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## Relationship of physiological parameters as predictors of performance in volleyball players

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### Abstract

This research was entitled as “Relationship of Physiological Parameters as Predictors of Performance in Volleyball Players”. The subjects for the present study were hundred (50-male and 50-female) inter-college level volleyball players from the affiliated colleges of Panjab University, Chandigarh. The data pertaining to the anthropometrical, physical and physiological variables was collected in the track and laboratory of Physical Education Department, Panjab University. The performance was assessed by the panel of three judges rating of skills during the inter-college tournament of Panjab University. In order to correlate the performance in playing ability on the basis of the physiological variables, Pearson’s Product Moment Correlation and Multiple Correlations will be employed. The dependent variables predicting playing ability performance in volleyball was found out through Regression Equations. The analysis of data of men volleyball players reveals that none of the physiological variables showed any significant relationship to playing ability. In case of women volleyball players also none of the physiological variables showed any significant relationship to volleyball playing ability.

**Keywords:** Physical education, colleges, West Bengal, policies

### Introduction

The application of modern science and technology to analyze and improve the performance of athletes has become very essential. A few countries had organized innovative programs satisfying the scientific developments for Olympic athletes. The World of Sports has rather intrigued the area of sports sciences concerning biomechanics, physiology, sports medicine, sports psychology and sports sociology. Most of the countries have started applying the practical methods of carbohydrate loading, blood doping, attitude training, relaxation techniques etc. It leads to an increased awareness and realization of the application of sports sciences to get greater performance from sports persons. This makes it imminent to consider that high acquisition of elements of skill, motor fitness physical and physiological abilities does not by itself ensures high degree of performance in a game situation. Players must learn to translate these qualities in the right manner according to the changing demands in a game situation. But the ensuing qualities give an unquestionable advantage to achieve excellence in sport performance given the right training and opportunities. According to Edward Superlak (2008) <sup>[6]</sup> modern qualified sport involves constant improvement of effectiveness of the process of athletes’ training and obtaining high sport results. The modern scientific and technological development allows this process and facilitates solving practical problems in sport. One of the most fundamental issues in today’s contemporary sport is the search for the most effective means of selection of future athletes. The process of selection should account for proper differentiation between athletes and correct identification of the most outstanding candidates for further training leading to the championship level”. Gabbet T and Georgieff B (2005) <sup>[5]</sup> suggest that some of the physical and physiological parameters typically improve with increases in playing level Male players are taller, heavier, leaner, and have greater standing reach height, speed, agility, muscular power, and estimated maximal aerobic power than female players. Given the improvements in lower-body muscular power, agility, and estimated maximal aerobic power with increased playing level, and given the importance of these qualities to competitive performances, conditioning coaches should train these qualities to improve the playing performances of junior volleyball players.

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### Physiological variables and performance in volleyball

Smith D J, Roberts D, Watson B (2007) [7] suggests Volleyball has been described as an 'interval' sport with both anaerobic and aerobic components. Bayios and others (2006) [1, 2] suggest that in order to improve young volleyball players' performance, everyday coaching should be complemented by detailed assessment of their body build and physiological characteristics. Coutts (1976) [4] studied eleven members of Canadian National Women Volleyball teams who were tested on Vertical Jumping Ability and Margria, Test of Anaerobic Power. He concluded that velocity scores on the two tests were not significantly related to each other and when correlating these values with height and weight, the relationship between velocity on the Margria test and height was the only significant correlation. Power values on both tests were significantly related to each other, as well as, height and weight. The average values of 1.5 m/sec and 108 kg m /sec for the Margria test and 1.56 m/sec and 110kgm/sc on the vertical jump, thus, provide normative values on two distinct aspects of leg power per unit body weight for female volleyball players. At international level, there has been some thrust on research to study and predict physical, physiological, and anthropometric performance factors in various games and sports. But not enough research studies have concentrated on prediction of performance factors, especially in the game of volleyball which is necessary, not only for proper selection of sportsperson who are most promising for the game, but also to select most viable tools of training to help players achieve their optimal capacities.

### Selection of the subjects

The subjects for the present study were hundred (50-male and 50-female) inter-college level volleyball players from the

affiliated colleges of Panjab University, Chandigarh.

### Selection of variables

The following anthropometric, physical and physiological variables were selected because these variables are considered to be important for better volleyball performance in male and female players.

#### A. Dependent variables

Performance of Volleyball Players

#### B. Independent variables

Physiological Variables

- Resting pulse rate
- Resting systolic /diastolic blood pressure
- Peak Expiratory Flow Rate
- Vital Capacity

### Collection of data

The data pertaining to the anthropometrical, physical and physiological variables was collected in the track and laboratory of Physical Education Department, Panjab University. The performance was assessed by the panel of three judges rating of skills during the inter-college tournament of Panjab University.

### Statistical procedure

In order to correlate the performance in playing ability on the basis of the physiological variables, Pearson's Product Moment Correlation and Multiple Correlations will be employed. The dependent variables predicting playing ability performance in volleyball will be found out through Regression Equations.

**Table 1:** Descriptive Analysis of Age and Weight of Men and Women Volleyball Players

Variable	Mean		SD		Range		Skewness		Kurtosis	
	Men	Women	Men	Women	Max. Men Women	Min. Men Women	Men	Women	Men	Women
Pulse	76.42	82.56	7.36	7.03	60 65	94 97	-.188	-.328	.329	-.285
BP (SYS)	116.2	118.4	5.05	6.56	108 100	126 130	.276	-.57	-.63	.488
BP(Dia.)	74.6	75.52	5.08	6.35	60 60	84 90	-.297	-.224	.313	-.156
PFR	4.52	3.62	726	.58	3.0 2.5	5.5 5.0	-.373	.35	-.725	-.29
VC	2.99	2.53	.56	.48	2.0 1.8	4.3 3.6	.08	.19	-.289	-.1.1
Assess. Ability	15.97	15.77	2.55	1.7	12.5 13.5	22.6 22.5	.76	.2.26	.381	7.01

The mean, standard deviation, range, Skewness and Kurtosis for pulse, blood pressure (systolic and diastolic) peak flow rate, vital capacity, and assessment ability are given in Table 1. It shows that means for pulse were 76.42(SD=7.36) sec. and 82.56(SD=7.03) or men and women respectively. Blood pressure diastolic means were 74.6mmHg (SD=5.08) for men and 75.52 mmHg (SD=6.35) for women players, and means for peak flow rate were 4.52(SD=.726) liters and 3.62(SD=.58) liters for men and women respectively. For vital capacity the means for men were 2.99 liters (SD=.56) and for women 2.53 liters (SD=.48). For assessment ability the

means score were 15.97(SD=2.55) for men and 15.77 (SD=1.7) for women.

The coefficients of correlation between volleyball playing ability and selected physiological variables for men have been given in Table 2

Table 2 indicates the coefficients of correlation between pulse, systolic blood pressure, diastolic blood pressure, Peak flow rate, and vital capacity were 0.027, 0.014, 0.05, 0.044 and 0.147 respectively. There was no significant relationship between any one of the chosen physiological variable and volleyball playing ability.

**Table 2:** Co-Efficient of Correlations between Selected Physiological Variables and Volleyball Playing Ability (Men)

Variable	r Value
Pulse	0.027
Systolic Blood Pressure	0.014
Diastolic Blood Pressure	0.050
Peak Flow Rate	0.044
Vital capacity	0.147

The coefficients of correlation between volleyball playing ability and selected physiological variables for women have been given in Table 3.

The table 3 shows that the coefficients of correlation between the selected variables of Pulse, Systolic Blood Pressure, Diastolic Blood Pressure, Peak Flow Rate, and Vital capacity were 0.177, 0.182, 0.138, 0.273, and 0.179 respectively. None of the selected physiological variables showed any significant correlation to volleyball playing ability.

**Table 3:** Co-Efficient of Correlations between Selected Physiological Variables and Volleyball Playing Ability (Women)

Variable	r Value
Pulse	0.177
Systolic Blood Pressure	0.182
Diastolic Blood Pressure	0.138
Peak Flow Rate	0.273
Vital capacity	0.179

### Discussion of findings

The analysis of data of men volleyball players reveals that none of the physiological variables showed any significant relationship to playing ability. In case of women volleyball players also none of the physiological variables showed any significant relationship to volleyball playing ability. The reliability of data for the motor performance and those physiological variables where performance scores depended on the subject's active involvement in the testing procedures was established by test retest method. Tests in all performance variables were repeated after one day's gap on fifteen randomly selected subjects under, as far as possible, similar conditions, and measurements were recorded by the same testers. The Reliability coefficients of test retest scores ranged between 0, 72-0.94 for physical and physiological variables. Means for pulse were 76.42(SD=7.36) sec. and 82.56(SD=7.03) for men and women respectively. Systolic blood pressure means were 116.2 (SD=5.05) 118.4(SD=6.56) and Diastolic Blood pressure means were 74.6mmHg (SD=5.08) for men and 75.52 mmHg (SD=6.35) for women players respectively, and means for peak flow rate were 4.52(SD=.726) liters and 3.62(SD=.58) liters for men and women respectively. For vital capacity the means for men were 2.99 liters (SD=.56) and for women 2.53 liters (SD=.48). Hence, Physiological variables of pulse, systolic blood pressure, diastolic blood pressure, Peak flow rate, and vital did not have any significant relationship with volleyball playing ability for men.

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