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Prevalence Of Shoulder Impingement Syndrome Among Cricketters In Puducherry

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ABSTRACT

Background: Shoulder impingement syndrome (SIS) occurs when the rotator cuff tendons become compressed during shoulder movements, leading to pain and reduced range of motion. Cricketers are particularly susceptible due to the repetitive nature of bowling, batting, and fielding, which involves extensive shoulder use. Understanding the prevalence of SIS among cricketers is essential for developing preventive strategies and effective rehabilitation programs tailored to this specific population. With increasing participation in cricket globally, awareness and research into this condition are vital for improving player health and performance. its prevalence is yet to established. In order to understand the prevalence of Shoulder impingement syndrome among cricketers the study is conducted.

Aim: To investigate the prevalence of Shoulder impingement syndrome among cricketers.

Methods: It is the cross-sectional observation study 100 professional Cricketers will be selected according to selection criteria. The selected participants will be assessed with Neer Impingement Test for diagnosing Shoulder impingement syndrome, and the data's will be recorded.

Result: Out of 100 cricket players, 28.44% were spinners, 41.37% were fast bowlers and 30.19% were batsmen. Shoulder impingement was found to be present in 25(25 .00%) of the cricketers in sports academies in Puducherry. Chi- square test showed a statistically significant association between shoulder impingement and training volume ($p<0.05$).

Conclusion: This study concluded that there is prevalence of Shoulder Impingement syndrome among cricketers.

Keywords: *Shoulder Impingement syndrome, Cricketers, Neer impingement Test*

1. INTRODUCTION

Shoulder impingement syndrome (SIS), also known as subacromial impingement syndrome, is a prevalent Musculoskeletal condition characterized by pain in shoulder, accounting for approximately 36% of all shoulder disorders.[1] It involves the compression of the rotator cuff tendons and surrounding structures within the sub acromial space, leading to pain, inflammation, and reduced shoulder function.[2] This painful condition often results from repetitive overhead activities or structural narrowing of space through which the rotator cuff tendons passes.[3]Cricket and bowling are popular leisure activities worldwide. Cricket is a skilled sport that requires years of practice, while bowling is a skilled recreational activity. The shoulder complex, the most movable joint, is affected by delicate arm and hand movements. Overuse and incorrect techniques can lead to shoulder injuries.[4]

The second most common site of sports injury is shoulder (14%). This is supported by Frost and Chalmers[5]; Noorbhai et al.[6]; Dhillon et al.[7]; Ranson and Gregory[8]. The reasons are improper repeated shoulder movements while bowling, poor throwing technique while fielding. The cricketing activity most often associated with shoulder injury is bowling, followed by fielding

and batting. Repeated throwing can result in overuse shoulder problems, degenerative changes in the rotator cuff, tendinitis in the biceps or a tear of the supraspinatus tendon. Most injuries sustained in cricket are noncontact and have always been categorized as "overuse" injuries. There is mounting evidence that a fast shift in workload increases the risk of numerous injuries more than a constant workload.[9-13] although the relative contributions between change of workload and absolute workload vary according to injury type.[12] A review of long-term injury surveillance studies by stretch (2007) across Australia, South Africa and England, found that most injuries occur early in the season when the least cricket is being played. Upper limb injuries constituted 29% of all injuries in this review.[14]

Shoulder Impingement syndrome (SIS) Occurs among cricketers, particularly those involved in repetitive overhead activities such as bowling and Throwing.[15]The pathogenesis of SIS is multifactorial, encompassing both extrinsic factors, such as anatomical variations in the acromion due to improper techniques especially in fast bowlers and intrinsic factors, including rotator cuff tendon degeneration, muscle imbalances, scapular dyskinesis and glenohumeral internal rotation deficit GIRD).[16] Clinically, patients often present with anterior shoulder pain exacerbated by overhead activities and may experience nocturnal discomfort.[17]

During bowling in cricket, the internal shoulder rotators are involved in the acceleration phase of the arm through concentric contractions, while the external rotators are involved in the deceleration phase.[18] Shoulder injuries were more common in fast bowlers with a front-on action than bowlers with a side-on or mixed-action and shoulder injuries were more common in wrist spinners than finger spinners. In wrist spin the bowlers appear to rotate the bowling shoulder internally, while the arm circumducts.[19] While the external rotators are in the deceleration phase, the internal rotators of the shoulder contribute to the arm's acceleration phase by concentric compressions. During the acceleration phase of the bowling movement, the external rotator muscles, which govern the arm and shoulder, perform abnormally. The impingement problem might be made worse by any weakness that arises during the acceleration phase.[20]

Fast bowlers are particularly susceptible to SIS due to the high forces and repetitive motions involved in their delivery actions.[21] Fielders are also at risk, as the act of throwing from the outfield involves rapid, forceful arm movements that can strain the shoulder complex. Over time, these stresses may result in tendinitis, rotator cuff tears, or sub acromial impingement.[5] In cricketers, altered scapular kinematics can lead to shoulder impingement. Poor scapular positioning reduces the efficiency of the rotator cuff muscles, thus contributing to SIS (Rasmussen et al., 2017). Scapular dyskinesis, which involves abnormal scapular movement patterns, often occurs in athletes involved in overhead sports. This abnormal scapular movement increases the likelihood of shoulder impingement due to the altered mechanics of the acromion and the rotator cuff tendons.[22] Common symptoms of SIS in cricketers include anterior shoulder pain, especially during overhead movements, a sensation of weakness, and a reduced range of motion. These symptoms can significantly impair performance, limiting a player's ability to bowl or throw effectively.[23]

The primary aim of this study was to determine the prevalence of shoulder injury in professional cricketers on various aspects on fielding, batting and bowling, along with training and activities of daily living. By considering the biomechanical aspects of cricket training routines, including exercises and drills involving the shoulder joint, researchers can uncover how the cumulative mechanical stress on the shoulder during training sessions may correlate with the development of shoulder impingement syndrome. The results of the study will offer valuable insights into injury prevention and athlete well-being.[24] Diagnosis was done with Neer impingement test. Which involves stabilization of scapula by the examiner, and the arm was forward flexed by the examiner until the patient reported pain or until full elevation was reached. A positive test was considered to be pain in the anterior or lateral part of the shoulder, typically in a range of 90° to 140°of flexion.[25]

2. METHODOLOGY

It was a cross-sectional study aimed to investigate a group of cricketers in Puducherry. Convenient sampling technique was used to enrolled participants in the study. A total of 100 cricket players were recruited from various sports clubs in Puducherry, adhering to specific selection criteria. The inclusion criteria included male Cricket players, an age range of 18 to 35 years, and a minimum of one consecutive years of experience in their field. These criteria ensured a specific demographic representation and professional experience among the participants. Conversely, several exclusion criteria were applied, which involved excluding recreational cricketers, individuals with a previous history of neurological and muscular disease. By implementing these criteria, the study aimed to gather data from a homogeneous group of male Cricketers who met the established requirements, allowing for a focused investigation into the research objectives.

Data was collected from Puducherry cricket Academy including Rajeev Gandhi cricket stadium, Neyam cricket Academy and cricket association of Pondicherry. All participants were guided about the research process and purpose of this research prior to the data collection. An informed consent form was signed by all participants. All players were interviewed and collected data regarding demographic and training details was recorded. And then, they were evaluated for the presence of shoulder Impingement syndrome through special tests.

The diagnosis of the Shoulder impingement was made according to the following criteria:

1.Pain in the gleno-humeral region.

2. positive impingement signs (Neer impingement test), and pain reproduction (tenderness while palpation of bicep or rotator cuff muscle, painful arc with active shoulder abduction movement and pain in any of the shoulder movement (FLEX, ABD, IR, ER)) [26]

3. TEST PROCEDURE

1. NEER TEST

The therapist passively flexed the arm while it was medially rotated while stabilizing the players 'scapula with one hand. If the participant complained of pain while in this posture, the test's outcome was considered affirmative. According to reports, the sensitivity range for the Neers test is 0.00 to 0.93 and a specificity range from 0.31 to 1.00 [27]

All ethical considerations were made. The study was approved by Institutional Human Ethics Committee (IHEC) Sri Balaji Vidhyapeeth for ethical purposes. The participation

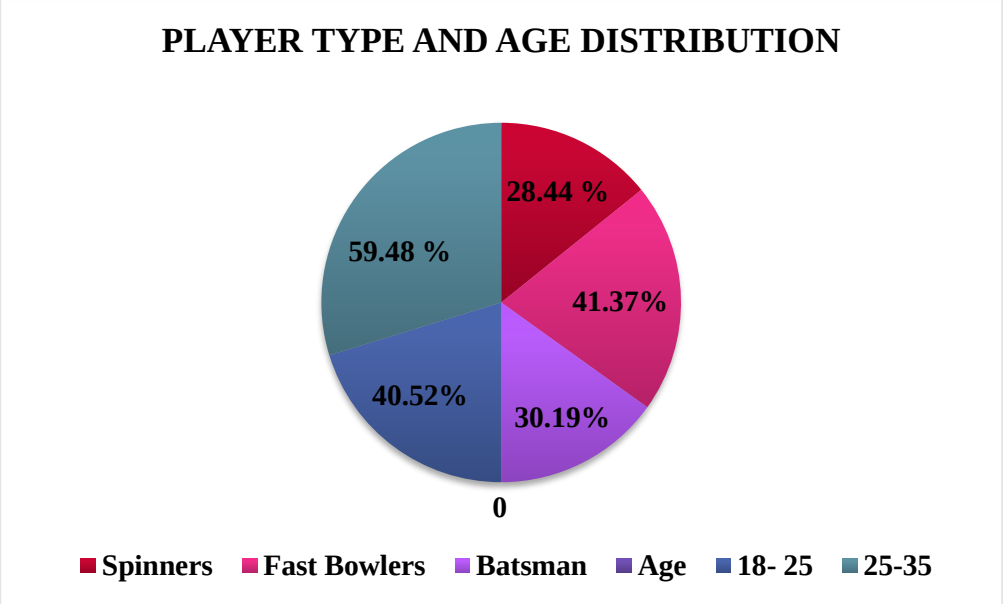
in the research was entirely voluntary. Priority was given to each participant's privacy and dignity. All of the information that was gathered was kept private. SPSS version 22 was used to analyze and interpret the gathered data. The results were shown as graphs and tables. The chi square test was used to determine the relationship between shoulder impingement and training volume.

4. RESULT

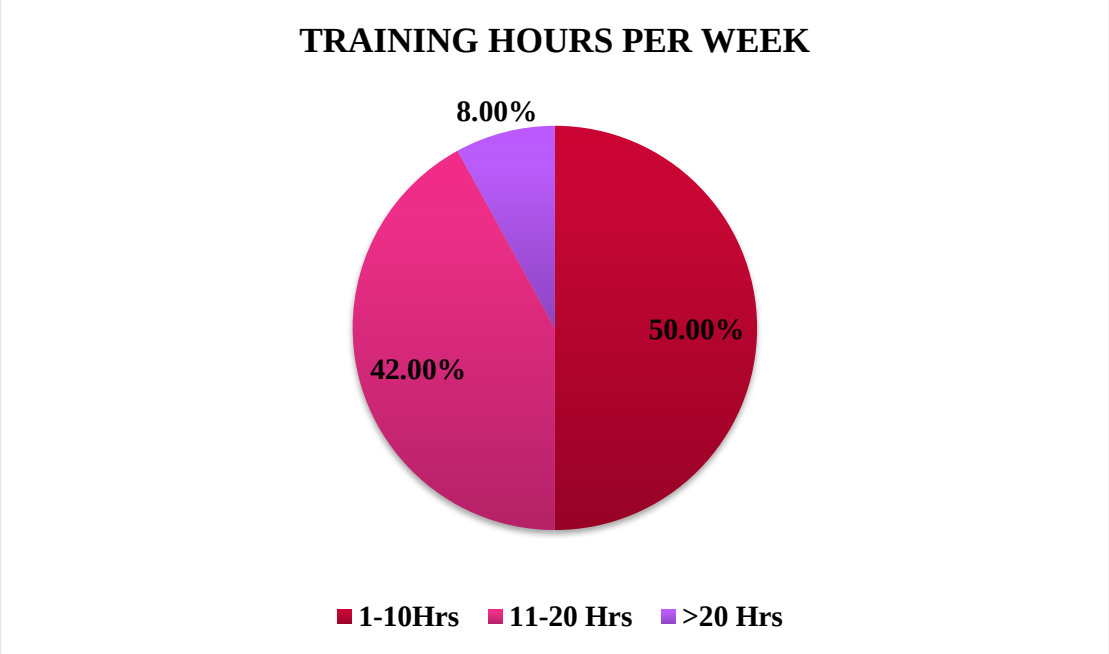
Descriptive statistics illustrates that out of 100 cricket players, 28.44 % were spinners, 41.37% were fast bowlers and 30.19% were batsmen. Age was divided into two categories, 40.52 % of the players were of 18 to 25 years and 59.48% players were from the age range of 26 to 35 years. 50.00% players reported to do training of 1 to 10 hours per week, 42.00% reported to do training for 11 to 20 hours per week and 8.00% players had reported to do training for more than 20 hours per week (Table 1).

Table 1: Descriptive Statistics

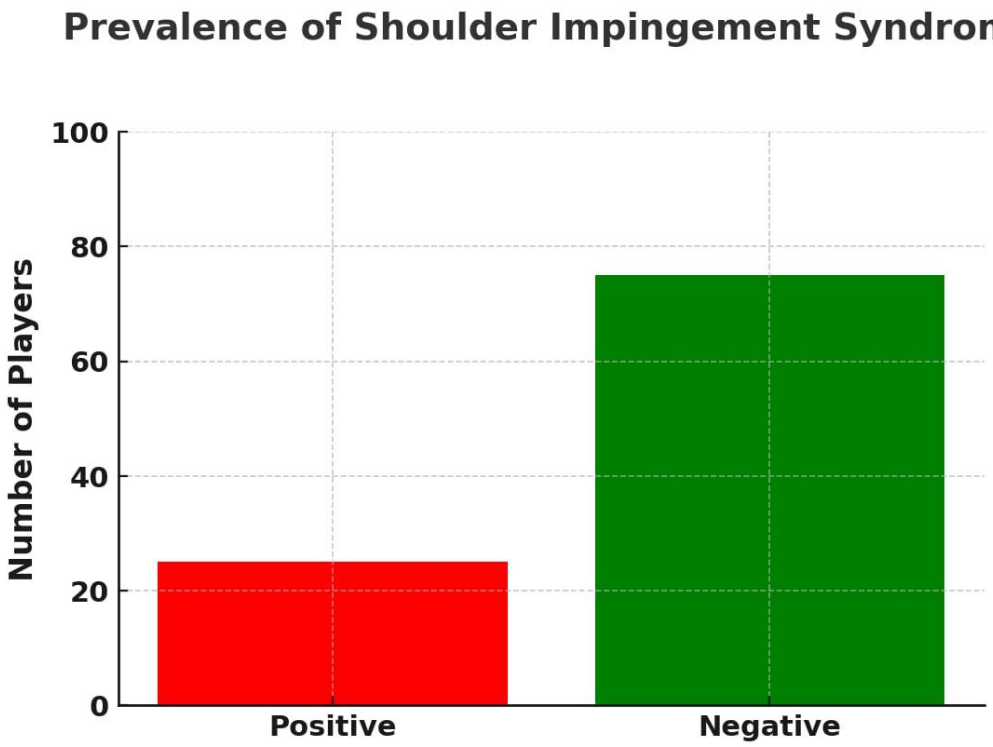
Descriptive statics(N=100)		
PLAYER TYPE	SPINNERS	28(28.44%)
	FAST BOWLERS	41(41.37%)
	BATSMAN	31(30.19%)
AGE	18-25 Years	41(40.52%)
	25- 35Years	59(59.48%)
TRAINING HOURS PER WEEK	1-10hrs	50(50.00%)
	11-20hrs	42(42.00%)
	>20hrs	8(8.00%)



Graph 1: Shows the Player Type and Age Distribution among cricketers



Graph 2: Shows the training volume per week among cricketers



Graph 3: shows that the Shoulder impingement was diagnosed in 25(25.00%) of the cricketers

in sport academies of Puducherry and 75(75.00%) of the players showed negative results.

Table 2 showed the cross tabulation of training volume with shoulder impingement. Shoulder impingement was found in 12.00% players who had a training volume of 1 to 10 hours per week, 8.00 % who had a training volume of 11 to 20 hours per week and 5.00 % who had a training volume of greater than 20 hours per day.

Table 2: Training volume

Training Volume* Cross Tabulation Shoulder Impingement				
		Shoulder impingement		**Total**
		Positive	**Negative**	
TRAINING VOLUME	**1-10HRS**	12(12.00%)	38(38.00%)	50(50.00%)
	11-20 HRS	8(8.00%)	34(34.00%)	42(42.00%)
	>20 HRS	5(5.00%)	3(3.00%)	8(8.00%)
TOTAL		25(25.00%)	75(75.00%)	100(100%)

Table 3 shows the association of shoulder impingement with training hours. Chi- square test results revealed a p-value of less than 0.05 [0.019], which means that a statistical significant association was found between shoulder impingement and training volume among cricketers of sport academies in Puducherry.

Table 3: Chi-Square Tests

Chi- Square Test			
	value	**df**	**Asymptotic significance(2sided)**
Person chi-square	7.85	2	**0.019** (Significant)
Likelihood Ratio	7.42	2	**0.024** (Significant)
Linear by linear association	6.91	1	**0.008** (Significant)
N of valid cases	100		
a.1 cells (16.7%) have expected count less than 5. The minimum expected count is 4			

5. DISCUSSION

Shoulder impingement syndrome (SIS) is a prevalent concern among cricketers, particularly due to the sport's repetitive overhead activities such as bowling and throwing. While specific data on the prevalence of SIS among cricketers in Puducherry is limited, broader studies provide insights into the occurrence and contributing factors of shoulder injuries in cricket.

The primary objective of this study was to determine the prevalence of shoulder Impingement syndrome among professional cricketers in Puducherry Our findings revealed that 25.0% of male cricketers exhibited shoulder impingement syndrome, while 75.0 %did not display any signs of impingement. These results contribute valuable insights to the existing body of knowledge on shoulder impingement in cricket, particularly among cricketers.

A study focusing on young amateur fast bowlers highlighted a significant prevalence of shoulder instability, with 44.6% of participants exhibiting positive results in clinical tests for instability. This instability can predispose athletes to conditions like SIS, emphasizing the need for targeted preventive measures and rehabilitation strategies.[28] According to the latest study, 49 (42%) of the 116 cricket players who were assessed and interviewed for the sport at Faisalabad's sport academies had shoulder impingement. E Rahman et al. corroborated the results of the most recent study, showing that 25% of bowlers experienced rotator cuff injuries and 40% of participants experienced shoulder discomfort out of 100 players.[29]

According to another systematic study, fast bowlers who use a front-on bowling motion are more likely than those who use a side-on or semi-front-on motion to sustain shoulder ailments, such as impingement syndrome. This elevated risk may result from a combination of certain bowling styles and rotator cuff muscle imbalance.[21]A cross-sectional study involving 79 patients with shoulder impingement syndrome revealed that the condition is more prevalent in males (57%) compared to females (34%). The study also found that individuals aged 26-35 years and 56-65 years had higher prevalence rates, indicating that both younger and older cricketers may be at increased risk.[21]

Additionally, research indicates that shoulder injuries account for approximately 5% of all injuries sustained by cricketers. The repetitive nature of bowling and throwing, combined with inadequate fitness and improper techniques, are significant contributing factors to these injuries.[30]

The strategies that follow are advised in order to reduce the risk of SIS among cricket players:

1. Technique optimization: To minimize excessive strain on the shoulder joint, coaches and trainers should place a strong emphasis on appropriate throwing and bowling skills.
2. Strength and Conditioning: To preserve shoulder stability and muscular balance, strength training regimens that target the rotator cuff and scapular stabilizing muscles should be put into place.
3. Frequent Screening: Regular evaluations for scapular dyskinesis and shoulder instability can help with early identification and treatment, perhaps halting the development of impingement syndrome.
4. Age-Specific Training: Because SIS is more common in some age groups, programs for training and rehabilitation

should be specifically designed to meet the needs of these groups.

In current study, chi- square test results revealed a statistical significant association ($p<0.05$) between shoulder impingement and training volume among cricketers of sport academies in Puducherry. M Mohammad Rashaduzzaman et al. found that batsmen who play four or more sessions in one week are the most common victims of upper extremity MSK pain in clubs of Dhaka city.[31] In recent study, shoulder impingement was found in 9.00% players who had a training volume of 1 to 10 hours per week, 6.00% who had a training volume of 11 to 20 hours per week and 3.00 % who had a training volume of greater than 20 hours per day.

This study emphasizes the need of appropriate training, technique improvement, and preventative interventions to reduce the incidence of shoulder impingement and associated injuries in cricket players, even though the prevalence figures for SIS among Puducherry cricket players are not easily accessible.

RECOMMENDATION:

- Further studies with a larger and more diverse sample size are recommended to improve the generalizability of the findings on shoulder impingement syndrome among Puducherry male professional cricketers.
- Future research should explore additional contributing factors, such as playing position, workload intensity, and muscle imbalances, to provide a more comprehensive understanding of the condition.
- It is recommended to investigate the long-term effects of shoulder impingement syndrome on performance and career longevity in professional cricketers.
- The study's findings should be utilized to develop sport-specific rehabilitation and prevention programs tailored to the needs of cricketers.
- Further research should include a comparative analysis of injury prevalence among different levels of professional cricket to identify trends and risk factors unique to elite players.

6. CLINICAL IMPLICATION AND FUTURE SCOPE

The study highlights the potential role of targeted shoulder muscle strengthening in reducing the risk of shoulder impingement syndrome among cricketers. Clinical therapies may involve customized training regimens designed to improve shoulder muscle strength and stability. These programs might be used as a rehabilitation and prevention technique for professional cricket players who are susceptible to shoulder impingement syndrome. This study suggests that a greater understanding of shoulder impingement might lead to early identification and management.

7. CONCLUSION

The study found that 25 % of cricketers in Puducherry suffer from Shoulder Impingement Syndrome (SIS), a significant concern. Training volume and risk factors include high workload, poor biomechanics, and muscle imbalances. SIS affects bowling, throwing, and overall performance, causing shoulder pain, reduced range of motion, and functional limitations.

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CONFLICT OF INTEREST: None

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