

Prevalence of Overweight and Obesity among Secondary School Students of Bharatpur, Nepal

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ABSTRACT

Background: Obesity is one of the major public health problems worldwide. The trend has been increasing in lower socioeconomic country like Nepal. Obesity and overweight are prevalent in all age groups and responsible for various health issues. Children and adolescent group are more vulnerable in developing countries like ours. So, this study is aimed to estimate the prevalence of overweight and obesity among secondary school students of Bharatpur-10.

Methods: It was a cross-sectional study done on class 9 and 10 (Two private and two government secondary schools) of Bharatpur-10 Municipality, Chitwan. A predesigned questionnaire was distributed among the students. Weight was recorded by standardized weighing machine and height by metallic measuring tape. Body mass index was calculated by appropriate formula.

Results: There were 266 students (55.6% male and 44.6% female) in this study with the mean age of 14.91 years and majority (74.8%) were in age group 13-15 years. 9.77% students were overweight and 3% obese; overweight was prevalent in 5.4% male and 15.3% female students, and 6% public and 20% private school students. Students who take snacks during watching television were significantly overweight as compared to those who do not (13.33% vs 6.11%). There was no significant association between overweight and ethnicity/religion, type of family, number of siblings, family history of diabetes, socioeconomic status, food consumption frequency, hours of watching TV or not involving in physical activities in school.

Conclusions: This study found that majority of overweight was among female students of 13-15 years age group from private school. Also eating snacks during watching television is associated with overweight.

Keywords: obesity; overweight; lifestyle; socioeconomic status; Body Mass Index.

INTRODUCTION

Overweight and obesity have been a major health problem in affluent countries, and now the trend is increasing in low income countries like Nepal.¹ According to World Health Organization, overweight is defined as a Body mass index (BMI) of 25 or greater and obesity as a BMI of 30 or greater.² Obesity results from an imbalance between intake and expenditure leading to abnormal growth of fat cell number or size.²

The study by Marie et al, found that BMI of 25kg/m² or greater has increased between 1980 and 2013 - from 28.8% to 36.9 % in men and from 29.8% to 38% in women. The problem has increased in children and adolescent in developed countries (23.8% of boys and 22.6% of girls). Children and adolescents in developing countries also show the accelerating trend from 8.1% to 12.9% in 2013 for boys and from 8.4% to 13.4% in girls.³ East and South Asia have rising BMI for both sexes and Southeast Asia for boys. Global age standardized prevalence of obesity increased from 0.7% in 1975

to 5.6% in 2016 in girls and from 0.9% in 1975 to 7.8% in 2016 for boys. In the year 2016, 50 million girls and 74 million boys worldwide were obese.⁴

Non communicable diseases (NCD), as diabetes, osteoarthritis and cardiovascular disease are found more on overweight and obese people. According to the estimation of World Health Organization 68% of deaths globally is due to NCDs, and about three quarters of all NCD deaths occur in low and middle- income countries.⁵

In Nepal, NCDs are responsible for 60% of all deaths and cardiovascular diseases related deaths are 23%.⁶ It has been shown that skin disease like Psoriasis is also closely related with obesity.⁷ The children who are overweight and obese in their adolescence life are more likely to be overweight and obese in their adulthood. Short term health consequences are also present in overweight and obese children.¹ These children have low participation of school and other daily activities.⁸

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Overweight and obesity have become a public health problem in Nepal. About a quarter of population (23.5%) represents the adolescent population.⁹ So, the need to recognize the problem and to take necessary measures is of utmost importance. There has been no study so far related with adolescence overweight and obesity in Chitwan district. The study aimed to find the prevalence and risk factors of overweight and obesity among the adolescence children of Government and private school in Chitwan.

METHODS

This was a cross-sectional study conducted among 266 students (class 9 and 10) from August 25 to September 25. Among 6 public and 5 private schools in Bharatpur-10 Municipality, 2 private and 2 government schools of were included in this study using non-probability convenient sampling technique. Study conducted by patnaik et al.⁸ found that prevalence of overweight and obesity among school going children is 10.5% and 45.2%. Considering this as a prevalence, taking 5% level of significance and 80% power of test. Sample size was calculate as, $P_1(1-P_1)+P_2(1-P_2)$ $(z_{\alpha}+z_{\beta})^2/(P_2-P_1)^2=0.105(1-0.105)+0.452(1-0.452)(2.58+2.32)^2/(0.347)^2=51$. So, minimum of sample size= $51*4=204$ (2 government and 2 private school) was determined but this study was conducted among 266 students. A minimum of 55 students were selected from each schools with unequal number of students from each grades purposively.

Approval from Institutional Ethical Committee (COMS-IRC 2019-031) was obtained. A predesigned self-administered questionnaire was distributed among the students of class 9 and 10. At the time of data collection verbal consent with signature was taken and those who were not able to give consent taken from family members. Weight was recorded by standardized weighing machine and height by metallic measuring tape. Data collection was done and entered into SPSS-16. Analysis was done using mean and standard deviation for quantitative variable, and number and percentage for categorical variable. Chi square test was used for inferential statistics. A p-value of < 0.05 was considered as statistically significant.

RESULTS

Our study included 266 students with the mean age of 14.3 ± 0.96 years, among which 74.8% were in the age group 13-15 years. There were 55.6% male and 44.4% female students. The general characteristic of the students is given in Table 1.

Among the participated students, 9.77% (26 students) were overweight and 3.01% (8 students) were obese. (Table 2).

Table 1. General characteristics of the respondents. n=266

Characteristics	Frequency	Percentage
Age Group		
13-15	199	74.80
16-18	67	25.20
Mean±SD	14.3±0.96	
Gender		
Male	148	55.60
Female	118	44.40
Education		
Brahmin	143	53.80
Chhetri	54	20.30
Dalit/Janjati	22	8.30
others	47	17.70
Religion		
Hindu	251	94.40
Buddhist	10	3.80
Islam	2	0.80
Christian	3	1.10
Type of family		
Nuclear	226	85.00
Joint	34	12.80
Extended	6	2.30
Sibling		
Up to 2	198	74.40
More than 2	68	25.60
School		
Private	111	41.70
Public	155	58.30
Socioeconomic Class		
Upper	45	16.90
Upper middle	172	64.70
Lower middle	39	14.70
Lower	10	3.80

Majority of the overweight students fell in the age group 13-15 years (12.6%). Overweight was prevalent in 5.4% males and 15.3% females. Similarly private students (18%) were found to be overweight as compares to public students (3.9%). However, there was no significant association between overweight and ethnicity, religion, type of family, number of siblings, education grade or socioeconomic class (Table 3).

Table 2. Prevalence of overweight and Obesity.

Prevalence	Number	Percentage
Overweight	26	9.77
Obesity	8	3.01

Table 3. Association of overweight with sociodemographic characteristics. n=266						
Characteristic	Overweight		Chi-square	p-value	OR	95% CI
	Yes	No				
Age group (Years)						
13-15	25(12.6%)	174 (87.4%)	6.95	0.008*	9.48	1.2-71.3
16-18	1(1.5%)	66(98.5%)				
Gender						
Female	18(15.3%)	100(84.8%)	7.22	0.007*	3.1	1.3-7.5
Male	8(5.4%)	140(94.6%)				
Ethnicity						
Brahmin	11(7.7%)	132(92.3%)	2.71	0.218		
Others	15 (12.2%)	108(87.8%)				
Religion						
Hindu	23(9.2%)	228(90.8%)	5.28	0.17		
Others	3(20%)	12(80.0%)				
Family						
Nuclear	21(9.3%)	205(90.7%)	1.64	0.529		
Extended/Joint	5(12.5%)	35(87.5%)				
Sibling						
≤2	23(11.6%)	175(88.4%)	1.78	0.084		
>2	3(4.4%)	65(95.6%)				
Type of School						
Private	20(18.0%)	91(82.0%)	14.67	<0.001*	5.4	2.1-14.09
Public	6(3.9%)	149(96.1%)				
Education						
Grade 9	16(11.9%)	118(88.1%)	1.43	0.231		
Grade 10	10(7.6%)	122(92.4%)				
Socioeconomic class						
Upper	4(8.9%)	41(91.1%)	1.31			
Upper middle	19(11.1%)	153(88.9%)				
Lower middle	2(5.1%)	37(94.9%)	0.687			
Lower	1(10.0%)	9(90.0%)				

*statistically significant at 5% level of significance

Severe variables were studied to determine their effect on overweight (Table 4). Eating snacks during watching TV was significantly associated with overweight ($p < 0.05$), whereas frequency of food consumption, taking candy/chocolate, hours of watching television per day, not involving in sports or regular physical activities in school, or family history of diabetes were not significantly associated with a higher BMI (Table 5).

DISCUSSION

This study showed overweight was high in age group of 13-15 years which is similar in the study done by Nagaret al¹⁰ and Kotianet al.¹¹ Higher prevalence of overweight in this group is due to puberty when there is increase of adipose tissue in overall body.

We found that overweight among adolescent studying in private schools is 6 times higher than public school. The study of Piryani et al⁸ showed prevalence of overweight is twice in private school. Similar results of higher prevalence in private

school were also found in the studies of Regmi et al,¹² Gupta et al,¹³ Kaur et al,¹⁴ and Maharjan et al.¹⁵

Prevalence of overweight in female students is nearly 3 times more than the male students. Similar studies done in other districts of Nepal also found high prevalence of overweight and obesity among female students (Acharya et al¹⁶ in Kaski and Regmi et al¹² in Tulsipur Municipality); another study by Koirala et al¹⁷ in childhood overweight in Lalitpur district showed overweight to be more prevalent in female child (30.9%). This finding is consistent with the studies from India and Kuwait, which also show higher prevalence in females. This could be because of increased physical activity among boys when compared to girls.¹⁸⁻²¹

A recent STEPS Survey²² in 2019 shows that 25.1% of female are overweight and obese as compared to 15.3% in our study, but this survey included adult population (15-69 years) whereas our study included adolescent students (13-18 years). Nepal Demographic and Health Survey in 2011 showed

Table 4. Information of lifestyle related variables		
Variables	Frequency	Percentage
Frequency of food consumption (per day)		
More than 4 times	122	45.9
Less than 4 times	144	54.1
Eating snacks/Packed food		
Yes	240	90.2
No	26	9.8
Fast food consumption		
Yes	241	90.6
No	25	9.4
TV hours per day		
Don't watch at all	118	44.4
Less than 2 hours	72	27.1
More than 2 hours	76	28.6
Mobile/Laptop time		
Don't watch at all	45	16.9
Less than 2 hours	53	19.9
More than 2 hours	168	63.2
Snacks during watching TV		
Yes	135	50.8
No	131	49.2
Taking candy/chocolate		
Yes	233	87.6
No	33	12.4
Consumption of fresh fruits/salad per day		
Irregular	81	30.5
Once	50	18.8
Twice	46	17.3
More than twice	89	33.5
Habit of taking cold drinks/ Packed Juice(in 1 week)		
Occasionally	186	69.9
Once	39	14.7
Twice	17	6.4
More than twice	24	9.0
Play sports		
No	83	31.2
Yes	183	68.8
Transportation to school		
By vehicle	158	59.4
By walking	108	40.6
Regular physical activities in school		
No	149	56.0
Yes	117	44.0
Family member with Diabetes		
Yes	64	24.1
No	202	75.9

Table 5: Association of overweight with lifestyle factors, n=266						
Characteristic	Overweight		Chi-square	p-value	OR	95% CI
	Yes	No				
Frequency of food consumption (per day)						
More than 4 times	16(13.11%)	106(86.89%)	2.85	0.091		
Less than 4 times	10(6.94%)	134(93.06%)				
TV hours per day						
Don't watch at all	11(9.32%)	107(90.68%)	0.76	0.963		
Less than 2 hours	7(9.72%)	65(90.28%)				
More than 2 hours	8(10.53%)	68(89.47%)				
Snacks during watching TV						
Yes	18(13.33%)	117(86.67%)	3.93	0.047*	3.15	1.2-8.2
No	8(6.11%)	123(93.89%)				
Taking candy/chocolate						
Yes	23(9.87%)	210(90.13%)	1.65	0.888		
No	3(9.09%)	30(90.91%)				
Play sports						
No	11(13.25%)	72(86.75%)	2.65	0.198		
Yes	15(8.20%)	168(91.80%)				
Regular physical activities in school						
No	15(10.07%)	134(89.93%)	1.28	0.856		
Yes	11(9.40%)	106(90.60%)				
Family member with Diabetes						
Yes	8(12.50%)	56(87.50%)	0.71	0.399		

*statistically significant at 5% level of significance

comparatively less female prevalence than our study (2.9%).²³

Overweight was found higher in upper middle class in this study whereas in the study done by Piryani et al⁸ in Lalitpur sub-metropolitan city it was found in higher socioeconomic background.

In this study students watching television more than 2 hours were found to be overweight (10.5%). Piryani et al⁸ found that overweight is nearly nine times common in those who watch television more than 2 hours. Similar finding was also seen in the study done by Regmi et al.¹² Risk of overweight was three times higher in adolescent girls watching television more than 2 hours in a study in Sri Lanka and seven times more in another study in India.^{11,24} Watching television could be a factor for increase overweight due to less physical activities.

Students who take snacks during watching television were found overweight (13.3%) nearly

twice than those who do not take snacks. The risk of having overweight is 3.15 times higher among those children who watch television than those who do not. This result was found statistically significant. Uses of new technologies and sedentary life style may predispose children to antisocial behavior and problem like obesity and it is important to encourage them for regular physical exercise to avoid the health problems.

CONCLUSIONS

This study found that majority of the overweight was found in 13-15 years age group of students. Female sex, private school and eating snacks during watching television are associated with being overweight. Increased awareness about childhood overweight and obesity is very much important.

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