Analysis of Body Composition Among Intercollegiate Male Volleyball Players

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ABSTRACT *To achieve the purpose of the study, 60 volleyball players from six colleges during 2014-15 Zonal Tournament held at United Institute of Technology, Coimbatore were selected. Their age ranged from 18-21 years. The data collected from the subjects were age, weight, and skinfold measurement to find out the body composition. The collected data were analyzed at the level of 0.05, P>2.38, F ratio for following variables are BD=6.06, %BF=6.02, FM=4.56, and LBM=3.9. Whenever F ratio was significant, scheffe's post hoc test administered and its result in BD between KTVR and KCT=0.014, CSICE and SNS=0.015 and KTVR and SNS=0.016, %BF between KTVR and KCT=6.09, CSICE and SNS =6.55 and KTVR and SNS=7.14, FM between CSICE and SNS=5.95 and LBM between KTVR and CSICE=10.98. The result of the study showed that there is a significant difference among the intercollegiate mae volleyball players in body composition.*

Introduction

An accurate appraisal of body composition provides an important basis to formulate an intelligent program of total fitness. The frequently used standard- the height-weight tables is of limited value in evaluating physique, since it is well established that overweight and over fat are not synonymous. This point is clearly illustrated by the athletes, many of whom are muscular and exceed some average weight for their age and height, but otherwise are lean in terms of body composition. For, such persons, a weight loss program is unnecessary and may even be detrimental to sports performance.

The evaluation of the body composition permits quantification of the major structural components of the body-muscle, bone and fat. The term overweight refers to body mass in excess of some standard, usually the mean body mass for a given structure. Being some average, ideal or desirable body mass based on height-weight tables should not necessarily dictate whether or not someone goes on a reducing regimen. A more desirable alternative is to determine the body composition by one of several laboratory or field techniques **(McArdle et al., 1991)**.

Generally there are two procedures used to evaluate body composition: one is direct, that means chemical analysis of the human cadaver and second one is indirect method, i.e., hydrostatic weighing machine, skinfold and girth measurement etc., **(Heyfield et al., 1990, BCAM, 1968 and Brozek, 1963)**. The indirect methods give the prediction of percent body fat through skinfold or circumference measurements. Fat fold measurements can provide fairly consistent and meaningful information concerning body fat and its distribution **(Hayes et al., 1988)**.

In general, there are two ways to use fatfolds. The first is to sum the scores as an indication of the relative degree of fat among individuals. The second way to use fatfold is in conjunction with mathematical equations designed to predict body density or percent body fat. These equations are population specific and predict fatness accurately within homoeostasis (age, gender, level of training and fat) groups **(Jackson et al., 1980, Katch and Katch, 1980 and Pollock and Jackson, 1980)**.

With reference to the above said scientific evidences, the researcher has chosen an indirect method to predict body composition of intercollegiate volleyball players**.**

Methodology
Selection of subjects
To achieve the purpose of the study, 60 male volleyball players from six engineering colleges from Anna University zone XI intercollegiate tournament held at United Institute of Technology, Coimbatore at 2014-15. Their age ranged from 18-21. The data was collected under normal condition in the morning between 6.00AM and 10.00AM.

Selection of variables
In this study, the researcher selected the following four body composition variables. They are:

1. Body density **(Jackson and Pollock, 1978)**
2. Percent body fat **(Siri, 1956)**
3. Fat mass **(McArdle et al., 1991)**
4. Lean body mass **(McArdle et al., 1991)**

Measurements
Body density was assessed using skinfold measurement taken from seven sites namely chest, axilla, triceps, subscapular, abdomen, suprailliac and thigh. Weight was measured by digital standing scales (Model DS-410, Seiko, Tokyo, Japan) to the nearest 0.1 kg.

Statistical analysis
Descriptive statistics and one way ANOVA was employed for the comparison of data among the intercollegiate volleyball players. If 'F' shows significant, the post hoc test (Scheffe's) was administrated. The collected data were analyzed by using of SPSS-20 at 0.05 level of confidence.

Result
After analyzing the data, the results of the body composition variables are given in table1. This table shows that the descriptive statistics of body composition among intercollegiate volleyball players. The CSICE and KTVR teams has higher (1.07) in body density, KTVR and CSICE teams has lesser (11.46 and 6.69) mean values in percent body fat and fat mass respectively and KTVR dominate (58.79) in the lean body mass among the group.

Table 1

COMPUTATION OF DESCRIPTIVE STATISTICS AMONG INTERCOLLEGIATE MALE VOLLEYBALL PLAYERS ON BODY COMPOSITION

Sl. No	Variables	College	Mean	SD
	Body density	SNS Tech	1.05	.006
		KCT	1.06	.011
		UIT	1.06	.011
		CSICE	1.07	.007
		KTVR	1.07	.006
		SREC	1.06	.005
	Percent body fat	SNS Tech	18.61	3.08
		KCT	17.56	5.11
		UIT	13.87	4.95
		CSICE	12.06	3.18
		KTVR	11.46	2.71
		SREC	15.09	2.35
	Fat mass	SNS Tech	12.65	3.18
		KCT	11.74	3.83
		UIT	8.77	4.79
		CSICE	6.69	2.39
		KTVR	7.81	2.83
		SREC	9.84	2.74
	Lean body mass	SNS Tech	54.74	5.98
		KCT	54.85	8.83
		UIT	51.54	5.82
		CSICE	47.80	4.66
		KTVR	58.79	6.12
		SREC	54.25	6.36

Table 2

COMPUTATION OF "F" RATIO AMONG INTERCOLLEGIATE MALE VOLLEYBALL PLAYERS ON BODY COMPOSITION

Variables	Group	Sum of squares	df	Mean square	F
Body density	Between Groups	.002	5	.000	6.06*
	Within Groups	.004	54	.000	
Percent body fat	Between Groups	417.14	5	83.43	6.02*
	Within Groups	748.35	54	13.86	
Fat mass	Between Groups	263.03	5	52.61	4.56*
	Within Groups	622.74	54	11.53	
Lean body mass	Between Groups	680.97	5	136.19	3.29*
	Within Groups	2229.46	54	41.28	

*Significant at 0.05 level of confidence, Table value 2.38

Table 2 shows that one way ANOVA of body composition among inter collegiate male volleyball players. The obtained F ratio of BD, %BF, FM and LBM respectively 6.06, 6.02, 4.56 and 3.29 which are greater than the required table value 2.38. Hence there exists a significant difference in body composition among inter collegiate male volleyball players.

Table-3

COMPUTATION OF SCHEFFE'S POST HOC TEST AMONG INTERCOLLEGIATE MALE VOLLEYBALL PLAYERS ON BODY COMPOSITION

Variables	Groups	SNS	KCT	CSICE	CI
Body density	CSICE	0.015*	-	-	0.00
	KTVR	0.016*	0.014*	-	
Percent body fat	CSICE	6.55*	-	-	5.74
	KTVR	7.14*	6.09*	-	
Fat mass	CSICE	5.95*	-	-	5.23
Lean body mass	KTVR	-	-	10.98*	9.91

*Significant at 0.05 level

Whenever F ratio was significant scheffe's post hoc test was administered. The above table shows that the result of post hoc test among intercollegiate volleyball players in BD between KTVR and KCT(0.014), CSICE and SNS (0.015) and KTVR and SNS (0.016), %BF between KTVR and KCT(6.09), CSICE and SNS (6.55) and KTVR and SNS (7.14), FM between CSICE and SNS (5.95) and LBM between KTVR and CSICE (10.98) at the confidence interval of 0.00, 5.74, 5.23 and 9.91 respectively.

Discussion

Demands on physical predisposition (including body composition) for professional volleyball players are increasingly higher, because its weaknesses must be compensated by other qualities namely experience, the ability to anticipate, and volleyball intelligence. The highest level of sport performance may be achieved only by the synergic influence of all partial components (factors of sport performance). However, body composition must be monitored not only selectively, but continuously. This type of information may allow the coach or the players themselves to identify their own changes in body composition (**Maly et al., 2011**).

The result of the study showed that there is a significant difference found for body density, percent body fat, fat mass and lean body mass among intercollegiate men volleyball players. Result of this study closely associate with **Hadzic et al**., **2012, Maly et al**., **2011** and **Koley et al., 2010**.

Conclusion

Finally, the result clearly indicates there is a significant difference among the six volleyball team players in body composition. It directly relates to the performance of the players, because KTVR College won the title in that tournament. Hence, it is concluded that, this study will be helpful for the coaches to select the team and draw a training programme.

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