



A Study on Prevalence and Factors Associated With Obesity among Adolescents in Shivamogga City – A Cross Sectional Study

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ABSTRACT

Introduction: Prevalence of obesity in childhood ranges from 5% to 20%. Earlier detection of obesity and its risk factors in children is important to prevent development of complications in adult life.

Objectives: To estimate the prevalence and risk factors associated with obesity among adolescents.

Methodology: Cross sectional study was conducted for a period of 3 months from July to September 2015 among 13 to 16 years high school children in urban area of Shivamogga city. Sample size was calculated by taking prevalence as 5% and $\epsilon = 0.35$ and sample size was found to be 596. Pretested semi structured questionnaire was used for data collection and anthropometric measurements were recorded as per the WHO guidelines.

Results: In the present study prevalence of overweight and obesity were found to be 7.67% and 5.83% respectively. The socioeconomic status, junk food intake, watching TV and playing video/mobile games were found to be statistically significant with the obesity.

Conclusion: The prevalence of obesity was high among adolescents in urban area. Study recommends education about the diet and physical activity to adolescents.

Key words: Obesity, non-communicable diseases, school children.

INTRODUCTION

Chronic non communicable diseases are increasing important health problems among adults both in developed and developing countries. Out of many non-communicable diseases obesity is one of that chronic condition which begins from childhood and leads to many chronic diseases like cardiovascular diseases, Hypertension, and Diabetes in adults.

Obesity is Defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size(hypertrophic obesity) or an increase in number of fat cells(hyperplastic obesity) or a combination of both.¹In adults overweight and obesity is defined as theBMI status ≥ 25 kg/m² and ≥ 30 kg/m² respectively but in children the definition of the obesity is different.² In children overweight is

defined as BMI more than 85th percentile and obesity more than 95th percentile.³

The prevalence of obesity in children varies between the countries and within the country and it ranges from 5% to 20%.⁴ This difference in the prevalence is due to differences in the underlying causes. The underlying cause of obesity is not known definitely. It is related to many behavioural factors and environmental factors. Dietary factors are associated with age, gender and eating pattern. This include eating outside homes, drinking sweetened beverages and fresh juice, eating large quantities and taking frequent meals and snacks.⁵ All these factors interact with each other and contributes to increase in the energy intake which leads to obesity.

Physical activity is one of the important causes of

obesity. Children who are active at the childhood will be active in their adulthood this reduces the development of obesity.⁶ Other factors which are related to obesity are socioeconomic status, family history of obesity and other genetic diseases.⁷

So earlier detection of obesity and its risk factors in children is most important to prevent the complications of obesity in adult.

OBJECTIVES

This study was conducted to estimate the prevalence of obesity among adolescents and to study the risk factors associated with the obesity.

MATERIALS AND METHODS

A descriptive cross sectional study conducted among high school children of Shivamogga city in Karnataka state. The study population consists of school children aged 13 to 16 years in an urban area of Shivamogga city. This study was conducted for a period of 3 months from 1st July 2015 to 31st September 2015. A list of government and private schools was obtained from the Deputy Director of Public Instructions (DDPI) Office Shivamogga. From that list, four schools were selected by using simple random sampling method. By relative precision method by taking prevalence as 5% and $\epsilon = 0.35$ and sample size was found to be 596 which was rounded of 600.

Ethical clearance was obtained from the Shivamogga Institute of Medical Sciences. A prior permission was obtained from school authority/principal to conduct the study by explaining the study protocol

Method of collection of data: The study was conducted among school children aged 13 to 16 years in Shivamogga city. A prior permission was obtained from school authority to conduct the study by explaining the study protocol. All children were interviewed personally using separate questionnaire. This questionnaire comprised of the questions regarding the physical activities and diet. Anthropometric measurements (height and weight) were recorded as per the WHO guidelines.

The height measurement scale was fixed to the wall and height was measured without any footwear. The student stood straight with heels, buttocks, back touching the wall and stretching upwards to the fullest extent with arms hanging on the side. The head was aligned so that the lower rim of the orbit and the auditory canal were in the horizontal plane.

Weight was measured without any footwear with

clothing (school uniform). BMI was calculated and children were identified as overweight if BMI was more than 85th percentile and obese if BMI was more than 95th percentile (IAP Growth Monitoring Guidelines for Children from Birth to 18 Year).⁸ Children who were absent during data collection even after two visits were excluded from the study.

Statistical Analysis: The data was entered in the Microsoft excel spread sheet and analysed by using epi-info 7 software. Chi square test was used to analyse the association between obesity and various factors.

RESULTS

The present study was conducted among 600 high school children aged 13 – 16 years in an urban area of Shivamogga. Out of 600 children 342 (57.00%) were boys and 258(43.00%) were girls. 57.5% and 42.5% of the children were in the age group 13-14 years and 15-16 years respectively.

In the present study prevalence of overweight and obesity were found to be 7.67% and 5.83% respectively.(Table 1)

Table 1: Prevalence of Obesity

BMI Status	Cases (%)
Normal(<85 th percentile)	519 (86.50)
Overweight(85 th -95 th percentile)	46 (7.67)
Obesity(>95 th percentile)	35 (5.83)

Note: BMI: Body Mass Index

In this study overweight and obesity were considered as single entity that is BMI Status more than 85thPercentile and we analysed with this single entity with other risk factors. Prevalence of Overweight/obesity increases with increase in the Socio-economic status which shows statistically significant at p value 0.004.

In this study age of the student, gender, diet, hours of playing outdoor game were not significantly associated with BMI status more than 85th percentile. Odds of having obesity in children who eats junk food more than 3 times in a week is 3.39 times higher compared to children who eats junk food less than 3 times in a week(OR:3.39, CI: 2.09-5.47, p value <0.001). Similarly Odds of having obesity in children who watches TV more than 3 hours in a day and plays video/ mobile game more than 2 hour in a day is 3.61 times(OR: 3.61, CI: 2.17-6.01, p value <0.001) and 3 times(OR:3.04, CI: 1.86-4.97, p value <0.001) more compared to children who watches TV less than 3 hours in a day and plays video/ mobile game less than 2 hour in a day respectively..(Table 2)

Table 2: Association between various risk factors and obesity

Variables	Normal (n=519)(%)	BMI Status >85 th percentile (n=81)(%)	ODDs Ratio(CI)	p Value
Age				
13 - 14 years	300(57.80)	45(55.56)	1.09(0.68-1.75)	0.703
15 - 16 years	219(42.20)	36(44.44)		
Sex				
Boys	299(57.61)	43(53.08)	1.20(0.75-1.92)	0.444
Girls	220(42.39)	38(46.91)		
Diet				
Veg	128(24.66)	16(19.75)	1.32(0.72- 2.38)	0.335
Mixed	391(75.34)	65(80.25)		
Junk food Intake				
<3times/ week	374(72.06)	35(43.21)	3.39(2.09-5.47)	<0.001*
≥3times/week	145(27.94)	46(56.79)		
TV Watching				
<3hours/day	443(85.36)	50(61.73)	3.61(2.17-6.01)	<0.001*
≥3hours/day	76(14.64)	31(38.27)		
Playing Video/Mobile game				
<2hour/day	320(61.66)	28(34.57)	3.04(1.86-4.97)	<0.001*
≥2hour/day	199(38.34)	53(65.43)		
Hours of playing Outdoor game				
≥1hour/day	351(67.63)	47(58.02)	1.51(0.93-2.43)	0.088
<1hour/day	168(32.37)	34(41.98)		

Note: * = p <0.05, %= Percentage, N= Numbers , CI= Confidence interval

DISCUSSION

In the present study prevalence of overweight and obesity were found to be 7.67% and 5.83% respectively. Similarly prevalence of overweight and obesity were 9.9% and 4.8% respectively in the study done by Kotian MS et al.⁴ Other study done by Saraswathi SY showed the prevalence of overweight/obesity as 8.75 percent in the urban Area of Mysore.⁹ A study done in USA during 2001-2002 showed high prevalence of overweight and obesity as 31.5 and 16.5%, respectively in 6 to 19 year age group children.¹⁰ This variation in the prevalence of obesity may be due to different in the place of the study and life style changes of the children.

In the present study there was no significant association between obesity and age and sex of the students. But study done by Varadappa ST showed significant association between age of the students and obesity but not with sex of the students.¹¹ Similarly study done by Kumah DB showed no association between gender of the students and obesity.¹²

In this study there was no association between diet of the students and obesity. Similarly study done by Goyal RK et.al¹³ and Varadappa ST¹¹ showed obesity was not associated with diet of the students.

In our study we found prevalence of overweight/obesity was higher in the children taking junk food more than/equal to 3 times in a week, watching TV more than/equal to 3 hours in a day and playing video/ mobile game more

than/equal to 2 hour in a day and these factors showed statistically significant at p value <0.05. This could be due to the ingredients involved in the preparation of junk food usually contain more fat and calorie but less nutritive value and this leads to accumulation of fat and development of obesity. Children sitting ideally in front of TV for than 3 hours in a day leads to decreased catabolism and increased adipose tissue accumulation. Another reason is that, the children who watch TV for longer hours tend to have food while watching TV which results in weight gain and obesity.

Similarly study done by Kotian MS et al showed the prevalence of overweight was higher among the adolescents who ate chocolates daily, had physical activity of < one hour/day, watched television ≥ 4 hours/day.⁴ Studies done by Swinburn B and Tremblay MS showed sedentary behaviours like watching television and playing computer games are associated with increased prevalence of obesity.^{14,15} Study done by Namdev G and S Kalasker PS showed prevalence of obesity was more among children who watches TV and uses mobiles for more than one hour in a day.^{16,17} But study done by Mehan M et.al not showed any significant association between watching TV and obesity.¹⁸

CONCLUSION

This cross sectional study concludes that higher prevalence of overweight and obesity among adolescents in urban area. There were various risk fac-

tors associated with obesity like lesser physical activity and junk food intake. So, further studies should be conducted to confirm these findings. Hence the study recommends education about the diet and physical activity to adolescents.

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REFERENCES

1. World health organisation. World health organisation obesity: Preventing and managing the global epidemic. Technical report series 894. WHO. Geneva. 2000.
2. Krebs NF, Himes JH, Jacobson D, Nicklas TA, Guilday P, Styne D. Assessment of Child and Adolescent Overweight and Obesity. *American Academy of Pediatrics*. 2007; 120(4): 194.
3. Khadilkar VV, Khadilkar AV, Choudhury P, Agrawal KN, Ugra D, Shah NK. IAP growth monitoring guidelines for children from birth to 18 years. *Indian Pediatr*. 2007;44:187-97.
4. Kotian M S, Kumar S G, Kotian SS. Prevalence and determinants of overweight and obesity among adolescent school children of South Karnataka, India. *Indian J Community Med* 2010;35:176-8
5. St-Onge MP, Keller KL, Heymsfield SB. Changes in childhood food consumption patterns: a cause for concern in light of increasing body weights. *American Journal of Clinical Nutrition*. 2003; 78 :1068 -1073.
6. Reilly JJ, Methven E, McDowell ZC, Hacking B, Alexander D, Stewart L, Kelnar DJ. Health consequences of obesity. *Archives of Disease in Childhood* 2003;88:748-752
7. Lyon HN, Hirschhorn JN, Genetics of common forms of obesity: a brief overview. *American Journal of Clinical Nutrition*, 2005;82(1):215-217
8. Khadilkar VV, Khadilkar AV, Choudhury P, Agrawal KN, Ugra D, Shah NK. IAP growth monitoring guidelines for children from birth to 18 years. *Indian Pediatr*. 2007;44:187-97.
9. Saraswathi SY, Najafi M, Gangadhar RM, Malini SS. Prevalence of Childhood Obesity in School Children from Rural and Urban Areas in Mysore, Karnataka, India. *J Life Sci*. 2011;3(1): 51-55.
10. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents and adults. 1999-2002. *JAMA* 2004;291:2847-50.
11. Varadappa ST, Prakash PK, Gangabaraiah, Raju RMN, Subbanna LY. Prevalence of Obesity among College Students in Rural Area of Bangalore Natl J Community Med. 2014; 5(1): 42-45.
12. Kumah DB, Akuffo KO, Abaka-Cann JE, Afram DE, Osae EA. Prevalence of Overweight and Obesity among Students in the Kumasi Metropolis. *Journal of Nutrition and Metabolism*. 2015;1-4.
13. Goyal RK et.al. Prevalence of Overweight and Obesity in Indian Adolescent School Going Children : Its Relationship with Socioeconomic Status and Associated Lifestyle Factors. *JAPI*. 2010;58:151-58.
14. Swinburn B, Egger G: Preventive strategies against weight gain and obesity. *Obes Rev*. 2002;3:289-301.
15. Tremblay MS, Willms JD: Is the Canadian childhood obesity epidemic related to physical inactivity? *Int J ObesRelatMetabDisord*. 2003;27:1100-1105.
16. 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.
17. S Kalasker PS, Tarannum A. Prevalence of Childhood Obesity among School Going Children and Its Associated Socio-Demographic Factors in Shirur Village, Bagalkot. *Ntl J Community Med* 2016; 7(9):782-785.
18. Mehan M, Munshi A, Surabhi S, Bhatt T, Kantharia N. Study of School Environment and Prevalence of Obesity & Its Predictors Among Adolescent (10- 13 Years) Belonging to a Private School in an Urban Indian City. *Natl J Community Med* 2012;3(3):400-7.