ORIGINAL RESEARCH PAPER

Volume-7 | Issue-11 | November-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY OF PREVALENCE OF HYPERTENSION AND PREHYPERTENSION IN SCHOOL GOING CHILDREN AGED 10 TO 15 YEARS:

Paediatrics

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ABSTRACT

BACKGROUND: Hypertension in children is one of the growing public health problem worldwide. Childhood hypertension may cause significant morbidity and mortality in future. The objective of the study is to find the prevalence of childhood hypertension and prehypertension in school going children in Kanchipuram district.

METHODS: A cross-sectional study conducted from February 2017 till July 2018 in Kanchipuram . A total of 1020 school students of age between 10 to 15 years were taken up for this study. Both govt and private school students were taken for this study. Anthropometric variables such as Height,Weight,BMI and Blood pressure were measured for each child separately.Then children were catogorized as hypertensive or pre-hypertensive based on Fourth Task Force report.

RESULTS: The overall prevalence of hypertension was 3.92% and pre-hypertension was 6.76%.In government school children the prevalence of hypertension was 3.46% and pre-hypertension was 5.06%. In private school children the prevalence of hypertension was 4.18% and pre-hypertension was 7.75% .

CONCLUSIONS: Hypertension in children is prevalent in both government and private schools,with high prevalence in private schools.Regular blood pressure monitoring should be made mandatory in all schools atleast once a year.

KEYWORDS

Hypertension ,Prehypertension, Risk factors and Children.

INTRODUCTION:

Hypertension is one of the most important and common cause of morbidity and mortality in the world. It plays an important role in development of ischemic heart diseases, cerebrovascular diseases, cardiac and renal failure. It is now understood that hypertension detected in some children may be a sign of an underlying disease, whereas in other cases the elevated BP may represent the early onset of essential or primary hypertension[1].

Hypertension in children is considered as an important risk factor for the development of hypertension in adulthood. Blood pressure monitoring in children is mostly neglected part of routine physical examination as it involves various variables like age, sex and height which makes its diagnosis complicated and mostly remain unnoticed[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 at determination of prevalence in hypertension of healthy school going children in Kanchipuram district.

METHODS:

Subjects were children aged between 10 to 15 years of age residing in and around Kanchipuram. Children from both sex were randomized from random number generator. The numbers selected for sampling are twenty schools which includes 10 numbers of government schools and 10 numbers of Private schools.

A sample size of 1020 children from rural and urban places of both government and private schools were taken into study. As per the previous studies, the prevalence of hypertension in school going children is estimated to be about 4% to 16.2%[3-5].

One thousand and twenty students, 559 males (54.80%) and 461 females (45.20%) participated in this study. The study was carried by means of a pretested and predesigned-questionnaire. Each student's parents contact details were taken and information regarding parent's education, occupation, various family risk factors like hypertension, obesity , diabetes mellitus etc. were taken through telephone.

Heights and weights of students were measured using standardized protocols adapted from Lohman and colleagues to meet the needs specific to the Indian context. For measurements, the students were asked to remove all excess clothing,shoes, all items from their pockets, watches, eyeglasses, belts and jewellery including hairpins. Weight was measured to the nearest 0.1 kg using electronic weighing machine. Height was measured to the nearest 0.1cm using stadiometer using the standard protocol with head, shoulder blades, buttocks and heels in contact with the backboard and head in the Frankfort line and biparietal line parallel to the ground.

These measurements were used to calculate BMI (Weight (kg)/height (m^2) of students. Age and gender specific BMI cut- off points which were derived from 2007 WHO growth reference for school children aged 5 – 19 years, was used to classify the participants as underweight, normal weight, overweight and obese. This growth reference is well suited for the Indian context[14].

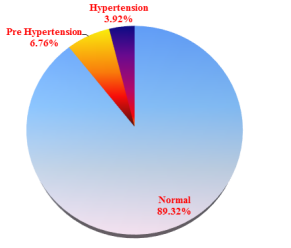
Blood pressure was measured with standardized sphygmomanometer with appropriate size cuff covering two third of the arm. The BP is measured by auscultatory method, at the level of heart after 5 minutes of rest[14].

RESULTS:

Prevalence of Prehypertension and Hypertension:

The prevalence of hypertension was studied in three groups namely Normal, Pre hypertension and hypertension. Out of 1020 school going children, 40 had Hypertension, 69 belonged to Prehypertension and 911 belonged to Normal. This is shown as a pie chart in Figure 1.

Fig. 1. Prevalence of Prehypertension and Hypertension



In this study group of prevalence is 10.68% including 3.92% of hypertension and 6.76% of prehypertension .

Age and Gender wise distribution of Prehypertension and hypertension :

Table.1 showed that age and gender wise distribution of prehypertension and hypertension school going children. Age group between 14 to 15 years school going childrens levels were significantly ($P < 0.001$) increased when compared with between 10 to 13 years school going childrens.

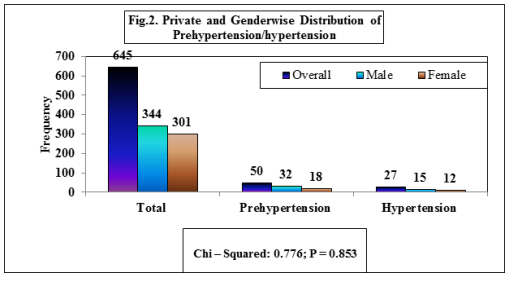
Table.1. Age and Gender wise Distribution of Prehypertension and hypertension

Age (Year)	Total children's Screened	Gender	Normal	%	Prehypertension	%	%Hypertension	%
10	166	Both	160	96.4	5	3.0	1	0.6
	94	Male	91	58.4	3	1.8	0	0
	72	Female	69	41.6	2	1.2	1	0.6
11	174	Both	161	92.5	9	5.2	4	2.3
	100	Male	93	53.4	5	2.9	2	1.15
	74	Female	68	39.1	4	2.3	2	1.15
12	182	Both	166	91.2	10	5.5	6	3.3
	92	Male	83	45.6	6	3.3	3	1.65
	90	Female	83	45.6	4	2.2	3	1.65
13	158	Both	137	86.7	13	8.2	8	5.1
	86	Male	74	46.8	7	4.4	5	3.2
	72	Female	63	39.9	6	3.8	3	1.9
14	153	Both	128	83.7	16	10.5	9	5.9
	84	Male	69	45.1	9	5.9	6	3.9
	69	Female	59	38.6	7	4.6	3	2.0
15	187	Both	159	85.0	16	8.6	12	6.4
	98	Male	82	43.9	9	4.8	7	3.7
	89	Female	77	41.1	7	3.7	5	2.7

Chi – Squared: 41.62; P = 0.0012.

Private and Gender wise Distribution of Prehypertension/ hypertension:

Figure 2. Showed that Private school and gender wise distribution of prehypertension and hypertension school going children. There was no significance (p =0.853) that correlate with male and female of private school going children prehypertension and hypertension levels.



Government and Genderwise Distribution of Prehypertension/ hypertension

Figure 3. Showed that Government school and gender wise distribution of prehypertension and hypertension school going children. There was no significantly (p =0.631) correlated with male and female of Government school going children prehypertension and hypertension levels.

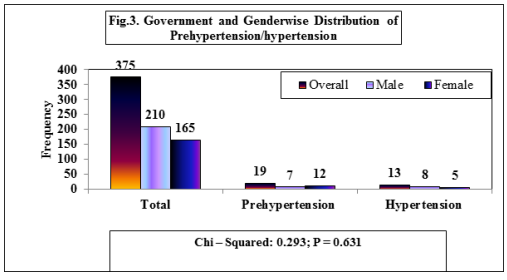


Table.3. Relationship between Obese, Overweight with Hypertension/ Prehypertension

Table.3 Indicates the relationship between obese, overweight with hypertension and prehypertension of school going children. In Private school going children overweight, prehypertension and hypertension levels were significantly ($P<0.001$) increased when compared with government school going childrens. There was no significant changes in obese of Government school going childrens and private school going childrens.

TABLE.3:

Variables	Government			Private			P- value
	Male n=210	Female n=165	Total n=375	Male n=344	Female n=301	Total n= 645	
Hypertension	8	5	13(3.46%)	15	12	27(4.18%)	<0.001
Prehypertension	7	12	19(5.06%)	32	18	50(7.75%)	<0.001
Obese	10	12	22(5.86%)	12	15	27(4.19%)	NS
Overweight	42	49	91(24.26%)	81	97	178(27.59%)	<0.001

NS – Not Significant

DISCUSSION :

Childhood hypertension is one of the rising public health problem[1]. Childhood hypertension may lead on to significant mortality and morbidity. Early intervention on these children will help decreasing the morbidity and mortality.

The area chosen for the study is Kanchipuram district.

In the present study, the total prevalence of hypertension among the children is 3.92% and pre-hypertension is 6.76%.

In government school children 3.46% were hypertensive and 5.06% were pre-hypertensive children. In private school 4.18% were hypertensive and 7.75% were pre-hypertensive children.

Overweight is one of the risk factor for hypertension. In present study, around 27.59% with hypertension were overweight. Sandvik et al, Paffenbarger RS et al and Soundarssanane M,et al have found similar results[9-11].The prevalence of hypertension was more among children aged 13 to 15 years similar to study done by Raj M et al[13].

In the present study, 34% of school children with obesity and overweight has hypertension and prehypertension. Andriska et al found in their study that 41% of hypertensive children were obese and

overweight children[9-12].

CONCLUSION :

Childhood hypertension is prevalent in both rural and urban areas of India In the present study, we conclude that prevalence is more in private school children. Overweight children are more prone to develop childhood hypertension. Regular BMI measurements in school may serve as useful markers to prevent childhood hypertension.

RECOMMENDATIONS:

All children irrespective of age, sex, school must check blood pressure at least once in a year. Blood pressure and BMI monitoring should be made mandatory in all school sectors.

LIMITATIONS:

Larger sample size could have given even more accurate prevalence rate of hypertension & prehypertension. And also long term follow-up of the children could not be done.

Funding: No funding sources

Conflict of interest: None declared

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

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