

Original Research Article

Epidemiology of overweight and obesity in school going children: 11-15 years in the urban area of Cuttack city

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Received: 14 November 2019

Accepted: 07 December 2019

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ABSTRACT

Background: The world health organization has described obesity as one of today's most neglected public health problems, affecting developed and developing countries in the world. A dramatic increase in overweight and obesity among children and adolescent has raised the concern of various public health physicians especially in developing country like India. This study was conducted with an objective to study the prevalence of overweight and obesity and its associated risk factors among school going children of Cuttack city.

Methods: School based cross sectional study was done among the children of 6th to 10th class. To calculate the maximum sample size prevalence of obesity was assumed to be 10%, taking absolute error of 2% and 10% non-response rate the sample was calculated to be 1000. By multistage sampling method the children were selected. Data was collected using a pre-designed and pre-tested questionnaire and analyzed by using SPSS version 16.

Results: The combined prevalence of overweight and obesity was 20.2% and it was higher among boys (20.6%) than girls (19.8%). Overweight and obesity was found to be significantly associated with type of school, parent's occupation, hours of using TV/computer, eating habit, family history of obesity, type of family and mode of transport to school.

Conclusions: Prevalence of overweight and obesity was found to be high in school going children, which indicates an urgent need to increase awareness via education and motivation of all stakeholders to prevent the complications in future.

Keywords: Epidemiology, Obesity, Overweight, School going children

INTRODUCTION

Obesity is simply defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired.¹ The underlying cause is the undesirable excess calorie intake and/or sedentary lifestyle leading to weight gain.

The World Health Organization (WHO) defines obesity as a global epidemic.² Obesity has become an increasingly important medical problem in children and

adolescents. Many of the outcomes associated with obesity that was previously known to affect adults are now affecting children as well. This epidemic of childhood obesity has resulted in great concern regarding the management of obesity and its complications.³

Over the past three decades the prevalence of overweight and obesity has increased substantially.⁴ Globally, an estimated 170 million children (aged 18 years) are estimated to be overweight, and in some countries the number of overweight children has trebled since 1980.^{5,6}

The prevalence of obesity among children aged 6 to 11 years has increased from 6.5% in 1980 to 19.6% in 2008. The prevalence of obesity among adolescents aged 12 to 19 years has increased from 5.0% to 18.1%.^{7,8} The high prevalence of overweight and obesity has serious health consequences. Raised body mass index (BMI) is a major risk factor for diseases such as cardiovascular disease, type 2 diabetes and many cancers e.g. colorectal cancer, renal cell carcinoma and oesophageal cancer.^{9,10}

These diseases often referred to as Non-Communicable Diseases (NCDs), not only cause premature mortality but also long-term morbidity. In addition, overweight and obesity in children are associated with significant reductions in quality of life and a greater risk of teasing, bullying and social isolation.^{5,11,12} Due to the rapid increase in obesity prevalence and the serious health consequences, obesity is commonly considered one of the most serious health challenges of the early 21st century.⁴

The prevalence of overweight and obesity among children and adolescents has increased significantly in the developed countries as well as in the developing countries. In developing countries such as India, especially in urban population, childhood obesity is emerging as a major health problem. It is also increasingly recognized as a significant problem in developing countries and countries undergoing economic transition.¹³ India is heading gradually in non-communicable diseases including childhood obesity compared to other developing countries. Since, adolescence is a period of transition from childhood to adulthood; it assumes critical position in the life cycle of human beings, characterized by an exceptionally rapid rate of growth.¹⁴

The most important long-term consequence of childhood obesity is its persistence into adulthood, with all the associated health risks. Obesity is more likely to persist when its onset is in late childhood or adolescence and when the obesity is severe.^{15,16} Overweight in adolescence has also been shown to be significantly associated with long-term mortality and morbidity.¹⁷

Many studies have been conducted in developed countries so also in India on overweight and obesity in school going children. No such study has been conducted in this part of the country. Hence this study was conducted to evaluate the prevalence of obesity and other related risk factors among school going children of Cuttack city.

METHODS

Study period was January 2016-December 2016. Study design was cross-sectional study. Study population was children of class 6th to class 10th (11-15 years) of different schools of Cuttack city.

Tools

The children were surveyed through a pre-designed, pre-tested, semi-structured and self-administered questionnaire which had sections eliciting information on: Social and demographic parameters, Diet, Activity, Relevant family history of obesity and physical examination i.e. height, weight, waist circumference and hip circumference.

For measurement of height, a wall stadiometer calibrated with anthropometric tape was used. For weight measurement, a mechanical weighing machine was used. For waist and hip circumference, an anthropometric tape was used.

Sample size

The sample size was calculated by using the following formula,

$$\text{Sample size (S)} = 4pq/L^2$$

Where,

p - Prevalence of overweight and obesity

q - (100 - p)

L - Allowable error

By assuming the following parameters,

$$p = 10\% \text{ }^9$$

$$q = (100 - 10) = 90$$

$$L = 20\% \text{ of prevalence i.e. } 20\% \text{ of } 10 = 2,$$

$$\text{Sample size (S)} = 4 \times 10 \times 90 / 2 \times 2 = 900.$$

After adding a non-response rate of 10%, an additional 100 children were included. Thus, a total of 1000 school children were selected for this study.

Sampling technique

The study was done in the urban area of Cuttack city and Multistage Sampling Technique was used i.e.

- Simple random sampling - to identify the schools.
- Simple random sampling - to identify the section from various classes.
- Systematic random sampling - to identify children in the particular section.

Inclusion criteria

- Apparently healthy children between the age group 11 to 15 years present on the day of visit.
- Children oriented with the purpose of the study and willing to participate.

Exclusion criteria

- Children with chronic illnesses and/or on long term medications.
- Children diagnosed to be obese and hypertensive secondary to other causes.
- Those children who were unwilling to participate in the study.

Ethical approval for the research work was obtained from The Institutional Ethics Committee, S.C.B. Medical College, Cuttack. Permission for the research work was also taken from the District Education Officer, Cuttack.

The complete list of govt. and private high schools was procured from the office of District Education Officer of Cuttack district. Out of total 76 high schools under Cuttack Municipal Corporation, 52 are govt. Odiya medium, 10 are private Odiya medium and the rest 14 are private English medium high schools. 10% of the total no. of high schools i.e. 8 schools (5 govt. Odiya medium, 1 private Odiya medium and 2 private English medium) were taken by simple random sampling method. The selected schools were approached for the research work and permission from the school authorities were collected before starting the survey in school premises.

The study included children from class 6th to class 10th. From each class one section is chosen by simple random sampling method. The register of the selected section was collected from the school office and from the register the students were chosen by systematic random sampling method till the required number of students achieved. By this procedure 25 students from each class irrespective of sex were selected and in total 1000 students from 8 schools were selected for the present study. If anybody from the selected roll number was absent, then the next roll number was taken into account for the study. The data collection was done during the game period so that their study was not being hampered.

Students were given pre-tested, pre-designed and semi-structured questionnaire, made in English language. Each question was explained in the language of their teaching, either in English and/or Odiya. After fully understanding the questions, the willing students were asked to fill up the consent form and the questionnaire. After completion of form fill up, student's weight and height were measured.

The weight was measured by a mechanical weighing machine with their school uniform and shoes removed. The recordings were made to their nearest 0.1 kg measurements. Height was measured without shoes to the nearest 0.1 cm using a wall stadiometer. The heels, buttocks, upper back and back of the head were in contact with the wall and the head was positioned in Frankfurt's plane.

Data so collected were entered in SPSS 16 software for tabulation and analysis.

Data analysis

Data were analyzed by using the software SPSS 16 version in the Department of Community Medicine, S.C.B. Medical College and appropriate statistical measures i.e. percentages, proportion and chi square test were applied in this study.

RESULTS

The total number of students from Government Odiya medium schools, Private Odiya medium schools and Private English medium schools were 625, 125 and 250 respectively as shown in Table 1. Male students (52.6%) outnumbered the female students (47.4%).

Table 1: Distribution of students according to type of school.

Type of school	Male	Female	Total
Govt. Odiya medium	332(53.1)	293(46.9)	625
Private Odiya medium	68(54.4)	57(45.6)	125
Private English medium	126(50.4)	124(49.6)	250
Total	526(52.6)	474(47.4)	1000

*Figures in parenthesis indicates percentage

According to Table 2, the mean height of students in Govt. Odiya medium, Private Odiya medium and Private English medium schools were 1.46-meter, 1.47 meter and 1.56 meter respectively. The mean weight was 39.56 kg, 44.77 kg and 50.62 kg in Govt. Odiya medium, Private Odiya medium and Private English medium school respectively. The overall mean height was 1.48 meter and the overall mean weight was 42.98 kg. In all the schools, the mean height and weight among male children were slightly higher than female children.

The mean BMI of Govt. Odiya medium students (18.37) was lower than Private Odiya medium students (20.63). The same for Private English medium students was 20.75. The mean BMI of Govt. Odiya medium boys (18.21) was less than their respective girls' counterpart (18.55). The same was seen in Private English medium students (boys-20.49, girls- 21.02). Whereas the reverse was seen Private Odiya medium students (boys-20.97, girls-20.23). The mean BMI of students of class 6th, 7th, 8th, 9th and 10th were 17.75, 18.48, 19.09, 19.43 and 21.49 respectively. The mean BMI of female students were higher than male students in the 13, 14 and 15 yrs age group students. Whereas in 11 and 12 yrs age group, male students were found to have more BMI in comparison to female students.

Table 3 depicts, the overall prevalence of overweight and obesity observed in the present study were 11.1% and 9.1% respectively. The combined prevalence of overweight and obesity was 20.2%. The prevalence of overweight and obesity among boys were 10.5% and 10.1% respectively and among girls these were 11.8% and 8.0% respectively. The combined prevalence of

overweight and obesity was higher among boys (20.6%) than girls (19.8%). The difference of BMI between male

and female was found to be statistically significant ($p=0.025$).

Table 2: Mean height, weight and BMI of study population.

Mean height, weight & BMI		Govt. Odiya medium school	Private Odiya medium school	Private English medium school	Overall mean
Height in meter	Male	1.47	1.46	1.59	1.48
	Female	1.45	1.47	1.53	
	Overall	1.46	1.47	1.56	
Weight in kg	Male	39.84	45.47	52.21	42.98
	Female	39.24	43.94	49.01	
	Overall	39.56	44.77	50.62	
BMI	Male	18.21	20.97	20.49	19.25
	Female	18.55	20.23	21.02	
	Overall	18.37	20.63	20.75	

Table 3: Sex wise prevalence of overweight and obesity.

BMI category	Sex		Total
	Male	Female	
Underweight	86(16.3)	50(10.5)	136(13.6)
Normal	332(63.1)	330(69.6)	662(66.2)
Overweight	55(10.5)	56(11.8)	111(11.1)
Obese	53(10.1)	38(8.0)	91(9.1)
Total	526(100)	474(100)	1000(100)

*Figure in parenthesis indicates percentage
[Chi-square = 9.338, df = 3, $p=0.025$, significant]

The overall prevalence of overweight and obesity were 21.5%, 23.5%, 13.0%, 20.0% and 23.0% among 11th, 12th, 13th, 14th and 15th yr age group students respectively as shown in Figure 1. The overall prevalence of overweight and obesity was lowest in 13th yr age group students and highest in 12th yr age group students. This difference was found to be statistically significant (Chi-square = 64.84, df = 12, $p=0.000$).

According to Table 4, the prevalence of overweight among Govt. Odiya medium students was found to be much less (7.4%) in comparison to Private Odiya medium students (14.4%) and Private English medium students (18.8%). Similarly, the prevalence of obesity was also much less among Govt. Odiya medium students (6.2%) in comparison to Private Odiya medium students (12.8%) and Private English medium students (14.4%). This difference was found to be statistically significant ($p=0.000$). The combined prevalence of overweight and obesity among the children of both professional and semiprofessional group were nearly same (26.4% and 25.9% respectively) as shown in Table 5. However, the same for children of unskilled workers was found to be 11.1%. This finding was found to be statistically significant ($p=0.000$).

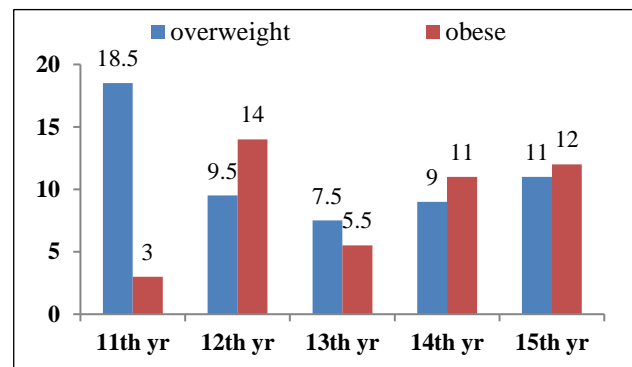


Figure 1: Age wise prevalence of overweight and obesity.

According to Table 6, the prevalence of overweight and obesity were found to be higher in children of working mothers than the children whose mothers work as housewives. The prevalence of overweight and obesity among children of working mothers were 16.7% and 10.7% respectively; these were 10.1% and 8.8% respectively among children of mothers who were housewives. This difference was found to be statistically significant ($p=0.014$).

It was found that the combined prevalence of overweight and obesity was higher in those children who spent >2 hours/day on TV/computer (23.4%) than the other group children who spent ≤2 hours/day (21.8%) as per Table 7. This difference was found to be statistically significant ($p=0.000$).

A significantly higher prevalence of overweight and obesity was found among children having only vegetarian diet (overweight-17.8% and obesity-11.9%) than those children having mixed diet (overweight-10.2% and obesity-8.7%) as shown in Table 8.

Table 4: BMI of children and medium of school.

BMI category	Medium of school			Total
	Govt. Odiya	Private Odiya	Private English	
Underweight	121(19.4)	5(4.0)	10(4.0)	136(13.6)
Normal	419(67.0)	86(68.8)	157(62.8)	662(66.2)
Overweight	46(7.4)	18(14.4)	47(18.8)	111(11.1)
Obese	39(6.2)	16(12.8)	36(14.4)	91(9.1)
Total	625(100)	125(100)	250(100)	1000(100)

*Figure in parenthesis indicates percentage
 [Chi-square = 78.96, df = 6, p=0.000, significant]

Table 5: BMI of children and their father’s occupation.

Father’s occupation	BMI category				Total
	Underweight	Normal	Overweight	Obese	
Profession	6(4.7)	89(69.0)	28(21.7)	6(4.7)	129
Semi profession	6(4.3)	97(69.8)	22(15.8)	14(10.1)	139
Clerical	64(15.7)	256(62.7)	36(8.8)	52(12.7)	408
Skilled	26(21.5)	80(66.1)	12(9.9)	3(2.5)	121
Semi-skilled	16(16.8)	62(65.3)	10(10.5)	7(7.4)	95
Unskilled	18(16.7)	78(72.2)	3(2.8)	9(8.3)	108
Total	136(13.6)	662(66.2)	111(11.1)	91(9.1)	1000

*Figure in parenthesis indicates percentage
 [Chi-square = 66.30, df = 15, p=0.000, significant]

Table 6: BMI of children and their mother’s occupation.

Mother’s occupation	BMI category				Total
	Underweight	Normal	Overweight	Obese	
Housewife	125(14.7)	564(66.4)	86(10.1)	75(8.8)	850
Working	11(7.3)	98(65.3)	25(16.7)	16(10.7)	150
Total	136(13.6)	662(66.2)	111(11.1)	91(9.1)	1000

*Figure in parenthesis indicates percentage
 [Chi-square = 10.52, df = 3, p=0.014, significant]

Table 7: BMI status among children using TV/computers.

BMI category	TV/Computer use per day		Total
	≤ 2 hrs	>2 hrs	
Underweight	99(12.1)	37(20.2)	136(13.6)
Normal	564(69.0)	98(53.6)	662(66.2)
Overweight	88(10.8)	23(12.6)	111(11.1)
Obese	66(8.1)	25(13.7)	91(9.1)
Total	817(100)	183(100)	1000(100)

*Figure in parenthesis indicates percentage
 [Chi-square = 17.92, df = 3, p=0.000, significant]

It was found that the prevalence of overweight and obesity were higher in children consuming fast food >3 times/wk (overweight- 15.3% and obesity- 10.7%) than those children who consumed fast food ≤3 times/wk (overweight- 10.4% and obesity- 8.8%) as shown in Table 9.

Table 10 depicts, when the duration of playing outdoor games by children was compared with their BMI status,

there was higher prevalence of overweight/obesity in children with less outdoor activities. The prevalence of overweight and obesity (10.5% and 7.9%) was lower among the children who participated in outdoor games for >2 hrs daily than among the children who played for ≤2 hrs daily (11.1% and 9.2%). But the association was found to be non-significant on statistical analysis (p=0.919).

Table 8: BMI status of children and their eating habits.

BMI category	Eating habits		Total
	Vegetarian	Mixed diet	
Underweight	22(18.6)	114(12.9)	136(13.6)
Normal	61(51.7)	601(68.1)	662(66.2)
Overweight	21(17.8)	90(10.2)	111(11.1)
Obese	14(11.9)	77(8.7)	91(9.1)
Total	118(100)	882(100)	1000(100)

*Figure in parenthesis indicates percentage
[Chi-square = 13.28, df = 3, p = 0.004, significant]

Table 9: BMI status of children and their fast food consumption habits.

BMI category	Fast food consumption		Total
	≤ 3/wk	>3/wk	
Underweight	115(13.5)	21(14.0)	136(13.6)
Normal	572(67.3)	90(60.0)	662(66.2)
Overweight	88(10.4)	23(15.3)	111(11.1)
Obese	75(8.8)	16(10.7)	91(9.1)
Total	850(100)	150(100)	1000(100)

*Figure in parenthesis indicates percentage
[Chi-square = 4.37, df = 3, p=0.224]

Table 11 shows the relationship between family history of obesity and the prevalence of overweight/obesity among children. Out of 462 children having positive family history of obesity, 138(29.9%) children were having overweight/obesity. In contrast, it was very less (11.9%) in children with negative family history of obesity. The association between family history of

obesity and childhood prevalence of obesity was found to be significant (p=0.000).

Table 12 shows the prevalence of overweight/obesity among children living in joint family was found to be higher (24.5%) than those living in nuclear family (19.5%) and 3rd generation family (15.8%). The difference was found to be significant (p=0.000). The prevalence of underweight children was higher in 3rd generation families (21.5%).

Table 10: BMI status of children and duration of playing outdoor games.

BMI category	Duration of outdoor games/day		Total
	≤ 2 hrs	>2 hrs	
Underweight	127(13.8)	9(11.9)	136(13.6)
Normal	609(65.9)	53(69.7)	662(66.2)
Overweight	103(11.1)	8(10.5)	111(11.1)
Obese	85(9.2)	6(7.9)	91(9.1)
Total	924(100)	76(100)	1000(100)

*Figure in parenthesis indicates percentage
[Chi-square = 0.49, df = 3, p=0.919]

Table 11: BMI status of children and family history of obesity.

Family h/o obesity	Underweigh t/normal	Overweight /obese	Total
Positive history	324(70.1)	138(29.9)	462(100)
Negative history	474(88.1)	64(11.9)	538(100)
Total	798(79.8)	202(20.2)	1000(100)

*Figure in parenthesis indicates percentage
[Chi-square = 49.81, df = 1, p = 0.000, significant]

Table 12: BMI status of children and type of family.

BMI category	Type of family			Total
	Nuclear	Joint	3 rd generation	
Underweight	57(9.9)	45(16.9)	34(21.5)	136(13.6)
Normal	407(70.7)	156(58.6)	99(62.7)	662(66.2)
Overweight	70(12.2)	26(9.8)	15(9.5)	111(11.1)
Obese	42(7.3)	39(14.7)	10(6.3)	91(9.1)
Total	576(100)	266(100)	158(100)	1000(100)

*Figure in parenthesis indicates percentage
[Chi-square = 33.37, df = 6, p = 0.000, significant]

Out of all 1000 students, 283 children (28.3%) were used to come to school by self-cycling, 460(46.0%) children by means of automobiles and 247(24.7%) by walking. Out of 460 children who came by automobiles, 70(15.2%) were overweight/obese. This percentage was very less in other two groups. It was 6% among the children who came by cycling and 3.9% among the children who came by walking. So, the mode of

transportation to school was significantly associated with the prevalence of overweight/obesity (Chi-square=30.29, df = 2, p=0.000).

DISCUSSION

In the present study, in all Govt. Odiya medium, Private Odiya medium and Private English medium schools, the

mean height and weight among male children were slightly higher than female children. These findings were opposite to that of the study by A Jahnavi et al, in 2011.¹⁸

In this study, the mean BMI of Private English medium boys (20.49) was found to be less in comparison to girls (21.02). In a similar study by Shah C et al, at Bhavanagar in an English medium school, he found the mean BMI of 18.31 for boys and 19.26 for girls which were less than the present study.¹⁹

The mean BMI of students of class 6th, 7th, 8th, 9th and 10th were 17.75, 18.48, 19.09, 19.43 and 21.49 respectively. The mean BMI of female students were higher than male students in the 13, 14 and 15 yrs age group students. Whereas in 11 and 12 yrs age group, male students were found to have more BMI in comparison to female students. These findings were similar to the findings of a study by A Jahnavi et al, among school children aged 11-16 yrs with mean BMI of 18.44 among girls and 17.61 among boys.¹⁸ Shah C et al had a reverse observation among 11-12 yrs school students with mean BMI more among girls (19.26) than boys (18.31).¹⁹

The prevalence of overweight and obesity observed in the present study were 11.1% and 9.1% respectively. The prevalence of overweight and obesity among boys were 10.5% and 10.1% respectively and among girls were 11.8% and 8.0% respectively. This difference of BMI between male and female was found to be statistically significant ($p=0.025$). T Aggarwal et al, in their study found no significant difference of prevalence between boys and girls 20. The higher prevalence in boys than girls was opposite to the findings of the studies by Shah C et al, S Kumar et al, and C Padez et al.¹⁹ A Sood et al, in their study on adolescent school girls of Bangalore city found the overall prevalence of overweight and obesity to be 18.1% which is slightly less than the present study.²¹⁻²³

In the present study the prevalence of overweight and obesity was 23.5% for 12th yr age group students and it was higher in comparison to other age group students. This difference was found to be statistically significant ($p=0.000$). This may be explained by onset of puberty in the 11-12 yrs age group. The studies by T Aggarwal et al, 20 and Tarek Tawfi k Amin et al, showed lesser prevalence than the present study.²⁴

The present study showed a statistically significant difference in the prevalence of overweight and obesity between Govt. Odiya medium students (7.4%, 6.2%), Private Odiya medium students (14.4%, 12.8%) and Private English medium students (18.8%, 14.4%). The higher prevalence of overweight/obesity in private English medium school signifies that the students may be from affluent society with sophisticated lifestyle i.e. sedentary behaviour and less physical activity leading to obesity. This finding in the present study was supported by the findings of D R Bharati et al, a study among school going children of Wardha city, Central India".

They found that the risk of overweight and obesity were significantly higher among children studying in English medium school than students studying in non-English medium school.²⁵

In the present study more number of overweight and obese children were reported from family with the father as a professional or semiprofessional worker. This finding was similar to the findings of studies by D R Bharati et al in Wardha city 25 and Dr B Mohanty et al, in Pondicherry.²⁶

A statistically significant ($p=0.000$) difference in the prevalence of overweight and obesity was found between children who spent >2 hours/day on TV/computer (26.2%) and the other group children who spent ≤ 2 hours/day (18.9%). It has been mentioned that watching TV for more than 2 hours/day increases adolescent's chances of being overweight (111). The results of the present study were supported by B Mohanty et al 26, M S Kotian et al, S Patnaik et al, A Laxmaiah et al, S Jain et al.²⁷⁻³⁰

A significantly higher prevalence of overweight and obesity was found among children having exclusively vegetarian diet (17.8%, 11.9%) than those children having mixed diet (10.2%, 8.7%). The findings of the present study were similar to that of study by T Aggarwal et al.²⁰ Another study by G Jain et al, conducted in Bhilai Nagar among school students, found that vegetarian diet or non-vegetarian diet did not have any effect on prevalence of underweight, overweight and obesity.³¹

In this study, it was found that the prevalence of overweight and obesity were higher in children consuming junk food >3 times/wk (15.3%, 10.7%) than those children who consumed junk food ≤ 3 times/wk (10.4%, 8.8%). R K Goyal et al, also had the similar observations related to the dietary habits 32. In another study among male primary school children in Al-Hassa, Kingdom of Saudi Arabia by Tarek Tawfi k Amin et al, found the frequency of eating out was high among overweight and obese children with an odds ratio increased from 0.2 for low frequency to >4 for a frequency of 5 times per week or more.²⁴

In this study, the prevalence of overweight and obesity (10.5%, 7.9%) was lower among the children who participated in outdoor games for >2 hrs daily than among the children who played for ≤ 2 hrs daily (11.1%, 9.2%). The findings of the present study were similar to that of studies by Dr B Mohanty et al, M S Kotian et al, and S Patnaik et al.²⁶⁻²⁸

It was observed that significantly higher proportions (15.2%) of children coming to school by automobiles were found to be overweight and obese. The same for other modes of transport like cycling and walking were 6% and 3.9% respectively. The above finding was similar to the finding by Dr Biswajit Mohanty et al. Author found that 2.3%, 6.7% of children were overweight/obese

among the children going to school by physical mode (cycling and walking) and fuel vehicles respectively.²⁶ Sallis and Glanz et al, found that overweight and obesity was less common among children with active recreation and active transport such as walking or cycling.³³

CONCLUSION

The prevalence of overweight and obesity was found to be 11.1% and 9.1% respectively. The overall prevalence of overweight and obesity was higher among boys (20.6%) than girls (19.8%). High rate of overweight and obesity were found in children of English medium schools as compared to Odiya medium schools. High prevalence of overweight and obesity was significantly associated with profession of parents, duration of watching TV, junk food consumption, family history of obesity and playing outdoor games. More emphasis should be given on primordial and primary level of prevention for childhood obesity in schools. Health education of students, parents and teachers regarding possible adverse effects of overweight and obesity, Interpersonal Communication (IPC) to obese children to modify high risk behavior and advocacy for healthy food habits and lifestyle changes from childhood should be done.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kanyari SS, Satapathy DM, Giri RC. Epidemiology of overweight and obesity in school going children: 11-15 years in the urban area of Cuttack city. *Int J Res Med Sci* 2020;8:298-306.