

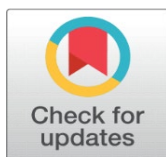
BANGLADESHI AND INDIAN YOUTH ATHLETES DIFFER IN STRENGTH AND ENDURANCE

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ABSTRACT

The purpose of the research was to investigate the health-related physical fitness of youth athletes from Bangladesh and India. The forty athletes from each country, Bangladesh (n=40) and India (n=40) were chosen using a simple random sampling method. The researchers selected Bangladeshi athletes from the Jashore district in Bangladesh and Indian athletes from the Murshidabad and Birbhum districts of West Bengal, India. Those who competed in at least one district-level competition were included in the study. For the study, the researchers chose male athletes between the ages of 17 and 21 years. The study included lower body explosive strength in the standing broad jump test, upper body muscular strength in the pull-up test and cardio-respiratory endurance in the cooper test as variables. The data was analysed using descriptive and inferential statistics (independent t-test), with the significance level set at 0.05. An independent sample t-test shows that Bangladeshi and Indian youth athletes standing broad jump $t(78) = 2.10$, sig. = 0.039; pull-ups $t(78) = 1.68$, sig. = 0.099; cooper test $t(78) = 2.34$, sig. = 0.022 respectively. The findings revealed a substantial difference in leg explosive strength and cardio-respiratory endurance, but no substantial difference in upper body muscular strength between Bangladeshi and Indian youth athletes.

Keywords: Cardio-Respiratory Endurance, Cooper Test, Pull-Ups, Standing Broad Jump, Strength

1. INTRODUCTION

Physical conditioning is characterized as the capacity to complete everyday tasks efficient and effective manner without becoming exhausted, as well as having enough energy to participate in any recreational activity [Penney and Clarke \(2005\)](#). In sports, agility, power, explosiveness, stamina, and range of motion are all important motor skills. Players' fitness level and technical skills are highly valued in

sports training schedules [Kansal \(1996\)](#). Overall, fitness and training are emphasised because they are key elements of success [Hamilton \(1993\)](#). Physical fitness is one of the aspects that contribute to top-level sports performance since it allows athletes to move around the field in varied ways [Islam \(2018\)](#). According to [Haskell et al. \(2007\)](#) and [Glassman \(2002\)](#), health-based fitness is defined as cardiovascular endurance, muscular endurance, muscle strength, muscle softness, and body composition, which encompasses physiologic and psychological functions. Physical fitness is a strong predictor of morbidity and mortality, making it a valuable indicator for public health surveillance [Cuenca-Garcia et al. \(2022\)](#). Researcher [Keating \(2003\)](#), discovered the efficacy of a health and fitness test system for teens in the USA, found that the fitness norms are determined by a battery of tests. The test has been shown to improve health-related lifestyle quality. The amount of oxygen that can be transported by the body to the working muscles, as well as the efficiency with which those muscles use that oxygen, determines an individual's level of physical fitness [Choudhuri et al. \(2002\)](#).

Multiple components of health-related physical fitness have been recognized as key indicators of current and future health among youths, CRE (cardio-respiratory endurance), muscle strength (muscle strength, local muscle endurance, and force), and bodily proportion are all important factors to consider [Hurtig-Wennlöf et al. \(2007\)](#), [Ortega et al. \(2008\)](#), [Smith et al. \(2014\)](#). Physical fitness tests can be used to assess health-related indicators at the teenage level, and some of them can also be utilized in other settings like sports [Marques et al. \(2021\)](#). Also, physical fitness is a key component of sports performance and is required in every sport. One of the most important aspects of general physical fitness is cardiovascular endurance [Kerketta and Singh \(2015\)](#). Most games rely on cardiovascular fitness to succeed. A player's cardiovascular fitness must be elite if he wants to play with good mental and physical abilities [Kaur and Singh \(2019\)](#). To determine aerobic capacity, the maximal oxygen consumption (VO_2 max) is commonly used, depending on the circumstances, this could be determined directly (lab tests) or indirectly (field tests) [Oluwadare and Olufemi \(2018\)](#). For athletes to perform at their best in competitions, they must have a high level of cardiovascular endurance. Regular physical activity and a high level of cardiovascular endurance have been linked to better memory and executive control performance, so intervention training in general improved cognitive function [Helgerud et al. \(2001\)](#). Increased maximum oxygen consumption (VO_2 max), exercise capacity, and weight and fat loss were just a few of the advantages of cardiovascular endurance training [Vrachimis et al. \(2016\)](#).

Games and sports are challenging in general because they require a lot of muscles and joints to stretch to perform large-dynamic activities or stay away from sports injuries [Rochcongar \(2004\)](#). Athletes can use an optimum range of motion to avoid injuries and increase performance in a variety of sports [Rahman and Islam \(2020\)](#). To succeed in a team sport, athletes must have the perfect combination of technical, tactical, physical (such as somatotype), and mental ability [Bangsbo and Michalsik \(2002\)](#). Soccer players must have a high level of cardiovascular endurance to produce repeated sprint ability and strength to meet the physical fitness criteria [Kartal \(2016\)](#), [Islam et al. \(2019\)](#). In all racquet sports, having a high level of aerobic fitness is a prerequisite for competing at the elite level [Girard and Millet \(2008\)](#), [Lees \(2003\)](#). Badminton requires short and long-term endurance as well as force, quickness, mobility, power, and rapidity, which are all fundamental skills [Lees \(2003\)](#), [Lieshout and Lombard \(2003\)](#). A great level of physical fitness is required of Kabaddi players. Kabaddi is a sport that requires athletes to have all physical fitness components and a variety of other unspecified traits [Pal \(2019\)](#). Runners should

focus on rapid strength, maximal stamina, speed, and agility throughout their fundamental exercises in their particular events [Bong-Ju and Byoung-Goo \(2017\)](#).

In most sports, cardiovascular endurance and coordination of the shoulders and legs are crucial to success. According to prior study, volleyball, football, and wrestling all require muscular fitness, which includes strength, muscular endurance, and power [Corbin and Le Masurier \(2014\)](#). Arm strength and leg power are fitness metrics that measure a person's ability to overcome maximum resistance with their shoulders and legs. Lower leg power is crucial in a range of sports and athletic activities [Singh \(2018\)](#), [Andrabi et al. \(2019\)](#). Running is a great way to strengthen your heart and circulatory system. It's a high-intensity aerobic exercise that burns both fatty acids and carbs for energy [Cantwell \(1985\)](#). A variety of elements influence physical fitness, including one's health, physical structure, nutrition, rest and sleep, altitude, habit, physical surroundings of living, and temperature. Though Bangladesh and India are nearby independent countries, their geographical environments, economic conditions, religions, and eating habits are vastly different [Reza \(2018\)](#). Therefore, the researchers want to evaluate the lower and upper body strength and endurance between Bangladeshi and Indian youth athletes. The findings reflect the current state of fitness among athletes from both countries.

2. METHODOLOGY

2.1. SELECTION OF SAMPLES

A total of N=80 male athletes were selected for the study, among them n=40 from Jashore district in Bangladesh and n=40 from Birbhum and Murshidabad districts in West Bengal, India. Athletes from a variety of sporting disciplines compete in athletics, basketball, handball, football, badminton, and kabaddi. At least one district-level competition was attended by all of the athletes. [Table 1](#)

Table 1

Table 1 Anthropometric Variables of the Participants (Mean ± SD)			
Anthropometric Variables	Bangladeshi Youth Players	Indian Youth Players	
Age (yrs.)	18.88 ± 1.30	17.96± 1.5	
Body Weight (kg)	62.03 ± 2.89	56.3± 5.69	
Stature/Height (m)	1.69 ± 0.94	1.66± 0.06	
BMI= Weight (kg)/Height ² (m)	21.28 ± 1.78	20.33 ± 1.97	

The standing broad jump (SBJ) is a field-based test that can be used to assess explosive strength in the lower limbs as well as physical fitness [Thomas et al. \(2020\)](#). In several youth fitness batteries, a variety of measures of upper arm and shoulder strength have been used. The pull-up test is perhaps the most used way to evaluate upper-body muscular strength. The Cooper test is a simple and effective sports field test for determining cardio-respiratory endurance in athletes. [Table 2](#)

Table 2

Table 2 Variable and Criterion Measures		
Variables	Test Items	Unit of Measure
Lower body explosive strength	Standing broad jump	Meter (m)
Upper body muscular strength	Pull-up	Number (n)
Cardio-respiratory endurance	Cooper test	Meter (m)

3. TEST PROTOCOL

3.1. STANDING BROAD JUMP

The standing broad jump test was conducted on a sand jumping pit. The athletes stood with their feet parallel and in a standing position. After being directed by the tester, the athletes had to jump forward, as far as they could in a horizontal manner. The athletes could do a self-determined depth counter movement of the legs and a free-arm amplitude swing because no instructions were given on how to move their legs or arms. The athletes were required to land with both feet together and block the jump without moving forward. All of the tests were repeated three times, with a short reprieve between each attempt. The distance between the starting line and the heel of the closest landing foot to the starting line was measured with a tape in meters, and the best score of three tests were kept for final assessment [Thomas et al. \(2020\)](#).

3.2. PULL-UP

A metal or wooden bar with a diameter of 1½ inches is recommended. The standard must be sufficiently high for the athletes to hang fully extended arms and legs, feet off the ground. He should grab it with his overhand. The athlete elevates his body with both hands until his chin can be put over the bar, and then returns to his own body to complete the hang position. The activity is played as much as feasible. During the movement, the body must not swing. Knees must not be elevated, and leg kicking is not authorized. Pull-ups were counted as per the method explained [Hunsicker and Reiff \(1976\)](#).

3.3. COOPER TEST

A 400-meter track was used for cooper's test. The athletes were paired, and the selected runners were to run while their partner kept records of their laps. 'Ready and Go' was used to signify the start of the race. As the runners crossed the finish line, lap calls were made to the scorer. When 11 minutes have passed, the investigator announces the remaining time. A whistle was blown at the 12th minute to signal the end of the run/walk. To the nearest 25 meters, the lap score was recorded. The goal was to cover as much ground as possible in the allotted twelve minutes. The process was then repeated with the next group [Rengasamy et al. \(2014\)](#).

3.4. STATISTICAL PROCEDURES

The statistical analysis was carried out using SPSS (version 26 for Windows; IBM, Chicago, IL, USA). The data was tested for normality using the Shapiro-Wilk test. Parametric assessment was utilised because all of the data had a normal distribution. For each group, the mean, standard deviation, and standard error mean

were calculated, which aided in the comparison of physical fitness variables between athletes from two countries. To determine the level of significance, independent samples was used, with α value at.05.

4. RESULTS

Table 3

Table 3 Descriptive Statistics on Fitness Components of Youth Athletes from Bangladesh (BD) and India (IND)

Items	Groups	N	Mean	Std. Deviation	Std. Error Mean
Standing Broad Jump	BD	40	2.4	0.18	0.03
	IND	40	2.31	0.17	0.02
Pull-up	BD	40	10.38	2.35	0.37
	IND	40	11.1	1.43	0.23
Cooper test	BD	40	2599.68	276.21	43.67
	IND	40	2354.5	602.69	95.29

Table 3 shows that the mean value and standard deviation of standing broad jump for BD and IND youth athletes were 2.40 ± 0.18 and 2.31 ± 1.17 , pull-up were 10.38 ± 2.35 and 11.10 ± 1.43 , and the cooper test were 2599.68 ± 276.21 and 2354.50 ± 602.69 respectively.

Table 4

Table 4 Fitness Testing on Young Athletes from Bangladesh (BD) and India (IND) as Carried Out Using an Independent Sample T-Test (2-Tailed)

Test	Groups	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
Standing Broad Jump	BD	0.08	0.04	2.1	78	0.039
	IND					
Pull-up	BD	0.72	0.43	1.68	78	0.099
	IND					
Cooper test	BD	245.17	104.82	2.34	78	0.022
	IND					

Table 4 an independent sample t-test shows that Bangladeshi and Indian youth athletes standing broad jump $t(78) = 2.10$, sig. = 0.039 (2-tailed), $p < 0.05$; pull-ups $t(78) = 1.68$, sig. = 0.099 (2-tailed), $p < 0.05$; cooper test $t(78) = 2.34$, sig. = 0.022 (2-tailed), $p < 0.05$ respectively. The standing broad jump and cooper test of Bangladeshi athletes were found to be much superior to those of Indian athletes, while the pull-up was found to be nearly identical in both populations.

5. DISCUSSIONS

According to the results of this study, there were substantial disparities in leg power and cardiorespiratory endurance between Indian and Bangladeshi youths. There was no significant difference in shoulder strength. A similar study was done by [Mondal \(2015\)](#), the results show that Bangladeshi youths outperform Indian

youths in terms of lower-body dynamic strength (standing broad jump) and cardiorespiratory fitness (cooper reduced test). [Chan et al. \(2016\)](#) compared the muscle strength and endurance components of Hong Kong and international elite athletes (Norwegian, French, and Scandinavian), finding that Hong Kong athletes had less leg muscular strength and endurance than the three countries. Finally, the researchers recommend that strength and conditioning specialists create customised training programmes for Hong Kong athletes. On the other hand, researcher [Reza \(2018\)](#) did not confirm any difference in the fitness components between adolescent school boys from Bangladesh and India (West Bengal). It is quite clear that the morphological changes are the underlying causes that are reflected in the superiority of fitness or component of fitness. In our study the Bangladeshi athletes had an increased BMI than the Indian counterparts which is also reflected as superiority of fitness components i.e., leg power and cardiorespiratory fitness. The increased amount of mass may be attributed to the different lifestyle, more specifically the eating habits of Bangladeshi athletes when compared to the Indian athletes.

6. CONCLUSIONS

The study employed field-based fitness test to assess and compare the fitness components of the Bangladeshi and Indian athletes. The following findings were evident:

- 1) Bangladeshi athletes had a significantly better leg power when compared to Indian athletes.
- 2) Bangladeshi athletes had a significantly better cardiorespiratory endurance when compared to Indian athletes.
- 3) There was no substantial difference in upper body muscular strength between the athletes of the two countries.

7. LIMITATION

The sample sizes in this study were too limited. A huge sample size might have yielded more useful results.

CONFLICT OF INTERESTS

None.

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