



## RELATIONSHIP OF SELECTED ANTHROPOMETRIC & PHYSICAL FITNESS VARIABLES WITH THE VOLLEYBALL PLAYING PERFORMANCE

### KEYWORDS

Anthropometric Variable, physical fitness Variables, Playing Performance

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**ABSTRACT** *The present study was undertaken to find out the significant relationship of selected anthropometric variable & physical fitness variables with the volleyball playing performance. 18 male volleyball players from SAI training centre, Kurukshetra were selected as a subject for the present study with age range between 15 to 20 years. The following anthropometric variables i.e. Height, Weight, Sitting height, Hand Span, Arm length, Leg length and physical fitness variables i.e. Speed, vertical jump, sit and reach and 1500 m run variables were selected for the testing the hypothesis. The playing performance was analyzed by four point rating scale through subjective observation of expert. Pearson's Product Moment correlation test was employed for the present study and the level of significance was set at 0.05. The statistical test was computed by using standard statistical package SPSS 17. Analysis of the results indicated that only Height from the anthropometric variables and Speed from the physical fitness variables were shown the significant relationship with the volleyball playing performance.*

### INTRODUCTION

Volleyball is a sport played by two teams on a playing court divided by a net. There are different versions available for specific circumstances in order to offer the versatility of the game to everyone. The object of the game is to send the ball over the net in order to ground it on the opponent's court, and to prevent the same effort by the opponent. The team has three hits for returning the ball (in addition to the block contact). The ball is put in play with a service: hit by the server over the net to the opponents. The rally continues until the ball is grounded on the playing court, goes "out" or a team fails to return it properly.

Volleyball is a complex and determining game requiring sophisticated training. Players must have good aerobic fitness, speed, strength, technical skills and understanding of basic Volleyball strategies. In volleyball, technical and tactical skills, anthropometric characteristics and individual physical performance capacities are most important factors that contribute to the success of a team in competitions.

Preponderance of scientific evidence obtained from different investigations has revealed that high level of performance depends upon various factors like somatic, physiological, anthropometrics, psychological factors etc. Hence, there is a need to pay attention upon these factors, which are main predictors of sports performance. Countries leading in sports, such as America, Russia, Germany, China etc are using well developed scientific system of training for their players and teams over a period of several years but India is in cross roads. Though it has developed and improved to considerable extent yet much is desired to be achieved.

Anthropometry is the systematic quantitative representation of the human body. Anthropometric techniques are used to measure the absolute and relative variability in size and shape of the human body. Depending on the objective, anthropometric instrumentation may include weighing scale, anthropometer, skinfold caliper, body volume tanks, and bioelectrical impedance analyzers. Anthropometry helps to study the relationship between the size and shape of the human body and sports performance. Expert of this field use internationally standardized techniques to meas-

ure athletes and use calculations of body composition, dimensions, proportion and ratio to help improve sport performance.

In modern volleyball measurement, evaluation, analysis and interpretation of player's team performance are very important in scientific training and development of top class team. Match analysis and tests are the most important means to obtain data and subjective information on the performance of players and team during the match. Scouting has become a tool used by every coach to prepare their team for the competition.

The study was delimited to Sports Authority of India training centers boys of Kurukshetra and selected anthropometric and motor ability variables. The study was further restricted to the volleyball playing performance which was evaluated through statistical match analysis based on 4 points rating scale. The study was hypothesized that there would be significant relationship between selected anthropometrical variable & physical fitness variables with the volleyball playing performance.

### METHODOLOGY

For the present study 18 male volleyball players from Sports Authority of India training centre, Kurukshetra with age range between 15 to 20 years were selected as a subject for the present study and all the selected subjects were national player. Hence, consecutive sampling was used for the selection of the subjects. On the basis of available related literature, expert guidance, investigators own experience, availability of the equipments and feasibility of the test the following anthropometric, physical fitness variables and over all volleyball playing performance were selected for this study.

#### Anthropometric Variables-

**1. Weight-** The subjects stand erect in the center of the scaled platform of a portable weighing machine wearing minimal clothing and the weight was recorded in kilogram.

**2. Height-** The height was measured with an anthropometric rod. The measurement was the taken with the individual

standing straight against an upright wall.

**3. Sitting height-** The player was seated on a measuring box or a level platform. The participant was instructed to take and hold a deep breath and while keeping the head in the Frankfort plane the measurer applied gentle upward lift through the mastoid processes. The recorder placed the headboard firmly down on the Vertex.

**4. Hand span-** The hand is placed palm down on a flat surface. The fingers are outstretched as far as possible. The maximum distance between tips of the thumb to the little finger was recorded in centimeter.

**5. Arm Length-** the subject hangs his right arm at the side of the body and measurement from the acromion process to tip of the middle finger were taken in centimeter.

**6. Leg Length-** the subject stand erect facing forward and measurement were taken from greater trochanter to heel of the feet in centimeter.

**Physical Fitness Variables-**

**Speed-** 20 M dash was used to measure the speed of the subjects. Participants are required to take ready position behind the starting line. On command "Go" start running as fast as possible till the finish line. The better time of trials was used in statistical analysis.

**Explosive Strength-** Vertical Jump test was used to measure the explosive leg strength. Participants were required to take approach and jump to reach as high as possible against the marked wall by their hand. The height was measured to the nearest centimeter.

**Flexibility-** Sit and reach test was used and the Participants are asked to sit on the floor with straight knees and slide his hands along the measuring scale as far as possible. The score nearest to centimeter was recorded.

**Cardio Vascular Endurance-** 1500 M run test was used to measure the Cardio Vascular Endurance. The participants are asked to take a standing start and the signal "Go" the subject start running the 1500 meter distance in standard 400 meter track. The time taken by stop watch.

**Overall volleyball playing performance:** - Over all playing performance was analyzed through statistical match analysis (SMA) by using four point rating scale will be used to evaluate the playing performance. Performance of each player in match analysis was recorded through subjective observation method by using 4-point rating scale. The result of action were observed and recorded by two observers on prepared Performa after practicing the observation.

**Table 1**

Skill level	Symbol used	Points
Very good (gaining direct point)	+	3
Good (advantage in)		2
Poor (advantage out)	O	1
Fault (giving direct point to the opponent)	-	0

After attaining the above information, the success rate (efficiency) was calculated by using the following formula.

**(Success rate = 100 X [ 3 X total numbers of very good actions + 2 X total numbers of good actions + 1 X total numbers of poor actions + 0 X total numbers of fault ac-**

tions / 3 X overall total attempts made by a player.)

To find out the relationship between selected anthropometrical variable & physical fitness variables with the volleyball playing performance Pearson Product Moment correlation test was used. For the purpose of analysis, the level of significance was set at 0.05.

**FINDING**

The significance relationship of anthropometrical and physical fitness variable with playing performance of selected subjects were presented in table 2and 3.

**Table 2**  
**Relationship of selected anthropometric variables with playing performance**

S. No.	Variables	Mean	S. D.	Coefficient of correlation
1	Height	190.38	5.89	0.47*
2	Weight	74.84	7.02	0.26
3	Sitting height	95.61	2.87	0.36
4	Hand span	11.23	.60	0.35
5	Arm length	82.85	2.73	0.17
6	Leg length	91.15	2.30	0.19

\*Significant at 0.05, (N=16; r=0.468)

It was evident from the table 2 that co-efficient of correlation of Height with Playing performance in volleyball was .47, which was significant at 0.05 level. It indicates that there was significant relationship of Height with playing performance in volleyball. It was also evident from the table 2 that except the Height, rest of the anthropometric variables were not significant at 0.05 level. It indicates that there was no significant relationship of rest of the anthropometric variables with playing performance in volleyball.

**Table 3**  
**Relationship of selected physical fitness variables with playing performance**

S. No.	Variables	mean	SD	Co-efficient of Correlation
1	Speed	3.41	0.21	0.63*
2	Explosive Strength	69	7.44	0.29
3	Flexibility	19.07	3.77	0.08
4	Cardio Vascular Endurance	5.61	0.43	0.36

\*Significant at 0.05 level (N=13; r=0.514)

Table 3 shows that the co-efficient of correlation of 20 meter dash with playing performance in volleyball was 0.63, which was significant at 0.05 level. It indicates that there was significant relationship of 20 meter dash with playing performance in volleyball. It was also evident from the table 3 that except the 20 meter dash, rest of the motor ability variables were not significant at 0.05 level. It indicates that there was no significant relationship of rest of the motor ability variables with playing performance in volleyball.

**DISCUSSION**

The study was conceptualized with the purpose to find out the relationship between selected anthropometrical variable & physical fitness variables with the volleyball playing performance. The knowledge about difference of selected

anthropometric and physical fitness variables are very important for training and performance implementation in volleyball. The finding of the study also be utilized while consider the factor for the selection of player training age, experience, and fitness etc. The finding indicating the requirement of the involvement of player in the match could be used by the coaches while planning the training program considering the tactical plan for the player. Based on the findings of the study it was revealed that the anthropometrical variable Height and physical fitness variable 20 meter dash were significantly correlated with playing performance.

In modern volleyball each team tries to reach high and jump high to make playing action like block and spike more difficult for opponent while performed over the net and due to this reason more emphasis has to be given on team's attack, block and service because these are the offensive action and team's most of the points are gain through these playing action, along with this, winning chances become more with an effective block and to make the team more stronger in these playing actions Height has to be given more importance. Even it has been seen the team composition at international level the average height of the top class teams are increasing which shows the significant importance of height in volleyball. The statistical significance of speed a selected physical variable attributed to the fact that speed in movement plays a vital role in different playing actions such as set, service, block, attack, defence, reception and chasing the ball into the free zone. As per the position of play each player has to perform these specific actions with desirable speed.

On the basis of finding text book depiction, scientific facts available and scholar own understanding the hypothesis stated earlier there would be significant relationship between selected anthropometrical variable & physical fitness variables with the volleyball playing performance was partially accepted and partially rejected.

## CONCLUSION

Following conclusions were drawn from the present study-

- The statistical finding showed that there was significant relationship of anthropometric variable i.e. Height with the volleyball playing performance.
- The statistical finding showed that there was significant relationship of physical fitness variables i.e. Speed with the volleyball playing performance.
- The statistical finding showed that there was no significant relationship of anthropometric variable i.e. Weight, Sitting height, Hand span, Arm length and Leg length with the volleyball playing performance.
- The statistical finding showed that there was no significant relationship of physical fitness variables i.e. vertical jump, sit and reach and 1500 m run with the volleyball playing performance.

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