Relationship Of Selected Physical And Anthropometrical Variables With The Game Performance Of College Men Volleyball Players

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ABSTRACT

This study examined the relationship between game performance and selected physical fitness and anthropometrical variables of volleyball players who have represented intercollegiate level, their age ranged from 18-21 years under the V.T.U. jurisdiction. The subjects were taken from Bangalore district studying in Bachelor degree in Engineering coming under Bangalore Regional jurisdiction only. The parameters of physical fitness like Abdominal Strength, Muscular Power, Flexibility Speed, Agility and Muscular Endurance were assessed. The anthropometric variables like height, weight, arm length, leg length and arm span were assessed. The four point rating scale was employed to assess the game performances of the volleyball players during game situations. Data in the four skills namely serve, pass (service reception), attack and block were rated on a scale from zero to three. The rating of the players was done by three experienced and well known judges as per the rating scale during match situations. The statistical tool used was Pearson product moment correlation. There exists a positive correlation between game performance with abdominal strength ($r' = 0.467; P < 0.01$), muscular power ($r' = 0.343; P < 0.05$), flexibility ($r' = 0.368; P < 0.05$), agility ($r' = 0.498; P < 0.01$) and muscular endurance ($r' = 0.500; P < 0.01$), in addition it is also showed that the game performance is negatively correlated with speed ($r' = -0.380; P < 0.05$). It is clearly exemplified that there exists a positive correlation between game performance with height ($r' = 0.399; P < 0.05$), arm length ($r' = 0.463; P < 0.01$), arm span ($r' = 0.547; P < 0.01$), leg length ($r' = 0.548; P < 0.01$), arm girth ($r' = 0.559; P < 0.01$), thigh girth ($r' = 0.418; P < 0.01$) and calf girth ($r' = 0.498; P < 0.01$), besides the results also reveal that there is a negative insignificant correlation between game performance and weight. It was concluded that there is a need to improve the physical fitness parameters in relation to anthropometric measurements so as to enhance the game performance of the volleyball players.

Keywords: Physical Anthropometrical, Game performance.

INTRODUCTION: The players are creating and breaking new records in today's competitive sports. Traditionally the motto of Olympic festival is faster, higher and stronger is still alive in the field of physical education and sports. The aim of games and sports is fast suited with every field. The level of physical fitness is increasing day to day because of development of science and technology. Volleyball is a game played indoor or outdoor by teams whose members seek to score points in the course of hitting a ball back and forth across a net. It is a popular game in the matter of techniques, blocking as well as jumps and smashes play a crucial part in volleyball. Successful game of volleyball needs ability of the players to generate good speed, agility, flexibility and incredible power during the play of game. Skills like spiking, passing, attack and block are of utmost importance for a player at any level of play. Not merely skills but also physical
and anthropometric measurements of a player will contribute to the success of the player as well as of the team. The performance of athletes, players, sportsmen at various national and international competitions has been poor and this is of great concern especially to the coaches, physical educationists, sports scientists and researchers. Optimal performance thus requires a combination of technical and tactical abilities as well as a high degree of physical fitness. Efforts to improve the standard of our sportsmen, have achieved an insignificant success in this respect. The performance of any player will depend upon his physical fitness and anthropometric characteristics.

Physical activity enhances mental development of person (Cowell and France, 1963). In physical education and sports, especially, in developing physical fitness there is a large collection of activities for experiencing success (Kane, 1975). Many studies conducted outside India have advised for physical fitness has positive effect on sport performance capacity (Harre, 1977 and Hollman, 1981). Anthropometric characteristics play an important role in determining the success of an athlete. Quite naturally, the interest in anthropometric characteristics and body composition of sportspersons from different competitive sports has increased tremendously over the last decades. It has been well established that specific physical fitness or anthropometric measurements indicate whether the player would be suitable for the competition at the highest level in a specific sport (Slater et al., 2005). These physical and anthropometric parameters are the responsive indicators of physical growth and nutritional status of the sportspersons for their maximal performances. These indicators of viewpoint sports performance depend largely on heredity, correlated with age, height, socio-economic status, nutritional status and exercise practice. Proper evaluation of these parameters plans the quantification of physical and anthropometric measurements of players which can be vital in relating body structure and sports performance. Several studies have examined the relationships between physical fitness and anthropometric measurements of volleyball players (Gladden & Colacino, 1978; Fry et al., 1991). The findings of these studies have shown that certain anthropometric measurements are advantageous to the volleyball players, including greater height and greater vertical jump distance (Gladden & Colacino, 1978).

AIMS AND OBJECTIVES OF THE STUDY:

The aim of the present study is to examine the relationship of physical fitness and anthropometric measurements with game performance of volleyball players.

MATERIAL AND METHODS:

Sample: The present study was carried out on forty male players who have represented intercollegiate level, their age ranged from 18-21 years under the V.T.U. jurisdiction. The subjects were taken from Bangalore district studying Bachelor Degree in Engineering stream coming under Bangalore Regional jurisdiction only.

Variables selected: The parameters of physical fitness like Abdominal Strength using Sit Ups, Muscular Power using vertical jump, Flexibility using Sit and Reach Test, Agility using quadrant Jump, Speed using 50 Meter Dash and Muscular Endurance using Push Ups test were assessed. The anthropometric variables like height, weight, arm length, leg length and arm span were assessed. The four point rating scale was employed to assess the game performance of the volleyball players during game situations. Data in the four skills namely serve, pass (service reception), attack and block were rated on a scale from zero to three. The rating of the players was done by three experienced and well-known judges as per the rating scale during match situations.

Statistical Analysis: Pearson's Coefficient of Correlation was applied to establish the relationship among the variables measured. Data were analyzed using SPSS (Statistical Package for Social Science) version 11.5 at 0.05 and 0.01 level of probability was used to indicate statistical significance.
ANALYSIS AND INTERPRETATION OF DATA:

The results pertaining to the significant relationship between the selected physical fitness and game performance of volleyball players by using Pearson’s Coefficient of Correlation are presented in the following tables.

**Table-1**  Table showing relationship between selected physical fitness variables and game performance of volleyball players.

<table>
<thead>
<tr>
<th>Game Performance and Physical Fitness</th>
<th>N</th>
<th>Df (N-2)</th>
<th>‘r’ value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal Strength</td>
<td>40</td>
<td>38</td>
<td>0.467</td>
<td>**</td>
</tr>
<tr>
<td>Muscular Power</td>
<td>40</td>
<td>38</td>
<td>0.343</td>
<td>*</td>
</tr>
<tr>
<td>Flexibility</td>
<td>40</td>
<td>38</td>
<td>0.368</td>
<td>*</td>
</tr>
<tr>
<td>Agility</td>
<td>40</td>
<td>38</td>
<td>0.498</td>
<td>**</td>
</tr>
<tr>
<td>Speed</td>
<td>40</td>
<td>38</td>
<td>-0.380</td>
<td>*</td>
</tr>
<tr>
<td>Muscular Endurance</td>
<td>40</td>
<td>38</td>
<td>0.500</td>
<td>**</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level; ** Significant at 0.01 level.

The above table shows the analysis of the game performance with the selected physical fitness variables is represented. From the above table it is clearly illustrated that there exists a positive correlation between game performance with abdominal strength (‘r’=0.467; P<0.01); muscular power (‘r’=0.343; P<0.05), flexibility (‘r’=0.368; P<0.05), agility (‘r’=0.498; P<0.01) and muscular endurance (‘r’=0.500; P<0.01), in addition it is also showed that the game performance is negatively correlated with speed (‘r’=−0.380; P<0.05).

**Table-2**  Table showing relationship between selected anthropometric measurements and game performance of volleyball players.

<table>
<thead>
<tr>
<th>Game Performance and Anthropometric Measurements</th>
<th>N</th>
<th>Df (N-2)</th>
<th>‘r’ value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>40</td>
<td>38</td>
<td>0.399</td>
<td>*</td>
</tr>
<tr>
<td>Weight</td>
<td>40</td>
<td>38</td>
<td>-0.147</td>
<td>NS</td>
</tr>
<tr>
<td>Arm Length</td>
<td>40</td>
<td>38</td>
<td>0.463</td>
<td>**</td>
</tr>
<tr>
<td>Arm Span</td>
<td>40</td>
<td>38</td>
<td>0.547</td>
<td>**</td>
</tr>
<tr>
<td>Leg Length</td>
<td>40</td>
<td>38</td>
<td>0.548</td>
<td>**</td>
</tr>
<tr>
<td>Arm Girth</td>
<td>40</td>
<td>38</td>
<td>0.559</td>
<td>**</td>
</tr>
<tr>
<td>Thigh Girth</td>
<td>40</td>
<td>38</td>
<td>0.419</td>
<td>**</td>
</tr>
<tr>
<td>Calf Girth</td>
<td>40</td>
<td>38</td>
<td>0.498</td>
<td>**</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level; ** Significant at 0.01 level; NS = Not Significant
The above table illustrated the analysis of the game performance with the selected anthropometric measurements is represented. From the above table it is clearly exemplified that there exists a positive correlation between game performance with height ($r^2=0.398; P<0.05$), arm length ($r^2=0.463; P<0.01$), arm span ($r^2=0.547; P<0.01$), leg length ($r^2=0.548; P<0.01$), arm girth ($r^2=0.559; P<0.01$), thigh girth ($r^2=0.418; P<0.01$), and calf girth ($r^2=0.498; P<0.01$), besides the results also reveal that there is a negative insignificant correlation between game performance and weight.

**DISCUSSION OF RESULTS:**

Every game needs the specific skills which are essential for achievement in the competitions. The execution of the skill can be aesthetic and attractive if the individual possesses the requisite fitness components. The fitness variables required differ as per the demands of the skills and the game. Volleyball is an exiting and fast modern game involving varied fitness components. Volleyball is a game played indoor or outdoor by teams whose members seek to score points in the course of hitting a ball back and forth across a net. It is a popular game in the matter of techniques, blocking as well as jumps and smashes play a crucial part in volleyball.

The results of the study showed that there was a significant correlation between the selected physical fitness and anthropometric measurements with the game performance of volleyball players except weight.

Some of the studies in this area have concluded that training develops physical fitness and skills in the game found that fitness factors and skill tests are interrelated to each other. The volleyball players require well developed speed, agility, muscular power and muscular endurance.

Muscular strength and power is very important for vertical jump and speed of movement around the court. Core stability and abdominal function is important in agility and balance and in the controlling of movement and execution of skills. Flexibility is defined as the extent or full range of movement in any joint without undue strain to the articulation and muscles attachments. Greater flexibility is mechanically advantageous as it saves energy and reduces risk of injuries. Agility is defined as the ability of an individual to rapidly change the body position and direction in a smooth, quick and precise manner. Agility is advantageous as it improves serving, passing, attacking, and blocking. Muscular endurance holds great significance because of its dependence on functional capacity and integration of the systems required for oxygen supply, transport, delivery and utilization. Having a high level will reduce the effect of fatigue during long periods of play.

In the present study the height, arm length, arm span, leg length, arm girth, thigh girth and calf girth have significant relationship with game performance. Though volleyball players have better height, arm length, arm span, leg length, arm girth, thigh girth and calf girth, these measurements might be due to less fat on the arm in the players. In volleyball, teams compete by manuvers handling the ball above the head, height is considered to be the most important physical attribute. The volleyball players have greater arm and leg length, arm span, arm girth, thigh girth and calf girth. This might be due to more fat on the arm in the players. In the present study, the mean height of the players was greater. Greater body weight among volleyball players might be disadvantageous for them in attaining a good jumping height as they have to lift a greater weight (Bandyopadhyay, 2007).

It was recently shown that volleyball players showing skill execution was an important as physical and anthropometric characteristics for predicting success in volleyball players (Gabbett & Georgieff, 2007). Further, confirmed in the earlier studies that fitness factors and skill tests are interrelated to each other. Subramanian (1991) found that training resulted significant improvement in general physical fitness and basketball skills a known fact that every game needs the specific skill.
CONCLUSION

On the basis of the result as shown in the above tables and discussion of results, the following conclusion may be drawn:

1. Game performance of volleyball player can be performed in the best possible manner if the players have abdominal strength muscular power, flexibility, agility, and muscular endurance.
2. Game performance of volleyball player can be performed in the superlative potential manner if the players have height, arm length, arm span, leg length, arm girth, thigh girth and calf girth.
3. Speed has negative influence on game performance.
4. Game performance may not be influenced by weight.

From the study it was concluded that there is a need to improve the physical fitness parameters and anthropometric measurements so as to enhance the game performance of the volleyball players. The coaches can develop specific training programmes for volleyball players. In the training programme, emphasis must be laid on the improvement of power, flexibility, speed, agility, endurance and reduce the body weight.

REFERENCES


