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Study of Prevalence of Obesity and Hypertension in Adolescent School Children and Risk Factors Associated

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ABSTRACT

Aim: *To study prevalence of obesity and its association with hypertension and risk factors associated with them in adolescents school children.*

Materials and methods: *Its is a Cross-sectional study carried out over a period from June 2012 to July 2013 conducted among adolescent school children belonging to the age group of 12 to 16 years of both genders.*

Results: *In our study, over all obesity showed a prevalence of 4.5%per 100 children. On the whole, prevalence of overweight and obesity was 13.3%. Adolescent hypertension showed a prevalence of 11.9 per 100 children. Hypertension was not significantly more in private schools compared to government schools. Hypertension is more common in overweight and obese children, Also risk factors like use of extra salt, TV watching, physical activity are associated with obesity and HTN.*

Conclusion: *Prevention and early treatment of obesity could go a long way in preventing the development of type-2 DM and CAD/strokes in later life .*

Key words: *Adolescents, Obesity, Overweight, Hypertension.*

INTRODUCTION

Childhood overweight and obesity are increasingly prevalent global problems and have received much attention in recent years. Obesity is evolving as a major nutritional problem in the developing countries, affecting a substantial number of adults and resulting in an increased burden of chronic disease. These are serious public health challenges of the 21st century as it appears to increase the risk of subsequent morbidity, whether or not obesity persists into adulthood.[1,2]

Outcomes related to childhood obesity include hypertension, type 2 diabetes mellitus , dyslipidemia, left ventricular hypertrophy, nonalcoholic steatohepatitis, obstructive sleep apnea, and orthopedic and psychosocial problems.[3-5] The knowledge that blood pressure during childhood is an established predictor of adult blood pressure, which in turn increases

mortality from CVD, clearly underscores the importance of studying childhood blood pressure and the need for establishing preventive measures in early life.[6] Adolescence is a period of transition between childhood and adulthood. It occupies a crucial position in the life of human beings characterized by an exceptionally rapid rate of growth[7]. During the past 20 years, prevalence of obesity among children and adolescents have doubled in America [8].

The United States National Center for Health Statistics suggests that nearly 15% adolescents are overweight or obese[8,9]. There is evidence that children and adolescents of affluent families are overweight than in the past possibly because of decreased physical activities, sedentary lifestyles, altered eating patterns and increased fat content of the diet[8,10]. Present study aim to Study Prevalence of obesity and its association with Hypertension & Risk factors associated with them.

MATERIALS AND METHODS

The study was conducted in four schools of Hyderabad. Of which two were government schools and two private schools. It is a Cross-sectional study carried out over a period from june 2012 to july 2013. 800 adolescent school children belonging to the age group of 12 to 16years of both genders were included in the study. Selection of schools was done by stratified random sampling by collecting the list of schools in Hyderabad..

Inclusion criteria: All 12-16 year old children of both sexes from selected schools.

Exclusion criteria: All those children aged below 12yrs and above 16yrs are excluded from the study. Children with known renal or heart diseases and with chronic medication bound to cause hypertension are excluded.

The following instruments were used in the survey to collect data. :

1. Pre-tested Questionnaire in English to collect personal particulars, family history of HTN/DM/CAD/Stroke, dietary habits, physical activity, TV watching, use of extra salt, transport to school etc.
2. OMRON Electronic weighing scale to measure weight in kgs up to 100 gms accuracy.
3. Stadiometer to measure Height to the nearest of 0.1 cms.
4. Mercury gravity sphygmomanometer with proper cuff size to measure the Blood Pressure accurately.

All the participants were explained about the purpose of the study along with the scope of future intervention, if necessary. They were ensured strict confidentiality, and then informed consent was taken from each of the participants before the total procedure. The participants were given the options not to participate in the study, if they wanted.

Data regarding family and personal information were recorded by personal interview by the principal investigator. It was followed by weight measurement and BP check-up as mentioned below in details. Children from the representative sample were called for screening according to their classes and were given rest for 5 min.

The procedures were explained briefly and demonstrated to them. Blood pressure was measured in each subject three times by the same observer using standard mercury sphygmomano-meter with appropriate cuff size. Two readings of the BP of each child were taken, with an interval of 5 min between each reading. Third reading taken during next visit .The mean of three readings was calculated.

The weight and height of each child were recorded. Height was measured by a WHO approved wall-mounted height measuring scale. An Electronic weighing scale to measure weight in kgs up to 100 gms accuracy was used to measure weight Overweight and obesity were defined by body mass index (BMI) for gender and age. Gender, age and height were considered for determining hypertension. Children with a BMI >85th percentile of reference data were considered overweight and those with a BMI >95th percentile were considered obese.[11] The reference data used

to identify the cut-off points were taken from the CDC 2000 dataset for BMI.[12]

Blood Pressure was measured using standard methodology as recommended by The Fourth Report on the diagnosis, evaluation, and treatment of high BP in children and adolescents. Average systolic or diastolic BP >95th percentile for gender, age, and height was considered as Hypertension. Pre-hypertension was defined as average systolic BP or diastolic BP that was >90th percentile but <95th percentile. Children with BP levels >120 mmHg systolic and/or 80 mmHg diastolic were also considered pre-hypertensive.[13] Children were defined as overweight and obese if their BMI falls above 85th and 95th percentiles, respectively, of the reference curve for their age and gender.

RESULTS

The collected data were thoroughly screened and entered into Excel spreadsheets and analysis was carried out. The procedures involved were transcription, preliminary data inspection, content analysis, and interpretation. SPSS 17.0 was used to calculate proportions, and significance test was used in this study. A Total of 800 Adolescent school child studying 7th to 10th classes belonging to the age group of 12-16 years of both genders were included in the study. The exact age was verified from school records.400 children from government schools & 400 children from private schools.

Table-1: Demographic distribution in government and private schools

Age in years	Government schools		Private schools		Total
	Males	Females	Males	Females	
12 yrs	36	47	48	32	163
13 yrs	26	52	33	53	164
14 yrs	42	45	45	30	162
15 yrs	41	45	50	30	166
16 yrs	43	23	50	29	145
Total	188	212	226	174	800

Out of 800 school children 51.8% were males(n=414) and 48.2 % were females(n=386). Mean age of children in government schools is 13.94 ±1.4 yrs and mean age of children in private schools is 13.98±1.4yrs . Mean weight of children is 44.06±10.8 kgs and 48.60± 13.1 in government schools & private schools respectively. Mean height of children is 157.60 ±8.6 cms and 162.41±17.8cms in government and private schools respectively.

Table-2: Obesity in both groups of children.

Characteristic	Private school	Government school	Total	p-value
Normal or under weight	358	333	694	<0.047*
Over weight	30	40	70	
Obesity	12	24	36	
Total	400	400	800	

*p<0.05 is significant

The prevalence of obesity and overweight in govt schoools is 3% and 7.5% respectively. The prevalence of obesity and overweight in private schools is 6% and 10% and respectively.

Over all prevalence of obesity was 4.5% the overall prevalence of overweight and obesity together in our study was 13.3%. Prevalence of obesity in private schools is twice compared to government schools. P value is < 0.047 which is statistically significant

Table-3: Obesity and Hypertensive in age wise distribution.

Age in years	Total number of children	Obesity	Over weight	Hypertensives
12 yrs	163	19	12	14
13 yrs	164	17	5	21
14 yrs	162	11	4	17
15 yrs	`166	13	7	20
16 yrs	145	10	8	21
Total	800	95	36	93

In Our study, Adolescent Hypertension and prehypertension collectively was 11.9% that was observed higher in children with overweight and obesity

Table-4: Hypertensives with type of hypertension in children.

Type of hypertension	Government schools	Private schools	Total
Diastolic	5	6	11
Pre- diastolic	10	9	19
No diastolic HTN	385	385	770
Systolic	24	33	57
Pre systolic	18	17	35
No Systolic HTN	358	350	705

Table-5: Hypertension in government schools private schools

Hypertension	Government school	Private school	Total	P-value
Yes	43	52	95	0.35
No	357	348	705	

Table-6: Gender wise distribution of Obesity and Hypertension in children.

Gender	Total	Over Weight	Obesity	Hypertensive	P-value
Males	414	40	22	51	< 0.001*
Females	386	30	14	44	

*p<0.05 is significant

Table-7: Factors influencing in Obesity and hypertension in present study.

Characteristic	Government school	Private school	Over Weight	Obese	Hypertension	p-values
Food habits						
Vegetarian	32	26	3	2	6	0.41
Non vegetarian	368	374	67	34	91	
Sleep duration						
<8 hrs	54	67	13	7	23	0.29
>8 hrs	346	333	57	29	72	
Physical activity						
<60 min/day	128	162	33	20	41	0.04
>60 min/day	272	238	37	16	54	
TV watching						
<2 hrs	86	75	17	4	15	<0.0001*
>2 hrs	314	325	53	32	80	
Family history of HTN/DM/CAD						
Yes	133	160	23	18	47	0.067
No	267	240	47	18	48	
Extra salt intake						
Yes	87	103	19	11	42	<0.0001*
No	313	297	51	25	53	
Transport						
By walk/bicycle	298	175	17	6	29	<0.0001*
Motor vehicle	102	225	13	6	14	
Skip break fast						
Yes	125	166	27	16	39	0.001*
No	275	234	43	20	56	
Junk foods						
Almost daily	21	40	7	8	9	0.027
Occasionally	379	360	63	28	86	

*p<0.05 is significant

DISCUSSION

We conducted a cross sectional study to determine the magnitude of Adolescent obesity and overweight as well as hypertension in a representative population of school children from Hyderabad. The relationship of obesity with adolescent hypertension was also explored.

In our study, over all obesity showed a prevalence of 4.5% per 100 children. On the whole, prevalence of overweight and obesity was 13.3%. Adolescent hypertension showed a prevalence of 11.9 per 100 children. The prevalence of obesity in affluent adolescent school children in Delhi according to BMI criteria was found to be 7.4%. An earlier study on school children had reported a similar prevalence rate of obesity as 7.5%[10]. In our study, adolescent hypertension and pre-hypertension collectively was 11.9% that was observed higher in children with overweight and obesity. In addition, studies on Indian schoolchildren have also demonstrated that the prevalence of hypertension in overweight children is significantly higher than that among normal children.[13-16]

In Our study we found that children who eat junk foods almost daily have high prevalence of obesity and hypertension compared to those who eat occasionally. Hypertension was 14.7% vs

11.6%.also the prevalence of obesity in those children who come by walk is 9.7% compared to those who come by motor vehicle(18.3%).Benson et al[17], also found that 90% of overweight children, 46% of obese children and 24% of severely obese children remained undiagnosed. These data highlight the need to improve the diagnosis of weight problems in children and adolescents, especially overweight children, who could benefit most from potential interventions.

Reilly et al[18], examined risk factors for obesity at 7 years of age in a subsample of 909 UK children from the Avon longitudinal study of parents and children. A junk-food dietary pattern at 3 years of age was associated with obesity at 7 years of age in an unadjusted model. A junk food dietary pattern was characterized by increased levels of fizzy drinks, sweets, chocolates, chips, fried foods and other junk foods. There was no significant relationship with obesity for a healthy, traditional, or fussy dietary pattern. Height and weight were measured by the research team.

Marshall et al.[19] systematic review of a total of 39 studies indicated that 49% of the variance in body fatness may be explained by factors other than TV viewing. Therefore, the authors conclude that this very small effect is unlikely to be of substantial clinical importance. Our study generated awareness about dangers of obesity and hypertension among children, guardians and teachers. We strictly followed the current recommendation for children in detecting elevated BP that can only be confirmed after a minimum of three separate BP measurements. Thus "white coat hypertension" was ruled out in our study.[13]

Verma et al.[20], studied hypertension prevalence in urban children in the age group of 5-15 years in Ludhiana (Punjab) Hypertension was diagnosed by BP levels at more than 95 th %. The prevalence of high BP was 2.8 percent, which is comparable to the results of the LIG school children of the present study. Similarly, another study from Ludhiana in 2004 revealed that prevalence of sustained hypertension was 7% amongst urban children and 2.6 amongst rural children[15].

LIMITATIONS

Sample size could have been larger. Cut off values for BMI & hypertension may vary worldwide.

CONCLUSION

The study showed that there is increased prevalence of obesity in private schools compared to government schools. Hypertension was not significantly more in private schools compared to government schools were as hypertension is more common in overweight and obese children. Some risk factors like use of extra salt, TV watching, physical activity were associated with obesity and HTN.

Hence, the prevention and early treatment of obesity could go a long way in preventing the development of type-2 DM and CAD/strokes in later life.

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