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Comparative study of somatic characteristics and fitness of under 19 years state level male basketball and volleyball players

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Abstract

Somatotyping and fitness are the most important factor for any type of performance. The aim of the present study was to find out the somatic characteristics and fitness of under-19 year state level male Basketball and Volleyball players. Total sixty (60) district level male Basketball (30) and Volleyball (30) players were selected at random from Ghaziabad, Meerut and Bijnor Districts of Uttar Pradesh. All the subjects were assessed for height, weight, BMI, breaths, girths, skinfold thickness, vertical jump, flexibility and reaction time. Analyzing the data it was found that 1. The Basketball players were significantly taller than Volleyball players. 2. The biceps and triceps skin folds of Basketball players were significantly higher than Volleyball players. 3. The Basketball players had greater thigh circumference than Volleyball players. 4. The significant difference was observed between Basketball and Volleyball players in Ectomorphic and Mesomorphy components. The Basketball players had greater Ectomorphy component than the Volleyball players and Volleyball players had greater Mesomorphy components than Basketball players. 5. The significant difference was observed between Basketball and Volleyball players in vertical jump and flexibility. The Basketball players had higher vertical jump than the Volleyball players and Volleyball players had better flexibility than Basketball players. 6. The body types of Basketball Group was Mesomorphic Ectomorph (2.31, 3.37, 3.67), total percentage 66.66% and Volleyball Group was Ectomorphic Mesomorph (1.84, 4.19, 2.72), total percentage 56.66%.

Keywords: Somatotyping, Basketball, Volleyball, Flexibility, Reaction time.

Introductions

Now-a-days sports has become an interesting subject not only to sportsperson, organizations and coaches but also to the academicians. Sports science has emerged as a new branch of scientific endeavour. With the help of science and technology human performance has achieved a distinctive mark which was beyond imagination even 60 years back. The selection of appropriate athletic, with a comparatively higher structure, modern training methods highly developed gadget and equipment considered to be the factors responsible for such higher level of performance. The physique definitely plays the crucial part in that regard and is a factor in the success. "Structure determines functions and functions determine structure." Successful participation in these sports requires from each player a high level of technical and tactical skills and suitable anthropometric characteristics. All ball games require comprehensive abilities including physical, technical, mental and tactical abilities. Among them, physical abilities of players are more important as these have marked effects on the skill of players and the tactic of the teams because ball games require repeated maximum exertion such as dashing and jumping. Such physical abilities are important for Basketball, Volleyball and Handball players to achieve higher levels of performance. To evaluate these physical abilities, the anthropometric measurements, parameters of body composition such as the percent body fat (% Fat) fat free mass (FFM) and somatotype components are often use. Studies on the physical characteristics of the human body to date indicate that the morphological characteristics of athletes successful in a specific sport differ in somatic characteristics from the general population. Basketball and volleyball require handling the ball above the head; therefore, having a greater height is an advantage in these sports. Higher body mass however, is a hurdle for handball and volleyball players in achieving good jumping height. Various researchers suggested that different body size shape and proportions are beneficial in different physical activities (Malhotra *et al.*, 1972)^[2]

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Purpose of the Study

The purpose, of the study were as follows –

- To find out the somatic characteristics of U-19 year state level male Basketball players and Volleyball players.
- To compare somatic characteristics of U-19 year state level male Basketball and Volleyball players.
- To find out the significant difference, if any, between under-19 years state level male Basketball and Volleyball players in respect to vertical jump, flexibility and reaction time.
- To find out the percentage of players under – 19 years state level male Basketball and Volleyball players, whose were belonged in various components of somatotypes.

Methodology

- For the present study sixty (60) male subjects were randomly selected from Ghaziabad, Meerut and Bijnor Districts of Uttar Pradesh; among them, thirty (30) subjects for U-19 years state level male Basketball players and thirty (30) for Volleyball players.
- To conduct the present study the following measurement were taken –
- Personal parameters — Age, Height, Weight and BMI,
 - Vertical jump, • Flexibility, • Reaction time, • Skinfold thickness, • Circumference, • Width, H. length. To collect relevant data for this study, The

following instruments were used – Weighing Machine, Flexometer, Measuring Tape, Stadiometer, Skinfold Calliper, Sliding-calliper and Reaction Timer.

Results & Discussion

Table 1: Personal Parameters of Basketball and Volleyball Players

Variable	Basketball Players		Volleyball Players		‘t’ value
	Mean	SD	Mean	SD	
Age	17.87	± .61	17.70	± .65	1.04
Height (cm)	173.08	± 8.08	166.03	± 6.15	3.80*
Weight (kg)	61.22	± 6.60	59.28	± 7.69	1.04
BMI (kg/m ²)	20.49	± 2.41	21.46	± 2.08	-1.68

* Significant at 0.01 level $t_{0.05, 58} = 2.00$

Table 1 shows the descriptive statistics of personal parameters of Basketball and Volleyball players. The table represented that the height of Basketball players were 173.08 ± 8.08 cm (mean \pm SD) and for Volleyball players it was 166.03 ± 6.15 cm. Mean body height of Basketball players was significantly higher than those of Volleyball players ($P < 0.05$). No statistically significant difference was observed between the Basketball and the Volleyball players in relation to body weight and BMI.

Table 2: Statistics on Skinfold of Groups (Basketball and Volleyball)

Parameter	Basketball		Volleyball		‘t’ value
	Mean	SD	Mean	SD	
Biceps (mm)	3.68	± 2.10	2.67	± 1.30	2.26*
Triceps (mm)	7.97	± 4.59	5.98	± 2.62	2.06*
Sub scapula (mm)	9.43	± 4.15	8.22	± 3.67	1.20
Suprailliac (mm)	7.05	± 5.22	5.05	± 3.16	1.80
Thigh (mm)	11.65	± 6.25	9.33	± 5.20	1.56
Calf (mm)	7.68	± 3.65	6.77	± 4.00	.93
Abdomen (mm)	14.90	± 9.83	11.20	± 7.45	1.64

* Significant at 0.05 level $t_{0.05, 58} = 2.00$

In Table 2 descriptive statistics for Skin fold measurement values were depicted. Both biceps ($P > 0.05$) and triceps Skin folds ($P > 0.05$) measurements were significantly higher for Basketball players than Volleyball players. There

were no significant differences observed between two groups for sub scapula, suprailliac, thigh, abdomen and calf skin fold measurement.

Table 3: Statistics on Circumference / Girth of Two Groups (Basketball and Volleyball)

Variable	Basketball		Volleyball		‘t’ value
	Mean	SD	Mean	SD	
Waist (cm)	71.38	± 6.12	69.12	± 5.40	1.52
Abdomen (cm)	73.79	± 6.56	71.30	± 7.15	1.41
Gluteus (cm)	87.28	± 6.75	84.37	± 4.57	1.92
Wrist (cm)	15.79	± .89	16.15	± 1.42	- 1.33
Thigh (cm)	50.20	± 5.14	47.50	± 4.26	2.22*
Calf (cm)	33.34	± 2.93	32.55	± 2.59	1.11
Biceps (cm)	24.37	± 2.48	24.33	± 1.92	.076

* Significant at 0.05 level $t_{0.05, 58} = 2.00$

Table 3 representing the statistics of circumference/girth of two groups (Basketball and Volleyball). There was no significant difference between Basketball and Volleyball players in Biceps, waist, abdomen, glutens, wrist and calf

circumference between the two groups, but thigh circumference ($p > 0.05$) was significantly higher for Basketball players than Volleyball players.

Table 4: Statistics on Length of Two Groups (Basketball and Volleyball)

Variable	Basketball		Volleyball		't' value
	Mean	SD	Mean	SD	
Upper Ex. (cm)	74.81	± 4.79	76.25	± 4.21	1.29
Lower Ex (cm)	91.09	± 5.19	88.46	± 4.98	1.993
Thigh (cm)	43.62	± 2.99	42.36	± 4.59	1.26
Hand (cm)	55.22	± 4.51	56.60	± 3.61	-1.30
Plan (cm)	19.15	± .75	19.15	± 1.57	.00
Forearm (cm)	27.02	± 1.63	27.27	± 1.48	-.63

Table 4 shows the descriptive statistics for length of body segment of Basketball and Volleyball players. There was no significant difference between Basketball and Volleyball

players in relation to upper extremity, lower extremity, thigh, hand, palm and fore arm length.

Table 5: Statistics on width of two groups (Basketball and Volleyball)

Variable	Basketball		Volleyball		't' value
	Mean	SD	Mean	SD	
Hummers (cm)	6.62	± .50	6.52	± .43	.79
Femur (cm)	9.47	± .74	9.48	± .48	-.10

Table 5 shows statistics of width of the body segment of Basketball and Volleyball players. No significant difference

was observed in hummers and femur width between the Basketball and Volleyball players.

Table 6: Statistics on Somatotyping of Two Groups (Basketball and Volleyball)

Type	Basketball		Volleyball		't' value
	Mean	SD	Mean	SD	
Endomorphy	2.31	± 1.41	1.84	± .98	1.52
Mesomorphy	3.37	± 1.17	4.19	± .98	-2.94*
Ectomorphy	3.69	± 1.41	2.72	± 1.01	3.07*

* Significant at 0.05 level $t_{0.05, 58} = 2.00$

Table 6 summarizes the descriptive statistics of the somatotyping components. Ectomorphic values of Basketball players were significantly higher ($P>0.05$) than those of Volleyball players and mesomorphic values of

Volleyball players were significantly higher ($P>0.05$) than the Basketball players. In relation to endomorphic components, no significant difference observed between two groups.

Table 7: Statistics on Percentage of Players whose were belong in various Classes of Bodytype

Somatotyping Classes	Volleyball Players		Basketball Players	
	No. of Players (30)	%	No. of Players (30)	%
Mesomorphic Endomorph	2	6.66	7	23.33
Endomorphic Mesomorph	1	3.33	1	3.33
Ectomorphic Mesomorph	17	56.66	1	3.33
Mesomorphic Ectomorph	5	16.66	20	66.66
Ectomorphic Endomorph	5	16.66	1	3.33

Table 7 shows that percentage players whose were belonged in various components of somatotyping. Most of Basketball players were belonged in mesomorphic Ectomorph (66.66%) bodytype and Volleyball players were belonged in Ectomorphic Mesomorph (56.66%) bodytype. Total subjects

of Basketball and Volleyball were belonged in Mesomorphic Endomorph, Endomorphic Mesomorph, Ectomorphic Mesomorph, Mesomorphic Ectomorph and Ectomorphic Endomorph classes of somatotyping.

Table 8: Statistics of Vertical Jump, Flexibility and Reaction Time of Two Groups

Variables	Volleyball Playe rs		Basketball Play ers		't' value
	Mean	SD	Mean	SD	
Vertical jump	40.78	5.64	48.72	5.39	5.57*
Flexibility	12.03	4.85	9.50	4.92	-2.00*
Reaction time	12.86	2.14	13.96	3.83	1.37

* Significant at 0.01 level $t_{0.05, 58} = 2.00$

Table 8 representing the statistics of vertical jump, flexibility and reaction time of U-19 years state level male Basketball and Volleyball players in the form of means, SD and 't' values. The table revealed that the jumping ability of Basketball players were significantly higher ($p>0.05$) than

Volleyball players and other side flexibility of Volleyball players were significantly better ($p>0.05$) than Basketball players. In relation to reaction time, there was no significant difference observed between two groups.

Discussion

The present study showed that Basketball players were significantly taller than Volleyball players. Both biceps and triceps skin folds measurements were observed to be significantly higher for Basketball players than Volleyball players. Basketball players had greater thigh circumference than Volleyball players and there were no significant difference between Basketball and Volleyball players in relation to length and width of the body. In respect to somatotyping, ectomorphic values of Basketball players were significantly higher than those of Volleyball players and mesomorphic values of Volleyball players were significantly higher than the Basketball players. In relation to endomorphic components, no significant difference observed between two groups. Most of Basketball players were belonged in mesomorphic ectomorph (66.66%) bodytype and Volleyball players were belonged in ectomorphic mesomorph (56.66%) bodytype. Total subjects of Basketball and Volleyball were belonged in mesomorphic endomorph, endomorphic mesomorph, ectomorphic endomorph, mesomorphic ectomorph and ectomorphic endomorph classes of somatotyping. The jumping ability of Basketball players were significantly higher than Volleyball players, in case of flexibility Volleyball players were significantly better than Basketball players. In relation to reaction time, there was no significant difference observed between two groups.

Conclusion

The Basketball players were significantly taller than Volleyball players. The biceps and triceps skin folds of Basketball players were significantly higher than Volleyball players. The Basketball players had greater thigh circumference than Volleyball players. The significant difference was observed between Basketball and Volleyball players in ectomorphic and mesomorphy components. The Basketball players had greater ectomorphy component than the Volleyball players and Volleyball players had greater mesomorphy components than Basketball players. The body type of Basketball group was mesomorphic ectomorph (2.31, 3.37, 3.67), total percentage 66.66% and Volleyball group was ectomorphic mesomorph (1.84, 4.19, 2.72), total percentage 56.66%. The significant difference was observed between Basketball and Volleyball players in vertical jump and flexibility. The Basketball players had higher vertical jump than the Volleyball players and Volleyball players had better flexibility than Basketball players.

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