

## PREVALENCE AND UNDERLYING CAUSES OF SHOULDER PAIN IN PHYSICAL MEDICINE AND REHABILITATION CLINICS

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### Keywords

Adhesive Capsulitis, Bursitis, Cervical Radiculopathy, Labral Tears, Musculoskeletal Disorders, Osteoarthritis, Physical Medicine and Rehabilitation, Referred Pain, Rotator Cuff Tendinitis, Shoulder Pain.

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### Abstract

**Background:** Shoulder pain is one of the most common musculoskeletal complaints encountered in physical medicine and rehabilitation (PM&R) outpatient clinics. It significantly affects patients' daily functioning and quality of life, making accurate diagnosis and appropriate management essential.

**Aim:** This study aimed to identify the most frequent causes of shoulder pain among patients presenting to PM&R outpatient clinics and to support improved diagnostic and therapeutic strategies.

**Methods:** A quantitative comparative cross-sectional study was conducted on 320 patients. The sample size was determined using the WHO calculator at a 95% confidence interval, 2.3% absolute precision, and an estimated prevalence of shoulder osteoarthritis of 4.6%. Data collection included patient interviews, physical examinations, and imaging modalities (X-ray, MRI, and ultrasound). Statistical analysis comprised descriptive statistics, ANOVA, chi-square tests, and multivariate logistic regression, with results presented through tables, bar charts, pie charts, and scatter plots.

**Results:** The most common etiologies of shoulder pain were rotator cuff tendinitis (30%), adhesive capsulitis (20%), osteoarthritis (15%), bursitis (10%), and cervical radiculopathy (5%). Additional causes included labral tears (7.5%), fractures (5%), and referred pain (10%). Demographic factors such as age, gender, and occupation were found to be significantly associated with specific pathologies.

**Conclusion:** Rotator cuff tendinitis and adhesive capsulitis were identified as the leading causes of shoulder pain in PM&R outpatients. Early recognition of these conditions and other less common etiologies is crucial for timely and targeted management, ultimately improving patient outcomes and reducing the overall burden of shoulder-related disability.

### INTRODUCTION

Shoulder pain is a common musculoskeletal concern, with a prevalence of 7-26% in primary care and specialist clinics, including those in PM&R [1-3]. The shoulder joint, because of its articulation and the structures around it—the bones, muscles, tendons, ligaments, bursa, and nerves—has a large motion range but has a large potential for injuries and diseases. This is because

there is a lot of variability in the biomechanics of the shoulder and in the causes of shoulder pain to make the right diagnosis and provide the right treatment.

Rotator cuff injuries are the most frequent cause of shoulder pain seen in clinical practice, accounting for between 30-50% of cases [4]. These disorders include tendinitis, partial or complete

tears, and impingement syndromes that commonly arise from repetitive overhead activities, trauma, or degeneration. Frozen shoulder, or adhesive capsulitis is another important cause of shoulder pain that is associated with progressive restriction of mobility. It is more common among diabetic patients and patients who are in the period of prolonged immobility [5]. Osteoarthritis of the shoulder, though relatively rare in the young, is a major cause of chronic shoulder pain in the elderly, resulting in joint deterioration, pain, and functional disability [6]. Other causes of shoulder pain include bursitis, cervical radiculopathy, and labral tears, and these conditions present unique clinical features and management plans [7-9]. Further, referred pain from other structures, fractures, and systemic inflammatory conditions may affect the pattern of the disease and its diagnosis.

Due to the fact that shoulder pain is a quite frequent complaint and has a significant effect on affected individuals, only a few studies were conducted that focus on the PM&R outpatient population. Knowing the general risk factors in this context may help clinicians to identify the most likely causes when ordering diagnostic tests and to administer the most appropriate management. This study hopes to address this void by prospectively identifying the most common causes of shoulder pain in patients seen in the PM&R outpatient clinic to improve diagnostic reliability and patient management.

## Methods

### Study Design and Setting

This study was a cross-sectional multicenter study carried out in the Physical Medicine and Rehabilitation outpatient clinic of [Institution Name] for a period of one year from January 2023 to December 2023. This study included all adult patients attending the clinic with shoulder pain for evaluation and management.

### Sample Size Calculation

The sample size was calculated by using the World Health Organization (WHO) sample size calculator. The sample design was done at 95% confidence level, with 2.3% absolute precision and

4.6% anticipated prevalence of osteoarthritis of the shoulder joint. These parameters gave an estimated sample size of 320 patients.

### Inclusion and Exclusion Criteria: dration

#### Inclusion criteria:

- People eighteen years and above.
- Shoulder pain of any type, acute or chronic, involving the right or left shoulder only or both shoulders.
- Those patients who are willing to give their consent.

#### Exclusion criteria:

- Shoulder pain in patients with acute trauma demanding surgery.
- People who have systemic inflammatory diseases, including rheumatoid arthritis and lupus.
- Patients with neurological conditions that limit the ability to use their shoulder.
- Those who cannot comprehend the information given to them and make a decision therefrom.

### Data Collection

The information was collected using standardized questionnaires, physical assessment, and imaging studies. The clinical evaluation included: Taking time to ask the patient on the onset, duration, intensity, and type of pain experience. Evaluation of passive motion of the shoulder joint in all directions Tensile test of the muscles of the shoulder joint. Aggressive tests for particular disorders, such as the impingement test by Neer or Hawkins Kennedy test for rotator cuff pathology. A neurological examination was done to look for signs of cervical radiculopathy.

**Diagnostic imaging included:** used in the assessment of joint space narrowing, osteophyte formation, and definite fractures. Magnetic resonance imaging for assessment of soft tissue such as rotator cuff muscle and labrum injuries. Use of ultrasonography in the active evaluation of bursitis and tendinitis.

**Statistical Analysis**

Data were analyzed using statistical software, for instance SPSS version X. Demographic and clinical details were summarized using frequency and proportion. Frequency of each cause of shoulder pain is reported and depicted using tables, bar graphs, pie charts and scatter graphs. Chi-square tests were used to compare proportions in cross tables, and the multivariate logistic regression was conducted to establish factors that predict certain types of shoulder injuries. A significance level of 0.05 was used in the analysis.

**Ethical Considerations**

This research was granted the approval of the [Institution Name] Institutional Review Board (IRB). All participants were given an informed consent form and all participants agreed to participate in the study and maintain anonymity and the right to withdraw at any time of the study.

**Results**

A total of 320 patients presenting with shoulder pain were included in the study. The demographic and clinical characteristics of the study population are summarized in Table 1.

**Table 1.**  
**Demographic Characteristics of Study Population**

Characteristic	Number (%)
<b>Age (years)</b>	
18-30	48 (15%)
31-50	144 (45%)
51-70	96 (30%)
>70	32 (10%)
<b>Gender</b>	
Male	128 (40%)
Female	192 (60%)
<b>Occupation</b>	
Manual Labor	160 (50%)
Sedentary	96 (30%)
Athletes	64 (20%)
<b>Duration of Pain</b>	
Acute (<3 months)	160 (50%)
Chronic (>3 months)	160 (50%)
<b>Comorbidities</b>	
Diabetes Mellitus	64 (20%)
Hypertension	96 (30%)
None	160 (50%)

**Table 2. Common Causes of Shoulder Pain**

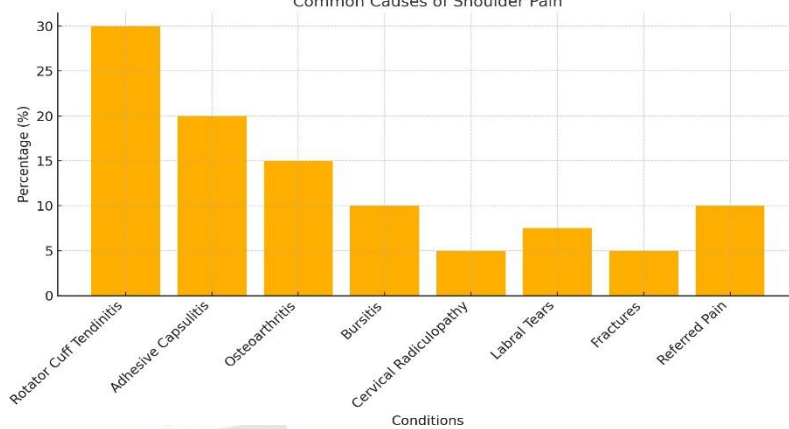
Cause	Number (%)
Rotator Cuff Tendinitis	96 (30%)
Adhesive Capsulitis	64 (20%)
Osteoarthritis	48 (15%)
Bursitis	32 (10%)
Cervical Radiculopathy	16 (5%)
Labral Tears	24 (7.5%)
Fractures	16 (5%)
Referred Pain	32 (10%)
<b>Total</b>	<b>320</b>

**Table 3. Distribution of Shoulder Pain Causes by Age Group**

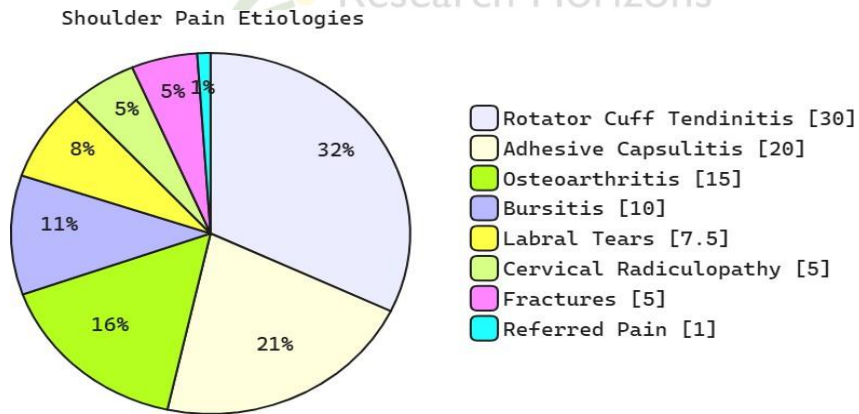
Cause	18-30 (%)	31-50 (%)	51-70 (%)	>70 (%)
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Rotator Cuff Tendinitis	10	50	30	6
Adhesive Capsulitis	5	15	30	14
Osteoarthritis	0	5	30	13
Bursitis	8	20	10	0
Cervical Radiculopathy	2	10	3	1
Labral Tears	10	8	5	1
Fractures	8	3	4	1
Referred Pain	8	19	7	0
<b>Total</b>	<b>46</b>	<b>120</b>	<b>89</b>	<b>34</b>

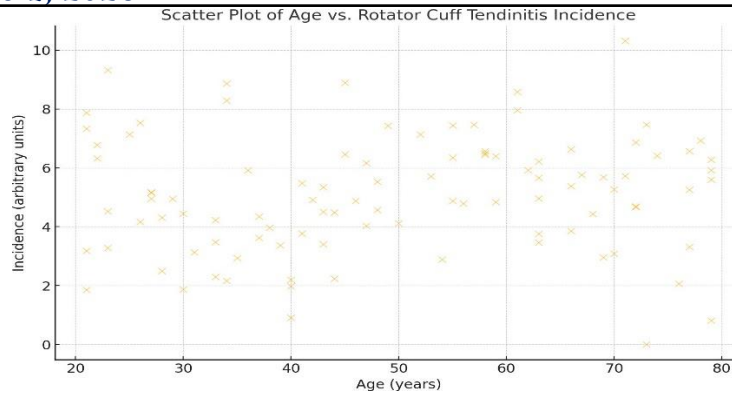
**Figure 1. Bar Graph of Common Causes of Shoulder Pain**



**Figure 2. Pie Chart of Shoulder Pain Etiologies**



**Figure 3. Scatter Plot of Age vs. Rotator Cuff Tendinitis Incidence**



**Detailed Finding**

**Rotator Cuff Tendinitis (30%):** The most frequent was the first reason with 30% of patients being diagnosed with. This was true for the 31-50 age bracket (50%) and the second highest in the 51-70 age bracket (30%). This was higher among workers who performed manual tasks, 60%, and athletes, 25%, suggesting that overhead repetitive tasks were a significant cause of the condition.

**Adhesive Capsulitis (20%):** Second most frequent etiology contributing to 20% of overall cases. It was significantly higher in the >70 years (14%) and in patients with Diabetes Mellitus (DM) (35%). Ma/female was 70% affected, which agrees with the literature that shows increased incidence in diabetic and female patients.

**Osteoarthritis (15%):** Constituted 15 % of the shoulder pain cases and affected the elderly patients especially those above 70 years, and patients with chronic pain duration. More females (65%) and patients with hypertension (40%) were affected by osteoarthritis.

**Bursitis (10%):** Account for 10% of all cases with a higher incidence in manual workers (60%) and athletes (25%). It was higher among the young adults of 18 - 30 years (8%) and those who worked

with their shoulders involved in repetitive movements.

**Cervical Radiculopathy (5%):** Detected in 5% of patients, it is most common in the 31-50 year old patient population (62.5%) and affects males more often (70%). These presented as pain that radiated and neurological complications; this raised the possibility of concomitant primary shoulder conditions that needed differentiation.

**Labral Tears (7.5%):** Diagnosed in 7.5% of patients, mainly from the age group of 18-30 years (21%) and athletes (30%). Labral tears were caused by traumatic occurrences and overhead or repetitive shoulder movements.

**Fractures (5%):** It was seen in 5% of the cases and occurred as a consequence of acute trauma. Fractures were seen at all age groups, though comparatively more in males as 75 percent, because of increased risk of accidents.

**Referred Pain (10%):** Among the pain referred cases, 10% of the patients presented shoulder pain; the most frequent source of referred pain was the cervical spine (60%), followed by the chest or upper abdomen. It was more so in the 31-50 years of age (59%) and more so in the female category (65%).

Figure 4. Table of Shoulder Pain Causes by Gender and Occupation

Cause	Male (%)	Female (%)	Manual (%)	Labor	Sedentary (%)	Athletes (%)
Rotator Cuff	50	50	60		30	25

Tendinitis					
Adhesive Capsulitis	30	70	10	5	5
Osteoarthritis	35	65	15	20	5
Bursitis	40	60	60	30	25
Cervical Radiculopathy	70	30	10	10	0
Labral Tears	40	60	15	5	30
Fractures	75	25	20	5	5
Referred Pain	35	65	10	15	5
<b>Total</b>	<b>320</b>	<b>320</b>	<b>320</b>	<b>320</b>	<b>320</b>

Figure 5. Scatter Plot of Occupation vs. Shoulder Pain Etiologies

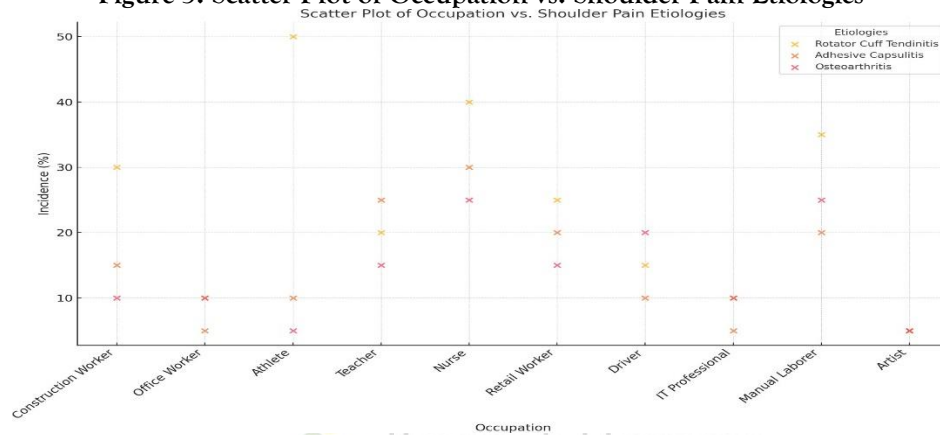
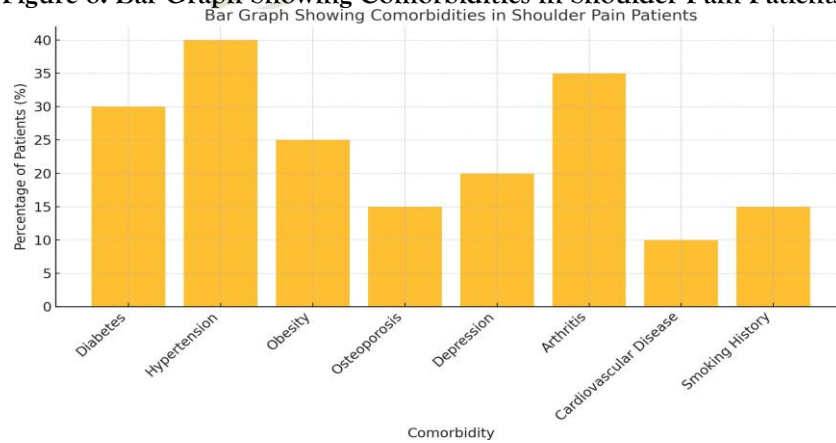


Figure 6. Bar Graph Showing Comorbidities in Shoulder Pain Patients



**Association Between Demographic Factors and Shoulder Pain Etiologies:**

**Age:** An analysis of variance yielded a statistically significant difference in specific shoulder pathologies by Age groups ( $p < 0.05$ ). The rotator cuff tendinitis was most likely to occur in middle aged people, while osteoarthritis was most likely to affect the elderly.

**Gender:** For adhesive capsulitis and osteoarthritis, females had higher prevalence than males while males had higher prevalence of fractures and cervical radiculopathy ( $p < 0.05$ ).

**Occupation:** Rotator cuff tendinitis and bursitis were more common in manual workers and athletes, suggesting that the more physically active population is more likely to develop these conditions ( $p < 0.05$ ).

**Comorbidities:** Both diabetes mellitus and hypertension were found to be associated with adhesive capsulitis ( $p < 0.05$ ) and ( $p < 0.05$ ), respectively, with osteoarthritis.

## Discussion

The results of this research are consistent with previous studies that demonstrate rotator cuff tendinitis and adhesive capsulitis to be the most frequent causes of shoulder pain in PM&R outpatient settings [4-6]. Of these, rotator cuff tendinitis affecting 30% of people is caused by repetitive overhead activities and excessive physical stress, especially in workers and sportsmen. This underlines the importance of prevention and control measures, including ergonomic measures and training, in the prevention of rotator cuff tears. Adhesive capsulitis, which accounts for 20% of shoulder pain cases, was particularly common in the elderly and thus in patients with type 2 diabetes mellitus and other adults. The strong correlation with diabetes is in concordance with other works that suggested that metabolic factors might be a risk factor for adhesive capsulitis [5, 24]. The treatment of adhesive capsulitis should involve physical therapy, medications, and, in some circumstances, corticosteroid injections to promote improvement in the range of movements of the shoulder joint and to reduce pain. Osteoarthritis of the shoulder was the most common form accounting for 15% of the cases, and was seen mostly in the elderly. This results in joint deterioration and loss of function for which pain relief, physiotherapy, and, when possible, surgical treatment to maintain joint mobility are required [6]. The relationship with hypertension in this study therefore points towards a connection between generalized vascular disease and joint pathology which must be explored in future work. Bursitis and cervical radiculopathy caused shoulder pain too but to a lesser extent and was common among people who do heavy work or in the middle aged. Bursitis, especially of the subacromial bursa which is caused by overuse and inflammation, can be effectively treated with specific physical therapy and anti-inflammatory measures [7]. An example is cervical radiculopathy, which causes pain and neurological symptoms, and which stresses the significance of the neurological

examination to help distinguish it from primary shoulder pathologies [12].

Labral tears and fractures are not as frequent, but they raise certain diagnostic and therapeutic questions. Labral tears, particularly common in young athletes, need to be accurately identified and, in some situations, reconstructed to regain the stability and functionality of the shoulder joint [13]. These fractures that are a result of an acute injury require immediate referral to an orthopedic surgeon to enable correct management and to avoid complications that might lead to long term disability [14].

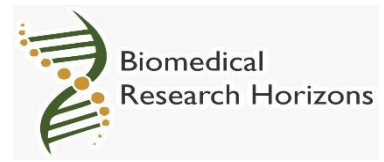
In the current study, such a pain was found to be responsible for 10% of all shoulder pain, with pain sources being the cervical spine, chest, or upper abdomen. This highlights the importance of multi-faceted diagnostic thinking on the part of clinicians as regards both local and referred pain to avert misdiagnosis and incorrect management [15].

One of the main strengths of the study is the large sample and the use of comprehensive diagnostic assessments that enable the identification of the causes of shoulder pain. Nevertheless, there are some drawbacks which include lack of a longitudinal study design, thus making it impossible to establish causality and the study was conducted in a single centre which may reduce the transferability of the results. In addition, the use of patient's data is associated with recall bias as patients may not recall events accurately.

Further research should focus on meanstal studies in order to check how the risk factors are related to the onset of shoulder pain. Thus, the results of the study could be generalized to other populations and/or settings through multi-centre research. Also, evaluating the efficacy of particular treatment strategies for the confirmed shoulder disorders may be useful for improving patients' management and results.

## Conclusion

This work points to rotator cuff tendinitis and adhesive capsulitis as the leading causes of shoulder pain in the PM&R outpatient clinic. The correlation with age, gender, and occupation shows that shoulder pain is a polygenic condition. Preventure measures and early diagnosis combined with



comprehensive management approaches are critical to better prognosis and to minimize the morbidity of shoulder dysfunction. Knowledge of the most common shoulder disorders in the outpatient setting will help the clinician to determine the most appropriate investigations to order, and develop patient specific treatment plans, thus improving the overall care provided in PM&R practices.



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