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Buneet Singh
Scholar, CT University, Ludhiana, Punjab, India

Dr. Malook Singh
Assistant Professor, CT University, Ludhiana, Punjab, India

Corresponding Author:
Buneet Singh
Scholar, CT University, Ludhiana, Punjab, India

Assessment of physiological and physical fitness parameters among intercollegiate female volleyball players of Jammu region

Buneet Singh and Malook Singh

Abstract
The current study seeks to compare the physiological and physical fitness parameters of intercollegiate female volleyball players in the Jammu region's urban and rural areas. A total of 100 intercollegiate female volleyball players—50 from urban settings and 50 from rural ones—were chosen. The chosen variables for this study are physiological variables like body mass index (BMI) and resting heart rate, as well as physical fitness indicators like muscular strength and explosive strength. Descriptive statistics and an independent t-test were used at a 0.05 level of significance to compare physiological and physical fitness variables between rural and urban intercollegiate female volleyball players. The result shows that intercollegiate volleyball players from the Jammu area of urban and rural areas have notable differences in muscular strength and body mass index fitness parameters and no significant difference found in explosive strength and resting heart rate.

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

1. Introduction
Volleyball is a fast-paced and competitive sport that demands physical fitness, physiological effectiveness, and skilled proficiency. Player performance is impacted by a number of physiological factors, such as cardiovascular endurance, muscular strength, flexibility, and anaerobic capacity, as well as physical fitness elements including agility, speed, and balance. It is essential to comprehend these characteristics in order to enhance player performance, design customized training plans, and ensure the best possible competitive results.
The diverse origins of intercollegiate volleyball players often include differences in their training regimens, body traits, and surroundings. With its unique geographical and cultural characteristics, the Jammu area is a perfect place to examine how these elements interact. Comparative analyses of athletes' physical and physiological fitness parameters can provide insights into their readiness, point out areas for development, and highlight strengths and limitations. This research examines the physiological and physical fitness parameters of intercollegiate volleyball players from the Jammu area in a comparative manner. The goal of the research is to contribute to the body of knowledge in sports science, help coaches create tailored training regimens, and increase understanding of the fitness profiles needed to succeed in volleyball by looking at these variables. The results of the study will also be valuable for upcoming research in fitness assessment and sports physiology.

2. Literature Review
Kaur Manpreet and Singh Somanpreet (2020) [6] For the purpose of the study, total number of 100 subjects age ranged from 14-19 years old was selected from government and private school of Punjab. The subjects were randomly selected. The subjects were made thoroughly aware regarding the objectives of the study and different Health Related Fitness variables (Cardio-respiratory Endurance, Muscular Strength & Endurance, flexibility and Body Composition) were selected for this present study. The independent t test was applied to analyze the obtained data at level of significance 0.05 and the results indicates that a significant difference was found in the Cardio-respiratory Endurance, Muscular Strength &

Endurance, and Body Composition of the government and private school of Punjab whereas, an insignificant difference was found in the Flexibility of government and private school of Punjab.

Singh, T. (2021) [2] The purpose of this study was to compare muscular power and speed between the Circle Style Male Kabaddi Players of Punjabi University Patiala and Panjab University Chandigarh. A total one hundred nine (N=109) circle style male kabaddi players of eight teams of both universities were selected. In this study the over head medicine ball throw test and 50 meters run test were used to measure the muscular power of upper body and speed of the players. The study had been analyzed with the help of mean, SD, SED and the comparison between groups was done with the help of 't' ratio. For Statistical Description the Statistical Package for Social Sciences (SPSS), version 21.0 was used. The study revealed that on the basis of the finding both Universities' players were possessing same degree of speed ability. But players of Panjab University Chandigarh were better in muscular power of upper body than the players of Punjabi University Patiala**.**

Singh, N. (2022) [1] The objective of the study was to find the differences of selected physical fitness components between the Volleyball and Football players of age 16-18 years. The subjects of this study were the boys of 16-18 years 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.

Tiwari, L. (2024) [5] 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 subject. The age 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 competitions. 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 dry spirometre. The data collected on the different level of basketball player were analyzed by independent "t" test. The level of significance for testing the hypothesis was set at 0.05 level of confidence. It is 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 group were not differ significantly.

Singh N & Harish (2025) [4] the aim of the present study was to compare the mental toughness between Rural and urban racket sports players. Total hundred (n=100) players were selected for study as sample. The samples were further divided into two groups of 40 rural players and 60 urban players. The data was collected by using simple random sampling technique of sports person and age of the subjects was 18 to 30 years. In order to assess the mental toughness of rural racket sports players and urban racket sports players, the questionnaire by Sandeep Tiwari was used. The data was collected tabulated and subject to statistical analysis. Descriptive analysis was done by computing means, standard deviations and t-test. The result revealed that there is no significant difference found between the rural racket sports players and urban racket sports players.

3. Methodology

3.1 Research Design

This is a survey study under Descriptive Research.

3.2 Selection of the Subjects

A group of 100 female volleyball athletes, aged between 18 and 25, will be chosen from the Jammu area. This area will be split into two segments: urban (50) and rural (50). Five colleges from the rural section and five from the urban section will be picked through convenience sampling, and from each college, 10 intercollegiate volleyball players will be intentionally selected.

3.3 Selection of the variables

The study selected physical fitness factors such as muscular strength and explosive strength, as well as physiological factors such as body mass index (BMI) and resting heart rate.

3.4 Statistical Analysis

The chosen physiological and physical fitness components of intercollegiate volleyball players will be compared and analyzed using an independent t-test with SPSS software to determine the significance of the findings. To test the hypothesis, the significance level was set at 0.05.

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

The data collected for the study was analyzed using statistical methods, and the findings are presented in the tables below.

Table 1: Summary of t-test findings comparing the muscular strength of urban (50) and rural (50) intercollegiate female volleyball players in the Jammu region.

Muscular Strength		
	Urban	**Rural**
Mean	27.94	23.88
Stand. Dev.	8.34	6.55
SEM	1.18	0.93
n	50	50
t	2.7087	
d.o.f	98	
critical value	1.984	

The computed 't' value is greater than the critical value (2.7087>1.984). There is significant difference in the muscular strength among urban (mean=27.94) and rural (mean=23.88) intercollegiate female volleyball players of Jammu region.

Table 2: Summary of t-test findings comparing the explosive strength of urban (50) and rural (50) intercollegiate female volleyball players in the Jammu region.

Explosive Strength		
	Urban	**Rural**
Mean	1.474	1.441
Stand. Dev.	0.228	0.262
SEM	0.024	0.025
n	50	50
t	0.669	
d.o.f	98	
critical value	1.984	

The computed 't' value is less than the critical value (0.669<1.984). There is insignificant difference in the explosive strength among urban (mean=1.474) and rural (mean=1.441) intercollegiate female volleyball players of Jammu region.

Table 3: Summary of t-test findings comparing the heart rate of urban (50) and rural (50) intercollegiate female volleyball players in the Jammu region.

Heart Rate		
	Urban	**Rural**
Mean	96.02	91.44
Stand. Dev.	15.73	13.86
SEM	1.93	2.08
n	50	50
t	1.5451	
d.o.f	98	
critical value	1.984	

The computed 't' value is less than the critical value (1.5451<1.984). There is insignificant difference in the heart rate among urban (mean=87.16) and rural (mean=88.84) intercollegiate female volleyball players of Jammu region.

Table 4: Summary of t-test findings comparing the body mass index (BMI)of urban (50) and rural (50) intercollegiate female volleyball players in the Jammu region.

Body Mass Index(BMI)		
	Urban	**Rural**
Mean	20.56	19.29
Stand. Dev.	2.91	2.43
SEM	0.41	0.34
n	50	50
t	2.3697	
d.o.f	98	
critical value	1.984	

The computed 't' value is greater than the critical value (2.3697>1.984). There is significant difference in the body mass index (BMI) among urban (mean=20.56) and rural (mean=19.29) intercollegiate female volleyball players of Jammu region.

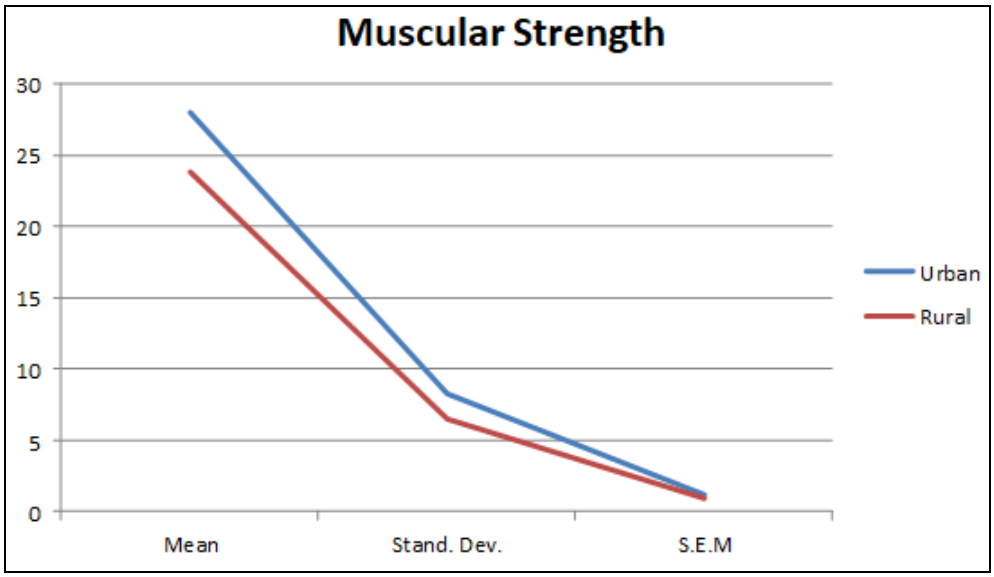

Fig 1: A graphical representation comparing the muscular strength of intercollegiate female volleyball players from urban (n=50) and rural (n=50) areas of the Jammu region (n=100) regarding the mean, standard error of the mean, and standard deviation.

	Mean	**Stand. Dev.**	**S.E.M**
Urban	27.94	8.34	1.18
Rural	23.88	6.55	0.93

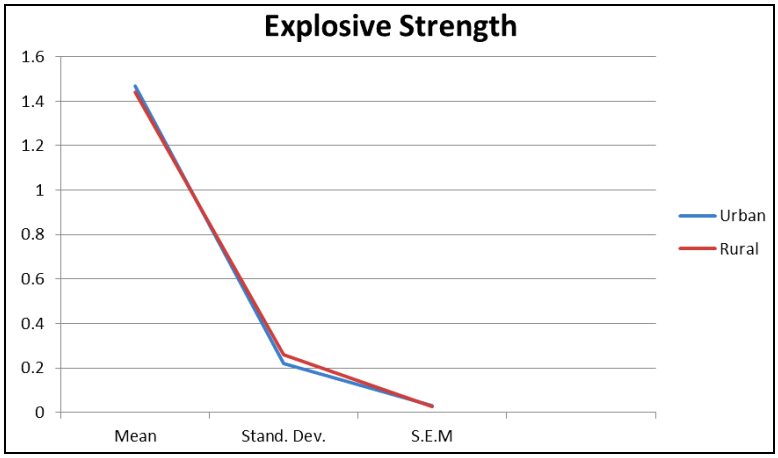

Fig 2: A graphical representation comparing the explosive strength of intercollegiate female volleyball players from urban (n=50) and rural (n=50) areas of the Jammu region (n=100) regarding the mean, standard error of the mean, and standard deviation.

	Mean	Stand. Dev.	S.E.M
Urban	1.47	0.22	0.032
Rural	1.44	0.26	0.037

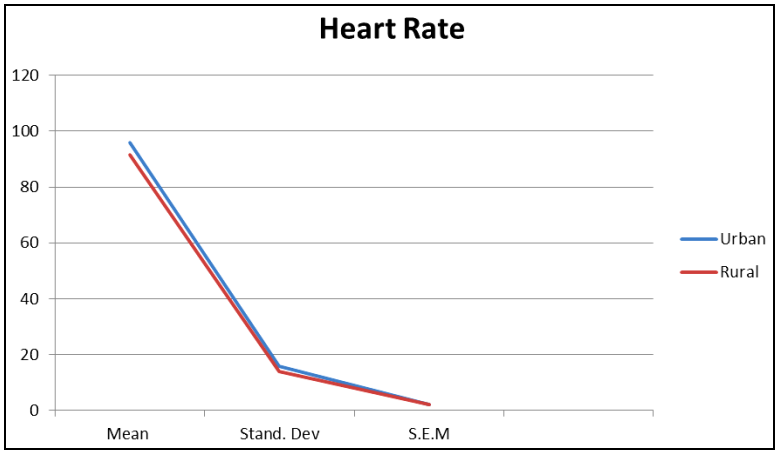

Fig 3: A graphical representation comparing the heart rate of intercollegiate female volleyball players from urban (n=50) and rural (n=50) areas of the Jammu region (n=100) regarding the mean, standard error of the mean, and standard deviation.

	Mean	Stand. Dev.	S.E.M
Urban	96.02	15.73	2.22
Rural	91.44	13.86	1.96

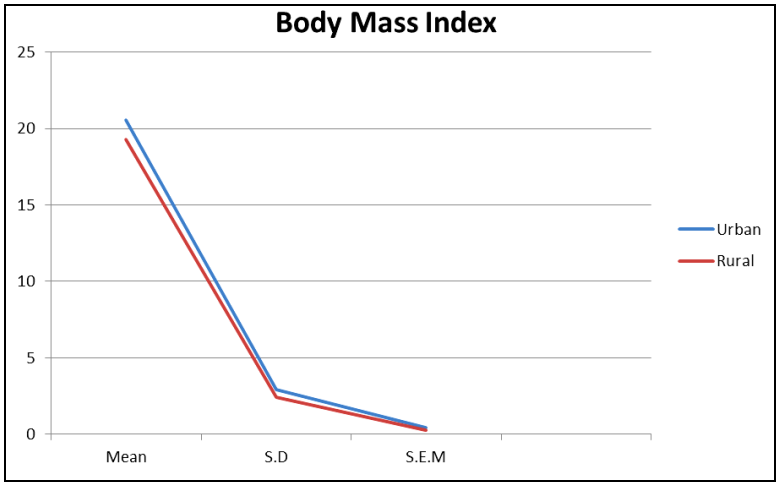

Fig 4: A graphical representation comparing the body mass index of intercollegiate female volleyball players from urban (n=50) and rural (n=50) areas of the Jammu region (n=100) regarding the mean, standard error of the mean, and standard deviation.

	Mean	Stand. Dev.	S.E.M
Urban	20.56	2.91	0.41
Rural	19.29	2.43	0.34

5.1 Discussion

The study aimed to compare physiological and physical fitness variables among intercollegiate volleyball players. The findings revealed significant differences muscular strength and body mass index variables, and no significant differences explosive strength and heart rate variables. This implies that players from various teams may have similar training routines, which could lead to alike physiological adaptations and fitness levels. The findings may also have been affected by environmental and contextual variables, such as nutritional practices, recovery times, and match schedules. Although these elements are outside the scope of the current study, they deserve attention in future research to give a more complete picture of performance variation.

6. Conclusion

Within the limitation of the study and procedure following conclusion were arrived at: There was significant difference between urban and rural intercollegiate volleyball players in variables i.e. muscular strength and body mass index. There was insignificant difference between urban and rural intercollegiate volleyball players in variables i.e. Heart rate and explosive strength. To gain a deeper insight into their impact on physiological and physical fitness outcomes, future studies should think about adding more variables, such as psychological factors, recovery protocols, and dietary habits.

7. References

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