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Prevalence and Determinants of Obesity among School Going Adolescents in Rural Areas of Dehradun

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Abstract

Introduction: Childhood obesity is one of the most serious public health challenges of the 21st century. The problem is global and has been steadily affecting many low and middle income countries. Globally, in 2010 the number of overweight children was estimated to be over 42 million. Out of these 35 million are residing in the developing countries .WHO defines overweight and obesity as “abnormal or excessive fat accumulation that may impair health[2].”

Material and Methods

Study type: school based cross-sectional study.

Study time: this study was carried out over a period of two months, from June 2018 to July 2018.

Study place: carried out in two schools, one government and one private, in the field practice areas under the Rural Health Training Centre of SGRRIM&HS, Dehradun. , the sample size was calculated as 205.8 or 206.

Sampling technique: simple random sampling method was used to carry out this study.

Results: The present study revealed that 14[6.7%] and 5 [2.4%] of the adolescents were overweight and obese respectively, giving overall prevalence of 9.1%. In this study, majority of the overweight/obese subjects [17.8%] consumed fruits occasionally, [12.17%] followed a non-vegetarian diet, [12.6%] visited restaurants more than once per week, [11.48%] had the habit of eating chocolates regularly, [11.25%] consumed calorie-rich foods, [11.8%] consumed aerated drinks regularly and [15.74%] did not bring tiffin regularly to school. The association between all the above dietary habits and overweight/obesity was found to be statistically significant.

Conclusion: Prevalence of overweight and obesity was found to be 6.7% and 2.4% respectively in this study with the overall prevalence of 9.1%.

Keywords : Obesity, Adoloscent, Overweight .

Introduction

Childhood obesity is one of the most serious public health challenges of the 21st century. The problem is global and has been steadily affecting many low and middle income countries. Globally, in 2010 the number of overweight children was estimated to be over 42 million.

Out of these 35 million are residing in the developing countries. Recent studies carried out in northern India show that childhood overweight and obesity is on the rise with prevalence ranging from 2.5% to 15.5% and 0.9% to 9.3% respectively in school going children[1].

WHO defines overweight and obesity as "abnormal or excessive fat accumulation that may impair health[2]." Childhood overweight and obesity are a known precursor to other non-communicable diseases in adulthood. Childhood obesity is a fore runner of metabolic syndrome, poor physical health, mental disorders, respiratory problems and glucose intolerance, all of which can track into adult life. Developing countries like India have a unique problem of 'double burden' wherein at one end of the spectrum we have obesity in adolescents while at the other end we have malnutrition and underweight.

Aim and Objectives

- To assess the prevalence of overweight and obesity in school going adolescents.
- To determine the various risk factors for overweight and obesity in school going adolescents.

Material and Methods

Study type: school based cross-sectional study. Study **Time:** this study was carried out over a period of two months, from June 2018 to July 2018.

Study place: carried out in two schools, one government and one private, in the field practice areas under the Rural Health Training Centre of SGRRIM&HS, Dehradun.

Sample size: formula used was $4PQ/L^2$, where, P= combined prevalence of overweight and obesity was taken as 32.7%. Q= 1-p, L= allowable error was fixed at 20% in this study. With the above parameters, the sample size was calculated as 205.8 or 206. Hence a number of 210 students were included in this study. Out of the total 210, 105 subjects were taken up in a government school and the rest 105 subjects were taken in a private school.

Sampling technique: simple random sampling method was used to carry out this study.

Study subjects: children aged between 10-19 years who were present, were included in the study. Consent was taken from the principals of the selected schools as well as from the individual students who wanted to participate in the study.

The requisite data was collected on a pre-designed and pretested questionnaire by using direct personal interview method. After measuring height and weight of the students, the body mass index [BMI] was computed using the formula:- BMI= weight(kg)/ (Height in metres)^2.

The WHO BMI-for-age charts were used as reference charts and the subjects with BMI >+1SD were taken as overweight and those with BMI >+2SD were taken as obese. Collected data was classified, tabulated and analysed using appropriate statistical tools and conclusions were made accordingly.

Table 1: Age Wise Distribution

Age-Group [Years]	Number	Non-Overweight Non-Obese	Overweight		Obese	
10-11	22[10.5%]	18[81.8%]	3	13.6%	1	4.5%
11-12	22[10.5%]	16[72.7%]	4	18.1%	2	9.1%
12-13	22[10.5%]	21[95.4%]	1	4.5%	0	0.0
13-14	22[10.5%]	18[81.8%]	4	18.1%	0	0.0
14-15	22[10.5%]	21[95.4%]	1	4.5%	0	0.0
15-16	22[10.5%]	21[95.4%]	1	4.5%	0	0.0
16-17	26[12.4%]	26[12.4%]	0	0.0	0	0.0
17-18	26[12.4%]	25[96.1%]	0	0.0	1	4.5%
18-19	26[12.4%]	25[96.1%]	0	0.0	1	4.55
Total	**210[100%]**	**191[90.9%]**	**14**	**6.7%**	**5**	**2.4%**

Table 2: Gender Wise Distribution of Study Subjects

Gender	Number	Non-Overweight Non-Obese	Overweight		Obese	
Male	116[55.2%]	104[89.6%]	7	6.03%	5	4.3%
Female	94[44.8%]	87[92.5%]	7	7.4%	0	0.0
Total	**210[100%]**	**191[90.9%]**	**14**	**6.7%**	**5**	**2.4%**

Table 3: Association between Overweight/Obesity and Dietary Habits of Study Subjects

Dietary Habits	Total=210	Overweight	Obese	Test of Significance [df=3]
Fruit Intake				
Regular	137	5[3.6%]	1[0.72%]	χ^2 = **15.676 p≤ 0.05**
Occasional	73	9[12.3%]	4[5.4%]	

Diet				
Vegetarian	54	0	0	χ^2 = **31.105**
Non-vegetarian	156	14[8.9%]	5[3.2%]	**p≤ 0.05**
Eating out/week				
Once or Nil	68	1[1.4%]	0	χ^2= **27.199 p≤ 0.05**
More than once	142	13[9.1%]	5[3.5%]	
Chocolate-eating				
Regular	148	13[8.7%]	4[2.7%]	χ^2 = 18.126 **p≤ 0.05**
Occasional	62	1[1.6%]	1[1.6%]	
Consumption of Calorie-rich foods				
Regular	160	14[8.7%]	4[2.5%]	χ^2 = 44.313 **p≤ 0.05**
Occasional	50	0	1[2%]	
Tiffin from Home				
Regular	102	1[0.09%]	1[0.09%]	χ^2 = 12.390 df= 3 **p≤ 0.05**
Irregular	108	13[12.03%]	4[3.7%]	
Aerated Drinks				
Regular	152	14[9.2%]	4[2.6%]	χ^2 = 46.632 df=3 **p≤ 0.05**
Occasional	58	0	1[1.7%]	

Table 4: Association between Overweight/Obesity and Physical Activity Patterns

Activity	Total=210	Overweight	Obese	Test of Significance [df=6]
TV-watching				
<2 hours	99	3[3.03%]	0	
2-4 hours	63	4[6.3%]	1[1.5%]	χ^2 = 24.592 p≤ 0.05
>4 hours	47	7[14.8%]	4[8.5%]	

Exercise/week				
>2 hours	26	0	0	χ^2 = 30.775 p≤ 0.05
1-2 hours	45	0	0	
<1 hour	139	14[10.07%]	5[3.5%]	
Conveyance				
Walking	119	3[2.5%]	0	χ^2 = 32.319 df=6 p≤ 0.05
Cycling	31	2[6.4%]	0	
Motorised	60	9[15.0%]	5[8.3%]	
Sleeping in the afternoon				
Yes	111	12[10.8%]	4[3.6%]	χ^2 = 11.564 df=3 p≤ 0.05
No	99	2[2.02%]	1[1.01%]	

Figure 1: Overall Prevalence of Overweight and Obesity in the Study Subjects

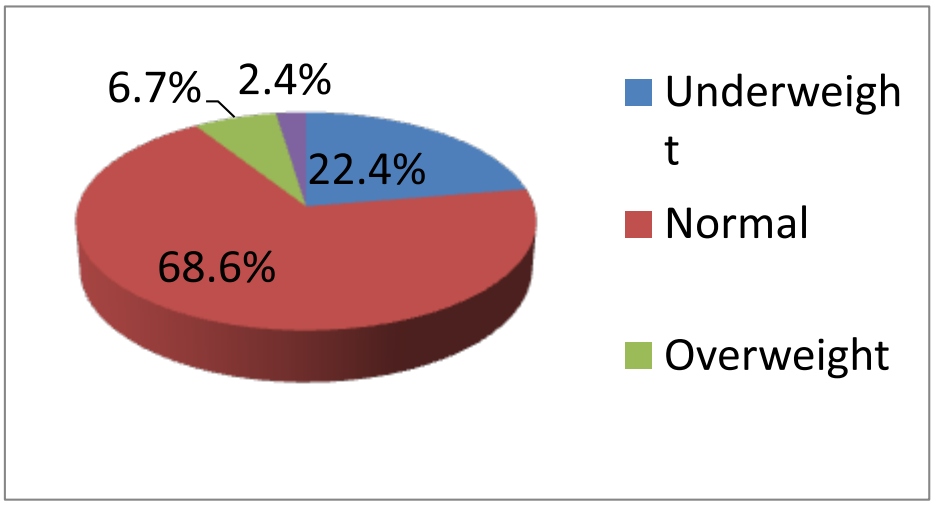

Figure 2: Comparison of Prevalence of Overweight And Obesity Between Government And Private Schools

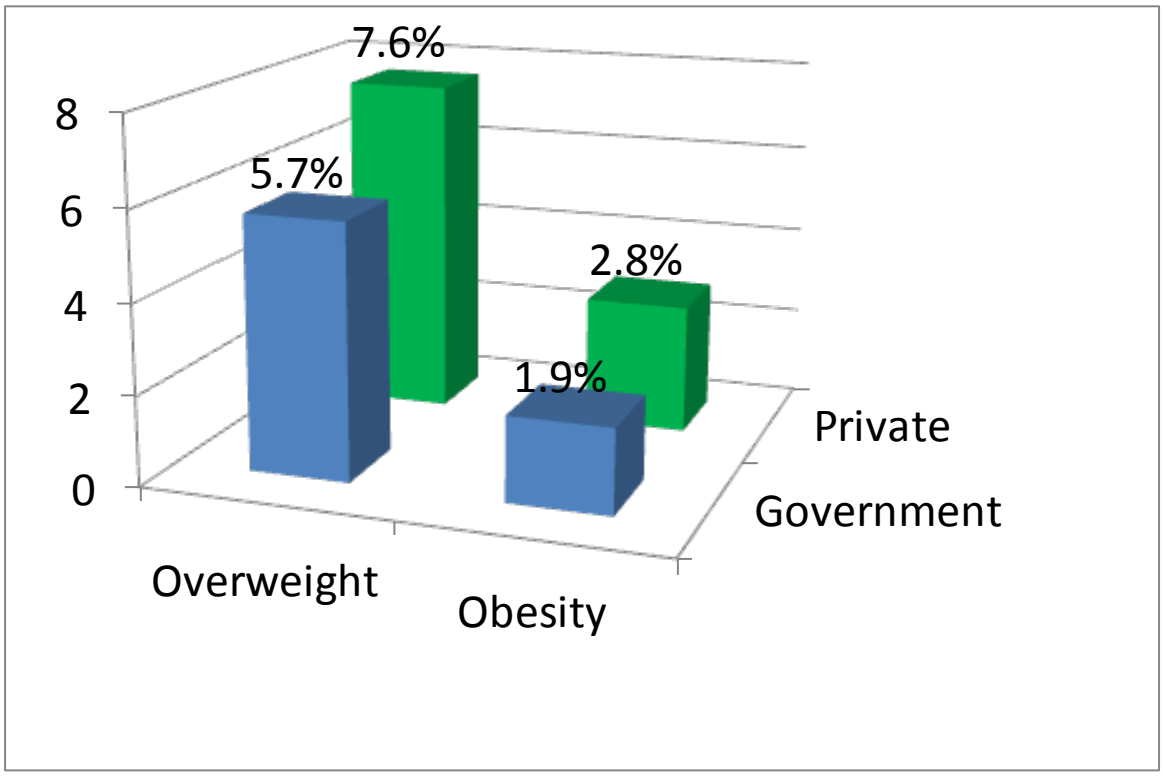

Table 5: Overweight and Obesity in Association with the Type of School Attended

Type of School	Total=210	Overweight	Obese	Test of Significance
Government	105	6[5.7%]	2[1.9%]	
Private	105	8[7.6%]	3[2.8%]	χ^2 = 7.996 df=3 p≤ 0.05
Total	210	14[6.7%]	5[2.4%]	

Discussion

The present study revealed that 14[6.7%] and 5 [2.4%] of the adolescents were overweight and obese respectively, giving overall prevalence of 9.1% which is almost similar to the observations made by Kumar S et al (2007) [2], Raj M et al (2007) [3], Kotian S M et al (2010)[4] and Katta V.A. et al (2013) [5]. In this study, majority of the overweight/obese subjects [17.8%] consumed fruits occasionally, [12.17%] followed a non-vegetarian diet, [12.6%] visited restaurants more than once per week, [11.48%] had the habit of eating chocolates regularly, [11.25%] consumed calorie-rich foods, [11.8%] consumed aerated drinks regularly and [15.74%] did not bring tiffin regularly to school. The association between all the above dietary habits and overweight/obesity was found to be statistically significant. Similar findings were found in Kumar S. et al (2007) [2], Banjade B. et al (2014) [6], Goyal R K et al (2010) [7], Kotian SM et al (2010) [4], Goyal J P et al (2011) [8] etc. This study also depicted that the majority of overweight/obese subjects [23.40%] had the habit of watching TV for more than 4 hours a day, [13.66%]

carried out physical exercise for less than one hour in a week, [23.33%] used motorised conveyance to school and [14.4%] had the habit of sleeping in the afternoon. There was significant association between overweight/obesity and the above mentioned physical activities. Similar observations were found in Kotian SM et al (2010) [4] Goyal JP et al (2011) [8], Goyal R K et al (2010) [7]. The prevalence of overweight/obesity was found more in those subjects that attended private school [10.47%] as compared to government school students [7.6%] and the association between the two was also found to be significant. Similar observations were also found in Gupta DK at al (2011), Bharti DR et al (2008), and Jagadesan S et al(2014) [9].

Conclusion

Prevalence of overweight and obesity was found to be 6.7% and 2.4% respectively in this study with the overall prevalence of 9.1%. Dietary habits like regular consumption of chocolates, calorie-rich foods like chips and ice-creams, aerated drinks, non-vegetarian diet, eating outside of home, occasional intake of fruits and not bringing tiffin regularly to school were significantly associated with overweight and obesity. Physical activities like watching TV for more than 4 hours, exercising for less than one hour per week, using motorised conveyance and sleeping regularly in the afternoon has been associated significantly with overweight/obesity in this study. Prevalence of overweight/obesity was found more to be in students that attended private school as compared to government school, which was also significantly associated. At individual level, students should follow a more healthy diet, physical activity of at least 30 minutes should be carried out regularly and active participation in house-hold activities should also be promoted by the parents. At school level, importance of nutrition and physical activities should be enhanced. The schools should organise regular health-checkups in order to provide the students with wholesome development and screen any overweight or obesity related ill effects on their health.

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