

Original Research Article

A study on prevalence of overweight and obesity in school going adolescents and its association with socio-demographic factors in Lucknow district

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ABSTRACT

Background: Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. Obesity has become a global public health issue and is widely recognized as a key risk factor for coronary heart disease, hypertension, diabetes and many other health problems. The objectives of present study were to assess the prevalence of overweight and obesity and its association with socio-demographic factors amongst school-going adolescents in Lucknow district.

Methods: This study was a school-based cross-sectional study and was carried out in urban and rural areas of Lucknow, from January 2018 to June 2018. Sample size was 620. A multi-stage random sampling technique has been used to select the required sample size. Data analysis was done using software MS Office excel and SPSS 18 for windows.

Results: A total of 620 adolescents were studied. Majority (82.1%) of adolescents were found to be non-overweight/obese while 17.9% were found to be overweight/obese. Majority (66.7%) of students were overweight or obese, belonging to social class I while only 15.7% students were overweight or obese belonging to social class V.

Conclusions: The results of our study show that overweight/obesity continues to be a public health concern in adolescents. The current study shows that adolescent overweight and obesity are increasing even in low socio-economic status. Emphasis should be placed on awareness program for obesity prevention among school students by strengthening lifestyle change.

Keywords: Overweight, Obesity, Adolescents, Prevalence, Socio-demographic factors

INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. Obesity has become a global public health issue and is widely recognized as a key risk factor for coronary heart disease, hypertension, diabetes and many other health problems.¹

World Health Organization defines adolescent as “young people between the age of 10 and 19 years”.² They constitute about one billion (18%) of the world's population.³

Obesity in adolescents is very important as adolescence represents a crucial stage in human life during which lifestyles are formed and become established. Dietary habits appear to be established in close association with

lifestyle. In addition, the greatest health problems in this age-group will be found in young adult populations.⁴

In India, the pooled data after 2010 estimated a combined prevalence of 19.3% of childhood overweight and obesity which was a significant increase from the earlier prevalence of 16.3% reported in 2001-2005. Overweight and obesity rates in children and adolescents are increasing not just among the higher socio-economic groups but also in the lower income groups.⁵ Obesity is more likely to persist when its onset is in late childhood or adolescence and when obesity is severe.⁶

However, whether or not obesity persists into adulthood, obesity in childhood appears to increase the risk of subsequent morbidity.⁷ Early prevention of adolescent overweight and obesity is therefore very important but prevention strategy has to be supported by accurate epidemiological data. Considering the depth of this issue, we took this study as an attempt in this direction with an aim to find out the prevalence of overweight and obesity among school-going adolescents in urban and rural areas of Lucknow district, different factors responsible for overweight and obesity in them and thereafter provide recommendations for health care to them. The objective of present study was to assess the prevalence of overweight and obesity and its association with socio-demographic factors amongst school-going adolescents in Lucknow district.

METHODS

This study was a school-based cross-sectional study and was carried out in urban and rural areas of Lucknow, Uttar Pradesh from January 2018 to June 2018. This study was carried out in Era's Lucknow Medical College and Hospital in Lucknow district.

Sample size

Considering prevalence of overweight and obesity 14.6% (9.8+4.8) in school going adolescents in UP, sample size was calculated based on formula,

$$N = \frac{(Z\alpha)^2 pq}{L^2},$$

where p=expected proportion (prevalence), q=100-p, α =confidence level (Type I error) and L=Allowable error (in % of p).⁸ With 20% of 'p' as allowable error and after adding 10% data loss sample size comes round to n=620.

Sampling technique

A multi-stage random sampling technique has been used to select the required sample size. In rural Lucknow, there are 8 blocks, from which 2 senior secondary schools were randomly selected from different blocks. In a given school, students from classes VI to XII of age group 10-19 years have been selected through systematic random

sampling. 433 adolescents were chosen from urban schools; similarly from rural schools 187 adolescents has been chosen.⁹ Before conducting the permission was obtained from school committee.

Data collection and tools of investigations

A structured pre-tested preformed interview schedule was used to record socio-demographic data. Body weight was measured by a standardized portable digital weighing machine. Height was measured using a non-stretchable measuring tape to the nearest 0.1 cm. BMI-for-age was interpreted by using Z-score classification system. Overweight, obesity and underweight were identified by using WHO charts of BMI for age 5-19 years for boys and girls. Children were graded as overweight for Z score>+1 SD (equivalent to BMI 25 kg/m² at 19 years), obese for Z score>+2SD (equivalent to BMI 30 kg/m² at 19 years), thinness for Z score<-2SD and severe thinness for Z score<-3SD.^{10,11}

The socio-economic classification was done on the basis of revised modified BG Prasad's classification 2017.

Statistical analysis

Data analysis was done using software MS Office excel and SPSS 18 for windows. Descriptive statistical analysis, which included frequency, percentages was used to characterize the data.

RESULTS

A total of 620 adolescents were studied. Of these majority (57.9%) were males. In urban schools proportion of males and females was 55.9% and 44.1% respectively while in rural schools the percentage of adolescent's girls was only 37.4%. In the current study, most of the adolescents were in the age group 14-16 years (60.1%) and a minimum of 11.6% in the age group of 17-19 years (Table 1).

In present study 85% of adolescents were from nuclear families while only 15% were from joint families. It was observed that the majority of adolescents in urban and rural areas belonged to SES-IV (29.6% 48.7% respectively (Table 2).

In present study that majority (82.1%) of adolescents were found to be non-overweight/obese while 17.9% were found to be overweight/obese, and it was observed that 18.5% of adolescents from urban areas were either overweight or obese while in rural areas 16.6% found to be overweight or obese (Table 3).

In the present study, 50% of students of 10 years of age were found overweight/obese while only 5.7% among students of 17 years of age were found overweight/obese. A highly significant association of age with overweight/obesity status of adolescents was found in the

study ($p < 0.001$). 17.5% of males and 18.4% of females were found overweight/obese (Table 4).

It was observed that about 18.5% of students in urban areas were overweight or obese while in rural areas 16.6% were overweight or obese. 17.2% adolescents who

lived in joint family were overweight or obese while the percentage of overweight or obese adolescents who lived in nuclear families was 18% (Table 5).

Table 1: Age and gender distribution of subjects.

Variables	Urban (n=433)		Rural (n=187)		Total (n=620)	
	N	%	N	%	N	%
Age (years)						
10	16	3.7	0	0.0	16	2.6
11	45	10.4	0	0.0	45	7.3
12	52	12.0	6	3.2	58	9.4
13	35	8.1	21	11.2	56	9.0
14	87	20.1	58	31.0	145	23.4
15	79	18.2	51	27.3	130	20.9
16	80	18.5	18	9.6	98	15.8
17	29	6.7	6	3.2	35	5.6
18	9	2.1	17	9.1	26	4.2
19	1	0.2	10	5.3	11	1.8
Gender						
Male	242	55.9	117	62.6	359	57.9
Female	191	44.1	70	37.4	261	42.1

Table 2: Distribution of subjects according to biosocial characteristics.

Variables	Urban (n=433)		Rural (n=187)		Total (n=620)	
	N	%	N	%	N	%
Family Type						
Joint	62	14.3	31	16.6	93	15.0
Nuclear	371	85.7	156	83.4	527	85.0
Family Member Count						
<4	43	9.9	14	7.5	57	9.2
4-6	305	70.4	133	71.1	438	70.6
>6	85	19.7	40	21.4	125	20.2
Father Occupation						
Professional	59	13.6	3	1.6	62	10.0
Semi professional	102	23.6	25	13.4	127	20.5
Clerk, farm owner, shopkeeper	144	33.3	116	62.0	260	41.9
Daily wage labourer	128	29.6	43	23.0	171	27.6
Social Class						
I	8	1.8	1	0.5	9	1.5
II	118	27.3	16	8.6	134	21.6
III	120	27.7	68	36.4	188	30.3
IV	128	29.6	91	48.7	219	35.3
V	59	13.6	11	5.9	70	11.3

Table 3: Distribution of subjects according to overweight/non-overweight status.

Overweight vs. non-overweight	Urban (n=433)		Rural (n=187)		Total (n=620)	
	N	%	N	%	N	%
Non overweight/obese	353	81.5	156	83.4	509	82.1
Overweight/obese	80	18.5	31	16.6	111	17.9

Present study shows that socioeconomic class had direct relation with overweight and obesity status of students. Majority (66.7%) of students were overweight or obese, belonging to social class I while only 15.7% students

were overweight or obese belonging to social class V. The association was found to be significant ($p=0.003$) (Table 6).

Table 4: Association of age and gender with student's overweight/non-overweight status.

Variables	Non overweight/obese (n=509)		Overweight/obese (n=111)		Total	Chi-square	P value
	N	%	N	%			
Age							
10	8	50.0	8	50.0	16	42.09	<0.001
11	26	57.8	19	42.2	45		
12	48	82.8	10	17.2	58		
13	46	82.1	10	17.9	56		
14	117	80.7	28	19.3	145		
15	107	82.3	23	17.7	130		
16	91	92.9	7	7.1	98		
17	33	94.3	2	5.7	35		
18	23	88.5	3	11.5	26		
19	10	90.9	1	9.1	11		
Gender							
Male	296	82.5	63	17.5	359	0.073	0.78
Female	213	81.6	48	18.4	261		

Table 5: Association of habitat and biosocial characteristics with student's overweight/non-overweight status.

Variables	Non Overweight/obese		Overweight/Obese		Total	Chi-square	P value
	No.	%	No.	%			
Place							
Urban	353	81.5	80	18.5	433	0.32	0.572
Rural	156	83.4	31	16.6	187		
Family type							
Joint	77	82.8	16	17.2	93	0.036	0.849
Nuclear	432	82.0	95	18.0	527		
Family member count							
<4	44	77.2	13	22.8	57	1.135	0.567
4-6	363	82.9	75	17.1	438		
>6	102	81.6	23	18.4	125		

Table 6: Association of father's occupation and socioeconomic status with student's overweight/non-overweight status.

Variable	Non overweight/obese		Overweight/obese		Total	Chi-square	P value
	N	%	N	%			
Father occupation							
Professional	54	87.1	8	12.9	62	2.644	0.619
Semi professional	108	85.0	19	15.0	127		
Clerk, farm owner, shopkeeper	210	80.8	50	19.2	260		
Daily wage labourer	137	80.6	33	19.4	170		
Socio economic status							
I	3	33.3	6	66.7	9	16.411	0.003
II	106	79.1	28	20.9	134		
III	157	83.5	31	16.5	188		
IV	184	84.0	35	16.0	219		
V	59	84.3	11	15.7	70		

DISCUSSION

In the present study, it was observed that the majority (85%) of adolescents were belonging to joint families. Our findings were similar to the findings, observed by Jain et al (2018) in Meerut, in which majority (71.8%) were from nuclear families and almost similar results were also observed by Gamit et al (2015) in Gujrat.^{12,13}

It was found in our study that the majority of students were from SES IV (35.3 %), followed by SES III (30.3%), similar findings were observed by Taneja et al, who also found a majority of students belonging to category 2 (43%) followed by cat 3 (26%).¹⁴

A total of 17.9% of adolescents were found to be overweight/obese in which 15.5% were overweight while 2.4% were obese. 18.5% of adolescents from urban areas were either overweight or obese while in rural areas 16.6% found to be overweight or obese. This association was found insignificant. Wang et al (2018) also observed that the prevalence of overweight in urban areas was higher than in rural areas (9.3% versus 7.1%) while studies by Pathak et al and Alok et al showed positive correlation between type of residence and BMI categories which were statistically significant.¹⁵⁻¹⁷

In the present study higher number of males (17.5%) was overweight or obese than a female (18.4%) which is similar to NFHS-4 data.¹⁸

In our study overweight and obesity was found more in adolescents from nuclear family than who were from joint family, however, findings were not statistically significant. Similar findings were reported in studies conducted by Jain et al (2018) in Meerut, Gamit et al in Surat and Keerthan et al.^{12,13,19}

In our study we observed that socio-economic class had a direct relation with overweight and obesity status of students. Prevalence of overweight increases as social class increases (66.7% in social class I while 15.7% in social class V), the association was found to be significant ($p=0.003$). Ganie et al also found similar results.²⁰

In our study, it was found that overweight/obesity status decline with the age of adolescents. A highly significant association of age with overweight/obesity status of adolescents was found in our study ($p<0.001$). Jain et al (2018) and Barbu et al also found a significant association between age and overweight/obesity in adolescents.^{12,21}

In the present study similar proportion of males and females were found overweight while obesity was found little more prevalent in females than males. Similar findings were observed by Ng et al.

Family member count was found inversely related to overweight/obesity of students in our study while it was

statistically insignificant. Overweight/obesity was found to be 22.8% students among who had <4 members in the family while 17.1% overweight or obese individuals were found among ones who had 4-6 family members. Abdalla et al in their study observed that there was significant relationship between BMI for age and family size ($p=0.00$).²²

In our study we found that proportion of obese children was found maximum among children of clerks, shopkeepers and farm owners (3.1%) and minimum of 1.6% in children of professionals. Occupation of father was not significantly associated with overweight and obesity of adolescents in present study, but contradictory to our study, Gamit et al and Vohra et al in their study found significant association between parent's occupation and overweight and obesity.^{13,23}

CONCLUSION

The results of our study show that overweight/obesity continues to be a public health concern in adolescents. The current study shows that adolescent overweight and obesity are increasing even in low socio-economic status. In addition, our findings reinforce previous researches showing obesity associations with certain socio-demographic factors. Emphasis should be placed on awareness program for obesity prevention among school students by strengthening lifestyle change.

Limitations

As the study was cross-sectional in design, so it could not establish clear cut causal relationship. There was relatively small sample size, which is not true representation of whole district. Respondents were children and many of them might not have told correct information about socioeconomic status and habit. This could have brought some differences in association of variables.

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Conflict of interest: None declared

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

REFERENCES

1. WHO. Health topics: Obesity. Available at <http://www.who.int/topics/obesity/en/>. Accessed 21 July 2018.
2. WHO. Health topics: Adolescent Health. Available at http://www.who.int/topics/adolescent_health/en/. Accessed 21 July 2018.
3. World Health Organization, "Health needs of adolescents," Tech. Rep. 609, WHO Expert Committee, Geneva, Switzerland: 1997.
4. Alenazi SA, Koura HM, Zaki SM, Mohamed AH. Prevalence of obesity among male adolescents in Arar Saudi Arabia: Future risk of cardiovascular

- disease. *Indian J Community Med*. 2015;40(3):182-7.
5. Ranjani H, Mehreen TS, Pradeepa R, Anjana RM, Garg R, Anand K, et al. Epidemiology of childhood overweight and obesity in India: A systematic review. *Indian J Med Res*. 2016;143:160-74.
 6. Obesity: preventing and managing the global epidemic, Report of a WHO consultation. Geneva, World Health Organization; 2000: Technical Report Series 894.
 7. Mahajan PB, Purty AJ, Singh Z, Cherian J, Natesan M, Arepally S, et al. Study of childhood obesity among school children aged 6 to 12 years in union territory of Puducherry. *Indian J Community Med*. 2011;36:45-50.
 8. Nawab T, Khan Z, Khan IM, Ansari MA. Influence of behavioral determinants on the prevalence of overweight and obesity among school going adolescents of Aligarh. *Indian J Public Health*. 2014;58:121-4.
 9. Government of India, Ministry of Home Affairs, Office of the Registrar General and Census Commissioner, India; 2011 Census Data; Available at <http://www.census2011.co.in/census/district/528-lucknow.html>. Accessed 21 July 2018.
 10. WHO. BMI-for-age (5-19 years). Available at https://www.who.int/growthref/who_2007_bmi_for_age/en/ Accessed 21 July 2018.
 11. WHO. Chart catalogue. Available at https://www.who.int/childgrowth/standards/chart_catalogue/en/ Accessed 21 July 2018.
 12. Jain B, Jain S, Garg SK, Chopra H, Singh G, Mittal C. Impact of Sociodemographic factors on prevalence of overweight and obesity among adolescents of urban Meerut. *Indian J Comm Health*. 2018;30(1):90-5.
 13. Gamit SS, Moitra M, Verma MR. Prevalence of obesity and overweight in schoolgoing adolescents of Surat city, Gujarat, India. *Int J Med Sci Public Health*. 2015;4(1):42.
 14. Taneja M, Maini B, Singh M, Mathur SK. Identification of Family Risk Factors of Obesity in Urban Adolescents of North India. *J Obes Metab Res*. 2015;2:84-8.
 15. Wang H, Hu R, Du H, Fiona B, Zhong J, Yu M. The relationship between sleep duration and obesity risk among school students: a cross-sectional study in Zhejiang, China. *Nutr Metabol*. 2018;15(1):48.
 16. Pathak S, Modi P, Labana U, Khimyani P, Joshi A, Jadeja R, et al. Prevalence of obesity among urban and rural school going adolescents of Vadodara, India: a comparative study. *Int J Contemp Pediatr*. 2018;5:1355-9.
 17. Alok P, Malay P, Divyeshkumar V. Prevalence of overweight and obesity in adolescents of urban and rural area of Surat, Gujarat. *Natl J Med Res*. 2012;2:325-9.
 18. National Family Health Survey (NFHS-IV): 2014-15. Ministry of Health and Family Welfare, Government of India. Available at <http://rchiips.Org/nfhs/pdf/NFHS4/India.pdf>. Accessed 18 October 2018.
 19. Keerthan KM, Prashanth K, Kavya EB, Kavya RR, Kumar KB, Krishnamurthy H, et al. Prevalence of obesity among high school children in Dakshina Kannada and Udupi Districts. *Nitte Univ J Health Sci*. 2011;1:16-20.
 20. Ganie MA, Bhat GA, Wani IA, Rashid A, Zargar SA, Charoo BA, et al. Prevalence, risk factors and consequences of overweight and obesity among schoolchildren: a cross-sectional study in Kashmir, India. *J Pediatr Endocrinol Metabol*. 2017;30(2):203-9.
 21. Barbu CG, Teleanu MD, Albu AI, Sirbu AE, Martin SC, Bancescu A, et al. Obesity and eating behaviours in school children and adolescents -data from a cross sectional study from Bucharest, Romania. *BMC Public Health*. 2015;15:206.
 22. Abdalla MM, Mohammed SG, Gritly SM. Assessment of nutritional status of the adolescents (13-18 years) studying in secondary schools in Elhafeir Area-Dangle Locality-Northern State 2018. *Indian J Appl Res*. 2018;8(5).
 23. Vohra R, Bhardwaj P, Srivastava JP, Srivastava S, Vohra A. Overweight and obesity among school-going children of Lucknow city. *J Fam Community Med*. 2011;18(2):59.

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