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Comparison of body composition variables among university level hand ball, kabaddi and volleyball players

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Abstract

Much of the focus has been directed toward sports such as handball, volleyball gymnastics, diving, wrestling, long-distance running, and other athletic sports where a lower body mass has been perceived as a means of enhancing performance to find out the differences in body composition variables. The aim of this study was to analyze the body composition variables, BMI and percent body fat among handball, kabaddi and volleyball players. To achieve the purpose of this study, the investigator selected randomly selected 30 handball players, 30 kabaddi players and 30 volleyball players, who participated at State level Inter University competitions held at Chennai during the year 2014 and their mean age was 20.6 years with standard deviation of + 1.4 years. The data on BMI and percent body fat were compared for the differences existed among the players using statistical tool ANOVA. The study proved that though there seem to be significant differences in BMI and handball players tend to have more than kabaddi and volleyball players, there was no significant difference in percent body fat among the players. Hence, it was concluded that the difference noted in BMI was absorbed in body due to the vigorous playing situations of the players.

Keywords: Handball, kabaddi, volleyball, BMI and percent body fat

Introduction

The integral relationship between performance in sport, body weight, and overall health of the athlete has received considerable attention over the past several years. Much of this focus has been directed toward sports such as handball, volleyball gymnastics, diving, wrestling, long-distance running, and other aesthetic sports where a lower body mass has been perceived as a means of enhancing performance. It is important to note, however, that issues related to low body mass represent only one end of the body mass continuum encountered in sport. In contrast, sports such as kabaddi face the challenge of increasing body mass as a means of enhancing performance. Although anecdotal observation suggests that over the past 10 years in kabaddi a “bigger is better” concept has pervaded through all playing positions at all competitive levels, there is limited evidence to support this claim. Furthermore, and perhaps of more importance, it is not clear whether this increase in body size has been the result of an increase in lean body mass or of an increase in body fat. It is logical to assume that an increase in body mass accompanied by an increase in fat-free mass would be particularly important in enhancing the performance of players at a number of playing positions. However, as previous work has indicated (Bale et.al. (1994) [1], Burke et.al. (1980) [3], Crews et.al. (1978) [4], Kelley and Wickkiser (1975) [5], should this increase in body weight be the result of an increase in body fat, the potential negative effects on performance and long term health implications cannot be overlooked. While in the game of kabaddi there seemed to be a “bigger is better”, in handball, the conception is different that a “taller is better” and in volleyball medium sized who can be able attack and defend in the playing situations.

Tsunawake *et al.* (2003) [8] made a study to evaluate the body composition in 12 members of the women volleyball team and 11 members of the women handball team that won the championship in the Japan Inter High School meets and found no significant difference was observed in any measured item of the physique, skin fold thickness or body composition between the volleyball players and handball players. Monyeki *et al.* (2005) [6] study was to

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determine the relationships between the body composition characteristics, body mass index (BMI), sum of skinfolds (SSF),% body fat (%BF), fat free mass (FFM) and waist-to-hip ratio (WHR), and nine physical fitness items in undernourished rural primary school children in Ellisras, South Africa and found body composition was significantly related to physical fitness, but not always in the expected direction. Brodersen and Boniface (2007) [2] found that school-based physical education (PE) is often proposed as a strategy for obesity prevention, but many trials have found non-significant effects on body mass index (BMI) and found higher levels of school PE were associated with lower gains in adiposity in boys. Vucetic V, et.al. (2008) [9] presented 69 the morphological characteristics of 54 Croatian national level track-and-field athletes. 21 anthropometric body measures were taken on a sample of 15 sprinters (S), 16 endurance sprinters (S4), 10 middle-distance runners (MD) and 13 long-distance runners (LD). Body fat percentage, body mass index and somatotype were also calculated. Canonical discriminative analysis showed significant difference between the athletes of various running events, in the measures of body volume and body fat, while no significant difference was found in the variables of longitudinal and transversal dimensions of the skeleton. Thus, the theoretical foundations based on previous researches proved that the body composition variables had direct influence on athletic ability of players and there were differences bound on body composition variables of the players depending on their playing positions and the game. Further it was found that there was further scope for research to make comparative analysis of body composition variables of players from different games.

It was therefore the purpose of this study was (a) to evaluate body composition parameters, in terms of body mass index and percent body fat among State level Inter University competitions players of handball, kabaddi and volleyball, and (b) to compare body composition of the players among the selected players for any differences.. For this purpose, the height and weight were used to determine the body mass index and the skinfold data has been used to calculate body

fat percentage. These data were used to ascertain the value of using skinfold measure to evaluate differences in body fat both within and across different players.

Methodology

To achieve the purpose of this study, the investigator selected randomly selected 30 handball players, 30 kabaddi players and 30 volleyball players, who participated at State level Inter University competitions held at Chennai during the year 2014 and their mean age was 20.6 years with standard deviation of + 1.4 years. Data were collected from the subjects, their height, weight, and skin fold measures of three sites. Based on the collected data, the subjects' body mass index and percent body fat were determined. The data on BMI and percent body fat were compared for the differences existed among the players using statistical tool Anova.

Results

The descriptive statistics on BMI and percent body fat, consisting, mean, standard deviation and range among handball, kabaddi and volleyball players are presented in Table I.

Table 1:

Variables	Players	Mean	S.D
BMI	Handball	21.79	2.61
	Kabaddi	19.14	2.47
	Volleyball	20.78	2.81
Percent Body Fat	Handball	14.11	2.07
	Kabaddi	13.24	1.68
	Volleyball	13.68	1.87

The results presented in Table I proved that there were differences in body composition variables, BMI and percent body fat of the handball, kabaddi and volleyball players. To find out the statistical significance of the differences among the selected groups, ANOVA was employed and the results presented in table II.

Table 2: Differences in Body Composition Variables among Handball, Kabaddi and Volleyball Players

Variables	Source of variance	Sum of Squares	df	Mean squares	F- ratio	Sig
Body Mass Index	Between	105.20	2	52.60	7.59*	0.05
	Within	603.18	87	6.93		
Percent Body Fat	Between	11.42	2	5.71	1.62	NS
	Within	307.24	87	3.53		

The results presented in Table II proved that there was significant differences among BMI of the Handball, kabaddi and volleyball players and there was no significant differences among the groups on percent body fat. Since significant F values were obtained on BMI the results were further subjected to post hoc analysis using Scheffe's post hoc interval test and the results presented in Table III.

Table 3: Multiple Comparisons of Paired Means on BMI among Handball, Kabaddi and Volleyball Players

Handball	Kabaddi	Volleyball	MD	C.I
21.78	19.14		2.62*	1.68
21.78		20.78	1.00	1.68
	19.14	20.78	1.63	1.68

* Significant

The results presented in Table III proved that paired mean comparisons between handball and kabaddi players was significant and other comparisons were not significant on BMI of the handball, kabaddi and volleyball players.

Discussions

The results presented in this study gave way for consideration that whether the increase in body size has been the result of an increase in lean body mass or of an increase in body fat. It is logical to assume that an increase in body mass accompanied by an increase in fat-free mass would be particularly important in enhancing the performance of players. However, the different nature of playing situations can give different absorption of body fat was found in this study. Even though there was significant difference between handball players and kabaddi players and kabaddi players were found to be less BMI, there was no significant difference among the players

when their percent body fat was considered. This shows that the enhanced BMI levels of handball players was absorbed in body while assessing percent body fat. The findings of this study were in agreement with the findings of Noel et.al. (2003) [7]

Conclusions

The study proved that though there seem to be differences in BMI and handball players tend to have more than kabaddi and volleyball players, from the standpoint of the athlete's overall health and medical prognosis there was no significant difference in percent body fat among the players. Hence, it was concluded that the difference noted in BMI was absorbed in body due to the vigorous playing situations of the players.

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