

## Article

# Frequency of Shoulder Pain in Recreational Badminton Players

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### ABSTRACT

**Background:** Shoulder pain is a prevalent musculoskeletal issue in overhead sports such as badminton, particularly among recreational players who often lack formal training and preventive care. Despite badminton's rising popularity in Pakistan, limited data exist on the frequency and impact of shoulder pain in non-elite players, representing a critical research gap. **Objective:** This study aimed to determine the frequency and severity of shoulder pain and its associated functional disability in recreational badminton players in Rawalpindi and Islamabad. **Methods:** A descriptive cross-sectional study was conducted among 260 recreational badminton players (aged 18–40 years) selected through convenience sampling. Inclusion criteria required active participation in badminton for at least six months, while individuals with recent injuries, neurological disorders, or surgeries were excluded. Data were collected using a self-structured demographic questionnaire and the validated Shoulder Pain and Disability Index (SPADI). Descriptive and inferential statistics were performed using SPSS version 27, with mean, standard deviation, and percentages reported. **Results:** Shoulder pain was reported by 76.15% of participants. The mean pain score was  $22.76 \pm 19.57$ , and the mean disability score was  $16.27 \pm 16.29$ . SPADI total score averaged  $19.52 \pm 16.87$ , indicating a clinically significant impact on shoulder function, though mostly at mild-to-moderate levels. **Conclusion:** Shoulder pain is highly prevalent among recreational badminton players, often contributing to functional impairment. These findings underscore the need for targeted prevention strategies and early clinical interventions to reduce long-term musculoskeletal burden in this population.

**Keywords:** Shoulder Pain, Badminton, Musculoskeletal Injuries, Recreational Athletes, SPADI, Functional Disability, Prevalence

## INTRODUCTION

Badminton is a globally popular sport, enjoyed by an estimated 200 million individuals worldwide, and recognized for its high-speed, skill-intensive gameplay (2). With a history spanning over 2,000 years, its structured form has gained significant momentum, particularly in Asia and Europe, and has become one of the most widely played racquet sports in countries like China, Indonesia, and Denmark (4, 5). In Pakistan, badminton is the second most practiced sport, with increasing accessibility to courts and clubs contributing to its growing popularity across both genders (3). The nature of badminton, characterized by high-intensity, intermittent movements, including rapid directional changes, lunges, jumps, and overhead strokes, imposes substantial demands on players' musculoskeletal systems, particularly the shoulder complex (8, 9).

Previous studies have indicated that shoulder pain is among the most frequently reported injuries in both professional and recreational badminton players, attributed largely to the repetitive overhead motions and biomechanical stresses inherent in the

sport (17, 32). While elite players may benefit from structured training, conditioning, and medical support, recreational players often lack access to proper guidance, making them more susceptible to overuse injuries and resulting discomfort (12, 30). This difference in exposure and care raises concerns about the potential underestimation of injury prevalence and impact in non-professional populations.

Research conducted internationally has demonstrated varying injury rates, with shoulder pain prevalence ranging from 30% to over 60% depending on age, playing frequency, and training level. However, a consistent observation across studies is the higher rate of overuse injuries among recreational players compared to their elite counterparts, particularly in the shoulder joint due to its complex anatomical and functional role in overhead sports (27, 33). Despite the global attention on badminton injuries, there is a noticeable gap in literature addressing shoulder pain specifically among recreational badminton players in Pakistan. Local studies

remain limited, and few have systematically assessed both the frequency and severity of shoulder-related pain and disability in this demographic.

Understanding the extent of shoulder pain in recreational badminton players is essential, not only for informing injury prevention strategies but also for guiding rehabilitation and conditioning programs suited to amateur athletes. In addition, this study addresses a critical gap in localized research that reflects the experiences of Pakistani players, whose playing conditions, access to care, and physical preparation may differ significantly from those in developed countries. The current study aims to determine the frequency and severity of shoulder pain in recreational badminton players in the Rawalpindi and Islamabad region

## MATERIAL AND METHODS

This descriptive cross-sectional study was conducted to determine the frequency and severity of shoulder pain among recreational badminton players in Rawalpindi and Islamabad. The study population comprised male and female players aged between 18 and 40 years who had been actively playing badminton recreationally for at least six months. Participants were recruited from various sports clubs including Shehbaz Sharif Sports Complex, Rawalpindi Sports Complex, Rising Sun Sports Complex, and Jacaranda Family Club. A convenient (non-probability) sampling method was employed to enroll participants. Individuals with a history of traumatic injury or recent accidents, known neurological or pathological conditions, or recent surgical procedures were excluded from the study to minimize confounding factors and ensure a homogenous sample. A total of 260 participants were included, based on sample size estimation using Raosoft software with a 5% margin of error and a 95% confidence interval. All participants provided written informed consent after being briefed on the study's objectives, and ethical approval was obtained from the relevant Institutional

Data was collected in April 2024 through direct distribution of questionnaires at sports venues. The primary outcome of interest

**Table 1. Demographic Characteristics of Participants (n = 260)**

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	152	58.46%
	Female	108	41.54%
Marital Status	Single	225	86.54%
	Married	35	13.46%
Occupation	Student	132	50.77%
	Player	128	49.23%
Age (years)	Mean $\pm$ SD	22.73 $\pm$ 2.20	

Among the 260 participants, 76.15% (n = 198) reported experiencing shoulder pain, while 23.85% (n = 62) did not. The prevalence rate of shoulder pain among this recreational cohort was notably high. The distribution is shown in Table 2. The mean pain severity score among participants reporting shoulder pain was 22.76  $\pm$  19.57, and the mean disability score was 16.27  $\pm$  16.29. The overall SPADI total score, combining pain and disability, was 19.52  $\pm$  16.87, suggesting a moderate level of functional limitation. Table 3 provides a detailed breakdown of pain severity. A majority

was the frequency of shoulder pain among participants, while the secondary outcome included the severity of shoulder pain and the level of associated disability. To collect data, a self-structured questionnaire was used to record demographic details, playing history, and general health status of participants. Pain and disability were assessed using the validated Shoulder Pain and Disability Index (SPADI), which consists of 13 items—five related to pain and eight related to functional disability—rated on a numerical scale. SPADI has demonstrated strong construct validity and reliability across diverse populations (18). No follow-up was required due to the cross-sectional nature of the study.

Ethical considerations were strictly adhered to throughout the research process. Written informed consent was obtained from all participants, and their anonymity and confidentiality were preserved by assigning unique identification codes and securing all data in password-protected files accessible only to the research team. Statistical analysis was performed using SPSS version 27 (SPSS Inc., Chicago, IL, USA). Descriptive statistics such as means, standard deviations, frequencies, and percentages were calculated to summarize demographic data and study outcomes. Pain and disability scores were presented with their corresponding measures of central tendency and dispersion. No missing data were observed in the final dataset, and sensitivity analysis was not required given the descriptive aims of the study. Potential confounding variables were minimized through strict inclusion and exclusion criteria.

## RESULTS

A total of 260 recreational badminton players participated in the study, with a mean age of 22.73  $\pm$  2.20 years. The sample comprised 152 males (58.46%) and 108 females (41.54%). The demographic distribution also revealed that the majority of participants were single (86.54%) and primarily students (50.77%), while the remaining were categorized as active players (49.23%). Descriptive statistics for demographic variables are presented in Table 1.

of the participants with shoulder pain reported it as mild to moderate, accounting for 77.3% of all affected individuals. Only 6.5% experienced pain levels classified as very severe or extremely severe, suggesting that while shoulder pain is common, it is typically not debilitating.

The analysis of disability scores demonstrated a parallel trend, with most respondents experiencing mild disability. These results are aligned with the relatively low number of participants reporting

very severe or extreme pain. No statistically significant difference in pain or disability scores was found between male and female participants ( $p > 0.05$ , independent samples t-test), indicating that shoulder pain was similarly prevalent and impactful across

genders. Furthermore, no significant correlation was observed between age and pain severity (Pearson's  $r = 0.083$ ,  $p = 0.187$ ), suggesting that within this relatively young population, age was not a major determinant of pain intensity.

**Table 2. Prevalence of Shoulder Pain**

Pain Status	Frequency (n)	Percentage (%)
Shoulder Pain	198	76.15%
No Pain	62	23.85%

**Table 3. Classification of Shoulder Pain by Severity (n = 260)**

Pain Severity Level	Frequency (n)	Percentage (%)
Mild	123	47.3%
Moderate	78	30.0%
Severe	42	16.2%
Very Severe	13	5.0%
Extremely Severe	4	1.5%

**Table 4. Descriptive Statistics for SPADI Scores (n = 198)**

Domain	Mean $\pm$ SD
Pain Score	22.76 $\pm$ 19.57
Disability Score	16.27 $\pm$ 16.29
Total SPADI Score	19.52 $\pm$ 16.87

**Table 5: Comparison of SPADI Total Scores Between Genders**

Variable	Group	Mean $\pm$ SD	t-value	df	p-value
SPADI Total Score	Male (n = 115)	19.83 $\pm$ 17.05	0.45	196	0.653
	Female (n = 83)	19.13 $\pm$ 16.65			

Table 5 presents the results of an independent samples t-test comparing SPADI total scores between male and female recreational badminton players who reported shoulder pain. The mean SPADI score for males (n = 115) was  $19.83 \pm 17.05$ , while females (n = 83) had a mean score of  $19.13 \pm 16.65$ . The difference between groups was not statistically significant ( $t = 0.45$ ,  $df = 196$ ,  $p = 0.653$ ), indicating that shoulder pain and associated functional disability were comparably experienced by both genders. This finding aligns with the broader analysis, suggesting that gender does not significantly influence the severity of shoulder dysfunction in this recreational athlete population.

The results demonstrate a high prevalence of shoulder pain among recreational badminton players in Rawalpindi and Islamabad. The predominance of mild to moderate pain severity, accompanied by parallel patterns of functional disability, suggests the influence of repetitive overhead motion and poor postural mechanics rather than acute trauma. Although most cases did not result in severe impairment, the subclinical impact on performance and physical function warrants further exploration. The lack of gender-based and age-based statistical significance underscores the universal exposure to shoulder strain among recreational players, regardless of demographic subgroup.

## DISCUSSION

The present study revealed a notably high prevalence of shoulder pain among recreational badminton players in Rawalpindi and Islamabad, with 76.15% of participants reporting discomfort. This finding emphasizes the burden of musculoskeletal complaints in

non-elite athletes and supports prior evidence that repetitive overhead activities inherent in badminton can contribute to shoulder pathology (9, 32). These results are aligned with those reported by Afsar K et al., who found a prevalence of 63.3% among recreational players, although the slightly higher percentage in our study may be attributed to differences in sampling technique and population characteristics (49). While Afsar's study utilized systematic random sampling, our study employed a convenience sampling method, which may have introduced selection bias and favored inclusion of symptomatic individuals. Nonetheless, both studies underscore a significant and clinically relevant issue in the amateur athletic community.

Comparative literature also offers insights into variable prevalence rates. For instance, Ejaz R et al. reported a lower shoulder pain rate of 49.4%, likely influenced by different participant demographics and physical training exposure (3). Similarly, studies on elite athletes, such as the one conducted by Antonio C et al., reported a shoulder pain prevalence of 47.4% among competitive Spanish players (51). These discrepancies may stem from differences in training intensity, biomechanics, physical conditioning, and injury prevention programs typically more accessible to elite athletes. Furthermore, Zhou X et al. found a prevalence of 30.8% in a younger badminton cohort, reinforcing that age, level of experience, and duration of exposure significantly affect injury incidence (55). In contrast, our population, with a mean age of 22.73 years, likely faced longer cumulative exposure and lacked structured training, contributing to the higher observed prevalence.

The pain severity and disability levels observed in our study were consistent with previous findings, including Rachel Lau *et al.*'s 2023 study, which reported a mean pain score of  $30.4 \pm 14.4$  among youth overhead athletes (50). The current study revealed a mean pain score of  $22.76 \pm 19.57$  and a disability score of  $16.27 \pm 16.29$ , suggesting that while pain is common, its impact on daily function varies. Notably, 77.3% of those with shoulder pain reported mild to moderate symptoms, supporting the theory that most cases represent overuse syndromes rather than acute injuries. Such conditions, including subacromial impingement, rotator cuff strain, or scapular dyskinesis, are frequently reported in overhead sports and are typically associated with poor biomechanics and muscular imbalances (27, 33, 37). The clinical implication of these findings highlights the importance of preventive conditioning and targeted rehabilitation strategies for recreational players, who may lack professional oversight.

The relevance of these findings is multifaceted. From a biomechanical standpoint, repetitive high-velocity arm movements during badminton, especially during overhead strokes like smashes and clears, place considerable stress on the glenohumeral joint and periarticular soft tissues (28, 30). Over time, this can lead to adaptive but potentially pathological changes, such as reduced internal rotation and altered scapular kinematics, which have been shown to correlate with shoulder pain in throwing athletes and racquet sports participants alike (44, 51). The persistent use of improper technique in recreational settings, combined with poor warm-up routines and lack of strength training, may further contribute to microtrauma accumulation, leading to chronic discomfort and functional limitations.

Despite its important findings, this study has several limitations. The cross-sectional design precludes determination of causality, and the use of a convenience sample may limit generalizability to broader populations. Moreover, subjective assessment through self-reported questionnaires such as SPADI, while validated and reliable, may be influenced by individual perception and recall bias. The study did not stratify players by experience level, training load, or stroke technique, all of which are potential confounders. Additionally, no imaging or clinical diagnostic tools were employed to confirm specific shoulder pathologies, which could have enriched the clinical applicability of the findings.

Nevertheless, studying has notable strengths. It addresses a significant knowledge gap regarding musculoskeletal health in recreational badminton players in Pakistan, a population often overlooked in sports medicine literature. The sample size was robust, and the use of a validated outcome measure enhances the reliability of the reported prevalence and severity rates. These insights are crucial for coaches, physiotherapists, and sports medicine practitioners who engage with amateur athletes and can guide the implementation of injury prevention programs focused on shoulder health.

Future research should aim to explore longitudinal outcomes and assess the impact of specific training interventions on reducing shoulder pain in recreational settings. Comparative studies across different regions and playing levels could further elucidate modifiable risk factors. Incorporating objective clinical

assessments, including physical examination, range of motion testing, and imaging, would strengthen diagnostic accuracy and help in tailoring individualized rehabilitation protocols.

This study confirms that shoulder pain is a common complaint among recreational badminton players in the twin cities of Rawalpindi and Islamabad. The findings underscore the need for increased awareness, structured preventive strategies, and early management approaches to reduce the burden of shoulder-related dysfunction in non-professional athletes.

## CONCLUSION

This study identified a high frequency of shoulder pain among recreational badminton players in Rawalpindi and Islamabad, aligning with the study's objective to assess its prevalence and severity. The findings underscore that 76.15% of participants experienced shoulder pain, with varying levels of associated functional disability, highlighting the musculoskeletal burden in non-professional athletes. Clinically, these results emphasize the urgent need for targeted preventive measures, including proper warm-up routines, biomechanical training, and early rehabilitation strategies to mitigate overuse injuries. From a research perspective, the study fills a critical knowledge gap in local sports medicine literature and provides a foundation for future longitudinal and interventional studies aimed at reducing shoulder-related dysfunction in recreational sports populations.

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