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Investigation of body composition variables among different topography university athletes

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Abstract

The present study aims to investigate the body composition of different topography Indian university athletes. To achieve the purpose of the study 160 male athletes from four zones of India such as South, North, East and West consist of 10 athletes in each category like sprinters, middle distance runners, jumpers and throwers from different topography namely plain, hills and coastal athletes selected at random. The muscle mass and fat mass were selected as body composition variables and the selected variables are tested by using skin fold calliper. The collected data on dependent variables statistically tested by using 4X4 factorial design to find the main and interaction effects. The scheffs post hoc test used to find the paired mean difference, when the main and interaction effects found significant. The level of significance was fixed at 0.05. The results on muscle mass and fat mass on factor A (Different Athletes) and factor B (Different Zones) found significant. The interaction effect on selected dependent variables also shows significant. The study concluded that the muscle mass and fat mass similar among different category athletes whereas the same was differ at topography. The fat mass varies on different category athletes and topography.

Keywords: Athletes, topography, muscle mass and fat mass

Introduction

The findings related with the effectiveness of walking, jogging, cycling and calisthenics in modifying the body composition on young and middle aged adults, have special meaning to physical educators, students of physical education and others involved in dealing with exercise programs. The above statements explains the important role of exercise that can play in effective weight control the evaluation of body composition permits quantification of the major structural components of the body such as muscle, bone and fat (Dunford, 2006) [3].

There are various physical activities and exercises which lead to modification of the body composition of the individual, who participates in it and it is substantiate by the research findings repeatedly. Understanding of the topography in relation to body composition of an individual has a great importance to physical educators exercise experts, and other professionals involved with fitness industry in carrying out and making appropriate programmes for effective weight control.

The description with regard to walking, jogging and cycling programmes of different combinations leading to modify the body composition of young and middle- aged adults is given below. The body composition is concerned in part with the obesity of the individual, measuring this aspect of body composition, the total body it is divided into two components namely, lean body weight and fat body weight. Lean body weight includes, muscle, bone and vital organs (Chumlea, 2005) [2].

The underlying assumption is that total body weight equals lean body weight plus fat body weight The higher the percentage of fat body weight, the higher the degree of obesity The skin fold measures are considered to be a superior indicator of obesity than is over weight as determined from weight tables Skin fold thickness gives an estimation of total body fat in as much as fifty percent of the total fat lies immediately under the skin Body fat generally has been considered to be a liability in the performance of motor activities (Going, 2006) [5]. However very few objective studies have been done showing the direct relationship between body fat and the performance of various motor activities. Direct evidence of this nature would be very useful in demonstrating the fact of both athletes an non-athletes that excess of body fat

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affects deliriously on Motor performance. Indeed, muscle mass and fat mass was the best analytical variables to find the difference among various topography Indian university athletes.

Methodology

To achieve the purpose of the study 160 male athletes from four zones of India such as South, North, East and West zones consist of 10 athletes in each category like sprinters, middle distance runners, jumpers and throwers from different topography namely plain, hills and coastal athletes selected at random. The muscle mass and fat mass were selected as body composition variables and the selected variables are tested by

using skin fold calliper. The unit of measurement of muscle mass and fat mass in kilograms. The collected data on dependent variables statistically tested by using 4X4 factorial design to find the main and interaction effects. The Factor A denotes the category of the athletes such as sprinters, middle distance runners, jumpers and throwers and the factor B denotes the different topography such as South, North, East and West zone of Indian Universities. The scheffs post hoc test was used to find the paired mean difference, when the main and interaction effects found significant. The level of significance was fixed at 0.05.

Results

Table 1: Mean values of Factor A and Factor B on Fat Mass and Muscle Mass

Fat Mass				Muscle Mass			
Factor A	Mean	Factor B	Mean	Factor A	Mean	Factor B	Mean
Sprinters	14.08	North	14.08	Sprinters	34.4	North	33.95
Jumpers	14.03	South	13.70	Jumpers	32.33	South	32.60
Throwers	13.33	East	13.38	Throwers	34.38	East	31.10
Mid. Dis. Runners	11.78	West	12.05	Mid. Dis. Runners	26.75	West	30.43

Table 2: The main and interaction effects of factor a and factor b on fat mass

Source of Variance	Sum of Squire	Degrees of Freedom	Mean Square	F. Ratio
Factor – A	138.10	3	46.03	44.67*
Factor – B	93.15	3	31.05	30.13*
AXB	85.95	9	9.55	9.27*
Error	148.40	144	1.03	
Total	465.60	159		

*Significance at 0.05.

Table III: The Main and Interaction Effects of Factor A and Factor B on Muscle Mass

Source of Variance	Sum of Squire	Degrees of Freedom	Mean Square	F. Ratio
Factor – A	264.93	3	88.31	95.47*
Factor – B	64.13	3	21.38	23.11*
AXB	42.13	9	4.68	5.06*
Error	133.20	144	0.93	
Total	504.38	159		

*Significance at 0.05.

The results on body composition among different topography athletes shows that the fat mass have significant difference among sprinters, middle distance runners, jumpers and throwers whereas there was no significant difference among different topography. The paired mean differences and the simple effect interpretation on fat mass show that the sprinters and jumpers have no significant difference. In view of topography the north zone and south zone, south zone and east zone paired mean have in-significant difference on fat mass.

The results on muscle mass on factor A and factor B shows that there was a significant difference found on main and interaction effects. The paired mean differences and the simple effect interpretation on breath holding time on paired mean of athletes and topography found significant. Among athletes, the sprinters and throwers have greater muscle mass when compare with jumpers and middle distance runners. The comparison on muscle mass among different topography also found significant in favour of north zone athletes when compare with south, east and west zone athletes.

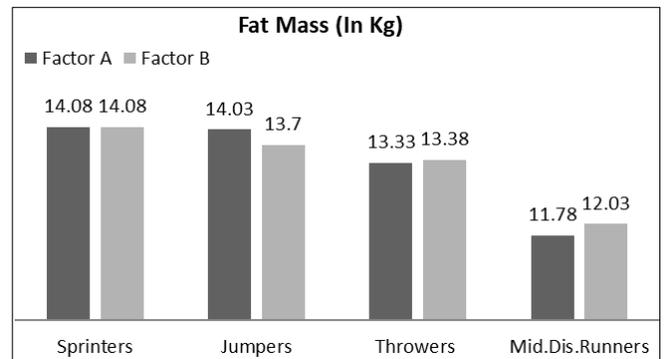


Fig 1: The Bar Diagram of Mean Values of VO₂MAX of Factor A and Factor B

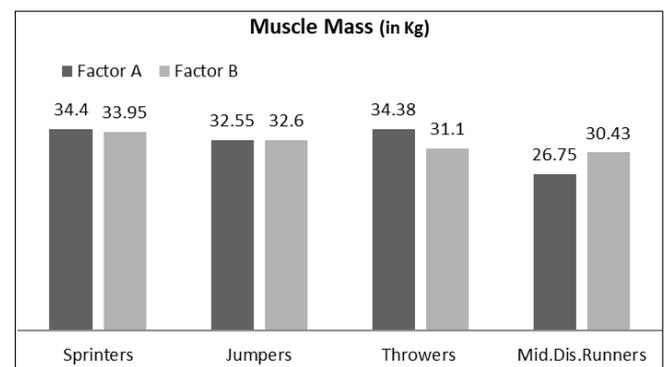


Fig 2: The Bar Diagram of Mean Values of Breath Holding Time of Factor A and Factor B

Discussion

The results on body composition such as fat mass and muscle mass were in line with previous finding and it shows that the athletes are capable of remarkable athletic and body composition and functional performance, thereby Body fat percentage of athletes varies depending on the sex of the athlete and the sport. However, optimal body fat percentages for an individual athlete may be much higher than these minimums and should be determined on an individual basis (Heymsfield, 2005) [6]. Body composition analysis should not be used as a criterion for selection of athletes for athletic teams. Weight management interventions should be

thoughtfully designed to avoid detrimental outcomes with specific regard for performance, as well as body composition (Siri, 1995) ^[8].

Sport performance is highly dependent on the health- and skill-related components of fitness and in-addition to the athlete's technique and level of competency in sport-specific motor skills (Going, 2006) ^[5]. All fitness components depend on body composition to some extent. An increase in lean body mass contributes to strength and power development. Strength and power are related to muscle size (Brozek, 1999) ^[1]. Thus, an increase in lean body mass enables the athlete to generate more force in a specific period of time. Reduced nonessential body fat contributes to muscular and cardio respiratory endurance, speed, and agility development. Additional weight provides greater resistance to athletic motion thereby forcing the athlete to increase the muscle force of contraction per given workload (Marfell-Jones, 2006) ^[7]. The additional body fat can limit endurance, balance, coordination, and movement capacity. Joint range of motion can be negatively affected by excessive body mass and fat as well, and mass can form a physical barrier to joint movement in a complete range of motion. Thus, athletes competing in sports that require high levels of flexibility benefit from having low levels of body fat (Chumlea, 2005) ^[2]. The present study also have similarity and contrast on the selected body composition among athletes in the different topography of Indian University Athletes.

Conclusion

Based on the results of the study concluded that the sprinters have greater fat mass when compare with middle distance runners, Jumpers and Throwers. There was no significant difference sprinter and jumpers on fat mass. There was a significant difference found among athletes and zones on muscle mass. The north zone athletes have greater muscle mass when compare with east, west and south zone athletes on muscle mass.

Recommendation

From the study outcome it will recommended that the body composition among athletes in the different topography of India have greater impact and need more attention to improve performance to attain higher-level achievements.

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