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Comparison of Body Composition Among South Zone Inter University Male Handball Player

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ABSTRACT

The purpose of the study was to compare the body composition among south zone inter university male handball players. Sixty four (64) male handball players were selected from south zone inter university competition for the year 2013-14. Percent body fat, lean body mass and fat mass were measured by Durnin and Womersley (1974) proposed four sites was used. The results of ANOVA showed that percent body fat, lean body mass and fat mass showed no significant difference among the groups ($p > 0.05$). It is concluded that south zone inter university male handball players tend to show no difference in body composition. However, Periyar university players had greater percent body fat and fat mass than other team players.

KEYWORDS : body composition, percent body fat, lean body mass, fat mass, handball, players.

Introduction

Handball has become one of the most popular team sports at both the national and international level (Clanton & Dwight, 1997; Marczinka, 1993). The game of handball is played between two teams, each with six court players and a goalie. The objective of the game is to score as many goals as possible by dribbling, passing, and throwing the ball at the goal. While one team attempts to score a goal, the opposing team attempts to block and intercept throws. The six court players are positioned as follows: two wing players, two back-court players, one center back-court player, and one pivot player. The game is played over two periods of 30 minutes, with a 10-minute break between the periods.

Modern team handball consists of intense, intermittent activities such as running, sprinting, jumping as well as regular in fights between players (i.e. holding, pushing etc.). Research indicates that heavy, strong players, who are not compromised in regard to running capacity or speed seems to be superior. The need for bigger, stronger and faster team handball players is supported by the development in anthropometrics and physical performance parameters over the years. Besides the advantage of physical superiority, tactical and technical skills are better expressed if a player is not inhibited by poor conditioning. In addition, tougher tournaments, more games per season and more aggressive playing supports the need of optimal conditioning.

The success of an athlete depends a lot on the body type. Body size, build, and body composition can impair or help performance. Athletic performance relates to body type (body shape and size), and body composition (muscular development and amount of body fat). Body fat contributes no strength advantage and limits endurance, speed, and movement through space. The purpose of the study was to compare the body composition among south zone inter University male handball players.

Methods

Subjects

A total of sixty four (64) male handball players were selected as subjects from south zone inter university handball tournament, organised by Periyar University, Salem, Tamilnadu. Each team constitutes of 16 players each. The mean age, height and weight of the selected subjects are presented in Table 1.

Table 1: The subjects physical characteristics

Teams	Age	Height	Weight
1	21.87 ± 2.24	1.73 ± 0.50	67.18 ± 6.52
2	20.25 ± 1.77	1.70 ± 0.52	63.75 ± 7.48
3	21.18 ± 1.55	1.73 ± 0.67	68.50 ± 9.90
4	21.43 ± 2.15	1.73 ± 0.71	67.50 ± 8.61

Variables and tests

In the present study percent body fat, lean body mass and fat mass were selected as criterion variables. Measuring body fat percentage is an easy method of discovering correct body weight and composition. Beneath the skin is a layer of subcutaneous fat, and the percentage of total body fat can be measured by taking the 'skinfold' at selected points on the body with a pair of calipers.

Estimation of body fat was carried out by skinfold thickness measurement. Measurement can use from 3 to 9 different standard anatomical sites around the body. The right side is usually only measured (for consistency). The tester pinches the skin at the appropriate site to raise a double layer of skin and the underlying adipose tissue, but not the muscle. The calipers are then applied 1 cm below and at right angles to the pinch, and a reading in millimeters (mm) taken two seconds later. The mean of two measurements should be taken. If the two measurements differ greatly, a third should then be done, then the median value taken.

The sites

There are many common sites at which the skinfold pinch can be taken. The four sites (triceps, biceps, subscapular and suprailliac) proposed by Durnin and Womersley (1974) is applied in this research.

Formula to Calculate

Body density and percentage body fat is calculated using the equations of Durnin and Womersley (1974), for each side of the body, using the following equations:

Density (g/cm^3) = c – m (log ΣS)

Once density is calculated, the Siri (1961) equation is used to estimate percentage body fat:

Fat (%) = [(4.95 / D) – 4.5] x 100

Where: D = Density 4.95 and 4.5 are the constants calculated by Siri (1961) using the assumptions on the density of FM and FFM. Lean Body mass (Wilmore & Costill, 1994) was measured using the following equation:

$$LeanBodyMass = \frac{(100 - bodyfatpercentage)}{100} \times weight$$

Fat mass was measured by following formula:

Fat Mass = Body mass × (% Fat ÷100)

Statistical techniques

The data collected was statistically analysed using Analysis of variance (ANOVA) to examine the difference. When *F* is significant Scheffé S post hoc test was applied to know the difference among the groups. The level of confidence was fixed at 0.05 to test the significance. The

data was analysed in computer system by using statistical package for social science (SPSS) version 16.

Results

The result of this study showed no significant difference on percent body fat ($p > 0.05$), lean body mass ($p > 0.05$) and fat mass ($p > 0.05$) of south zone inter university male handball players remain (Table 2). Among the four teams Periyar University players had greater percent body fat and fat mass than other team players.

Table 2: Estimation of group difference in body composition

Variables	Groups	Mean	Standard deviation	F ratio	p value
Percent body fat	1	5.85	2.35	1.687	0.179
	2	6.23	3.12		
	3	6.55	2.80		
	4	8.08	3.60		
Lean body mass	1	63.15	5.07	1.425	0.244
	2	59.60	5.50		
	3	63.79	7.54		
	4	61.84	6.36		
Fat mass	1	4.03	1.93	1.227	0.308
	2	4.14	2.56		
	3	4.70	2.75		
	4	5.65	3.24		

Discussion

The uniqueness of this study was to examine body composition among of interuniversity male handball players which showed no significant difference among groups on percent body fat, lean body mass and fat mass showed (Figure 1, 2 and 3). The fat free mass and fat mass significantly distinguish the players of the higher ranked team and the players in the lower ranked team (Stuempfle, Katch, and Petrie 2003; Milanese *et al*. 2011). It has been also well documented that athletes undergo physical changes in anthropometric measures (body composition, lean body mass, body density, fat mass, etc.) by participating in sports and training (Carbuhn, Fernandez, Bragg, Green, & Crouse, 2010). A high body mass, and especially a high degree of fat free mass has previously been speculated to be beneficial in handball (Ziv and Lidor, 2009), and therefore we interpret the present findings to strengthen this assumption. However, the subjects had lower absolute amounts of fat free mass compared to what has previously been shown among players in the best Spanish team (Gorostiaga *et al*., 2005). The difference in percent body fat, lean body mass and fat mass was not statistically significant among the selected handball teams. However, Periyar university players had greater percent body fat and fat mass than the other team players. Similarly, Anna university players had greater lean body mass than other team players. The non existence of significant difference in body composition may be due to similar demographical and lifestyle of the selected players.

Figure 1: Percent body fat of south zone inter university male handball players

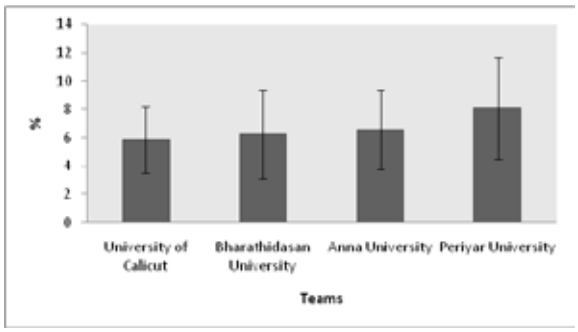


Figure 2: Lean body mass of south zone inter university male handball players

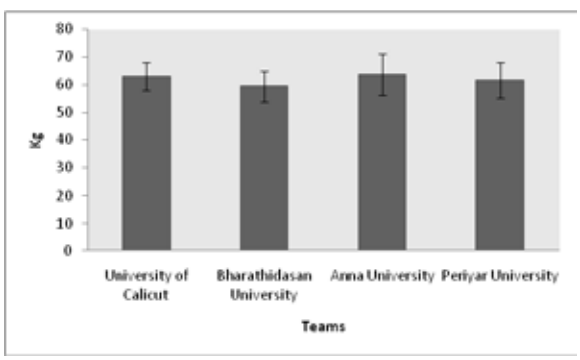
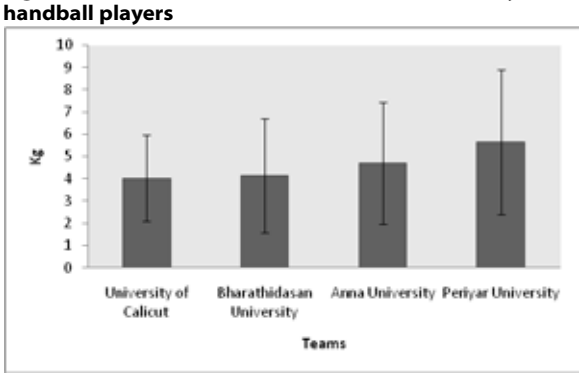


Figure 3: Fat mass of south zone inter university male handball players



Conclusions

It is concluded that top four teams from south zone inter university handball players depict similar body composition. However, the variation in body composition of handball players with respect to specific playing position has to be investigated.

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