

COMPARISON OF PHYSICAL FITNESS AND PHYSIOLOGICAL VARIABLES BETWEEN VOLLEYBALL AND BASKETBALL PLAYERS

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ABSTRACT

The aim of the study, was to compare the physical fitness variables and physiological variables between volleyball and basketball players. To achieve the purpose of this study, eighty male players, i.e. forty basketball players and forty volleyball players, were selected as subjects from various departments of Jammu & Kashmir University, and their age ranged from 19 to 25 years. The Speed, Agility, Muscular endurance, Resting Pulse Rate and. Breath Holding Time fitness variables were selected for this study. The ensure reliability of the data, test and retest method was adopted. Ten subjects were selected randomly to establish the reliability of the data. The mean, standard deviation and 't' ratio on speed, agility, muscular endurance, resting pulse rate, and Breath Holding Time between volleyball and basketball players were analyzed. Analysis of data revealed that significant difference existed between volleyball and basketball players on speed. Whereas basket ball players were better in speed than volleyball players when compared with the mean values. There was also significant difference between volleyball and basketball players on agility. Whereas basket ball players were better in agility than volleyball players when compared with the mean values. But significant difference was not found between volleyball and basketball players on muscular endurance., resting pulse rate. and breath holding time.

Keywords: Pulse rate, endurance, breath hold, agility, speed, fitness

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INTRODUCTION

‘Sports’ is a popular spectacle and a mass social movement of contemporary times. In the process of historical development sports has occupied a prominent place both in the moral culture of a society. Its social significance continues to soar. In the modern days ‘sports for all’ become a very popular slogan. Participation in sports will yield optimum physical fitness and positive health for all. In the hurry scenario of modern life people need more exercise to keep their body and mind fit to execute the day-to-day activities effectively.

Physical education experts and leaders in India feel that measures should be taken to develop a positive attitude among people towards sports to achieve international standards. It is a myth that foreign coaches would be able to perform miracle in our sports concern. It is stated that, better performance can be attained only through the introduction of scientific methods and techniques through systematically adopted training.

Physical fitness has now become the concern of many nations and has become a universal human movement. It has promoted considerable projects, innovations in scientific program, features for individual and mass participation, motivational and promotional techniques and organizational pattern. The need for administrative physical fitness program, in addition to technical training, in order to raise the level of performance among sports men and especially among the athletics are being increasingly felt in our country.

Physical fitness is one aspect of total fitness. The term has been defined in different ways. Physical fitness is a prime requisite in order to get the optimum in life and to live most and serve best in this modern world. A sound body and a sound mind are men’s most precious possessions (Hooks, 1974).

Nowadays great interest and importance to all concerned with physical education athletics is the speed with which an individual can react in a game situation. For example in swimming race or 100 meter start a difference in reaction to the pistol shoot can result in several fact gained or lost. On such slim margin hang the fruit victory in closely fought contest(**Devries, 1966**).

“Physical fitness provides capacity for activities--- greater the physical endurance and precision, movement will be --- which are essential for our daily walk of life. The greater the physical fitness, the longer can a person keep going and more efficient will be his performance and capacity for recover from fatigue(**Willgoose, 1971**).

“The benefits of physical fitness are numerous. The person who is physically fit has greater amount of strength ,energy and stamina on improved sense of well being, better protection from injury, because strong well developed muscles safeguard bones , internal organs and joints and keep moving parts linear and improved cardio respiratory function”(Bucher and William, 1985).

Exercise makes all the individual motors that power the organs, tissues, and cells in the body operate at higher revolutions per minute. In all forms of training with young children, strict consideration should be given to the balance, between carefully evaluated intervals of work and adequate rest periods. There are two kinds of endurances. They are aerobic and anaerobic endurance. Aerobic endurance refers to the process of taking in , transporting and using oxygen ,while muscular endurance represents the capacity of the muscles for continuous performance of localized activity.

Physiological systems are highly adoptable of exercise. Each task has major physiological components and fitness for the task requires effective functioning of appropriate systems. Much research has been conducted in this area and specific principles of training have been established on the basis of scientific findings for developing these aspects of physical process.

Robson and others found from the analysis of the data that boys have more shoulder strength than girls in all graders. In significant difference in performance between boys and girls of grade are and two boys of grade three and four in standing broad jump. It was also revealed that boys of grade four were significantly superior to the girls of the same grade in 50 meters run and shuttle run. Stefanik and others found at the end of an increasingly active year showed, that better physical performance was exhibited. Yadav conducted a study on standardization of physical fitness norms of the school children of Haryana (13-16 years age) with the purpose of estimating the fitness level, Singeseth and Holesh measured the flexibility of football players. They conducted that a higher degree of flexibility is essential for success in football. Jennet indicated significant difference between mean factor scores for various groups of players. Adams found to correlate Average power (AP) significantly. Also based on the results of these investigations the subject grouped high PP and AP were stronger and had greater power decline (PD). Robert Singer studied 18 male college students who were divided into two equaled groups on the basis pretest performance on the Harvard Step test. Both the groups trained for five weeks, four days per week for 30 minutes a day. As a result of training both the groups showed significant improvement from the pre to post step trails. Berger and Paradis showed the black students significantly on the shuttle run, 50 yards dash 600 yards run and composite fitness scores. It was concluded that black male students of similar socio economic level to white students in the 70 grade have a higher physical fitness.

In this study, the researcher made an attempt to compare the physical fitness variables and physiological variables between volleyball and basketball players. It was also hypothesized that there would be a significant difference exists between basketball and volleyball players.

METHODOLOGY

Selection of subjects:

To achieve the purpose of this study, eighty male players, i.e. forty basketball players and forty volleyball players, were selected as subjects from various departments of Jammu & Kashmir University, and their age ranged from 19 to 25 years. Before conducting the tests, all the subjects were oriented and purpose of the test procedures clearly explained to the subjects. The research scholars of the department of physical education, helped to collect the data for the investigator.

Selection of variables:

1.Speed, 2. Agility, 3. Muscular endurance, 4. Resting Pulse Rate and 5. Breath Holding Time

Selection of Tests:

The present study was undertaken to analyze the selected physical fitness variables such as speed, agility, muscular endurance and physiological fitness variables such as resting pulse rate and breath holding time of basketball and volleyball players. The investigator

analyzed various literatures, has consulted the experts in physical education and selected the items, which were standardized and most suitable for the purpose of this study. They were presented in table – I.

Table 1
TESTS SELECTION

S. No.	Variables	Test Items	Units
1.	Speed	50meters dash	Seconds
2.	Agility	Shuttle Run	Seconds
3.	Muscular Endurance	Sit-ups	No.'s/minute
4.	Resting Pulse Rate	Pulse rate per minute	Numbers
5.	Breath Holding Time	Holding the breath for maximum duration	Seconds

Reliability:

The ensure reliability of the data, test and retest method was adopted. Ten subjects were selected randomly to establish the reliability of the data. The selected criterion variables in the present investigation were tested twice under similar condition. The obtained data on speed, agility, muscular endurance and resting pulse rate and breath holding time, were subjected to intra class correlation to find out the reliability for the data and they were presented in table-2

TABLE 2
INTRA CLASS CORRELATION CO-EFFICIENT VALUES ON SELECTED CRITERION VARIABLES

S.No	Test	'R' value
1	Speed	0.89*
2	Agility	0.86*
3	Muscular endurance	0.88*
4	Resting pulse rate	0.99*
5	Breath holding time	0.92*

*Significant at .05 level of confidence. (The table value required for significance at .05 level of confidence with df 9 was 0.767)

Administration of Test and Collection of the Data

Before administrating the test, the investigator explained the nature and purpose of the study to the subjects. The investigator demonstrated the entire test items in a detailed manner. Each subjects was asked to perform as many trails as they wanted to familiarize themselves with the test items. The data on speed, agility, muscular endurance, resting pulse rate and breath holding time were collected by administering 50 meters dash, shuttle run, sit-up, pulse rate per minute and holding the breath for maximum duration in seconds respectively.

1. 50 Meter Run

Purpose: The purpose of this test was to measure speed of the subjects. **Equipment:** Starting clapper, measuring tape and stop watches. **Procedures:** After a short warm-up period the subject take a position behind the starting line. The starter used the command ready and clap, the subject run across the finish line, which will be drawn at 50 meters from the starting line as fast as possible. **Scoring:** The score is the elapsed time to the nearest tenth second between the starting signal and the subject crosses finish line.

2. Shuttle Run

Purpose: To measure the performer's running and changing direction. **Equipment and Material:** Marking tape, stop watches and two block of wood (2"x 2" x 2"). **Administration of the Test:** The performer starts behind the starting line on the signal "GO", and runs to the blocks, picks of one returns to the starting line, and places block behind the line, he then repeats the process with the second block. Allow some rest between the two trails. **Scoring:** The score for each performer is the length of time taken (to the nearest tenth of a second) to complete the course. Record only the best trail.

Bent Knee Sit-Ups

Purpose: To assess the abdominal strength and muscular endurance. **Equipments and materials** Mat and stop watch were used. **Procedure:** The subjects were asked to take a spine lying position on the mat knees bent to an angle less than 90 degrees, hands were locked behind neck. A partner held the ankles jointly on the ground. To perform the sit-ups, the subject lifted his trunk, head and then lowered his trunk touching the mat with his elbows. This exercise is done continuously without pause for one minute. Numbers of correctly executed sit-ups were recorded as the performance. To facilities counting and recording the subjects were paired one subjects performed this exercise while his partner counted. After the score was recorded the subjects inter changed their position, i.e., the partner become the performer and vice versa. **Scoring:** Recording the number of correctly executed sit-ups performed in one minute.

Pulse Rate

Purpose: The purpose of the test was to find out the pulse rate at rest of the individuals. **Equipments:** stop watch, pencil and score sheet was used to assess the pulse rate at rest. **Procedure:** he pulse rate of the subject was recorded in sting position. Before taking the normal pulse rate the subject was asked to relax in a sting position for 30 minutes. The pulse rate was taken at the radial artery at the rest in such a manner that palptation was clearly felt by the fingertips. The measurement of palpitation was counted for one minute. **coring:** he pulse rate was recorded for one minute from each subject.

Breath Holding Time

Purpose: The objective was to measure the ability of the subject to hold the breath for longer time. **Equipments :** A stop watch with calibration of 1/10 seconds, score sheet and a pencil were used to administer the test. **Procedure:** The subject stood at ease and inhaled deeply after which he held his breath for a length of time possible to him. The index finger of the respondent served as indicator for the investigator to know the stand and end of the recording time. The thumb and centre finger were used to hold the nose to avoid letting the air through the nostrils. The subjects were requested not to let the air out by opening the mouth while

recording the breath holding time. **Scoring:** The time of holding the breath till the subject let the air out was closed by using the stop to the nearest 1/10 of a second as breath holding time.

Statistical Analysis

The static group design was used as experimental design in the study. The collected data on selected criterion variables were statistically analyzed by using independent 't' ratio to find out the significant difference between volleyball and basketball players.

RESULTS

The mean, standard deviation and 't' ratio on speed, agility, muscular endurance, resting pulse rate, and Breath Holding Time between volleyball and basketball players were analyzed and presented in Table 3 to 7.

Table 3
MEAN STANDARD DEVIATION AND 't' RATIO ON SPEED OF VOLLEYBALL AND BASKETBALL PLAYERS

Group	Mean	S.D.	't' ratio	Level of Significance
Volleyball Players	8.096	0.085	4.778*	0.05
Basketball Players	7.967	0.151		

* Significant at 0.05 level

t.05 (78) = 1.99.

Table 3 indicates that the mean, standard deviation and 't' ratio of speed of volleyball and basketball players. The mean and standard deviation values were 8.096 ± 0.085 for volleyball players and 7.967 ± 0.151 for basketball players respectively and the 't' ratio for these values was 4.778. The obtained 't' ratio for speed was found significant at 0.05 level of confidence and this value was higher than the required table value of 1.99 for degrees of freedom 78. The result of the study shown that the basketball players, have better speed than the volleyball players.

Table 4
MEAN STANDARD DEVIATION AND 't' RATIO ON AGILITY OF VOLLEYBALL AND BASKETBALL PLAYERS

Group	Mean	Standard Deviation	't' ratio	Level of Significance
Volleyball Players	12.722	0.309	3.09*	0.05
Basketball Players	12.499	0.336		

• Significant at 0.05 level, t.05 (78) = 1.99

Table 4 indicates the mean, standard deviation and 't' ratio of agility of volleyball and basketball players. The means and standard deviation values were 12.722 ± 0.309 for volleyball players and 12.499 ± 0.336 for basketball players respectively. The 't' ratio for these values was 3.09. The obtained 't' ratio for agility was found significant at 0.05 level of confidence and this value was higher than the required table value of 1.99 for degrees of freedom 78. The result of the study shown that the basketball players, have better agility than the volleyball players when compared with the mean values.

Table 5
MEAN STANDARD DEVIATION AND 't' RATIO OF MUSCULAR
ENDURANCE ON VOLLEYBALL AND BASKETBALL
PLAYERS

Group	Mean	Standard Deviation	't' ratio	Level of significance
Volleyball Players	55.525	3.167	0.692	0.05
Basketball Players	55.975	2.688		

Insignificant at 0.05 level, $t_{0.05}(78) = 1.99$.

Table 5 indicates the mean, standard deviation and 't' ratio of muscular endurance of volleyball and basketball players. The means and standard deviation values were 55.525 ± 3.167 for volleyball players and 55.975 ± 2.688 for basketball players respectively. The 't' ratio for these values was 0.692. The obtained 't' ratio for muscular endurance was found no significant difference at 0.05 level of confidence and this value was lesser than the required table value of 1.99 for degrees of freedom 78. The result of the study shown that there was no significant difference occurred between basketball players and volleyball players on muscular endurance.

Table 6
MEAN STANDARD DEVIATION AND 't' RATIO ON RESTING PULSE RATE
OF VOLLEYBALL AND BASKETBALL PLAYERS

Group	Mean	Standard Deviation	't' ratio	Level of significance
Volleyball Players	64.85	2.134	0.404	0.05
Basketball Players	65.025	1.739		

Insignificant at 0.05 level, $t_{0.05}(78) = 1.99$.

Table 6 indicates the mean, standard deviation and 't' ratio of resting pulse rate of volleyball and basketball players. The means and standard deviation values were 64.85 ± 2.134 for volleyball players and 65.025 ± 1.739 for basketball players respectively. The 't' ratio for these values was 0.404. The obtained 't' ratio for resting pulse rate was found no significant difference at 0.05 level of confidence and this value was lesser than the required table value of 1.99 for degrees of freedom 78. The result of the study shown that there was no significant difference occurred between basketball players and volleyball players on Resting Pulse Rate.

Table 7
MEAN STANDARD DEVIATION AND 't' RATIO ON BREATH HOLDING
TIME OF VOLLEYBALL AND BASKETBALL PLAYERS

Group	Mean	Standard Deviation	't' ratio	Level of significance
Volleyball Players	54.65	2.190	0.312	0.05
Basketball Players	54.5	2.356		

Insignificant at 0.05 level, $t_{0.05}(78) = 1.99$.

Table 7 indicates the mean, standard deviation and 't' ratio of breath holding time of volleyball and basketball players. The means and standard deviation values were 54.65 ± 2.190 for volleyball players and 54.5 ± 2.356 for basketball players respectively. The 't' ratio for these values was 0.312. The obtained 't' ratio for breath holding time was found no significant difference at 0.05 level of confidence and these value was lesser than the required table value of 1.99 for degrees of freedom 78. The result of the study was shown that there was no significant difference occurred between basketball players and volleyball players on breath holding time.

DISCUSSION

In this study the investigator found out there was a significant difference between volleyball and basketball players in speed and agility, whereas basketball players were better in speed and agility than the volleyball players when compared with the mean values. And also the results of the present study showed that there was no significant difference between volleyball and basketball players on muscular endurance, resting pulse rate and breath holding time.

This may be due to the fact that, basically volleyball and basketball players having better physical fitness and physiological fitness and both game players such as volleyball and basketball players need the same qualities for better performance.

The investigator hypothesized in earlier that there may be a significant difference between volleyball and basketball players on selected criterion variables. The results of this study indicated that there was a significant difference between volleyball and basketball players on speed and agility. There was no significant difference between volleyball and basketball players on muscular endurance, resting pulse rate and breath holding time. Hence, the investigator hypothesis was partially accepted.

CONCLUSIONS

1. There was a significant difference between volleyball and basketball players on speed. Whereas basketball players were better in speed than volleyball players when compared with the mean values.
2. There was a significant difference between volleyball and basketball players on agility. Whereas basketball players were better in agility than volleyball players when compared with the mean values.
3. There was no significant difference between volleyball and basketball players on muscular endurance.
4. There was no significant difference between volleyball and basketball players on resting pulse rate.
5. There was no significant difference between volleyball and basketball players on breath holding time.

APPLICATION IN SPORTS

This study provides an opportunity to find out the speed, agility, muscular endurance, resting pulse rate and breath holding time of the basketball and volleyball players. This research may be helpful to suggest ways and means for improving physiological through special type of physical exercise. This study will help the physical education teachers and coaches in selecting the athletes for the purpose of competition.

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