

## Prevalence of hypertension in school going children of Uttar Pradesh population

<sup>1</sup>Dr. M. M. Agarwal, <sup>2</sup>Dr Rajkumari Mittal, <sup>3</sup>Dr. Shwetank Agarwal

<sup>1</sup>Associate Professor, Varun Arjun Medical College, Shahjahanpur, Bareilly, Uttar Pradesh, India

<sup>2</sup>Assistant Professor, Department of Paediatric, Varun Arjun Medical College, Shahjahanpur, Bareilly, Uttar Pradesh, India

<sup>3</sup>H.O.D. (General Surgery), Special Interest in Paediatric Surgery, V.A.M.C. & R.H., Banthra, Shahjahanpur, Bareilly, Uttar Pradesh, India

### Correspondence:

Dr. Shwetank Agarwal

H.O.D. (General Surgery), Special Interest in Paediatric Surgery, V.A.M.C. & R.H., Banthra, Shahjahanpur, Bareilly, Uttar Pradesh, India

Email id: [shwetankagarwal@gmail.com](mailto:shwetankagarwal@gmail.com)

### Abstract

**Background**-Increased carotid intima media thickness or ventricular hypertrophy and they are also at increased risk of cardiovascular disease in adulthood. Moreover, BP tracks from childhood to adulthood. Consequently, detection and management of elevated BP at an early age may be an important mean for limiting the disease burden due to hypertension. The causes for increase in blood pressure are attributed to obesity.

**Aim and objectives**- to find out the prevalence and the risk factors of hypertension in school going children in Uttar Pradesh, India.

**Materials and method**- Children those who were having positive family history, findings were reconfirmed by telephonic interview of parents, about their current medications and doctor visits. All the entries were double checked for any possible key-board error. Association of each of the categorical with hypertension (outcome variable) is assessed with chi-square test.

**Results** -55 were hypertensive while in the female population 35 were hypertensive. 10 hypertensive males were <10 years of age and 18 were between the age of 10-12 years. In female population 2 were <10, 20 were between 10-13 and 12 were <13 years of age.

**Conclusion**- Life style modification which includes weight control, encouragement of exercise, reduction in dietary sodium and fat and, where appropriate, cessation of smoking and alcohol. It is essential to assess and, wherever possible, modify all cardiovascular risk factors. Prevention of the problem through healthy lifestyle choices and prevention of obesity is important.

**Keywords**-Hypertension, Diabetes mellitus, Ischemic heart diseases.

### Introduction

Over the past two decades, studies have shown that "essential" hypertension (i.e., hypertension of unknown etiology), can be found among children and adolescents. These particular blood pressure (BP) patterns show a strong correlation to adulthood hypertension.<sup>1,2</sup> According to the recommendations of the 1996 task force report on BP in children and adolescents, BP measurements should be incorporated into the routine pediatric examination of children three years of age and older.<sup>3</sup> Children with elevated blood pressure (BP) can develop target organ damage; for example, increased carotid intima-media thickness

or ventricular hypertrophy and they are also at increased risk of cardiovascular disease in adulthood. Moreover, BP tracks from childhood to adulthood.<sup>4</sup> Consequently, detection and management of elevated BP at an early age may be an important mean for limiting the disease burden due to hypertension.<sup>5</sup> The causes for increase in blood pressure are attributed to obesity, change in dietary habits, decreased physical activity and increasing stress. Nutritional surveys, in the USA show a significant secular increase in systolic and diastolic blood pressures.<sup>6</sup>

Hypertension, as well as dyslipidemia, type 2 diabetes, orthopedic problems, sleep apnea, and gall bladder disease, is one of many complications associated with obesity in children. The percentage of obese children and adolescents has more than doubled since the early 1970s.<sup>7</sup> Obesity is also associated with development of acanthosis nigricans (AN), a skin lesion characterized by hyperpigmentation and a velvety thickening that occurs on the skin folds usually around the neckline. AN, as well as hypertension, are associated with hyperinsulinemia.<sup>8</sup> The increasing prevalence of obesity in children, the fact that BP in adulthood can be predicted by childhood and adolescent BP patterns, and that hypertension is one of the most important risk factors for cardiovascular disease; emphasizes the importance of assessing BP as a risk factor for hypertension and its complications as early as possible.<sup>9</sup> In this study we put our efforts to find out the prevalence and the risk factors of hypertension in school going children in Uttar Pradesh, India.

### Materials and methods

The present study was a cross sectional study conducted in the private schools of Uttar Pradesh state. The subjects were between 6 to 18 years of age.

#### Exclusion criteria

- (1) children who were advised bed rest for more than 15 days during the last 6 months, due to any sickness
- (2) any chronic systemic disease
- (3) were absent during the time of conduction of the study due to any reason
- (4) those who were not willing for study.

The study protocol was approved by ethical committee of the college and a prior consent for the study was taken from school administration and from the parents.

A semi-structured pre-tested questionnaire was administered to each student with the help of class representative and asked to get filled by parents at home, incomplete answer confirmed by telephonic contact or repeating questionnaire. Questionnaire included information regarding demographic details and family history of hypertension, diabetes mellitus, ischemic heart disease in father and mother. Children those who were having positive family history, findings were reconfirmed by telephonic interview of parents, about their current medications and doctor visits. All the entries were double checked for any possible key-board error. Association of each of the categorical with hypertension (outcome variable) is assessed with chi-square test. Variables showing statistically significant association with the outcome variables ( $P < 0.05$ ) were considered as statistically significant.

### Results

A total of 1177 subjects were included into the study with 55.64% male and 44.01% female population. In male population 55 were hypertensive while in the female population 35 were hypertensive. 10 hypertensive males were <10 years of age and 18 were between the age of 10-12 years. In female population 2 were <10, 20 were between 10-13 and 12 were <13 years of age. While establishing the relationship between the different risk factors with childhood hypertension we observed that the 10 hypertensive subjects were obese, 18 had

positive family history of hypertension, 16 had positive family history of diabetes mellitus and 07 had positive family history of ischemic heart disease.(table- 1,table- 2)

**Table1:Ageandsexwisedistribution**

	Hypertensive	Normotensive	Total
<b>Males</b>	55	600	<b>655</b>
<b>&lt;10year</b>	10	243	<b>253</b>
<b>10-12years</b>	18	160	<b>178</b>
<b>Female</b>	35	483	<b>518</b>
<b>&lt;10years</b>	2	155	<b>157</b>
<b>10-13Years</b>	20	181	<b>201</b>
<b>&lt;13 years</b>	<b>12</b>	<b>147</b>	<b>159</b>

**Table2:Relationshipbetweendifferentvariablesandchildhoodhypertension**

Variables	Status	Hypertensive	Normotensive	Total	Pvalue
<b>Obesity</b>	Present	10	72	82	<b>0.0002</b>
	Absent	11	1140	1151	
<b>FamilyH/Ohyper tension</b>	Present	18	150	168	<b>0.1005</b>
	Absent	63	1009	1072	
<b>FamilyH/Odiabe tesmellitus</b>	Present	16	157	173	<b>0.0102</b>
	Absent	60	1036	1096	
<b>FamilyH/OIHD</b>	Present	07	62	69	<b>0.0061</b>
	Absent	<b>74</b>	<b>1104</b>	<b>1178</b>	

## Discussion

There is no current standard UK definition of hypertension in children. However, the issue has been researched in some detail in the USA, where a working group in 2004 defined the condition as an average systolic and/or diastolic blood pressure  $\geq 95$ th percentile for gender, age and height on three or more separate occasions<sup>10</sup>. The working group also introduced the concept of 'pre-hypertension' which it defines as a blood pressure level  $\geq 90$ th percentile but  $< 95$ th percentile. European guidance from the European Society of Cardiology uses the same definitions<sup>11</sup>.

Normal blood pressure values for children and adolescents are based on age, sex and height. They are available in standardised tables<sup>12</sup>. These may be simplified into a table which gives an indication of the levels of blood pressure in children and adolescents that require further evaluation<sup>13</sup>.

We observed that the prevalence of childhood hypertension increases with age, among females it increases after 10 years and in males it increases after 13yrs. Positive family history of diabetes mellitus, Ischemic heart disease was found to be significant association for childhood hypertension. A fall in prevalence on repeated evaluation has been noticed by Gupta and Ahmed<sup>14</sup> and Verma et al<sup>15</sup> so we did BP measurement on different occasion to reduce false positives. Burke et al<sup>16</sup> also have recommended serial measurement to reduce the effect of regression to mean and increase predictive values. Studies from Turkey<sup>17</sup> and Zambia<sup>18</sup> on school children showed rise of BP with age. Soundarssanane MB et al from India also gives same opinion of increase in hypertension with increase in age.<sup>19</sup> In their study on adolescent and young adults, they found a significant increasing trend of BP was seen only among males. In a recent study from India.<sup>20</sup>

In children a cause for the hypertension should be sought. Basic screening tests to detect underlying pathology should be carried out together with investigations to assess comorbidity and end-organ damage. Further testing may be required, depending on individual and family histories, the presence of risk factors and the results of the screening tests. The younger the child is at presentation and the more severe the blood pressure abnormality, the more likely that there is a secondary cause of hypertension<sup>21</sup>.Zambian study<sup>22</sup> which showed that parental history before age of 60 was related to offspring hypertension. Studies from India like Verma et al,<sup>15</sup> Soundarssanance et al<sup>19</sup> and Gupta and Ahmed<sup>14</sup> have also reported similar observations. But in our study we couldn't observe such relationship which might be due to inadequate screening of parents as hypertension is iceberg disease and is largely asymptomatic. The awareness that essential hypertension has its origin in childhood has resulted in increased emphasis on screening. The Indian Pediatric Nephrology Group recommends annual measurement of blood pressure in all children more than 3-year-old, who are seen in clinics or hospital setting.<sup>23</sup>

### Conclusion

Life style modification which includes weight control, encouragement of exercise, reduction in dietary sodium and fat and, where appropriate, cessation of smoking and alcohol. It is essential to assess and, wherever possible, modify all cardiovascular risk factors. Prevention of the problem through healthy lifestyle choices and prevention of obesity is important.

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