



ISSN: 2456-0057

IJPNPE 2021; 6(2): 362-365

© 2021 IJPNPE

[www.journalofsports.com](http://www.journalofsports.com)

Received: 09-05-2021

Accepted: 22-06-2021

**Dr. Dev Raj Yadav**

Associate Professor and Head  
Department of Physical  
Education, MMH College,  
Ghaziabad, Uttar Pradesh, India

## An assessment study on strength endurance and cardiovascular endurance of male athletes

**Dr. Dev Raj Yadav**

### Abstract

Sports refers to any physical activity which includes movement of body muscles by excreting bodily energy by incorporating certain skills. To perform in any sport, people require certain types of physical fitness. Muscular endurance implies the ability of an athlete or person to perform muscular activities repeatedly using muscle group. Cardiovascular endurance refers to efficiency of one's heart to work properly during any physical activity. The present study was carried out to compare the muscular endurance and cardiovascular endurance of male athletes. A sample of 270 male athletes belonging to Meerut, Ghaziabad, and Bijnor districts was selected using a purposive random sampling procedure. The bent knee sit-up test and 3 min step test were administered to measure muscular endurance and cardiovascular endurance, respectively. The obtained data were analyzed using one way ANOVA. The findings of the study suggest that a significant difference in the muscular endurance and cardiovascular endurance of male athletes. Further, it was also revealed that the zone has a significant influence on the muscular endurance and cardiovascular endurance of male athletes.

**Keywords:** Sports, strength endurance, muscular endurance, cardiovascular endurance, male athletes, Anova.

### Introduction

Sport pertains to any form of competitive physical activity or game that aims to use, maintain or improve physical ability and skills while providing enjoyment to participants and, in some cases, entertainment to spectators. Sports can, through casual or organized participation, improve one's physical health. Hundreds of sports exist, from those between single contestants, through to those with hundreds of simultaneous participants, either in teams or competing as individuals. In certain sports such as racing, many contestants may compete, simultaneously or consecutively, with one winner; in others, the contest (a match) is between two sides, each attempting to exceed the other. Some sports allow a "tie" or "draw", in which there is no single winner; others provide tie-breaking methods to ensure one winner and one loser. A number of contests may be arranged in a tournament producing a champion. Many sports leagues make an annual champion by arranging games in a regular sports season, followed in some cases by playoffs.

Sport is generally recognized as system of activities based in physical athleticism or physical dexterity, with major competitions such as the Olympic Games admitting only sports meeting this definition. Other organizations, such as the Council of Europe, preclude activities without a physical element from classification as sports. However, a number of competitive, but non-physical, activities claim recognition as mind sports. The International Olympic Committee (through ARISF) recognizes both chess and bridge as bona fide sports, and Sport Accord, the international sports federation association, recognizes five non-physical sports: bridge, chess, draughts (checkers), Go and xiangqi, and limits the number of mind games which can be admitted as sports.

Sport is usually governed by a set of rules or customs, which serve to ensure fair competition, and allow consistent adjudication of the winner. Winning can be determined by physical events such as scoring goals or crossing a line first. It can also be determined by judges who are scoring elements of the sporting performance, including objective or subjective measures such as technical performance or artistic impression.

**Corresponding Author:**

**Dr. Dev Raj Yadav**

Associate Professor and Head  
Department of Physical  
Education, MMH College,  
Ghaziabad, Uttar Pradesh, India

Athletic participation requires a high level of physical fitness. Physical fitness is a major requirement to become a successful athlete in any area of sports. The selection of athletes to different athletic events depends on their present physical fitness level. The fitness of athletes is measured using different physical fitness tests. The periodic measurement of physical fitness elements such as muscular strength, muscular endurance, cardiovascular endurance, flexibility, and agility helps to ensure the physical fitness standards among athletes. This further helps to get the proper training to maintain or enhance their physical fitness and achieve success in the athletic career.

Muscular strength endurance refers a person's ability to put external force using bodily muscle groups many times or in repeated exercises. The muscular endurance can be measured by how many repetitive physical activities that an individual can perform in a given time. The most prominently used measure for this is sit-up and push-up exercises.

Cardiovascular endurance refers to the potential ability of heart and lungs to function in an optimum level when the individual is under any physical activity. It is assessed by measuring the maximum amount of oxygen intake during physical activities. It was defined by Johnson and Nelson (1988) as "the ability of the circulatory and respiratory system to adjust and to recover from the effects of exercise or work." The general research studies emphasize that there is a significant difference in the physical fitness of male and female athletes. According to those studies, male athletes hold higher physical fitness standards compare to female athletes.

Athletic participation requires a high level of physical fitness. Physical fitness is a major requirement to become a successful athlete in any area of sports. The selection of athletes to

different athletic events depends on their present physical fitness level. The fitness of athletes is measured using different physical fitness tests. The periodic measurement of physical fitness elements such as muscular strength, muscular endurance, cardiovascular endurance, flexibility, and agility helps to ensure the physical fitness standards among athletes. This further helps to get the proper training to maintain or enhance their physical fitness and achieve success in the athletic career.

Muscular strength endurance refers a person's ability to put external force using bodily muscle groups many times or in repeated exercises. The muscular endurance can be measured by how many repetitive physical activities that an individual can perform in a given time. The most prominently used measure for this is sit-up and push-up exercises.

Cardiovascular endurance refers to the potential ability of heart and lungs to function in an optimum level when the individual is under any physical activity. It is assessed by measuring the maximum amount of oxygen intake during physical activities. It was defined by Johnson and Nelson (1988) as "the ability of the circulatory and respiratory system to adjust and to recover from the effects of exercise or work." The general research studies emphasize that there is a significant difference in the physical fitness of male and female athletes. According to those studies, male athletes hold higher physical fitness standards compare to female athletes.

**Table 1:** The Mean and Standard Deviation Scores of Muscular Endurance among Male Athletes Belonging to Three Different Zones

Variable	Zone of Male Athletes		
	Meerut (n=87)	Ghaziabad (n=88)	Bijnor (n = 88)
Mean	17.79	17.78	15.95
SD	2.95	2.93	3.36

**Table 2:** The One Way Anova for Muscular Strength Endurance among Male Athletes Belonging to Three Different Zones

Variable	Sources of Variance	Sum of Squares	Df	Mean sum of squares (MS)	F
Muscular strength endurance	Between groups	214.951	2	98.481	
	Within groups	2478.992	260	9.535	10.329
	Total	2675.954	262		

\*\*\* Significant at 0.001

**Table 3:** The Mean and Standard Deviation Scores of Cardiovascular Endurance among Male Athletes Belonging to Three Different Zones

Variable	Zone of Male Athletes		
	Meerut (n=87)	Ghaziabad (n=88)	Bijnor (n = 88)
Mean	12.93	14.84	11.83
SD	5.07	4.29	5.10

**Review of literature**

Karak and Mandal (2016) [6] founded out the difference in the physical fitness between athletes and nonathlete students age ranging from 17 to 20 years. They selected 60 samples and administered AAHPER youth Fitness Test. The data were then analyzed using an independent t-test. The results revealed that athletes possess significantly higher muscular strength and endurance, cardiovascular endurance, speed, and agility than the non-athletes.

Sharma (2015) [1] measured the difference in the cardiovascular fitness of athlete men and non-athlete men aged 20-24 years. Harvard Bench Step Test was administered to assess the cardiovascular fitness of 15 athlete men and 15 non-athlete men. The data were treated using an independent

t-test. The findings showed significantly higher cardiovascular fitness among athlete men than non-athlete men. Thus, it was evident that regular practice improves cardiovascular fitness among men athletes.

Another study conducted by Rathod and Kumar (2013) on the physical fitness of 100 male athletes and non-athletes of different colleges in Gujarat. Physical fitness factors such as speed, strength, endurance, agility, and explosive power among male athletes and non-athletes male were studied by administering AAHPER youth fitness test. The results implied that on the whole, the non-athlete males are physically not so fit. They are found to be lack in speed and explosive power; and sub-average in strength, endurance, and agility as compare to male athletes.

Kim (2010) explored the benefits of 12 weeks training on certain pi muscular strength and driver shot performance. Further, two groups were formed in which nine male golf players belonged to the training group and eight male golf players belonged to the control group. From the results, it was concluded that training enhances the physical fitness among male golf players in relation to all physical fitness variables.

## Methodology

### Aim

The aim of the study was to study the muscular strength endurance and cardiovascular endurance of male athletes of different zones of Uttar Pradesh State.

### Hypothesis

- There would be a significant difference in the muscular strength endurance of male athletes belonging to three different zones.
- There would be a significant difference in the cardiovascular endurance of male athletes belonging to three different zones.

### Research Design

A purposive sampling research design was used for the study.

### Procedure

The male student-athletes studying in different colleges of

three different zones such as Meerut zone, Ghaziabad zone, and Bijnor zone were approached for the study. The purpose of the study was explained to them. Then, their consent to participate in this study was obtained. Then, the physical fitness tests, namely, bent knee sit-up test and 3 min step test, were administered to measure muscular strength endurance and cardiovascular fitness, respectively.

### Tool Used for the Study

Two physical fitness tests were used to measure muscular strength endurance and cardiovascular endurance among male athletes.

### Bent Knee Sit-up Test

It is used to measure abdominal strength endurance. After doing warm-up for 10 min, athlete lies on the mat with the knees bent, feet flat on the floor, and their hands on their ears.

**Table 4:** One way ANOVA for Cardiovascular Endurance among Male Athletes Belonging to Three Different Zones

Variable	Sources of Variance	Sum of Squares	Df	Mean sum of squares (MS)	F
Cardiovascular endurance	Between groups	408.517	2	204.259	8.741
	Within groups	6075.802	260	23.368	
	Total	6484.319	262		

\*\*\*Significant 0.001

Another person holds athletes feet on the ground. When the “start” signal was given, the athlete performs as many sit up as possible for the duration of 30 s. The number of correct count is considered as the score.

### Three-Minute Step Test

It was developed by two people, namely, Skubic and Hodgkin's, to assess the cardiovascular endurance of males. The male athletes must step 24 steps in every minute. After this exercise, the male athletes are supposed to sit for a minute during which their palpitations are counted. Finally, these scores are compared with the established norms to determine the level of cardiovascular endurance. In the case of athletes, those who cannot complete stepping in 3 min their total time taken is noted and their pulse rate shall be counted after 1 min, usually for 30 s. Then, the scores compared with the established norms to determine the level of cardiovascular endurance.

### Statistical Analysis

The descriptive statistical methods such as mean, standard deviation, and one way ANOVA was used to compare the muscular strength endurance and cardiovascular endurance among male athletes.

### Results and Discussion

Table 1 depicts the mean and SD scores of male athletes on muscular endurance belonging to three different zones. The results reveal that male athletes belonging to Meerut zone have obtained a mean score of 17.79 (SD = 2.95), the male athletes belonging to Ghaziabad zone have obtained a mean score of 17.78 (SD = 2.93) while the male athletes belonging to Bijnor zone have obtained a mean score of 15.95 (SD = 3.36). Thus, from the mean scores, it is evident that the male athletes belonging to Meerut zone hold significantly higher muscular endurance than the male athletes of Ghaziabad zone. And Bijnor zone, respectively. One way ANOVA results are provided below

Table 2 shows one way ANOVA for muscular endurance among male athletes belonging to three different zones. The obtained F ratio is 10.329, which is highly significant at 0.001 level. Thus, from the findings, it is evident that there is highly significant difference muscular strength endurance among male athletes belonging to three different zones. Thus, zone has a significant influence on the cardiovascular endurance of male athletes. Therefore, we accept the first hypothesis – “There would be a significant difference in the muscular strength endurance of male athletes belonging to three different zones” is accepted.

Table 3 depicts the mean and SD scores of male athletes on cardiovascular endurance belonging to three different zones. The results reveal that male athletes belonging to Meerut zone have obtained mean score of 12.93 (SD = 5.93), the male athletes belonging to Ghaziabad zone have obtained a mean score of 14.84 (SD = 4.29) while the male athletes belonging to Bijnor zone have obtained a mean score of 11.83 (SD = 5.10). Hence, it is clear that the male athletes belonging to all three zones differ in their level of cardiovascular endurance. The male athletes belonging to Ghaziabad zone hold significantly higher cardiovascular endurance than the male athletes of Meerut zone and Bijnor zone, respectively. One way ANOVA results are provided below.

Table 4 shows one way ANOVA for cardiovascular endurance among male athletes belonging to three different zones. The obtained F ratio is 8.741, which is highly significant at 0.001 level. Therefore, from the above results, it is clear that there is a highly significant difference cardiovascular endurance among male athletes belonging to three different zones. Thus, zone has a significant influence on the cardiovascular endurance of male athletes. Hence, we accept the second hypothesis – “there would be a significant difference in the cardiovascular endurance of male athletes belonging to three different zones” is accepted.

### Conclusions

- There is a significant difference in the muscular strength

endurance of male athletes belonging to three different zones. The male athletes belonging to Meerut zone hold significantly higher muscular endurance than the male athletes belonging to Ghaziabad zone and Bijnor zone, respectively.

- There would be a significant difference in the cardiovascular endurance of male athletes belonging to three different zones. The male athletes belonging to Ghaziabad zone hold significantly higher cardiovascular endurance than the male athletes belonging to Meerut zone and Bijnor zone, respectively.
- The concerned authorities and parents have to provide proper training facilities to enhance muscular endurance and cardiovascular endurance among male athletes.

## References

1. Sharma Rajesh. Physical Fitness and Wellness, A.K. Books, Hoogly, West Bengal, 2015.
2. Kumar S. Cardiovascular fitness between sportswomen and nonsports women: Comparative study. *Int J Phys Educ Sports Health*. 2016;36:229-31.
3. Kim H, Jung H, Song J, Lee E. A follow-up study on the physique, body composition, physical fitness, and isokinetic strength of collegiate taekwondo athletes. *J Exerc Rehabil*. 2015;11:57-64.
4. Sheela Kumar, *et al.*, Fitness, Aerobics and Gym Operations, Khel Sahitya Kendra, Ansari Road, Daryaganj, New Delhi.
5. Pukhan M. Sports for all and its role for maintenance and promotion of physical fitness and wellness. *Int J Phys Educ Fit Sports*. 2018;7:24-7.
6. Karak K, Mandal T. Comparative study on physical fitness between physical education students and general students. *Int J Phys Educ Sports Health*. 2016;3:223-6.
7. Bsahir S, Malipatil RP. A comparative study of cardiovascular fitness between sportsperson and nonsports person. *Res J Phys Educ Sci*. 2013;1:11-3.
8. Manilal KP. Science of Strength Training, Sports Publication, Ansari Road, Daryaganj, New Delhi.
9. Degati AE, Kumar H. The relationship between selected physical fitness variables with the performance of Ethiopian junior sprinters and middle distance athletes across genders. *IOSR J Sports Phys Educ*. 2017;4:6-10.
10. Gaurav V, Singh A, Sandeep, Singh M, Bhanote P. Comparison of cardiovascular fitness between adolescent athletes and nonathletes. *Int J Phys Educ Fit Sports*. 2015;4:32-7.
11. Modak Pintu, Debnath KK. Science of Sports Training, Sports Publication, Ansari Road, Daryaganj, New Delhi.