



ASSESSMENT OF ANTHROPOMETRIC MEASUREMENTS AND BODY COMPOSITION OF SELECTED SPORTS WOMEN IN COIMBATORE DISTRICT

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ABSTRACT This study was conducted with the objective to determine the anthropometric measurements and body fat of selected female athletes. About 420 female athletic students were selected through purposive random sampling from different colleges in Coimbatore district. Anthropometric parameters including Height, Weight, Body mass index, Waist circumference, Hip circumference, Waist hip ratio and Body fat were assessed. The results of Anthropometric measurements indicated 15 per cent of the subjects were underweight whereas 68 percent belonged to overweight and obese category. About 66 percent of female athletes has Body Mass Index (BMI) within normal. Waist Hip Ratio for 132 subjects (31 percent) was high with >0.86 . 21 percent of the sports people had high range of body fat percent and only 17 percent were in ideal range.

KEYWORDS : Anthropometric measurements, female athletes, Body mass index, Waist and Hip circumference, Waist Hip ratio, body fat

INTRODUCTION

Physical characteristics and body composition have been known to be fundamental to excellence in athletic performance (Mathur, 1985). Moses (2016) studied that "Anthropometry and body composition are particularly important for the athletes, because the height, weight of lean mass (muscle and bone mass) in athletes decreases efficiency of indicators based on body weight such as body mass index (BMI)".

Assessment of body fat in athletes may help to optimize competitive performance and monitor the success of training regimens and thus is of considerable interest to sports professionals (Ackland, 2012). It has been stated that improves body composition in athletes is associated with enhancement in cardiorespiratory fitness and strength (Hogstorm, 2012). Body composition may also be related to health complications because medical problems may arise in athletes with very low body mass, extreme mass changes due to dehydration or eating disorders (Sundgot, 2013).

This study was conducted with the objective to determine the anthropometric measurements and body composition of selected female athletes.

METHODOLOGY

Coimbatore district was selected and the population for the study was chosen from different colleges in Coimbatore. Four hundred and twenty (N=420) female sports person were selected through purposive random sampling method. Sports women engaged in various sports activity such as competing sports, weight lifting, endurance sports, group event, athletic event, etc of age group 18-21 were recruited. Exclusion criteria included non-metabolic disease, pregnancy, and long term oral steroid use, history of thyroid disorder, tumor and cardiovascular diseases.

The data was collected in relation to sports activity and anthropometric measurements including height, weight, BMI, Waist hip circumference, waist hip ratio and body fat percentage.

Sports activity

Regular physical activity (PA) can alter the requirements for some micronutrients (Woolf and Manore, 2006). This makes it important to choose foods carefully, taking into account the quality and quantity of macronutrient intakes, since requirements can vary depending on the type of exercise performed (Rousseau *et al*, 2005). There is strong evidence that appropriate selection of nutrients, timing of intake and proper supplement choice are associated with optimal health and exercise performance (Rodriguez *et al*, 2009). Students activity in sports were assessed with the type of sports involved such as Athletic event, Group event, Hand ball, Kho-Kho, Volley ball, Power lifting, Badminton, Table tennis, Basketball and Hockey; number of years engaged in sports; session of practice and duration of practice in regular and event times.

Anthropometry provides the single most portable, universally applicable inexpensive and non-invasive technique for assessing the size, proportions and composition of the human body. It reflects both

health and nutritional status and predicts performance, health and survival. As such it is valuable, but currently underused tool for guiding public health policy and clinical decisions.

Height and Weight

Standing height is an assessment of maximum vertical size. Standing height was measured using a stadiometer with a fixed vertical backboard and an adjustable head piece. The students stood on stadiometer with bare foot, heels together and the head positioned so that the line of vision was perpendicular to the body, arms hanging freely by the side and the head back, buttocks and heels in contact with the stadiometer. A straight rod was brought on to the top most point on the head with sufficient pressure to compress hair. Height was recorded to the nearest of 0.1 cm (NHANES, 2017).

Weight was ideally recorded after voided without shoes and with minimal clothing. Before weighing the scale was calibrated to zero (Joshi, 2008). The students stood over the machine and head positioned straight after which weight was noted. From the result, BMI was calculated.

Waist and Hip circumference and ratio

Waist Hip circumference was measured at the midpoint between the lower margin of the least palpable rib and the top of the iliac crest, using a stretch resistant tape that provides a constant 100 g tension. Hip circumference was measured around the widest portion of the buttocks. With the tape parallel to the floor. For both measurements, the subject were made to stand with feet close together, arms at the side and body weight evenly distributed and should wear little clothing. The subject was relaxed and the measurements was taken at the end of a normal expiration. Each measurements are within 1 cm of one another, the average was calculated. If the difference between the two measurements exceeds 1cm, the two measurements was repeated (WHO, 2011).

Waist Hip Ratio was mostly used to measure the accumulation of abdominal fat. WHR when goes above 0.8 in women and one in men is sign of high risk in men and women (Bisai, 2011).

Body fat percent

Body fat assessment is paramount to the assessment of nutritional status and despite the challenges that is poses, anthropometry is still the most widely used method in the clinical settings. The percentage of body fat to that of lean body mass was assessed with the Omran fat analyser.

RESULTS AND DISCUSSION

Height and weight

Table – I Height and weight of sports women

Particulars	Numbers	Per cent
Height		
140-155 cm	104	25
155-170 cm	274	65
170-185 cm	42	10

Weight		
30-45kg	72	17
45-60kg	268	64
60-75 kg	64	15
75-90kg	16	4

Body weight is the most widely used and sensitive and simplest reproducible measurement for the evaluation of nutritional status of individuals. It reflects more recent nutrition than height. Height is affected only by long-term nutritional deprivation; it is considered as an index of chronic or long duration malnutrition. Anthropometric data showed that 25 per cent had the mean height of 140-155 cm, 65 per cent ranged between 155-170 cm and 10 per cent were between 170-185 cm respectively. Similarly, Kumudhini (2011) reported that the majority of sports women in her study (75 per cent) ranged between 160-170 cm in height, only 8.33 per cent sports women were found to be above 170 cm. Majority of sports women (83.34 per cent) to have a body weight between 51-60 kg. In this study, about 64 per cent sports women were found in the body weight category 45-60 kg, while 17 per cent between 30-45 kg and 15 per cent between 60-75 kg. Nearly 4 per cent of the subjects were overweight (75-90 kg).

Body Mass Index

BMI of the selected sports women were given in the table –II

TABLE - II Body Mass Index of the selected sports women

Body Mass Index	Percent
<16	5
16-16.9	3
17-18.4	14
18.5-24.9	66
25-29.9	10
30-34.9	2
35-39.9	0.5
>40	0.5

Body Mass Index (BMI) value indicate that majority of the selected sports person had ideal Body Mass Index (66 per cent), 14 per cent were mildly malnourished, 3 per cent fall under moderately malnourished, 5 per cent were classified as severely malnourished, 10 per cent were overweight, only 2 per cent were found in obese (class I) category and about 0.5 per cent belonged to obese (class II and class III) categories.

Waist and Hip circumference

Table – III Waist and hip circumference

Particulars	Mean ± SD
Waist circumference (cm)	73 ± 17.07
Hip circumference (cm)	86 ± 11.96

The mean waist and hip circumference of athletes was 73 ± 17.07 cm and 86 ± 11.96 cm respectively.

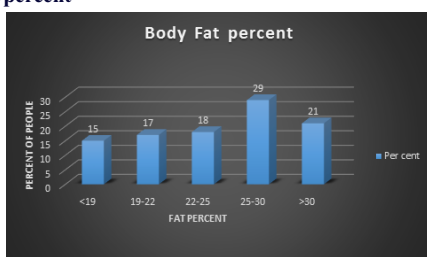
Waist Hip Ratio

Table – IV Waist Hip Ratio

Waist Hip ratio	Numbers	Percent
<0.75	80	19
0.75-0.79	126	30
0.8-0.85	82	20
>0.86	132	31

The Table shows that 31 per cent (132 subjects) of selected subjects were at higher health risk on basis of Waist Hip ratio (>0.86), 20 per cent (82 subjects) are at moderate risk (0.8 - 0.85), while 30 per cent (126 subjects) and 19 per cent (80 subjects) are with lower risk.

Body fat percent



Based on the criteria by Janes, (2015), only 17 per cent were found (19-22 per cent) to have the body fat in ideal range. Neither too low body fat nor high fat can bring about imbalance in the homeostatic mechanism.

A positive correlation existed between BMI and body fat with R Value of 0.5731. As the age increased body fat percent also increased but the correlation was very week (R=0.256).

CONCLUSION

The selected female sports women mostly had ideal reference to BMI and Body fat. Very few were over nourished while a considerable percentage of the selected subjects were malnourished (BMI < 18.5). Positive correlation was observed between BMI and Body fat; Age and Body fat. Further, the study can be extended to investigate the effects of eating habits and training regime.

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