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# Body Fat Distribution among School Children at Areas of High Altitude and Low Altitude

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**Abstract**

Physical education has devised organized games and sports in a systematic way within the frame work of educational institutions. Every student or child who participates in games and sports will know a lot about the human movement. Morphology measurements are also essential for allotting physical activities to individual students according to their fitness. For this study B.M.I and Body Fat Distribution among School Children at Areas of High Altitude and Low Altitude was taken, The study was limited in following aspects and these limitations were taken into consideration while interpreting the results. The study was limited to high school students, and The morphological measurements were done with the limited facilities available. High altitude region was delimited to Madikeri and low altitude region was delimited to Mangalore. Morphological variables, Weight, Height, Skin fold, Biceps, Triceps, Sub scapular, Super iliac, Lateral abdomen and Test Batteries. The study is based on BMI and Body Fat distribution among school children at areas of high altitude and Low altitude. The subjects have been selected for the concern study are school children's. Total of 100 students were selected out of 50 were from high altitude and 50 from low altitude. BMI was measured through skin fold caliper. The BMI values of students residing in low altitude region I more than those residing at high altitude. The difference is not significant at .05 level of significance as to T value to be surpassed is 2.02.The skin fold measurements of low altitude students is high in student at low altitude than in student at high altitude. The difference is not significant at .05 level of significance.

## INTRODUCTION

Movement allows every individual opportunity to explore their potential in the movement activities. Physical movements are a biological necessity. Physical education has devised organized games and sports in a systematic way within the frame work of educational institutions. Every student or child who participates in games and sports will know a lot about the human movement. Morphology measurements are also essential for allotting physical activities to individual students according to their fitness. Variation in the position of the muscular attachments, the structure of the joints, length of body levels weight and other morphological or structural variations affect the performance in physical activity.

**Statement of the problem:**The purpose of the study was to find out ***"B.M.I and Body Fat Distribution among School Children at Areas of High Altitude and Low Altitude".***

**The hypotheses of study:**

1. It was hypothesized that high altitude students were free from obesity.
2. It was hypothesized that low altitude students have more body mass and fat compared to high altitude students.

**The limitations of study:**

The study was limited in following aspects and these limitations were taken into consideration while interpreting the results.

1) The study was limited to high school students.
2) The morphological measurements were done with the limited facilities available.
3) The activity and the nutritional aspects were not considered and mentioned which could have affected certain measurements.

**Delimitation:**

1) The study was restricted to low altitude and high altitude student of high school.
2) High altitude region was delimited to Madikeri and low altitude region was delimited to Mangalore in the present study.
3) The study was further delimited to skin fold variables and BMI.

**Definitions of the term:**

1. **Morphological variables:** Morphological variables are dimension of the structure of human body taken at specific sites to give skin folds measurements. .
2. **Weight:** Total weight of the body or subject and measured in kilograms (kgs).
3. **Height:** Length of the subject which is measured usually in centimenters (cms).
4. **Skin fold:** The tester grasps the skin fold between thumb and index finger and attaches the jaws of the calipers about one centimeter from the thumb and finger. The measurements are in millimeters.
5. **Biceps:** Located on the ventral side of the upper arm (over the biceps), halfway between acromion and olecranon process. The crest of the skin fold is parallel to the long axis of the upper arm.
6. **Triceps:** Located on the dorsum of the right upper arm (over the tricips), at the marked level half way between the actomial process of the scapula and olecranon process (elbow). While measuring this skin fold, the arms should hang freely. The crest of the skin fold is parallel to the long axis of the upper arm.
7. **Sub scapular:** Located about 1 cm below the lower angle of the right scapula with the subject standing in relaxed position. The crest of the skin fold is medially upward and laterally downward at about 45°.
8. **Super iliac:** It is the measurement of the vertical fold on the crest of the Ilium at the axially line.
9. **Lateral abdomen:** The skin fold is taken on the side of the abdomen at the mid axially line at the level of the umbilicus. The fold is lifted parallel to the long axis of the body.
10. **Test Batteries:** The test find out obesity and body fat distribution was conducted in the class room stadium with adequate facilities before conducting test. The subjects were made to assemble at the testing venue and the purpose of the test was explained to them.
11. **1) Measurement of Height:**

The subject was asked to stand on stadio meter without shoes and with heels together, buttocks and back touching the vertical beam and the head oriented in front on horizontal plans. The subject was asked to take a deep breath and stand still while taking the measurement. A stiff wooden foot scale was held horizontally on the land mark vertex

slightly pressing the subjects head and touching the wall mounted studio meter at a right angle. The subject was asked to step out by lowering the head and the reading indicated by the lower end of the wooden scale on studio meter, gradations were recorded to the nearest centimeter.

**2) Measurement of Body weight:** The body weight of each subject was taken on a portable electronic machine or weighing machine. The subject was asked to wear only under clothing and bear footed the accuracy of the weighing machine was checked at intervals with standard weight before taking the measurement, care, was taken by the investigator that weighing machine stood at zero when there was no weight on it the measurement of the body weight was recorded to nearest half a kilogram.

**12. Body Fat and Body Mass Index:**

Body weight adjusted to height squared, referred to as body mass index (BMI; in $kg.m^{-2}$), in excess of 25 and 30 indicates overweight and obesity, respectively. A lower healthy BMI limit of 18.5 has also been recognized. The assumption underlying BMI guidelines lies in its supposed close association with body fatness and consequent morbidity and mortality. Several formulae predict percentage body fat (% BF) from BMI, which may provide a better indication of morbidity and mortality than BMI alone.

**Methodology:**

The study is based on BMI and Body Fat distribution among school children at areas of high altitude and Low altitude. The subjects have been selected for the concern study are school children's. Total of 100 students were selected out of 50 were from high altitude and 50 from low altitude. BMI was measured through skin fold caliper .

**Analysis:**

The statistical analysis of the data all selected morphological measurements, variables among low altitude and high altitude students has been selected for the study. The data pertaining to skinfold measurement are the main variables.

To compare the data selected morphological measurements of boys at low altitude and high altitude have been presented below.

**Table-1**

**The BMI values of low altitude and high altitude students**

| Stasticial value | Low altitude | High altitude |
|---|---|---|
| Mean | 16.97 | 61.71 |
| Standard deviation | 1.88 | 1.60 |
| Standard error | 1.01730 | |
| Mean difference | 1.043 | |
| T- test value | 1.0258 | |

**Table No: 2**

**The skin fold value of low altitude and high altitude students**

| Stasticial value | Low altitude | High altitude |
|---|---|---|
| Mean | 0.62 | 0.55 |
| Standard deviation | 0.0467 | 0.0624 |
| Standard error | 0.0337 | |
| Mean difference | 0.0346 | |

| | | |
|---|---|---|
| T- test value | 1.0286 | |

The BMI values of students residing in low altitude region I more than those residing at high altitude. The difference is not significant at .05 level of significance as to T value to be surpassed is 2.02.

The skin fold measurements of low altitude students is high in student at low altitude than in student at high altitude. The difference is not significant at .05 level of significance.

**CONCLUSION:**

The researcher has made an attempt to investigate the physical status of students at low altitude and high altitude i.e. Body Mass Index and skin fold values. BMI and skin fold values are important indication of obesity and overweight and in a significant factor determining health in the youth of today. Though physiological difference between student at low altitude and high altitude are present as far as cardio-vascular capacity is concerned, it was assumed as a resulting factor the body fat status would also be affected. Though differences are present, statistically they are not significant.

The researcher feels that more advanced studies can be concerned regarding the obesity of students at different topographical regions, which could also give an indication in difference in cardio vascular capacities.

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