**Journal of Advanced Medical and Dental Sciences Research**
@Society of Scientific Research and Studies
Journal home page: www.jamdsr.com doi: 10.21276/jamdsr ICV 2018= 82.06 UGC approved journal no. 63854
(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

*Original Research*

# Correlation of Blood Pressure and Anthropometric Measurements in School Children

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***ABSTRACT*:**
**Background:** The prevalence of hypertension in children and adolescents seems to be increasing. The present study was undertaken to evaluate correlation of blood pressure and anthropometric measurement in school children. **Materials & Methods:** The present study was conducted in the department of Community Medicine. It comprised of 580 school children age ranged 12-16 years of both genders. In all children, height (cm), weight (kg), systolic and diastolic blood pressure was recorded. **Results:** Maximum boys were in age 12 years and 16 years and girls in age 14 years, followed by 70 boys in 12 years, 80 in 15 years and 60 in 14 years. 48 girls in 15 years, 42 in 13 years, 38 in 12 years and 17 in 16 years. Boys had 22% and girls had 20% of prevalence of hypertension. The mean height in males was 155.2 cm and in girls was 146.2 cm, weight was 37.4 kg in boys and 32.1 kg in girls, SBP was 132.4 mm Hg in boys and 124.6 mm Hg in girls. DBP was 86.2 mm Hg in boys and 74.6 mm Hg in girls. **Conclusion:** Authors found a positive correlation of weight of subjects and systolic and diastolic blood pressure in subjects.
**Key words:** children, diastolic blood pressure, hypertension

Received: 14 March, 2019 Revised: 20 May 2019 Accepted: 22 May 2019

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**This article may be cited as:** Gupta B, Gupta R, Gupta M, Dua A. Correlation of Blood Pressure and Anthropometric Measurements in School Children. J Adv Med Dent Scie Res 2019;7(6): 90-92.

## INTRODUCTION

The prevalence of hypertension in children and adolescents seems to be increasing. This rise is partially because of the increasing prevalence of obesity among children and adolescents, as well as a growing awareness of this disease. There is evidence that hypertension in children and adolescents can lead to adult hypertension. Presence of hypertension in children and adolescents may contribute to the early development of coronary artery disease. Previous reports have shown that early development of atherosclerosis does exist in children and adolescents and may be associated with childhood hypertension.[1]

Hypertension is a well-known risk factor for cardiovascular diseases and hypertension in adults often begins in the childhood. Many environmental and genetic factors play a significant role in the causation of blood pressure such as the age, gender, body size, body mass index, physical activity, diet and stress levels.[2] However, during adolescence, the main influencing factor that leads to hypertension is obesity and metabolic syndrome and familial factors of hypertension. In spite of it being a risk factor for cardiovascular diseases, high blood pressure is often under diagnosed in children.[3] Currently, however, there is no consensus on the choice of anthropometric predictor of high blood pressure in this population. Anthropometric indicators such as BMI, waist circumference, triceps skinfold and, more recently, the waist-to-height ratio, have been investigated for validity in predicting the risk for high blood pressure in the pediatric population.[4] The present study was undertaken to evaluate

correlation of blood pressure and anthropometric measurement in school children.

## MATERIALS & METHODS

The present study was conducted in the department of Community Dentistry. It comprised of 580 school children age ranged 12-16 years of both genders. The ethical approval was obtained from institutional ethical committee. All students were informed regarding the study.

General information such as name, age, gender etc. was recorded. In all children, height (cm), weight (kg), systolic and diastolic blood pressure was recorded. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

**Table I Age wise distribution of subjects**

| Age (Years) | Boys | Girls |
|---|---|---|
| 12 | 70 | 38 |
| 13 | 85 | 42 |
| 14 | 60 | 55 |
| 15 | 80 | 48 |
| 16 | 85 | 17 |
| Total | 380 | 200 |

Table I shows that maximum boys were in age 12 years and 16 years and girls in age 14 years, followed by 70 boys in 12 years, 80 in 15 years and 60 in 14 years. 48 girls in 15 years, 42 in 13 years, 38 in 12 years and 17 in 16 years.

**Table II Prevalence of hypertension in subjects**

| Total | Prevalence | |
|---|---|---|
| | Boys | Girls |
| 580 | 84 (22%) | 40 (20%) |

Table II shows that boys had 22% and girls had 20% of prevalence of hypertension.

**Table III Anthropometric parameters in all subjects**

| Anthropometric parameters | Boys | Girls |
|---|---|---|
| Height (cm) | 155.2 | 146.2 |
| Weight (Kg) | 37.4 | 32.1 |
| SBP (mm Hg) | 132.8 | 124.6 |
| DBP (mm Hg) | 86.2 | 74.6 |

Table III, graph I shows that mean height in males was 155.2 cm and in girls was 146.2 cm, weight was 37.4 kg in boys and 32.1 kg in girls, SBP was 132.4 mm Hg in boys and 124.6 mm Hg in girls. DBP was 86.2 mm Hg in boys and 74.6 mm Hg in girls.

**Graph I Anthropometric parameters in all subjects**

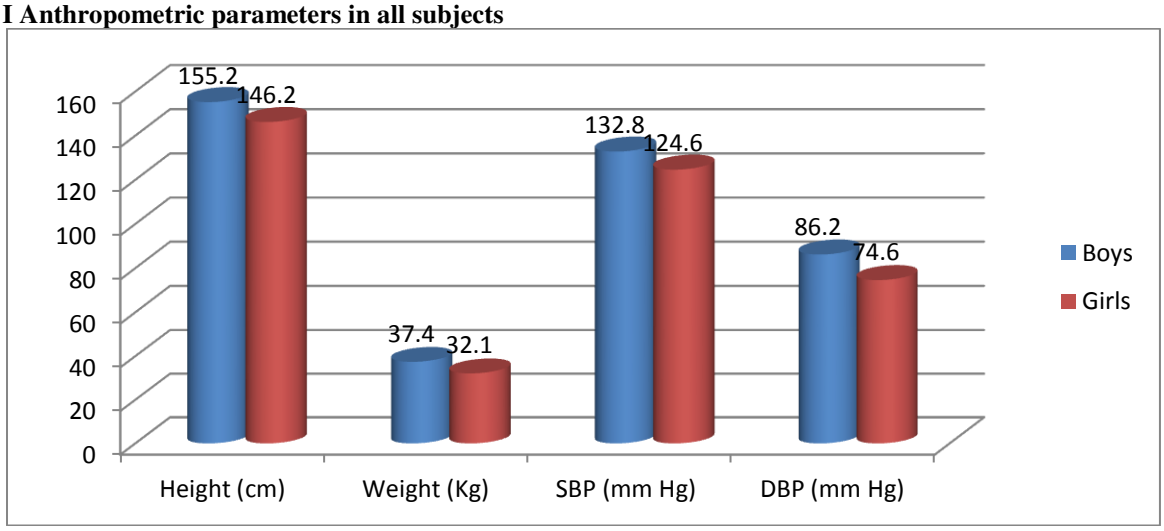

**Table IV Pearson's Correlation Coefficient**

| Anthropometric parameters | SBP | DBP |
|---|---|---|
| Height | 0.51 | 0.32 |
| Weight | 0.01 | 0.05 |

Table IV shows positive correlation of weight of subjects and systolic and diastolic blood pressure in subjects (P< 0.05).

## DISCUSSION

Hypertension is a major risk factor for cardiovascular and cerebrovascular diseases. The risk of morbidity and mortality due to these diseases among adults is on the rise and more so in developing countries such as India. Many cases of hypertension in adults begin during childhood both in males and females.[5]

The association between overweight and elevated BP in children would reflect on an increased burden of hypertension-related diseases as the obesity epidemic further goes up. Prevention of cardiovascular risk factors as early as in childhood – also called primordial prevention – may be an important strategy to prevent non-communicable diseases in a life course perspective, particularly in settings with scarce resources.[6] The present study was undertaken to evaluate correlation of blood pressure and anthropometric measurement in school children.

We included 580 school children age ranged 12- 16 years. Maximum boys were in age 12 years and 16 years and girls in age 14 years, followed by 70 boys in 12 years, 80 in 15 years and 60 in 14 years. 48 girls in 15 years, 42 in 13 years, 38 in 12 years and 17 in 16 years. We found that boys had 22% and girls had 20% of prevalence of hypertension.

Sachdev et al[7] in their study Defining ≥ 95th percentile as hypertension, 153 (10.2%) females and 177 (8.3%) males were hypertensive. Totally there were 330 subjects (8.3%) hypertensive in the study group. There was no significant difference in the prevalence of hypertension between the genders. A rise is observed in mean systolic and diastolic BP with increase in mean weight, height and BMI. There were 173 (4.8%) children who were overweight and 30 (0.8%) children who were obese. Among the overweight children, 62 subjects (35.83%) were hypertensive. Among the children who were obese, 19 (63.3%) were hypertensive. There was also a correlation between body mass index and hypertension.

In present study, mean height in males was 155.2 cm and in girls was 146.2 cm, weight was 37.4 kg in boys and 32.1 kg in girls, SBP was 132.4 mm Hg in boys and 124.6 mm Hg in girls. DBP was 86.2 mm Hg in boys and 74.6 mm Hg in girls. There was a positive correlation of weight of subjects and systolic and diastolic blood pressure in subjects (P< 0.05).

Agarwal et al[8] found that weak correlations among all the anthropometric parameters and systolic and diastolic levels, with coefficients values ranging from 0.18 to 0.28 (p < 0.001). In multivariate analysis, only body mass index and triceps skin fold were found as predictors of high blood pressure, regardless of abdominal adiposity, sexual maturation and socioeconomic status. They concluded that total body adiposity seems to be a better predictor of high blood pressure risk than abdominal fat in this population.

Durrani et al[9] in their study found that the overall prevalence of hypertension was found to be 11.77%. Blood pressure of both genders appears to have positive correlation with anthropometric characteristics. Authors concluded that with increase in anthropometric measurements like height, weight and BMI were found to be positively correlated with hypertension among school children.

## CONCLUSION

Authors found a positive correlation of weight of subjects and systolic and diastolic blood pressure in subjects.

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