

## ANALYSIS OF CARDIOVASCULAR ENDURANCE BETWEEN FOOTBALL PLAYERS AND HOCKEY PLAYERS

<sup>1</sup>Dr. Okram Parlin

Lecturer, Department of Physical Education  
Waikhom Mani Girls' College, Thoubal, Manipur, India

<sup>2</sup>Prof. T. Inaobi Singh

Professor, Department of Physical Education and Sports Science  
Manipur University, Canchipur, Manipur, India

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### **Abstract:**

*The present study is intended to study the difference in Cardiovascular Endurance between Football Players and Hockey Players. For the purpose of the study, 30 male players, 15 each from Football and Hockey from different colleges of Manipur University who participated in the Manipur University Inter College Tournament 2024-25 which was held between September to November 2024. The subjects were between age group of 18-25 years. It was hypothesized that there may be significant difference on Cardiovascular Endurance between Football and Hockey Players. For this study, Harvard step test was administered to test Cardiovascular Endurance. For analysis and interpretation of data 't'- test statistical analysis was conducted. The level of significance was set at 0.05 level of confidence. The results were found that between the two games, Football Players were seen to have superior performance than Hockey Players because of the difference in nature of the movements.*

**Keywords:** Cardiovascular Endurance, Football, Harvard step test, Hockey.

### INTRODUCTION

Health is an individual's fundamental right and is considered a state of physical, mental, social, and spiritual well-being. Health is mainly responsible for determining one's quality of life. If one is a responsible, healthy person, she may be repeated to remain so if she continues in good health through self-discipline. Physical health helps to determine mental health and vice versa.

Health-related physical fitness focuses on optimum health and prevents the onset of disease and problems associated with inactivity. Maintaining an appropriate level of health-related fitness allows a person to Meet emergencies, reduce the risk of disease and injury, work efficiently, participate and enjoy physical activity (sports, recreation, leisure), and look one's physical best. (Prajakta, 2010)

Cardiovascular endurance refers to the ability of the circulatory system to provide oxygen to body cells to support the oxidative energy schemes of the body and to remove waste

products of metabolism. In the human body, when many muscles work for long periods of time, these factors limit the amount of work that can be accomplished. Therefore, the primary objective of cardiovascular endurance training is to improve the circulation of the working muscles (Dr. Manoj Kumar Jadiya, Nov. – Dec. 2021)

Cardiovascular endurance is related to moderate work or contractions of large muscle groups over a long period of time that places stress on the respiratory system and circulatory systems of the body to supply an adequate amount of blood and oxygen to the muscles during any moderate kind of physical activity. (G.jackson, 1985)

Dr. Sinku Kumar Singh states that cardio-respiratory endurance reacts effectively to a given signal. These signals may be experienced in different forms in various games and sports. (Singh, 2011)

A physically fit heart beats at a lower rate and pumps more blood per week at rest. Regular endurance exercise results in an increased capacity to use oxygen, leading to the ability for more physical work. Assessing cardiorespiratory fitness encompasses testing the ability of the respiratory, cardiovascular, and skeletal muscle tissue to take in, deliver, and utilize oxygen while performing prolonged exercise of moderate to high intensity. (Kumara S., 2016)

Football is the world's most popular sport, boasting the highest number of participants and spectators. Its rules and essential equipment are straightforward, allowing the game to be played almost anywhere—whether on official football fields, in gymnasiums, on streets, school playgrounds, parks, or beaches. In football, cardiovascular endurance is a crucial factor influencing players' performance. Athletes with muscular cardiovascular endurance are better equipped to respond and adapt to various game situations, enhancing their performance on the field. Multiple interpretations of endurance have emerged in discussions surrounding the sport.

Hockey refers to various team sports played in both summer and winter, originating on outdoor fields, ice sheets, or dry surfaces such as gymnasiums. Although these sports differ in specific rules, player counts, attire, and playing surfaces, they share essential characteristics: two opposing teams utilize sticks to propel a ball or puck into a goal. Recently, the term "hockey" has primarily been associated with two forms: field hockey, a stick-and-ball sport included in the summer Olympics, and the winter sports of bandy and ice hockey. This association arises because field hockey and its related stick-and-ball variants predate ice-based games like bandy and ice hockey and dry-floor sports such as roller hockey and floor hockey. Additionally, the specific meaning of "hockey" in common usage often varies based on location, geography, and the sport's popularity (Mola et al., 2025; Taye et al., 2024).

## OBJECTIVE OF THE STUDY

The objective of the study was to compare the Cardiovascular ndurance between Football and Hockey Players

## HYPOTHESIS OF THE STUDY

It was hypothesized that there may be significant difference on Cardiovascular endurance between Football and Hockey Players.

## MATERIALS AND METHOD

### Subject

For the purpose of this study, 30 male players, 15 each from Football and Hockey from different colleges of Manipur University, who participated in the Manipur University Inter College Tournament 2024-25, which was held between September and November 2024, were selected as the subjects. The subjects were between the age group of 18-25 years.

### Methodology

The Harvard Step Test was administered to test the Cardiovascular endurance of Football and Hockey Players. The Harvard Step Test measures a player's aerobic fitness and is a predictive test of their VO<sub>2</sub> max. The test was conducted at Manipur University, and the Manipur University Inter College Tournament 2024-25 venue. This test used a step or platform 20 inches high, a stopwatch, a metronome, or a cadence tape.

**Procedure:** The players step onto and back down from the step at a rate of 30 completed steps per minute (one second up, one second down) for 5 minutes. The players immediately sat down upon completion of the test, and the total number of their heartbeats was counted from 1 to 1 and 1/2 minutes, from 2 to 2 and 1/2 minutes after finishing, and finally from 3 to 3 and 1/2 minutes after finishing. The players' heartbeats were counted by feeling the players' pulse at their wrists.

**Scoring:** The player's fitness index score is then determined by the given equation:

Fitness Index Score = (100 x test duration in seconds) divided by (2 x sum of heartbeats in the recovery periods)

For analysis and interpretation of data 't'- test statistical analysis was conducted. The level of significance was set at a 0.05 level of confidence.

## RESULTS

| GROUP    | N  | MEAN | Standard Deviation | SEM  | df | t-value |
|----------|----|------|--------------------|------|----|---------|
| Football | 15 | 1.27 | 9.90               | 2.55 | 28 | 3.09*   |
| Hockey   | 15 | 1.17 | 7.71               | 1.99 |    |         |

\*Significant at 0.05 level of confidence

**Table 1** showing Score of Significant Mean Difference on Cardiovascular endurance between Football and Hockey Players

Tabulated 't' 0.05 (28) = 2.04

The above table shows the difference on scores between Football Players and Hockey Players on Cardiovascular endurance. Significant difference was found as the t-value obtained was 3.09\*, while the tabulated t-value was 2.04 at 0.05 level of confidence.

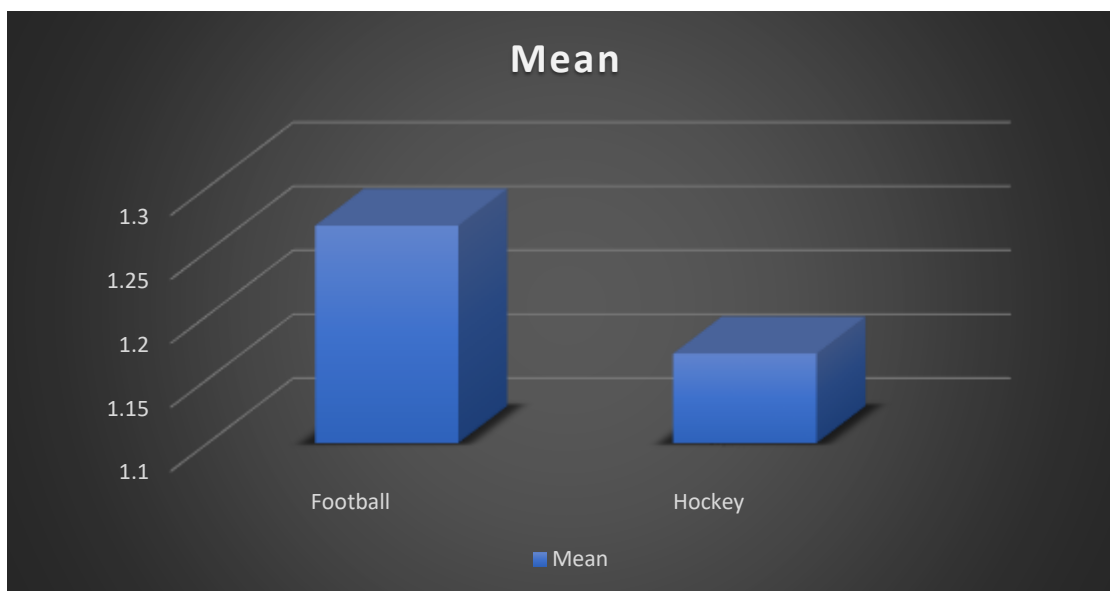


Fig 1 Graph showing Score of significant Mean Difference on Cardiovascular Endurance between Football Players and Hockey Players

### Discussion and Findings

Table 1 shows that the comparative study on the Cardiovascular endurance of Football and Hockey Players who participated in the Manipur University Inter College Tournament 2024-25 was performed. It was found that the score of significant mean difference in Cardiovascular endurance of football players was greater than that of Hockey Players, and the calculated t-value was more than the tabulated t-value where the significance level was set at 0.05 level of confidence. So, based on the findings, we can say that Football Players dominate Hockey Players in the results of Cardiovascular endurance (\*t' = 3.09).

This present study hypothesized that there may be a significant difference in Cardiovascular endurance between Football Players and Hockey Players. In the above discussion of the study, it was found that there was a significant mean difference in cardiovascular endurance between football and hockey players. Football Players were greater than Hockey Players as calculated 't'-value 3.09 as obtained, and the tabulated value 2.04 was significant at a 0.05 confidence level. It was found that there is a significant difference in Cardiovascular endurance between Football and Hockey Players. Football Players were found to have enhanced performance in cardiovascular endurance compared to hockey players.

## CONCLUSION

Based on the results and findings, it was concluded that statistical technique on an independent t-test was employed to compare the Cardiovascular endurance of Football and Hockey Players who participated in the Manipur University Inter College Tournament 2024-25. From the above finding, the result was that football players were found to perform superiorly to hockey players because of the differences like the movements. The Cardiovascular endurance was one of the major motor abilities to perform physical activities in any particular task. Football is one of the major games, among others, that require cardiovascular endurance. If Football Players have enriched Cardiovascular endurance, they will enhance their performance for a longer duration of time during play; they should be able to perform without feeling any fatigue.

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