

To Study the Correlation of Body Mass Index with Agility and Flexibility of Hamstring Muscle on Practicing Male Cricket Players

Dr. Boskey Panchal¹, Dr. Ravi Dumaniya²

¹PhD Scholar, MPT in Cardio - Respiratory Disorders, Assistant Professor, Shree Bhartimaiya College of Optometry and Physiotherapy, Surat, Gujarat

²Bachelors of Physiotherapist, Shree Bhartimaiya College of Optometry and Physiotherapy, Surat, Gujarat

Abstract: *Background and objective:* Body mass index is defined as weight (kg) divided by height (mtr) squared. Flexibility varies between individual, particularly, in terms of different in muscle length and joints. Agility is also the ability of the body to quickly change direction from one place to another. Objective of this study was to find the relation between BMI, hamstring muscle flexibility and agility in practicing male cricket player. *Method:* students of age 7 to 22 years were selected for the study as per inclusion criteria. Written consent has been taken and the method has been explained to students, body mass index calculated based on subjects' height and weight. height was measured in cm and body weight in kg. Hamstring muscle flexibility was measured using YMCA sit and reach test. *Statistical analysis:* Descriptive statistics of Mean and standard deviation were calculated. All collected data were analyzed using SPSS. Level of significance for correlation testing was set at $p \leq 0.05$ and confidence interval 95%. Spearman correlation test was used to find correlation between outcomes. *Results:* In BMI vs. hamstring flexibility correlation, there was no considered statistically significant correlation for age group subjects of 7 - 14 and 15 - 22 with respectively r values of $r = +0.007331186$, $r = -0.06369399$ and p values were $p = +0.944397316$, $p = +0.597704058$. In BMI vs. agility correlation, there was considered significant inverse relation in age group subjects age 7 - 14, and statistically non - significant correlation in age group 15 - 22, respectively r values were $r = -0.42829$, $r = -0.06369399$ values p values are $p = +0.00002$, $p = +0.38457$. *Conclusion:* Our result had concluded that there was no relationship between BMI and hamstring muscle flexibility for both age groups, and inverse correlation between BMI and agility for age group of 7 - 14 whereas non - significant correlation in age group of 15 - 22 showing weak correlation between BMI and agility.

Keywords: Hamstring muscle flexibility, BMI, YMCA sit and reach test, T agility run test.

1. Introduction

Agility is the ability to maintain or control body position while quickly changing direction during a series of movements. Agility is an essential component in most field requiring high - speed action (acceleration, maximal speed) and specially team sports competition. Moreover, agility is a combination of speed and coordination. (1) An athlete who displays good agility will most likely possess other qualities such as dynamic balance, spatial awareness, and rhythm as well as visual processing. (2)

In modern era of cricket, player requires 3 dimensional quality which includes batting, bowling and fielding, Fitness and agility are the key factors of their academics performance of cricket players but most of cricket players works on their physical fitness which provides them strength to stand long in field but lack of abilities in the change of direction quickly, running between the wickets, catching and chasing ball, denotes their low level of agility which affects their chances of selection despite having good academics techniques. In this era of cricket every cricket player requires good fielding skills with their batting or bowling abilities. Therefore, agility is factor which increases their chances of selection. so this study is formulated to check correlation of physical fitness and BMI. Here Agility has been measured using t - drill test. (3)

Body mass index is one of the most accurate anthropometric measurement used to determine when extra kilograms in

body weight as related to the height of that individual translates in to health risks (4). Simple anthropometrical measurements are taken to rule out obesity and are more practical both in the clinical practice and for large scale epidemiological studies. BMI is calculated as weight in kilograms divided by the square of height in meters is the most widely used and is a simple measure of body size (5).

Studies have reported that the high levels of obesity assessed by body mass index (BMI) could affect the motor performance and aerobic fitness of youths (6). Furthermore, the increase in the obesity levels prompted researchers in the field of obesity to focus their attention on the association between the BMI and musculoskeletal fitness. (7).

Flexibility refers to range of motion in a joint or series of joints and length in muscles that cross the joints to induce a bending movement and motion. Flexibility is usually described as a component of general physical fitness. Flexibility has been defined as the ability to make movements through the maximum possible amplitude or a range of movement. Cricketers have to run between the wickets, pick up the ball from the ground along running and chasing the ball. This all activities require flexibility. As hamstring is major muscle which is involved in running. tightness of hamstring muscle may cause strain or any other injury. However, the primary importance of the flexibility is in preventing and reducing the injuries. (8)

Volume 12 Issue 5, May 2023

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

Individuals body flexibility level is measured and calculated by performing a sit and reach test. The most widely used assessment performance is the sit and reach test used by the YMCA. (9) Flexibility and agility are two important parameters of fitness for athletes and also for the selection of athletes for any competition. Thus, it is very essential to understand if any relation is present between flexibility and agility to have more beneficial effect on athlete's performance. (10)

2. Purpose of Study

Although there are number of studies done on BMI, agility and other parameters, this study purposed to check the relationship between BMI flexibility of hamstring muscle and agility on practicing cricket players and assess their result.

Uniqueness of the Present Study

There are so many studies done on the agility and hamstring muscle flexibility but in this study, we use method for assess the hamstring muscle flexibility and agility, which will give an idea about the effect of BMI and flexibility as well as awareness of players about fitness. By that we can give conclusion for the study that relation between BMI, flexibility of hamstring muscle and agility are there or not.

Rationale and Goals of Study

We want to know the BMI in relation with agility, flexibility of hamstring muscle. by that we can know the awareness of the players and after that we can train for exercise program to improve their academicals performance.

Aims and Objective

To check correlation between agility and BMI, flexibility of hamstring muscle

3. Methodology

An Observational - correlation study was conducted on 164 young practicing male cricket player from various cricket academy of Surat, Gujarat. (Pankajkapadiya cricket academy, surat, Saritasagar cricket academy, surat, Youngster cricket academy, surat, Sai cricket academy, surat) during November 2019 – January 2020. Participants are selected based on inclusion - exclusion criteria. Inclusion criteria - Player with age group of 7 - 22 years, Player has been coached maximum for 8 months and players with player with history of any cardiopulmonary condition, any recent musculoskeletal injury and neuromuscular disorder and competitive cricket players were excluded.

Written consent has been taken and the method has been explained to students, body mass index calculated based on subjects' height and weight. height was measured in cm and body weight in kg. Hamstring muscle flexibility was measured using YMCA sit and reach test. 3 trial has been used to measure hamstring muscle flexibility. T run test used to measure their agility score.

Statistical Analysis

Descriptive statistics of Mean and standard deviation were calculated. All collected data were analysed using SPSS.

Level of significance for correlation testing was set at $p \leq 0.05$ and confidence interval 95%. Spearman correlation test was used to find correlation between outcomes.

4. Results

Table 1

	Age	
	7 - 14	15 - 22
BMI VS Age	R=+0.408001	R=+0.27877
	P=+0.00005	P=+0.018566
BMI VS Hamstring Flexibility	R= +0.007331186	R= - 0.06369399
	P= +0.944397316	P=+0.597704058
BMI VS Agility	R= - 0.42829	R= - 0.10477
	P= +0.00002	P=+0.38457

In BMI vs. age correlation and p value calculation by normal standard, the association between two variables would be considered statistically significant in all age group subjects age 7 - 14, 15 - 22, respectively r values are $r=+0.408001$, $r=+0.27877$ and p value are $p=+0.00005$, $p=+0.018566$.

In BMI vs. hamstring flexibility correlation and p value calculation by normal standard, the association between two variables would not be considered statistically significant in all age group subjects age 7 - 14, 15 - 22, respectively r values are $r= +0.007331186$, $r= - 0.06369399$ p values are $p= +0.944397316$, $p=+0.597704058$.

In BMI vs. agility correlation, p value calculation by normal standard, the association between two variables would be considered significant inverse relation in age group subjects age 7 - 14, and statistically non - significant in age group 15 - 22, respectively r values are $r= - 0.42829$, $r= - 0.06369399$ values p values are $p= +0.00002$, $p= +0.38457$.

5. Discussion

BMI is defined as weight (kg) divided by height (mtr) squared as an individual's height and weight, Agility is the quality of being agile. Agile refers to the ability to move quickly and easily, either physically or mentally. Agility is also the ability of the body to quickly change direction from one place to another. Studies have reported that the high levels of obesity assessed by body mass index (BMI) could affect the motor performance and aerobic fitness of youth.

Flexibility refers to range of motion in a joint or series of joints and length in muscles that cross the joints to induce a bending movement and motion. Purpose of study was to find out any significant correlation of BMI with hamstring flexibility, BMI and agility in practicing young cricket male player. The primary aim of this study was to find out relationship between BMI, agility and flexibility of hamstring muscle in practicing male cricket players.

AnuArora, Sneha D' Souza, Sujata Yardi studied on Association between Body Mass Index and Hamstring/Back Flexibility in Adolescent Subjects. and found weak association between BMI & Flexibility in adolescent subjects. (23) In this study, there is no statically significant correlation, between bmi and flexibility of hamstring muscle in age group of 7 - 14 as well as 15 - 22.

Pawiter Singh studied on Assessment of selected BMI, flexibility and agility parameters of cricket and baseball inter university level players "The result of the study established that there is significant difference of BMI & Agility parameter and insignificant differences show in Flexibility parameter. (17) Dr. Mahesh studied on " Relationship of body mass index with agility and speed of universe to players". Total 46 male players were selected, Age of the subjects ranged between 20 to 25 years To find out relationship between selected variables, descriptive statistics and the pearson's product moment correlation was used and find out that there exists a significant relationship between BMI and agility (18) In this study, there was statically inverse correlation between BMI and agility score for age group of 7 - 14 year players and there was no statically significant correlation between BMI and agility score for age group of 15 - 22 year players.

Deep mala thakur studied on flexibility and agility among children and adolescent athletes ". A correlational study was done on 50 athletes between the age group of 8 - 14 years who were recruited from rls ground Belgaum, Karnataka. And find out that there is no correlation between flexibility and agility in the samples. (16) In this study, there is statically significant correlation between age and agility, for age group of 7 - 14 as well as 15 - 22.

6. Conclusion

There is no statically significant correlation between BMI and flexibility of hamstring muscle for all subjects age group. There is no statically significant correlation between BMI and agility score for age group of 15 - 22 and statically inverse significant correlation between BMI and agility score for age group 7 - 14. So, it concludes that there is weak correlation between BMI and agility score.

7. Limitations

Study is done on limited age group, focused only young practicing male cricketers who are trained for maximum period of 8 months.

8. Further Recommendation

The same study can be done on other athletes, including women players. Similar study can be done focusing other age group and can be done on subjects trained more than 8 months.

Conflict of Interest: Nil

References

- [1] Homoud MN. Relationships between Illinois agility test and reaction time in male athletes. Swedish J Sci Res.2015; 2 (3): 28 - 33.
- [2] Kainoapauole, kentmadole, reliability and validity of the t - test as a measure of agility, leg power, and leg speed in college - aged men and women journal of

- strength and conditioning research - j strength cond res, vol.14, no.4, 2000.
- [3] WHO mean body mass index world health organization. retrived 5 february 2019
- [4] Stamlerj. Epidemiologic findings on body mass and blood pressure in adults. annualepidemiology.1991; (1) 347 - 362.
- [5] Physiotherapy for respiratory and cardiac problems. [adults and pediatrics]edited by jenifeir a pryor and s ammani Prasad.
- [6] The relationship bmi and hamstring tightness timj. nsutherland, christener. mclanchlan, Malcomr. sears, Richiepoulton, Robertj. hancox. european respiratory journal 2016 48: 734 - 747; doi10.1183/13993003.02216 - 2015.
- [7] Obesity and muscle flexibility kwagyanj, rettatm, ketete, Bettencourt, mqbool, xurandalos., ethn dis.2015 spring, 25 (2); 208 - 13.
- [8] Is poor hamstring flexibility a risk factor for hamstring injury " siobhan o connor et al j sport rehabilitation 2019.
- [9] Chung PK, Yuen CK. Criterion - related validity of sit - and - reach tests in university men in Hong Kong. Percept Mot Skills.1999 Feb; 88 (1): 304 - 16. doi: 10.2466/pms.1999.88.1.304. PMID: 10214658.
- [10] Assessment of selected BMI, flexibility and agility parameters of cricket and baseball players, pawiyersingh, international journal of physical education sports and health 20174 (2): 313 - 315.