SHORT ARTICLE

Prevalence and Correlates of overweight and obesity among school children in Guwahati city, Assam

Chetanjit Baruah

Demonstrator, Department of Community Medicine, Assam Medical College & Hospital, Dibrugarh, Assam

Abstract | Introduction | Methodology | Results | Conclusion | References | Citation | Tables / Figures

Corresponding Author

Address for Correspondence: Dr. Chetanjit Baruah Department of Community Medicine, Assam Medical College & Hospital, Dibrugarh 786001 Assam.
E Mail ID: baruahdrcheta@gmail.com

Citation

Baruah C. Prevalence and Correlates of overweight and obesity among school children in Guwahati city, Assam. Indian J Comm Health. 2018; 30, 1: 85-89.

Source of Funding: Nil **Conflict of Interest:** None declared

Article Cycle

Received: 27/11/2017; **Revision:** 14/12/2017; **Accepted:** 04/02/2018; **Published:** 31/03/2018

Abstract

Background: Childhood obesity is one of the most serious public health challenges of the 21st century. Obese children are at increased risk for heart disease, diabetes, stroke, cancer and osteoarthritis. **Aim & Objective**: To study the prevalence of overweight and obesity & its correlates among school children of Guwahati city. **Materials and Method:** School based cross sectional study was done among the students of 8th to 10th standard of Guwahati city, Assam. 465 school children were selected by multistage simple random sampling. Data was collected using a pre-designed, semi-structured questionnaire. **Results**: Prevalence of overweight and obesity was found to be 5.4 % & 2.8 %.and it was significantly more among those who were Non-vegetarian, whose breakfast habit were irregular, don't consume fruits, consume fast food daily, junk food daily, carbonated drinks daily, don't play outdoor games and use vehicles as mode of transport to school. **Conclusion**: Prevalence of overweight and obesity was found to be more among students having modifiable risk factors.

Keywords

Overweight; Obesity; Prevalence; BMI, School

Introduction

Childhood obesity is one of the most serious public health challenges of the 21st century. The prevalence of obesity is increasing both in developed and in developing countries and has become a major public health problem.

The body mass index (BMI) is the accepted standard measure of overweight and obesity for children two years of age and older. WHO parameters for BMI-for-age parameters are defined by standard deviations and describe overweight to be greater than +1standard deviation from the mean (equivalent to BMI=25 kg/m2 at 19 years) and obese as +2 standard deviations from the mean for 5 to19 year-olds (equivalent to BMI=30 kg/m2 at 19 years). (1)

Obese children are more likely to be obese in adulthood than healthy-weight children. This places them at increased risk for adult health problems such as heart disease, type 2 diabetes, stroke, multiple types of cancer and osteoarthritis.

There is a wide variation in the prevalence data for childhood obesity globally. The worldwide prevalence of childhood overweight and obesity increased from 4.2% (95% CI: 3.2%, 5.2%) in 1990 to 6.7% (95% CI: 5.6%, 7.7%) in 2010. This trend is likely to continue, and the prevalence is expected to reach 9.1%, or 60 million, in 2020.

Aim & Objectives

To determine the prevalence of overweight and obesity and identify its various correlates among the school children

Material & Methods

A School based cross-sectional study was conducted among School children from 8th to 10th standard of Guwahati City, Assam. Study Duration: 01/06/2017 to 30/07/2017. Sample Size Calculation: On the basis of the overall prevalence of overweight/obesity as 19 % as reported in a study by Nagaraj S *et al* (2) in Mysuru district, Karnataka, sample size was calculated using the formula: $n = Z\ 2pq/L^2$, where Z is the standard normal variate for 95% confidence interval = 1.96; p is the prevalence of obesity = 0.19; q = (1 − p) = 1 − 0.19 = 0.81; L is the allowable error. Considering an absolute allowable error of 20%, minimum sample size required was calculated to be 426. Multistage simple random sampling method was used to select schools. First of all, a list of all government and private schools was obtained and then by simple random sampling (using lottery method); a total of 4 schools (two Govt and two Private) were selected. From each selected school, children from 8th to 10th standard were included in the study. Thus, a total of 465 school children were included in the study.

Data Collection: Data was collected using a pre-designed, semi-structured questionnaire. Anthropometric measurements i.e weight and height of the students was taken and BMI calculated. Before collecting the data, permission was taken from the respective principals of the selected schools and verbal consent from the students.

Data Analysis: The data was analyzed using SPSS version 20.0 software. Percentage was calculated for all the variables and chi square test was applied.

Exclusion criteria: Students absent on the day of visit and who did not volunteer to participate in the study.

Ethical Approval: Ethical approval was taken from institutional ethical committee of Gauhati Medical College & Hospital, Assam

Results

The mean weight, height and BMI of the study subjects were 48.67 ± 10.75 Kg (Male 50.32 ± 11.26, Female 46.87 ± 9.89), 156.98± 18.95 cm (Male 160.67±10.39, Female 152.98±24.55) and 20.09 ± 8.03 Kg/m2 (Male 19.96±10.51, Female 20.23±3.87) respectively. Out of 465 students, 5.4 % were overweight and 2.8 %were obese

Most (6.3%) of the overweight and (3.5%) obese students belonged to 14-15 years of age group, followed by (5.1%) overweight and (1.7%) obese in 16-19 years of age group. The prevalence of overweight and obesity was more among boys (5.3% & 2.8%) as compared to girls (5.1% & 2.5%). The prevalence of overweight (6.6%) and obesity (2.7%) was more among study subjects belonging to Hindu religion. However, these differences were not statistically significant.

Higher prevalence of overweight (5.6%) and obesity (2.5%) was found among study subjects of nuclear family when it was compared with study subjects of joint family (3.9%) overweight and (3.9%) obesity although insignificant. The prevalence of overweight (6.9%) and obesity (3.4%) was significantly more among study subjects in private schools as compared with government schools and also significantly more among the study subjects who belongs to Upper Middle social class (8.8% & 4.1%), followed by Lower Middle social class (4.9% &2.4%) respectively

The prevalence of overweight and obesity was significantly more among the study subjects who were Non-vegetarian (9.2% & 3.3%), whose breakfast habit were irregular (9.3 % & 4.6%) ,who don't consume fruits (15.4 % & 11.5 %), followed by those who consume fruits occasionally (5.9 % & 2.4 %) and who don't consume vegetables (17.6 % & 11.8%), followed by those who consume vegetables occasionally (13.0 % & 5.8 %).

The prevalence of overweight and obesity was significantly more among the study subjects who consume fast food daily (7.1% & 3.6%), junk food daily (7.0 % & 3.8%) and carbonated drinks daily (7.8 % & 3.5%).

The prevalence of overweight and obesity was significantly more among the study subjects not playing outdoor games (7.9% & 6.3%), followed by study subjects playing outdoor games weekly (7.0% & 2.8%) respectively.

Again, the prevalence of overweight and obesity was more among the study subjects not playing indoor games (7.7 % & 5.1%), followed by study subjects playing indoor games for less than one hour daily (6.9 % & 2.3 %) although statistically insignificant.

Again, the prevalence of overweight and obesity (7.7 % & 3.6 %) was significantly more among the study subjects who use vehicles as mode of transport to school.

The prevalence of overweight and obesity (9.8% & 3.5%) was significantly more among the study subjects watching TV for more than 3 hours, watching PC/mobile for more than 3 hours (13.2% & 5.7 %) and who sleep for less than 6 hours daily (10.7% & 5.9 %) respectively.

Discussion

In the present study, the prevalence of overweight and obesity was 5.8 % & 2.8%. Goyal JP *et al* (3) found high prevalence of over-weight & obesity (13.9 % & 6.5%) whereas Vohra R *et al* (4) found low prevalence of over-weight and obesity (4.17% & 0.73%).

Overweight & obese students were in middle adolescent age group although statistically insignificant. This finding is similar with Kotian M S *et al* (5).

Overweight & obesity was more among boys (5.3% & 2.8%) than girls (5.1% & 2.5%) although statistically insignificant. This finding is similar with Goyal J P *et al* (3).

Students belonging to Hindu religion were overweight (6.6%) & obese (2.7%) although statistically insignificant as also observed by Vohra R *et al* (4).

Students of nuclear family were overweight (5.6%) and obese (2.5%) although statistically insignificant as also observed by Rohilla R *et al* (6).

Overweight (6.9%) and obesity (3.4%) was significantly more among students in private schools which was also reported by Namdev G *et al* (7).

Students of Upper Middle social class were significantly overweight and obese (8.8% & 4.1%) as also reported by Vohra R *et al* (4)

Students with non-vegetarian diet, irregular breakfast habit, don't consume fruits and vegetables, consume fast food and carbonated drinks daily, watch PC/mobile for more than 3 hours were significantly overweight and obese. Similar findings were reported by Watharkar A *et al* (8). Overweight and obesity was significantly more among students who consume junk food daily, don't play outdoor games, use vehicles as mode of transport to school, watch TV for more than 3 hours. Similar findings were reported by Goyal J.P.*et al* (3). Students who sleep for less than 6 hours daily were significantly overweight and obese (10.7% & 5.9 %). This finding is similar with Anuradha R.K. *et al* (9).

Conclusion

Prevalence of overweight and obesity was found to be 5.4 % & 2.8 %.and it was significantly more among those who were Non-vegetarian, whose breakfast habit were irregular, don't consume fruits,
consume fast food daily, junk food daily, carbonated drinks daily, don't play outdoor games and use vehicles as mode of transport to school.

Recommendation

School children should be encouraged to do regular physical activity, limit consumption of foods high in fat, sugar and calories; increase consumption of fruits, vegetables, legumes, whole grains, nuts and spend less time in screen based activities. Parents should be encourage motivating their children to eat more nutritious food, have regular meals and should provide their children with healthy food choices. In school curriculum, more knowledge about nutrition, physical activity and nutrition related disease should be incorporated. School authorities should ban unhealthy food in school canteens and make healthier choice available.

Limitation of the study

Study was conducted only in schools within field practice area of Gauhati Medical College, so results could not be generalized to the whole city. Also waist circumference, hip circumference and waist to hip ratio could not be assessed due to time and resource constraints.

Relevance of the study

Childhood obesity is a crucial issue that needs to be addressed urgently. Changing dietary practices and maintenance of regular physical activity starting as early as infancy through parental initiative and
social support interventions are the most important strategies to tackle childhood obesity.

References

1. WHO | BMI-for-age (5-19 years). Available from http://www.who.int/growthref/who2007_bmi_for_age/en/index.html. [Accessed on 12/02/2018] & www.epi.umn.edu/let/nutri/chobese [Accessed on 12/02/2018]
2. Nagaraj S, Bettapa P, Prakash B, Kaverappa V, Rani U, Ashok NC. Prevalence and determinants of overweight and obesity among school-going adolescents in Mysuru district, southern India. Int J Med Sci Public Health 2015;4:1182-1186
3. Goyal JP, Kumar N, Parmar I, Shah VB, Patel B. Determinants of Overweight and Obesity in Affluent Adolescent in Surat City, South Gujarat region, India. Indian J Community Med. 2011 Oct;36(4):296-300. doi: 10.4103/0970-0218.91418. PubMed PMID: 22279261; PubMed Central PMCID: PMC3263151.[PubMed].

4. Vohra R, Bhardwaj P, Srivastava JP, Srivastava S, Vohra A. Overweight and obesity among school-going children of Lucknow city. J Family Community Med. 2011 May;18(2):59-62. doi: 10.4103/2230-8229.83369. PubMed PMID: 21897912; PubMed Central PMCID: PMC3159229.[PubMed]
5. Kotian MS, S GK, Kotian SS. Prevalence and determinants of overweight and obesity among adolescent school children of South karnataka, India. Indian J Community Med. 2010 Jan;35(1):176-8. doi: 10.4103/0970-0218.62587. PubMed PMID: 20606948; PubMed Central PMCID: PMC2888353.[PubMed]
6. Rohilla R, Rajput M, Rohilla J, Malik M, Garg D, Verma M. Prevalence and correlates of overweight/obesity among adolescents in an urban city of north India. J Family Med Prim Care. 2014 Oct-Dec;3(4):404-8. doi: 10.4103/2249-4863.148127. PubMed PMID: 25657953; PubMed Central PMCID: PMC4311352.[PubMed]
7. Namdev G, Mishra MK, Saxena DK, Likhar SK. Socio-demographic Determinants of Overweight and Obesity among School Children in an Urban city of Central India . Natl J Community Med. 2015; 6(1):45-9.
8. Watharkar A, Nigam S, Martolia DS, Varma P, Barman SK, Sharma RP. Assessment of risk factors for overweight and obesity among school going children in Kanpur, Uttar Pradesh. Indian J Comm Health. 2015; 27, 2: 216 - 222.
9. Anuradha RK, Sathyavathi RB, Reddy TM, Hemalatha R, Sudhakar G, Geetha P, Reddy KK. Effect of social and environmental determinants on overweight and obesity prevalence among adolescent school children. Indian J Endocrinol Metab. 2015 Mar-Apr;19(2):283-7. doi: 10.4103/2230-8210.131765. PubMed PMID: 25729693; PubMed Central PMCID: PMC4319271.[PubMed]

Tables

TABLE 1: PREVALENCE OF OVERWEIGHT & OBESITY ACCORDING TO SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE STUDY SUBJECTS

Characteristics	Total (N=465)	Non-obese	Overweight	Obese	Test of significance
Age (in yrs)	No.	No. (%)	No. (%)	No. (%)	
10-13	66	64(96.9)	1(1.5)	1(1.5)	χ2=4.066 df=4 P=0.3972
14-15	283	255(90.1)	18(6.3)	10(3.5)	
16-19	116	108(93.1)	6(5.1)	2(1.7)	
Sex					χ2=0.0121 df=2 P=0.9940
Boys	242	224(92.5)	13(5.3)	7(2.8)	
Girls	233	203(87.1)	12(5.1)	6(2.5)	
Religion					
Hindu	406	372(91.6)	23(6.6)	11(2.7)	χ2=2.315 df=6 P=0.8886
Islam	39	37(94.8)	1(2.5)	1(2.5)	
Sikh	6	6(100.0)	0(0.0)	0(0.0)	
Christian	14	12(85.7)	1(7.1)	1(7.1)	
Social Class					χ2= 11.890 df=4 P=0.0182
Upper Middle	170	148(87.0)	15(8.8)	7(4.1)	
Lower Middle	202	187(92.5)	10(4.9)	5(2.4)	
Upper Lower	93	92(98.9)	0(0.0)	1(1.1)	
School					χ2=9.042 df=2 P=0.0109
Private	346	310(89.5)	24(6.9)	12(3.4)	
Government	119	117(98.3)	1(0.8)	1(0.8)	
Family type					χ2= 0.7768 df=2 P=0.6781
Nuclear	389	357(91.7)	22(5.6)	10(2.5)	
Joint	76	70(92.1)	3(3.9)	3(3.9)	

TABLE 2 PREVALENCE OF OVERWEIGHT & OBESITY ACCORDING TO DIETARY HABITS OF THE STUDY SUBJECTS

Dietary Habits	Total(N=465)	Non-obese	Overweight	Obese	Test of significance
Type of diet	No.	No. (%)	No. (%)	No. (%)	
Vegetarian	194	190(98.0)	0(0.0)	4(2.0)	χ2= 19.891 df=2 P<0.0001
Non-vegetarian	271	237(87.4)	25(9.2)	9(3.3)	
Breakfast habit					
Regular	357	334(93.6)	15(4.2)	8(2.2)	χ2= 6.138 df=2 P=0.0465
Irregular	108	93(86.1)	10(9.3)	5(4.6)	
Fruit intake					
Daily	236	222(94.1)	9(3.8)	5(2.1)	χ2= 14.725 df= 4 P= 0.0053
Occasionally	203	186(91.6)	12(5.9)	5(2.4)	
No	26	19(73.1)	4(15.4)	3(11.5)	
Vegetable intake					
Daily	310	303(97.7)	4(1.3)	3(1.0)	χ2= 46.246 df= 4 P<0.0001
Occasionally	138	112(81.2)	18(13.0)	8(5.8)	

No	17	12(70.6)	3(17.6)	2(11.8)	

TABLE 3 PREVALENCE OF OVERWEIGHT &OBESITY ACCORDING TO DIETARY HABITS OF THE STUDY SUBJECTS

Dietary Habits	Total(N=465)	Non-obese	Overweight	Obese	Test of significance
Consume Fast food	No.	No. (%)	No. (%)	No. (%)	
Daily	336	300(89.3)	24(7.1)	12(3.6)	χ2= 10.672 df= 4 P=0.0305
Occasionally	92	90(97.8)	1(1.1)	1(1.1)	
No	37	37(100.0)	0(0.0)	0(0.0)	
Consume Junk food					
Daily	314	280(89.2)	22(7.0)	12(3.8)	χ2= 9.658 df= 4 P=0.0466
Occasionally	70	67(95.7)	2(2.9)	1(1.4)	
No	81	80(98.7)	1(1.2)	0(0.0)	
Consume carbonated drinks					
Daily	318	282(88.7)	25(7.8)	11(3.5)	χ2= 14.669 df= 4 P=0.0054
Occasionally	102	100(98.0)	0(0.0)	2(1.9)	
No	45	45(100.0)	0(0.0)	0(0.0)	

TABLE 4 PREVALENCE OF OVERWEIGHT &OBESITY ACCORDING TO PHYSICAL ACTIVITY PATTERNS OF THE STUDY SUBJECTS

Play outdoor games	Total(N=465)	Non-obese	Overweight	Obese	Test of significance
	No.	No. (%)	No. (%)	No. (%)	
Daily	160	155(96.8)	3(1.8)	2(1.2)	χ2= 10.641 df= 4 P= 0.0309
Weekly	242	218(90.0)	17(7.0)	7(2.8)	
No	63	54(85.7)	5(7.9)	4(6.3)	
Play indoor games					
<1 hour	43	39(90.6)	3(6.9)	1(2.3)	χ2= 6.339 df= 6 P= 0.3863
1 hour	127	120(94.4)	4(3.1)	3(2.9)	
>1 hour	179	167(93.2)	9(5.0)	3(1.6)	
No	116	101(87.0)	9(7.7)	6(5.1)	
Mode of transport to school					
Vehicle	259	230(88.8)	20(7.7)	9(3.6)	χ2= 7.530 df= 2 P= 0.0232
Walking	206	197(95.6)	5(2.4)	4(1.9)	

TABLE 5 PREVALENCE OF OVERWEIGHT & OBESITY ACCORDING TO DIFFERENT SEDENTARY ACTIVITY OF STUDY SUBJECTS

Sedentary Activity	Total(N=465)	Non-obese	Overweight	Obese	Test of significance
	No.	No. (%)	No. (%)	No. (%)	
Daily TV watching hour					
<1	139	132(95.0)	5(3.5)	2(1.4)	χ2= 9.995 df= 4 P= 0.0405
1-3	214	200(93.4)	9(4.2)	5(2.3)	
>3	112	95(84.8)	11(9.8)	6(5.3)	
Daily PC/mobile use					
<1hour	227	210(92.5)	10(4.4)	7(3.0)	
1-3 hours	131	120(91.6)	8(6.1)	3(2.3)	χ2= 13.795 df= 6 P= 0.0320
>3 hours	53	43(81.1)	7(13.2)	3(5.7)	
Nil	54	54(100.0)	0(0.0)	0(0.0)	
Duration of sleep/day					
<6 hours	84	70(83.3)	9(10.7)	5(5.9)	χ2= 12.253 df= 4 P= 0.0156
6-8 hours	300	278(92.7)	14(4.7)	8(2.6)	
>8 hours	81	79(96.3)	2(2.4)	0(0.0)	