E-ISSN: 2583-8296 Vol.3, No.1, 2025 DOI:10.60081/SSHA.03.01.2025.368-373

Original Article

Preliminary Analysis of the Contribution of Shoulder Muscle Strength to Bowling Speed in University-Level Male Cricketers

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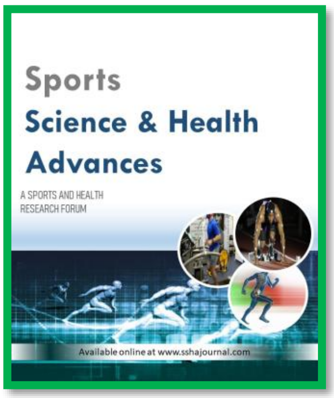

Peer-Reviewed
Refereed
Indexed

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How to cite: Hossain, R. (2025). Preliminary Analysis of the Contribution of Shoulder Muscle Strength to Bowling Speed in University-Level Male Cricketers. *Sports Science & Health Advances*. 3(1), 368-373.
https://doi.org/10.60081/SSHA.3.1.2025.368-376

Received: 01-06-2025
Accepted: 25-06-2025
Published: 30-06-2025

Abstract

Purpose: This study explored the affiliation between the power of the shoulder rotator muscle tissues and bowling velocity in male University level fast and medium-rapid bowlers. **Methods:** The researchers recruited 50 male University bowlers aged 18-30 through purposive sampling. The inner and outer shoulder rotator isometric energy was assessed using handheld dynamometry. Bowling pace was evaluated with a radar gun. The relationships among the variables of energy and bowling speed were assessed using Pearson's correlation. **Results:** Moderate to strong correlations were found between internal rotator power and bowling pace ($r = .544$, $p < .001$), while external rotator power showed a weak and non-significant correlation ($r = .365$, $p = 0.078$). **Conclusions:** Inner rotator electricity is associated with bowling speed among university- level fast bowlers, indicating its role in performance development, while outside rotator energy has a comparatively less significant impact.

Keywords: Bowling Speed, Shoulder Strength, Cricket Biomechanics, Muscle rotators, University Cricketers

Introduction

In cricket, fast bowling velocity is one of the key performance indicators that significantly impact the game's dynamics, forcing batters to respond quickly (Petersen et al., 2010). The mechanics of bowling involve intricate muscle movements, and the shoulder plays a crucial role in thrusting the arm forward and generating forces, particularly in high-velocity deliveries (Kellis & Katis, 2007). The electrical activity of muscle tissue around the shoulder, primarily in the rotator cuff organization, facilitates the provision of manipulation and force to propel the ball at high velocity (James et al., 2014).

Research has also been conducted into the effects of lower limb electricity, trunk rotation, and shoulder muscular electricity on bowling velocity (Bullock et al., 2016; Whiteley et al., 2012). A gap exists in studies examining the relationship between internal and external rotator strength and bowling speed in university - level cricketers. Knowledge in this area is crucial for the development of effective power training frameworks designed to optimize performance while minimizing the risk of injury (Chowdhury et al., 2019).

This study aimed to investigate the relationship between isometric shoulder rotator strength and bowling speed in male university bowlers who specialize in rapid and medium-speed, medium-pacer bowling. The preset assumption was that other things held constant; a high pace of bowling might be related to the high demand for rotator energy, mainly in internal rotators.

Materials and Methods

Subjects and Ethical Consideration Terms

Fifty male university-level fast and medium-fast bowlers aged 18–30 years were recruited from the Jashore University of Science and Technology cricket teams using purposive sampling between June 7, 2024, and September 24, 2024. The inclusion criteria were aged 18 to 30 years of age and have played for a minimum of two years as a fast or medium fast bowler without having any shoulder or upper extremity injuries in the last six months. Also excluded were all participants with any neurological condition that impaired their movement, as well as those who had undergone shoulder surgery prior to the study. All subjects were given study explanations and provided written informed consent. The Declaration of Helsinki's ethical principles were adhered to.

Instruments and Protocol

Assessment of shoulder power: The internal and external rotator muscle groups of the dominant shoulder were measured using an ActivForce2 handheld dynamometer (ActivBody Inc., San Diego, CA, United States). The calibration device was completed earlier than every testing session. Throughout every check consultation, participants performed three maximal voluntary contractions (MVCs) for both inner and external rotators while stood with the shoulder abducted to ninety degrees and the elbow flexed to ninety degrees. The height pressure was determined out of three trials and taken into consideration for analysis, with a foundation in Newton's (N) law.

Measurement of Bowling Speed:

Bowling speed was measured using a Bushnell Pace Velocity (Bushnell Organization, Park, KS, USA), set at 1.5 in the bowling crease and at the height of the bowler's release point. point Individuals carried out three most-effort tries on an outside pitch with a preferred cricket ball, interleaved with three minutes of relaxation to prevent fatigue. For evaluation, the quickest recorded ball velocity is measured in kilometers per hour.

Testing Protocol

All tests were completed during a single consultation, which began with a 10-minute dynamic warm-up and light bowling, as well as shoulder warming. The subsequent exams revealed protected shoulder power, as observed by the bowling speed check.

Data Analysis

Records were processed using IBM SPSS Statistics version 28. Descriptive statistics had been calculated, specifically the mean and standard deviation. Energy in inner and external rotators relative to bowling speed is evaluated using Pearson's correlation coefficients. Statistical importance became established at $p < .05$.

Results

The sample was constructed from 50 male rapid and medium-rapid bowlers at the University level. The common inner rotator energy of the dominant shoulder changed to 67. 83 ± 19.12 N and the outside rotator became 65.34 ± 13.87 N, and the typical maximum bowling velocity of contributors changed to 108.42 ± 6.89 km/h.

Correlation analysis revealed a significant, yet substantial, positive correlation between internal rotator power and ball velocity ($r = 0.544$, $p < 0.001$); that is, athletes with higher internal rotator energy tended to achieve higher bowling velocity. By contrast, the connection between external rotator electricity and bowling speed was not statistically significant and had a weaker correlation ($r = 0.365$, $p = 0.078$). It can be concluded from these findings that, of the two muscle groups, internal rotator electricity is positively related to cricket bowling pace. However, external rotator electricity is not strongly associated with cricket bowling pace in these subjects. Fifty university men fast and medium-quick bowlers made up the sample

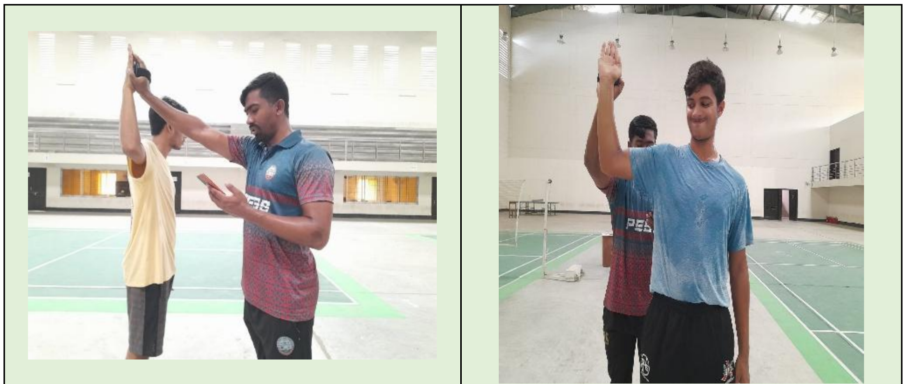

Figure 1 Measurement of Strength in Internal and External Rotators.

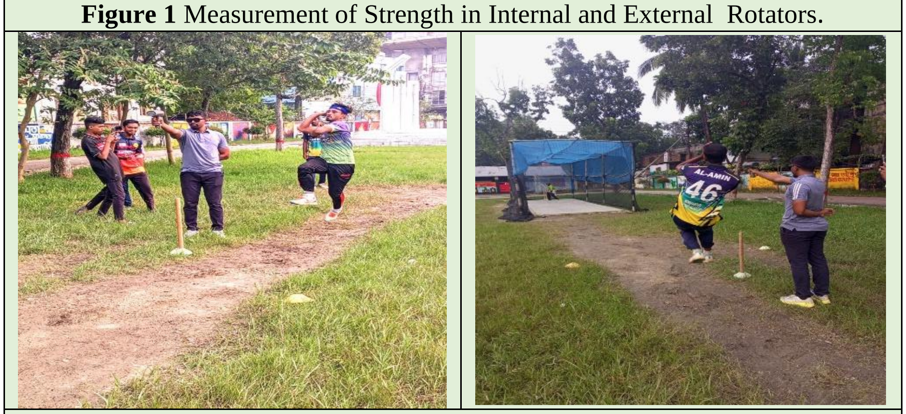

Figure 2 Checklist for the Cricket Bowling Speed Test

Table 1 Presents the descriptive statistics and correlations for the main factors

Variable	Mean ± SD	Correlation with Bowling Speed (r)	p-value
Internal Rotator Strength (N)	67.83 ± 19.12	0.544	<0.001
External Rotator Strength (N)	65.34 ± 13.87	0.365	0.078
Bowling Speed (km/h)	108.42 ± 6.89	-	-

Internal rotator strength and bowling pace exhibited a modest, statistically significant correlation, as determined by the Pearson correlation ($r = 0.544$, $p = 0.001$). However, outside rotator energy displayed a weakly effective affiliation without statistical significance ($r = 0.365$, $p = 0.078$). This means that in this population, internal rotator strength is extra tightly linked with bowling pace.

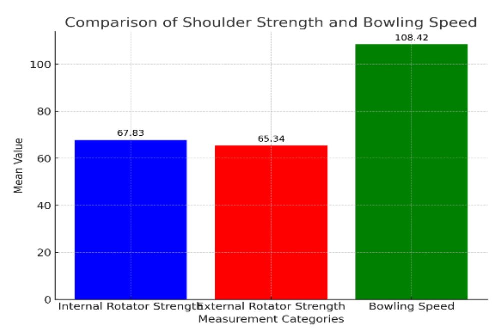

Figure 3 Mean Right Shoulder Strength and Bowling Speed of the Subjects

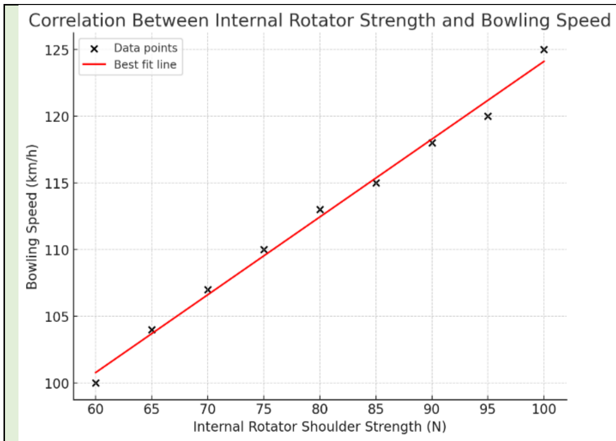

Figure 4 The Relationship between Internal Rotator Strength and Ball Speed

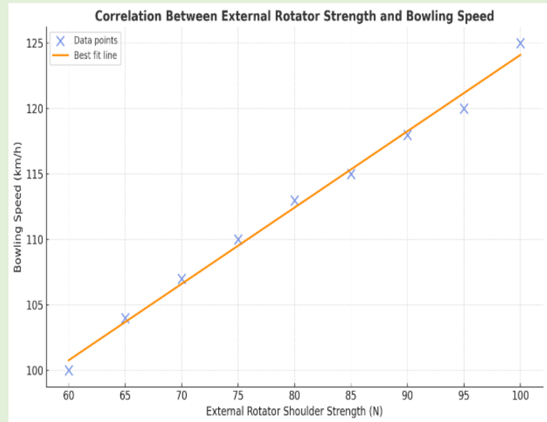

Figure 5 Correlation of External Rotator Strength and Bowling Speed

Discussions

The findings of this observation propose that there is a fine courting between the inner rotator muscle electricity and the bowling pace of university-level rapid and medium rapid bowlers. This correlation is moderate and consistent with various studies that have attempted to relate shoulder muscular activity with the performances of fast bowlers (James et al., 2014; Whiteley et al., 2012). This dating might be due to the significance of inner rotators in the course of pressure generation in the acceleration section of the ball launch (Kellis & Katis, 2007).

The relationship between external rotator energy and bowling pace becomes weak and non-massive. This suggests that external rotators, primarily responsible for deceleration and shoulder stabilization, contribute to the rate of the ball in an extra oblique manner (Foster et al., 2016). Their function in preventing damage is essential and should not be overlooked (Chowdhury et al., 2019).

There were several limitations to the study. The sample was quite small and contained data from just one university, so the findings are not generalizable. Other performance variables based on performance such as trunk rotation, lower body strength, and flexibility were not controlled for. These may make a sizeable contribution to the effect of bowling speed.

Future research must include a larger and more varied sample and measurement of other biomechanical variables. One of the experimental or longitudinal designs may enable elucidation of the causal relationships between bowling performance and muscle strength.

Conclusion

The primary analysis has demonstrated that the electrical activity of the inner rotator muscles in the dominant shoulder plays a crucial role in enhancing bowling velocity in male University level bowlers at both rapid and medium-speed levels. To improve the inner rotators, training programs designed to increase bowling velocity should be advanced. From the results of this observation, it does not appear that external rotator power has a significant correlation with speed; however, its role in stabilizing the shoulder joint and preventing harm makes it crucial for a comprehensive education program. Those outcomes build the foundation for coaches and sports scientists seeking to enhance the performance of fast bowlers through targeted strength training. Given that the relationship was significant, further studies are suggested to use larger sample sizes and more independent variables to have a full picture of the issue. Programs aimed at developing the internal rotators may be useful if based on accurate biomechanical analysis.

Acknowledgment

The author deeply expresses gratitude to the Department of Physical Education and Sports Science, Jashore University of Science and Technology, for their academic and research facilities relevant to the study. Special acknowledge is given to Md. Khalid Hasan and Humayun Ahmed for assisting in data collection. The author is greatly indebted to Md. Moznuzzaman for the robust supervision, constructive comments, and unrelenting support during the whole research work. Thanks, are also due to the Jashore University Cricket Team and all the student participants for their willingness to spare time and effort towards accomplishing the objectives of this study.

Conflict Of Interest

The author wants to make it clear that this research was carried out independently and did not receive any financial backing. There are no conflicts of interest or affiliations that might have swayed the results of this study.

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