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Analysis of Percentage of Body Fat among College Sprinters

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ABSTRACT: *The purpose of the study was to find out the analysis of percentage of body fat among college sprinters. To achieve the purpose of this study, subjects were selected from the Mangalore University Inter University athletic championship held at Mahatma Gandhi District stadium, Ajjarkad from 19th to 20th December 2015. In this athletic championship 60 sprinter, in that 20 athletes represented 100 meters run, 20 athletes represented 200 meters run and 20 athletes represented 400 meters run were selected as subjects. The selected subjects were aged between 18 to 25 years. The subjects were tested on selected criterion variable such as percentage of body fat. The percentage of body fat was assessed by the formula:*

Fat % = (495 / Body Density) – 450

Body Density = 1.1631 - 0.0632 log (Biceps + Triceps + Subscapular + Supraspinale)

One way analysis of variance was used to find out the differences between the groups. The result of the present study has revealed that there was no significant difference among the groups on sprinters.

Keywords: athletes, sprinters, percentage of body fat.

INTRODUCTION

Anthropometry refers to the measurement of the human individual. An early tool of physical anthropology, it has been used for identification, for the purposes of understanding human physical variation, in pale anthropology and in various attempts to correlate physical with racial and psychological traits. Anthropometry involves the systematic measurement of the physical properties of the human body, primarily dimensional descriptors of body size and shape. Today, anthropometry plays an important role in industrial design, clothing design, ergonomics and architecture where statistical data about the distribution of body dimensions in the population are used to optimize products. Changes in lifestyles, nutrition, and ethnic composition of populations lead to changes in the distribution of body dimensions and require regular updating of anthropometric data collections. One of the most important tasks for physical educationists is to measure different parts and components of human body. The scientific terminology given to the measurement of man is "Anthropometry" which is a word synthesized from two Greek word- 'Anthropos' means man and 'metreein' means to measure. Hence, anthropometry means the measurements of human body. A French mathematician, Barom Quetelet (Father of anthropometry) coined the term "Anthropometry" ('anthropo' means man and 'metry' means measurement). In ancient India and Egypt, the earliest anthropometric studies were undertaken to find one part of the body which would predict or become a common measurement of all other body parts. Thus, Anthropometry is the science of measuring the human body and its parts. It is used as an aid to the study of human evolution and variation. A review of literature reveals that anthropometry was the first technique of measurement used in physical education. Anthropometry was first introduced in physical education by a physician Dr. Edward Hitchcock who occupied the first chair of physical education created in USA in 1861 at

Amherst college, ohio. Thus, the history of measurement in physical education is less than, 150 years old. Dr. Edward Hitchcock measured height, weight, girths, breadths, vital capacity and some strength variables of physical education students evaluate progress and gain in health. Anthropometry is a technique to measure physical characteristics (body size, shape of specific body parts and proportion) of living beings, including men. Athropometry has been widely applied in a broad range of disciplines, such as ergonomics and health sciences. Because of its convenience, anthropometry has also been applied to understand physical characteristics of athletes in the field of sports science which targets improvement of athletic performance. Since correct application of anthropometric techniques and interpretation of the information assist management of health status in athletes and also improves their performance, it is important that support staff in the athletic fields, including sports dieticians, share the knowledge associated with anthropometry, To date, the measurement protocol proposed by the International Society for the Advancement of Kinanthropometry (ISAK) has been recognised as an international standard for anthropometric measurements in health and sports science and has been applied across many countries. It is hoped that the international measurement protocol such as that by ISAK to be recognized widely in the sports sciences also and will lead to development of human resources skilled in anthropometry. The relationship of body build or physique to physical performance and activity has been substantially investigated within given fields of interest. Over the years, the structure, size and function relationships have been well established and generally accepted by researches and practitioners in these fields. Research in this area of study has been centered on the development of morphological rating systems of assessment and classification and the application of these systems to physical performance. The skinfold measurement test is one of the oldest and still most common methods of determining a person's body composition and body fat percentage. This test estimates the percentage of body fat by measuring skinfold thickness at specific locations on the body. The thickness of these folds is a measure of the fat under the skin, also called subcutaneous adipose tissue. Skinfold thickness results rely on formulas that convert these numbers into an estimate of a person's percentage of body fat according to a person's age and gender. Skinfold measurements are generally taken at specific sites on the right side of the body. The tester pinches the skin at the location site and pulls the fold of skin away from the underlying muscle so only the skin and fat tissue are being held. Special skinfold calipers are then used to measure the skinfold thickness in millimeters. Two measurements are recorded and averaged. Sprinting is the short distance race which remained important part of competitive play of world's important civilizations. Sprinting is considered to be the oldest form of athletic competition. All the races in which runner covers entire distance at full speed are termed as sprints. Sprinting as a race category includes all distances up to 400 Meters classified as a long sprint. In specific terms, it is not easy or even possible to give a list of qualities necessary for an athlete to become a successful sprinter. However, on the basis of top class sprinters, some of these qualities can be mentioned. Generally an athlete of long height can become an outstanding sprinter easily. His weight should not be more than 170 pounds. For fast sprinting, drive power is very important irrespective of the fact that whether the which type of muscle length athlete possess, i.e., short or long. The physical peak for most humans, in most sports, is between 25 and 35 years of age; during this peak period, the well-conditioned athlete can create a confluence of muscular strength; peak cardiovascular and oxygen transport, speed and reaction time and mental capabilities (including the ability to deal with competitive pressures), all bound together by a desire to succeed. The heart, as with every human muscle, will gradually love efficiency and power over a time. The age of peak athletic performance depends upon the key functional element required of the successful competitor. In events were flexibility is paramount (for example, gymnastics and brief swimming events) the top competitors are commonly adolescents. In aerobic events, performance usually peaks in the mid-twenties, as gains from prolonged training, improved mechanical skills and competitive experience are negated by decreases in maximal oxygen intake and flexibility. Because of a longer plateauing muscle strength, performance in anaerobic events declines less steeply and in pursuits such as golf and equitation, where experience is paramount; the best competitors are aged 30-40 years. Caution is needed in drawing physiological inferences from athletic records, since the pool of potential competitor's decreases with age. Moreover, the motives of older participants often change from competitive success (winning at all costs) to social interaction and some participants in Masters events lack cumulated skills, since they did not begin competing until they reached their late thirties.

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METHODOLOGY

The purpose of the study was to analyze anthropometric characteristics and performance of college athletes and further to determine the relationship between different anthropometric parameters and performance of college Athletes (sprinters). For the purpose of this study, subjects were taken from the Mangalore University Inter Collegiate Athletic Championship held at the Mahatma District Stadium in Ajjarkad, Udupi District, Andhra Pradesh from 19th to 20th December, 2015. In this athletic championship, the investigator had taken 60 male athletes {20 (100meters sprinters), 20 (200 meters sprinters and 400 meters sprinters)} from 43 colleges on the basis of their willingness. The subjects were participated in this study based on their voluntary interest. The subjects were tested on selected criterion variable such as percentage of body fat. The percentage of body fat was assessed by the formula:

Fat % = (495 / Body Density) – 450

Body Density = 1.1631 - 0.0632 log (Biceps + Triceps + Subscapular + Supraspinale)

One way analysis of variance was used to find out the differences between the groups.

A. Test Administration – Percentage of Body Fat

Skinfold Measurement

Purpose: To assess the Body Fat of the athletes

Equipment Used: Harpenden Skinfold Caliper

Description: All the skinfold measurements were taken on right side of the body with the subject standing.

Biceps: The biceps skinfold thickness was measured as the thickness of a vertical fold raised on the anterior aspect of the arm, over the belly of the biceps muscle. The subject was asked to stand with arms hanging relaxed at the sides with the right palm directed anteriorly.

Triceps: The triceps skinfold be measured "vertically" in the midline of the posterior aspect of the arm, over the triceps muscle. This point was approximately midway between the lateral projection of the acromion process of the scapula and the inferior margin of the olecranon process of the ulna. The subject was measured standing with the arm hanging loosely and comfortably at his side.

Subscapular: The subscapular skinfold be picked up on a diagonal, inclined in fero-laterally approximately 45 degree to the horizontal plane in the natural cleavage lines of the skin. This site was just inferior to the inferior angle of the scapula. The subject stood comfortably erect, with the upper extremities relaxed at the sides of the body. To locate the site, the tester palpates the scapula and run the fingers inferiorly and laterally along its vertebral border until the inferior angle was identified. The skinfold was taken on a diagonal line coming from the vertebral border, 1 to 2 cm from the inferior angle of the scapula.

Supraspinale: The supraspinale skinfold was a diagonal skinfold following the natural cleavage lines of the skin. It was raised 5-7 cm above the anterior superior iliac spine on a line from the anterior axillary border to the spinale. This skinfold was used for somatotyping and was more anterior than the suprailium.

The scores were recorded in nearest 0.1 millimeters.

B. Analysis of Data

Formula for finding Body Density: Body Density = 1.1631 - 0.0632 log (Biceps + Triceps + Subscapular + Supraspinale)

Formula for finding Percentage of Body Fat: Fat % = (495 / Body Density) – 450

RESULTS

The data collected on percentage of body fat for 100 meters, 200 meters and 400 meters sprinters of Mangalore University inter collegiate athletes were subjected to one way analysis of variance to determine any significant differences on the dependent variable among the three categories of sprinters. The results obtained are presented in Table.

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Table

ONE WAY ANOVA FOR PERCENTAGE OF BODY FAT AMONG 100M, 200M AND 400M SPRINTERS

Variables	Group	Mean	S.D.	SS	df	MS	F ratio
Percentage Body Fat	100m	17.26	3.12	51.68	2	25.84	2.37
	200m	16.34	3.48	621.47	57	10.90	
	400m	15.83	3.29				

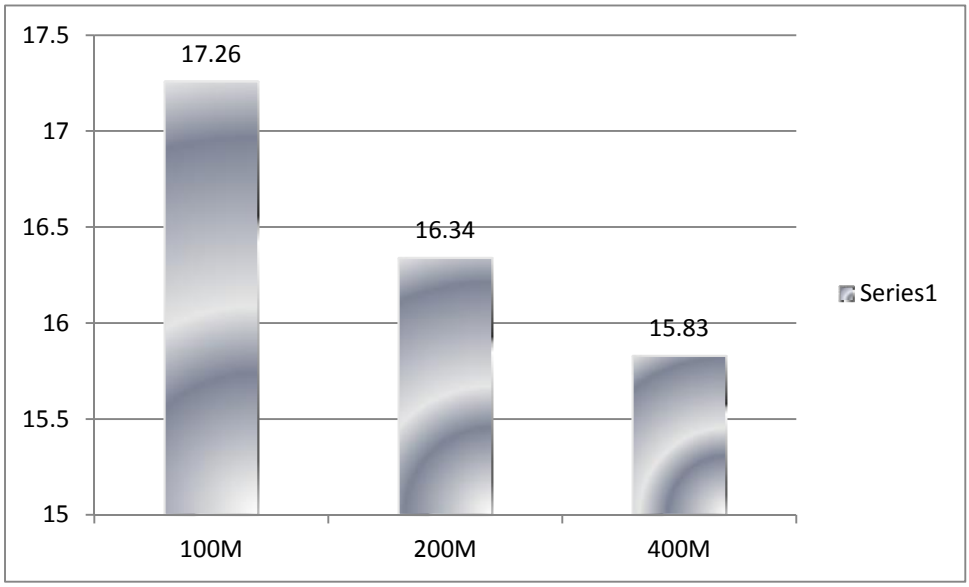
*Significant at 0.05 level with df 57 and 2 is 3.15

Table indicates the means and standard deviations on percentage of body fat among 100m, 200m and 400m sprinters as 17.26 ± 3.12, 16.34 ± 3.48 and 15.83 ± 3.29 respectively. The obtained F ratio 2.37 was less than the table value of 3.15 required for significance at .05 level of confidence for df 57 and 2. It is inferred from the results of the study that there was no significant difference in percentage of body fat among three categories of sprinters.

The mean values of Group I, Group II, Group III and Group IV on agility are graphically represented in the figure.

Figure

MEAN VALUES OF 100M, 200M AND 400M SPRINTERS



DISCUSSION/CONCLUSION

The result of the study indicates that all the groups have no significant difference between 100m, 200m and 400m sprinters. The present study also revealed that the above finding of the study was supported by Adhikari Anup and others, Rousanoglou, Noutsos and Bavios and Masaharu and Kagawa.

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