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A comparative study of anthropometric measurements between netball and volley ball university players

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Abstract
Anthropometric Measurement, Branch of science concerned with comparative measurements of the human body, its parts, and its proportions and composition. An anthropometric measurement is defined as dimension of the structure of the human body taken at specific sites to give measures of length, girth and width and subcutaneous fatty tissue.

Keywords: Anthropometric Measurements of Net Ball & Volley Ball Players Arm Length, Forearm Girth, Calf Girth, Thigh Girth

Introduction
Games and Sports are the part of human education has always existed in the human society. Before the dawn of civilization and culture, physical exercises were very important aspect of human existence. In the primitive society, the 'necessity for survival' motivated man to keep himself more physically fit and strong enough in comparison with stronger forces for nature (Kamlesh and Sangaral, 1981) [6].

The field of physical education and sports are international discipline. They develop international understanding and universal brotherhood in the present politically conflicting lives. Sports movements are considered one of the major adhesive forces for developing world peace. It may also as one of effective mean in solidifying national integration and developing national character. Sports have become the media of international relationship between the countries.

Sports in the present day have become extremely competitive, previous records are being broken whenever there is competition. It is not mere participation or few days practice that brings an individual victory, but the continuous hard work of training right from childhood, a strong anthropometry and physiological variables may influenced.

Statement of the Research Problem
"A Comparative Study of Anthropometric Measurements between Net ball and Volley ball University Players."

Limitations of the Study
1. Non availability of sophisticated instruments for measuring anthropometric measurements and 16 Personality factors were considered as one of the limitation for the study.
2. No special motivational techniques were used while conducting the tests was considered as limitation.
3. Factors such as socio-economic status, dietary habits, geographical variations, daily routine work, training, diet might have influenced the results which were not taken into consideration, which will be considered as another limitation.

Delimitations
1. The study was delimited to a total of 96 players from Netball and Volleyball games who have to be represented at university level.
2. The age of the subjects chosen was 18 to 28 years.
3. The following physical fitness, anthropometric measurements and psychological

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Anthropometric Measurements
1. Arm Length
2. Forearm Girth
3. Calf Girth
4. Thigh Girth

Hypotheses
The following hypotheses were formulated for empirical validation.
It was hypothesized that
1. There would not be any significant difference in selected anthropometric measurements between Netball and Volleyball university players.

Significance of the Study
1. The study would help to identify the variation in selected anthropometric measurements among Netball and Volleyball players.
2. The study would help us to know the anthropometric measurements factors of Net ball and Volleyball players.

Definition and Meaning of the Terms
Anthropometry
Branch of science concerned with comparative measurements of the human body, its parts, and its proportions and composition.

Methodology
Selection of subjects
The purpose of the present study is to compare the selected, anthropometric measurements between volleyball and netball university players of Bangalore University, Mangalore University, University of Mysore and Kuvempu University volleyball and netball teams. To achieve the purpose of the study, ninety six male players were selected at random from each category of Netball and Volleyball players, a total of 96 players in Karnataka state, India, who had their credit in participating interuniversity tournaments during the academic year 2011-12 in their respective games.

Selection of variables
Physical, anthropometric and psychological parameters are the ideal indicators of sports performance status of an individual. Even the slightest imbalance due to circadian variations may influence the level of performance. These parameters play an important role in almost all games and sports. Hence, the following variables were selected for this study:

Anthropometric Measurements
1. Arm Length
2. Forearm Girth
3. Calf Girth
4. Thigh Girth

Selection of Tests
The present study was undertaken primarily to compare the selected physical fitness, anthropometric measurements among selected university level Netball and Volleyball players of Karnataka state, India. As per the available literatures, the following standardized tests were used to collect relevant data on the selected dependent variables and they were presented in the Table-1(a).

Table I (a): Tests Selection

Sl. No.	Criterion Variables	Test Items	Unit of Measurement
	Anthropometric Measurements		
1.	Am Length		In Cms.
2.	Forearm Girth		In Cms.
3.	Calf Girth		In Cms.
4.	Thigh Girth		In Cms.

Research Design and Statistical Analysis
A two-sample t-test can only be used to assess the significance of the difference between the mean values of two independent groups. To compare differences in the mean values of three or more independent groups, Analysis of Variance (ANOVA) is used. Thus, ANOVA is suitable when the outcome measurement is a criterion variable and when the explanatory variable is categorical with three or more groups. A One-way ANOVA is used when the effect of only one categorical (outcome) is explored. The concept of ANOVA can be thought of as an extension of a two-sample t-test.

Analysis and Interpretation of the Data
The analysis of data and detailed results of the study have been discussed in this chapter. The purpose of the present study was to compare the selected anthropometric measurements variables between Netball and Volleyball university players of Karnataka. To achieve this, ninety six male players were selected randomly from each category of Netball and Volleyball games, a total of 96 players in Bangalore University, Mangalore University, University of Mysore and Kuvempu University teams of Karnataka state, India, who had their credit in participating university tournaments during the academic year 2011-12 in their respective games.
The probability level below which we reject the hypotheses is termed as level of significance. The 't' value obtained by 't' Test Analysis was compared at 0.05 and 0.01levels of significance, which was considered as adequate

Percentile Analysis
Percentile analysis one of the statistical measures used to describe the sample in terms of their demographic characteristics such as type of players and type of university. Distribution of sample based on the above mentioned demographic characteristics is given in the following tables.

Table 1: Distribution of sample over type of sports players

Players	Frequency	Percentage
Netball	48	50.00
Volleyball	48	50.00
Total	96	100.00

Table shows that 48 (50.00%) of the subjects are the Netball players and 48 (50.00%) of the subjects are the volleyball players who had their credit in participating university tournaments during the academic year 2011-12 in their respective games were selected. The pie diagram shows the number of sample of Netball and Volleyball players involved in the present study.

Inferential Statistics: 'T' Test
The analysis was carried out through various statistical techniques such as the descriptive and 't' test analysis. The data were compiled and analyzed using the Statistical Package for the Social Science (SPSS Version 16.5) for Windows XP Software.

Hypotheses regarding compare the Basketball and Volleyball university players' physical fitness, anthropometrical and 16 personality factors were tested and the findings of testing these hypotheses were presented. Each hypothesis tested is followed by a summary of testing that hypothesis was also presented. Finally, the summary of findings to research questions was presented.

Testing of Hypotheses

There was no significant difference between Basketball and Volleyball Players on selected Anthropometric

Table 1: Table showing the Mean scores, Standard Deviation and 't' value of the Forearm Girth of the university Netball and Volleyball players.

Forearm Girth (In Cms.)	Netball Players	Volleyball Players
Mean	25.854	26.437
Standard Deviation	1.700	1.687
't' value	1.68[NS]	

[NS]Not Significant

The formulated hypothesis is that "there is a significant difference in the Forearm Girth between Netball and Volleyball university players", hence, the collected data was applied to the statistical techniques to find out the significant difference in the Forearm Girth between Netball and Volleyball university players.

The calculated mean scores, standard deviation of Netball players are 25.854 and 1.700 respectively and mean scores and standard deviation of Volleyball players are 26.437 and 1.687 respectively. The calculated 't' value 1.68 is less than the table value 1.98 at 0.05 level. Hence, the stated hypothesis accepted for the said criterion variable that "there is no significant difference in the Forearm Girth between Netball and Volleyball university players." The both players had similar forearm girth.

Table 2: Table showing the Mean scores, Standard Deviation, and 't' value of the Arm Length of the university Netball and Volleyball players.

Arm Length (In Cms.)	Netball Players	Volleyball Players
Mean	80.000	81.895
Standard Deviation	3.913	3.465
't' value		2.51*
*Significant at 0.05 level.		

The formulated hypothesis is that "there is a significant difference in the Arm Length between Netball and Volleyball university players", hence, the collected data was applied to the statistical techniques to find out the significant difference in the Arm Length between university Netball and Volleyball players.

The calculated mean scores and standard deviation of Netball players are 80.000 and 3.913 respectively and mean scores and standard deviation of Volleyball players are 81.895 and 3.465 respectively. The calculated 't' value 2.51 is greater than the table value 1.98 at 0.05 level. Hence the stated hypothesis for the said criterion variable is rejected and an alternative hypothesis has been accepted that "there is a significant difference in the Arm Length between Netball and Volleyball university players." The volleyball players had more Arm length than basketball players

Table 3: Table showing the Mean scores, Standard Deviation and 't' value of the Calf Girth of the university Netball and Volleyball players.

Calf Girth (In Cms.)	Netball Players	Volleyball Players
Mean	35.291	34.833
Standard Deviation	2.534	2.486
't' value	0.89[NS]	

[NS]Not Significant

The formulated hypothesis is that "there is a significant difference in the Calf Girth between Netball and Volleyball university players, hence, the collected data was applied to the statistical techniques to find out the significant difference in the Calf Girth between university Netball and Volleyball players.

The calculated mean scores and standard deviation of Netball players are 35.291 and 2.534 respectively and mean scores and standard deviation of Volleyball players are 34.833 and 2.486 respectively. The calculated 't' value 0.89 is less than the table value 1.98 at 0.05 level. Hence the stated hypothesis for said criterion variable is accepted that "there is no significant difference in the Calf Girth between Netball and Volleyball university players." The both players had similar calf girth.

Table 4: Table showing the Mean scores, Standard Deviation and 't' value of the Thigh Girth of the university Netball and Volleyball players.

Thigh Girth (In Cms.)	Netball Players	Volleyball Players
Mean	52.625	51.437
Standard Deviation	4.408	3.825
't' value		1.41[NS]

[NS]Not Significant

The formulated hypothesis is that there is a significant difference in the Thigh Girth between Netball and Volleyball university players", hence, the collected data was applied to the statistical techniques to find out the significant difference in the Thigh Girth between university Netball and Volleyball players.

The calculated mean scores and standard deviation of Netball players are 52.625 and 4.408 respectively and mean scores and standard deviation of Volleyball players are 51.437 and 3.825 respectively. The calculated 't' value 1.41 is less than the table value 1.98 at 0.05 level. Hence the stated hypothesis for said criterion variable is accepted that "there is no significant difference in the Thigh Girth between Netball and Volleyball university players." The both players had similar thigh girth.
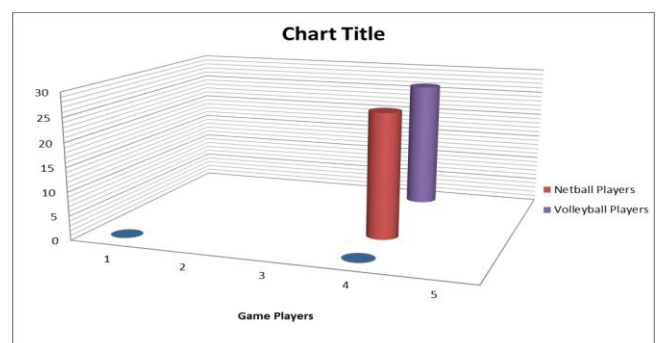

Fig 1: Comparison Mean scores of Forearm Girth as anthropometric measurement between Netball and Volleyball players
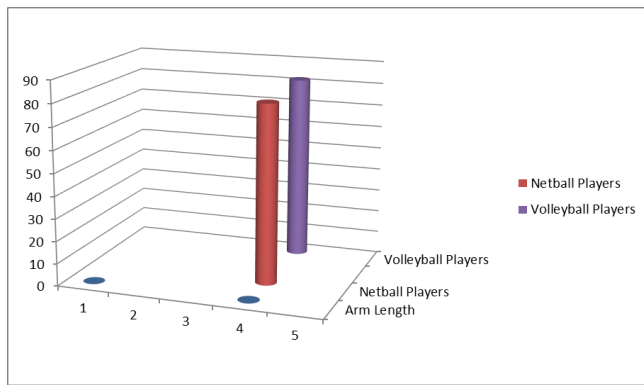
Fig 2: Comparison Mean scores of Arm Length as anthropometric measurement between Netball and Volleyball players
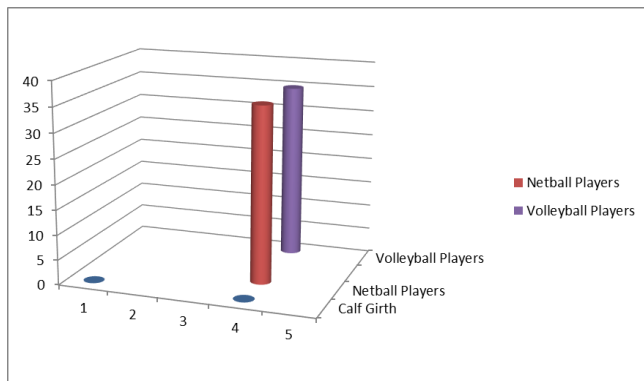

Fig 3: Comparison Mean scores of Calf Girth as anthropometric measurement between Netball and Volleyball players
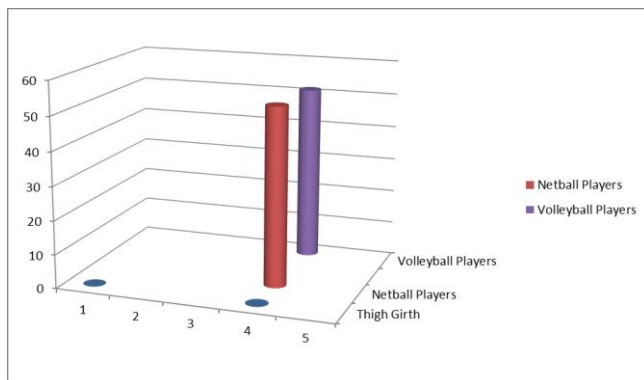

Fig 4: Comparison Mean scores of Thigh Girth as anthropometric measurement between Netball and Volleyball players.

Discussion Anthropometric Measurements
The Volleyball players showed markedly greater standing height, forearm length and arm length than Netball players. It may be concluded that arm anthropometric information would have vast studious assessment in the identification of sport talents in overhead games such as Netball and Volleyball. In volleyball, teams compete by manipulating skills of spiking and blocking high above the head. In basketball, players try to carry the ball by dribbling and passing among a group of teammates and opponents and score goals in a hoop located above the head. Since both games require handling the ball above the head, height is considered to be the most important physical attribute. Some authors have suggested the height as an important condition of sports talent in such events that require height and the presence of tall players is an indispensable element in success as a team. In the study, significantly lesser height among the inter-university netball players might be disadvantageous for them in attaining a good

jumping height as their center of gravity would be comparatively lower. In tall players, proportionally longer extremities are beneficial to reach the basket. Some authors opined the height as an important condition of sports talents in such events that require it, and the presence of tall players was an indispensable element in success as a team. Even though no significant difference was observed in the values of body weight, leg length and forearm, calf and thigh girths between the two groups. The possible reason could be explained in terms of nature and skills of the game.

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