



Research Article

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A study of anthropometric variables among state level male volleyball players

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Abstract

The main purpose of the study was to compare the anthropometric variables (arm length, calf circumference, shoulder girth, upper arm girth, waist circumference, thigh circumference and chest circumference) among different age groups of State level male volleyball players of Chandigarh (India). To achieve the objective of the study, a total of sixty (60) state level male volleyball players of different three age groups (under-14, under-17 and under-19) were selected purposively as the subjects of the study. Subjects were chosen from Chandigarh, state level volleyball league, 2016. The age of the subjects ranged between 12 to 19 years. Anthropometric variables were measured in nearest a centimeter. To determine the significance difference on anthropometric variables, analysis of variance (ANOVA) was computed with the help of SPSS software. The level of significance was set at 0.05. Statistical calculation on gathered data showed that there were significant difference found on arm length and upper arm girth among different age groups of state level male volleyball players. To find out the paired mean differences where 'F' test is significant the Scheffe's Post-Hoc test was employed.

Keywords: Anthropometric variables, State level, Volleyball Player, Male.

INTRODUCTION

Volleyball is relatively new as a competitive sport. The intent of its inventor, William Morgan, was to create a mild, non-contact, recreational activity that middle aged businessmen could play safely during their noon hour break [1]. Once enjoyed as a casual and recreational game, volleyball has developed into a powerful and complex athletic sport with techniques and tactics constantly being refined to higher levels [2]. Volleyball began to be more and more competitive with high physical, technical and tactical performances. The popularity of volleyball has grown in leaps and bounds in the past two decades, and the game continues to build momentum at the professional collegiate and scholastic level [3]. Volleyball is a complex game of simple skills. It has also shown in recent years that there is a trend that volleyball players adopt the technique, tactics and physical performance. 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 [4].

Anthropometry is the study of the measurement of the human body in terms of the dimensions of bone, muscle, and adipose (fat) tissue. The word "anthropometry" is derived from the Greek word "anthropo" meaning "human" and the Greek word "metron" meaning "measure". The field of anthropometry encompasses a variety of human body measurements. Weight, stature (standing height), recumbent length, skinfold thicknesses, circumferences (head, waist, limb, etc.), limb lengths, and breadths (shoulder, wrist, etc.) are examples of anthropometric measures.

Anthropometrical measurement for assessment of physical status was expanded quite naturally to include consideration of body types and the relation of physique to one's health, immunity from disease, posture, physical performance, and personality qualities. Anthropometry provides scientific methods and observation to help in finding out talent in sports. (Anthropometry means the measurement of man). There is profound positive relationship between performance in sports and the anthropometric aspects of an athlete's body. It has been scientifically proved that different sports or different events in a same sport require the demand of different bodily characteristics. The player's anthropometric dimensions, reflecting body shape, proportionality and composition are variables which play a major role in determining the

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potential for success in chosen sport [5].

Anthropometric measurements relevant to human movement gained formal recognition as a discipline with the inauguration of the International Society for Advancement of Kin anthropometry in 1986. Anthropometrists of all continents have participated in several major multidisciplinary studies that are being or have been conducted to assess the physical characteristics of people. Kin anthropometry has been defined as the quantitative interface between human structure and function [6]. This interface is examined through the measurement and analysis of age, body size, shape, proportion, composition and maturation as they relate to gross body function. Previous reports have shown that body structure and morphological characteristics are important determinants of performance in many sports and certain physical impressions such as body composition (body fat, body mass, muscle mass) and physique (somatotype) can significantly influence athletic performance [7].

OBJECTIVES OF THE STUDY

The objectives of the study were to compare the anthropometric variables (arm length, calf circumference, shoulder girth, upper arm girth, waist circumference, thigh circumference and chest circumference) among different three age groups of state level male volleyball players of Chandigarh (UT), India.

METHOD AND PROCEDURE

For the purpose of the study, sixty (60) state level male volleyball players of different age categories i.e., under-14, under-17 and under-

19 from Chandigarh (India) were selected as subjects of the study by using purposive sampling technique. The age of the subjects ranged between 12 to 19 years. Arm length was measured from the acromiale (lateral edge of the acromion process, e.g. bony tip of shoulder) to the tip of the little finger by steel tape and recorded to the nearest 0.1 cm. Calf circumference was measured using steel tape on the calf muscle. Biacromial diameter i.e. shoulder girth is measured the straight length between the left and right acromiale points is recorded to the nearest 0.1 cm. Upper Arm circumference was measured with steel tap on relaxed elbow on the medial area of arm and is recorded to the nearest 0.1 cm. Abdominal (Waist) circumference was measured in a standing position, at the high point of the iliac crest and then crosses the line to indicate the midaxillary line of the body; the measurement is made at minimal respiration to the nearest 0.1 cm. Thigh circumference is measured by tape place around the mid-thigh and the tape is positioned perpendicular to the long axis of the thigh and is recorded to the nearest 0.1 cm. Chest circumference was measured at the end of maximal expiration after full motivation and was recorded in the nearest 0.1 cm. To find out the significance differences among state level volleyball players on anthropometric variables, Analysis of Variance (ANOVA) was applied with the help of SPSS software. For testing hypothesis, the level of significance chosen was 0.05.

RESULTS AND DISCUSSION

Descriptive analysis of anthropometric variables among different three age groups of state level male volleyball players is presented in table-1.

Table 1: Descriptive Analysis of Anthropometric Variables among State Level Volleyball Players

Variable	Group	N	Mean	Std. Deviation	Std. Error
Arm Length	14	20	70.6120	2.71990	0.62399
	17	20	74.4220	3.26664	0.71284
	19	20	76.8684	3.44876	0.79120
Calf Circumference	14	20	31.5896	2.87519	0.65961
	17	20	33.4554	3.32162	0.72484
	19	20	31.9505	3.41992	0.78458
Shoulder Girth	14	20	41.9100	1.79605	0.41204
	17	20	42.4785	2.83629	0.61893
	19	20	43.7147	1.99981	0.45879
Upper Arm Girth	14	20	21.1221	2.12556	0.48764
	17	20	22.9084	3.05500	0.66666
	19	20	23.3947	2.65440	0.60896
Waist Circumference	14	20	69.9168	7.51907	1.72499
	17	20	70.2370	9.35073	2.04050
	19	20	75.1305	9.93042	2.27819
Thigh Circumference	14	20	38.9689	3.78765	0.86895
	17	20	39.0071	4.72643	1.03139
	19	20	40.2389	4.59960	1.05522
Chest Circumference	14	20	73.1253	6.77751	1.55487
	17	20	75.7525	12.51241	2.73043
	19	20	77.2026	5.29723	1.21527

The analysis of variance (ANOVA) among state level male volleyball players on anthropometric variables is presented in Table-2.

Table 2: Analysis of Variance among State Level Male Volleyball Players on Anthropometric Variables

Variable	Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Arm Length	Between Group	378.144	2	189.072	18.885*	0.000
	Within Group	560.671	56	10.012		
	Total	938.815	58			
Calf Circumference	Between Group	39.657	2	19.828	1.914	0.157
	Within Group	579.990	56	10.357		
	Total	619.647	58			
Shoulder Girth	Between Group	32.450	2	16.225	3.123	0.052
	Within Group	290.941	56	5.195		
	Total	323.391	58			
Upper Arm Girth	Between Group	54.780	2	27.390	3.885*	0.026
	Within Group	394.809	56	7.050		
	Total	449.589	58			
Waist Circumference	Between Group	328.954	2	164.477	2.028	0.141
	Within Group	4541.415	56	81.097		
	Total	4870.370	58			
Thigh Circumference	Between Group	20.140	2	10.070	0.519	0.598
	Within Group	1085.830	56	19.390		
	Total	1105.970	58			
Chest Circumference	Between Group	162.622	2	81.311	1.020	0.367
	Within Group	4463.123	56	79.699		
	Total	4625.745	58			

*Significant at .05 level; $F_{.05}(2, 56) = 3.15$

Table 2 clearly indicates that there were significant differences obtained on arm length and upper arm girth among state level volleyball players, since the 'F' value obtained at 0.5 level of significant is 18.885 and 3.885 whereas the calculated value is. No significant differences were found on the variables of calf circumference (19.14), shoulder girth (3.123), waist circumference (2.028), thigh

circumference (0.598) and chest circumference (0.367) as the tabulated value of degree of freedom (2, 56) is 3.15. To find out the paired mean differences where F test is significant the Scheffe's Post-Hoc test was employed and the data pertaining to this is presented in table-3.

Table 3: Significant Differences between the Paired Means of Arm Length among State Level Volleyball Players

Groups			Mean difference	Sig.
Under-14	Under-17	Under-19		
70.61	74.42		3.81*	0.002
70.61		76.86	6.25*	0.000
	74.42	76.86	2.44	0.059

*Significant at 0.05 level

Table 3 clearly indicates that the significant differences existed between under-14 and under-17, under-14 and under-19 on arm length since the value obtained were 3.81 and 6.25 respectively. No

significant difference existed between under-17 and under-19 on arm length since the value obtained was 2.44.

Table 4: Significant Differences between the Paired Means of Upper Arm Girth among State Level Volleyball Players

Groups			Mean difference	Sig.
Under-14	Under-17	Under-19		
21.12	22.90		1.78	0.114
21.12		23.39	2.27*	0.038
	22.90	23.39	0.49*	0.846

Table 3 clearly indicates that the significant difference existed between under-14 and under-19, on upper arm girth since the value obtained was 2.27. No significant differences existed between under-14 and under-17, under-17 and under-19 on upper arm girth since the value

obtained were 0.114 and 0.848 respectively. Mean scores of different age groups of state level male volleyball players on anthropometric variables are depicted graphically in figure-1.

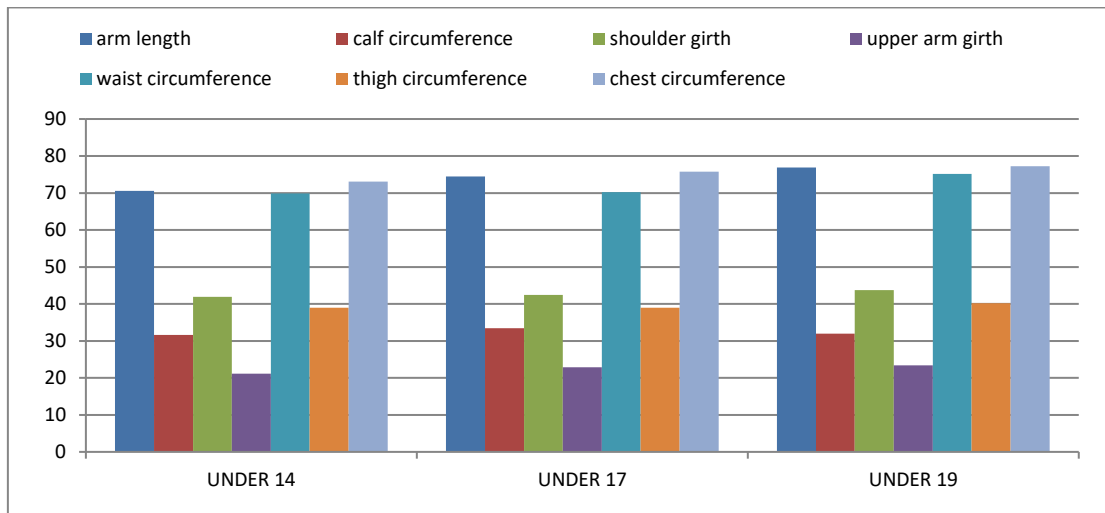


Figure 1: Graphical Representation of Mean Scores of State Level Volleyball Players on Anthropometric Variables

CONCLUSION

In the light of the findings and limitations of the present study the following conclusions were drawn:

- Significant differences were found among state level volleyball players on the variables of arm length and upper arm girth.
- No significant differences were found on the variables of calf circumference, shoulder girth, waist circumference, thigh circumference and chest circumference.

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