

A Response Analysis to Access the Role of Adhesive Capsulitis on Quality of Life in Patients with T2DM

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Abstract: Adhesive capsulitis (AC) is a musculoskeletal disorder of shoulder that causes pain and restricted ROM at the glenohumeral joint [11]. The exact cause is not known and the condition can be seen more common in Diabetes. Due to pain and functional disability the quality of life is greatly affected among patients. The present study involves impact of AC on the quality of life in patients with T2DM. The patients were recruited after thoroughly checking their disease history and following the inclusion and exclusion grounds of the study. SPADI and SF-36 were the two scales considered to evaluate severity of AC and Quality of life in patients with T2DM. The frequency of AC was observed more in female Diabetic patients. The quality of life analysis with respect to severity of AC showed that majority of individuals fell under average to unhealthy category.

Keywords: Diabetes, Adhesive Capsulitis, SPADI, SF-36

1. Introduction

Adhesive capsulitis is one of the most common musculoskeletal disorder observed in orthopedics [2, 9, 10, 13, 17]. It has been described as a self-limiting disorder in some studies that resolves in 1–3 years [6, 8, 10, 14, 21, 22], other studies have shown patients with adhesive capsulitis which suffer long-term ROM deficits that may last up to 10 years [1, 4, 5, 17, 19]. The condition occurs in both males and females, with greater frequency in female particularly in her 5th to 7th decade of life. There is generally no preference for handedness and adhesive capsulitis rarely occurs simultaneously bilaterally [1, 14]. However, other studies have reported that it can occur sequentially bilaterally in up to 40% of patients [7]. Adhesive capsulitis is commonly associated with other systemic and nonsystemic conditions and by far diabetes mellitus is the most condition, with an incidence of 10–30% [3,13].

Adhesive capsulitis is classified into two categories: (1) primary, which is insidious and idiopathic, thought to be autoimmune disorder or (2) secondary, which develops due to pain or immobilization following trauma or surgery [12]. The symptoms in Primary Adhesive Capsulitis may progress so slowly that the patient does not even seek medical attention until ROM and pain severely limit their daily activities. This is unlikely for the person with secondary Adhesive capsulitis who usually notices their symptoms soon after an injury or trauma as their ROM does not appear to improve as expected. It occurs in 2-5% of the general adult population and in 10-30% of the patients with diabetes, mainly affects individuals over 40 years of age with female predominance.

SPADI The Shoulder Pain and Disability Index (SPADI) is a self-administered questionnaire that consists of two dimensions, one for pain and the other for functional

activities. It can be used to reliably measure the pain and functional disability in subjects based on which the severity of Adhesive Capsulitis can be ascertained. SPADI is a 13 point scale, which are divided into 5 and 8 points to measure severity of pain and functional disability of an individual to measure the degree of difficulty an individual has with various activities of daily living that require use of body's upper-extremity, respectively. The scale gives three outcomes TPS (Total Pain Score) and TDS (Total Disability Score). These two collectively provide TSS (Total SPADI Score) which is used to evaluate the severity of Adhesive capsulitis. The score ranges between 0-100, with a high score depicting greater pain and disability[15].

SF-36 Short-Form Health Survey (SF-36) is a generic measure of quality of life comprising two summary components : Physical component Summary (PHC) and Mental Component Summary (MCS). These two components are collectively measured by 8 subscales for physical functioning, social functioning, role limitations (physical problems), role limitations (emotional problems), mental health, vitality, pain, and general health perception. Impact of AC with diabetes on quality of life was measured with the 36-Item Short-Form Health Survey (SF -36). Each subscale generates a score from 0 to 100, with a higher score indicating better health. A mean of 50 ± 10 is considered as a standard value based on general population norms. According to 95% CI, a value obtained in the confidence limit range of $\text{Mean} \pm 1.96\text{SD}$ is considered as average in terms of the health status of an individual and the values beyond this range of confidence limit are considered as unhealthy and healthy on either sides of the confidence limit [20].

2. Materials and Methods

A multicentre cross-sectional study, 375 patients attending OPD from C.M. Patel College of Physiotherapy and some other hospitals with physiotherapy unit in Gandhinagar province of Gujarat West India were evaluated for Diabetes and Adhesive Capsulitis (AC).

Inclusion Criteria: Subjects included were T2DM patients (males and females, age group between 45 to 65 years) with symptomatic shoulder, unilateral Adhesive Capsulitis, painful stiff shoulder for at least 3 months with more than 50% loss of active and passive range of shoulder joint compared to the unaffected side.

Exclusion Criteria: Subjects with recent history of surgery on particular shoulder, rheumatoid arthritis, any pathology in shoulder other than Adhesive Capsulitis, any neurological condition affecting shoulder, Thyroid disorders, pain or disorders of cervical spine, elbow, wrist or hand, rotator cuff rupture and tendon calcification.

Finally, a pool of 250 patients with Type 2 Diabetes Mellitus was considered to proceed with this study. After confirming the diabetic history from the medical records and obtaining prior informed consent, subjects were assessed for pain and restriction of ROM in the shoulder. Those with painful shoulder and restricted range of motion were referred to an orthopaedic surgeon to confirm the diagnosis of Adhesive Capsulitis. Hand dominance was noted and patients were classified into three categories (mild, moderate and severe) according to severity of Adhesive Capsulitis based on SPADI (Shoulder Pain And disability Index). All the subjects were given SF-36 survey questionnaire to record their quality of life. Those subjects who were unable to read or write were interviewed and their responses were marked by the tester. Scoring for SF-36 subscale component was done manually.

Outcome measures

- 1) Demographics – prevalence of AC
- 2) Pain and disability – SPADI Scale
- 3) Quality of life – SF-36 Questionnaire developed by RAND.

3. Statistical Analysis

Data was analysed using the SPSS Statistical package version 16. Demographic analysis was carried out to access the overall and gender based prevalence of AC, mean age, and duration of T2DM. To determine the correlation (if any) between severity of AC and quality of life Spearman's correlation coefficient was considered.

4. Results

All the 250 subjects were patients with T2DM and they were classified into two groups with AC and without AC. Table 1 shows demographic data depicting number of males and females in both groups with their mean age and duration of Diabetes Mellitus. In the present study AC was observed in 29.45% females and 24.03% males. Mean age in males was

greater in both groups, these were as follows : 59 ± 4.7 in males without AC and 63 ± 7.2 in males with AC. Mean value for duration of Diabetes Mellitus was greater in males with AC (11.6 ± 7.8) as compared to the females of the same group (8.7 ± 6.08).

Severity of AC was accessed in patients with AC using SPADI (Shoulder Pain And Disability Index). Based on the SPADI score the diabetic patients with AC were classified into three categories Mild (1-33), Moderate (34-66) and Severe (67-100) depending upon the severity of AC (Table 2). TSS (Total SPADI Score) was comparatively greater in females for all the three categories. Categorisation is carried out on the basis of Total SPADI Score

Further SF-36 questionnaire was used to determine the quality of life of subjects and the impact of AC over health status. Physical Component Summary (PCS) showed a decreasing trend as the severity of AC increased, which depicts decline in physical health of the subjects. However, Mental Component Summary (MCS) showed a different trend. Moreover, females with AC showed lower scores for PCS than males but this score was greater in females without AC (Table 3).

Spearman's correlation coefficient showed a negative correlation between severity of AC and quality of life, Physical health component (PHC) of SF-36 in females with AC, $r = -0.76$ while, severity of AC and mental health component (MHC) were positively correlated, $r = 0.63$.

Table 1: Mean values for Age and duration of T2DM in males and females from both groups

Group	Gender	Mean Age \pm SD	Mean Duration of T2DM \pm SD
Without AC (n=182)	Male (n=79)	59 ± 4.7	9.8 ± 6.04
	Female (n=103)	54 ± 5.3	7.4 ± 8.3
With AC (n=68)	Male (n=25)	63 ± 7.2	11.6 ± 7.8
	Female (n=43)	61 ± 6.07	8.7 ± 6.08

Table 2: Severity of Adhesive Capsulitis (AC) on the basis of SPADI score analysis in T2DM patients with AC

Category	Males			Females		
	TPS*	TDS#	TSS^	TPS*	TDS#	TSS^
Mild (1%-33%)	28	31.3	30	32	32.5	32.3
Moderate (34%-66%)	42	47.5	45.4	62	56.25	58.5
Severe (67%-100%)	72	71.3	71.5	78	8.25	77.6

*Total Pain Score, #Total Disability Score, ^Total SPADI Score.

Table 3: SF-36 score of patients of T2DM with and without AC

Category		Gender	PCS	MCS
Without AC		Male	51.73 ± 6.64	53.42 ± 7.03
		Female	54.71 ± 8.09	56.63 ± 5.56
With AC	Mild	Male	46.64 ± 6.63	49 ± 9.93
		Female	44.89 ± 8.56	47.26 ± 7.71
	Moderate	Male	42.17 ± 11.34	47.04 ± 6.43
		Female	40.08 ± 8.06	46.91 ± 11.43
	Severe	Male	38.91 ± 9.08	41.14 ± 5.81
		Female	34.07 ± 7.54	38.11 ± 6.17

In males the correlation between severity of AC and PHC is moderately positive, $r = 0.59$ and between severity of AC and MHC is less, $r = 0.42$

All the 250 subjects were categorised into three types – healthy, average and unhealthy on the basis of both physical and mental health component summary scores of SF-36.

Table 4: Categorisation of subjects on the basis of SF-36 score for assessment of Quality of life.

Category	Gender	PCS		MCS	
		Without AC	AC	Without AC	AC
Healthy	Male	1.01	0.00	3.89	1.96
	Female	2.13	0.00	2.17	1.13
Average	Male	36.16	43.17	42.14	35.29
	Female	28.33	29.64	26.26	27.98
Unhealthy	Male	19.63	23.15	22.15	17.68
	Female	12.73	4.03	3.38	15.95

(values are in percentages)

Majority of subjects were at average health status while some subjects fell under unhealthy category and only a few respondents were categorised as healthy, Table 4. This categorisation is done on the basis of a standardised mean value, a mean of 50 ± 10 is considered as an average score for health, and the values more or less than this are considered as healthy and unhealthy respectively.

5. Discussion

According to previous studies, an overall occurrence of AC in general population ranges between 2-5%. However, an increased frequency is observed in Diabetes Mellitus with a reported prevalence upto 30%. In the present study its prevalence was observed to be 27.2%, quite concurring with the earlier reported studies. The frequency was observed high in females (29.45%) and low in males (24.03%). Previously reported studies have shown association between duration of Diabetes and AC. In the present study the subjects of age group between 45-65 years were considered and all the subjects had diabetes for >6 years. The duration of diabetes was more in male patients for both groups with and without AC.

It is evident from this study that the AC interferes with the quality of life. This was observed with Physical Component Summary and Mental Component Summary scores of SF-36. The subjects without AC showed greater scores due to which they fell under healthy to average category in matters of health status. Whereas, the subjects with AC possessed lower scores for both PCS and MCS so they fell under average to unhealthy category. Moreover, an interesting fact to be noted is that since the duration of Diabetes Mellitus was more in males but scores for PCS and MCS of SF-36 were less in females, reflecting that quality of life was compromised more in case of females. An apparent reason may be the distinct psychological tendencies of gender as of which females tend to feel more restless and emotionally unfit with health issues.

6. Conclusion

Quality of life was compromised in all T2DM subjects of this study but the impact increased with development of AC. The frequency of females was greater than males to fall under unhealthy category.

References

- [1] Binder AI, Bulgen DY, Hazleman BL, Roberts S. Frozen shoulder: a long-term prospective study. *Ann Rheum Dis.* 1984;43:361–4.
- [2] Bridgman JF. Periarthritis of the shoulder and diabetes mellitus. *Ann Rheum Dis.* 1972;31:69–71.
- [3] Bunker TD, Anthony PP. The pathology of frozen shoulder. A Dupuyten-like disease. *J Bone Joint Surg Br.* 1995;77:677–83.
- [4] Bulgen DY, Binder AI, Hazleman BL, Dutton J, Roberts S. Frozen shoulder: a prospective clinical study with an evaluation of three treatment regimens. *Ann Rheum Dis.* 1984;43:353–60.
- [5] Clarke GR, Willis LA, Fish WW, Nichols PJR. Assessment of movement at the glenohumeral joint. *Rheumatol Rehabil.* 1975;14:39–46.
- [6] Codman EA. Ruptures of the supraspinatus tendon and other lesions in or about the subacromial bursa. In: Codman EA, editor. *The shoulder.* Boston: Thomas Todd; 1934. p. 216–24.
- [7] Greene WB. *Essentials of musculoskeletal care.* 2nd ed. Rosemont, IL: American Academy of Orthopedic Surgeons; 2001.
- [8] Grey R. Brief note: the natural history of “idiopathic frozen shoulder”. *J Bone Joint Surg.* 1978;60A:564.
- [9] Lesquesne M, Dang N, Benasson M, Mery C. Increased association of diabetes mellitus with capsulitis of the shoulder and shoulder-hand syndrome. *Scand J Rheumatol.* 1977;6:53–6.
- [10] Lundberg BJ. The frozen shoulder. *Acta Orthop Scand.* 1969;119:1–59.
- [11] Melzer C, Wallny T, Wirth CH, Hoffman S. Frozen shoulder: treatment and results. *Arch Orthop Trauma Surg.* 1995;114:87–91.
- [12] Malone T, Hazle C. Rehabilitation of adhesive capsulitis. In: Ellenbecker TS, editor. *Shoulder rehabilitation. Non-operative treatment.* New York: Thieme; 2006.
- [13] Pal B, Anderson J, Dick WC, Griffiths ID. Limitation of joint mobility and shoulder capsulitis in insulin- and non-insulin dependent diabetes mellitus. *Br J Rheumatol.* 1986;25:147–51.
- [14] Reeves B. The natural history of the frozen shoulder syndrome. *Scand J Rheumatol.* 1975;4:193–6.
- [15] Roach KE, Budiman-Mak E, Songsiridej N, Lertratanaku L. Development of a shoulder pain and disability index. *Arthritis Care Res* 1991; 4: 143–9.
- [16] Sattar MA, Luqman WA. Periarthritis: another duration related complication of diabetes mellitus. *Diabetes Care.* 1985;8:507–10.
- [17] Schaffer B, Tibone JE, Kerlan RK. Frozen shoulder: a long-term follow-up. *J Bone Joint Surg Am.* 1992;74:738–56.
- [18] Farivar SS, Cunningham WE and Hays RD. Correlated physical and mental health summary scores for the SF-36 and SF-12 Health Survey, V.1. *Health and Quality of Life Outcomes* 2007, 5:54
- [19] Sharma R, Bajekal R, Bhan S. Frozen shoulder syndrome: a comparison of hydraulic distension and manipulation. *Int Orthop.* 1993;17:275–8.
- [20] Ware JE, *et al.* The equivalence of SF-36 summary health scores estimated using standard and country-

specific algorithms in 10 countries: Results from IQOLA project. J Clin Epidemiol 1998;51:1167-70.

[21] Watson-Jones R. Simple treatment of stiff shoulders. J Bone Joint Surg Br. 1963;45:207-13.

[22] Wither RJW. The painful shoulder: review of 100 personal cases with remarks on the pathology. J Bone Joint Surg Br. 1949;31:414-7.

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