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Prevalence of Hypertension in School Going Children of Ajmer, Rajasthan

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ABSTRACT

Background: *Early diagnosis of hypertension in childhood is an important strategy in its control and hypertension may begin in childhood, perhaps even in infancy.*

Material and Method: *A Cross-sectional study was carried out over a period from January 2016 to October 2016 conducted among total 1498 school going children of Ajmer belonging to the age group of 8 to 18 years of both genders.*

Result: *Overall 14.82% children had elevated blood pressure. Prevalence of hypertension was higher in children of upper ages (>11 years) as compare to children of lower ages (<12 years). The difference was statistically significant. Almost equal percentage of children had elevated blood pressure in either gender. Positive family history was more often present in pre-hypertensive and hypertensive children (70.11%, 76.19% respectively) as compared to normotensive children (56.92%).*

Conclusion: *Awareness of hypertension was very low. Periodic measurements should be done in schools to identify the high risk group of children and adolescents who can develop hypertension.*

Keywords: *Prevalence, hypertension , school children.*

INTRODUCATION

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

Elevated blood pressure, systolic or diastolic at any age, in either sex is a contributor for all forms of cardiovascular disease[3]. 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.

MATERIAL AND METHODS

Source of data

Apparently healthy school children in the age group of 8 to18 years in Ajmer City.

Period of study

During the term between January 2016 to October 2016.

Method of Collection of Data

In this study data regarding the list of Schools in Ajmer city was collected from Rajasthan Govt. official website (rajssa.nic.in). Two government & two private schools were selected from total schools by using simple random sampling. Within the selected school children were selected by systematic sampling technique, proportionate to the total number of children in that school.

Sample size

Sample size calculated on the basis of the prevalence of obesity in urban Indian school children as 10%. Calculation of sample size done by using the formula of $4pq/L^2$ Where p (10%) is the prevalence, q=1-p (90%), L is the allowable error. The sample size was calculated as 1112, considering a relative error of 18%. So, sample size was kept above it, Total 1600 apparently healthy students were enrolled, but out of them 102 students were left on follow up. So, total 1498 students were studied, with keeping almost equal distribution of gender and all ages groups.

Inclusion Criteria

Apparently healthy school going children between the age group 8 to 18years of both sexes, who had given consent.

Exclusion Criteria

- Those children unwilling for study
- Those who were absent during the time of conduction of study due to any reason.
- Children with any acute or chronic illness.
- Children on long term medication.
- Those who do not give required information.

Data recording

Data were collected in two predesigned performa meeting the objective of the study. On first performa all personal details and examinations were recorded. Detailed personal and family information including family history of overweight and hypertension was recorded on second performa with the help of their parents and recollected on next fixed date visit.

Ethical Issues

The plan of thesis was approved by Institutional Ethical Committee of JLN Medical College, Ajmer. Purpose of study was fully explained to the children and their verbal consent was obtained prior to the examination.

RESULTS

Table no.1.Prevalence of Hypertension

Blood Pressure	No of children	% of children
Normal	1276	85.18%
Pre-hypertension	158	10.55%
Hypertension	64	4.27%
Total	1498	100%

Table shows that overall 14.82% children had elevated blood pressure.

Table no. 2. Age wise distribution of children to their Blood pressure

Age	Normal blood pressure	Pre-hypertension	Hypertension	Total
8 Year	95	1	0	96
	98.96%	1.04%	0.00%	100.00%
9 year	102	5	1	108
	94.44%	4.63%	0.93%	100.00%
10 year	83	7	2	92
	90.22%	7.61%	2.17%	100.00%
11 year	99	12	3	114
	86.84%	10.53%	2.63%	100.00%
12 year	146	19	7	172
	84.88%	11.05%	4.07%	100.00%
13 year	185	28	11	224
	82.59%	12.50%	4.91%	100.00%
14 year	176	28	12	216
	81.48%	12.96%	5.56%	100.00%
15 year	123	16	7	146
	84.25%	10.96%	4.79%	100.00%
16 year	107	14	7	128
	83.59%	10.94%	5.47%	100.00%
17 year	73	13	7	93
	78.49%	13.98%	7.53%	100.00%
18 Year	87	15	7	109
	79.82%	13.76%	6.42%	100.00%
Total	1276	158	64	1498
	85.18%	10.55%	4.27%	100.00%
χ^2=24.91			p≤0.05	

Table shows that prevalence of hypertension was higher in children of upper ages (>11 years) as compare to children of lower ages (<12 years). The difference was statistically significant.

Table no. 3. Gender Wise Distribution of Blood pressure of children

Gender	Normal blood pressure	Pre-hypertension	Hypertension	Total
Boy	721	90	33	844
	85.43%	10.66%	3.91%	100
Girl	555	68	31	654
	84.86%	10.40%	4.74%	100
Total	1276	158	64	1498
	85.18%	10.55%	4.27%	100
χ^2=0.633			p≤0.05	

Table shows that almost equal percentage of children had elevated blood pressure in either gender, but girls (4.74%)had higher prevalence of hypertension as compared to male (3.91%). The difference was statically significant.

Table no. 4. Distribution of Blood Pressure in relation to Family History of Hypertension

Blood pressure	Family History of Hypertension		Total
	Positive	Negative	
Normal blood pressure	94	73	167
	56.29%	43.71%	100%
Pre-hypertension	61	26	87
	70.11%	29.82%	100%
Hypertension	32	10	42
	76.19%	23.81%	100%
χ^2=9.48			p≤0.05

Positive family history was more often present in pre-hypertensive and hypertensive children (70.11%, 76.19% respectively) as compared to normotensive children (56.92%). The difference was statistically significant.

DISCUSSION

In present study, the overall prevalence of hypertension was 4.27%. Similarly Kumar Amritanshu et al (2015)[4] from Ahmedabad found 4.7% prevalence of hypertension in children. Also, Mohan B et al (2004)[5] found 6.69% prevalence of hypertension in school children in urban areas of Ludhiana. Avinash Sharma et al (2005-06)[6] found 20% prevalence of sustained hypertension among school children aged 11-17 years in Shimla. Sundar et al[7]. (2013) from Chennai found prevalence of Adolescent hypertension was 21.5%. Similar trend has been found in western countries Salvadori et al (2004) [8]found 7.4% hypertension in Toronto (Canada). Also, William E. Moore et al (2009)[9] from USA reported that prevalence of hypertensive measurements was 13.8%. This diverse prevalence of hypertension may be attributed to variable racial, ethnic, geographic, environmental and cultural factors operating in different study populations.

The prevalence of hypertension was higher in children of upper ages (>11 years) as compared to lower ages (<12 years). The difference was statistically significant. Similarly Verma M et al (1994)[10]from Ludhiana found hypertension only in children of 12 years and more of age in a study population involving children of 5 to 15 years of age. Chakarborty et al[11]. (2011) found increased prevalence of hypertension over age. Also, William E. Moore et al (2009)[9] found higher prevalence of hypertension in children of higher age group in comparison to lower age groups. Also, Kumar Amritanshu et al (2015)[4] found similar results in their study.

Various postulates put forward to explain this phenomenon include biological maturation, increase in body mass and hormonal changes[12].

The prevalence of hypertension was higher in girls (4.74%) as compare to boys (3.91%). The difference was statistically significant. Similarly, Shah et al[13]. (2013) found higher prevalence of hypertension in girls as compared to boys. Anjan kumar V S et al. (2015)[14] found higher prevalence of hypertension in girls as compared to boys. Also, Avinashsharma et al[15]. (2005-06) found higher prevalence of hypertension in girls as compare to boys. On the contrary Verma M et al (1994)[10] found no significant difference in the prevalence of hypertension between the two sexes. Contrary, William E. Moore et al (2009)[9] found higher prevalence of hypertension in boys as compare to girls.

These variable results may be due to regional differences, different sample sizes and, the different age group of the children studied.

Positive family history was more often present in pre-hypertensive and hypertensive (70.11%, 76.19% respectively) as compared to normotensive children (56.92%). The difference was statistically significant. The difference was statistically significant. Similarly, Verma M et al

(1994)[10] found a statistically significant correlation with positive family history of hypertension; 85.7% of hypertensive children had positive family history. Kelishadi R et al[16]. (2004) found that SBP and DBP of children were higher when both parent being hypertensive than one of them. Shi Y et al. (2012)[17] family history of hypertension showed effects on SBP and DBP in younger girls and adolescent boys. Both family income and parent education demonstrated independent associations with BP in young children.

Research shows that both genetic and environmental factors significantly influence BP and the development of hypertension during childhood[18]. Familial aggregation has been shown in first-degree relatives.

CONCLUSION

Prevalence of hypertension was 4.27%. The prevalence of hypertension was higher in children of upper ages as compared to lower ages . The difference was statistically significant.

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