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# Anthropometric Profile of School Children Belonging to Different Regions of Himachal Pradesh

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**Abstract:**

*Introduction: Anthropometry is the study of human body measurement which is used in anthropometrical classification and comparison. Anthropometry is widely recognized as one of the useful techniques to assess the growth and nutritional status of individual or population.*

*Methods: The purpose of this study was to compare boys and girls on their anthropometric variables. For the purpose of this study 606 school going children aged 13 to 17 years were selected as subjects from Himachal Pradesh. The anthropometrical variables were taken as the height, body weight, body mass index (BMI), waist circumferences and hip circumferences. Weight was recorded to the nearest 0.5 kg by using a standard weighing machine. The anthropometer was used to measure height to the nearest 0.1 cm. The measurement of waist circumference (in cm) was taken midway between the subcostal margin and iliac crest while the hip circumference (in cm) was taken at the point of maximum circumference over the buttock. The BMI was calculated for each subject by using standard technique. The t test was used to draw the results by using the SPSS (v.16) software.*

*Results and Discussions: The results of the study indicate that there are significant differences between boys and girls in their height, waist circumference, hip circumference and BMI, whereas no significant differences were found in their body weight.*

*Conclusion: The boys and girls within the age group of 13 to 17 years were differing in their height, waist circumference, hip circumference and BMI, whereas they showed similarity in their body weight.*

**Key words**: anthropometric, school children, Body Mass Index, Himachal Pradesh

## Introduction

Anthropometry is extensively recognized as one of the fruitful techniques to gauge the growth and nutritional status of an individual or population (Grover, Singh and Jain 2009; Gorstein et al. 1994). In this one studies the measurement of the human body in terms of the dimensions of bone, muscle, and fat percentage (Ali and Mohammad, 2012; Lakshmi 2005). Today, anthropometry has many practical uses; for example, it is used to assess nutritional status, to monitor the growth pattern of children. Anthropometry is the study of human body measurement which is used in anthropometrical classification and comparison.

As Himachal Pradesh is a hilly state of India, the physical and anthropometric status of the children of this area is different from the different states of India. In the present scenario, several researchers worked on this topic: Bakhetia and Jain (2007) studied to draw an anthropometric profile of rural school girls, Grover, Singh, and Jain (2009) also drew an anthropometric profile of rural preschool children belonging to different agroclimatic regions of Punjab. Hattiwale, Maniyar, Das and Dhundasi (2008) studied the role of body mass index on physical fitness index in two different age groups of healthy young males from north interior Karnataka, India. Sangha, Pandher and Kochhar (2006) established an anthropometric profile and adiposity rate in the obese Punjabi children and their parents, while Msamati and Igbigbi (2000) sketched the anthropometric profile of urban adult black Malawians. But none of the contemporary researchers tried to study the

anthropometrical profile of school going children of any hilly area in India. Thus we have framed this study and tried to draw an anthropometry profile of children who belong to Himachal Pradesh.

## Materials and Methods

### Subjects

A total of six hundred and six (606) school going children aged thirteen to seventeen years old were randomly selected as the subjects for the study. The subjects were recruited from four districts of Himachal Pradesh, i.e. Chamba, Kinnaur, Lahul and Shimla.

### Procedure

To accomplish the aim of this study the anthropometrical variables of this study were taken as the height, body weight, body mass index (BMI), hip circumference (HC) and waist circumference (WC). To acquire data on the anthropometrical variables, the following procedures were adopted:

*Height (H):* The anthropometer was use to measure heights of the selected subjects to the nearest 0.1 cm. For each height reading, the heel, buttocks and shoulder blades were in contact with the vertical surface of the anthropometer.

*Body weight (BW):* Body weight was recorded to the nearest 0.5 kg using a portable weighing machine calibrated in kg. All subjects were asked to wear light clothing and removed their shoes before weight measurements were taken.

*Waist circumferences (WC):* The measurement of waist circumference (in cm) was taken midway between the subcostal margin and iliac crest by using a steel measuring tape.

*Hip circumferences (HC):* Hip circumference (in cm) was taken at the point of maximum circumference over the buttock. To minimize intra- and inter-observer errors, two people had been trained to take all measurements. A male took the circumferences for male subjects and a female for female recruits, in keeping with local tradition.

*Body mass index (BMI):* Body mass index (BMI) was derived by Quetelet's index from body weight/(height)$^2$.

## Statistical Treatment

The results were drawn by using the SPSS (v.16) statistical package for Windows XP version. The t test was used to compare each study groups. The alpha level of significance was set at 0.05.

## RESULTS

**Table 1: Indicating Mean, Mean Difference (MD), Standard Deviation (SD), t values of boys and girls**

|  |  | *N* | Mean | *SD* | *MD* | *t* |
|---|---|---|---|---|---|---|
| H (cm) | Boys | 342 | 151.73 | 10.86 | 4.17 | 5.28* |
|  | Girls | 264 | 147.56 | 7.72 |  |  |
| BW (kg) | Boys | 342 | 41.35 | 8.11 | 0.86 | 1.33 |
|  | Girls | 264 | 40.49 | 7.44 |  |  |
| WC (cm) | Boys | 342 | 25.71 | 3.26 | 0.84 | -2.99* |
|  | Girls | 264 | 26.55 | 3.69 |  |  |
| HC (cm) | Boys | 342 | 30.79 | 3.45 | 1.73 | -5.90* |
|  | Girls | 264 | 32.52 | 3.73 |  |  |
| BMI (kg/m²) | Boys | 342 | 17.86 | 2.50 | 0.68 | -3.07* |
|  | Girls | 264 | 18.54 | 2.90 |  |  |

*Significant $p < 0.05$
Tabulated $t_{0.05}(604) = 1.96$
H-Height, BW-Body Weight, WC- Waist Circumference, HC- Hip Circumference, BMI- Body Mass Index.

An examination of Table 1 indicates that there is a significant difference between boys and girls in their height, waist circumference, hip circumference and BMI as calculated t values are found more than tabulated t value at 0.05 level of significance, with 604 degree of freedom. No significant difference was recorded between boys and girls in their body weight.

## Discussion

From the results of the study it is attributed that there was significant difference observed in the variables of height, waist circumference, hip circumference and BMI between boys and girls and no significant difference found in the variable of the body weight of the boys and girls. It is also revealed from the findings that boys up to age of 17 years were taller than the girls of same age group. On the other hand, girls of this age group, having wider hip and waist circumference as at this age, state developing maturation and when they reach the age of 17 years old, they almost complete maturation, while boys attain the maturation at the age of 19 to 21 years. BMI is based on the body weight and height of the subject and, as can be seen from the results, girls have a higher BMI, which shows that they have a heavier body structure in comparison with the boys of same age group.

## Conclusions

On the basis of the drawn results and limitations of this study, the following conclusions can be stated:-

- The height, waist circumference, hip circumference and BMI differ significantly between boys and girls.
- No significant difference was recorded in the weight between boys and girls.

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