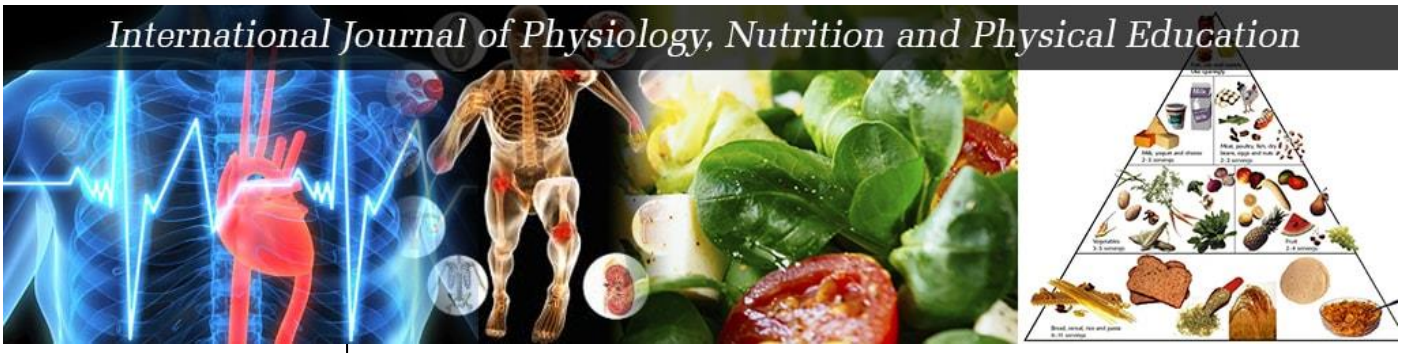

ISSN: 2456-0057
IJPNPE 2019; 4(1): 250-251

www.journalofsports.com
Received: 08-11-2018
Accepted: 11-12-2018

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Comparative study of physical and physiological variables of volleyball players: A systematic review and meta-analysis

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Abstract
The present study was focused to assess the level of Physical and Physiological variables of Volleyball Players. A group of 30 subjects (15 district and 15 state) aged 18-24 years participated in the study. The purposive sampling technique was used to attain the objectives of the study. All the subjects, after having been informed about the objective and protocol of the study, gave their consent and volunteered to participate in this study. The SPSS 14.0 software was used. The between-group differences were assessed by using the Student's t-test for dependent data. The level of significance was set at 0.05. It is concluded from the results of physical fitness components, significant between-group differences were found for speed (t=3.15*), strength (t=4.65*), power (t=3.71*) and endurance (t=3.96*). In case of physiological variables, significant between-group differences were found for vital capacity (t=1.85*) whereas no significant between-group differences were found for peak flow rate (t=0.56) and Resting Pulse Rate (t=0.55).

Keywords: Physical fitness, physiological characteristic, volleyball players

Introduction
Scientific approaches should be used to improve athletes' performance and to select outstanding athletes and training programs for elite sports. One essential fundamental step of the scientific approach is systematic collection of empirical data of various phenomena. Today, sport has become cultural phenomenon of great magnitude and complexity. Its scope is awesome; nearly everybody has become involved in some or other way in it. It has got mass participation. Various research studies conducted by experts in physical education and sports have emphasized the importance of investigating the specific structures, co-related with the various sports activities, for the selection and development of talent in sports and for better performance at different levels of sports competition. Brar (1986) [3]. These factors also influence the physical fitness status and technical and tactical capabilities of the sportsman. OF all these factors the most important one that of the physical fitness, as a high level of efficiency in techniques and tactics are also dependent upon physical fitness. Therefore, it is necessary that during the selection of sportsmen for competition a relatively high weight age should be given to physical fitness Gabbet & Georgieff (2007) [5].
Sport competition has become so important in today's society that extremely lofty expectations by others are placed on competing athletes regardless of competitors' abilities, reasons for participation, and skill levels. Basketball has gained worldwide popularity and fascinated players and spectators with its dynamic characteristics as a team sport (Hoffman & Maresh, 2000) [8]. In this sport, players cover about 4500–5000m during a 40-min game with a variety of multidirectional movements such as running, dribbling, and shuffling at velocities and jumping (Crisafulli *et al*., 2002) [4]. To execute such movements during performance, both aerobic and anaerobic metabolic systems appear to be involved throughout a game (Ciuti *et al*., 1996). While most of us envision volleyball as a fun game played occasionally at beach parties or the park, it is a sport with varsity school teams and traveling professional teams.

2. Selection of Subjects
A group of 30 subjects (15 district and 15 state) aged 18-24 years participated in the study.

The purposive sampling technique was used to attain the objectives of the study. All the subjects, after having been informed about the objective and protocol of the study, gave their consent and volunteered to participate in this study.

3. Statistical Procedure

To determine the significant differences between District and State Level Volleyball players, unpaired t-test was employed for data analyses. To test the hypothesis, the level of significance was set at 0.05.

4. Results

Table 1: Significant differences in the mean scores of physical fitness variables of the district and state level volleyball players

Physical Fitness Variables	Mean		SD		t-value
	District	State	District	State	
Speed	9.33	7.56	1.37	0.77	3.15*
Strength	41.50	43.80	13.75	11.22	4.65*
Power	176.73	186.56	6.09	10.56	3.71*
Endurance	1878.00	18460.96	225.64	418.49	3.96*

The results of physical fitness components (i.e., speed, strength, power and endurance) between volleyball players of district and state are presented in Table-1. In case of physical fitness components, significant between-group differences were found for speed (t=3.15*), strength (t=4.65*), power (t=3.71*) and endurance (t=3.96*).

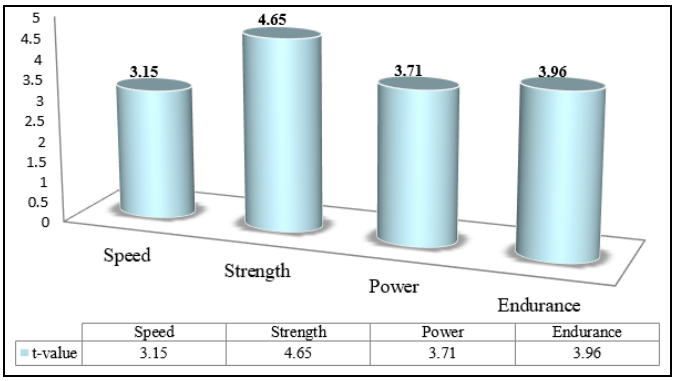

Fig 1: T-value comparison of physical fitness variables of the district and state level volleyball players

Table 2: Significant differences in the mean scores of physiological variables of the district and state level volleyball players

Physiological Variables	Mean		SD		t-value
	District	State	District	State	
Resting Pulse Rate	65.36	68.33	10.69	6.70	0.55
Peak Flow Rate	617.09	615.40	52.40	88.96	0.56
Vital Capacity	3.25	3.57	0.59	0.76	1.85*

The results of physiological variables (i.e., resting pulse rate, peak flow rate and vital capacity) among volleyball players are presented in Table-2. In case of physiological variables, significant between-group differences were found for vital capacity (t=1.85*) whereas no significant between-group differences were found for peak flow rate (t=0.56), resting pulse rate (t=0.55).

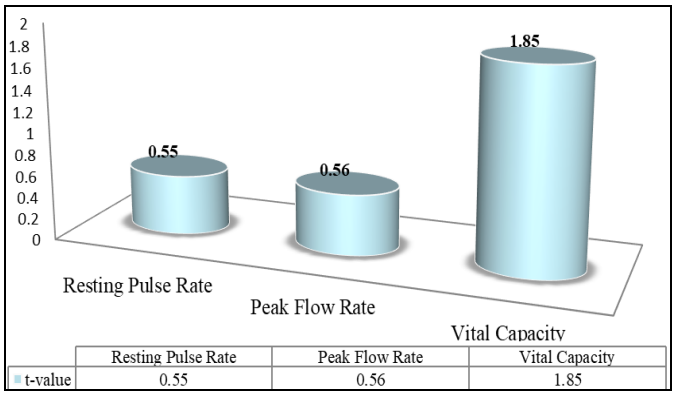

Fig 2: T-value comparison of physiological variables of the district and state level volleyball players

5. Conclusion

In case of physical fitness, significant between-group differences were found for speed (t=3.15*), strength (t=4.65*), power (t=3.71*) and endurance (t=3.96*). In case of physiological variables, significant between-group differences were found for vital capacity (t=1.85*) whereas no significant between-group differences were found for peak flow rate (t=0.56) and resting pulse rate (t=0.55).

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