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Evaluation of endurance ability among football players

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Abstract

The aim of the study was to explore the cardiovascular endurance ability of football players. The participants ranged in age from 18 to 25 years old. The study's male subjects were picked by the current researchers. Participants in the study played in the senior 1st division league from the Murshidabad district. The 40 participants from various clubs in Raghunathganj, Murshidabad, West Bengal, India, were chosen using a simple random sampling procedure. The Harvard step test was used to assess cardiovascular fitness. After the collection of relevant data, descriptive statistics were used to process and analyze the data. When compared to norms, the result revealed that football players were in the good range of cardiovascular endurance.

Keywords: Cardiovascular endurance, football, Harvard step test

1. Introduction

Today, sports are now a major part of our human and social lives. Football, as we know it now, has come to an improvement since its birth; one of the most popular sports in the world is football and the game is first played in England in the 12th century, but Edward II banned it in 1324 [1]. On May 21, 1904, delegates from seven countries met to form the Federation International de Football Association (FIFA), in response to the game's growing popularity [2]. Soccer is played on a grass field that is 100-110 meters long and 64-75 meters wide [3], it is one of the most intricate and dynamic games (in match scenarios), with 22 players competing for possession of the ball [4]. Soccer is a passing and running game with unpredictable and rapidly changing situations that necessitate a keen awareness of other players as well as the ability to make quick decisions and act on them without delay [5, 6]. In football, one of the most important basic health fitness components is cardiovascular endurance [7]. A step test is one of the most common methods for determining maximum oxygen consumption [8]. Brouha *et al.* developed the Harvard step test in the Harvard fatigue laboratory to assess cardiorespiratory fitness [9]. It is a test for determining a human's physical fitness (cardiovascular endurance) using a mathematical formula to calculate an Index Number called the Physical Efficiency Index (PEI) [10]. Fitness is defined as the state of being able to live a perfect life and efficiently complete tasks, resulting in useful contributions and services [11]. Cardiorespiratory fitness is a broad and clinical term that describes the ability of the lungs, blood, heart, muscles, and other organs and organ systems to transport and use oxygen via aerobic metabolic pathways [12]. Cardiovascular fitness is concerned with physiological aspects of fitness, specifically the fitness of the heart and circulatory system, as well as its responses to stress. According to the Greek philosopher, Aristotle states, "The body is the temple of the soul, and the body must be physically fit to achieve harmony of body, mind, and spirit" [13]. Regular physical activity can improve your appearance by helping you control your weight, build muscle, and develop good posture; Physical activity also causes changes in your body's organs, such as strengthening your heart muscle and improving the health of your blood vessels [14]. On other hand, Regular physical activity and a high degree of cardiovascular fitness have been associated with increased memory and executive control ability, indicating that intervention training improves cognitive function in general [15]. One of the most important variables in exercise physiology is VO₂ max, which was frequently used to determine an individual's cardiorespiratory fitness [16]. Age, gender, fitness and training, changes in altitude, and the action of the ventilator muscles

can all influence VO₂ max in different people [17]. Physical fitness, physiological and psychological fitness, and other factors all contribute to the success of sports and games and All of the variables are vital and interrelated [18]. Scientific data has shown that aerobic endurance is important in the competitive development of football players, as well as having a well-developed fitness level to fulfill the game's diverse demands [19]. Since endurance is very important for footballers so, the authors want to know what level of cardiovascular endurance football players have.

2. Methodology

2.1 Selection of samples

A total of 40 participants were selected, including men's football players from various clubs in Raghunathganj, Murshidabad, West Bengal, India. Their ages ranged from 18 to 25 years. All of the participants were included in the Murshidabad district senior 1st division league. Finally, data was gathered from the Makenjee park stadium at Raghunathganj, Murshidabad, West Bengal, India.

2.2 Selection of variable

The Harvard Step test was used to measure cardiovascular endurance ability. For testing equipment, a 20-inch (50.8 cm) high bench for men, a stopwatch, and a metronome were needed.

2.3 Procedure for Collecting Data

After a brief explanation, the athlete performs the Harvard step test by stepping up and down on the platform at the rate of 30 steps per minute (per 2 seconds) for 5 minutes or until

tired. When an athlete can no longer maintain a 15-second stepping rate, they are said to be exhausted. Following the completion of the test, the footballer instantly sits down, and the total number of heart rates was counted from 1 to 1½ minutes after finishing, and from 2 to 2½ after completion, and then from 3 to 3½ minutes after completion. The athletes' pulse rates were counted by feeling their heart rate on the wrist.

2.4 Scoring

The following equations were used to calculate the athlete fitness index score.

Fitness Index (long form) = $(100 \times \text{test duration in seconds})$ divided by $(2 \times \text{sum of heartbeats in the recovery periods})$.

2.5 Statistical Procedures

The investigation's data were collected, and descriptive statistics were used to explain the sample's characteristics. To interpret and statistically analyze the data, the mean and standard deviation were used.

3. Findings and Discussions

In this area, the researcher presented the characteristics of the participants and calculated the mean, SD, and physical fitness index of the variable for Murshidabad district senior 1st division league football players. The Harvard Step Test was used to determine the participants' level of cardiovascular fitness, which ranged from 18 to 25 years old. This research will look into the cardiovascular endurance of football players.

Table-1: The participants' individual traits (Mean \pm SD)

Items	Football Players (n=40)
Age (yr.)	22.05 \pm 2.75
Weight (kg)	58.12 \pm 4.90
Height (m)	1.70 \pm 0.043
BMI (kg/m ²)	19.99 \pm 1.49

According to the data collected, table 1 shows the average age of all the subjects were 22.05 \pm 2.75 years old. Their height and weight were 1.70 \pm 0.043 m and 58.12 \pm 4.90 kg, respectively, and their BMI was 19.99 \pm 1.49.

Table 2: Mean and Standard Deviation of Football players

Variable	Football Players	
	Mean	SD
Cardiovascular Endurance	92.40	12.35

Table 2 shows the mean of cardiovascular Endurance among football players was 92.40 and the standard deviation was 12.35 respectively.

Table 3: Fitness Index (long form) norms are based on the Harvard Step Test for males [9].

Fitness Index (long form)	Rating
>96	Excellent
83-96	Good
68-82	Average
54-67	Low Average
<54	Poor

The norms based on The Harvard step test for males were shown in the above table. There were five different categories: Excellent (>96), Good (83-96), Average (68-82),

Low Average (54-67), and Poor (<54). According to our study, the mean of cardiovascular endurance shows good cardiovascular efficiency when compared with Fitness Index (long form). According to [20] conducted a study to determine the physical and physiological status of Bhaichung Bhutia football school players from the Rohini Centre in New Delhi, and the findings revealed that the players had an average cardiorespiratory fitness and endurance capacity. Researchers [3] investigated the cardiovascular endurance profile of football players, finding that when compared to the norms, they had lower cardiovascular endurance. According to [11] looked into the results of a cardiovascular endurance test for male cadet officers and found that their level of cardiovascular endurance fitness was very satisfactory. Non-athlete undergraduate students at Obafemi Awolowo University in Ile-Ife, Nigeria, had low cardiorespiratory fitness [21].

4. Conclusion

Based on the findings and within the study's limitations, the findings revealed a good range of cardiovascular endurance fitness among male football players. When we looked at the literature, we found that the conclusions of research in the team sports categories were identical to ours and other research contradicted our findings. It could be due to differences in ground dimensions, training intensity and

volume, and other performance-limiting factors among study groups and age groups.

5. References

1. Kerketta I, Singh R. Comparison of cardiovascular endurance between male soccer and hockey players of G.G.V. Bilaspur. *International Journal of Physical Education, Sports, and Health*. 2015;2(2):326-327.
2. Giulianotti R. *Football*. Blackwell Publishing Ltd, 1999, 1-22.
3. Rosman NAB, Anuar MFB. Cardiovascular endurance profile of male soccer players under 18 years old in secondary school in perak, Malaysia. *European Journal of Molecular & Clinical Medicine*. 2020;7(2):6041-6044.
4. Islam MS. Introducing drone technology to soccer coaching. *International Journal of Sports Science and Physical Education*. 2020;5(1):1-4.
<https://doi.org/10.11648/j.ijsspe.20200501.11>
5. Belly G. *Soccer to Boys*. London: Sons ltd, 1972, 15.
6. Islam MS. Relationship of abdominal muscle endurance with selected anthropometric measurements in soccer players. *International Journal of Physiology, Nutrition and Physical Education*. 2018;3(2):1088-1090.
7. Svensson M, Drust B. Testing soccer players. *Journal of sports sciences*. 2005;23(6):601-618.
8. American College of Sports Medicine (ACSM). *Guidelines for exercise testing and prescription*. 6th ed. London: Lippincott Williams & Wilkins. 1995;(3-10):57-80.
9. Fox EL, Billings CE, Jr Bartels RL, Bason R, Mathews D. Fitness standards for male college students. *Internationale Zeitschrift fur angewandte Physiologie, einschliesslich, Arbeitsphysiologie*. 1973;31(3):231-236.
<https://doi.org/10.1007/BF00697601>
10. Soliman Ismail W. Evaluating the validity and reliability of Harvard step test to predict VO₂max in terms of the step height according to the knee joint angle. *Journal of Applied Sports Science*. 2011;1(2):126-132.
11. Kassim M, Mokhtar RS. The evaluation of cardiovascular endurance test for male cadet officers. *Modern Applied Science*. 2015;10(2):11-16.
12. Foss ML, Keteyian SJ. *Fox's physiological basis for exercise and sport*. William C Brown Pub, 1998.
13. Kumar R. A diagnostic study of cardiovascular fitness between rural and urban college girls of physical education classes. *International Journal of Physiology, Nutrition and Physical Education*. 2019;4(1):586-587.
14. Bali A. A study of cardio-respiratory endurance of athletes and non-athletes. *International Journal of Physiology, Nutrition and Physical Education*. 2019;4(1):755-757.
15. Helgerud J, Engen LC, Wisloff U, Hoff JAN. Aerobic endurance training improves soccer performance. *Medicine and science in sports and exercise*. 2001;33(11):1925-1931.
16. Bassett DR, Howley ET. Limiting factors for maximum oxygen uptake and determinants of endurance performance. *Medicine and science in sports and exercise*. 2000;32(1):70-84.
17. Noakes TD, Peltonen JE, Rusko HK. Evidence that a central governor regulates exercise performance during acute hypoxia and hyperoxia. *Journal of Experimental Biology*. 2001;204(18):3225-3234.
18. Kaur H, Singh N. A study of cardiovascular endurance among national level players of different games. *International Journal of Advances in Science Engineering and Technology*. 2019;7(2):72-74.
19. Sulaiman I, Balu C, Kumar VK. Aerobic endurance test performance among football players in different age and play-positions during COVID-19. *International Journal of Physical Education, Sports, and Health*. 2022;9(2):4-6.
20. Sharma D, Rawat JS. Study on physical and physiological status of Bhaichung Bhutia football school players. *International Journal of Physiology, Nutrition and Physical Education*. 2018;3(1):1931-1934.
21. Oluwadare OA, Olufemi OO. Aerobic fitness levels among undergraduate students of a Nigerian university using cooper's 12-minute walk test. *International Journal of Advanced Research and Publications*. 2018;2(4):6-8.