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Prevalence of hypertension among urban school children of Srinagar district of Kashmir division in Jammu and Kashmir: A cross-sectional study

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Abstract
Hypertension among children is emerging as a global concern. Given this, a cross-sectional study of hypertension was conducted in 2016 among schoolchildren aged 10–16 years in Srinagar district Kashmir. The data collection was done for a period of one year from May 2016 to April 2017 after obtaining the permission from the directorate of school education of Jammu & Kashmir. A total of 30 clusters were taken for the study and 21 subjects including both male and female were included per cluster. Selection of the study unit was done in two stages. In our study, the prevalence of hypertension was 2.03%.

Keywords: hypertension, urban school children

Introduction

Systemic hypertension is an important condition in childhood, with estimated population prevalence of 1-2% in the developed countries. The causes for increase in blood pressure are attributed to obesity, change in dietary habits, decreased physical activity and increasing stress [1]. Similar data is lacking from India; small surveys in school children suggest a prevalence ranging from 2-5 %.

Elevated blood pressure, systolic or diastolic at any age, in either sex is a contributor for all forms of cardiovascular disease. Identifying and modifying risk factors reduces the incidence and complications in adolescents and adult. Prevalence of hypertension varies across countries and states. It is multifactorial disease, influenced by genetic, racial, geographic, cultural and dietary patterns. This study was conducted to observe the prevalence of hypertension in school children of Srinagar district of Kashmir valley.

Studies have shown that obese people have a 5 times greater incidence of hypertension than those of normal weight [2]. The obesity epidemic has also been linked to an increase in the number of children with high blood pressure. Scientists in the United States (US) found that while more than 3% of children studied had high blood pressure, three-quarters of them had not been properly diagnosed [3]. Around 30% of overweight children have abnormal blood pressure. Therefore, weight loss is the initial treatment choice for high blood pressure in children [4]. In a developed country such as the US, more than 4 million children are estimated to have hypertension, a number that has increased 5-fold over the last 30 years, and has been linked to growing obesity in children among other factors [5]. The same pattern has been found in developing countries; for example in India the prevalence of hypertension in overweight schoolchildren was significantly higher than that among normal weight children [6]. An emerging double burden of both malnutrition and obesity has also been identified in developing countries [7]. This poses the possibility that such an association could also be present in schoolchildren of Srinagar city, a city in Jammu and Kashmir, India, where there is a lack of data about these issues. The aim of the present study was to find out the prevalence of high blood pressure levels in school children in Srinagar Kashmir.

Methodology

The study was a population based cross-sectional study conducted in the selected government and private schools of the Srinagar district. The data collection was done for a period of one year from May 2016 to April 2017 after obtaining the permission from the directorate of school education of Jammu & Kashmir. A total of 30 clusters were taken for the study and 21 subjects including both male and female were included per cluster. Selection of the study unit was done in two stages. In total, 639 students—from 5th to 10th grades were chosen randomly from those 30 schools and examined for hypertension. Measurements of arterial blood pressure were performed in a quiet room after five minutes of resting in a sitting position. Right arms were kept at the same level of heart during the measurement. Cuff bladder was arranged to cover about 75% of the upper arm, and the measurements were performed using a tool calibrated to cover the upper arm fully [8]. The cuff was inflated until the radial pulse was no longer audible from the ante-cubital area, and then the cuff was deflated 2–3 mm Hg per second while auscultating the pulse. While decreasing the cuff pressure, the onset of the sound was systolic blood pressure of the student, and the disappearance of the sound was accepted as diastolic blood pressure. The measurements were performed three times repeatedly at an interval of five minutes by the same investigator during 9 am–12 noon. From the total study group, 2.03% as hypertension. There was statistically significant relationship between sex and blood pressure in these children (Table 3). Five female students had grade-2 hypertension. No male student was found to have elevated hypertension. There was a statistically significant relationship, however, between age group and the rate of hypertension ($P < 0.05$) TABLE 4. In general, the proportion of children with normal blood pressure level in each age group was greater than those with and hypertension.

In our study, the prevalence of hypertension was 2.03%. The prevalence of hypertension reported in this study is consistent with the prevalence reported in the literature. The reason for the difference between the prevalence of hypertension in this study and those in the previous studies might be the usage of different age-groups.

Table 1

New blood pressure classification for children and adolescents(Modified)		
HTN Classification	Children aged 1-12 years(percentile based)	Everyone>=13 years old(mm Hg based)
Normotensive	<90th percentile	<120/<80
Elevated blood pressure	>=90th percentile or >=120/80 mm Hg (lower) to < 90th percentile	120-129/<80
Stage 1 hypertension	>=95th percentile to <95th percentile+12mm Hg or130/80 to 139/89 mmHg (lower)	130-139/80-89
Stage 2 hypertension	>=95th percentile to +12mm Hg or>= to 140/90 mmHg (lower)	>=140/90

Table 2

Blood Pressure	Gender		Total
	Male	Female	
110/80	0	5	5
100/60	121	104	225
100/70	102	98	200
110/70	37	44	81
120/90	0	1	1
130/80	0	1	1
130/90	0	7	7
140/100	0	2	2
140/80	0	2	2
150/90	0	1	1
70/60	0	1	1
90/60	50	50	100
90/70	7	5	12
90/80	1	0	1
Total	318	321	639

Among the total students that participated in the present study ,13 had raised blood pressure which is 2.03 percent of the total study population.225(35.21%) had blood pressure of 100/60 that is normal blood pressure, 200(31.29(%) students again had normal blood pressure of the value of 100/70 and 81(12.69%) subjects had normal BP of 110/70.
Five female students had grade-2 hypertension. No male student was found to have elevated hypertension.

Table 3

Gender	Blood Pressure							
	<120/80	120/90	130/80	130/90	140/100	140/80	150/90	Total
Male	318	0	0	0	0	0	0	318
Female	308	1	1	6	2	2	1	321
Total	626	1	1	6	2	2	1	639

Among the total students that participated in the present study, 13 had raised blood pressure which is 2.03 percent of the total study population. No male participant had raised blood pressure, all hypertensive were females.

Table 3

AGE	Blood pressure							Total
	<120/80	120/90	130/80	130/90	140/100	140/80	150/90	
10	71	0	0	0	0	0	0	71
11	92	0	0	0	0	0	0	87
12	148	0	0	0	0	0	0	148
13	126	1	0	3	0	1	0	130
14	108	0	0	2	2	1	1	114
15	61	0	0	0	0	0	0	61
16	24	0	1	1	0	0	0	27
Total	625	1	1	6	2	2	1	638

Among the participants there was no hypertensive in the age group of 10, 11, 12 and 15 years. One child of 13 years had BP of 120/90, 3 had 130/90 and 1 had BP of 140/80 mm hg.
In the age group of 14 years 2 children had 130/90, 2 had 140/100 and one had 140/80 mm hg.
In the age group of 16 there was 1 with 130/80 and one with 130/90 BP.

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