

Analysis of percent body fat among all India inter university hand ball players

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Abstract

To accomplish the purpose of the study, a total of three hundred and twenty (320) male handball players were selected as subjects from All India Inter University Handball Tournament, organised by Periyar University, Salem, Tamilnadu. In which four university teams from five zones (East, South, West, North and Central) took part in competition. Each team constitutes of 16 players each. The mean age, height and weight of the selected subjects are 22.92 ± 2.04 years, 176.38 ± 4.70 cm and 71.40 ± 6.73 Kg respectively. The investigator selected percent body fat as criterion variables. The data were collected and analysed using ANOVA Since five groups are involved Scheffé S post hoc test was applied to determine the significant differences. The level of confidence was fixed at 0.05 to test the significance. The present study showed that the percent of body fat was in greater percent for north zone players

Keywords: body fat inter university hand ball players

1. Introduction

Maintaining a specific body weight and body composition are important requirements for optimal athletic performance. In order to achieve a body composition that promotes maximum physical ability, competitive athletes must train at a high level of intensity with great frequency. This level of intensity can vary by sport, and the timing of intense training can vary by age of the athlete. In certain sports, highly-focused training can begin as early as adolescence, whereas in other sports, this level of training does not occur until early adulthood. Elite athletes who are training their bodies to achieve athletic greatness typically aim to develop a highly-muscular, minimally-fat body composition as compared to the average person.

For the athlete specifically, overly strenuous athletic training during adolescence and early adulthood can have a major impact on her level of health. There is the potential to cause permanent damage to internal body systems with lasting effects throughout adulthood. The majority of athletes who participate in athletics at a highly competitive level do so during their college years. This is a time when athletes are completing growth and development and must take care of their bodies. It is therefore critical for competitive athletes, especially athletes, to be able to learn about their body composition measurements as accurately as possible in order to maintain a sufficient level of health while training.

2. Methodology

A total of three hundred and twenty (320) male handball players were selected as subjects from All India Inter University Handball Tournament, organised by Periyar University, Salem, Tamilnadu. In which four university teams from five zones (East, South, West, North and Central) took part in competition. Each team constitutes of 16 players each. The mean age, height and weight of the selected subjects are 22.92 ± 2.04 years, 176.38 ± 4.70 cm and 71.40 ± 6.73 Kg respectively. The investigator selected percent body fat as criterion variables.

2.1 Selection of Variables

Dependent Variables

The dependent variables selected in this study was percent body fat

2.2 Selection of Tests

Table 1: Tests used for criterion variables

| S.No | Variables | Methods / Tests /Equipment |
|------|----------------------|----------------------------|
| 1 | Percent body fat (%) | Skinfold caliper |

The criterion variables was acceptable at 0.05 level and this reveals that the test item is reliable.

2.3 Collection of Data

All the assembled at All India Inter University Handball Tournament organised by Periyar Univeristy, Salem, Tamilnadu, who were tested on body composition. The data were collected from all subjects during their resting conditions.

2.4 Percent body fat

Purpose

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 callipers. This test only requires four measurements.

2.5 Equipment required

Skinfold Calliper and measuring tape

1. Procedure

Estimation of body fat 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.

2. The sites

There are many common sites at which the skinfold pinch can be taken. The four sites proposed by Durnin and Womersley (1974) is applied in this research. The sites recommended by Durnin and Womersley (1974) are Triceps, Biceps, Subscapular and Suprailliac (waist).

3. Triceps

A mark is made at the mid-upper arm, midline of the posterior aspect of the arm over the triceps muscle, measured with the elbow bent at 90°, used for identifying the biceps and triceps SFT. During the measurement, the arm should be hanging freely by the side, palms inwards towards the thighs.

4. Biceps

Measured midline of the anterior aspect of the arm, over the biceps muscle, mid-point on the arm as above.

5. Subscapular

Found just below and lateral to the bottom tip of the scapula, measured in a 45° angle. Subjects stand with their arm relaxed by their side. The scapula was palpated with the fingertips to find the bottom of the bone and the SFT is then measured in the natural crease. Subject's shoulders are relaxed.

6. Suprailliac (waist)

Found 1 cm above the anterior superior iliac spine (top of the hip bone) in the mid-axillary line (waistline). Measured horizontally with the subject breathing gently.

7. 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:

$$\text{Density (g/cm}^3\text{)} = c - m (\log \Sigma S)$$

Where:

D = Density

c and m = standard age and sex-specific coefficients

SS = Sum of all four skinfold measurements (mm)

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

$$\text{Fat (\%)} = [(4.95 / D) - 4.5] \times 100$$

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:

Fat mass was measured by following formula:

$$\text{Lean Body Mass} = \frac{(100 - \text{bodyfatpercentage})}{100} \times \text{weight}$$

$$\text{Fat Mass} = \text{Body mass} \times (\% \text{ Fat} \div 100)$$

The data were collected and analysed using ANOVA Since five groups are involved Scheffé S post hoc test was applied to determine the significant differences. The level of confidence was fixed at 0.05 to test the significance.

2.6 Percent body fat

It is clear from the figure 1 that percent body fat mean values of east, south, west, north and central zone handball players who took part in All India inter university handball tournament.

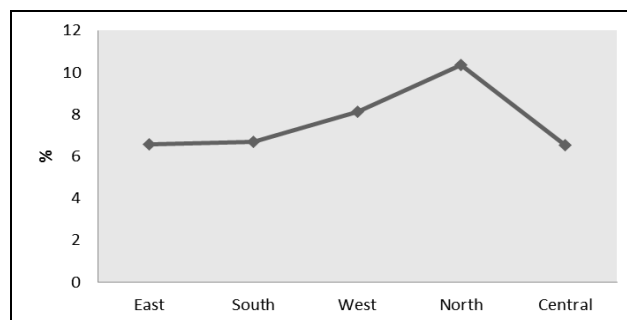


Fig 1: Graphical representation of the data on Percent body fat

Table 2: Summary of ANOVA among All India Inter University handball players on Percent body fat

| Variables | Source of Variance | Sum of Squares | df | Mean Square | F |
|------------------|--------------------|----------------|-----|-------------|--------|
| Percent body fat | Between Groups | 699.098 | 4 | 174.775 | 38.32* |
| | Within Groups | 1436.602 | 315 | 4.561 | |
| | Total | 2135.700 | 319 | | |

*Significant

Table 2 clearly show that there is a significant difference among the groups on percent body fat. The obtained *F* ratio of 38.32 is greater than the required table value of 2.40031087 at $\alpha = 0.05$ for the df of 4 and 315. Thereby it infers that the percent body fat found differ among the groups, among north zone players showed greater percent body fat than others.

Table 3: Scheffé S test for percent body fat

| East | South | West | North | Central | MD | CI |
|------|-------|------|-------|---------|--------|------|
| 6.58 | 6.68 | | | | -0.1 | 1.16 |
| | | 8.14 | | | -1.56* | 1.16 |
| 6.58 | | | 10.36 | | -3.78* | 1.16 |
| 6.58 | | | | 6.54 | 0.04 | 1.16 |
| | 6.68 | 8.14 | | | -1.46* | 1.16 |
| | 6.68 | | 10.36 | | -3.68* | 1.16 |
| | 6.68 | | | 6.54 | 0.14 | 1.16 |
| | | 8.14 | 10.36 | | -2.22* | 1.16 |
| | | 8.14 | | 6.54 | 1.6* | 1.16 |
| | | | 10.36 | 6.54 | 3.82* | 1.16 |

*Significant

Since the obtained *F* is significant Scheffé S post hoc test was applied to know the differences among the groups are presented in Table 3. It clearly shows that north zone and west zone handball players have a significantly greater percent body fat compared to other zone players, whereas statistically significant variation on percent body fat didn't exist among east, south and central zone handball players.

3. Conclusions

The present study showed that the percent body fat, found differ among the groups, among north zone players showed greater percent body fat, than others. Based on the findings of the study, it can be concluded that university players across India show different body composition and physique which can be ascertained for future players for the nation.

4. References

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