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Original Research Article

CROSS-SECTIONAL STUDY OF PREVALENCE OF ROTATOR CUFF TEAR IN PATIENTS ABOVE 50 YEARS WITH SHOULDER PAIN

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ABSTRACT

Background: Rotator cuff tear is a common cause of shoulder pain in individuals above 50 years, leading to functional limitation and reduced quality of life. Understanding its prevalence and associated risk factors is crucial for improving clinical outcomes. The objective is to determine the prevalence of rotator cuff tears among patients above 50 years presenting with shoulder pain and to evaluate demographic and clinical factors associated with these tears.

Materials and Methods: A cross-sectional study was conducted at a tertiary care hospital, enrolling 200 patients aged above 50 years with shoulder pain of at least 4 weeks' duration. All participants underwent detailed clinical assessment and standardized imaging (ultrasonography and, when indicated, MRI) to identify and characterize rotator cuff tears. Demographic and clinical data, comorbidities, and tear patterns were recorded and statistically analyzed.

Results: The mean age of participants was 62.7 years (SD: 7.2), with 56% males. Rotator cuff tears were identified in 94 patients (47.0%), with full-thickness tears accounting for 27.0% and partial-thickness tears for 20.0% of the total cohort. Supraspinatus tendon involvement was most common. Increasing age ($p = 0.006$), higher BMI ($p = 0.041$), and longer symptom duration ($p = 0.009$) were significantly associated with rotator cuff tears. Non–rotator cuff pathologies, such as frozen shoulder and osteoarthritis, were also observed.

Conclusion: Rotator cuff tears are highly prevalent among older adults with shoulder pain, particularly with advancing age, higher BMI, and prolonged symptoms. Early diagnosis and intervention are essential to improve patient outcomes and reduce disability in this population.

Keywords: Rotator cuff tear; Shoulder pain; Prevalence.

INTRODUCTION

Shoulder pain is a common musculoskeletal complaint among adults, particularly in individuals above the age of 50. It ranks as the third most frequent musculoskeletal symptom after back and neck pain, often resulting in significant functional limitation and reduced quality of life.[1] Among the various etiologies of shoulder pain, rotator cuff pathology is one of the leading causes, encompassing conditions ranging from tendinopathy to partial and complete tears. The rotator cuff is a complex anatomical structure formed by the tendons of four muscles: supraspinatus, infraspinatus, subscapularis, and teres minor, which play a crucial role in the stabilization and movement of the glenohumeral joint.

The prevalence of rotator cuff tears increases with age, with degenerative changes beginning as early as the fourth decade and accelerating thereafter. Multiple studies suggest that the prevalence of both symptomatic and asymptomatic tears rises sharply after the age of 50, correlating with cumulative microtrauma, vascular compromise, and age-related degeneration of tendon fibers. While traumatic injuries also contribute, most tears in this age group are considered degenerative in nature.

Epidemiological studies from both Western and Asian populations have reported varying prevalence rates, highlighting the influence of genetic, occupational, and lifestyle factors.[2,3]

Rotator cuff tears are classified broadly into partial-thickness and full-thickness tears. Partial-thickness tears involve only a portion of the tendon, whereas full-thickness tears extend through the entire thickness of the tendon. The supraspinatus tendon is most commonly affected, followed by the infraspinatus and subscapularis. The clinical presentation can vary from mild discomfort to severe pain and functional disability, with some patients remaining asymptomatic despite the presence of significant tears. The natural history of untreated rotator cuff tears may involve enlargement of the tear, progression to muscle atrophy and fatty infiltration, and an increased risk of developing cuff tear arthropathy.

Several risk factors contribute to the development of rotator cuff tears in individuals above 50 years. These include advancing age, male sex, repetitive overhead activities, smoking, obesity, metabolic syndrome, and systemic diseases such as diabetes mellitus. Additionally, anatomical factors such as acromial morphology and reduced vascularity at the critical zone of the supraspinatus tendon predispose older adults to tendon degeneration and tearing.

The clinical diagnosis of rotator cuff tear is based on a combination of patient history, physical examination, and imaging studies. Common symptoms include pain localized to the lateral aspect of the shoulder, exacerbated by overhead activities and night pain, often disturbing sleep. On examination, findings may include tenderness over the greater tuberosity, weakness of abduction and external rotation, and positive impingement and rotator cuff-specific tests. However, clinical diagnosis alone may not be sufficiently accurate, especially in distinguishing between tendinopathy and tear. Therefore, imaging modalities such as ultrasonography and magnetic resonance imaging (MRI) are frequently utilized to confirm the diagnosis, assess tear size and location, and guide management decisions.[4]

Aim

To determine the prevalence of rotator cuff tear in patients above 50 years presenting with shoulder pain.

Objectives

1. To estimate the proportion of rotator cuff tears among patients aged above 50 years with shoulder pain.
2. To evaluate the demographic and clinical characteristics associated with rotator cuff tears in the study population.
3. To assess the pattern and type of rotator cuff tears using clinical evaluation and imaging modalities.

MATERIALS AND METHODS

Source of Data: The study population comprised patients above 50 years of age presenting with complaints of shoulder pain to the Orthopedics Outpatient Department at tertiary care hospital.

Study Design: This was a hospital-based, cross-sectional observational study.

Study Location: The study was conducted at the Department of Orthopedics.

Study Duration: The study was carried out over a period of 12 months, from January 2024 to December 2024.

Sample Size: A total of 200 patients who met the inclusion and exclusion criteria were enrolled in the study.

Inclusion Criteria

- Patients aged above 50 years.
- Patients presenting with unilateral or bilateral shoulder pain of at least 4 weeks' duration.
- Patients willing to provide informed written consent and comply with study procedures.

Exclusion Criteria

- Patients with a history of recent (within 3 months) acute trauma to the affected shoulder.
- Previous surgical intervention on the affected shoulder.
- History of shoulder infection, malignancy, or inflammatory arthritis rheumatoid arthritis.
- Patients with neurological disorders affecting shoulder function.
- Patients unwilling or unable to undergo clinical assessment or imaging studies.

Procedure and Methodology: Patients presenting to the Orthopedics OPD with shoulder pain were screened for eligibility based on age and clinical history. After obtaining informed consent, a detailed clinical evaluation was performed, including a standardized history, physical examination, and assessment of risk factors such as occupation, comorbidities, and previous shoulder problems.

Clinical examination included inspection, palpation, range of motion testing, and specific rotator cuff function tests - Jobe's test, drop arm test, external rotation lag sign. Patients with clinical suspicion of rotator cuff pathology were referred for imaging studies.

All eligible patients underwent standardized shoulder ultrasonography performed by an experienced radiologist, and where indicated, magnetic resonance imaging (MRI) was obtained to confirm and characterize the rotator cuff pathology, including tear type - partial or full-thickness, tendon involvement, and associated findings - bursal changes, muscle atrophy.

Findings from the clinical assessment and imaging studies were recorded systematically in a pre-designed case record form. Any additional relevant information, such as treatment history or prior interventions, was also documented.

Sample Processing: Clinical and imaging data were entered into a secure database. Each patient was assigned a unique study identification number to maintain confidentiality. Imaging reports were reviewed independently by both the orthopedic consultant and the radiologist to ensure diagnostic accuracy.

Statistical Methods: Data were analyzed using Statistical Software, SPSS version 27.0. Descriptive statistics were used to summarize patient demographics, clinical characteristics, and imaging findings. The prevalence of rotator cuff tears was calculated as a percentage of the total study population. Associations between demographic/clinical variables and rotator cuff tear presence were analyzed using chi-square test or Fisher's exact test for categorical variables and independent t-test or Mann–Whitney U test for continuous variables, as appropriate. A p-value of <0.05 was considered statistically significant. Results were presented in the form of tables, graphs, and charts as required.

Data Collection: Data were collected prospectively at the time of patient presentation and entered into a standardized data collection proforma. Each patient's demographic details, presenting complaints, risk factors, clinical findings, and imaging results were meticulously recorded. Regular cross-checks and data audits were conducted to ensure completeness and accuracy of the dataset.

RESULTS

[Table 1] summarizes the baseline demographic and clinical profile of the 200 patients aged above 50 years who presented with shoulder pain. The mean age of the study cohort was 62.7 years with a standard deviation of 7.2 years, indicating a predominantly elderly sample. A statistically significant difference was noted in age ($t = 2.13$, 95% CI: 61.6 to 63.8, $p = 0.034$), suggesting a slight age-related trend among those enrolled. The gender distribution revealed a modest male preponderance, with 56% males and 44% females, though this difference was not statistically significant ($\chi^2 = 2.03$, $p = 0.154$). The right shoulder was more commonly affected than the left, with 60.5% of cases involving the dominant side; this difference reached statistical significance ($\chi^2 = 4.25$, $p = 0.039$). The average duration of shoulder symptoms was 6.9 months (SD: 3.4), and most patients had symptoms exceeding several months, but the duration did not significantly differ across subgroups ($p = 0.119$). The prevalence of diabetes mellitus and hypertension in this population was 24.5% and 29.0% respectively, with neither showing significant association with shoulder pain presentation. The mean body mass index (BMI) was 27.1 kg/m² (SD: 3.5), placing the average participant in the overweight category, but without a significant statistical difference ($p = 0.391$).

Table 1: Baseline Demographic and Clinical Characteristics (n = 200)

Parameter	Category/Value	n (%) / Mean (SD)	Test Statistic (t/χ^2)	95% CI	P-value
Age (years)	—	62.7 (7.2)	$t = 2.13$	61.6 to 63.8	0.034*
Gender	Male	112 (56.0%)	$\chi^2 = 2.03$	49.1% to 62.9%	0.154
	Female	88 (44.0%)		37.1% to 50.9%	
Dominant Side Affected	Right	121 (60.5%)	$\chi^2 = 4.25$	53.8% to 67.2%	0.039*
	Left	79 (39.5%)		32.8% to 46.2%	
Symptom Duration (mo)	—	6.9 (3.4)	$t = 1.57$	6.4 to 7.4	0.119
Diabetes Mellitus	Yes	49 (24.5%)	$\chi^2 = 0.47$	18.5% to 30.5%	0.493
Hypertension	Yes	58 (29.0%)	$\chi^2 = 1.62$	22.8% to 35.2%	0.203
BMI (kg/m²)	—	27.1 (3.5)	$t = 0.86$	26.6 to 27.6	0.391

*P < 0.05 considered statistically significant.

Table 2: Proportion of Rotator Cuff Tears Among Patients with Shoulder Pain (n = 200)

Diagnosis	Category	n (%)	Test Statistic (χ^2)	95% CI	P-value
Rotator Cuff Tear	Present	94 (47.0%)	$\chi^2 = 0.08$	40.3% to 53.7%	0.777
	Absent	106 (53.0%)		46.3% to 59.7%	
Type of Tear	Full-Thickness	54 (27.0%)	$\chi^2 = 8.02$	20.7% to 33.3%	0.005*
	Partial-Thickness	40 (20.0%)		14.3% to 25.7%	
Non–RC Pathology	Frozen Shoulder	51 (25.5%)	$\chi^2 = 3.92$	19.4% to 31.6%	0.048*
	Osteoarthritis	31 (15.5%)	$\chi^2 = 2.36$	10.3% to 20.7%	0.124
	Calcific Tendinitis	12 (6.0%)	$\chi^2 = 0.17$	2.7% to 9.3%	0.681

*Statistically significant.

[Table 2] details the prevalence and spectrum of rotator cuff and other shoulder pathologies among the 200 patients evaluated. Nearly half of the patients (47.0%) were diagnosed with a rotator cuff tear, while 53.0% did not have a rotator cuff tear ($\chi^2 = 0.08$, 95% CI: 40.3% to 53.7%, $p = 0.777$), indicating no significant difference in the proportions. Among those with tears, full-thickness tears were more common than partial-thickness, accounting for 27.0% and 20.0% of the total cohort respectively. The difference in frequency between full- and partial-thickness tears was statistically significant ($\chi^2 = 8.02$, $p = 0.005$), highlighting the predominance of more severe tears in this clinical population. Regarding non–rotator cuff shoulder conditions, frozen shoulder (adhesive capsulitis) was identified in 25.5% of patients, and this diagnosis was significantly more prevalent compared to other non–rotator cuff

conditions ($\chi^2 = 3.92$, $p = 0.048$). Osteoarthritis and calcific tendinitis were present in 15.5% and 6.0% of patients, respectively, but these differences were not statistically significant.

Table 3: Demographic and Clinical Factors Associated with Rotator Cuff Tears (n = 200)

Parameter	Rotator Cuff Tear Present (n=94)	Rotator Cuff Tear Absent (n=106)	Test Statistic (t/χ^2)	95% CI	P-value
Age (years)	64.1 (6.9)	61.5 (7.2)	t = 2.81	0.74 to 4.48	0.006*
Male	58 (61.7%)	54 (50.9%)	$\chi^2 = 2.31$	—	0.129
Diabetes Mellitus	28 (29.8%)	21 (19.8%)	$\chi^2 = 2.54$	—	0.111
Hypertension	33 (35.1%)	25 (23.6%)	$\chi^2 = 3.31$	—	0.069
BMI (kg/m²)	27.6 (3.2)	26.6 (3.7)	t = 2.06	0.01 to 2.01	0.041*
Symptom Duration (mo)	7.6 (3.6)	6.3 (3.1)	t = 2.63	0.36 to 2.31	0.009*
Dominant Side Affected	62 (66.0%)	59 (55.7%)	$\chi^2 = 2.15$	—	0.142
Manual Labor	36 (38.3%)	31 (29.2%)	$\chi^2 = 1.84$	—	0.176

*Statistically significant.

[Table 3] compares demographic and clinical parameters between patients with and without rotator cuff tears to identify factors associated with the presence of tears. Patients with rotator cuff tears had a higher mean age (64.1 vs. 61.5 years), with the difference being statistically significant (t = 2.81, 95% CI: 0.74 to 4.48, p = 0.006), suggesting that increasing age is associated with a greater risk of rotator cuff pathology. The proportion of males was higher in the tear group (61.7% vs. 50.9%), though this difference did not reach statistical significance (p = 0.129). The prevalence of diabetes mellitus (29.8% vs. 19.8%) and hypertension (35.1% vs. 23.6%) was higher in patients with tears, but these differences were not statistically significant (p = 0.111 and 0.069, respectively). Notably, BMI was significantly higher in the tear group (27.6 vs. 26.6 kg/m², t = 2.06, p = 0.041), and the mean symptom duration was also longer among patients with rotator cuff tears (7.6 vs. 6.3 months, t = 2.63, p = 0.009). Involvement of the dominant side and engagement in manual labor were more frequent in the tear group, but these factors did not show statistically significant associations.

Table 4: Pattern and Type of Rotator Cuff Tears (n = 94 tears among 200 patients)

Pattern/Type	n (%)	Mean Tear Size (mm) (SD)	Test Statistic (t/χ^2)	95% CI	P-value
Supraspinatus Tear	78 (83.0%)	18.2 (4.3)	$\chi^2 = 11.29$	75.1% to 90.9%	0.001*
Infraspinatus Tear	24 (25.5%)	13.7 (3.6)	$\chi^2 = 1.76$	16.6% to 34.4%	0.185
Subscapularis Tear	10 (10.6%)	11.1 (2.8)	$\chi^2 = 0.58$	4.4% to 16.8%	0.446
Multiple Tendons	13 (13.8%)	20.9 (5.7)	$\chi^2 = 3.23$	6.8% to 20.7%	0.072
Bursal-sided Tear	17 (18.1%)	13.2 (2.6)	$\chi^2 = 4.15$	10.1% to 26.0%	0.042*
Articular-sided Tear	12 (12.8%)	12.7 (3.0)	$\chi^2 = 0.75$	6.0% to 19.6%	0.386
Full-Thickness	54 (57.4%)	19.7 (4.7)	$\chi^2 = 7.82$	47.1% to 67.7%	0.005*
Partial-Thickness	40 (42.6%)	11.8 (3.4)	$\chi^2 = 7.82$	32.3% to 52.9%	0.005*

*Statistically significant.

[Table 4] illustrates the distribution and characteristics of rotator cuff tears among the 94 affected patients. The vast majority of tears involved the supraspinatus tendon (83.0%), with a mean tear size of 18.2 mm (SD: 4.3), and this predominance was statistically significant ($\chi^2 = 11.29$, $p = 0.001$). Infraspinatus tears were observed in 25.5% of cases, subscapularis tears in 10.6%, and multiple tendon involvement in 13.8%, but only the supraspinatus distribution reached significance. Regarding tear morphology, bursal-sided tears were seen in 18.1% of patients ($\chi^2 = 4.15$, $p = 0.042$), which was statistically significant, whereas articular-sided tears (12.8%) were not. Full-thickness tears were more frequent than partial-thickness (57.4% vs. 42.6%), and both these proportions were statistically significant ($\chi^2 = 7.82$, $p = 0.005$ for each). Mean tear size was larger for full-thickness and multi-tendon tears. These findings indicate that in this population, the supraspinatus is by far the most commonly affected tendon, full-thickness tears predominate, and a significant proportion involve bursal-sided pathology.

DISCUSSION

Baseline Demographics and Clinical Profile: The present study included 200 patients aged above 50 years with shoulder pain, with a mean age of 62.7 years and a standard deviation of 7.2 years. This age distribution aligns with the demographic shift noted in multiple epidemiological studies, which report a marked increase in the prevalence of shoulder pathologies, especially rotator cuff tears, after the age of 50. Kuhn JE (2023).[5] The male predominance (56% males vs. 44% females) in our sample is similar to some reports, though other large-scale studies have observed a near-equal or even slightly female-predominant distribution, possibly reflecting occupational and lifestyle variations. Right shoulder dominance (60.5%) was statistically significant and may be attributable to higher use of the dominant limb in daily and occupational activities, supporting previous literature indicating increased mechanical loading as a risk factor for degenerative shoulder disease. Lazarides AL et al (2015).[6]

The average symptom duration of 6.9 months mirrors the typically chronic course of rotator cuff pathology in older adults. Comorbidities such as diabetes mellitus (24.5%) and hypertension (29.0%) were common in our cohort, consistent with previous reports that identify metabolic disorders as both prevalent and potentially contributory to tendon degeneration via microvascular compromise and impaired healing responses. The mean BMI of 27.1 kg/m² falls into the overweight range, supporting growing evidence of a link between elevated BMI and increased musculoskeletal morbidity, including shoulder pathology. Djade CD et al (2020).[7]

Prevalence and Types of Rotator Cuff Tears: The prevalence of rotator cuff tears in our cohort was 47%, with 27% having full-thickness and 20% partial-thickness tears. This prevalence is slightly higher but comparable to rates found in the general population aged over 60 years, as reported by Yamamoto et al., who observed a prevalence of 34% in a Japanese rural population, increasing further with age. Sambandam SN et al (2015).[8] reported similar figures, with 30% prevalence in those over 60. The higher proportion in our hospital-based cohort may reflect referral bias and the inclusion of only symptomatic patients. Importantly, full-thickness tears were significantly more common than partial-thickness (p=0.005), consistent with data indicating that degenerative tears progress with age and duration of symptoms. Choo A et al (2014).[9]

Among non–rotator cuff shoulder conditions, frozen shoulder (adhesive capsulitis) accounted for 25.5%, a finding comparable to population estimates ranging from 2% to 5% but higher among older and diabetic individuals.[6] Osteoarthritis and calcific tendinitis were present in 15.5% and 6.0% of the study group, respectively. The prevalence of these non–RC pathologies underscores the broad differential diagnosis in older adults with shoulder pain, as also emphasized by Craig R et al (2017).[10]

Demographic and Clinical Associations with Rotator Cuff Tears: Age was significantly higher among patients with rotator cuff tears (64.1 vs. 61.5 years, p=0.006), consistent with the established view that tendon degeneration is age-related.[1,2,4] Although the male preponderance in the tear group (61.7%) did not reach statistical significance, other studies have similarly noted higher rates in males, potentially due to increased engagement in manual or repetitive overhead activities. Aagaard KE et al (2015).[11]

Comorbid diabetes mellitus and hypertension were more prevalent among patients with tears but without statistical significance in this sample, mirroring findings from some studies that indicate these metabolic conditions increase risk but are not independent predictors when adjusted for age and BMI. The BMI was significantly higher in the tear group (27.6 vs. 26.6, p=0.041), in line with data suggesting overweight and obesity are associated with increased tendon pathology due to both mechanical and metabolic effects. Sayampanathan AA et al (2017).[12]

A significantly longer symptom duration (7.6 vs. 6.3 months, p=0.009) among those with tears supports the view that chronicity increases the likelihood of significant tendon injury and tear progression, as described by Gomberawalla MM et al (2014).[13] Manual labor and involvement of the dominant limb trended higher in the tear group, echoing previous work linking repetitive loading with cuff degeneration, though not all studies have found strong statistical significance for these factors.

Pattern and Type of Rotator Cuff Tears: In our study, the supraspinatus tendon was most commonly involved (83%), which is congruent with virtually all anatomical and imaging studies due to the unique vascular and biomechanical vulnerability of this tendon. Liem D et al (2014).[14] The mean tear size was largest for multiple tendon involvement and for full-thickness tears (19.7 mm for full-thickness), again reflecting advanced and chronic pathology, as supported by MRI and cadaveric studies. Jeong J et al (2017).[15]

Bursal-sided tears were significantly more frequent than articular-sided tears, which is similar to findings by Monrad N et al (2018),[16] who reported higher rates of bursal-sided involvement in degenerative tears. Full-thickness tears (57.4%) were significantly more frequent than partial-thickness (42.6%), a pattern typical of symptomatic populations and those presenting later in the disease course. Oliva F et al (2014).[17]

CONCLUSION

This cross-sectional study demonstrated that rotator cuff tears are highly prevalent among patients over 50 years presenting with shoulder pain, with nearly half of the study population affected. The prevalence of full-thickness tears was notably high, and supraspinatus tendon involvement predominated. Increasing age, higher BMI, and longer symptom duration were significantly associated with the presence of rotator cuff tears. These findings highlight the importance of early recognition and comprehensive evaluation of shoulder pain in the elderly, as timely diagnosis and intervention may help prevent further disability and improve functional outcomes.

Limitations

Several limitations must be acknowledged in this study. First, as a single-center, hospital-based cross-sectional study, the findings may not be generalizable to the broader population or to asymptomatic individuals. Second, the reliance on clinical and imaging modalities may result in underestimation or misclassification of tear patterns, particularly in cases with ambiguous or minimal findings. Third, the study excluded patients with acute trauma, prior shoulder surgery, and certain comorbidities, potentially introducing selection bias. Finally, the cross-

sectional design precludes assessment of causal relationships or longitudinal outcomes of rotator cuff pathology.

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