



**JOURNAL  
OF  
PHYSICAL EDUCATION  
AND  
SPORTS SCIENCES**

J  
O  
P  
E  
S  
S



A Publication of  
**MARUTHI  
COLLEGE OF  
PHYSICAL EDUCATION**

# COMPARISON OF THE BODY COMPOSITION AMONG SCHOOL BOYS AT THE AGE OF THIRTEEN TO FIFTEEN YEARS OF TAMIL NADU STATE

Mrs. Bhavani Ahilan,\* and Dr. V. Gopinath\*\* Ph.D. Scholar\*, Reader\*\*

Dept of Physical Education and Sports Sciences, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu.

## ABSTRACT

The aim of the study was to find out the comparison of the body composition among school boys at the age of thirteen to fifteen years of Tamil Nadu state. The total number of schools where classes of VII, VIII, IX and X standards are available in selected 20 districts. From each district 5 schools were selected at random, likewise 100 schools were selected at random in the whole state. Fifty subjects were selected from all 100 schools at random from the specified age group of 13, 14, and 15 years respectively. A total of 5000 student boys were selected in each age group. The skinfold fat sites (triceps and Sub- scapular) have been chosen for this study. The obtained data were statistically analyzed by one way analysis of variance, to find out whether there was any significant difference on body composition among the different age groups. The level of significance was fixed as 0.05. If the obtained 'F' ratio is significant, Scheffe's post hoc test was applied. The findings of this study showed that the 13 years boys were having significantly more fatmass than 14 years and 15 years boys. However there is no significant difference found between 14 years and 15 years boys on fatmass.

Key words-Body composition, Skinfold fat

## INTRODUCTION

In 1918, the educational policies commission stated six objectives of education. Health, command of fundamental processes, worthy home membership, vacation citizenship, worthy use of leisure time and ethical character. In 1938 these were consolidated to self realization, human relationship, economic efficiency and civil responsibility. Through both statements, educational leaders showed a desire to develop the child as a whole. Physical education is a process through which an individual obtains optimal physical mental and social skills and fitness through physical activity. Physical education programme provides each student with an opportunity to assess his fitness, and develop the skill and understanding that will enable him to enjoy a productive stay in school/college. Fitness has become a national concern. Basically, fitness means being in good physical condition and being able to function at one's best level.<sup>17</sup> In schools there is compulsory physical activity programme for all boys and girls. Growth, development and maturation are terms that can be used to describe changes starting at conception and continuing through adulthood that occur in the body growth refers to an increase in the size of the body or any of its parts. Development refers to differentiation along specialized lines of functions, so it reflects the functional changes that occur with growth. Finally maturation refers to the process of taking on the adult form and becoming fully function being considered.

At birth, 10% to 12% of total body weight is fat. At physical maturity, the fat content reaches approximately 15% of total body weight for males and approximately 25% for females. This gender difference like that

seen in muscle growth is primarily due to hormonal differences. The trend of body fat increasing with age illustrates the relationship between subcutaneous fat (Measured at the triceps and subscapular sites) and age for both males and females. Until age 12 to 14 around puberty; males and females do not differ substantially in height, weight, girth, bone width and skin fold thickness.18

## Body Composition

This 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 non invasive methods for estimating bone mineral, skeletal muscle and adipose tissue.

The following skinfolds are commonly used in growth studies: triceps biceps, and medial calf skinfolds on the extremities, and the subscapular, supraillia, and abdominal skinfold on the trunk. Among these, the triceps and sub-scapular skinfolds have been used most often in growth studies. The sum of skinfolds is a proxy for overall subcutaneous fat, while the ratio of trunk to extremity skinfolds indicates the relative distribution of subcutaneous fat.11

## STATEMENT OF THE PROBLEM

The purpose of the study is to compare the body composition among school boys at the age of thirteen to fifteen years of Tamil Nadu state.

## METHODOLOGY

**Sampling Technique:** - The sampling procedures should be based upon large distribution of random population. **Selection of Subjects:** - The study was designed to compare the body composition of different age group male school going students of Tamil Nadu. The total numbers of schools where classes of VII, VIII, IX and X standards are available in selected 20 districts were listed. From each district 5 schools were selected at random, likewise 100 schools were selected at random in the whole state. Fifty subjects were selected from all 100 schools at random from the specified age group of 13, 14, and 15 years respectively. A total of 5000 student were selected in each age group.

In order to assure reasonable homogeneity as related to chronological age. The randomness of the samples is supported by the fact that all the boys who met requirements of being within two months of their birthdays were included during each test period.5

On the date of test, the subjects were within two months of their birthday. Thus, the age between 13 years  $\pm 2$  month 14 years  $\pm 2$  month and 15 years  $\pm 2$  months were considered as 13,14 and 15 years group respectively. **Selection of variable:** - Physical fitness is required for all age group. At the school level, obesity is one of the major problems among the pupil. So researcher is interested to compare the body composition (sum of skinfold fat) of school boys from thirteen to fifteen years of age. The purpose of the sum of the skinfold fat is to evaluate the level of fatness of the total body fat. **Testing procedure:-**

Two skinfold fat sites (triceps and sub scapular) have been chosen for this test because they are easily measured and are highly correlated with total body fat. The triceps skinfold is measured over the triceps muscle of the right arm half way between the elbow and the acromion process of the scapula with the skinfold parallel to the longitudinal axis of the upper arm. The sub scapular site is 1 cm below the inferior angle of the scapula in line with the natural cleavage lines of the skin. The skinfold measurement is registered on the dial of the caliper. Each measurement should be taken three consecutive times with the recorded score being the median (middle) of the three scores. **Statistical technique employed for analysis of data:** One way analysis of variance was applied to find out whether there was any significant difference on body composition among the different age groups. The level of significance was fixed at 0.05, if the obtained F ratio is significant; Scheffe's post hoc test was applied.

## RESULT OF THE STUDY

**TABLE I**  
**ANALYSIS OF VARIANCE ON SUM OF SKIN FOLDS AMONG THE THREE DIFFERENT GROUPS**

Source of variation	Degree of freedom	Sum of scores	Mean sum of scores	F ratio
Between group	2	1858.73	929.36	11.52*
With in group	14997	1209679.85	80.66	

\*Significant at 0.05 level (Table value 2.99)

Table I displays F-ratio 11.52 to be significant at 0.05 level of confidence, since the tabulated F-ratio was only 2.99. This clearly indicates that significant differences among the three age group of school boys on sum of skin folds.

**TABLE II**  
**SCHEFFE'S POST HOC TEST FOR SIGNIFICANT DIFFERENCE AMONG MEANS OF DIFFERENT AGE GROUPS ON SUM OF SKIN FOLDS**

	13 years	14 years	15 years	Mean difference	CI
Means	17.20	16.57		0.63*	0.39
	17.20		16.45	0.75*	
		16.57	16.45	0.12	

Table II relating to the post hoc test for significance, indicates significant differences between the age group of 13 and 14 years on the sum of skin folds as the mean difference of 0.63 is much more than the critical difference of 0.39. Further, significant difference is also found between the age group of 13 and 15 years as the mean difference of 0.75 is much more than the critical difference. On the other hand insignificant difference between means was found between age group of 14 and 15 years as the mean difference of 0.12 was less than the critical difference.

## DISCUSSION

The results of the study investigation show that, 13 years boys were having significantly more fat mass than 14 years and 15 years boys. Prior to adolescence fat-free mass was increases. Growth, maturation, and development are three in teracting tasks that dominate approximately the first two decades of life. As children grow, they become taller and heavier; they increase in lean and fat tissues, their organs increase in size, and so on. Different parts of the body grow at different rates and different time, resulting in changes in body proportions.<sup>15</sup>

An unvarnished tale states, "Most people become obese because of physical inactivity".<sup>1</sup> such is true for teenagers as well as adults. A study in California revealed 14 percent of high school seniors (boys and girls) were obese. The need for physical education in elementary, junior and senior high schools can be substantiated on this verity alone.

Obesity is related to a number of diseases including diabetes, coronary heart diseases, psychological disturbances, kidney disease, hypertension, stroke, liver ailments, and mechanical difficulties (particularly, back and foot problems). As a consequence, life expectancy is significantly reduced among the obese population. Excessive obesity may result in as high as 100 percent increase in mortality over that which might be expected.

Obesity often begins early in childhood and, if this occurs, the chances for adults obesity are there times greater compared to children of normal body weight. Simply stated, child generally does not "grow out of" an obesity problem.<sup>4, 8</sup> Excessive fatness also develops slowly during the adult years. Middle - aged men and women invariably weight more than their college-aged counterparts of the same height.

Adipocytes (fat cells) probably increase in number up to early adolescence. Lack of exercise and overeating may stimulate their formation. Obesity then is a combination of the number of adipocytes and their lipid content.<sup>3</sup> Obese people have a larger number of fat cells which contain a greater volume of lipids than their lean contemporaries. As a consequence, physical educators should seriously consider that.

In a study <sup>7</sup> adipose cellularity was established for 34 infants and children who ranged in age from a few days to age 13. Fat cell size in newborn infants and children up to the age of 1 year who about one fourth the size of adult fat cells. fat cell size tripled during the first 6 years with little further increase in size to age 13. Although several studies have determined adipose cellularity in childhood and adolescence, <sup>15, 16</sup> there is still a scarcity of data on changes in adipose cell size during this growth period. We may reasonably assume, however, that cell size increases during this period because cell size in adulthood is significantly larger than cell size at age 13 or in late adolescence. Beyond age 1, cell number increases gradually to the age of about 10 - Like cell, size, there is significant cell hyperplasia during the growth spurt in adolescence until adulthood; thereafter, there is generally little further increase in cell number.

However there was no significant difference was found between 14 years and 15 years boys on fatmass.

## IMPLICATION

Prevention of obesity results in greater success than treatment. This is particularly true during preadolescence. Evidence suggests that over eating during this period may cause adipocyte hyperplasia (an increase in the number of fat cells), thus planting the garden in which obesity may grow and bloom. Exercise keeps total body fat content low and may reduce the rate at which adipose cells accumulate. If a given food intake does not allow weight reduction, then physical activity must be increased for a negative energy balance to occur. Activities must be selected requiring considerable energy expenditure but at the same time within the physical and skill capabilities of individual. Living habits are developed early, and so the sooner control programs are initiated, the better.

### Note: Districts

(Tuticorin, Virudhu Nagar, Madurai, Sivaganga, Dindigal, Pudukkottai, Tirunelveli, Tiruchirappalli, Thanjavur, Perambalur, Cuddalore, Villupuram, Tirivannamalai, Vellore, Namakkal, Salem, Kanchipuram, Karur, Dharmapuri, Tiruvallur)

### REFERENCE:

1. Abraham, S., et al.: Relationship of childhood weight status to morbidity in adults. Public Health Rep., 86:273, 1971.
2. Bembem D A. Walker L, Bembem MG, Fetters N. Influence of preseason training on serum testosterone (T) levels in NCAAI Wrestlers (Abstract). Med Sci Sports exerc 1997:29:s218
3. Brook, C.G.D., and Lloyd, J.K.: Adipose cell size and glucose tolerance in obese children and effects of diet. Arch. Dis. child. 48:301, 1973.
4. Charney, H.C., et al.: Childhood antecedents of adult obesity. N. Engl. J. Med., 95:6, 1976.
5. Clarke, Harrison H. Physical and Motor tests in the Medford Boys Growth Study, Englewood Cliffs, New Jersey: prentice hall Inc., 1971:4.
6. Garrett E. Williams & Kirkendall T. Donald. Exercise and Sport Science, Lippincott Williams & Wilkins-a Wolters kluwer company, U.S.A., 2000:330.
7. Hagar, A., et al.: Adipose tissue cellularity in obese school girls before and after dietary treatment. Am. J. clin. Nutr., 31:68, 1978.

