

## A Comparative Analysis of Physiological and Physical Fitness Variables among Intercollegiate Volleyball Players of Jammu Region

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**Abstract:**

The present study aims to investigate the comparative analysis of physiological and physical fitness variables between urban and rural intercollegiate volleyball players of Jammu region. A total (N=100) intercollegiate volleyball male players, 50 from urban areas and 50 from rural areas were selected. The variables selected for the present study were Physiological Variables contain BMI and Resting Heart Rate whereas Physical fitness variables contain Muscular Strength and Explosive Strength. For comparing physiological and physical fitness variables between rural and urban intercollegiate volleyball players, descriptive Statistics and independent't' test were applied at 0.05 level of significance. The finding reveals no significant difference in both physiological and physical fitness variables between urban and rural intercollegiate volleyball players of Jammu region. These results suggest that the Physiological and Physical variables are relatively similar. The findings led to the conclusion that a few other factors, such as the small sample size and the individuals' insincere responses, might be to blame for the outcomes.

**Keywords:** Muscular Strength, Explosive Strength, BMI, Resting Heart Rate.

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### 1. Introduction:

Volleyball is a dynamic and competitive sport that requires physical fitness, physiological efficiency, and skill expertise. A variety of physiological characteristics influence player performance, including cardiovascular endurance, muscular strength, flexibility, and anaerobic capability, as well as physical fitness components like as agility, speed, and balance. Understanding these characteristics is critical for improving player performance, developing tailored training programs, and assuring the best competitive outcomes.

Intercollegiate volleyball players frequently come from varied backgrounds, with varying training regimes, physical characteristics, and environmental situations. The Jammu region, with its distinct geographical and cultural traits, provides an ideal site for studying the interactions of these factors. Comparative studies of physiological and physical fitness factors among athletes can reveal information about their readiness, highlight strengths and weaknesses, and identify opportunities for improvement. This study focuses on a comparative comparison of physiological and physical fitness characteristics among intercollegiate volleyball players from the Jammu region. By investigating these variables, the study hopes to add to the corpus of knowledge in sports science, assist coaches in establishing individualized training programs, and build a better understanding of the fitness profiles

required to excel in volleyball. The study's findings will also be useful for future studies in sports physiology and fitness evaluation.

## 2. Literature Review

**Priti D. Khode & Dr. Ajit Bhise. (2024)** The primary aim of the present study was to compare Physical Fitness Variables between Lifters and Attackers of Volleyball Players. A total of 200 male Volleyball Players were selected from Sant Gadge Baba Amravati University Amravati by simple random sampling. The sample consisted of 100 Attackers and 100 Lifter male Volleyball Players. The data was computed and analyzed using descriptive statistics and 't' t-test in order to compare the significant difference between Lifter and Attackers of volleyball Players, the level of significance was set at 0.05 level. The result indicated that there were partially insignificant differences between Lifters and Attackers of volleyball Players.

**Tiwari L. (2024)** The purpose of the study was to compare the physical & physiological variables among the Inter District & Inter-State Levels of Basketball players. Sixty (60) Male basketball players (30 inter-district and 30 interstate) were randomly selected from Uttar Pradesh as a subjects. The ages of the subjects were ranged from 17-28 years. It was hypothesized that there would be a significant difference in the physical fitness variables and physiological variables among the Indian basketball players of different levels of competition. The physical variables chosen were speed, endurance, and power which were measured by 50m dash(sec), 2.4km. run(min.) and sergeant jump. The physiological variables were resting heart rate measured by manual methods and vital capacity which is measured by a dry spirometer. The data collected on the different levels of basketball players were analyzed by independent "t" test. The level of significance for testing the hypothesis was set at 0.05 level of confidence. It was found that the interstate-level players were better than inter-district players with respect to speed, power, and endurance. In terms of physiological variables namely RHR and vital capacity both the groups did not differ significantly.

**Singh, B. (2024)** in the present study, planned to scrutinize the difference between abdominal muscular endurance among school boys of Uttarakhand. The subjects for this study were from the state of Uttarakhand. The simple random sampling was used in the study. A total number of two thousand (2000) subjects were selected from the rural and urban parts of Uttarakhand. Moreover, subjects were also selected from different private and government schools in Uttarakhand. All subjects were between the age group of 13-17 years. To check the abdominal muscular endurance of subjects the sit-up test was used by the researcher. After the collection of relevant data; to investigate the significant difference between abdominal muscular endurance among school children of Uttarakhand, Analysis of variance (ANOVA) was applied. The level of significance was set at 0.05 percent ( $p < 0.05$ ). After the analysis, the results show that the government rural school boys had better abdominal muscular endurance as compared to the private rural school boys. The result shows that the government rural school boys had better abdominal muscular endurance as compared to the government urban school boys. Further, the results show that the government rural school boys had better abdominal muscular endurance as compared to the private urban school boys.

**Devi and Chaudhari (2022)** This research study has been conducted on adolescent players with an aim to find out the difference between Volleyball ( $n=300$ ) and Basketball ( $n=300$ ) players of district

Kangra. The sample for the present study was taken from schools of district Kangra. Each player was tested for physical fitness variables i.e. arm and shoulder length, abdominal strength, agility, explosive, strength, speed, and endurance between rural and urban adolescent players. To analyze the difference in physical fitness variables between two groups of volleyball and Basketball players was determined thought test and to know the difference within the groups of rural and urban players ANOVA was applied. From the findings, it has been found that there existed no significant difference in the above-given physical fitness variables between Volleyball and Basketball players belonging to the Kangra district but a significant difference was observed within the groups of rural and urban volleyball and basketball adolescent players.

**Singh, N. (2022)** The objective of the study was to find the differences in selected physical fitness components between Volleyball and Football players aged 16-18 years. The subjects of this study were boys 16-18 years of age selected from the four districts of Punjab viz. Amritsar, Tarn Taran, Gurdaspur, and Pathankot. The subjects were 150 Volleyball players and 150 Football players. The purposive sampling method was used to select the sample. They were tested for their physical fitness components and comparisons were made. The physical fitness components were explosive power, speed, muscular endurance, balance, and flexibility. Independent t-test revealed that there was a significant difference between Football players and Volleyball players on the variable explosive power and speed. The study concluded that Volleyball players had better explosive power whereas Football players had better speed.

**Parry, I. (2017)** The purpose of the present study was to find out the significant difference in selected anthropometric, physical, and physiological variables between volleyball and basketball players. To achieve the purpose of the study, fifteen (15) male volleyball and fifteen (15) male basketball players were randomly selected from the Dept of Physical Education and Sports Sciences of Annamalai University, Tamil Nadu. The age of the selected subjects ranged from 19 to 25 years. The selected subjects were tested on selected criterion variables such as Arm length, Leg length, Speed, Agility, and Resting pulse rate. The collected data were statistically analyzed between volleyball and basketball players by using ANCOVA (Mean, Standard deviation, and t-test). The level of significance was fixed at 0.05 in all cases. The result of the present study pointed out that there was a significant difference in speed, agility, arm length, leg length, and resting pulse rate among male volleyball and basketball players. It was also conducted that the anthropometric, physical, and physiological test is one of the best methods for improving the ability of game performance as well as fitness for the young generation.

**Dr.K.M.Valsaraj. (2013)** The purpose of the present study is to find out the relationship between motor fitness components and the body mass index of Uttarakhand boys. A total of 200 subjects (100 rural and 100 urban) belonging to high-altitude areas in Uttarakhand state were selected by using systematic random sampling. The age of the boys ranged between 14-15yrs. The data was collected by administering the test in their schools in their free time. Keeping the feasibility in mind, Explosive Strength, Muscular Endurance, Cardio Vascular Endurance, Muscular Power, Speed, Agility, Reaction time, and Flexibility were selected as motor fitness components and B.M.I. was calculated by using their body weight and standing height. Descriptive statistics and Pearson's product-moment Correlation were used for statistical treatment. The level of significance was set at 0.05 levels. The

results of the study showed that there is no significant relationship between selected motor fitness variables and the Body Mass Index of boys of urban and rural society in high-altitude areas of Uttarakhand state.

### 3. Methodology

#### 3.1 Research Design

This is a survey study under Descriptive Research.

#### 3.2 Selection of the Subjects

A total of 100 intercollegiate volleyball players and the age range of 18-25 years will be taken as subjects from the Jammu region. The Jammu region will be divided into urban (50) and rural areas (50). By using convenience sampling, 5 colleges from rural and 5 colleges from urban areas will be selected and 10 intercollegiate volleyball players will be selected purposively from each college.

#### 3.3 Selection of the variables

The physical fitness variables i.e. Muscular Strength and Explosive Strength and physiological variables contain BMI and resting heart rate were chosen for the study.

#### 3.4 Statistical Analysis

To assess the selected data of physiological and physical fitness components of intercollegiate level players of volleyball will be compared and analyzed by using, an independent t-test with the help of SPSS software to test the significance of the results. The level of significance was kept at 0.05 to test the hypothesis.

### 4. Other Sections

S.No.	Tools / Test	Variables	Equipments	Scoring
1	One min. Sit ups	Muscular Strength	Mat or flat surface	No. of repetitions
2	Standing Broad Jump	Explosive Strength	Paper, pencil	Distance
3	Stethoscopes	Heart rate	Stopwatch and scoring sheet	Beats in min.
4	Body Mass Index(BMI)	To measure the body fatness	BMI calculator	Acc. To norms

### 5. Results and Discussion

To accomplish the purpose of study data collected was analyzed with statistical technique and results are presented in below tables.

**Table:1 Summary of t-test results comparing muscular strength among urban(50) and rural(50) intercollegiate male volleyball players of Jammu region.**

Muscular Strength		
	Urban	Rural
Mean	33.78	34.08
Stand. Dev.	9.28	7.02
SEM	1.31	0.99
n	50	50
t	0.182	
d.o.f	98	
critical value	1.984	

The computed 't' value is less than the critical value ( $0.182 < 1.984$ ). There is insignificant difference in the muscular strength among urban (mean=33.78) and rural (mean=34.08) intercollegiate male volleyball players of Jammu region.

**Table:2 Summary of t-test results comparing explosive strength among urban(50) and rural(50) intercollegiate male volleyball players of Jammu region.**

Explosive Strength		
	Urban	Rural
Mean	2.266	2.264
Stand. Dev.	0.171	0.182
SEM	0.024	0.025
n	50	50
t	0.067	
d.o.f	98	
critical value	1.984	

The computed 't' value is less than the critical value ( $0.067 < 1.984$ ). There is insignificant difference in the explosive strength among urban (mean=2.266) and rural (mean=2.264) intercollegiate male volleyball players of Jammu region.

**Table:3 Summary of t-test results comparing heart rate among urban(50) and rural(50) intercollegiate male volleyball players of Jammu region.**

Heart Rate		
	Urban	Rural
Mean	87.16	88.84
Stand. Dev.	13.68	14.73
SEM	1.93	2.08
n	50	50
t	0.112	
d.o.f	98	
critical value	1.984	

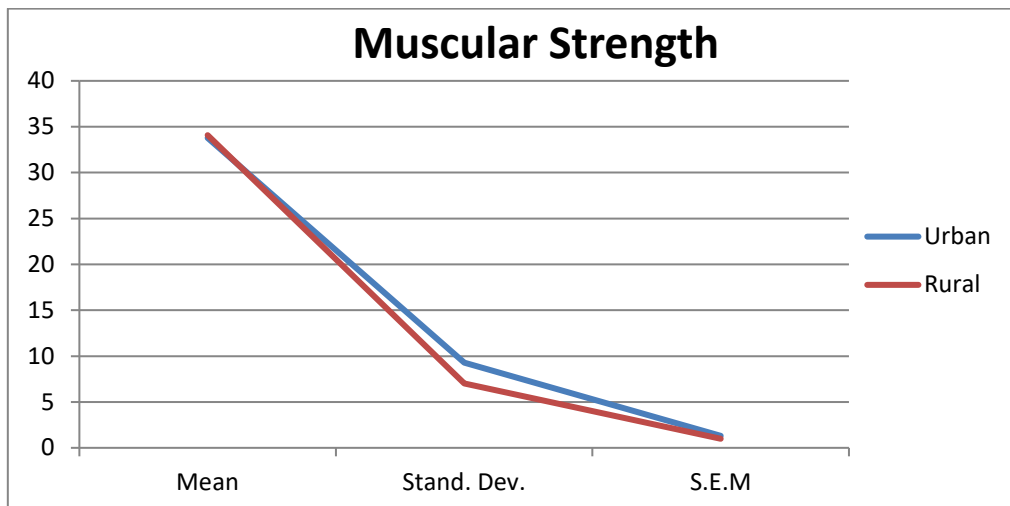
The computed 't' value is less than the critical value ( $0.112 < 1.984$ ). There is insignificant difference in the heart rate among urban (mean=87.16) and rural (mean=88.84) intercollegiate male volleyball players of Jammu region.

**Table:4 Summary of t-test results comparing body mass index among urban(50) and rural(50) intercollegiate male volleyball players of Jammu region.**

Body Mass Index(BMI)		
	Urban	Rural
Mean	20.67	20.28
Stand. Dev.	2.34	1.71
SEM	0.33	0.24
n	50	50
t	0.944	
d.o.f	98	
critical value	1.984	

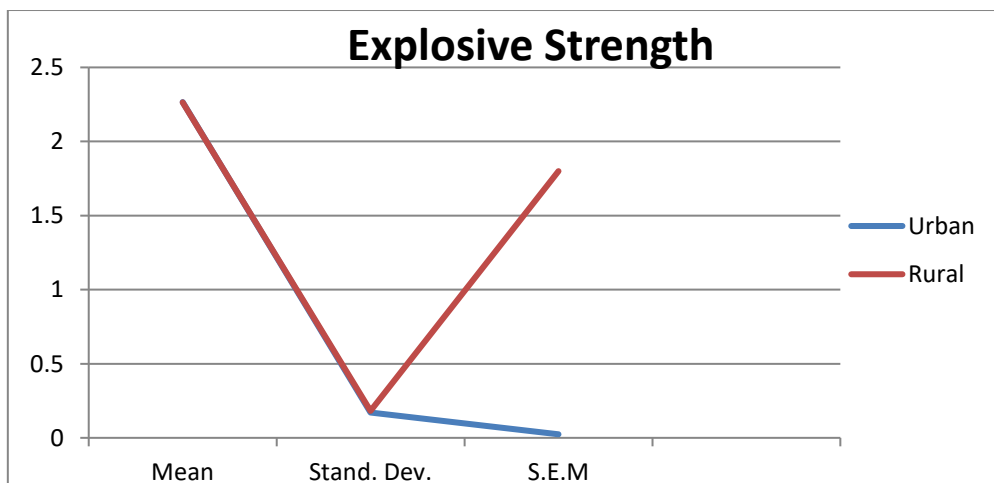
The computed 't' value is less than the critical value ( $0.944 < 1.984$ ). There is insignificant difference in the body mass index (BMI) among urban (mean=20.67) and rural (mean=20.28) intercollegiate male volleyball players of Jammu region. m

**Fig:1 Graphical illustration comparing muscular strength urban(n=50) and rural(n=50) intercollegiate male volleyball players of Jammu region(n=100) concerning mean, standard error of mean and standard deviation.**



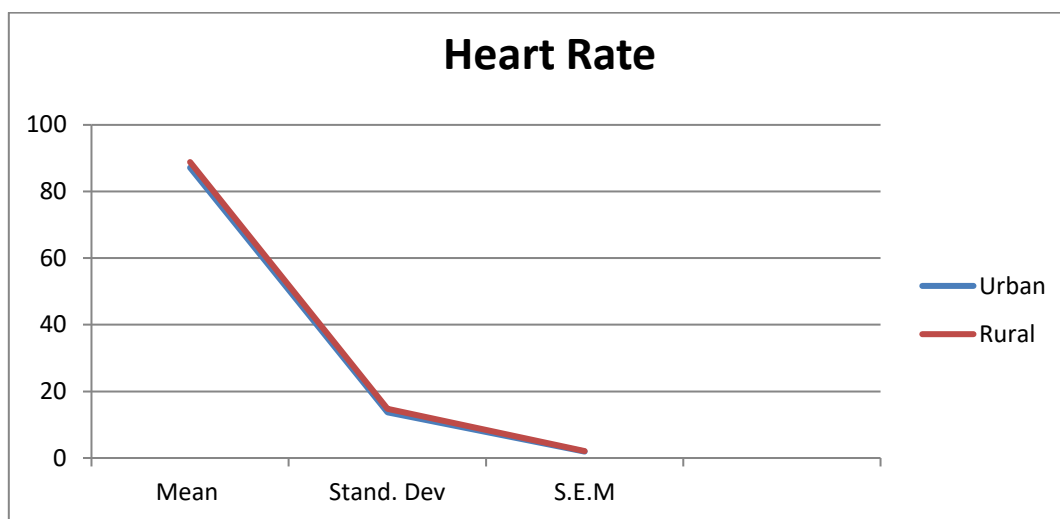
	Mean	Stand. Dev.	S.E.M
Urban	33.78	9.28	1.31
Rural	34.08	7.02	0.99

**Fig:2 Graphical illustration comparing explosive strength urban(n=50) and rural(n=50) intercollegiate male volleyball players of Jammu region(n=100) concerning mean, standard error of mean and standard deviation.**



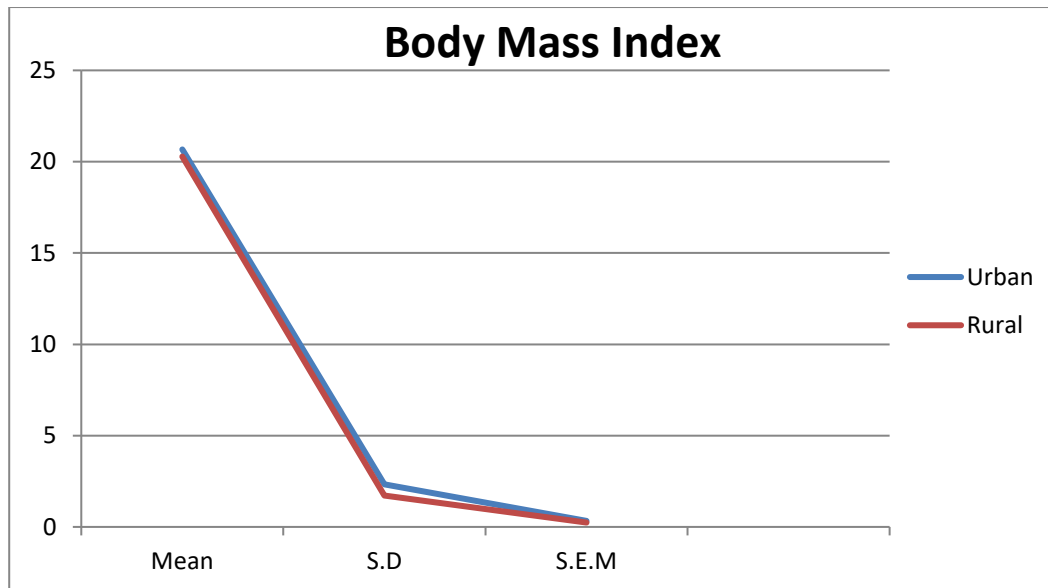
	Mean	Stand. Dev.	S.E.M
Urban	2.266	0.171	0.024
Rural	2.264	0.182	0.025

**Fig:3 Graphical illustration comparing heart rate urban(n=50) and rural(n=50) intercollegiate male volleyball players of Jammu region(n=100) concerning mean, standard error of mean and standard deviation.**



	Mean	Stand. Dev.	S.E.M
Urban	87.16	13.68	1.93
Rural	88.84	14.73	2.08

**Fig:4 Graphical illustration comparing body mass index urban(n=50) and rural(n=50) intercollegiate male volleyball players of Jammu region(n=100) concerning mean, standard error of mean and standard deviation.**



	Mean	Stand. Dev.	S.E.M
Urban	20.67	2.34	0.33
Rural	20.28	1.71	0.24

### 5.1 Discussion

The study aimed to compare physiological and physical fitness variables among intercollegiate volleyball players. The findings revealed no significant differences across all measured variables. This suggests that players from different teams may undergo similar training regimens, resulting in comparable fitness levels and physiological adaptations. Furthermore, environmental and contextual factors, such as match schedules, recovery periods, and nutritional practices, could have influenced the results. These factors were beyond the scope of the current study but merit consideration in future research to provide a more comprehensive understanding of performance variability.

## 6. Conclusion

Within the limitation of the study and procedure following conclusion were arrived at: There was insignificant difference between urban and rural intercollegiate volleyball players in physical variables i.e. muscular strength and explosive strength. There was insignificant difference between urban and rural intercollegiate volleyball players in physiological variables i.e. Heart rate and body mass index. Future research should consider incorporating additional variables, such as dietary habits, recovery protocols, and psychological factors, to better understand their influence on physiological and physical fitness outcomes.

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