



Original Article

Prevalence of Adhesive Capsulitis Among Diabetics and Non-Diabetics with Shoulder Pain in General Population

Zarnab Seher^{1*}, Nayyab Goher², Ayesha Hamid³, Umaira Latif¹, Amna Bukhari⁴, Hira Rafique⁵, Kanwal Fatima⁶ and Hafiza Rabia Javed⁷¹Islamabad Diagnostic Centre, Faisalabad, Pakistan²The University of Faisalabad (TUF), Faisalabad, Pakistan³Neuromuscular clinical Physiotherapist⁴The University of Lahore, Lahore, Pakistan⁵Quaid-e-Azam Educational Complex, Quaid-e-Azam college of Physical Therapy, Sahiwal, Pakistan⁶University of Sargodha, Sargodha, Pakistan⁷University of Sialkot, Sialkot, Pakistan

ARTICLE INFO

Key Words:

Adhesive Capsulitis, Frozen Shoulder, Diabetics, Non-Diabetics, Shoulder Pain

How to Cite:

Seher, Z. ., Goher, N. ., Hamid, A. ., Latif, U. ., Bukhari, A. ., Rafique, H., Fatima, K. ., & Javed, H. R. . (2023). Prevalence of Adhesive Capsulitis Among Diabetics and Non-Diabetics with Shoulder Pain in General Population: Prevalence of Adhesive Capsulitis. *Pakistan Journal of Health Sciences*, 4(06). <https://doi.org/10.54393/pjhs.v4i06.804>

*Corresponding Author:

Hira Rafique

5Quaid-e-Azam Educational Complex, Quaid-e-Azam college of Physical Therapy, Sahiwal, Pakistan
hirazohaib8@gmail.com

Received Date: 30th May, 2023Acceptance Date: 17th June, 2023Published Date: 30th June, 2023

ABSTRACT

Adhesive Capsulitis (AC), also known as Frozen Shoulder is the most common complaint by the diabetic patients as compared to non-diabetics, which needs to be addressed and treated in early stages as if left untreated, it may cause pain in the shoulders, loss of mobility and reduced range of motion. **Objective:** To find out prevalence of frozen shoulder among diabetics and non-diabetics in general population. **Methods:** This observational study was conducted over three hundred participants recruited by using the observational cross convenient analytical sampling technique. Participants were recruited from four cities of Punjab including Faisalabad, Lahore, Sargodha and Hafizabad. Participants of age between 25-60 years and having shoulder pain and stiffness were included in the study while those suffering from arthritis and any other musculoskeletal or systematic disorder resulting in shoulder pain were excluded. SPADI short form was used to assess shoulder pain and resulting disability in individuals. Data were then analyzed using SPSS V22. **Results:** The results showed that the overall prevalence of Adhesive Capsulitis was 38% with 28.07% in males and 45.70% in female, with higher prevalence in diabetic patients 66.67% then the non-diabetics 9.33%. **Conclusions:** This proved that Adhesive Capsulitis is proportionally higher in diabetics than non-diabetics and higher in females than males.

INTRODUCTION

Adhesive capsulitis (AC), commonly known as frozen shoulder, is a very painful shoulder disorder that lasts longer than three months. This inflammatory disorder results in fibrosis of the glenohumeral joint capsule and is characterized by gradually increasing stiffness and a considerable reduction in range of motion, usually in the external rotation. However, the patients can have a fast onset of symptoms and a protracted healing process. Even

though it could take up to two or three years, most of the time, the recovery is rewarding [1, 2]. There are three clinical phases through which primary AC generally progresses: First phase is known as painful phase which lasts for 2-9 months, where gradual onset of aching shoulder happens usually at night and when lying on the affected side. Second phase is Stiffening or Frozen phase that lasts for 4-12 months in which the patient experiences

difficulty with simple activities of daily living and the pain level is often not altered. The stiffness progresses and may lead to muscle wasting due to disuse atrophy. Third phase is known as Thawing phase that lasts for 5-12 months. In this phase the patient experiences a gradual increase in pain, although it may reappear as the stiffness eases [3]. Although people between ages 40 to 60 are mainly affected by the adhesive capsulitis with a female predominance but the exact prevalence of this disorder is still unknown [4, 5]. The prevalence of AC ranges from 2%-5% in the general population [6] and 30% in those with diabetes [7], and about 58% in females [8]. Furthermore, there is evidence that protease inhibitors used for antiretroviral therapy have been associated with the development of frozen shoulder. It has been estimated that 13.4% of persons with diabetes have adhesive capsulitis, which means that diabetic people have five times greater risk of having adhesive capsulitis than non-diabetic [7]. Although the exact relation of diabetes and adhesive capsulitis is still unknown, but there is a possibility that glycation processes may alter the tissues of the capsule and subsequently trigger the development of frozen shoulder [9]. Around 30% of those with adhesive capsulitis have diabetes [7]. Adhesive capsulitis is considered by the spontaneous onset of symptoms such as pain, stiffness and progressive loss of mobility of the joint [10]. It presents in some cases, but not all, as a fibrotic state with capsular and ligament involvement and an inflammatory-based contracture that restricts the rotational interval of the affected shoulder [11]. Though AC usually resolve on its own, several researches have shown about 40% of the individuals continue to feel pain and stiffness after three years and 7-15% endure some kind of irreversible functional loss [12]. Patients may also experience soreness around the anterior shoulder joint, anxiety, or protectiveness of the limb. The PROM is constrained, especially for external rotation. Holding the scapula is crucial to identifying glenohumeral external rotation because scapula-thoracic motions can occasionally compensate and conceal the diagnosis. Pain and decreased range of motion can limit further testing for rotator cuff pathology, impingement, and other soft tissue pathologies, and if they are found, they are typically due to the stiffness [13]. Effective glycemic control and early management of AC may hold a higher level of productivity in patients with diabetes. Awareness programs should be initiated periodically targeting the diabetes population, particularly women, to provide information on prevalence, symptoms and risk factors for AC is increasing. Initial examination and shoulder radiograph should be performed in diabetic patients with suspected adhesive capsulitis, because early detection promotes better cure and late detection worsens clinical outcomes. In addition,

physicians should update their clinical knowledge of this association as it is of primary importance in the diagnosis and management of adhesive capsulitis in patients with diabetes mellitus. Larger multi-center studies are needed to further investigate adhesive capsulitis in these populations. Therefore, this study was conducted to determine the rate of adhesive capsulitis in diabetic and non-diabetic patients in order to properly address the above issues.

METHODS

The following comparative analytical study was conducted on 300 participants with in a period of 6 months from December 2022 to May 2023. The population of the study was composed of 150 diabetics and 150 non-diabetic of Sargodha, Faisalabad, Hafizabad and Lahore city. Sample was approached using observational cross convenient sampling technique. Participants were recruited on the basis of following inclusion criteria: 1. Age between 25-60 years, 2. Those having shoulder pain and stiffness from last three months, 3. Those diagnosed with Adhesive capsulitis, 4. Having night pain and 5. With normal radiograph. Participants were excluded on basis of following criteria: 1. Having AC secondary to arthritis and any other musculoskeletal disorder that may limit shoulder ROM and cause pain, 2. Having any systematic disorder resulting in shoulder pain, 3. Cervical Spondylosis SPADI short form was used to assess shoulder pain and resulting disability in individuals [14]. Once research purpose and questions were explained to participants. If participants had difficulty in understanding questionnaire, they were briefed about meaning and then they marked it. SPSS version 22.0 was used for data analysis. Qualitative data were expressed in form of frequency distribution and graphs. While mean and standard deviation was extracted from numeric data.

RESULTS

The results showed that out of 300 participants 38% were males while 62% were females. Majority of the participants 42.7% belonged to age group 36-45 years, while least participants were from age group 56-65 years (40%). The overall prevalence of Adhesive capsulitis reported was 38% (Table 1).

Table 1: Demographics of participants (n=300)

Demographic variables		f (n)	%age
Gender	Male	114	38
	Female	186	62
Age	25-35 years	68	22.7
	36-45 years	128	42.7
	46-55 years	64	21.3
	56-65 years	40	13.3
Diabetic		150	50

Non-Diabetic		150	50
Adhesive Capsulitis	Positive	114	38
	Negative	186	62

Table 2 shows that the prevalence of Adhesive capsulitis (AC) was higher among females as compared to males. In females it was 45.70% while in males it was found to be 28.07%. AC was found to be more prevalent among diabetic then non-diabetic population. Among 300 participants, AC was more prevalent participants of age group 46-55 years (81.81%) followed by age group 36-45 years (57.89%).

Table 1: Demographics of participants (n=300)

Prevalence of Adhesive capsulitis among	Yes f (%)	No f (%)
Male population (n=114)	32 (28.07)	82 (71.93)
Female population (n=186)	85 (45.70)	101 (54.30)
Diabetic (n=150)	100 (66.67)	50 (33.33)
Non-diabetic (n=150)	15 (10)	135 (90)
Age Bracket 25-35 (n = 32)	12 (37.50)	32 (62.50)
Age Bracket 36-45 (n = 38)	22 (57.89)	16 (42.11)
Age Bracket 46-55 (n = 44)	36 (81.81)	08 (18.19)
Age Bracket 56-65 (n = 35)	19 (54.28)	16 (45.71)

All those suffering from AC i.e. both diabetic and non-diabetic, had mild to moderate pain due to AC and reported an increase in pain during physical activity. The dominant side of pain among both diabetic and non-diabetic patients was right side with prevalence of 65% and 66.67% respectively. While 15% diabetic and 13.33% non-diabetic reported pain in both sides (Table 3).

Table 3: Intensity and Dominant Side of Pain

Parameter	Diabetic with AC (n=100) f (%)	Non-Diabetic with AC (n=15) f (%)
Intensity of Pain		
Mild	20 (20)	08 (53.33)
Moderate	45 (45)	03 (20)
Severe	35 (35)	04 (26.67)
Dominant side		
Right	65 (65)	10 (66.67)
Left	20 (20)	3 (20)
Both	15 (15)	2 (13.33)
Pain Worst at		
Rest	0 (0)	0 (0)
During Activity	100 (100)	15 (100)

55% diabetic and 26.67% non-diabetic reported severe pain while lying on affected side, 40% of both population i.e., diabetic and non-diabetic reported severe pain while picking up any object from the higher shelf. Majority of the participants with AC had pain in activities involving external rotation of the arm reaching at back of neck (90% and 66.67%), washing hairs (68% and 33.33%), washing back (73% and 46.66%), putting on an undershirt (71% and 40%), and removing something from back pocket (82% and 46.66%) (Table 4).

Table 4: Prevalence of Shoulder pain and disability among Diabetic and Non diabetic population

SPADI Short Form Items	Mild f (%)	Moderate f (%)	Severe f (%)	Mild f (%)	Moderate f (%)	Severe f (%)
When lying on involved side	14 (14)	31 (31)	55 (55)	2 (13.33)	5 (33.33)	8 (53.34)
When reaching for something on a high shelf	15 (15)	45 (45)	40 (40)	6 (40)	3 (20)	6 (40)
	Yes f (%)	No f (%)	Yes f (%)	No f (%)		
When touching the back of neck	90 (90)	10 (10)	10 (66.67)	5 (33.33)		
When pushing with the involved arm	82 (82)	18 (18)	10 (66.67)	5 (33.33)		
When washing hair	68 (68)	32 (32)	5 (33.33)	10 (66.67)		
When washing back	73 (73)	27 (27)	7 (46.66)	8 (53.34)		
When putting on an undershirt or jumper	71 (71)	28 (28)	6 (40)	9 (60)		
When putting on shirt that button down the front	85 (85)	15 (15)	04 (26.67)	11 (73.33)		
When carrying a heavy object	68 (68)	32 (32)	10 (66.67)	5 (33.33)		
When removing something from back pocket	82 (82)	18 (18)	7 (46.66)	8 (53.34)		

DISCUSSION

In the current study, the overall prevalence of AC was 38% with a higher prevalence among females (45.70%) than males (20.07%) and the dominant side of shoulder pain in diabetic and non-diabetic population with AC was right side (80% and 66.67%). The results of current study are supported by a study conducted in Karachi in 2020 by Ahmad *et al.*, where the prevalence of AC was 54.78% among diabetic population and was more prevalent among females (68.26%) while 37.36% reported to had pain on right side [3]. Similar results were obtained in a study conducted in India where the prevalence AC among diabetic population was 20% and of them 66% belonged to age less than 55 years [15]. The similar results were obtained in a study conducted in Lahore by Inayat *et al.*, where the prevalence of AC among diabetic patients was 41.3% with a high prevalence among females (72.1%) and 78.8% individuals with AC belonged to age group 41-60 years while in the current study AC was more prevalent among age group 46-55 years (81.81%) and the prevalence of AC among diabetic population was 66.67% [16]. Prevalence of AC among overall population was 38%. The study conducted by Hand *et al.*, also supported the following results where prevalence of AC among diabetic population was found to be 5 folds increased then in overall population [17]. Uddin *et al.*, in 2013 conducted a study, the results of which are in contradiction with the current study. It showed that the overall prevalence of AC 71.4% while of them 42.5% were

diabetic, 5% had impaired glucose tolerance and 52.5% were non-diabetic. The study showed higher prevalence of AC in males than female. 52% had AC on right side, 32.5% in left side and 17 had AC in both shoulders [18]. The results show higher prevalence of AC among non-diabetic population and males, while in current study AC was more prevalent among diabetic population and among females while the dominant side of AC was similar to previous study. Several studies prove that adhesive capsulitis causes restriction in shoulder ROM particularly shoulder abduction and external rotation [19, 20]. In the current study individuals with AC also reported pain and difficulty in performing activities that involved shoulder abduction and external rotation as picking up an object from height, taking hand at the back of neck, washing hairs and back, pulling and pushing an object, downing on and off a shirt and taking something from the pocket.

CONCLUSIONS

The study concluded that diabetic patient had higher percentage of Adhesive capsulitis with age >46 years as compared to non-diabetics with age < 46 years. It was also found that though female participants have higher prevalence of Adhesive capsulitis as compared to male participants.

Authors Contribution

Conceptualization: ZS

Methodology: UL, AB, KF, HRJ

Formal analysis: AH

Writing-review and editing: NG, HR, KF, HRJ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

REFERENCES

- [1] Hubbard MJ, Hildebrand BA, Battafarano MM, Battafarano DF. Common soft tissue musculoskeletal pain disorders. *Primary Care: Clinics in Office Practice*. 2018 Jun; 45(2): 289-303. doi: 10.1016/j.pop.2018.02.006.
- [2] Mezian K, Coffey R, Chang KV. Frozen shoulder. *StatPearls Publishing*; 2021.
- [3] Ahmad Q, Yaseen I, Sattar R, Abbas U, Nawaz U. Prevalence of frozen shoulder among patients with diabetes: a single center experience from Karachi, Pakistan. *Rawal Medical Journal*. 2020 Dec; 45(4): 838-41.
- [4] Kwaees TA and Charalambous CP. Rates of surgery for frozen shoulder: an experience in England. *Muscles, Ligaments and Tendons Journal*. 2015 Oct; 5(4): 276. doi: 10.11138/mltj/2015.5.4.276.
- [5] Murakami AM, Kompel AJ, Engebretsen L, Li X, Forster BB, Crema MD, et al. The epidemiology of MRI detected shoulder injuries in athletes participating in the Rio de Janeiro 2016 Summer Olympics. *BMC Musculoskeletal Disorders*. 2018 Dec; 19(1): 1-7. doi: 10.1186/s12891-018-2224-2.
- [6] Manske RC and Prohaska D. Diagnosis and management of adhesive capsulitis. *Current Reviews in Musculoskeletal Medicine*. 2008 Dec; 1: 180-9. doi: 10.1007/s12178-008-9031-6.
- [7] Zreik NH, Malik RA, Charalambous CP. Adhesive capsulitis of the shoulder and diabetes: a meta-analysis of prevalence. *Muscles, Ligaments and Tendons Journal*. 2016 Jan; 6(1): 26.
- [8] Cho CH, Koo TW, Cho NS, Park KJ, Lee BG, Shin D, et al. Demographic and clinical characteristics of primary frozen shoulder in a Korean population: a retrospective analysis of 1,373 cases. *Clinics in Shoulder and Elbow*. 2015 Sep; 18(3): 133-7. doi: 10.5397/cise.2015.18.3.133.
- [9] Hsu CL and Sheu WH. Diabetes and shoulder disorders. *Journal of Diabetes Investigation*. 2016 Sep; 7(5): 649. doi: 10.1111/jdi.12491.
- [10] Boutefnouchet T, Jordan R, Bhabra G, Modi C, Saithna A. Comparison of outcomes following arthroscopic capsular release for idiopathic, diabetic and secondary shoulder adhesive capsulitis: A Systematic Review. *Orthopaedics & Traumatology: Surgery & Research*. 2019 Sep; 105(5): 839-46. doi: 10.1016/j.otsr.2019.02.014.
- [11] Buchbinder R, Youd JM, Green S, Stein A, Forbes A, Harris A, et al. Efficacy and cost-effectiveness of physiotherapy following glenohumeral joint distension for adhesive capsulitis: a randomized trial. *Arthritis Care & Research*. 2007 Aug; 57(6): 1027-37. doi: 10.1002/art.22892.
- [12] Thomas SJ, McDougall C, Brown ID, Jaberoo MC, Stearns A, Ashraf R, et al. Prevalence of symptoms and signs of shoulder problems in people with diabetes mellitus. *Journal of Shoulder and Elbow Surgery*. 2007 Nov; 16(6): 748-51. doi: 10.1016/j.jse.2007.02.133.
- [13] Whelton C and Peach CA. Review of diabetic frozen shoulder. *European Journal of Orthopaedic Surgery & Traumatology*. 2018 Apr; 28: 363-71. doi: 10.1007/s00590-017-2068-8.
- [14] Agrawal RP, Gothwal S, Tantia P, Agrawal R, Rijhwani P, Sirohi P, et al. Prevalence of rheumatological

- manifestations in diabetic population from North-West India. *Journal of the Association of Physicians of India*. 2014 Sep; 62(9): 788-92.
- [15] Breckenridge JD and McAuley JH. Shoulder pain and disability index (SPADI). *Journal of Physiotherapy*. 2011 Jan; 57(3): 197. doi: 10.1016/S1836-9553(11)70045-5.
- [16] Inayat F, Ali NS, Shahid H, Younus F. Prevalence and determinants of frozen shoulder in patients with diabetes: a single center experience from Pakistan. *Cureus*. 2017 Aug; 9(8): e1544. doi:10.7759/cureus.1544.
- [17] Hand C, Clipsham K, Rees JL, Carr AJ. Long-term outcome of frozen shoulder. *Journal of Shoulder Elbow and Surgery*. 2008 Mar-Apr; 17(2): 231-6. doi: 10.1016/j.jse.2007.05.009.
- [18] Uddin MM, Khan AA, Haig AJ, Uddin MK. Presentation of frozen shoulder among diabetic and non-diabetic patients. *Journal of Clinical Orthopaedics and Trauma*. 2014 Dec; 5(4): 193-8. doi: 10.1016/j.jcot.2014.09.008.
- [19] Dyer BP, Burton C, Rathod-Mistry T, Blagojevic-Bucknall M, van der Windt DA. Diabetes as a prognostic factor in frozen shoulder: a systematic review. *Archives of Rehabilitation Research and Clinical Translation*. 2021 Sep; 3(3): 100141. doi: 10.1016/j.arrct.2021.100141.
- [20] Jacob L, Gyasi RM, Koyanagi A, Haro JM, Smith L, Kostev K. Prevalence of and Risk Factors for Adhesive Capsulitis of the Shoulder in Older Adults from Germany. *Journal of Clinical Medicine*. 2023 Jan; 12(2): 669. doi: 10.3390/jcm12020669.