

Epidemiology and Clinical Insights into Shoulder Pathologies: An Analysis of Patient Data from the Sydney Shoulder Research Institute

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ABSTRACT

Dysfunctions and pain in the shoulder are a prevalent musculoskeletal condition and a key area for clinical research. This paper investigates the etiology, epidemiology, and risk factors associated with shoulder pathologies based on a data set from the Sydney Shoulder Research Institute (SSRI) that spans a cohort between the years 2015 and 2024. A cohort was retrospectively designed to analyze the demography of patients, their injury mechanisms, symptoms durations, and the symptoms of joint that are associated with it. The findings pointed out that the male gender was more likely to encounter traumatic injuries when compared to the females who reported degenerative conditions of the shoulder such as rotator cuff tendinitis. The age and symptom duration of the patients pointed to a significant correlation to chronic shoulder disorders where above 42% experienced the symptoms for more than a year. Injury causes vary from trauma due to sports to degenerated conditions.

The study pinpoints the role that hand dominance plays, and the impact of contralateral shoulder and knee pathologies. Results highlighted the need for early diagnosis and implementing of ideal management measures to handle the long-term healthcare impacts.

INTRODUCTION

Dysfunctions and shoulder pain are still some of the common complaints in the musculoskeletal area and are a big topic for clinical research and practice [1]. The shoulder is unique as it is a highly mobile joint and allows for a wide range of motion which is of key importance for our daily lives, sports, and manual labor [2]. However, with its useful features of mobility, there are some tradeoffs like stability, that make the shoulder susceptible to a range of potential injuries and disorders [3]. From an anatomical perspective, the shoulder has a range of components like the glenohumeral joint that joins the upper arm bone to the scapula, the rotator cuff muscle which makes the body stable and assists movements, and tendons and ligaments that surround it to provide additional support [2]. Shoulder anatomy effectively supports movements hence the dynamic nature but is also likely to be exposed to risks like overuse, instability, and injury.

Shoulder pathologies are wide and can entail traumatic injuries like dislocations and fractures to conditions resulting from degenerations such as rotator cuff tears, tendonitis, and arthritis [4]. Other causes of shoulder pain include biochemical imbalances, inflammatory diseases like rheumatoid arthritis, and systematic conditions that can cause repetitive strain. The fact that shoulders are important in daily life makes their failure also severe as they can cause functional impairment, low life quality, and chronic pain [5]. Treatment of the conditions

entails using conservative treatment like physical therapy, medication, and surgery especially when the case is severe [4]. Healthcare systems are often left with an uphill task since most of the shoulder conditions are chronic, and if they persist, then they can impact their daily functioning over time.

Sydney Shoulder Research Institute (SSRI) data has nearly a decade of patient data specifically when it comes to the shoulder, and hence when analyzed, it offers crucial information on the etiology and epidemiology of shoulder conditions [6]. Through the analysis of the dataset, we derive crucial insights like the demographic distribution of people experiencing the symptoms, their causes, and their severity across different populations. Further, the ultimate insights on the common triggers of the condition inform ideal clinical practices and further guide future research.

This study seeks to analyze and explore the availed dataset exhaustively to uncover insights that could further enhance our understanding of shoulder pathologies. The research additionally provides insights into the risk factors that could further cause shoulder disorders from the perspective of prevention strategies, clinical practices, and healthcare policies. The findings from this research will hopefully assist in the incorporation of effective management measures that could potentially intensify shoulder disorders in patients and the healthcare systems.

METHODS

Study Design

The retrospective cohort study for this research was done using the Shoulder Research Institute (SSRI) dataset. The dataset has information on patients displaying shoulder disorders that has been gathered between the years 2015 and 2024 [6]. The information that will be integral for this analysis and present on the dataset includes the demographics, injury mechanisms, duration of the symptoms, and interlinked conditions. The database assists the study results to be comprehensive and valuable shedding light on the prevalence, etiology, and chronic levels of a considerably large and diverse population sample.

Quality and reliability are some of the core requirements and the study checked to ensure that such are met. Therefore, only persons confirmed to have shoulder symptoms were included and those lacking crucial data or having non-musculoskeletal conditions were removed from the study. The methodical approach ensured that ultimate results reflected persons looking for care on issues relating to the shoulder.

The study is retrospective giving a clear review of long-term insights on patient records that offer findings over a long period, which can be leveraged to provide long-term insights regarding the long-term insights of the shoulder symptoms [7]. The data collection process was planned carefully to ensure that all of the variables were captured, and that incomplete or missing data was removed to ensure minimal bias.

Inclusion and Exclusion Criteria

Inclusion Criteria

Patients who took part in the study were found to have clinical shoulder symptoms. To be confirmed and hence included in the dataset, you had to have medical records that had been well documented, imaging results from diagnosing tools like MRI and X-rays, or evaluation by experts from the field such as orthopedics. Additionally, both traumatic and non-traumatic historical cases of shoulder pains were included.

Exclusion Criteria

Patients were eliminated from the dataset if the details that were presented came out as incomplete and hence couldn't be processed for further analysis that could shed light on valuable insights. People who had shoulder pains that were not related to the musculoskeletal factors such as those due to cancer or cardiac issues were removed. Areas with less clinical

evidence that could point to pathology were removed to ensure the findings from the study were valid.

DATA COLLECTION AND VARIABLES

Demographics

Age, gender, and hand dominance were important demographics in the data collection. The factors provided grounds to comprehend the epidemiological patterns concerning shoulder symptoms and the way they can affect different populations [8]. The age was further placed to different groups so as to shed light on the different life stages since the cases differ significantly between the young and older age groups.

Injury Etiology

The etiology, such as traumatic and non-traumatic injury was used to differentiate the cause of shoulder symptoms. Traumatic injury was further categorized into those caused by sports, falls, or other accident types. On the other hand, non-traumatic accidents were then classified depending on how they started such as gradual or insidious onset of symptoms which is common especially when the shoulders are overused, there are degenerative conditions, or systematic diseases.

Symptoms Duration

The duration that the symptoms persisted was then classified as acute, depending on whether they were less than 3 months, subacute if they fell between three to twelve months, and chronic if they were above twelve months. The chronic levels of the symptoms were crucial aspects of the study since they offered information on the likely long-term impacts if they were not attended to or if they were managed poorly. The focus of this study is the chronic symptoms since they cover a big part of patients and the healthcare systems.

Associated Joint Symptoms

The shoulder pathology can be correlated to symptoms in other joints such as the knees [9]. With such variables, it is possible to explore some likely systematic or biomechanical factors that result in dysfunctions in the shoulder. Contralateral symptoms in the shoulder and knees were recorded to try and find patterns of comorbidity that could be important in informing treatment approaches [10].

Analytical Approach

Descriptive statistics were integral for analysis as it shed light on the key insights of the research such as the distribution of the demographic, cause of injury, and chronic symptoms [11]. Afterward, inferential statistics was done to find the likely relationships between the variables like the chi-square when handling the categorical data and t-tests when dealing with the continuous data [12]. Statistical significance is set at $p < 0.05$ and the confidence levels at 95% to ensure the ultimate findings were robust and reliable.

RESULTS

Gender Distribution

Gender distribution concerning shoulder pain showed the male to be susceptible (60%) as compared to the female (40%).



Figure 1 Shows bar chart gender distribution for people with shoulder symptoms. The male consists of 60%.

This thus shows consistency with the available literature that showed men, especially those who worked in occupations with high risk or sports, were more likely to have shoulder symptoms [13]. It is common for males to sustain traumatic injuries like dislocations, fractures, and tears in the ligaments especially when working on high-intensity jobs that may need significant lifting or contact sports such as football and rugby. On the other hand, the shoulder pains experienced by women such as rotator cuff tendinitis and impingement syndrome are likely to have been caused by chores such as office work, caregiving, and some physical therapy roles [14].

Age Distribution

Participants in the study were placed under different groups based on age to find a correlation between age and shoulder symptoms.

Most of the participants fell between the age range of 53 and 69 years and totaled 33% of the total participants in the cohort. The specific cohort presented high numbers of degenerative diseases like rotator cuff tears and osteoarthritis. Such conditions may be attributed to the wear and tear that typically happens over time and as one grows [15].

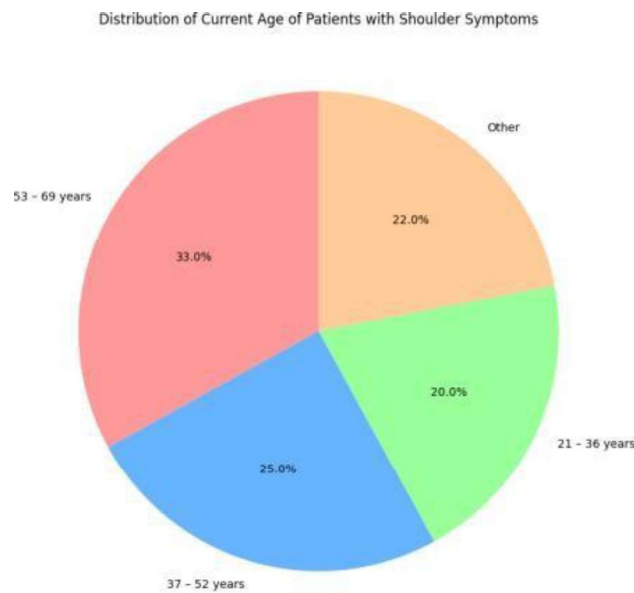


Figure 2 A pie chart with the age ranges of the shoulder pain symptoms patients. The age group of 53 to 69 years is the majority with 33% followed by 37 to 52 years.

The age segment between 37 and 52 years comprises 25% of the population who had cases of traumatic injuries and degenerative conditions. The result can be explained because such a point of life is in the middle characterized by the mid-life crisis and is at a point in time where persons encounter the onset of degenerative diseases or consequences of earlier choices of life [16]. Finally, the cases between 21-36 years were 20% of all of the reported cases and were majorly characterized by traumatic cases especially due to sports and activities that had a big impact.

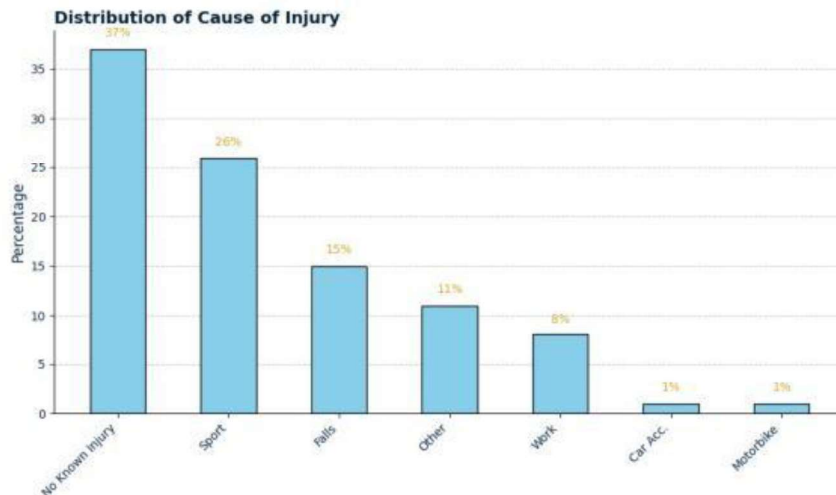


Figure 3 Displays that many of the patients don't know the cause of their shoulder pains (37%). 26 % is caused by sports, and 15%

Cases of Symptoms

Regarding the causes of the shoulder symptoms, most of those who encountered it could not exactly pinpoint the case since 'No Known Injury' was top accounting for 37% of the output. The finding is interesting and a key point of research since most of the participants here could not exactly pinpoint the traumatic event that resulted in the shoulder pathology. However, such cases could be pointed out to the repeated motion, poor posture, and overtime degeneration of structures in the shoulder. 26% of the reported cases were due to injuries that resulted from sports, especially the contact ones such as football, rugby, and swimming. When fall, especially in adults, account for 15% of the cases and can be attributed to low-density levels of bones, and decreased balance.

Duration of Symptoms

Almost half of the total sample (50%) stated that their conditions lasted for more than a year and hence chronic.

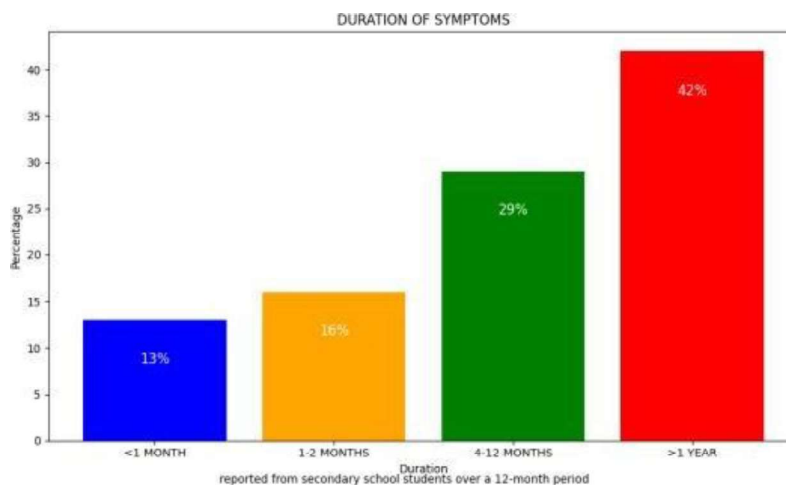


Figure 4 The duration of symptoms for the shoulder symptoms is set at more than 1 year.

This points out that it is important to diagnose and manage the symptoms earlier since a late diagnosis and unideal management strategies can impact long-term outcomes. Many of the shoulder conditions are chronic and can result in consistent pain, limitations in their functioning, and low quality of life for those who have been affected.

Hand Dominance and Symptoms Side

Regarding the hand dominance and the shoulder symptoms, there was an equal proportion between the dominant (56%) and non-dominant (42%). It was expected that the dominant side could be more prone to injury as it is used a lot, but the data showed that there was slight

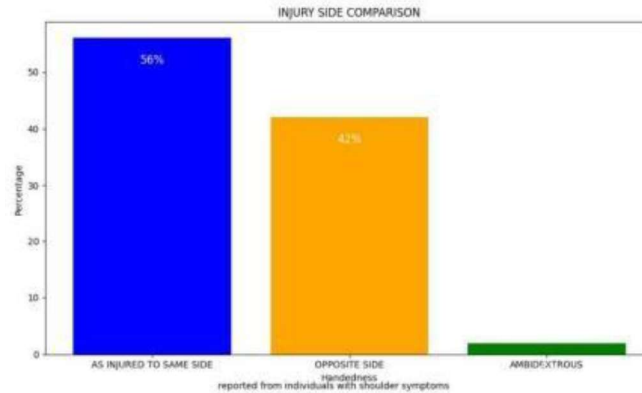


Figure 5 There is slight difference concerning the hands that are dominant or not and experiencing shoulder symptoms as shown above.

difference reported.

Hence, other factors like repeated movements, exposures in their occupations, and anatomical variations played a bigger role in the development of shoulder symptoms as opposed to hand dominance.

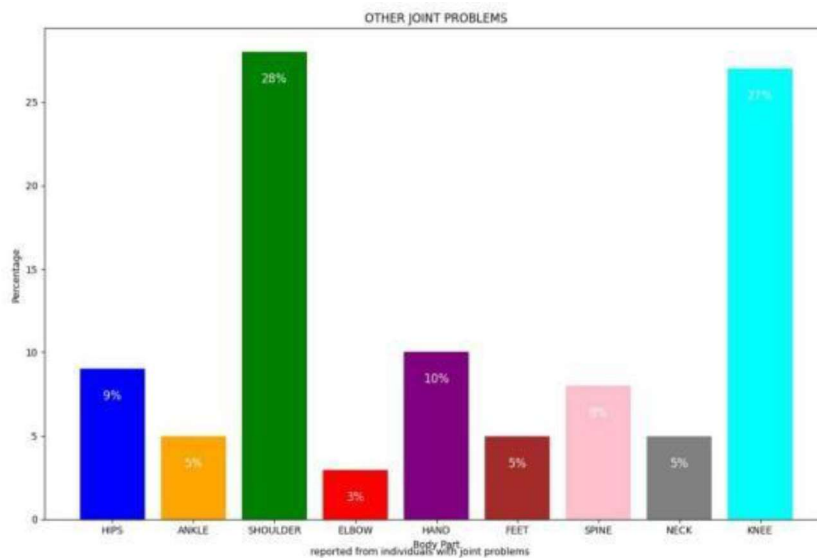


Figure 6 The figure shows the way other conditions are experienced along with the shoulder problem with that of the knee being the biggest with 27%.

Associated Joint Problems

27% of the individuals presented concurrent knee symptoms hence further showing a concrete

link to the interconnectedness of health of the musculoskeletal parts. The insights point out that shoulder pathologies may not be an isolated case but rather consist of the trend of joint issues that may be influenced by systematic factors such as biochemical adaptations and rheumatoid arthritis stemming from changes in posture and compensatory movements.

DISCUSSION

Demographic Patterns

The results from the study point out the roles that demography such as gender and age play when it comes to diagnosing and treating disorders in the shoulder. The fact that male is majorly affected by the symptoms can be explained by the fact that they engage in activities that are attributed to high risks like contact sports and manual labor.

Further, the elderly age group was reported to have a high prevalence of degenerative shoulder conditions, and this can be linked to changes in musculoskeletal because of age [17]. It is therefore necessary to implement prevention and management measures that suit the different groups with a specific focus on preventing injury, especially on the younger generations, active individuals, and the early interventions of the older adults especially with the risk of degenerative conditions.

Chronicity and Early Interventions

The majority of chronic shoulder symptoms amplify the need for early detection and management. Chronic pain and dysfunction can have a significant impact on the quality of life, resulting in a lifetime disability, limited mobility, and distress [18]. Hence, detecting the condition early and intervening in it is important to prevent it from progressing and hence reducing the severity of shoulder disorders. A multifaceted approach is needed which utilizes medical management, physical therapy, and lifestyle management to handle both the immediate and long-term dependencies of shoulder conditions.

Hand Dominance and Symptoms Distribution

The research findings point to an equal distribution between the dominant and non-dominant sides paint out a clear picture that it was a wrong assumption to think that the dominant side has a higher likelihood of injury. Hence, it's crucial to delve deeper and comprehend factors contributing to shoulder pathology. Clinicians need to consider a range of dynamics from the patient such as their lifestyle, biomechanics, and lifestyle when addressing the shoulder symptoms to ultimately deliver an ideal treatment plan [19].

Associated Joint Symptoms

The interlink of shoulder and knee symptoms calls for a broader and interconnected approach to managing musculoskeletal health [20]. The finding is important as it assists in diagnosing and treating patients with shoulder pain since that can extend to other joints hence the necessity to evaluate. Observed symptoms of comorbidity can also be a result of systematic conditions such as osteoarthritis and rheumatoid arthritis. Upcoming research therefore needs to explore such connections to enhance the overall treatments in persons who are experiencing the musculoskeletal issues that affect many joints.

CONCLUSION

To conclude, the findings from this study offer a clear picture of the epidemiology, chronicity, and etiology of symptoms in the shoulder parts of the body and are a result of exhaustively analyzing dataset from the Sydney Shoulder Research Institute. By analyzing the cause patterns, pain duration, and demographic patterns then it is easier to comprehend the factors that can contribute to the pain and dysfunctions of the shoulder. The study recommends implementing a targeted approach to prevent and manage shoulder pain and the risks of the different demographic groups, especially older adults and active individuals.

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