



ASSOCIATION OF SEDENTARY BEHAVIOR WITH OVERWEIGHT AND OBESITY AMONG SCHOOL ADOLESCENTS IN BHOPAL CITY

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Financial Support: None declared
Conflict of interest: None declared
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How to cite this article:

Namdev G, Mishra MK. Association of Sedentary Behavior with Overweight and Obesity among School Adolescents in Bhopal City. Ntl J Community Med 2016; 7(6):495-498.

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Date of Submission: 02-02-16

Date of Acceptance: 16-06-16

Date of Publication: 30-06-16

ABSTRACT

Background - Prevalence of overweight and obesity has increased for the past few decades. World Health Organization refers obesity as a global epidemic. There is a need to assess the prevalence and to find the factors responsible, so as to implement timely interventions.

Aims & objectives -To assess the prevalence of overweight and obesity among adolescents studying in school and the factors responsible for the same.

Material & methods -The study was conducted in adolescents studying at both government as well as private schools in Bhopal aged 12-19years. Obesity was assessed using WHO criteria for SEAR countries based on the body mass index. Pretested and semi structured questionnaire was used to collect the data on sedentary behavior like T.V. watching, using internet, playing videogames and indoor games.

Results: The overall prevalence of overweight was 5.6% and obesity was 1% among 4560 adolescents studied. Factors like time spent in watching television, internet using were directly related to overweight and obesity.

Conclusion: Overweight and obesity are multi factorial and needs a multi pronged interventions at the earliest for control and prevention.

Key words: Overweight, Obesity, Sedentary behavior

INTRODUCTION

Adolescence (10-19 years) 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.¹ During this transition phase, nutrition plays an important role in determining the weight of each and every individual. If weight gain occurs more in excess, than obesity is more likely to develop which is the mother of various non communicable diseases like Hypertension, Diabetes mellitus, Stroke, Osteoarthritis, Obstructive sleep apnea etc.

The World Health Organization (WHO) describes overweight and obesity as one of today's most im-

portant 'Public Health Problems' and has designated as a 'Global Epidemic'.² In India, it emerges at a very rapid rate in almost all age group, but proves quite alarming issue for adolescents because they suffer a lot physically, mentally as well as emotionally.

This burning problem is observed mainly due to rapidly changing lifestyle of adolescents. A lot of facilities are provided to them in today's scenario like T.V., Videogames, and Internet etc. As a result, they remain physically inactive and face many adverse consequences in future in form of obesity and its complications.

Therefore, in present study, we focus on sedentary behavior of adolescents like watching television, playing indoor games, video games and using internet. This study was undertaken with the objective to find the prevalence of overweight/obesity among school adolescents and to identify sedentary behavior associated with it.

MATERIAL AND METHODS

Institution based cross sectional study was conducted from July 2012 to June 2014 in 4560 school adolescents aged 12-19 years of Bhopal city.

The sample size is calculated based on the prevalence (9%) in a previous study.³ Allowable error 10% and non response error 10% are added to obtain the final sample size (4560).

Total 38 schools from both Govt. and private schools equally were selected by multistage simple random sampling procedure from the list of schools obtained from Ministry of education, Madhya Pradesh. After receiving written informed consent from the school principal, four class i.e. IX, X, XI, XII were considered for study. Adolescents from each class were selected by Lottery method.

All adolescents were included except those who were absent on the day of study. Verbal consent was taken from adolescents participating in the study and they were explained about the objective of the study. The study was approved by Institutional Ethics Committee before data collection.

A predesigned and pretested questionnaire was used to interview the study participants to elicit the information on individual characteristics such as age, sex, type of school and associated sedentary activities like playing indoor games, videogames, using internet and watching T.V. We assume that 100% adolescents watch T.V.

Anthropometric measurements were done to calculate Body mass index (BMI). BMI classification

for south East Asians given by WHO⁴ is used to calculate overweight and obesity in present study.

Body weight was measured (to the nearest 0.5 kg) with the subject standing motionless in the centre of the platform without shoes and to look straight ahead and then weight was recorded.

Height was measured (to the nearest 0.5 cm) with the subject standing in an erect position against a vertical scale of portable stadiometer and with the head positioned so that the top of the external auditory meatus was in level with the inferior margin of the bony orbit.

RESULTS

The present study was carried out to find out the prevalence of overweight and obesity among school adolescents and to determine the sedentary lifestyle factors associated with obesity. Out of 4560 students, 2398 (52.6%) were from private schools and 2162 (47.4%) from government schools comprising of 2596 (56.9%) girls and 1964 (43.1%) boys. Maximum number of students 2787(61.1%) were in the age group 15- 17 years.

Table1. Distribution of School Adolescents according to Body mass index (BMI) (n = 4560)

Body mass index	Adolescent (%)
Normal weight (18.5-23)	1982 (43.5)
Underweight (<18.5)	2276 (49.9)
Overweight (23-27.5)	256 (5.6)
Obese (>27.5)	46 (1)

In our study, we observe that 256 (5.6%) students were overweight and 46 (1.0%) were obese.

A statistically significant prevalence of overweight and obesity was noted amongst those students who were found to have using internet and play videogames.

Table2: Association of BMI of School Adolescents with sedentary physical activities (n= 4560)

Sedentary physic-cal activities	Normal weight (n=1982) (%)	Under weight (n=2276) (%)	Over weight (n=256) (%)	Obese (n=46) (%)	Total (n=4560) (%)	P value
Indoor games	1109 (56.0)	1266 (55.6)	142 (55.5)	22 (47.8)	2538 (55.65)	0.74
Video Games	747 (37.7)	876 (38.5)	116 (45.3)	10 (21.7)	1749 (38.35)	0.01
Using Internet	690 (34.8)	684 (30.1)	89 (34.8)	14 (30.4)	1477 (23.61)	<0.001

Table3: Association of BMI of school adolescents with duration of using internet (n=1477)

Using internet	Normal weight (n=684) (%)	Under weight (n=690) (%)	Over weight (n=89) (%)	Obese (n=14) (%)	Total (n=1477) (%)	P value
30 minute	84(12.28)	97(14.05)	5(5.61)	3(21.42)	189(17.5)	0.37
1 hr.	323(47.22)	321(46.52)	48(54.0)	6(42.85)	698(64.8)	
1.5 hr.	33(4.82)	22(3.18)	5(5.61)	1(7.14)	61(5.6)	
2 hr.	244(35.67)	250(36.23)	31(34.83)	4(28.6)	529(49.11)	

Table 4. Association of BMI of school adolescents with duration of watching T.V. (n= 4560)

Watching T.V.	Normal weight (n=1982) (%)	Under weight (n=2276) (%)	Over weight (n=256) (%)	Obese (n=46) (%)	Total (n=4560) (%)	P value
30 minute	627(31.6)	672(29.5)	79(30.9)	17(37.0)	1335	0.07
1 hr.	638(32.2)	758(33.3)	72(28.1)	8(17.4)	1476	
1.5 hr.	182(9.2)	193(8.5)	31(12.1)	8(17.4)	414	
2 hr.	535(27.0)	653(28.7)	74(28.9)	13(28.3)	1275	
Total	1982(43.5)	2276(49.9)	256(5.6)	46(1.0)	4560	

Table 5. Association of BMI of school adolescents with duration of playing videogames (n= 1749)

Duration of playing Video games	Normal weight (n=747) (%)	Under weight (n=876) (%)	Over weight (n=116) (%)	Obese (n=10) (%)	Total (n=1749) (%)	P value
30 minute	181(24.23)	171(19.5)	28(24.1)	2(20.0)	382(21.84)	<0.001
1 hr.	336(45.0)	456(52.0)	54(46.5)	2(20.0)	848(48.5)	
1.5 hr.	31(4.14)	72(8.5)	5(4.3)	0(0.0)	108(6.17)	
2 hr.	199(26.6)	177(20.2)	29(25.0)	6(60.0)	411(23.5)	

DISCUSSION

This comprehensive study is an attempt to document the prevalence of overweight and obesity and their associated factors amongst school adolescents aged 12 to 19 years.

Prevalence of overweight & obesity among school children: The overall prevalence of overweight and obesity among school adolescents was found to be 5.6% and 1.0% respectively in our study. Bishwalata et al (2005)⁵ found the prevalence of overweight 4.2% and of obesity 0.8% in a study done at Manipur. This finding is slightly lower than our study. Bharti et al (2008)⁶ at Wardha city, found the prevalence of overweight 3.1% which is much lower than our study while prevalence of obesity was 1.2% which is slightly higher than our study. At lucknow, Vohra et al (2010)⁷ reported prevalence of overweight & obesity 4.17% & 0.73% respectively. These findings are slightly lower than our study.

However, some studies reported higher prevalence of overweight and obesity than our study. Tilaki et al(2006)⁸ at Babol found the overall prevalence of overweight and obesity among school children 12.3% and 5.8% respectively. It is much higher than our findings. Warrich et al (2008)⁹at Karachi found that the 6% school children were obese and 8% were overweight. This finding is much higher than our study. The possible explanation behind these findings may be the difference in the cultural pattern of area of study and dietary preference for non vegetarian food items.

In metropolitan city, Delhi, Kapil U. et al (2002)¹⁰found the prevalence of obesity 7.4% while Sharma et al (2005)¹¹ found 22% overweight and 6% obese students. In Ludhiana, Punjab, Chhatwal (2004)¹² found that the prevalence of overweight and obesity was 14.2% and 11.2% respectively among school children. Thakre et al (2009-11)¹³at

Nagpur city, reported the 9.0% & 5.5% overweight and obesity respectively while Kamath et al (2012)¹⁴found the overall prevalence of overweight and obesity 10% and 5% respectively in Bangalore city among students. The possible reason of very high prevalence of overweight and obesity may be rapidly altered dietary habits and sedentary life style of metropolitan cities. These studies have small sample size and included school children only from affluent society and different criteria used for overweight and obesity.

In our study, we included a large sample size of school adolescents comprising wider age group of 12-19 yrs. and children selected from both private and government schools, may be the reason for relatively lower prevalence of overweight and obesity.

Obesity and sedentary physical activities: In our study, out of total overweight adolescents, 55.5% play indoor games, while 44.5% do not, 45.3% play videogames whereas 54.7% students do not and 34.8% use internet whereas 65.2% do not. Out of total obese, 47.8% play indoor games and 52.2% do not, 21.7% play videogames while 78.3% do not and 30.4% use internet and 69.6% do not use internet. Iyer et al (2004)⁵ found 19.2% overweight and 26% obese play videogames on daily basis.

In present study, all adolescents watch T.V. on daily basis. Majority of school adolescents, 30.9% overweight and 37% obese watch T.V. for 30 minutes and 30.9% overweight and 28.3% obese watch T.V. for 2 hours. Iyer et al (2004)¹⁵ found that 87% overweight and 97% obese subjects watch T.V. on daily basis, while in our study almost 100% children watch TV daily. Anwar et al (2009)¹⁶ also supported with our findings that 25.7% obese watch T.V. for more than 2 hours per day. Laxmiram et al (2005)¹⁷ reported 91% children watch T.V. for 2 hours, while Bishwalata et al (2005-06)⁵ and Kotian et al (2007)¹⁸found that the prevalence

of obesity was higher among those who watch T.V. for more than 2 hours.

Therefore, sedentary behavior among adolescents may be implicated in adolescent overweight and obesity because they reduce resting metabolism and lower energy expenditure.

CONCLUSION

In current study, the prevalence of overweight and obesity among adolescents was found to be only 5.6% and 1.0% respectively. The sedentary factor like using internet was found to be strongly associated with obesity while another component of physical inactivity like playing videogames also contributed to some extent.

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