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# Adhesive Capsulitis among Diabetic Patients Attending in a Tertiary Care Hospital in Dhaka, Bangladesh

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**Abstract:**

***Background: Adhesive capsulitis also termed as frozen shoulder is a condition characterized by painful and limited active and passive range of motions of the shoulder. It can adversely affect activities of daily living and consequently impair quality of life. The aim of the study was to estimate the prevalence of adhesive capsulitis among diabetic individuals and to study its relationship with age, gender, involved shoulder, body mass index (BMI) and glycaemic control.***

***Method: A cross-sectional observational study was done in 290 patients attending outpatient department of BIRDEM hospital during the period from1st April 2023 to 30th September 2023. Convenient type of sampling technique was applied. Patients with shoulder pain and restricted active and passive shoulder joint movements were diagnosed as having adhesive capsulitis. Data were statistically analyzed.***

***Results: Adhesive capsulitis was present in 54 (18.62%) of patients with diabetes. It was found that adhesive capsulitis was higher in increasing age, predominant in female 34(63.0%), more involve in left shoulder 27(50%). Statistically significant association was found with poor glycaemic status.***

***Conclusion: Adhesive capsulitis is a common problem in diabetic patients. Its occurrence was found to be prevalent with poorly controlled glycaemic status.***

***Key word: Diabetes mellitus, adhesive capsulitis, prevalence, glycaemic status.***

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## Introduction:

Diabetes mellitus (DM) is a chronic disease characterized by chronic persistent hyperglycemia, accompanied by several widely recognized complications such as nephropathy, neuropath, retinopathy and musculoskeletal disorders[1,2]. Adhesive capsulitis also termed as frozen shoulder is a condition characterized by painful and limited active and passive range of motions of shoulder[3].Total duration of the illness usually lasts 1-3 years[4].Adhesive capsulitis is more common among DM patients than in healthy individuals[5].The estimated prevalence of adhesive capsulitis is 11-30 in diabetic patients and 2-10 in non-diabetic population[6,7].Risk factors for adhesive capsulitis include female, age over 40 years,preceding trauma and prolonged immobilization of the glenohumeral joint. It is estimated that 70% of patients with adhesive shoulder capsulitis were women[8]. Demographic studies have shown that most patients with adhesive capsulitis (84.4%) fall within the age range of 40 years to 59 years[9]. 54% patients has left shoulder involvement, right shoulder is involved in 44% and two percent has bilateral involvement [10].

The disease may follow a variety of conditions including trauma, myocardial infarction,pulmonary tuberculosis, thyrotoxicosis and diabetes mellitus [11,,12]. Thomas et al. found on subjective differences in $HbA_{1C}$ level between their diabetic patients without frozen shoulders and diabetic patients with frozen shoulders[13].Others have found a higher prevalence of subjective shoulder pain and disability in patients with evaluated $HbA_{1C}$ levels [14].

There is no universal treatment algorithm and therefore treatment should be patient specific. Management includes physical modalities, analgesics, range of motion

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exercise and intra-articular corticosteroid injections[15].Procedure such as capsular hydrodilatation, manipulation under anesthesia and arthroscopic lyses of adhesion are reserved for shoulder resistant to more conservative methods[16,17,18].

Only limited data are available on the prevalence of adhesive capsulitis among diabetic patients in Bangladesh.So the aims of the study were to explore frequency of adhesive capsulitisand associated risk factors among diabetic patients in a tertiary care hospital in Bangladesh.

**Materials and Methods:**

This cross-sectional observational study was conducted in outpatient department of Bangladesh institute of research and rehabilitation in diabetes endocrine and metabolic disorders (BIRDEM) Hospital,Dhaka from 1st April to 30th September. A total 290 diabetic patients of either sex, aged between 18 to 65 years were included in the study.Convenience type of sampling technique was applied to enroll the patients.Patients with shoulder pain and restricted active and passive shoulder movements whose X-ray films of the glenohumeral joints were normal were diagnosed as having adhesive capsulitis.Patients with previous surgery in shoulder, malignancy, infective diseaseand those who could not give consent for study were excluded.Patient characteristics like age, gender, body mass index (BMI), duration of exercise, tobacco consumption, involved shoulder and glycaemic status were recorded. Informed consent was obtained from all the participants prior to the study. The study was approved by the institutional ethics committee (BADAS-ERC/EC/23/456 Date February 16, 22023).

Statistical analysis:The prevalence of adhesive capsulitis was shown in percentage. All quantitative variables were shown as mean with standard deviation. Unpaired t-test was applied to compare the characteristics between two groups. Qualitative variables were presented as frequency and percentage.Associations between two groups were shown by chi square test. SPSS version 20 was used for analysis.P <0.05 was considered statistically significant.

**Results:**

Out of 290 diabetic patients 54 patients had adhesive capsulitis. Prevalence of adhesive capsulitis among diabetic patients attending in BIRDEM hospital was 18.62%.

Of them 34 (63%) were female and20(37%) were male. Mean age of patients with adhesive capsulitis was (54.13±10.17).Ages of the majority of the patients 37 (68.5%)ranging from 41 to 60 years.Majority33(66.11%) patients were house wife. Left shoulder involvement was 27(50.0%), right shoulder involvement was 19(35.2%), bilateral involvement were 8(14.8%).BMI was 25.08±3.87, 13% were tobacco consumer. (Table1).

No statisticalsignificant association was found between gender and adhesive capsulitis(P =0.134).There was no statistically significant association between BMI, physical exercise, tobacco consumption with adhesive capsulitis among diabetic patients, insulin treated and non-insulin treated diabetic subjects(P=0.525, P=0.241,P=0.823,P=0.817)respectively (Table2).

In our study the adhesive capsulitis was significantly associated with poor glycaemic control in diabetic patients. Mean blood sugar2 hours after breakfast (ABF) in diabetic patients were 14.24± 4.65 mmol/L and $HbA_1C$ 9.16 (Table 3)

**Table-I**

*Socio-demographics status of adhesive capsulitis patients with diabetes mellitus. (n=54)*

| | Frequency | Percentage |
|---|---|---|
| Sex | | |
| Male | 20 | 37.0 |
| Female | 34 | 63.0 |
| Ageyears | | |
| ≤40 | 5 | 9.3 |
| 41-60 | 37 | 68.5 |
| >60 | 12 | 22.2 |
| Mean ±SD | 54.13±10.17 | |
| Occupation | | |
| Service | 5 | 9.27 |
| Business | 8 | 14.81 |
| House wife | 33 | 61.11 |
| Other | 8 | 14.81 |
| Involved shoulder | | |
| Right | 19 | 35.2 |
| Left | 27 | 50 |
| Bilateral | 8 | 14.8 |
| Tobacco consumption | | |
| Yes | 7 | 13.0 |
| No | 47 | 87.0 |
| Duration of exercise | | |
| Mean ±SD | 34.37±16.50 | |
| BMIkg/$m^2$ | | |
| Mean ±SD | 25.08±3.87 | |

BMI= body mass index

**Table-II**

*Association between Socio Demographic factors and adhesive capsulitis among diabetic patients*

| Variables | Adhesive Capsulitis | | |
|---|---|---|---|
| | Present | Absent | P value |
| Age | | | |
| ≤40 | 5 (14.7) | 29(85.3) | 0.628 |
| 41 – 60 | 37 (18.2) | 166 (81.8) | |
| > 60 | 12 (22.6) | 41 (77.4) | |
| Sex | | | |
| Male | 20 (14.9) | 114 (85.1) | 0.134 |
| Female | 34 (21.8) | 122 (78.2) | |
| Duration of Physical Exercise | 34.37 ± 16.50 | 37.49 ± 13.16 | 0.241 |
| Tobacco consumption | | | |
| Yes | 7 (20.0) | 28 (80.0) | 0.823 |
| No | 47 (18.4) | 208 (81.6) | |
| Treatment Diabetes | | | |
| Oral | 19 (17.9) | 87 (82.1) | |
| Insulin | 35 (19.0) | 149 (81.0) | 0.817 |

P after $x^2$ test. P-value <0.05

**Table-III**

*Association between Biochemical factors and adhesive capsulities among diabetic patients*

| Variables | Adhesive Capsulities | | |
|---|---|---|---|
| | Present | Absent | P value |
| Age 54.13 ± 10.17 | 51.97 ± 10.43 | 0.169 | |
| BMI | 25.08 ± 3.87 | 25.46 ± 3.18 | 0.525 |
| Fasting | 9.19 ± 2.76 | 9.58 ± 3.58 | 0.484 |
| 2hours ABF | 14.24 ± 4.65 | 12.72 ± 4.28 | 0.042 |
| HbA1c | 9.16 ± 2.04 | 8.40 ± 2.04 | 0.046 |

P after unpaired t test. P-value <0.05, BMI= body mass index,ABF=after break fast

**Discussion:**

In our study, we observed that out of 290 patients 54 (18.62%) had adhesive capsulitis. In the study conducted by Ramchurn et al[19], Sarker RN et al[20] and Ray et al[21] showed 25% ,17.9% and18% of diabetic patients having adhesive capsulitis respectively.

Age distribution revealed that mean ±SDof age was calculated 54.13±10.17. In a study mean age of the included patients was 54.29±9.15[22] which consistent with result of our study.Study conducted by Boyler-Walker et al[9]found 84.4% patients fall within the age range of 40 years to 59 years. Here 68.5% patients within 41-60 years of age group.

It was estimated that 63.0% of patients with adhesive capsulitis were women which supports Sheridam MA et al [23]study where 70 % patients were women. No statistically significant association was found between gender and adhesive capsulitis among diabetic patients which supports Thasni M A et al[24] study.Higher prevalence in female and house wife can be attributed to unawareness, poor glycaemic control and micro-injury to rotator cuff during house hold activities.

A study done by Malik AR et al[10]from India found 54% left shoulder involvement, 44% right shoulder involvement

and 2% had bilateral involvement.Here 27 patients (50%) were left shoulder involvement, 19(35.2%) patients right shoulder and 8(14.8%) had both shoulder involvement.

Study conducted by Kingston et al[25]concluded obesity and diabetes were significantly associated with developing adhesive capsulitis and should be considered as modifiable patient factor.That study evaluated with adhesive capsulitis developed and with a sex matched control group. Here we studied only on diabetic patients and mean BMI was above 25. No statistically significant association was found between BMI and adhesive capsulitis among diabetic patients. This finding obtained was similar to the finding of AsmathThasniM et al[24] study.

Sattar and Luqman's[26] study from Kuwait found no difference in the prevalence of adhesive capsulitis in insulin treated and non insulin treated diabetic subjects which is consistent with our study.

In our study, the adhesive capsulitis was significantly associated with poor glycaemic control in diabetic patients. Mean blood sugar 2 hours after breakfast (2 HABF) and $HbA_1C$of patients with adhesive capsulitis were 14.24 mmol/L and 9.16%. Study conducted by Ramchurn N et al[19] and AsmathThasni M et al [24] also found strong association between poor glycaemic control and incidence of adhesivecapsulitis.

**Conclusion:**

The study was done to find the prevalence of adhesive capsulitis in 290 diabetic patients and it relationship with age, gender,BMI, and glycaemic control. Adhesive capsulitis was found in older age group, female predominant, more in non-dominant hand and significantly associated with poor glycaemic status.

**Limitation of study:**

Our study is not without limitation. There was no controlled group. Number of study population is small. Further studies with large sample sizes are needed to confirm these findings.

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No funding was received from any agency for the study

**Conflict of interest :** None

**Author contribution:**

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Manuscript edition: Mohammad Rabiul Hasan, Sabbir Jashim Ahmed,Tanjima Begum

**Conflict of interest:**

We have no conflict of interest to declare

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