

# Comparison of Body composition among different Level of Students

Bhavani Ahilan

Sr.Lecturer, Sports Science Unit, University of Jaffna, SRILANKA

## Abstract

Body composition is defined as the proportion of fat, muscle, and bone in the body. It is usually given as a ratio of lean mass to fatty mass. Body composition will normally be expressed as either a percentage of fat or as a percentage of lean body mass. The study was designed to compare the body composition of different level of students (School, College, and University). To achieve the purpose of the study 1500 subjects were selected in this study (School-500, College-500, and University-500). The age of the subjects ranged for school students between 14-17 years, College 18-21 years, and University 22-25 years. In this study one of health related physical fitness variable namely body composition (Percent Body Fat) is selected as criterion variable. Selected variable is tested by following standardized test of sum of skin fold site. One way analysis of variance was applied to find out whether there was any significant difference on body composition among different level of Students. The level of significance was fixed at 0.05, if the obtained F ratio is significant, Scheffe's post hoc test was applied to find out the means difference. The results of the study show that there was a significant difference among the students on body composition. Further it reveals that, between the different levels of students body composition shows significant difference. It is concluded that school boys were having significantly more per cent body fat than the College and University Students. Prior to adolescence per cent body fat was increases because of to meet out the bio-logical needs.

**Key Words:** - Health related physical fitness, Body Composition, Percent Body Fat, Skin Fold thickness,

## INTRODUCTION

Growth and maturation are biologic processes, while development is a behavioral process. These processes interact to influence the individual's self-esteem, body image, and perceived competence.

An excess of fat in the body is unhealthy because, it requires more energy for movement and may reflect a diet high in saturated fat. Furthermore, it is believed that obesity contributes to degenerative diseases such as high blood pressure and atherosclerosis. Obesity can also in psychological maladjustments, and it also may shorten life. A balance between calorie intake and calorie expenditure is necessary to maintain proper body fat content. Exercise is effective as one way to control body fat. Increase in fat deposition is the result of increased lipoprotein lipase activity in these areas. This enzyme is considered the gatekeeper for storing fat in adipose tissue. Lipoprotein lipase is produced in the fat cells (adipocytes) but is bound to the walls of the capillaries where it exerts its influence on the chylomicrons, which are the major transporters of triglycerides in the blood. When lipoprotein lipase activity in any area of the body is high, chylomicrons are trapped and their triglycerides are hydrolyzed and transported in to the adipocytes in that area for storage.

Health practitioners universally agree that too much body fat is a serious health risk. Problems such as hypertension, elevated blood lipids (fats and cholesterol), diabetes mellitus,

cardiovascular disease, respiratory dysfunction, gall bladder disease, and some joint diseases are all related to obesity. Also, some research suggests that excessive accumulation of fat at specific body sites may be an important health risk factor (Wilmore, Buskirk, DiGirolamo, & Lohman, 1986). For instance, it appears that extra fat around the abdomen and waist is associated with higher risk of diabetes, heart disease, and hyperlipidemia. Individuals who accumulate a lot of fat around the waist (apple-shaped) are worse off than those who tend to accumulate fat in the thighs and buttocks (pear-shaped). The apple-shaped pattern of fat deposition is more commonly seen in men; whereas women tend to be pear-shaped.

**The American College of Sports Medicine (ACSM)** has defined health related physical fitness as “a state characterized by an ability to perform daily activities with vigor and a demonstration of traits and capacities that are associated with low risk of premature development of the hypo kinetic diseases (i.e, those associated with physical inactivity)” (**Nieman 1998**). Health related physical fitness is concerned with the development of those qualities that offer protection against disease and frequently are associated with physical activity (**Bucher, 1987**). Health-related physical fitness is typically defined as including cardio respiratory endurance, body composition, muscular strength and endurance, and flexibility (**American College of Sports Medicine 1995**).

**Body Composition:** Body composition refers to the relative percentage of muscle, fat, bone and other tissue of which the body is composed (**Corbin, 1994**).

The following variables were also included.

**Fat Free Mass:** Fat free mass refers to the weight of the nonfat tissues of the body (**Howly, 1997**).

**Percent Body Fat:** Percentage of the total weight composed of fat tissue, calculated by dividing fat mass by total weight (**Howly, 1997**).

**Lean Body Mass:** Lean body mass refers to weight of fat –free tissues and essential, life-sustaining lipids (**Howly, 1997**).

**Body Mass Index:** Measure of the relationship between height and weight; calculated by dividing the weight in kilogram by height in meters squared (**Howly, 1997**).

#### **AIM OF THE STUDY**

The purpose of this study was to compare the body composition (percent body fat) among different level of students.

#### **METHOD**

**Sampling Technique:** -The sampling procedure used in this study is large distribution of random population. **Selection of Subjects:** -The study was designed to compare the body composition (Percent body fat) of different level of Students (School, College, and University). To achieve the purpose of the study 1500 subjects were selected in this study (School-500, College-500, and University-500). The age of the subjects ranged for school students between 14-17 years, college 18-21 years, and University 22-25 years. **Selection of variable:** In this study one of health related physical fitness variable namely body composition (Percent Body Fat) is selected as criterion variable. Selected variable is tested by standardized test of sum of three skin fold site with Skin fold Caliper. **Statistical technique:** -One way analysis of variance was applied to find out whether there was any significant difference on body composition (percent body fat) among

different level of Students. The level of significance was fixed at 0.05, if the obtained F ratio is significant, Scheffe’s post hoc test was applied to find out the means difference.

### RESULT AND DISCUSSION

**TABLE I, ANALYSIS OF VARIANCE ON BODY COMPOSITION  
(PERCENT BODY FAT) AMONG DIFFERENT LEVEL OF STUDENTS**

Source of variation	Degree of freedom	Sum of Scores	Mean sum of scores	F ratio
<b>Between group</b>	<b>2</b>	<b>543.27</b>	<b>234.23</b>	<b>43.22*</b>
<b>Within group</b>	<b>1447</b>	<b>18305.64</b>	<b>1.25</b>	

\*Significant at 0.05 level (Table value 2.99)

**TABLE II, SCHEFFE’S POST HOC TEST FOR SIGNIFICANT DIFFERENCE AMONG  
DIFFERENT LEVEL OF STUDENTS ON BODY COMPOSITION (PERCENT BODY  
FAT).**

	School	College	University	Mean difference	CI
<b>Means</b>	<b>2.18</b>	<b>2.16</b>		<b>0.02</b>	<b>0.0011</b>
	<b>2.18</b>		<b>1.97</b>	<b>0.21</b>	
		<b>2.16</b>	<b>1.97</b>	<b>0.29</b>	

The result of the study shows that there was a significant difference among the students on body composition. Further it reveals that, between the different levels of students body composition shows significant difference.

### DISCUSSION

The result of the investigation shows that school boys were having significantly more per cent body fat than the College and University Students. Prior to adolescence per cent body fat was increases because of to meet out the bio-logical needs.

This health related physical fitness component is selected to the make-up of the body in terms of muscle, bone, fat and other elements. In respect to physical fitness, it particularly refers to the percentage of fat in the body as it relates to the fat force content. Skinfold thickness provides regional information on subcutaneous fat accumulation at specific body sites. Advances

in technology have provided noninvasive methods for estimating bone mineral, skeletal muscle and adipose tissue (**Garrett, 2000**).

Body fat plays a key role in energy storage and metabolic homeostasis along with thermoregulation. The range of total body fat associated with optimum health is 8-24 per cent in males and 21-35 per cent in females (**Gallagher, et al 2000 , Laquatra, 2004**). However, levels may be in lower range for active individuals and elite athletes (**Laquatra, 2004**).

An excess of fat in the body is unhealthy because, it requires more energy for movement and may reflect a diet high in saturated fat. Furthermore, it is believed that obesity contributes to degenerative diseases such as high blood pressure and atherosclerosis. Obesity can also in psychological maladjustments, and it also may shorten life. A balance between calorie intake and calorie expenditure is necessary to maintain proper body fat content. Exercise is effective as one way to control body fat.

Increase in fat deposition is the result of increased lipoprotein lipase activity in these areas. This enzyme is considered the gatekeeper for storing fat in adipose tissue. Lipoprotein lipase is produced in the fat cells (adipocytes) but is bound to the walls of the capillaries where it exerts its influence on the chylomicrons, which are the major transporters of triglycerides in the blood. When lipoprotein lipase activity in any area of the body is high, chylomicrons are trapped and their triglycerides are hydrolyzed and transported in to the adipocytes in that area for storage.

The reduction in lean body mass parallels the reductions in plasma proteins, particularly the rapid-turnover proteins that have been used to assess protein nutritional status. Retinol binding protein and prealbumin have been observed to decrease after 7 and 12 weeks, respectively, of the competitive season in high-school wrestlers who reduced their body weight by 6.6% repeatedly over the season (**Horswill and Parks, 1990**). These observations were confirmed in another study that reported a 22% reduction in prealbumin in high –school wrestlers who had repeatedly reduced body weight by 7.4% over the competitive season and were measured at a time when their body weight was 3.8% lower than in the early season . These findings support that the protein nutritional status of these athletes is diminished if not compromised with weight reduction, even when the average protein meets the RDA during the period of weight loss (**Roemmich & Sinning, 1996**).

### **Implication**

1. Body composition of the school boys (pre-adolescent) would be reduced by encouraging them to participate in regular physical education classes.
2. Scientifically designed exercises will be introduced to these people and regular home based or regional wise physical fitness program will be organized.
3. Physical education will be introduced as one of the curriculum subject in all levels of education.

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