

“Comparison of Hand Grip Strength in Cricket Players (Batsmen Vs Bowlers)”

Farhan Khan¹, Dr. Harish Sharma²

1. MPT Student, Department of Physiotherapy, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India
2. Associate Professor, Department of Physiotherapy, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

Corresponding Author

Dr. Harish Sharma

Associate Professor,

Department of Physiotherapy,

Teerthanker Mahaveer University,

Moradabad, Uttar Pradesh, India

Email; harishsharma.mrt@gmail.com

Abstract

Hand grip strength has been proven a significant predictor of performance in various sport, it is been found as a significant determinant of the bone minerals content and area.

Hand dynamometer is the most valid and reliable tool to measure grip strength. It was found that players within age group of 13-16 has lower HGS values as compared to adult players of age group up to 36 years.

It is economical way to calculated the overall strength of the limb and often used in clinical practice to find out the disease activity as the major factor that influence the grip strength includes muscle strength, fatigue, the time of the day, age, nutritional status, restricted motion and pain.

Methodology- a cross sectional observational study of 70 subjects divided into 2 groups of 35 each- batsmen and bowlers. Before taking the HGS, anthropometric variables were measured. HGS was measured by taking three mean values of the maximum grip recorded on hand held dynamometer.

Result- On using test of significance, Age, BMI and years of experience were statistically significant with ($p=.000$). HGS of batsmen were found to be greater than that of bowlers. Means value for bowlers was 1.06405 while mean value for batsmen was 1.33329. Sign test gives significant difference between both groups ($Z=.000$).

Conclusion- the present study concludes that the HGS of male batsmen is higher than that of male bowlers of same age group.

Key Words- Hand Grip Strength, batsmen, bowlers, dynamometer.

1. Introduction

Cricket is one of the most demanding sport comprising of different skill and high level fitness, excellent eye to and upper extremity power hand grip strength and the co-ordination movement shoulder arm and wrist is required increased upper body strength in batsmen and bowlers is important when cricket sport are excited proved benefits and added strength for a cricket are- To prevent injury, to increase bowling speed, to reduce the effect of fatigue in player, to improve the batting speed, to improving the throwing distance.

Grip strength can be defined as the force applied by the hand to pull on or suspend from objects and is a specific part of hand strength. Batting and bowling are the most important area of cricket.

Fast bowling in cricket is the projection the ball with the maximum velocity in the opposite side of the wicket at the distance of twenty-two yards. Batting is skill used with the bat to hit, edge stick or guide the ball after it how been bowled usually for the purpose of scoring runs during a match or game.

Hand grip strength has been proven a significant predictor of performance in various sport, it is been found as a significant determinant of the bone minerals content and area. Its assessment assumes performance in various fields.

The power of the hand grip is the result of force full flexion of all finger joints with maximum voluntary contraction that a player except, grip strength can be the best indicator of overall strength of the limb. It is expected that grip strength given the index of functional integrity of upper limb.

Grip strength plays a key role in prevention of injury. Hand grip dynamometers measures

hand grip based on 4 principles: sealed hydraulic system, variation in electrical resistance of length of wire, compression of an air- filled compartment and amount of tension produced in a spring³.

It is evaluated as a component of hand function in most of the sport. It is one of the best indicators of the overall strength of the limb. Hand held dynamometry is used to measure the muscular force generated by the flexor mechanism of the hand and the forearm¹. Hand dynamometer is the most valid and reliable tool to measure grip strength.

The HGS is correlated with the strength of upper limb, some anthropometric values as well as the general strength of the body. Previous studies shows that there is a marked reduction in HGS for both dominant and non-dominant hand in cricket players with shoulder injury hence it shows that the HGS is the outcome of overall strength of upper limb.

Genetically, hand dominance is inherited, but nutritional status plays an equally important role. The length of finger give better throw as all shots and throws are finished by wrist and fingers. Greater the grip strength were recorded in players with larger palmer surface. HGS depend on how often the player performs muscular activity like catching, holding, shooting and throwing of ball. Gender differences also play a significant role in determining the HGS as previous done show that the HGS of male players for both dominant and non- dominant hand is greater than that of women.

Bowlers head to bowling to the batsman continuously and for that they have to improve their shoulder strength, which will help them to bowl faster whereas the batsman focuses on bating more so it heavy be a reason that there is a significant difference between the two, the

strength level between the two is not at all similar.

While the same studies done on female cricket players and there was significant differences found between the batsman and bowlers due to the batsmen concentrating on holding the bat which lead to more grip strength in batsman group while bowlers work on their shoulder power to throw with appropriate speed and intensity.

In earlier studies it was found that there is an essential effect of age and BMI on hand grip strength in cricket players. It was found that players within age group of 13-16 has lower HGS values as compared to adult players of age group up to 36 years. It might be prominently due to the hormonal changes i.e., the testosterone levels in higher age group is at peak level helpful to perform with more intensity to the players. Players with lean body mass have higher HGS as compared to players with higher BMI. Therefore these two factors play a major role in deciding the HGS.

It is economical way to calculated the overall strength of the limb and often used in clinical practice to find out the disease activity as the major factor that influence the grip strength includes muscle strength, fatigue, the time of the day, age, nutritional status, restricted motion and pain therefore helps to understand the impact of shoulder and elbow loading on hand activity.

2. Objectives of the Study: To evaluate the hand grip strength of batsmen and bowlers using hand dynamometer in cricket players.

3. Methodology:

Study design- Observational design

Study type- Cross-sectional study

Sample size-70

Sample method- Convenience sampling

Study setting- Department of Physical Education, TMU, Moradabad

Materials to be used-

1. Hand dynamometer
2. Paper
3. Table
4. Chair
5. Stadiometer
6. Weighing machine

Instrumentation

Hand held dynamometer - Hand held dynamometry is used to measure the muscular force generated by the flexor mechanism of the hand and the forearm. Hand dynamometer is the most valid and reliable tool to measure grip strength. Grip strength plays a key role in prevention of injury.

The reliability results showed that the handgrip strength measured with dynamometer is reliable enough with ICC values, 0.85-0.98.

Inclusion Criteria:

- Male cricket players with 3 years of experience.
- Age group between 18-28 years
- Dominant hand

Exclusion Criteria:

- Cricket players with less than 3 years of experience.
- Female cricket players
- Players with upper limb injury like fracture or any recent surgery
- Non- dominant hand

4. Procedure

- Subjects were taken from department of physical education, TMU, Moradabad.
- After taking the subjects within desired criteria, subjects were divided into 2 groups i.e. the batsman and bowlers.

- The anthropometric measurements like age, height (using stadiometer), weight(using weighing machine) and BMI [weight /(height)²] were recorded for each group.
- The subjects were seated on a chair with back support and shoulder adducted and neutrally rotated, elbow flexed at 90 degrees, forearm and wrist in neutral position.
- The subjects were asked to hold the dynamometer, at their side without

touching the rest of the body, and squeeze it forcefully. Three trials were taken and mean was calculated for final values.

5. Statistical Analysis - SPSS software 20.0 is used for the statistical analysis. T test is used for the significance of variables. The level of significance was set at 0.05. Mean and standard deviation was taken out for comparing the HGS between two groups.

6. Result

Table 1- Showing significance of the age, BMI and Years of Experience

One-Sample Test									
	N	Std. Deviation	Std. Error Mean	Test Value = 0					
				t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
								Lower	Upper
AGE	70	1.247	.14910	151.195	69	.000	22.54286	22.2454	22.8403
BMI	70	1.664	.19899	103.860	69	.000	20.66743	20.2704	21.0644
YOE	70	0.897	.10721	34.311	69	.000	3.67857	3.4647	3.8925

Total number of subjects are presented by N i.e. 60

Mean values for age is 22.5429

Mean values for BMI is 20.66743

Mean value for YOE is 3.67857

On using test of significance, the above-mentioned variables are significant for the given study (i.e. p= .000)

Table 2- Showing the HGS of batsmen and Bowlers

One-Sample Test									
Groups	N	Std. Deviation	Std. Error mean	Test Value = 0					
				t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Batsmen HGS	35	7.88783	1.33329	48.409	34	.000	64.54286	61.8333	67.2524
Bowlers HGS	35	6.29503	1.06405	48.115	34	.000	51.19714	49.0347	53.3596

Mean value for HGS of batsmen is 64.54286 which is greater than that of bowlers i.e. 51.1971

TABLE 3 - SIGN test showing significant difference between HGS of Bowlers and Batsmen

	N	Negative difference ^a	Positive difference ^b	Z	Asymp. Sig. (2 Tailed)
Bowlers HGS	35	32	3	-4.733	.000
Batsmen HGS	35				

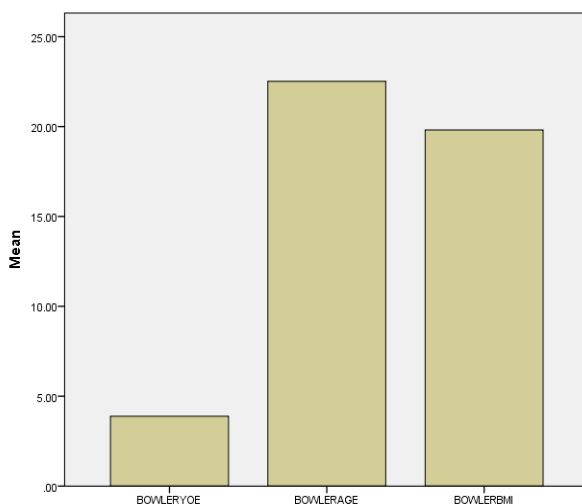
a. BOWLERHGS < BATSMANHGS

b. BOWLERHGS > BATSMANHGS

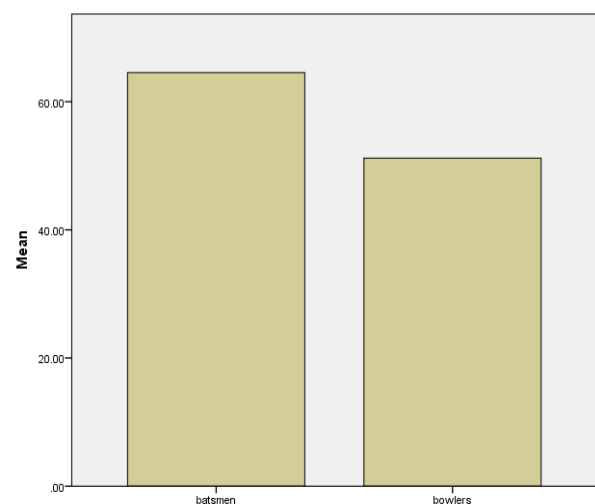
c. BOWLERHGS = BATSMANHGS

Since 32 subjects show negative difference i.e. HGS Batsmen > HGS Bowlers.

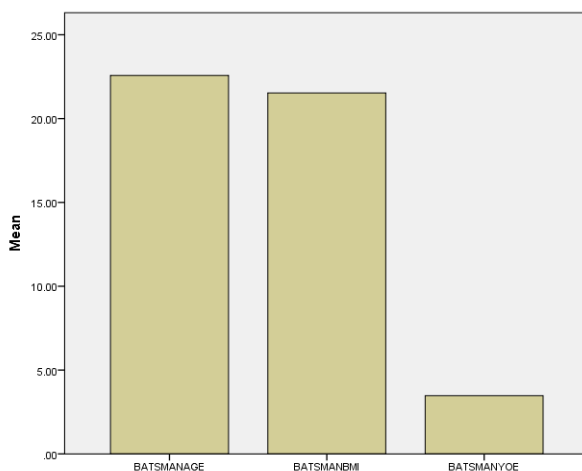
Graphs



Graph- Showing mean of BMI, YOE and AGE of Bowlers



Graph- Showing mean of HGS of batsmen and Bowlers



Graph- showing mean of mean BMI, YOE and AGE of batsmen

7. Discussion

The purpose of this study was to compare the HGS in cricket players i.e. b/w bowlers and batsmen as seen in table 5.2. The anthropometric measurement like age & BMI along with YOE are highly significant for the current study ($p=0.000$). Age group criteria was set at 18 to 28 years. Mean for age of both the group obtained in 22.54. It is shown in earlier studies that players with lower age group have higher testosterone levels play with much more intensity due to higher testosterone levels as compared to higher or elder age groups.⁸

Mean for BMI obtained is 20.607 which is under normal range and does not show any major important HGS. As study done by Pavan K Talupura in 2016 proved the cricket players with lean body mass or lesser muscle mass tend to have lesser BMI whereas players with higher muscle mass have higher values of BMI.⁵ For HGS the instrumentation used i.e. Hand dynamometer whose test retest reliability in study done by Pavan Kumar T (2016) showed the higher value of 10.743-0.856 for right hand and 0.781-0.899 for left hand.³

In this current study, HGS was found to be higher in the Group A i.e. Batsmen as compared to group B i.e. bowlers group. The mean value for Group A is 64.542 which is higher than that of Group B with 51.197 mean value. Using SSIGN test shows significant difference of Z value of .000 between two groups. It shows a significant difference between mean of both the groups study done by Megha Chaurasia et al in 2018 is done on female cricketers obtained the reverse results i.e., the HGS of female bowlers is lesser as compared to that of female. The mean of HGS for right hand in female in bowlers was 19.1200 while in batsmen, it was higher with value of 20.6900. Similarly, for left hand, the mean value of HGS in bowlers was 13.6800, which was lesser than that of batsmen with mean of 15.5300.⁴

It can be explained by position of game position during the play. For bowlers, there should be more shoulder strength due to strength required in throw of ball with faster velocity while for the batsmen more HGS is required in the dominant hand for holding bat and concentrate on batting. In their study they found more HGS in the right hand as it was dominant hand while batting during the play as compared to the left HGS.

On the contrary, study done by Dr. Ratnesh Singh in 2016, gave opposite finding where significant difference of ($p = .000$) is obtained with mean value of 34.81 for batsmen and mean

value of 39.80 for bowlers.⁷ Much evidences are not present on the current discussion topic.

8. Conclusion

Since the mean values of male Batsmen is higher than the mean values of male Bowlers in cricket sport therefore the present study concludes that the HGS of male batsmen is higher than that of male bowlers of same age group.

References

1. Sathya P, Kadiravan V, Ramakrishnan KS, Vedak TM. Correlation between hand grip strength and shoulder power in cricket players. *International Journal of Science and Research (IJSR)*. 2016;5(3):348-52.
2. Sathya P, Kadiravan V, Ramakrishnan K, Ghodake A. Association between hand grip strength and shoulder power in intercollegiate cricket players. *Int J Innov Res Sci Eng Tech*. 2016;5:3085-91.
3. Kumar TP, Kulandaivelan S, Yadav A, Vasu P. Test-retest reliability and consistency of electronic Jamar hand-grip dynamometer in Cricket players. *IOSR-Journal of Sports and Physical Education*. 2016;3(3):49-53.
4. Chaurasiya M, Mehta D. A comparative analysis on selected strength variables among female bowler and female batsman in cricket.
5. Talupuru PK, Kulandaivelan S, Haripriya U, Singh V. Effect of BMI on hand grip strength in elite cricket players. *Int J Physiother Res*. 2016;4(5):1696-700.
6. Shyamal K, Yadav KM. An association of hand grip strength with some anthropometric variables in Indian cricket players. *Facta universitatis-series: Physical Education and Sport*. 2009;7(2):113-23.
7. Singh R, Singh K. Difference between batsman and fast bowlers in relation to grip strength, back strength, leg strength and

- flexibility in cricket. International Journal of Advanced Research and Development. 2016;1(1):97-9
8. Sathya P, Kadiravan V, Ramakrishnan KS, Vedak TM. Correlation between hand grip strength and shoulder power in cricket players. International Journal of Science and Research (IJSR). 2016;5(3):348-52.
 9. Goswami S, Srivastava VK, Rajpoot YS. Association Between Ball Velocity and Hand Grip Strength of Male Cricket Players. Indian Journal of Physical Education, Sports Medicine & Exercise Science. 2016;16(1and2):60-3.
 10. Tahoor A, Koley S. Anthropometric Variables and Physical Fitness Characteristics in Female Cricket Players of Maharashtra and Punjab: A Comparative Study.
 11. Shanbhag AR, Kumar N. Correlations of Anthropometric Measurement and Handgrip Strength between Collegiate Cricket Fast and Spin Bowlers. Indian Journal of Physiotherapy & Occupational Therapy Print-(ISSN 0973-5666) and Electronic-(ISSN 0973-5674). 2021 Jul 19;15(4):1-0.
 12. Koley S, Yadav MK, Sandhu JS. Estimation of hand grip strength and its association with some anthropometric traits in cricketers of Amritsar, Punjab, India. Internet Journal of Biological Anthropology. 2009;3(1).
 13. Chahal A, Kumar B. Relationship of hand anthropometry and hand grip strength in junior basketball boys. Int J Health Sci Res. 2014;4(11):166-73.
 14. Trudelle-Jackson E, Jackson AW, Frankowski CM, Long KM, Meske NB. Interdevice reliability and validity assessment of the Nicholas Hand-Held Dynamometer. Journal of Orthopaedic & Sports Physical Therapy. 1994 Dec;20(6):302-6.