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Original Research Article

Prevalence of childhood hypertension and pre-hypertension in school going children of Bangalore rural district: a cross sectional study

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ABSTRACT

Background: Childhood hypertension is one of the rising public health problems. Childhood hypertension may lead to significant morbidity and mortality. The objective of the study was to find the prevalence of childhood hypertension and pre-hypertension in school going children of Bangalore Rural District.
Methods: A cross sectional study conducted between July 2015 to January 2016 in Bangalore Rural District. Total of 1024 school children aged between 6 to 16 years were examined. Both private and government school children were examined during the study. Anthropometric measurements like Weight, Height, BMI and Blood Pressure were measured for each child. Then children were categorized as hypertensive or pre-hypertensive based on Fourth Task force report and into obese or overweight based on WHO BMI charts.
Results: Prevalence of hypertension was 2.7% and pre-hypertension is 3.2%. In government school children 1.7% were hypertensive and 0.8% were pre-hypertensive. In private school children 3.5% were hypertensive and 5.1% were pre-hypertensive. Among children with hypertension 39% children were obese and 50% were overweight.
Conclusions: Childhood hypertension is prevalent in both government and private schools, with high prevalence in private schools. Blood pressure measurement should be made mandatory in all school children.

Keywords: Children, Hypertension, Pre-hypertension, Risk factors

INTRODUCTION

There are very few studies on distribution of hypertension in Indian children. National data is lacking in this perspective. Few studies done in India but they are limited to small area of children. Childhood hypertension is one of the rising public health problems, since it leads to development of adulthood hypertension early in life.[1]

Childhood hypertension is being diagnosed in increasing number of children and adolescents across the world.[2] The recent data on US children on prevalence of childhood hypertension shows that prevalence of pre-hypertension was estimated to be 14% and 6% in boys and girls respectively and the prevalence of hypertension was estimated to be 3-4% in many studies.[3-5] Present study aimed to determine prevalence of hypertension in healthy school going children in the rural area very near to Bangalore Metropolitan city.

METHODS

There are very few studies on distribution of hypertension in Indian children. National data is lacking in this perspective. Few studies done in India but they are limited to small area of children. Childhood hypertension is one of the rising public health problems, since it leads to development of adulthood hypertension early in life.[1]

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Present study aimed to determine prevalence of hypertension in healthy school going children in the rural area very near to Bangalore Metropolitan citys summarized in Table 1 and Table 2.

RESULTS

Of the total children from the area, 2.7% (28) were hypertensive and 3.2% (33) were pre-hypertensive. In government school children 1.7% were hypertensive and 0.8% were pre-hypertensive.

In private school children 3.5% were hypertensive and 5.1% were pre-hypertensive. Hypertension was significantly prevalent among private school children ($p<0.01$) (Table 3).

Table 1: Demographic data of children examined.

Variables	Government School				Private school			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Age	10.83	3.01	6.00	16.00	10.81	3.05	6.00	16.00
Weight	29.90	10.10	15.00	66.00	32.46	12.72	13.70	76.90
Height	1.34	0.14	1.03	1.67	1.38	0.16	1.04	1.780
WC*	0.87	3.61	0.45	58.00	0.93	4.33	0.45	75.00
BMI*	15.97	2.76	10.95	25.47	16.21	3.37	10.20	28.67
WHtR*	0.68	3.19	0.36	52.25	0.66	2.97	0.36	51.72
SBP*	99.80	6.85	88.0	130.0	99.57	7.93	84.0	138.00
DBP*	63.60	4.57	50.0	86.0	63.63	5.48	50.0	84.00
Hours of watching TV in hours	1.10	0.67	0.50	3.00	1.49	0.70	1.0	3.00
Hours of play in hours	0.84	0.25	0.50	2.00	0.94	0.15	0.50	1.00
Hours of outdoor play in hours	1.10	0.45	0.50	3.00	1.02	0.40	0.50	2.00
Hours of sleeping in hours	8.38	0.50	8.00	10.00	8.28	0.47	8.0	10.00

*WC (Waist circumference), BMI (Body mass Index), WHtR (Waist to Height Ratio), SBP (Systolic Blood Pressure), DBP (Diastolic Blood Pressure).

Table 2: Number of children examined in different ages.

Variables	Government school		Private school		p-value
Years	No	%	No	%	
6	41	8.97	61	10.83	0.00
7	45	9.74	50	8.88	0.00
8	38	8.23	43	7.64	0.00
9	44	9.52	50	8.88	0.00
10	43	9.31	53	9.41	0.00
11	47	10.17	59	10.48	0.00
12	49	10.61	58	10.30	0.00
13	46	9.96	50	8.88	0.00
14	42	9.09	58	10.30	0.00
15	43	9.34	56	9.95	0.00
16	23	4.98	25	4.44	0.00
Total	461	100	563	100.0	

Among 28 children with hypertension 39% children were obese and 50% were overweight (Table 4).

DISCUSSION

There is need to identify children with hypertension in our society because of its significant implications on the health of the child in later life. Early intervention on these children will help in decreasing later morbidity and mortality.[6-8]

The area chosen for the study is very close to Metropolitan city Bangalore.

The total prevalence of hypertension among the children is 2.7% and pre-hypertension among the children is 3.2%. The prevalence of hypertension in private school children is 3.5% and among government school children is 1.7%.

The high prevalence of hypertension in private school children due to decreased physical activity, change in nutritional habits and life style change.

This can be due to 63(11%) children from private school were obese/overweight when compared to 28(6%) from government school.

Obesity and overweight are one of the risk factor for hypertension. In present study, around 39% children with hypertension were obese and 50% children with hypertension were overweight. Sandvik L et al, Paffenbarger RS et al and Soudarssanane M, et al have found similar results.[9-11] Andriska et al found in their study that 41% of hypertensive children were obese.[12]

Obesity and overweight were significant risk factors causing hypertension in children.

Table 3: Anthropometric data and blood pressure measurements.

Variables	Government school (n=461)			Private school (n=563)			p-value
	Male (n=229)	Female (n=232)	Total (n=461)	Male (n=293)	Female (n=270)	Total (n=563)	
Hypertensive	4	4	8 (1.7%)	10	10	20 (3.5%)	<0.01
Pre-hypertensive	2	2	4 (0.8%)	14	25	29 (5.1%)	<0.01
Obese (>+2 Z score)	3	2	5 (1%)	14	4	18 (3.1%)	<0.01
Overweight (>+1 Z score)	13	10	23 (4.9%)	20	25	45 (7.9%)	<0.01

Table 4: Risk factors for hypertension.

Variables	Obese children	Overweight children
Hypertensive children (n=28)	11 (39%)	14 (50%)
Pre-hypertensive children (n=33)	5 (15%)	11 (33%)

Prevalence of hypertension was more among the children aged between 11 to 15 years (Figure 1) similar to study done by Raj M, et al which showed there was relative increase in systolic and diastolic blood pressure in early adolescent children.[13]

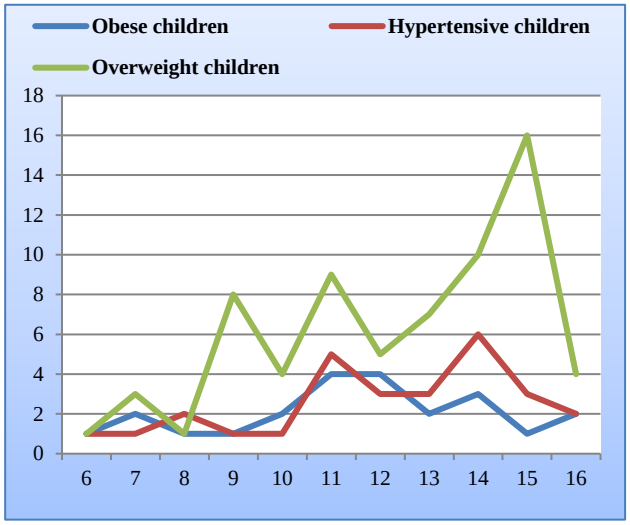

Figure 1: Hypertensive children in different age groups.

This can be due to increased prevalence of obese and overweight children in this age group.

CONCLUSION

Childhood hypertension is prevalent in rural areas of India also. There is need for regular checkups in these children unlike urban area children who have easy access to health care.

It was found hypertensive children in both private and government schools. Prevalence is more in private school children. Obese and overweight children are more prone to develop childhood hypertension. Regular BMI measurements in schools may useful as surrogate markers in predicting childhood hypertension in resource limited settings.

Government of Karnataka School Health card does not have BMI or BP columns (Figure 1). There is need to include Blood Pressure measurements in school health card.

Recommendations

All children irrespective of area, sex, school must be blood pressure checked at least once in a year. Blood pressure measurement should be made mandatory in routine school health check-up.

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Limitation

Long term follow-up of the children could not be done.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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