

Prevalence of Overweight and Obesity among School Children

Rahul Pengoria¹, Mohita Agarwal², N.C.Prajapati³, Pankaj Kumar¹, Dipti Agarwal¹

¹Assistant Professor, Department of Pediatrics, S.N.Medical College, Agra.

²Assistant Professor, Department of OBGYN, S.N. Medical College, Agra.

³Professor, Department of Pediatrics, S.N. Medical College, Agra.

Received: November 2014

Accepted: January 2015

ABSTRACT

Background: Obesity in children and adolescents is a serious public-health concern, and obesity research has become an important field of study. The aim of our study was to find out the prevalence of overweight and obesity in school children from the first to twelfth grade. **Methods:** An observational study was carried out wherein 1590 children from various schools were reviewed and their BMI was calculated. Accordingly they were categorized as Overweight or Obese. The trends were studied in different age groups and gender. **Results:** The prevalence of overweight girls was 9.87%, and boys were 10.92%. Only 1.31% of girls and 3.26% of boys were found to be obese. The overall prevalence, boys and girls combined, of overweight and obesity was 10.2% and 2.8%, respectively. **Conclusion:** Childhood Obesity is an important risk factor for future health issues. Encouraging healthy lifestyle and exercise routine in children would prevent the occurrence of this virtually disastrous epidemic.

Keywords: Overweight, Obesity, BMI.

INTRODUCTION

Obesity is defined as a body mass index (BMI) at or above the 95th percentile of the CDC sex-specific BMI-for-age growth charts. Obesity is associated with serious health risks. Monitoring obesity prevalence is relevant for public health programs that focus on reducing or preventing obesity. The worldwide prevalence of overweight and obesity in children and adolescents has increased in the recent decades.^[1] An estimated 170 million children under 18 years of age were overweight or obese in 2008, and it has been projected that approximately 30% of all children will be affected by these conditions by 2030.^[2,3] The prevalence of a body mass index (BMI) at or higher than the 95th percentile among children between the ages of 6 and 11 years in the United States increased from 4.2% in 1963–1965 to 15.3% in 1999–2000, before plateauing during the first decade of the 21st century. The overall prevalence of overweight, including obesity, in school children in European countries was estimated at 20.5%. The proportion of overweight and obesity was 24.5% in Eastern Asia countries and 11.9% in the Western Asia regions. The World Health Organization (WHO) has estimated that the majority of overweight or obese children live in developing countries, where the rates are increasing faster than in developed countries. A comparative study across

developing countries reported that prevalence rates of obesity in adolescents in Asia are highest.^[2,3]

Obesity in early life is a precursor to obesity in adulthood, and excess weight in adults is associated with many adverse health outcomes including type 2 diabetes, hypertension, dyslipidaemia, cardiovascular diseases and various type of cancers. The current increasing prevalence of childhood overweight and obesity will therefore adversely affect the burden of obesity-related diseases and their consequences on families and health systems in the near future. The etiological factors for childhood obesity include genetic, metabolic, and behavioural components.^[4] In spite of the demonstrated genetic influence, a strong obesogenic environment is essential for its phenotypic expression of overweight and obesity. Childhood and adolescence is a short period, but important, window of opportunity for the prevention management and control of obesity and subsequent related health consequences.

We performed a systematic review to determine the prevalence of childhood and adolescent overweight and obesity in school children, with a view to provide data for monitoring future trends.

MATERIALS AND METHODS

The current study was carried out to find out the prevalence of obesity among schoolchildren using WHO BMI-for-age charts for boys and girls.

This cross-sectional study was carried out in a group of schools in a city of North India. The schools selected for the study were all private institutions with nearly the same fee structure. This

Name & Address of Corresponding Author

Dr. Rahul Pengoria
32/75A/4 Rajpur Chungi
Agra 282001.

was to ensure a similar socio-economic status of the school children.

A total of 1590 students from classes 1st to 12th were enrolled in the study. The age group of the participants was between 5-18yrs. All apparently healthy students were included in the study. Students suffering from any systemic illness or chronic illness were excluded from the study. Information regarding age, sex, and class in which studying was obtained from school records. Age was recorded to nearest completed years. Prior consent for carrying out medical examination of children was taken from parents and school authorities.

Medical examination of children was carried out by a team of medical officers and paramedics. It included recording of height, weight, and clinical examination of all systems. Height was recorded with the help of a height scale with an accuracy of 0.1 cm. Weight was recorded using digital weighing machine with an accuracy of 0.1 kg. All students were weighed with uniform but without shoes, and weight was recorded after deducting 200 gm (0.2 kg) for uniform.

BMI was calculated for all the students and compared with the median of standard BMI-for-age chart of WHO. All children with one standard deviation above BMI for age and sex were defined as overweight and those with two standard deviations above BMI for age and sex were defined as obese.

RESULTS

Table 1: Age and Gender Distribution of Children

Age Group	Males	Females
6-10	304	226
11-13	236	196
14-15	168	138
16 and above	148	96

Table 2: Prevalence of Overweight and Obesity according to Age group in Males

Age Group	Males	Overweight	Obese	Total
6-10	352	48	18	66
11-13	236	40	6	46
14-15	168	6	2	8
16 and above	144	8	4	12
	930	102	30	132

Table 3: Prevalence of Overweight and Obesity according to Age group in Females

Age Group	Females	Overweight	Obese	Total	p-value
6-10	228	20	2	22	0.0373
11-13	198	20	4	24	0.2794
14-15	138	14	0	14	0.1998
16 and above	96	10	2	12	0.0986
	660	64	30	132	0.1836

In the present cross-sectional study, a total of 1590 school children consisting of 660 (41.2%) girls and 930 (58.4%) boys between the age groups of 6 and 19 years were included. They were, subsequently, divided into groups based on primary (6–10 years), upper primary (11–13 years), secondary (14–15 years), and senior secondary (16 years and above) levels of education. Their sex-wise distribution according to level of education is given in [Table 1]. As can be seen from [Table 1], the difference in the distribution of boys and girls in various age groups is not statistically significant.

BMI of all school children was compared with the WHO BMI-for-age chart. The prevalence of overweight girls was 9.87%, and boys were 10.92%. This is clearly shown in [Table 2]. Only 1.31% of girls and 3.26% of boys were found to be obese. The overall prevalence, boys and girls combined, of overweight and obesity was 10.2% and 2.8%, respectively [Table 2,3]

Overweight and obesity were more common among boys as compared to girls under the age of 13 years; combined prevalence of overweight and obesity among boys up to age of 10 years was 18.69% which is approximately twice more common than that among girls (i.e., 9.68%) of the same age group. It reduced to almost one and half times, i.e., 17.38%

among boys and 12.19% among girls, in the age group of 11–13 years. Trend changed afterward and a larger proportion of girls were overweight. However, except in the age group of 6–10 years, difference in the prevalence of overweight between sexes was not found statistically significant.

DISCUSSION

The present study was carried out as part of school health program. The prevalence of overweight and obesity found in our study was less than that found by Ranjani et al. in their systematic review of 52 studies, published between 1980 and 2013, on childhood overweight and obesity; Pawar et al. in their study of 4 schools in South Mumbai;^[5] Jagadesan et al. in their study among schoolchildren and adolescents in Chennai;^[6] Pradeepa et al. in their study in Tamil Nadu and Maharashtra;^[7] and Misra et al. in their multicentric study of 38,296 schoolchildren.^[8]

One of the reasons for lower prevalence of overweight and obesity in our context could be because the schools are located in an area where schools aim at all round development of children and place special emphasis on games and physical activities. Students are motivated to participate in

various health activities being carried out in the schools. Such inclusion of mandatory physical activity sessions in schools, according to Khandelwal and Reddy, is one of the important interventions toward controlling obesity.^[9] Another reason which is also a limitation of the study could be a small sample size which has not been able to detect the true prevalence of overweight and obesity in schoolchildren.

According to the logistic regression analysis, male students have OR: 1.68 (CI: 1.11 - 2.55, $P < 0.05$) times higher risk of being overweight than female students. This increased risk was statistically significant. This study determined that being overweight is more prevalent in males, and being male is an important risk factor. Similarly, other studies conducted in the same age group showed that males are more likely to be overweight than females.^[10-13] However, there are also studies claiming that obesity risk is higher in girls than boys.^[12,14,15] In this study we found a significant relationship between gender and obesity. Similarly, some studies also found no significant relationship between gender, being overweight and obese.^[14,16] The results of the studies regarding the relationship between childhood obesity and gender are not consistent with ours.

In our study, we also noted that overweight and obesity were more common among boys as compared to girls under the age of 13 years. Trend changed afterward and a larger proportion of girls were overweight. Similar findings have also been reported by Misra et al.^[8] Higher prevalence of obesity among adolescent girls may be linked to an early attainment of puberty as compared to boys. Postpubertal adolescent girls in the sociocultural milieu of developing countries like ours have very low levels of physical activity that is mainly restricted to household chores. Their participation in outdoor games and other health enhancing physical activities are much less as compared to boys.

Age was not an important risk factor for being overweight or obese according to the logistic regression results. Tola et al.^[16] also argued that age did not affect being overweight and obese. Similarly, Simsek et al.^[17] indicated that there was no significant difference between children 6 - 11 years of age and children 12 - 17 years of age. Similarly, a study conducted in Portugal claimed that age is not a risk factor for obesity. Some studies indicate that being overweight is more prevalent among children 7 - 11 or 7 - 12 years of age.^[12,15] The results of the studies on the relationship between age group and being obese or overweight are not consistent with ours.

CONCLUSION

It is very important to detect overweight and obese children in school. Obesity-prevention programs must be organized for all children, and attempt to target, in particular, male children who consume milk pudding more than four times per week with overweight or obese parents, and those who have highly educated parents and moderate or higher SES. Social and school life can be managed with programs integrating teachers, students, and their families in order to raise awareness about obesity.

REFERENCES

1. Swinburn BA, Sacks G, Hall KD, et al. The global obesity pandemic: shaped by global drivers and local environments. *Lancet*. 2011;378:804-14.
2. Cunningham SA, Kramer MR, Narayan KMV. Incidence of childhood obesity in the United States. *N Engl J Med*. 2012;370:403-11.
3. Lakshman R, Elks CE, Ong KK. Childhood obesity. *Circulation*. 2012;126:1770-9.
4. Ramachandran A, Snehalatha C. Rising burden of obesity in Asia. *J Obesity*. 2010;2010
5. Pawar SV, Choksey AS, Jain SS, Surude RG, Rathu PM. Prevalence of overweight and obesity in 4 schools of South Mumbai. *J Clin Diagn Res* 2012;10:OC01-2.
6. Jagadesan S, Harish R, Miranda P, Unnikrishnan R, Anjana RM, Mohan V, et al. Prevalence of overweight and obesity among school children and adolescents in Chennai. *Indian Pediatr* 2011;51:544-9
7. Misra A, Shah P, Goel K, Hazra DK, Gupta R, Seth P, et al. The high burden of obesity and abdominal obesity in urban Indian school children: A multicentric study of 38,296 children. *Ann Nutr Metab* 2011;58:203-11.
8. Khandelwal S, Reddy KS. Eliciting a policy response for the rising epidemic of overweight-obesity in India. *Obes Rev* 2012;14 Suppl 2:114-25
9. Piriñçi E, Durmus B, Gündoğdu C, Açık Y. Prevalence and risk factors of overweight and obesity among urban school children in Elazığ city, Eastern Turkey, 2007. *Ann Hum Biol*. 2009;37(1):44-56.
10. Andegiorgish AK, Wang J, Zhang X, Liu X, Zhu H. Prevalence of overweight, obesity, and associated risk factors among school children and adolescents in Tianjin, China. *Eur J Pediatr*. 2011;171(4):697-703.
11. Chen TJ, Modin B, Ji CY, Hjern A. Regional, socioeconomic and urban rural disparities in child and adolescent obesity in China: a multilevel analysis. *Acta Paediatr*. 2011;100(12):1583-9.
12. Esmaili H, Bahreynian M, Qorbani M, Motlagh ME, Ardalan G, Heshmat R, et al. Prevalence of general and abdominal obesity in a nationally representative sample of Iranian children and adolescents: The caspian-iv study. *Iran J Pediatr*. 2011;25(3):401.
13. Khader Y, Irshaidat O, Khasawneh M, Amarin Z, Alomari M, Batieha A. Overweight and obesity among school children in Jordan: Prevalence and associated factors. *Matern Child Health J*. 2008;13(3):424-31.
14. Jülfuss PB, Eide GE, Roelants M, Waaler PE, Hauspie R, Bjerknes R. Overweight and obesity in Norwegian children: prevalence and socio-demographic risk factors. *Acta Paediatr*. 2010;99(6):900-5.
15. Tola HT, Akyol P, Eren E. Prevalence and effected factors of obesity in children and adolescent in Isparta. *J Child*. 2007;7:10-4.

16. Simsek F. , Ulukol B. , Berberoğlu M. . Obesity prevalence in a primary school and a high school in Ankara. J Ankara Med School. 2005;58:163–6.

How to cite this article: Pengoria R, Agarwal M, Prajapati NC, Kumar P, Agarwal D. Prevalence of Overweight and Obesity among School Children. Ann. Int. Med. Den. Res. 2015;1(1):66-69.

Source of Support: Nil, **Conflict of Interest:** None declared