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Statistical analysis of selected body composition parameters of different age level of volleyball players

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Abstract
The main purpose of this study was to find out the difference of Body Composition parameters of different age level of volleyball players. For present study total 150 (50 in each category) female Volleyball Players selected and the age of subjects between 18-25 years. For this study of Body Fat% and BMI variables are selected. After collecting the relevant data descriptive statistic and t test was applied. The level of significance was set at 0.05. The outcome of the study shows that significant differences of Body Fat% variables and BMI between three different age level of volleyball players.

Keywords: Body fat %, body mass index and volleyball

Introduction
Body composition is first and prime influenced by diet and physical activity. Although body composition is genetically related to body type, the nature and sum of food consumed and the extent of input in physical activity put forth a profound influence on body composition. Overeating and lack of physical activities contribute to poor body composition. Individuals who are plump tend to eat extra and are more deskbound (Sodhi and Sidhu 1984).
Body fat exists in two depots or storage sites. The first store, termed necessary fat, is the fat accumulated in the bone marrow and in heart, muscles, liver, spleen, kidneys, intestines, lungs, and lipid-rich tissues of the nervous system. This fat is compulsory for customary physiological implementation. In the heart, for example, the quantity of dissectible fat determined from cadaver studies represents about 18.4g, or 5.3%, for an average heart weight of 349g in males, and 22.7g, or 8.6%, for an average heart weight of 256g in females. Standard body weight scales present a determine of total weight, but don't determine the lean-to-fat ratio of that weight. Standing on most scales can tell you only if you weigh more than the average person, but not if that weight is fat or muscle. Based only on scale weight, a 250-pound athlete with 8% body fat may be considered "overweight" by a typical weight chart. Such charts are not a good sign of ideal body weight for general health or for athletic performance. The ideal weight and fat-lean ratio varies considerably for men and women and by age, but the lowest percent of body fat considered safe for good health is 5 percent for males and 12% for females. The average adult body fat is closer to 15 to 18% for male and 22 to 25% for female (Bale (1991) [3]. Sportsmen tend to be at low end of this scale due to their improved lean weight (muscle mass). While low levels of body fat seem to be related to improved sports performance, body composition alone is not a great predictor of sports success. A linebacker needs to have enough body mass (lean and fat weight) to generate greater forces and avoid injury. Body fat among elite athletes varies largely by sport. There is little proof of any benefit when men drop under 8% and women drop under 14% body fat. Body composition, purposely body fat % is of immense interest to athletes and is regularly negatively related with athletic performance (Gomez, 2004; Malina, 2007; Sigurbjorn, Evans, Saunders, Obgurn, Lewis and Cureton 2000) [4, 5].

Methodology
For the purpose of the present study, 150 (50 in each category, Under 14, Under 17 and Under 19), selected from Punjab region and the age of group 21-28 years. After collecting the relevant data descriptive statistics and Student t test for paired samples was utilized to compare

the means of the pre-test and the post-test. The level of significance was set at 0.05 percent.

Analysis of results

Table 1: Mean and Standard deviation results with regard to Body Fat percentage among different age level of female volleyball players

Group	Mean	Std. Deviation
Under 14	14.6520	4.19393
Under 17	17.2880	3.71575
Under 19	17.7220	3.66997
Total	150	16.5540

Table-1 shows the Mean and SD values of Body Fat percentage of female Under 14, Under 17 & Under 19players were 14.6520±4.19393, 17.2880±3.71575 and 17.7220±3.66997 respectively. The obtained "F" ratio 9.229 (.000) was found statistically significant, (*P*< .05) .05 level of significance.

Table 2: Analysis of Variance (ANOVA) results with regard to Body Fat percentage among three different age level of female volleyball players

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	276.029	2	138.015	9.229	.000
Within Groups	2198.363	147	14.955		
Total	2474.393	149			

*Significant at F0.05 (3.04)

It is evident from table 2 that the results of Analysis of Variance (ANOVA) among different three age level of female volleyball players with regard to Body Fat percentage were found to be statistically significant (*P*< 0.05). Since the obtained "F" ratio 9.229 (.000) was found statistically significant.

Table 3 Analysis of Least Significant Difference (LSD) post hoc test with Regard to Body Fat percentage among three different age level of female volleyball players

	Under 14		Under 17		Under 19	
	Mean Difference	Sig.	Mean Difference	Sig.	Mean Difference	Sig.
Under 14	---	---	-2.63600*	.001	-3.07000*	.000
Under 17	2.63600*	.001	---	---	-.43400	.576
Under 19	3.07000*	.000	.43400	.576	---	---

Table 4: Mean and Standard deviation results with regard to Body Mass Index among different age level of female volleyball players

Group	Mean	Std. Deviation
Under 14	20.9926	2.23875
Under 17	21.5716	2.65567
Under 19	22.2976	2.93325
Total	21.6206	2.66157

Table-4 shows the Mean and SD values of Body Mass Index of female Under 14, Under 17 & Under 19players were 20.9926±2.23875, 21.5716±2.65567 and 22.2976±2.93325 respectively. The obtained "F" ratio 9.229 (.000) was found statistically significant, (*P*< .05) .05 level of significance.

Table 5: Analysis of Variance (ANOVA) results with regard to Body Mass Index among three different age level of female volleyball players

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42.756	2	21.378	3.103	.048
Within Groups	1012.757	147	6.890		
Total	1055.513	149			

*Significant at F0.05 (3.04)

It is evident from table 5 that the results of Analysis of Variance (ANOVA) among different three age level of female volleyball players with regard to Body Mass Index were found to be statistically significant (*P*< 0.05). Since the obtained "F" ratio 3.103 (.048) was found statistically significant.

Table 6: Analysis of Least Significant Difference (LSD) post hoc test with Regard to Body Mass Index among three different age level of female volleyball players

	Under 14		Under 17		Under 19	
	Mean Difference	Sig.	Mean Difference	Sig.	Mean Difference	Sig.
Under 14	---	---	-.57900	.272	-1.30500*	.014
Under 17	.57900	.272	---	---	-.72600	.169
Under 19	30500	.014	. 72600	.169	---	---

Conclusion

Study represent that the significant deference's observed in body fat percentage and Body mass index parameter. All the three different age group are different to each other. The results of the under 19 shows better body fat percentage and BMI as compare other two groups. The present results were supported with the previous study of Jelicic, *et al*., 2002 [1], Amit (2016) [2] and Surapan, *et al*. (2010).

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