poor glucose control:** Increased fluctuations in blood glucose levels contribute to complications in the joints. **Other conditions:** A history of shoulder trauma or other musculoskeletal conditions may further increase the risk.

2. METHODOLOGY

Study design: cross-sectional study **Study type: Prevalence** of adhesive capsulitis among diabetic populations **Study duration:** 1 month **Sample size:** 100 **Sample group:** Assessment group (single group) **Study population:** Diabetic population age group of 45 to 55 **Study setting: MGMCRI**, Puducherry. At the Mahatma Gandhi Medical and research institute in Puducherry, 100 diabetic patients participated in a cross – sectional study. The Shoulder Pain and Disability index (SPADI) is a self-administration questionnaire that measures pain and disability in the shoulder. Independent variables included sex (male/female), mode of anti-diabetic medication (insulin-dependent/non-insulin-dependent), treatment of Frozen shoulder (Medication, Medication + Physiotherapy, Medication + Physiotherapy + Arthroscopy), affected shoulder (Right/Left/Bilateral), age (Year), Duration of Diabetes (Year) and duration of frozen shoulder (Week) and dependent variable was only diabetes. Participants underwent thorough clinical assessments, including demographic data, medical history, HbA1c levels, and shoulder pain/mobility evaluation. The condition was diagnosed based on the insidious onset of pain, progressive restriction of shoulder movements, and exclusion of other causes. Data analysis was done using SPSS 25.0 version and below 5% level of significance.

3. SELECTION CRITERIA

Inclusion Criteria: The study will include subjects between the ages of 45 and 55 years who are willing to participate. Participants must have the ability to perform a full range of motion, excluding those with limitations. The study will focus on individuals with unilateral or bilateral adhesive capsulitis, as well as those with type II diabetes. Both male and female participants are welcome to take part in the study. **Exclusion Criteria**: The study will exclude individuals with any fractures in the shoulder complex, as well as those with stage 1 adhesive capsulitis, thoracic outlet syndrome, rheumatoid arthritis, osteoporosis, or malignancy. Participants who have had recent surgery in the shoulder complex will also be excluded, along with pediatric subjects. Additionally, patients who are not willing to participate in the study will not be included.

4. DATA COLLECTION PROCEDURE

Prior to our study the subject was given patient information leaflet along with informed consent form who fulfilled the inclusion criteria. The data was collected from the subjects using a will-structured questionnaire which includes patient demographics, contact, history of shoulder pain and severity.

Jayasri Dhanasekaran, Mohamed Shafiulla Inayathulla, Shanmugananth
Elayaperumal, Yogiswari Gunasekaran, Sindhuja Ravi

5. OUTCOME MEASURE

SPADI (The shoulder pain and disability index): The SPADI is a self-administered questionnaire that contains 13 items. The SPADI has two subscales: a 5-item subscale that measures pain and an 8-item subscale that measures disability. The SPADI is scored out of 100, with 0 being asymptomatic and 100 being the worst possible score.

6. STATISTICAL ANALYSIS AND RESULT

The study was done on 100 participants with diabetic mellites, the prevalence of adhesive capsulitis Descriptive statistics were used to describe continuous variable (mean, standard deviation). The Mann-Whitney u-test was performed between and within group analysis of range of motion and functional disability.

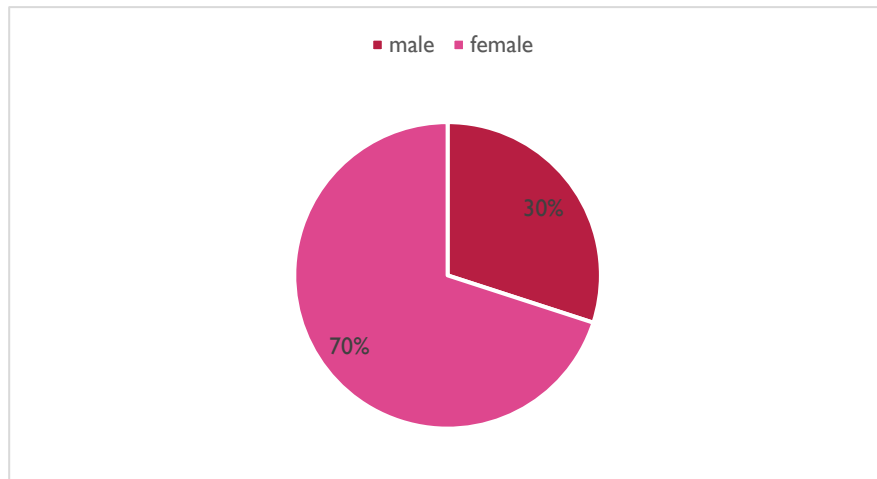DISTRIBUTION OF GENDER AMONG GROUPS

Table 1: Distribution of gender:

SI.NO	Groups	N	MALE	FEMALE
1.	Group	100	30(30%)	70(70%)

Table 1 presents the statistical analysis of gender distribution among the groups. It shows that out of 100 individuals, 30% (30) are male, while 70% (70) are female. This data highlights a higher proportion of females compared to males.
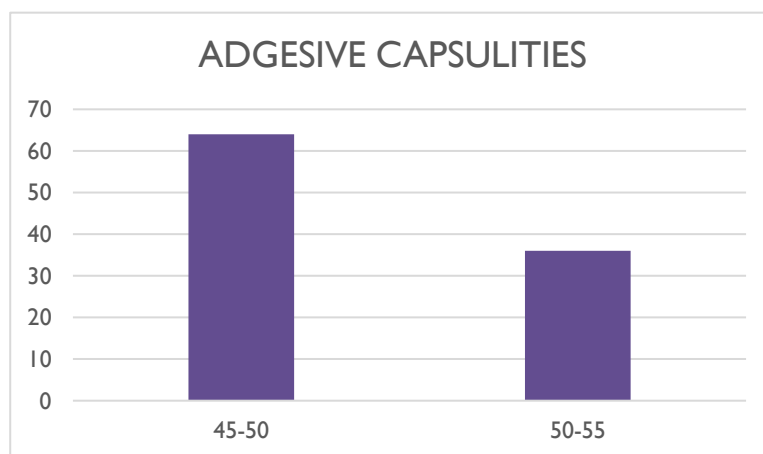
Jayasri Dhanasekaran, Mohamed Shafiulla Inayathulla, Shanmugananth
Elayaperumal, Yogiswari Gunasekaran, Sindhuja Ravi

Table 2: DISTRIBUTION OF AGE AMONG GROUPS:

SI.NO	AGE	PARTICIPANTS
1	45-50	64
2	50-55	36

Table 2 presents the statistical analysis of age among groups. The 45-50 age group has 64 participants, while the 50-55 age group has 36 participants. This indicates a higher number of participants in the younger age bracket.

Table 3: PREVALNCE OF ADHSIVE CAPSULITIES AMONG DIABETIC MELLITUS IN FEMALE

SI.NO	Groups	N	MEAN	S. D	T-Score	P-Score
1.	Group	70	40.50	2.03	55.9	0.87

Table 3 presents the statistical analysis of a group with 70 participants. It includes the mean value of 40.50 and a standard deviation (S.D) of 2.03, indicating the spread of data. The T-score is 55.9, and the P-score is 0.87, which helps assess statistical significance.
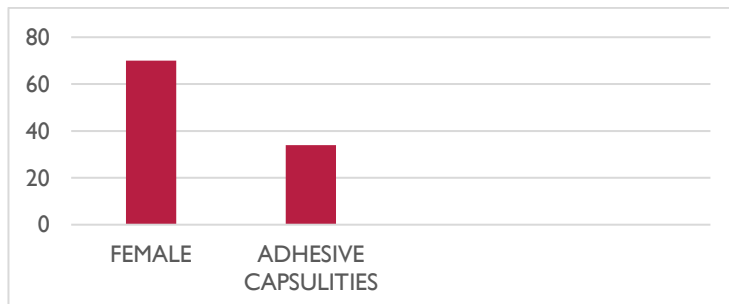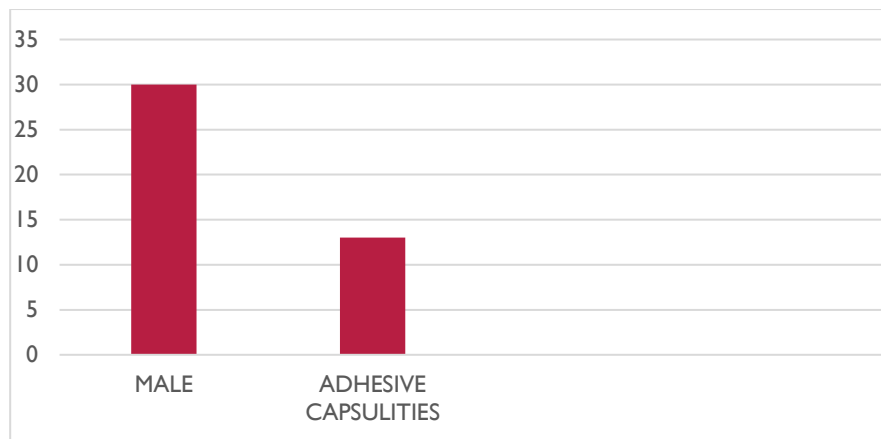

Graphical statistical analysis of prevalence of adhesive capsulitis in female

TABLE 4: PREVALANCE OF ADHESIVE CAPSULITIES AMONG DEABETIC MELLITUS IN MALE

S. I	Groups	N	MEAN	S.D	T-Score	P-Score
1.	Group A	30	50.50	3.03	45.5	0.081

Table 4 presents the statistical analysis of Group A, which consists of 30 participants. The mean value is 50.50, with a standard deviation (S.D) of 3.03, indicating the variability in data. The T-score is 45.5, and the P-score is 0.081, which helps evaluate statistical significance.

Jayasri Dhanasekaran, Mohamed Shafiulla Inayathulla, Shanmugananth
Elayaperumal, Yogiswari Gunasekaran, Sindhuja Ravi

Graphical analysis of prevalence of male, adhesive capsulitis among diabetic mellitus

The prevalence of diabetes in patients with adhesive capsulitis was 40% (34 of 88). The total prevalence of a diabetic condition in patients with adhesive capsulitis was 71.5% (63 of 88). Previous literature fails to reveal the incidence of newly diagnosed diabetes, 2 of 88 (2%), and prediabetes, 25 of 88 (28.4%) in patients presenting with adhesive capsulitis. Early diagnosis and effective management of DM reduce the risk of microvascular complications. DM is believed to play a role in the development of musculoskeletal complications.

7. DISCUSSION

The presence study aimed to investigate the prevention of adhesive capsulitis among diabetic millets in Puducherry. The finding of this study indicates that the prevalence of adhesive capsulitis among diabetic millets in female is significantly high, with 60% of the participant having a SPADI score >100. Adhesive capsulitis was seen in 24.9% and 66.67% of patients with diabetes mellitus by Ahmad et al. and Seher et al., while it was seen in 9.3% of non-diabetics. Adhesive capsulitis was associated with increasing age and prolonged duration of diabetes. It was more common in females and patients aged 46-55 years. In the study by Inayat et al., 43.1% of diabetic patients had adhesive capsulitis, which was more frequent in females and patients with poor diabetes control, insulin dependence, and a positive family history of adhesive capsulitis. A clinical review by Dias R *et al.* found that "peak age" of patients with frozen shoulder is 56 years old; in addition, another study found that the mean age of the disease occurrence is 53 years old. Another study conducted in Turkey discovered that the average age of frozen shoulder was between 40 to 60 years old.

Among all patients with frozen shoulders and diabetes, 14% of patients with good glucose control and 86% of patients with poor response were treated by medication, physiotherapy and arthroscopic. This higher percentage of patients who underwent the combination of medication, physiotherapy and arthroscopic in poor glucose control group shows that patients with higher blood sugar need more aggressive treatment. Frozen shoulders is five times more common in individuals with diabetes than in individuals without diabetes (Zreik et al., 2016). Generally, FS affects people with diabetes at a rate of 11 precent–30 precent, comparing to 2%–10% of individuals without diabetes (Uddin et al., 2014).

Study done by (Ray et al., 2011) reported that the prevalence of frozen shoulder was 18% in diabetic patients which were well-matched with our results. In this investigation, it also noted a prevalence-rate of 17.9 percent (Doly, 2017). In the study by Inayat et al., 43.1% of diabetic patients had adhesive capsulitis, which was more frequent in females and patients with poor diabetes control, insulin dependence, and a positive family history of adhesive capsulitis.

The treatment of adhesive capsulitis relies on symptomatic relief and improving shoulder ROM. Non-steroidal anti-inflammatory drugs (NSAIDs) have been shown to reduce pain in the initial phase. Physical therapy, in the form of stretching, gentle ROM exercises, and gradual graded resistance training, helps to control pain and improve shoulder mobility.

8. STUDY LIMITATION

Diabetic duration was predicated on identifying events that led to each patient's diabetes diagnosis. If the patient joined the insurance plan after developing diabetes, his or her diabetic history wouldn't be known. This may have underestimated the time since the patient's first diagnosis. **Measurement Limitations**: If the tools or methods used for data collection (e.g., surveys, questionnaires, interviews) are not perfectly reliable or valid, the results may not accurately reflect the phenomena being studied. **External Validity**: The findings of a study may only apply to a specific population, time, or location, limiting their broader applicability (i.e., external validity). Research conducted in a controlled setting may not translate well to real-world environments.

Jayasri Dhanasekaran, Mohamed Shafiulla Inayathulla, Shanmugananth
Elayaperumal, Yogiswari Gunasekaran, Sindhuja Ravi

9. CONCLUSION

Adhesive capsulitis was not an uncommon finding in our study, reported in almost one-fifth (60.2%) of the 100 Participants with type 2 diabetes mellitus enrolled. We recommend that treating physicians screen diabetic patients for adhesive capsulitis so that proper pain relief, physiotherapy, and rehabilitation may be provided timely and efficiently, thereby reducing morbidity and improving the quality of life for such patients. Literature evidence shows correlation between diabetes mellitus and frozen shoulder, with diabetic patients having a greater odd of developing the condition compared to the general population.

CONFLICTS OF INTEREST: The author declares no conflicts of interest regarding the publication of this paper

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