

Study of Prevalence of Hypertension in School Children Aged 6 to 15 Years in Gulbarga City

Sharangouda Patil*, Roopa Mangshetty**, Shridevi S.B.***

*Associate Professor, Department of Paediatrics, M R Medical College, Gulbarga, Karnataka, India.

**Associate Professor, Department of Paediatrics, M R Medical College, Gulbarga, Karnataka, India.

***Postgraduate in Paediatrics, Department of Paediatrics, M R Medical College, Gulbarga, Karnataka, India.

Abstract

Objectives : (1)To know the prevalence of hypertension in school children in Gulbarga city.(2)To know the relation of blood pressure with variable like sex, weight, height, socioeconomic status and family history. **Methods:** Two readings of blood pressure were recorded and mean was calculated. The children were labelled as hypertensive, if the blood pressure was above 95th percentile for that age, height and sex. **Results:** The overall prevalence of hypertension was found to be 3.9%. Blood pressure found to increase with age, weight and Height. **Conclusion:** Children with risk factors should be followed up for modification of risk factors.

Keywords: Hypertension; School children; Larger weight; Socioeconomic status; Family history.

Introduction

Hypertension is a major health problem in developed & developing countries affecting approximately 1 billion individual's world wide.[1] Children with upper percentile of blood pressure levels are more likely to become hypertensive in adult. If the trend towards adult hypertension can be recognized in childhood, it may be possible to alter life style and prevent systemic hypertension as well as related complication.[2] The present study was taken up to know the prevalence of hypertension in school children in the age range of 6 to 15 years in Gulbarga city, Karnataka and to determine the influence of contributory factors like age, sex, body weight, height, socio-economic status and parental history of hypertension. So that this can be a reference for blood pressure norms for children

of Gulbarga city.

Methods

The present study is a cross sectional study undertaken in three schools of Gulbarga city, Karnataka. A total of 2000 children aged 6-15 years were enrolled in the study and a questionnaire was used to collect information on subjects consisting of age, sex, type of family, socioeconomic status, history of renal disease, cardiac disease, family history of hypertension, anthropometry, blood pressure was recorded in sitting position in right arm by auscultatory method using a standard mercury sphygmomanometer with appropriate sized cuff covering about 2/3 of the upper arm and encircling it completely. Two measurements were taken at interval of

Corresponding Author: Dr. Sharangouda Patil, Associate Professor, **Associate Professor, ***Postgraduate in Paediatrics, Department of Paediatrics, M R Medical College, Gulbarga, Karnataka, India. E-mail: drsharanpatil@gmail.com

two minutes each and average of the two readings was calculated. The children were labelled as hypertensive, if the blood pressure was above 95th percentile for that age, height and sex and were evaluated by two subsequent measurements taken during two different visits at weekly intervals before labeling them as hypertensive. Children having persistently elevated BP on three occasions were subjected to the following investigations to rule out secondary causes of hypertension. Complete blood count, Urine-albumin, sugar, microscopy and specific gravity, Lipid profile, Renal profile-Blood urea, serum creatinine and renal ultrasound, Cardiac profile-Chest X Ray, ECG, Echocardiogram. Statistical methods included calculation of age and sex specific means and standard deviation (sd) for systolic and diastolic blood pressure, correlation coefficient and 't' test for significant difference in blood pressure between groups.

Results

Two thousand, apparently normal school children, between 6-15 years of age were studied. Out of these 1156 were boys and 844 were girls. The BP for each age group was taken and the children were labeled hypertensive, if the blood pressure was above 95th percentile for that age, height and sex. The mean systolic pressure and mean diastolic pressure were found to increase with

increasing age with a spurt in SBP at 13 yr in both the sexes as shown in Table 1.

On the other hand there was no significant difference between the SBP as well as DBP of the two sexes at various age groups except for the significant difference between SBP of the both sexes at 12 and 15 years and between DBP at 12 years of age. Systolic and diastolic blood pressures were found to have significant correlation with weight and height and hence with weight/height ratio in both sexes ($p < 0.01$). Blood pressure was higher in high socio-economic status ($p < 0.01$). Children with family history of hypertension have significantly higher blood pressures than children without family history ($p < 0.001$).

Discussion

In all the studies in India[3,4,5,6] and abroad[7,8] it has been shown that blood pressure, both systolic and diastolic, gradually increases with age, although such an increase is not a steady one. The findings of the present study are in agreement with the above statement.

The systolic spurt observed in the present study between 13-14 years in both sexes has been supported by other workers. However Task Force Committee USA reported only one spurt between 5 and 6 years in both the sexes.

Table 1: Correlation between Blood Pressure Status and Sex in Different Age Groups

Age	Systolic Pressure		Diastolic Pressure	
	Boys Mean±SD (mm Hg)	Girls Mean±SD (mm Hg)	Boys Mean±SD (mm Hg)	Girls Mean±SD (mm Hg)
6	96.07±5.95	95.97±5.1	63.28±4.42	62±3.77
7	98.05±6.08	97.48±6.01	63.83±4.64	63.63±5.36
8	101.13±5.4	100.23±5.35	65.1±5.5	65.49±5.37
9	101.81±6.07	102.02±6.34	65.6±6.09	65.5±4.93
10	104.27±6.09	104.23±6.12	65.8±4.95	66.48±6.28
11	105.13±6.69	105.18±7.49	68.18±6.65	67.89±4.78
12	105.82±6.53	108.02±6.58	68.24±4.59	68.7±3.39
13	107.8±7.39	108.08±7.64	68.3±4.85	69.05±4.63
14	111.39±6.78	110.94±6.53	71.23±4.49	72.13±3.68
15	114.58±4.96	112.15±5.95	73.36±4.21	72.76±4.19

Table 2: Prevalence of Hypertension in Various Studies

Present study	3.6%
Rakesh Agarwal, SL Mandowara, B. Bhandari and Garg OP (1982) ⁵	2.6%
Agarwal V.K., Rajiv Sharan, Shrivastava AK and Pandey CM (1983) ⁴	1.8%
Chahar CK, Shekhawat V, Migalani N and Gupta BD (1983) ⁶	1.39%
Sachdev (1984) ⁹	0.54%
Larويا, M Sharma, V. Diwedi, KM Belapurkar and PS Mathur (1989) ¹²	2.93%
Anand N.K. and Lalit Tandon (1996) ³	0.46%
Chada .S.L, tandon R, Gopinath N(1999)	11.6%
Avinash Sharma, Neelam Grover, Rajiv bharadwaj(2006) ¹¹	5.9%

The spurt may possibly be due to certain hormonal and physical changes occurring in the body at adolescence. The blood pressure levels in the present study were considerably lower, both systolic and diastolic pressures, in either sex than the findings in other Indian studies. Even in the Western studies similar differences have been observed, the difference between NIH Task Force readings and Bogalusa heart study being 10-15 mm Hg, with considerably higher level reported in the NIH report.[7,8]

The differences between the present study and other Indian studies can be explained by the fact that the mean body weight and height were higher in other studies in the comparable age groups, which are the main determinants of blood pressure in growing children. In the present study it has been seen that the mean systolic and mean diastolic blood pressures increase steadily and proportionately with weight. Similar observations have been made by other workers.[4,5,6] There is a strong correlation between blood pressure and weight as well as blood pressure and height in both sexes. There is no significant difference in blood pressures of the two sexes when the values are corrected for maturation status. In the present study it was seen that there were significant differences in the mean blood pressure levels (both systolic and diastolic) of children from class I and class II socio-economic groups in contrast to Agarwal *et al*[5] study and Sachdev[9] *et al* study which showed no association between socio-economic status and levels of blood pressure.

Children with family history of hypertension have significantly higher blood pressures than children without family history. Similar observation was made by Roya Kelishadi, Mahin Hashemipour, Nasrollah Bashardoost.[10]

The prevalence of hypertension in study population was 3.9% (n=78). The prevalence reported in various other studies ranged from 0.54 to 11.96%[3,4,5,6,11,12,13,14] (Table -2).

The vast majority of these children will have mild elevation of blood pressure and labeled as essential hypertensives¹⁵. The observation of the present study are in agreement with the above statement as all the 78 children who were labelled as hypertensives had only mildly elevated blood pressure and none had severe elevation of blood pressure (> 99th percentile).

Conclusions

The overall prevalence of hypertension was found to be 3.9%. Blood pressure, both systolic and diastolic gradually increases with age, the increase being more pronounced in systolic blood pressure than in diastolic blood pressure. There is a strong correlation between blood pressure and weight, height and weight/height ratio in both sexes. Larger weight children, high socioeconomic status and family history of hypertension in children are associated with elevated blood pressures and children may be at risk for developing hypertension at a later date. They should be followed up and considered for modification

of risk factors.

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