

To study the prevalence of Prehypertension and Hypertension in overweight and obese adolescence children.

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Abstract:

Background- Prevalence of Prehypertension and Hypertension is increasing globally which in turn changed epidemiology of diseases in children. This burden and long effects are red signal to health sector. **Aim and Objectives-** To study the prevalence of Prehypertension and Hypertension in overweight and obese adolescence children. **Material and methods-** This cross-sectional study was conducted among Adolescent school children aged 10-18 years belonging to class V to X. In this study, I have interviewed and examined total 1134 children from both the schools. **Results-** Out of 1134 students examined 18.78% were overweight (96 boys and 117 Girls) and 2.46% (19 boys and 09 Girls) having obesity. Out of 108 Prehypertensive students 14 students BMI was normal (12.96%), 73 students were overweight (67.59%) and 21 were obese (19.44%). Out of 35 hypertensive students 02 students BMI was normal (5.71%), 13 students were overweight (37.14%) and 20 were obese (57.14%).

Conclusion: Continuous research and creation of awareness regarding Prehypertension and hypertension should be done in the society.

Key words: Hypertension, Prehypertension, Overweight and obesity

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I. Introduction:

Globally standards of living are continued to rise, which leads to weight gain and obesity in children. This is posing a growing threat to the health of the Paediatrics world.

Prehypertension and Hypertension in children is commonly associated with obesity and is generally missed by the clinicians. These are alarming public health challenges of the 21st century as they appear to increase the risk of subsequent morbidity and mortality.¹

The rising trend in adolescent prehypertension and hypertension is widely attributed to the adolescent children obesity epidemic. Trends in childhood prehypertension and hypertension have risen in congruence with increasing trends in the overweight and obesity. The correlation between body mass index (BMI) and blood pressure in adolescence very important area of research of forthcoming medical fraternity.²

At present many Paediatricians do routine blood pressure measurement and physical examination among the Paediatrics population in the angel of prehypertension and hypertension. It is an important public health problem affecting both adults and children.³

Obesity is new world syndrome of changed dietary and lifestyle pattern which is accounting for large public and socioeconomic health burden.¹ Obesity is the strongest modifiable risk factor for childhood prehypertension and hypertension.⁴ overweight- Obesity and prehypertension-hypertension in children are common health problems throughout the world including India. ¹

The levels of blood pressure increased in parallel with the increasing BMI among most of the boys and girls, possibly since some adipocyte-derived factors are linked to blood pressure control, and aberrant production and release of those factors may contribute to the high prevalence of hypertension in the obese population.⁵

At Present world is passing through an epidemic transition, Obesity and high blood pressure is prevalent, not only in adults but also in children.⁶ This study was undertaken with aim of detecting Prehypertension-hypertension and its relation with Body mass index in adolescent children.

II. Material and Methods:

Aim and Objectives of this is to study the prevalence of Prehypertension and Hypertension in rural and urban area School adolescence Students. This is a Descriptive Cross-Sectional study done in Government School (Rural area) and Private school (Urban Area) of our taluka. All healthy school children in the age group 10 - 18 years of either gender who are willing to participate was included in this study. Only those were with chronic illness, chronic drug therapy and Chronic School absentees were excluded.

After permission of Institutional ethical and school authorities, I have visited the schools and interviewed and examined students with written, informed and valid consent or ascent duly signed by Parents or legal guardian.

Predesigned questioners involving basic data, risk factors, family history etc. were given prior to examination of blood pressure to parents which was filled by students and Parents. In school visit, we have made team of Paediatricians who explained the procedure to all students and then blood pressure measurement was done. In suspected cases three readings were taken by different Paediatricians to mark as a prehypertension and hypertension. Also, Measurement of weight and height was done in order to calculate Body Mass Index (BMI). Those students having raised blood pressure fully evaluated in tertiary care hospital and was advised Nonpharmacological and Pharmacological Management, Counselling, life style modification and Regular Follow up was done in all Positive cases.

Data analysis was done by Microsoft Excel with computerized statistical package for social sciences (SPSS) version 15.0.

III. Result And Observation:

This cross-sectional study was conducted among Adolescent school children aged 10-18 years belonging to class V to X. Two schools -one Zilha Parishad (Government-Rural area) school and other CBSE pattern private (Urban area) school belonging to Ahmednagar district were selected.

In this study, I have interviewed and examined total 1134 children of which 488 were from private urban area-based school where as 646 were from rural area Zilha Parishad school.

Urban area (Private School)	Rural area (Government School)	Total
488	646	1134

Most of the children who participated in this study were from the age of 15-16 years (15.87%) followed by 16-17 years (14.55%) years.

Age in years	No. of Children	Percentage
10-11	124	10.93
11-12	128	11.28
12-13	137	12.08
13-14	144	12.69
14-15	148	13.05
15-16	180	15.87
16-17	165	14.55
17-18	108	9.52
Tot al	1134	100%

To study the prevalence of Prehypertension and Hypertension in overweight and obese ..

Out of 1134 students examined 569 were boys and 565 were girls. In Private school 41% students were boys and 45% girls where as in Government school 59% boys and 55% girls were examined.

	Boys	Girls	Total
Urban area (Private School)	232 (41%)	256 (45%)	488
Rural area (Government School)	337 (59%)	309 (55%)	646
Total	569	565	1134

Out of 1134 students examined 108 students had Prehypertension (9.5%) and 35 finally diagnosed as a hypertensive (3%).

Blood Pressure	No. of children	Percentage
Normal	1026	90.5 %
Pre-hypertension	108	9.5 %
Total	1134	100 %

Blood Pressure	No. of children	Percentage
Normal	1099	97 %
Hypertension	35	3%
Total	1134	100%

In prehypertensive group of 108 students 64 were boys (59.25%) and 44 were girls (40.74%).

Blood Pressure	Boys	Girls	Total
Normal	505	621	1026
Pre-hypertension	64	44	108 (9.5%)
Total	569	565	1134

In Hypertensive group of 35 students, 21 were boys (60%) and 14 were girls (40%).

Blood Pressure	Boys	Girls	Total
Normal	548	551	1099
Hypertension	21	14	35 (3%)
Total	569	565	1134

Out of 1134 students examined 18.78% were overweight (96 boys and 117 Girls) and 2.46% (19 boys and 09 Girls) having obesity.

BMI (kg/m ²)	Boys	Girls	Total
<23 Normal	454	439	893 (78.74 %)
23-27 Overweight	96	117	213 (18.78 %)
>27 Obese	19	09	28 (2.46%)
Total	569	565	1134

Out of 213 overweight students 96 were boys with maximum fromage group of 11-12 and then 16-17 yrs. and in obesity out of 28 students 19 were boys of 11-12 yrs. age followed by 17-18 yrs. age group.

Age (years)	Overweig ht	Obese
10-11	11	02
11-12	17	06
12-13	10	03
13-14	09	01
14-15	12	00
15-16	10	00
16-17	14	02
17-18	13	05
Total	96/213	19/28

Out of 213 overweight students 117 were girls with maximum fromage group of 17-18 and then 15-16 yrs. And in obesity out of 28 students 09 were girls of 17-18yrs age group.

Age (years)	Overweig ht	Obe se
10-11	11	01
11-12	12	02
12-13	14	00
13-14	12	00
14-15	14	00
15-16	16	01
16-17	17	02
17-18	21	03
Total	117/213	09/28

Out of 108 Prehypertensive student's maximum were from age group of 17-18 yrs (31.48%). and then 16-17 yrs. (24.07%). Also, in hypertensive group, out of 35 students maximum were from age group of 17-18 yrs. (40%) age followed by 16-17 yrs. (25.71%) age group.

Age (years)	Prehypertension	Hypertension
10-11	02 (1.85%)	00
11-12	09 (8.33%)	00
12-13	07 (6.48%)	00
13-14	05 (4.62%)	01 (2.85%)
14-15	11(10.18%)	05 14.28%)
15-16	14(12.96%)	06 (17.14%)
16-17	26(24.07%)	09 (25.71%)
17-18	34(31.48%)	14 (40%)
Total	108	35

Out of 108 Prehypertensive students 66 (60%) were boys and 44 (40%) were girls.

	Boys	Gir ls	Tot al
Pre- Hypertension	66	44	108

Out of 35 hypertensive students 21 (60%) were boys and 14 (40%) were girls.

	Boys	Girls	Tot al
Hypertension	21(60 %)	14 (40%)	35

Out of 108 Prehypertensive students 14 students BMI was normal (12.96%), 73 students were overweight (67.59%) and 21 were obese (19.44%).

BP	BMI Categories			Total
	Norm	Overweight	Obe al se	
Normal		879	140 07	1026
Pre- hypertension	14	73	21	108
Total	893	213	28	1134

Out of 35 hypertensive students 02 students BMI was normal (5.71%), 13 students were overweight (37.14%) and 20 were obese (57.14%).

BMI Categories				
BP	Normal	Overweight	Obese	Total
Normal	891	200	08	1099
Hypertension	02	13	20	35
Total	893	213	28	1134

IV. Discussion

In this study, I have interviewed and examined total 1134 children from the schools. Most of the children were from the age of 15-16 years (15.87%) followed by 16-17 years (14.55%) years. Out of 1134 students examined 569 were boys and 565 were girls. In Rural Area Government school, out of 646 students 563 were normal BMI (87.15%), 74 had overweight (11.47%) and 09 were obese (1.39%) where as in urban area private school, out of 488 students, 330 students had normal BMI (67.62%), 139 were overweight (28.48%) and 19 were obese (3.89%).

Out of 1134 students examined 108 students had Prehypertension (9.5%) and 35 diagnosed as a hypertensive (3%). F. Odey et.al. (2008) studied 375 students in Nigeria in the age group of 10-18 yrs. age group also had prevalence of 7.5%. Diksha Rai et.al. in 2017 studied 500 students in Karnataka, India also found 4.2% prevalence of Hypertension in 08-17 yrs. of students.

In these 108 prehypertensive students 64 were boys (59.25%) and 44 were girls (40.74%) whereas in hypertensive students (3%) in which 21 were boys (60%) and 14 were girls (40%). Lawrence Tony et al. studied 2438 students in Kerala, India in 2016 found more prevalence of prehypertension in Boys as compared to girls.

Out of 108 Prehypertensive student's maximum were from age group of 17-18 yrs. (31.48%) and then 16-17 yrs. (24.07%). Also, in hypertensive group, out of 35 students maximum were from age group of 17-18 yrs. (40%) age followed by 16-17 yrs. (25.71%) age group. Eran

Israeli et.al in Israel in 2006 also observed that prehypertension and hypertension prevalence increase with increasing age.

In Prehypertensive and hypertensive group, maximum students were of 17-18 yrs. age. Out of 1134 students examined 18.78% were overweight (96 boys and 117 Girls) and 2.46% (19 boys and 09 Girls) having obesity. In this group of 213 overweight students 96 were boys with maximum fromage group of 11-12 and then 16-17 yrs. And in obesity out of 28 students 19 were boys of 11-12 yrs. age followed by 17-18 yrs. age group.

Out of 213 overweight students 117 were girls with maximum fromage group of 17-18 and then 15-16 yrs. And in obesity out of 28 students 09 were girls of 17-18yrs age group.

In 108 Prehypertensive students, 14 students BMI was normal (12.96%), 73 students were

overweight (67.59%) and 21 were obese (19.44%), where as in 35 hypertensive students 02 students BMI was normal (5.71%), 13 students were overweight (37.14%) and 20 were obese (57.14%).

V. Summary

- Total 1134 children from both the schools were interviewed and examined.
- In this study total 569 boys and 565 girls were examined.
- In Rural Area Government school, out of 646 students 563 were normal BMI (87.15%), 74 had overweight (11.47%) and 09 were obese (1.39%) where as in urban area private school, out of 488 students, 330 students had normal BMI (67.62%), 139 were overweight (28.48% and 19 were obese (3.89%).
- Prevalence of Prehypertension in this study is 9.5% and hypertension 3%.

- Prehypertension and hypertension were common in boys than girls.
- In Prehypertensive and hypertensive group, maximum students were of 17-18 yrs. age.
- Out of 1134 students examined, 18.78% were overweight (96 boys and 117 Girls) and 2.46% (19 boys and 09 Girls) having obesity.
- Out of 213 overweight students 96 were boys with maximum fromage group of 11-12 and then 16-17 yrs. and in obesity out of 28 students 19 were boys of 11-12 yrs. age followed by 17-18 yrs. age group.
- Out of 213 overweight students, 117 were girls with maximum fromage group of 17-18 and then 15-16 yrs. and in obesity out of 28 students 09 were girls of 17-18yrs age group.
- Out of 108 Prehypertensive students, 14 students BMI was normal (12.96%), 73 students were overweight (67.59%) and 21 were obese (19.44%).
- Out of 35 hypertensive students, 02 students BMI was normal (5.71%), 13 students were overweight (37.14%) and 20 were obese (57.14%).

VI. Conclusion

- This Study documents the increasing association of overweight- obesity and Prehypertension- hypertension among adolescents.
- Obese and overweight adolescents are seen at increased risk of high blood pressure.
- Prehypertension and hypertension in adolescence appears to be increasing like the epidemic of adolescent obesity.
- Continued research is required for Blood pressure charts in Indian scenario and management protocol in adolescents.
- Lifestyle modification and good dietary habit is a successful key in preventing prehypertension and hypertension in children.

Recommendations-

- ✓ Sensitization of school staff in regarding Overweight and obesity in children.
- ✓ Guest lectures of dietician and physical instructor should be conducted in every school regularly.
- ✓ Need for periodic blood pressure monitoring as part of the school health programme.

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