American Journal of Psychiatric Rehabilitation

Expert Opinion Article

Epidemiology of Adhesive Capsulitis in Indian Population: A Review

Rakesh Kumar[1*], Dr Supreet Bindra[2], Dr Pankajpreet Singh[3]

[1*,2,3]Research Scholar, Assistant Professor, Department of Physiotherapy, Sri Guru Granth Sahib World University, Fatehgarh Sahib (Punjab)

ABSTRACT

Adhesive Capsulitis (AC), commonly known as Frozen Shoulder, is a debilitating musculoskeletal condition characterized by progressive shoulder pain and restricted range of motion. Although Adhesive Capsulitis has been extensively studied in Western populations, limited comprehensive evidence is available regarding its epidemiology, risk factors, and its impact on Indian population, where high rates of metabolic disorders such as diabetes may affect disease patterns. The aim of this review is to explore the prevalence, risk factors, and impact of Adhesive Capsulitis in the Indian population. The global prevalence of Adhesive Capsulitis is estimated to be between 2% to 5% in the general population with higher rates in individuals between the ages of 40 to 60 years. The prevalence of AC in India has been found to be 10% to 42.58% in individuals with diabetes, particularly among the middle-aged and elderly populations. The risk factors contributing to the development of AC in India include diabetes mellitus, thyroid disorders, trauma or shoulder injuries, gender, age, and autoimmune conditions. The impact of AC is multifaceted, involving significant clinical, psychosocial, and economic burdens. Clinically, it leads to chronic pain, functional limitations, and disability, significantly impairing an individual's ability to perform daily activities and work. Psychosocially, patients often experience emotional distress, including anxiety and depression, exacerbated by long recovery periods and functional impairments. Economically, the condition contributes to substantial healthcare costs, lost productivity, and caregiving burdens. This review emphasizes the need for greater awareness, early diagnosis, and improved management strategies to mitigate the impact of Adhesive Capsulitis in India. Addressing these factors can enhance outcomes and reduce the burden on individuals and the healthcare system.

Keywords: Adhesive Capsulitis, Prevalence, Risk factors, Indian population

INTRODUCTION

Adhesive Capsulitis, commonly known as Frozen Shoulder, is a condition characterized by pain, stiffness, and limited function of the glenohumeral joint, which adversely affects the entire upper extremity. Patients typically describe onset of shoulder pain followed by a loss of motion. The most common limitations in range of motion are flexion, abduction, and external rotation (Orsi et al, 2012). The prevalence of Adhesive Capsulitis is estimated to be between 2% and 5% in the general population (Mallik et al., 2015) with higher rates in individuals between the ages of 40 to 60 years. It contributes to around 43.1% of the shoulder cases reported in India (Singh et al., 2015). Adhesive Capsulitis represents a major musculoskeletal concern in India due to the country's high prevalence of diabetes and thyroid disorders (Mallik et al.,2015). Individuals with diabetes are over three times more likely to develop the condition compared to non-diabetic individuals. Other associated conditions include thyroid disorders, Parkinson's disease, and cardiac diseases. (Kingston et al., 2018). Occupational factors can influence the prevalence of Adhesive Capsulitis, particularly among workers who have sustained shoulder injuries (Rai et al., 2019). Despite multiple regional studies, there is lack of an epidemiological synthesis. This review bridges that gap by summarizing available data and identifying critical risk factors relevant to the Indian context. Thus, the aim of this review is to summarize epidemiological evidence on Adhesive Capsulitis in India, to estimate the prevalence of Adhesive Capsulitis in Indian populations, to identify key risk factors and demographic correlates, to assess physical, psychosocial, and economic impacts and to highlight research gaps and propose recommendations.

Methodology (SANARA)

Search Strategy

A comprehensive search was conducted in multiple electronic databases, including PubMed, Scopus, Google Scholar, and ResearchGate, using a combination of keywords such as "Adhesive Capsulitis," "Frozen Shoulder," "Epidemiology," "India", "Indian Population," "Prevalence," "Risk Factors," and "Impact." The search was limited to studies published between 2010 and 2025 and conducted specifically on the Indian population.

Inclusion Criteria:

- Research articles reporting Adhesive Capsulitis or Frozen Shoulder in Indian population
- Studies reporting data on the prevalence, incidence, risk factors and impact of AC.
- Peer-reviewed journal articles, observational and cross-sectional studies were included.

Exclusion Criteria:

- Studies not conducted on the Indian population
- Non-peer-reviewed articles, conference abstracts, and opinion pieces.
- Studies conducted outside the specified time frame (2010-2025).

Results

On the basis of inclusion criteria, a total twenty studies were reviewed. The results of the study are summarized in three sections: Prevalence, Risk Factors and Impact of Adhesive Capsulitis.

Prevalence of Adhesive Capsulitis (AC) in Indian population

Our search revealed ten studies reporting the prevalence of Adhesive Capsulitis (AC) in Indian populations (Table 1). The prevalence of adhesive capsulitis in the general population has been reported to range from 2–5%, while it increases to approximately 10–42.5% among individuals with diabetes mellitus. Among patients presenting with shoulder pain, the prevalence may reach up to 70%, and about 14.5% of individuals with hyperthyroidism have also been reported to develop adhesive capsulitis.

Table 1: Studies Reporting Prevalence of Adhesive Capsulitis in India

Authors	Study population	Study Setting	Sample size (n)	Prevalence
Mathew et al, (2011)	Adults with diagnosed type 2 diabetes mellitus and age and sex-matched non-diabetic controls	This was a clinic-based comparative study conducted in a premier teaching institution in South India (Medical College Hospital, Trivandrum, Kerala) involving adults with type 2 diabetes mellitus attending a diabetic clinic	310	42.58% in the diabetics 31.61% in the non-diabetics
Mallik et al, (2015)	Study population includes patients visiting physical medicine department and Diabetic clinic centre at AMRI andCMRI	The study was conducted at Advanced physical medicine department and Diabetic clinic centre at AMRI and CMRI hospital, Dhakuria	120	2-5 % (Frozen Shoulder) Left shoulder – 57.5% Right shoulder – 33.8% Bilateral – 8.7% 14.5% - Hyperthyroidism
Singh et al, (2015)	Population includes all the patients (male and female) of shoulder pain aged 23-69 years	The study was conducted at department of orthopaedics of a tertiary care hospital catering suburban and rural population of Lucknow.	130	2% (Urban) 7.4% (Rural) 70% (Shoulder pain lifetime prevalence)
Gothwal et al, (2018)	The study population was patients with diabetes mellitus (Type 1 and Type 2) attending the medical outpatient department (OPD), the diabetic care and research centre, and those admitted to the hospital during the study period	The study was conducted over a period of two years at the Diabetic Care and Research Centre, S.P. Medical College and Associated Group of P.B.M. Hospitals, Bikaner.	Total - 5732 Male- 3216 Female – 2516	3.6% - Non-Diabetics And 13.1% diabetics 3.9% Frozen Shoulder had type 1 diabetes while 22.6% had type 2 diabetes.
Thasni et al, (2018)	The Study included patients of age 18-65 years (male and female) and diagnosed with Diabetes mellitus type 2	The study was conducted at the diabetic clinic in tertiary centre, Kozhikode, Kerala	300	32.3% of subject with type 2 diabetes.
Maini et al, (2019)	The study population was patients of frozen shoulder aged 35 years and above attending orthopaedic OPD of the institute	The study was conducted at the orthopaedic OPD of Punjab institute of Medical Sciences, Jalandhar	100	36% 11-30% (Diabetics) 2-10% (non-diabetic)
Rai et al, (2019)	Patient from a hospital who attended orthopaedic OPD and has features of	The study was conducted over a period of 9 months at the 151 Base Hospital, Guwahati, India	135	10-22% (Diabetic) 02-04% (General Population)

	idiopathic Adhesive Capsulitis of shoulder			
Yuvarani et al, (2021)	Patient with shoulder pain visited the Outpatient physiotherapy department, ACS Medical college and hospital, vellappanchavadi, Chennai, Giri Balaji physio, Trichy, Rajesh physio care, Arni, Thiruvannamalai	The study was conducted at the Outpatient physiotherapy department, ACS Medical college and hospital, vellappanchavadi, Chennai, Giri Balaji physio, Trichy, Rajesh physio care, Arni, Thiruvannamalai.	300	42.3%
Mittal et al, (2022)	Study included population with history of Diabetes mellitus	The study was conducted over a period of 6 months at the Moradabad, Uttar Pradesh	271	54.24%
Akanda (2022)	The study population includes frozen shoulder patients attending services at four selected sites in Dhaka: Metropolitan Medical Centre Limited (MMC Ltd), National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Islami Bank Central Hospital Limited (IBCH Ltd), and the Physiotherapy department of Saic Institute of Medical Science	This constitutes a hospital- or clinic-based research setting, typical for cross-sectional studies assessing patient patterns in clinical environments, conducted over a 6-month period in 2011.	100	2%, 38%, 49%, 11% of the respondents belongs to age of more than 25 years, 26-45 years, 46-65 years and less than 65 years

Risk factors for Adhesive Capsulitis (AC)

The Risk Factors for Adhesive Capsulitis are summarized in Table 2. Key Risk Factors from Indian Studies show that diabetes mellitus and its duration are the commonest risk factors for adhesive capsulitis, or frozen shoulder.

Summarized as below:

1. **Age:** Age is widely recognized as an important risk factor for adhesive capsulitis (AC). The condition is most commonly reported in middle-aged and older adults. Several studies have shown that AC predominantly affects individuals aged 40 years and above, with a higher frequency observed among those with diabetes mellitus (DM). Mallik et al. (2015) in a comparative study involving patients with and without type 2 DM reported that the mean age of patients with AC was 56.5 ± 9.99 years (range 31–79 years), with a median age of 55 years. Similarly, Akanda (2022) found that the majority of respondents were in the 46–65-year age group (49%), followed by the 26–45-year group (38%), with a mean age of 50.66 ± 13.40 years. In other studies, Maini et al. (2019), Rai et al. (2019), and Aggarwal et al. (2023) reported mean ages of 47.80 years, 47.5 years, and 48.9 ± 16.36 years, respectively, among individuals diagnosed with AC. Collectively, these findings suggest that adhesive capsulitis occurs more frequently in middle-aged and older adults, indicating that advancing age may play an important role in the development of the condition, especially among individuals with metabolic disorders such as diabetes mellitus.

2. **Gender:** Gender differences in adhesive capsulitis (AC) have been widely studied, as biological and hormonal factors may influence the risk of developing shoulder disorders. Several studies have reported variations in the distribution of AC between males and females, although the findings remain inconsistent across populations. Gothwal and Banseria (2018) reported that males had a 1.57-times higher risk of developing AC compared with females (OR = 1.57, 95% CI [1.38–1.78]), indicating male predominance in their study population. In contrast, Sudhir et al. (2015)

observed a female predominance, with a male-to-female ratio of 0.8:1. Similar trends were reported by Maini et al. (2019), Swami et al. (2018), Mallik et al. (2015), and Thasni et al. (2018), who documented higher proportions of females affected (52%, 52.4%, 55%, and 65.1%, respectively). However, contrary findings were presented by Yuvarani et al. (2021) and Mittal et al. (2022), where a greater proportion of males were affected (55.1% and 75.3%, respectively). Overall, these findings suggest that gender differences in adhesive capsulitis vary across studies, with some reported higher prevalence among females and others among males. This inconsistency indicates that gender alone may not be a definitive risk factor for AC and that its influence may depend on population characteristics and associated clinical conditions such as diabetes mellitus.

3. **Socioeconomic Status:** Socioeconomic status has been reported in some studies as a factor that may influence the occurrence of adhesive capsulitis (AC), particularly because lifestyle patterns and occupational characteristics may vary across socioeconomic groups (Thasni et al., 2018; Rai et al., 2019). However, evidence regarding its role as an independent risk factor remains limited in Indian research. Akanda (2022) reported that the majority of participants with AC belonged to the middle socioeconomic class (58%), followed by the upper class (31%) and lower class (11%). Although this distribution suggests a greater representation of individuals from the middle socioeconomic group, the study did not establish Socioeconomic status as an independent predictor of AC. Similarly, Thasni et al. (2018) reported that socioeconomic factors did not show a statistically significant independent association with adhesive capsulitis. In contrast, Swami et al. (2018) and Rai et al. (2019) found that a large proportion of AC cases were from urban populations (58.3% and 86%, respectively), which may indirectly indicate the possible influence of urban lifestyle and related socioeconomic determinants. Overall, the available evidence suggests that while socioeconomic patterns may influence the distribution of AC in certain populations, there is insufficient evidence to confirm Socioeconomic status as a direct or independent risk factor for adhesive capsulitis.

4. **Diabetes mellitus:** Diabetes mellitus (DM) has been consistently reported as a major risk factor for adhesive capsulitis (AC) across several studies conducted in India. Ray et al. (2011) found that 18% of individuals with diabetes had AC, indicating a notable burden of shoulder involvement among diabetic patients. Similarly, Singh et al. (2015) identified DM as the most common risk factor for periarthritis shoulder, accounting for 67.86% of cases. Thasni et al. (2018) further reported that the prevalence of AC increased with advancing age among patients with type 2 DM and was strongly associated with longer duration of diabetes and poor glycaemic control. In their study, the mean duration of DM was 18.42 years, and the prevalence of AC among patients with type 2 diabetes was 32.3%, highlighting the possible role of long-term metabolic changes in the development of AC. Additional evidence was provided by Maini et al. (2019), who observed that 36% of patients presenting with frozen shoulder in an orthopaedic outpatient department had diabetes. Similarly, Rai et al. (2019) reported a considerable proportion of metabolic abnormalities among patients with AC, with 27.4% having diabetes and 15.5% having prediabetes, suggesting a strong association between metabolic dysfunction and shoulder pathology. Rauoof et al. (2004) also identified diabetes mellitus as one of the most common associated conditions in patients with AC. The study additionally reported other comorbid factors such as previous myocardial infarction (5%), immobilization (5%), stroke (4%), and chronic bronchitis (4%). Furthermore, 56% of patients with AC showed radiological evidence of cervical spondylosis, indicating the presence of concurrent musculoskeletal conditions. Overall, these findings collectively suggest that diabetes mellitus, particularly long-standing and poorly controlled diabetes, is a significant and frequently reported risk factor associated with adhesive capsulitis.

5. **Obesity (BMI and waist circumference):** Obesity has been studied as a potential risk factor for adhesive capsulitis (AC), as excess body weight and central adiposity are commonly associated with metabolic disturbances that may affect musculoskeletal tissues. Gothwal and Banseria (2018) reported that individuals with a higher body mass index (BMI) had a significantly greater likelihood of developing AC, with approximately four times higher risk (OR = 4.07, 95% CI 2.85–5.81). This finding suggests that increased body mass may contribute to the development of shoulder pathology, possibly through metabolic and inflammatory mechanisms affecting connective tissues. However, Mathew et al. (2011) and Thasni et al. (2018) found that BMI was not significantly associated with adhesive capsulitis among individuals with diabetes in their respective studies. These findings indicate that BMI alone may not be a consistent predictor of AC and that other metabolic or clinical factors, such as duration of diabetes or glycaemic control, may play a more important role in disease development. Similarly, Rai et al. (2019) examined central obesity using waist circumference in a comparative study involving non-diabetic and prediabetic individuals with AC. The study reported

a statistically significant difference in waist circumference between the groups (t = 2.29, p = .013); however, this difference did not establish a clear independent association between central obesity and the occurrence of adhesive capsulitis. Overall, the evidence from available studies shows inconsistent findings regarding the role of obesity-related measures, such as BMI and waist circumference, in the development of adhesive capsulitis. This suggests that obesity may contribute to AC in certain populations, but it is likely not an independent or universal risk factor.

6. **Lifestyle Factors:** Lifestyle factors such as smoking and alcohol consumption have been studied as potential risk factors for adhesive capsulitis (AC). These behaviours are often linked to systemic inflammation, impaired tissue healing, and vascular changes that may contribute to the development of musculoskeletal disorders, including frozen shoulder. However, evidence from available studies suggests limited association between these factors and AC. Mathew et al. (2011) investigated lifestyle variables, including smoking and alcohol consumption, among individuals with adhesive capsulitis. Their findings showed that neither smoking nor alcohol use was significantly associated with the occurrence of AC, with reported p-values of p = .173 for smoking and p = .290 for alcohol consumption. These results indicate that, within the studied population, smoking and alcohol consumption did not appear to independently increase the risk of developing adhesive capsulitis. Overall, the available evidence suggests that although these lifestyle habits are recognized risk factors for several chronic and musculoskeletal conditions, their role in the development of adhesive capsulitis remains unclear and may be less significant compared with metabolic factors such as diabetes mellitus.

7. **Occupation:** Occupation has been considered a potential contributing factor in the development of adhesive capsulitis (AC), particularly in individuals engaged in repetitive upper-limb activities or physically demanding work that may place continuous stress on the shoulder joint. Occupational workload, prolonged postures, and repetitive movements have been suggested to influence shoulder disorders in some populations (Rai et al., 2019). Rai et al. (2019) examined occupational characteristics among individuals with adhesive capsulitis while comparing non-diabetic and prediabetic populations. The study reported that a proportion of participants were involved in manual, physically demanding occupations. However, statistical analysis indicated that occupation as a manual hard worker was not significantly associated with adhesive capsulitis (χ^2 = 0.23, p = .612). These findings suggest that although physically demanding work may theoretically contribute to shoulder strain, occupational workload alone may not be an independent risk factor for the development of adhesive capsulitis in the studied population. Overall, the available evidence indicates that the role of occupation in adhesive capsulitis remains uncertain, and it may interact with other clinical or metabolic factors rather than acting as a primary risk factor.

8. **Involved side:** The side of shoulder involvement has been examined in several studies on adhesive capsulitis (AC), as understanding whether the dominant or non-dominant shoulder is more commonly affected may help identify possible mechanical or functional contributors to the condition. However, existing evidence shows variability in the pattern of shoulder involvement across different populations. Rauoof et al. (2004) reported that the left shoulder was more commonly affected (54%), while bilateral involvement was relatively rare (2%), and most participants were sedentary workers (63%). Similar findings were observed by Rai et al. (2019), where the left shoulder (56.2%) was more frequently involved than the right shoulder (28.1%), with 15.5% of participants showing bilateral shoulder involvement. However, the association between side of involvement was not statistically significant (χ^2 = 0.10, p = 0.74). In contrast, Yuvarani et al. (2021) reported a higher involvement of the right shoulder (67%) compared to the left side. Although their results suggested a difference in side predominance, the statistical analysis indicated that this finding was not strongly significant (r = 8.211, p = 0.042). Overall, these studies demonstrate variation in the side of shoulder involvement among patients with adhesive capsulitis, with some reporting left-sided predominance and others reporting right-sided predominance. The statistical evidence across studies remains inconsistent, suggesting that side of involvement may vary across populations and may not represent a definitive risk factor for AC.

Table 2: Risk Factors of Adhesive Capsulitis in India

Authors	Risk factors	Risk factors estimate
Mathew et al, (2011)	1. Age 2. Gender 3. Education 4. Duration of type 2 DM	1. Age - p-value 0.046^{ns} 2. Gender 0.565^{ns} 3. Education 0.033^{ns} 4. Duration of type 2 DM <0.001*

	5. Smoking 6. Alcohol abuse 7. BMI 8.HbA1c	5. Smoking 0.173^{ns} 6. Alcohol abuse 0.290^{ns} 7. BMI 0.278^{ns} 8. HbA1c <0.001*
Mallik et al, (2015)	1.Diabetes mellitus	More patients with Frozen Shoulder had FBG>1130mg/dl and it was statistically significant (50% vs 30%) (p< 0.05)
Singh et al, (2015)	Diabetes mellitus in 1. Peri arthritis shoulder 2. glenohumeral arthritis 3.subacromial impingement 4. ACJ arthritis 5. Rotator cuff injury	1. Peri arthritis shoulder 67.86% 2. Glenohumeral arthritis 30.77% 3.Subacromial impingement 77.78% 4. ACJ arthritis90.91% 5. Rotator cuff injury 100.0% The majority of patients with glenohumeral arthritis had no associated significant risk factor. Association of risk factors and cause of shoulder pain was statistically significant(p<0.001)
Gothwal et al, (2018)	1.BMI 2. Duration 3. Age 4. Systolic BP 5. Retinopathy 6. Nephropathy 7. Neuropathy 8. CAD 9. PVD	1. BMI-CI - 7.429 2. Duration CI -5.127 3. Age CI- 2.631 4. Systolic BP CI-2.195 5. Retinopathy OR- 0.940 CI – 0.810-1.092 6. Nephropathy OR – 1.116 CI – 0.973- 1.280 7. Neuropathy OR – 2.546 CI- 2.230-2.906 8. CAD OR – 1.661 CI- 1.458-1.892 9. PVD OR – 0.979 CI – 0.851-1.125
Thasni et al, (2018)	1. Age 2. Duration of diabetes in years 3. BMI	1. Age 0.005^{ns} 2. Duration of diabetes in years <0.001* 3. BMI 0.993^{ns}
Maini et al, (2019)	1. Diabetics 2. Pre-Diabetics 3.Non diabetics	1.Diabetes (HbA1c> 6.5 %) 2.Pre diabetics (HbA1c 5.7-6.4%) 3. Non-diabetics (HbA1c <5.7%)
Rai et al, (2019)	1.Age 2.Female 3.Manual worker 4.Patients from rural background 5.Involvements of both shoulders 6.Duration of Adhesive Capsulitis months 7.Waist circumference 8.Pain score 9.Disability (SPADI) score	1.Age P value 0.31^{ns} 2. Female 0.97^{ns} 3. Manual worker 0.60^{ns} 4. Patients from rural background 0.19^{ns} 5. Involvements of both shoulders 0.74^{ns} 6. Duration of Adhesive Capsulitis months 0.21^{ns} 7.waist circumference 0.01* 8. Pain score 0.24^{ns} 9. Disability (SPADI) score 0.13^{ns}
Yuvarani et al, (2021)	1.Age 2.Side 3.SPADI	1.Age 0.638 2.Side 0.042 3.SPADI 0.012
Mittal et al, (2022)	1. Diabetic 2. Gender: Male 3. Married	1. Diabetic 54.47% 2. Gender: Male 75.3% 3. Married 74.2%

Akanda (2022)	1. Age -a)>25 b)26-45 c)46-65 d)<65 2. Gender – Female /Male 3. Economic status a) Upper class b) Middle class c)Lower class	1. Age a)>25: 2% b).26-45: 38% c).46-65: 49% d)<65: 11% 2. Gender – Female/male: 52% / 48% 3. Economic status a) Upper class 31% b) Middle class 58% c) Lower class 11%

Impact of Adhesive Capsulitis in Indian population

1. **Pain and Mobility Restrictions:** Pain and restriction of shoulder movement are the most commonly reported clinical features of adhesive capsulitis (AC), and these symptoms significantly affect the functional use of the upper limb in daily activities. The studies have also highlighted that shoulder pain and limited range of motion are key presenting complaints among patients with AC (Mittal et al., 2022). Frozen shoulder is a debilitating condition characterized by chronic pain, stiffness, and loss of range of motion (ROM) at the glenohumeral joint. Mallik (2017) reported that the primary symptoms of frozen shoulder were persistent shoulder pain and limited shoulder movement, which made routine daily activities difficult. The study further observed that individuals with diabetes experienced slightly greater pain and more restriction in shoulder movement compared with those without diabetes. The author concluded that patients with diabetes mellitus and frozen shoulder had greater pain and disability, as indicated by higher Shoulder Pain and Disability Index (SPADI) scores and reduced ROM. Similarly, Mittal et al. (2022) found that patients with diabetes and adhesive capsulitis commonly experienced shoulder pain and reduced range of motion, which negatively affected their daily activities. In their study population, 75.3% were males and 24.7% were females. Regarding symptom severity, 50.1% of participants had mild symptoms, 31.4% had moderate symptoms, and 18.5% had severe symptoms. Overall, these findings highlight that pain and mobility restrictions are major clinical manifestations of adhesive capsulitis and may be more pronounced among individuals with diabetes mellitus.

2. **Disability and Functional Limitations:** Disability and functional limitation are important consequences of adhesive capsulitis (AC), particularly among individuals with diabetes mellitus, as persistent pain and restricted shoulder movement can interfere with daily activities and reduce quality of life (Mittal et al., 2022; Magudapathi et al., 2023). Adhesive capsulitis is a common musculoskeletal complication in patients with diabetes mellitus and is characterized by progressive shoulder pain, stiffness, and marked restriction of both active and passive movements. These symptoms often result in functional impairment, affecting activities of daily living such as dressing, grooming, and overhead tasks. Mittal et al. (2022) reported that factors related to night pain, symptom severity, reduced mobility, and symptom frequency were observed in 54.47% of participants with diabetes, indicating that 147 out of 271 subjects with diabetes were affected by adhesive capsulitis. This finding suggests that these factors contribute to disability and functional limitations in individuals with the condition. Similarly, Magudapathi et al. (2023) found that only 20% of patients had a good quality of life, while about 65% experienced reduced quality of life and 14% were severely affected. Many patients required assistance from family members for daily activities such as bathing and toileting. The study also noted that patients with poor glycaemic control experienced greater functional difficulties, highlighting the importance of early intervention to reduce symptoms and improve quality of life.

3. **Psychosocial Impact of Adhesive Capsulitis:** The psychosocial impact of adhesive capsulitis (AC) has been highlighted in literature, where persistent shoulder pain and functional limitations have been shown to affect quality of life and well-being (Gupta et al., 2008). Chronic symptoms of AC can influence both physical functioning and emotional health, particularly among older adults and individuals with diabetes mellitus. Adhesive capsulitis causes long-lasting shoulder pain and stiffness that make daily activities difficult, especially for elderly people with diabetes. The resulting loss of independence may lead to frustration, emotional distress, and reduced mental well-being, thereby affecting overall quality of life. Gupta et al. (2008) reported that AC had a significant negative impact on quality of life. Their findings showed that the physical component score of the SF-36 decreased with increasing severity of AC, particularly among women, whereas the mental component score did not show a similar trend. Furthermore, individuals without AC had significantly higher quality-of-life scores in both the physical and mental domains compared with those with AC ($p \leq .000$; $p = .001$). Overall, these findings suggest that shoulder dysfunction associated with adhesive capsulitis can substantially reduce quality

of life, particularly by affecting physical functioning in elderly individuals and those with diabetes mellitus.

Discussion:

The prevalence of AC varies widely across studies, ranging from about 2–5% in the general population to as high as 54.24% in high-risk groups, especially people with diabetes mellitus (DM) and those with shoulder pain. This variation may be due to differences in study populations, diagnostic methods, and the presence of metabolic conditions. The higher prevalence among people with diabetes suggests that metabolic changes and long-term high blood sugar may increase the risk of AC. Age was identified as an important risk factor in most studies and reported more common in middle-aged and older adults, particularly those aged 40 years and above. Several studies reported that the average age of affected individuals was in the late forties to mid-fifties. The studies reported a higher number of females with AC, while others found more males affected. These differences may be due to variations in study populations, lifestyle factors, or healthcare-seeking behaviour. Therefore, gender may influence AC in some populations, but the evidence is not consistent. Socioeconomic factors were not strongly linked to AC in most studies. Although some research showed that many patients belonged to middle socioeconomic or urban groups, these factors were not confirmed as independent predictors. Diabetes mellitus was the most consistent and significant risk factor identified in this review. Many studies reported a high number of AC cases among people with diabetes. Longer duration of diabetes and poor blood sugar control were also linked to a higher risk of AC. These findings suggest that long-term metabolic changes in diabetes may lead to stiffness and inflammation in the shoulder joint. The role of life style disorders showed mixed results on BMI and waist circumference where few studies found that higher body mass index (BMI) increased the risk of AC, while others found no significant association. Similarly, waist circumference was not consistently linked with AC. This suggests that obesity alone may not be a strong risk factor, and metabolic conditions such as diabetes may play a larger role. Lifestyle habits such as smoking and alcohol consumption were not significantly associated with AC in the reviewed studies. Occupational factors also showed limited influence, as physically demanding work was not clearly linked to the condition.

AC has a major impact on physical function and quality of life. The condition causes shoulder pain, stiffness, and reduced movement, which can make daily activities such as dressing, grooming, and lifting the arm difficult. Studies also showed that people with diabetes often experience more severe pain and movement restrictions than those without diabetes. In addition, AC can lead to disability and reduced quality of life, especially in individuals with long-standing diabetes and poor blood sugar control. Many patients experience difficulty performing daily activities and may depend on others for support. Chronic pain and limited movement can also affect emotional well-being and overall health.

Conclusion:

Adhesive capsulitis is a significant musculoskeletal condition in India, particularly among adults aged 40–60 years and individuals with diabetes mellitus. While diabetes remains the most consistently reported risk factor, the roles of obesity, socioeconomic status, lifestyle habits, and occupation remain unclear. Other factors, including trauma, thyroid disorders, regional differences, and access to healthcare, may also influence its occurrence. However, the true burden of adhesive capsulitis in India is likely underestimated due to limited large-scale studies and possible underreporting. The condition significantly affects pain, mobility, functional ability, and quality of life, especially among individuals with long-standing diabetes. Therefore, early identification, improved awareness, accessible healthcare, and strengthened rehabilitation services are essential to reduce disability. Further large-scale epidemiological studies are needed to better understand the prevalence and risk factors of adhesive capsulitis in the Indian population.

References

1. Akanda BH. Prevalence of Frozen Shoulder: a cross-cut survey. J Clin Lab Res. 2022;5(3):1-4.
2. Amita Aggarwal, Manisha Rathi, Tanmaya Kapre, Tushar J Palekar, Annette Tuscano, Radhika Tambe, Preeti Gazbare. Correlation of Self-Reported and Performance-Based Measures in Patients with Non-Traumatic Stiff Shoulder Pathologies: An Observational Study. Int J Physio [Internet]. 2023 Jun. 9 [cited 2025 Feb. 28];10(2):24-9.
3. Banseria, Ruchita and Gothwal, Sunil. (2018). Frozen shoulder and their risk factors in diabetic population prevalence study from north-west India. Indian Journal of Scientific Research. 7. 10-12.
4. Belayet H Akanda (2022). Prevalence of Frozen Shoulder: A Cross-Cut Survey. Journal of Clinical and Laboratory Research. 5(3); DOI:10.31579/2768-0487/075.
5. Gupta S, Raja K, Manikandan N. Impact of Adhesive Capsulitis on quality of life in elderly subjects with diabetes: A cross-sectional study. Int J Diabetes Dev Ctries. (2008) Oct;28(4):125-

9. doi: 10.4103/0973-3930.45272. PMID: 20165600; PMCID: PMC2822156.
6. Impact of adhesive capsulitis on quality of life in elderly subjects with diabetes: A cross-sectional study – Gupta, S., Raja, K., and Manikandan, N. (2008). *International Journal of Diabetes in Developing Countries*, 28(4), 125-129. DOI: 10.4103/0973-3930.45272.
7. Kingston, K., Curry, E. J., Galvin, J. W., Li, X., and Shoulder, E. J. C. (2018). *Shoulder adhesive capsulitis: Epidemiology and predictors of surgery.* Journal of Shoulder and Elbow Surgery, 27(8), 1437–1443. https://doi.org/10.1016/j.jse.2018.04.004
8. Magudapathi. S., Uthrapathis. S., Anbu. N., Assessment of quality of life in Adhesive Capsulitis (AC) among type 2 diabetes mellitus patients attending out-patient department at Arignar Anna Govt Hospital of Indian medicine- a cross-sectional study, Eur. Chem. Bull. 2023,12(10), 2893-2901.
9. Maini S, Bansal A, Arora R, Bansal S. Prevalence of diabetes in patients with Frozen Shoulder. J Evol Med Dent Sci. 2019 Mar 18;8(11):804-6.
10. Mallik, Ritwika. (2017). A study of Frozen Shoulder in patients with and without diabetes. Journal of the Indian Medical Association. 115. 32.
11. Mathew AJ, Nair JB, Pillai SS. (2011). Rheumatic-musculoskeletal manifestations in type 2 diabetes mellitus patients in south India. *Int J Rheum Dis.* ;14(1):55–60.
12. Mittal P, Goel Y, Dutta S, Giri S, Verma S, Gadre S, Paul P, Poddar RK. A Study on Prevalence of Adhesive Capsulitis in Patients with Diabetes Mellitus. Journal of Current Medical Research and Opinion. 2022 Jun 20;5(06):1216-34.
13. Pahade, A., Sheth, M. S., and Vyas, N. J. (2019). *Prevalence of adhesive capsulitis of shoulder in general population: A cross-sectional study.* International Journal of Orthopaedics Sciences, 5(1), 222–226.
14. Rai SK, Kashid M, Chakrabarty B, Upreti V, Shaki O. Is it necessary to screen patient with Adhesive Capsulitis of shoulder for diabetes mellitus? Journal of family medicine and primary care. 2019 Sep 30;8(9):2927-32.
15. Singh S, Gill S, Mohammad F, Kumar S, Kumar D, Kumar S. Prevalence of shoulder disorders in tertiary care centre. Int J Res Med Sci. 2015 Mar;3(4):917-20.
16. Thasni A, Parappil S, Manjalavil M, Chandni R. Prevalence of Adhesive Capsulitis in diabetic patients in a tertiary care centre: An observational study. JMSCR. 2018;6(12):652-8.
17. Wani, Surendra and Mullerpatan, Rajani. Prevalence of shoulder dysfunction among Indian people with type II diabetes. - International Journal of Diabetes in Developing Countries. 2015 VL-35 DOI- 10.1007/s13410-015-0303-6
18. Yuvarani G, Paul J, Abraham MM, Harikrishnan N. A study to analyse the prevalence of periarthritis among shoulder pain subjects–A cross -sectional study. Biomedicine. 2021 Oct 29;41(3):678-81.