



## Comparison of Physiological and Anthropometrical Variables of University Volleyball Players

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### ABSTRACT

*The purpose of this study is to compare the physiological and anthropometrical variables of inter university female volleyball players. 75 North-East Zone Intervarsity Volleyball players 15 from each university including stand byes players i.e. Banaras Hindu University Varanasi, Lucknow University Lucknow, G.N.D.U. Amritsar, Panjab University Chandigarh and Manipur University Manipur, were selected for this study. The average age of the selected players was 18 to 25 years. Four physiological variables i.e. vital capacity, maximum expiratory pressure, breath holding capacity and pulse rate and seven anthropometrical variables i.e. height, weight, leg length, foreleg length, thigh length, calf girth and thigh girth were selected for this study. For statistical analysis of the data mean, was computed and one way ANOVA was utilized to compare the selected physiological and anthropometrical variables among the different university players. Level of significance was set at 0.05 level of confidence. Study concluded that in physiological variables, significant differences were found among the different team of volleyball players in vital capacity and breath holding capacity. In anthropometrical variables, significant differences were found among the different team of volleyball players in foreleg length, thigh length, weight, thigh girth and calf girth. In other physiological variables i.e. max. expiratory pressure and pulse rate, and in other anthropometrical variables i.e. height and leg length there were no significant differences were found among the different team of volleyball players. It means in these variables all five university players are more or less the same.*

### Keywords:

Introduction- Assessment of human physical performance through anthropometry helps to evaluate the physical structure and the functions of individuals. However human bodies are widely divergent in their size, shape and compositional characteristics. Today it has been realized that champion in different sports differ in their anthropometric and physiological characteristics that correspond to some extent with particular requirements of their respective events. Studies have shown that top level performance is not ensured if the anthropometric body dimensions of sportsman do not correspond to the mechanical aspect of the game concerned. Therefore it has been observed that apart from other factors the performance of a sportsman in any sports and game is influenced by various specific anthropometrical characteristics and physiological functions which help him or her to attain better performance. Grimmeth(1979) compared psychological and physiological profile of female varsity volleyball players and non-athletes on 21 physiological components and significant difference found between them was weight and strength. Singh (2001) also conducted a study on anthropometrical and physiological differentials among university female volleyball players and found significant differences in height, arm length and calf girth variables and also no significant differences in weight and thigh girth among the different group of volleyballers. Sufficient studies had not been done on women volleyball players where as every state of India is participating or sending their women volleyball teams in the National Championships. Therefore this study is an attempt to compare the physiological and anthropometrical variables of selected North –East Zone Interuniversity volleyball players.

Methodology:- The purpose of this study is to compare the physiological and anthropometrical variables of university female volleyball players. 75 North-East Zone Intervarsity Volleyball players 15 from each university including stand byes players i.e. Banaras Hindu University Varanasi, Lucknow

University Lucknow, G.N.D.U. Amritsar, Panjab University Chandigarh and Manipur University Manipur were selected for this study. The average age of the selected players was 18 to 25 years. The subjects belong to different parts of North- East Zone with varying socio-economic status. All the players had fairly well developed physique and all of them participated regularly for a number of years in volleyball tournaments. Four physiological variables i.e. vital capacity, maximum expiratory pressure, breath holding capacity, pulse rate and seven anthropometrical variables i.e. height, weight, leg length, foreleg length, thigh length, calf girth and thigh girth were selected for this study. Two days was utilized for conducting the tests to ensure uniform testing conditions. The subject's physiological characteristics were tested during morning sessions and in evening sessions all anthropometrical measurements were taken. Vital capacity was measured with the help of dry spirometer, pulse rate and breath holding capacity was measured with the help of stopwatch and Max. Expiratory rate was measured with the help of peak flow meter. All anthropometrical characteristics were measured with the help of steel tape and weight is measured with the help of electronic weighing machine. All the tests were conducted at their respective university sports complex of participating Universities during their coaching camps before Inter University tournament 2005. For statistical analysis of the data mean, was computed and one way ANOVA was utilized to compare the selected physiological and anthropometrical variables among the different university players. Level of significance was set at 0.05 level of confidence.

Result and discussion:-The mean score of selected physiological and anthropometrical variables of BHU, Lucknow university, GNDU, Panjab University and Manipur University is given in table-I. It is observed from the table that there is difference in means of all the selected physical and anthropometrical parameters in different teams.

Analysis of variance of different team of volleyball players in selected physiological and anthropometrical variables are given in table –II . In this table out of four physiological variables only in two variables namely max. expiratory pressure, pulse rate and in anthropometrical variables only in two variables namely height and leg length were not statistically significant at .05 level of confidence (value required for significance is 2.50) In other variables namely vital capacity, breath holding time, fore leg length, thigh length, weight, thigh girth and calf girth there were significance difference found in different team volleyball players at 0.05 level significance.

**Table-I**

Mean scores of selected physiological and anthropometrical variables of volleyball players

S. No.	Variables	BHU	Lucknow Univ.	GND Univ.	Punjab Univ.	Manipur Univ.
	Physiological Variables					
1.	Vital Capacity	23.6	24.53	25.86	25.00	22.06
2.	Max. Expiratory Pressure	115.33	120	120	117.33	116.66
3.	Breath Holding Capacity	24.06	22.26	26.73	24.06	22.26
4.	Pulse Rate	70.93	67.80	68.33	68.93	69.33
	Anthropometrical Variables					
5.	Fore Leg Length	37.73	34.36	38.43	37.83	37.70
6.	Thigh Length	39.20	37.40	40.43	38.86	40.96
7.	Height	151.6	150.53	153.46	146.73	147.33
8.	Weight	40.06	50.66	44.86	49.73	49.06
9.	Leg Length	93.13	92.00	93.63	94.06	91.69
10.	Thigh Girth	44.13	47.66	43.73	45.40	44.80
11.	Calf Girth	32.7	33.86	32.06	33.20	31.96

The analysis of data revealed that the women volleyball players of North East universities showed significant differences in some selected physiological and anthropometrical characteristics, but in most of the other selected variables, no significant differences were found.

**Table-II**

Analysis of variance of selected physiological and anthropometrical variables of volleyball players

Variables	Source of Variance	Df	SS	MSS	"F" Ratio
Physiological variables					
Vital Capacity	Between	4	1265866.67	316466.66	6.59*
	Within	70	3360000	48000	
Max. Expiratory Pressure	Between	4	25866.67	6466.66	0.205
	Within	70	2200000	31428.57	
Breath Holding Capacity	Between	4	201.25	50.31	3.35*
	Within	70	1048.67	14.98	
Pulse Rate	Between	4	85.73	21.43	1.514
	Within	70	990.94	14.15	
Anthropometrical Variables					
Foreleg Length	Between	4	157.25	39.31	19.65*
	Within	70	140.34	2.00	
Thigh Length	Between	4	2468.18	6171.79	5.18*
	Within	70	83327.56	1190.39	
Height	Between	4	489.33	122.33	1.17
	Within	70	7317.34	104.53	
Weight	Between	4	371.65	92.91	6.82*
	Within	70	953.87	13.62	
Leg Length	Between	4	63.28	15.82	1.30
	Within	70	849.18	12.13	
Thigh Girth	Between	4	143.39	35.84	5.92*
	Within	70	424.00	6.05	
Calf Girth	Between	4	37.98	9.49	3.93*
	Within	70	169.20	2.41	

\*Significant at .05 level

F.05 (4,70) = 2.50

As indicated by the findings, significant differences have been found in case of vital capacity among different University vol-

leyball players. This indicates a good respiratory muscle strength in volleyball players. Ghoshal and Sachdeva(1983) concluded that mean vital capacity was significantly higher due to the physical training the player underwent. Ghosh et al.(1984) conducted a study to assess the level of physical fitness of the sportsmen involve in ball games by measuring the different pulmonary functional capacities and concluded that vital capacity and forced expiratory volume of the sportsmen involved in ball games are higher than those of normal persons but their mean vital capacity was not significantly higher. This may be due to their some level of participation and age group & training age.

In breath holding capacity significant differences were found among the different teams of volleyball players and mean value is highest in GNDU players. This may be due to the developed pulmonary functional capacities of GNDU players compare to the other team players.

In anthropometrical variables significant differences were found in fore leg length, thigh length, weight, thigh girth and calf girth variables. Significant differences in fore leg length and thigh length may be due to the reason that in game of volleyball longer legs play a dominant role in execution of techniques and tactics by providing more jump for achieving the height during attack, block and dodge and more reach during covering in the field. In all the leading university teams of India the highest priority is given to height and size in the selection of players. They are selecting tall and heavy players in order to increase the effectiveness of blocking and spiking to use it as a counter weapon.

The total body weight is highest in Lucknow then in Chandigarh and least values are found in BHU. It is due to the height and training process of the players. As the height is increased proportionately weight is also increasing. Continuous vigorous training also increased the musculature which increased the lean body mass of the athlete and then total body weight is increased. The probable reason for significant difference of total body weight at different teams of volleyball players were due to the fact that hypertrophy of muscles were gradually takes place more and more as the training load is increased. Mokha and sidhu (1989) studied the physique and body composition and morphology of top level Indian female player of volleyball and found that best suited physique for female volleyball player is the tall stature, heavy in weight with longer and lower extremities. Mokha et al. (1998) concluded that the bigger skeletal framework and more weight help the players to be more stable in the field. The weight of BHU girls is found to be minimum followed by GNDU, Manipur, Punjab Univ. and maximum in Lucknow university. The living conditions including food habits of these states may have caused this difference. The persons from these states are usually found to be lean and thin.

In thigh girth and calf girth category significant differences were found among different university teams. It means higher performers have well developed musculature at thigh portion and calf portion than the other teams which are relatively suitable for volleyball game.

In other physiological variables like maximum expiratory pressure and pulse rate and in anthropometrical variables like height and leg length all team of female volleyball players possess more or less the same characteristics. This may be due to their same level of participation and age group and training age.

#### Conclusions:

On the basis of findings of this study, the following conclusions have been drawn:

1. In physiological variables, significant differences were found among the different team of volleyball players in vital capacity and breath holding capacity.
2. In anthropometrical variables, significant differences were found among the different team of volleyball players

- in fore leg length, thigh length, weight, thigh girth and calf girth.
3. In other physiological variables i.e. max, expiratory pressure and pulse rate, there were no significant differences were found among the different team of volleyball players.
  4. In other anthropometrical variables i.e. height and leg length there were no significant differences were found among the different team of volleyball players. It means in these variables all five university players are more or less the same.

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