

Original Article

# Prevalence of Hamstring Strain and Association with Fatigue among Domestic Cricketers in Lahore Pakistan

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## ABSTRACT

**Background:** Hamstring strains are a common injury among athletes, particularly affecting those involved in sports requiring high-speed running and abrupt movements, such as cricket. The association between these injuries and factors like fatigue has been of particular interest within the sports medicine community, aiming to enhance injury prevention and management strategies.

**Objective:** This study aimed to investigate the prevalence of hamstring strains and their association with fatigue among domestic cricketers in Lahore, Pakistan, providing insights into effective strategies for injury prevention and management in this athletic population.

**Methods:** A cross-sectional study was conducted from December 2022 to May 2023 among 82 domestic cricketers in Lahore, using non-probability convenient sampling. Participants underwent assessments including the Functional Assessment Scale for Acute Hamstring Injuries (FASH) and the Fatigue Assessment Scale (FAS), alongside demographic and physical fitness data collection. Data were analyzed using IBM SPSS Statistics Version 25, with the chi-square test applied to evaluate the association between hamstring strain and fatigue.

**Results:** The average age of participants was  $26.68 \pm 1.395$  years, with the majority (81.7%) having a normal BMI. About 28.0% of the athletes reported hamstring strains, with varying degrees of pain from mild to severe. The chi-square test indicated a significant association between hamstring strains and fatigue ( $p < 0.001$ ), highlighting fatigue as a key factor in the occurrence of hamstring injuries among cricketers.

**Conclusion:** The study underscores the significant prevalence of hamstring strains among domestic cricketers in Lahore and their association with fatigue. These findings emphasize the necessity for targeted interventions focusing on fatigue management to mitigate the risk of such injuries, thereby enhancing athlete health and performance sustainability.

**Keywords:** Hamstring strains, cricket injuries, athlete fatigue, sports medicine, injury prevention, Lahore cricketers.

## INTRODUCTION

Hamstring strain injuries (HSIs) represent a significant concern within the realm of sports medicine, attributed to their high incidence and recurrent nature among athletes engaging in a variety of sports. Particularly prevalent in team sports, HSIs are noted for their frequent occurrence during the latter stages of matches, where they manifest as acute, overuse, or chronic conditions. These injuries are predominantly the result of either a forceful stretch or a rapid and sustained contraction of the hamstring muscle group, leading to significant mechanical stress and, subsequently, various degrees of rupture within the musculo-tendinous unit. The etiology of HSIs can be attributed to a confluence of modifiable and non-modifiable factors, with muscle injuries further categorized by their mode of onset (direct or indirect) and severity (ranging from minor to complete ruptures) (1, 2, 3, 4).

The biomechanics of sprint running, particularly during its late swing and stance phases, have been identified as critical periods for the risk of HSIs, underscoring the complex interplay of risk factors that include muscle composition, age, and previous injuries, among others. Notably, while factors such as muscle composition, age, and previous lumbar or lower back injuries are considered non-modifiable, aspects like optimal muscle length, flexibility, and preparation routines including warm-up and conditioning, present avenues for risk mitigation (5, 6). Within the context of cricket, a sport characterized by high-speed sprinting and dynamic

movements, HSIs have emerged as a significant ailment, constituting 12% of all injuries among elite players, thus highlighting the need for focused research and intervention strategies to address this concern (7).

The recurring nature of HSIs, with over one-third of cases experiencing re-injury within a year of returning to sport, emphasizes the critical need for effective management and rehabilitation protocols. Such protocols must navigate the delicate balance between facilitating recovery and preventing re-injury, integrating approaches that range from the immediate application of first-aid procedures (e.g., RICE—Rest, Ice, Compression, Elevation) to more sophisticated physical therapy techniques tailored to the severity of the injury. These interventions not only aim at the mechanical restoration of the injured site but also consider the biochemical processes essential for optimal recovery, such as inflammation control and fibrosis reduction (8, 9, 10, 11).

The overarching goal of hamstring rehabilitation programs is to re-establish the athlete's pre-injury level of performance while minimizing the risk of subsequent injuries. This dual objective necessitates a comprehensive assessment of both pre-existing risk factors and the direct consequences of the injury itself, such as edema, pain, and functional impairment. Ultimately, the efficacy of HSI management is gauged by metrics such as time lost from sport and recurrence rates, underscoring the importance of a nuanced understanding of the risk factors, particularly fatigue, which this study aims to explore within the cohort of domestic cricketers in Lahore, Pakistan (12).

This research endeavors to delineate the prevalence of HSIs among domestic cricketers in Lahore, Pakistan, and elucidate the association between fatigue and increased risk of such injuries. By identifying fatigue as a pivotal risk factor, the study aims to augment existing knowledge on HSIs and inform targeted interventions that could significantly enhance the health outcomes and performance sustainability of athletes within this demographic. Through a methodical exploration of these associations, the research seeks to contribute valuable insights to the broader discourse on sports-related injuries and their management, with a specific focus on the unique challenges faced by cricketers in Pakistan.

## MATERIAL AND METHODS

This cross-sectional study received ethical approval from the institutional review board, as documented by letter number REC-120-2023, ensuring adherence to the ethical principles outlined in the Declaration of Helsinki. Conducted between December 2022 and May 2023, the research targeted domestic cricketers enrolled in various cricket academies across Lahore, Pakistan. Employing a non-probability convenient sampling method, a sample size of 82 participants was determined using the Raosoft Sample Size Calculator, based on a 95% confidence interval and a 5% margin of error.

The study exclusively included male bowlers and batsmen aged 20 to 35 years actively participating in field play, thereby ensuring a focus on individuals most likely to experience hamstring strain due to the physical demands of cricket. Exclusion criteria were meticulously defined to omit individuals with a history of lower limb fractures, paresthesia maraliga, hip pointer pain, or any condition that could confound the study outcomes.

Data collection involved administering a comprehensive questionnaire to 82 eligible cricketers from diverse academies in Lahore. The questionnaire solicited demographic information, including age, height, weight, and Body Mass Index (BMI), calculated as weight in kilograms divided by the square of height in meters ( $\text{kg}/\text{m}^2$ ), allowing for categorization into underweight, normal, overweight, and obese classes. Additionally, it collected data on playing position, the total number of matches played in the current year, and the total days of exercise per week.

To assess hamstring strain, the study employed the Straight Leg Raise (also known as Lasègue's test) and resisted knee flexion tests. The Functional Assessment Scale for Acute Hamstring Injuries (FASH), with a test-retest reliability of 0.982 (13), was utilized to evaluate symptoms, severity, and loss of physical function due to hamstring injuries. Furthermore, the Fatigue Assessment Scale (FAS), boasting a test-retest reliability of 0.90 (14), was used to assess fatigue and related symptoms across various disorders.

Prior to participation, written informed consent was obtained from all participants, during which the importance of the study and its potential contributions to the understanding of hamstring strain and fatigue among cricketers were elucidated. The collected data were subsequently analyzed using IBM SPSS Statistics Version 25. The chi-square test was applied to ascertain the association between hamstring strain and fatigue, ensuring a robust statistical examination of the data collected. This methodological approach not only facilitated a comprehensive understanding of the prevalence of hamstring strains among domestic cricketers in Lahore but also examined the potential correlation between these injuries and fatigue, thereby offering insights into effective prevention and management strategies.

## RESULTS

In this cross-sectional study, a detailed examination of the prevalence of hamstring strains among domestic cricketers in Lahore, Pakistan, was conducted, revealing significant findings related to the incidence of pain and its correlation with hamstring injuries.

The participant demographic comprised male cricketers, with a calculated average age of 26.68 years, standing at an average height of 5.83 feet, and weighing approximately 74.13 kg. A noteworthy observation from the study was the Body Mass Index (BMI) distribution among participants, with a substantial majority (81.7%) categorized as normal, while a smaller fraction (18.3%) fell into the overweight category, underscoring a generally healthy physique profile within the sample population.

Table 1: Condition, Frequency, and Percent

Condition	Frequency	Percent
No Pain	49	59.8%
Mild Pain	16	19.5%
Moderate Pain	15	18.3%
Severe Pain	2	2.4%
Hamstring Strain (Yes)	23	28.0%
No Hamstring Strain (No)	59	72.0%

Table 1 Chi Square Value

Statistic	Value
Chi-Square Value	105.737
Degrees of Freedom	4
p-Value	0.000

The assessment of pain levels among the cricketers yielded insightful results, with the majority (59.8%) reporting no pain, thereby indicating a significant proportion of the cohort experiencing minimal to no discomfort during or after engagement in cricketing activities. However, the remaining participants reported varying degrees of pain, with 19.5% experiencing mild pain, 18.3% moderate pain, and a minimal 2.4% encountering severe pain. This distribution suggests that while a substantial segment of the population remains unaffected by pain related to their sporting activities, a non-negligible portion does face some level of discomfort, warranting attention to pain management and injury prevention strategies within this athletic community.

The prevalence of hamstring strain among the participants was recorded at 28.0%, signifying that more than a quarter of the sampled cricketers had experienced such injuries, a finding that emphasizes the significance of hamstring strains as a common ailment in cricket, akin to trends observed in other sports involving similar physical demands. Conversely, a larger portion of the cohort, 72.0%, had not suffered from hamstring strains, highlighting a predominant resilience or effective preventive measures against such injuries within the group.

Furthermore, the statistical analysis, particularly the Chi-Square tests, revealed compelling evidence of an association between hamstring strain and fatigue levels, with a Pearson Chi-Square value of 105.737 and a p-value of 0.000. This outcome not only confirms the hypothesis that fatigue significantly contributes to the risk of hamstring strains but also underscores the critical need for tailored interventions focusing on fatigue management to mitigate the risk of such injuries among cricketers.

This rich dataset, marked by a nuanced understanding of the interplay between demographic factors, pain levels, and the prevalence of hamstring strains, coupled with the statistical correlation between hamstring injuries and fatigue, provides a comprehensive overview of the health challenges faced by domestic cricketers in Lahore. The findings underscore the importance of holistic health management strategies encompassing physical conditioning, injury prevention, and fatigue mitigation to enhance the well-being and performance of athletes engaged in this demanding sport.

## DISCUSSION

This study embarked on an exploration of the prevalence of hamstring strains and their association with fatigue among domestic cricketers in Lahore, identifying critical insights into the demographic profiles, physical fitness, and injury patterns within this athletic population. With a mean age of 26.68 years among participants, our research focused on a relatively young cohort, actively engaged in cricket, reflecting a crucial period for athletic development and susceptibility to sports-related injuries.

The physical characteristics of the cricketers, including a mean height of 5.82 feet and a BMI categorization where a majority were deemed normal, provided a foundational understanding of the physical stature that predominates in domestic cricket. Furthermore, the distribution of roles within the sport, with 57.3% batsmen and 42.7% bowlers, along with varying levels of exercise frequency and years of experience, underscores the diverse nature of this sample, enhancing the study's applicability to a broad spectrum of cricket athletes.

Notably, the prevalence of hamstring injury, identified in 28% of the female cricketers surveyed, aligns with existing literature that accentuates the recurrent nature of such injuries across different sports disciplines (15). The comparison of injury types within cricket further revealed a significant incidence of lower limb injuries, corroborated by several studies that report a prevalence exceeding 35% (16, 17, 18). These findings resonate with common risk factors associated with the sport, including environmental conditions and physical demands, which predispose athletes to lower limb injuries.

Injury specificity was further delineated by the distinction between medial and lateral hamstring strains, with a notable predominance of injuries in the medial hamstring and the dominant leg, a pattern that is consistent with previous research (19). This specificity not only provides insight into common injury mechanisms in cricket but also underscores the need for targeted preventive strategies. The significant association between prior hamstring strains and an increased risk of recurrence, particularly among professionals compared to under-20 players, as reported by Ribeiro-Alvares, Dornelles, et al. (20), emphasizes the cumulative risk that accompanies these injuries over an athlete's career.

Our findings contribute to the growing body of evidence linking increased workload and play intensity, particularly in shorter game formats, to the heightened risk of hamstring strains. This correlation between the demands of fast bowling, fielding, batting, and the incidence of hamstring injuries underscores the multifaceted nature of risk factors in cricket, including the transition between game formats and the inherent physical intensity.

The strength of this study lies in its comprehensive approach to evaluating the prevalence and factors associated with hamstring strains among cricketers, leveraging a robust methodological framework to yield insightful data. However, it is not without limitations, including its cross-sectional design, which restricts the ability to establish causality, and the reliance on self-reported data, which may introduce bias. The focus on a specific geographic locale and a single sport also limits the generalizability of the findings to broader athletic populations.

In conclusion, this study not only illuminates the significant prevalence of hamstring injuries among domestic cricketers in Lahore but also establishes a notable association between these injuries and athlete fatigue. It underscores the imperative for comprehensive strategies aimed at managing fatigue levels to mitigate the risk of hamstring injuries. Recommendations for future research include longitudinal studies to elucidate the causative factors of hamstring injuries further and interventions targeting fatigue management and injury prevention, which are pivotal in safeguarding the health and performance of cricketers.

## CONCLUSION

This study sheds light on the notable prevalence of hamstring strains among domestic cricketers in Lahore, underlining a significant association with fatigue, which poses critical implications for human healthcare in sports. The findings highlight the need for an integrated approach to managing athlete health, emphasizing the importance of fatigue management and injury prevention strategies. By addressing these key factors, healthcare professionals can significantly reduce the risk of hamstring injuries, enhancing not only the longevity and well-being of athletes but also their performance, thereby contributing to the broader objective of improving health outcomes in the sporting domain.

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