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Prevalence of overweight and obesity risk factors among adolescents in Tirupati schools and junior colleges

Anand Krishna Gorantla¹*, Chandrasekhar Bineni²

Department of Community Medicine, ¹Maharaja Institute of Medical Sciences, Vijayanagaram, ²Fathima Institute of Medical Sciences, Kadapa, Andhra Pradesh, India

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*Correspondence:

Dr. Anand Krishna Gorantla,

E-mail: maharaja.faculty@gmail.com

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ABSTRACT

Background: Obesity increases the risk of several chronic conditions including type 2 diabetes, cardiovascular diseases, gallbladder disease, osteoarthritis, back pain and some cancers. The present study was conducted to study the prevalence of obesity and overweight in adolescent population.

Methods: A total of 1258 students (males-644; females-614) with an age group 10-19 years were selected from the higher secondary schools and junior colleges in the urban area of Tirupati.

Results: The prevalence of overweight/obesity is found to be significantly higher in adolescents of private institutions than those from government institutions. Higher prevalence of overweight/obesity is found in school going adolescents 13.8% compared to college adolescents 6.7%. The variables like type of institution, residence, family history of obesity showed a significant positive association with overweight/obesity.

Conclusions: The present study recommended that the private institutions should encourage healthy life style practices among students to prevent the risk of overweight/obesity from emergence.

Keywords: Obesity, Overweight, Risk

INTRODUCTION

Risky behaviours such as smoking, consumption of high fatty diet and adopting a sedentary lifestyle that leads to obesity and cardiovascular illnesses. Obesity in children and adolescents could track into adult obesity and morbidity, with the risk for developing chronic diseases at that stage in life. Overweight and obesity as a public health problem is rapidly increasing in many middle-income and less developed countries. Many studies have shown rising trends in the prevalence of obesity and overweight in India. Obesity is emerging as an important health problem particularly in urban areas, paradoxically co-existing with under-nutrition imparting double burden of disease in India. Adolescent Obesity is increasingly being observed with the changing life style of families, with increased purchasing power and increasing hours of

inactivity and dietary and cultural transition. Overweight and obesity in childhood and adolescence may predispose persons to morbidity in adulthood. The classification criteria of overweight and obesity in children and adolescents are less standardised than those for adults. The present study was conducted to study the prevalence of overweight and obesity risk factors among adolescents in Tirupati schools and colleges.

METHODS

A cross-sectional study was carried out in Tirupati urban areas among a total of 1258 adolescents (males: 644; females: 614) studying in 4 institutions (2 government and 2 private). The institutions were selected by random sampling method out of the total existing institutions (government and private schools and government and

private junior colleges). The adolescents are studying 6th to Intermediate 2nd year. A standard questionnaire was used in collecting the required data regarding dietary patterns, physical activities, leisure activities including TV watching, computer games, visits to restaurant etc. The weight and height were recorded by using standardized instruments. Overweight and obesity risk factors were assessed using international obesity task force (IOTF) BMI standards for adult obesity in Asia and India. Ethical committee clearance for the study was obtained from the Institutional ethical committee, S.V. Medical College, Tirupati.

RESULTS

The prevalence of overweight/obesity has been found to be higher in females 13.0% compared to that in males 10.1% but the difference is not statistically significant. The prevalence of overweight/obesity is found to be significantly higher in adolescents of private institutions than those from government institutions 18.7% vs. 4.3%. A significantly higher prevalence of overweight/obesity is found in school going adolescents 13.8% compared to college adolescents 6.7% (Table 1). A comparatively higher prevalence of overweight/obesity is found in adolescents of Hindu religion 11.9% than in other religions 4.9% and the difference is also statistically significant. A higher prevalence is found in day scholars 13.6% compared to hostellers 6.5%. The prevalence is found to be significantly higher in those adolescents taking vegetarian diet 18.5% compared to non-vegetarian diet 10.4%. The prevalence has been found to be significantly (p<0.001; S) higher in those with positive family history of overweight/obesity 14.7% compared to those without family history 7.7% (Table 2). The prevalence of overweight/obesity is found to be comparatively higher in those with perceived bad health 15.6% than in those with good health 11.3% which is however found to be not statistically significant. Higher prevalence is found in those who felt physical activity is good 11.6% vs. 9.4% which however is not statistically significant. Similarly a slightly higher prevalence is found in those who are interested in checking weight 11.6% vs. 10.0% which however is not found to be statistically significant (Table 3). The prevalence of overweight/obesity is found to be higher in those who felt that the person's weight should be within normal limits 14.4% vs. 6.7% and the difference is also found to be

statistically significant (p<0.001; S). The prevalence is found to be higher in those with no perceived stress 12.3% vs. 10.4% but the difference is not statistically significant. The prevalence is found to be higher in those adolescents who have pleasant mood compared to those with irritant mood 11.7% vs. 11.0% but however the difference is not statistically significant (Table 4). The prevalence of overweight/obesity is found to be higher in those who are taking mixed oils 16.4% than those taking sunflower or safflower oil 14.8% and palm or coconut oil 5.6% and the differences are also found to be statistically significant (p<0.001; S). Contrastingly higher prevalence is found among those taking fruits on all days in a week 16.5% and least in those taking once weekly 9.1% and the differences are also statistically significant (p=0.005; S). On similar lines, a slightly higher prevalence is found among those who visit restaurant occasionally 12.2% compared to those who visit restaurant more than once in a week 9.1% which however is not statistically significant (Table 5). The prevalence overweight/obesity is found to be higher in those taking 0-5 times per week of soft drinks 12.0% compared to other groups but however the difference is not statistically significant. A higher prevalence of overweight/obesity is found among those consuming bakery items <3 times in a week 13.6% compared to those taking >3 times in a week 8.1% and the difference is found to be statistically significant (p=0.003; S). The prevalence is found to be higher in those taking nonvegetarian foods thrice weekly 14.8% compared to those taking twice or once in a week but however the differences are not found to be statistically significant (Table 6). The prevalence of overweight/obesity has been found to be highest among those sleeping for <4 hours 14.6% followed by those sleeping for 6-8 hours 13.2% and the difference is also found to be statistically significant (p=0.014; S). The prevalence is found to be lower among those who do meditate 9.3% but the difference is not statistically significant. A slightly higher prevalence is found among those who perform yoga 12.3% but the difference is not statistically significant. Contrastingly, higher prevalence is found among those practicing weight reduction methods 27.6% which is also found to be statistically significant (p<0.001; S) (Table 7). Thus in the final model of multivariate logistic regression analysis, the variables like type of institution, residence, family history of obesity showed a significant positive association with overweight/obesity (Table 8).

Table 1: Gender, type of institution and level of education of adolescents by overweight/obesity (N=1258).

S. No.	Risk	factors	Prevalence of overweight/obesity	Statistical significance	
1	Gender				
	(a)	Male	65/644 (10.1)	χ2=2.65;	
	(b)	Female	80/614 (13.0)	P=0.10; NS	
2	Type	of institution			
	(a)	Government	27/628 (4.3)	χ2=64.2;	
	(b)	Private	118/630 (18.7)	P<0.001; S	
3	Leve	l of education			
	(a)	School	118/853 (13.8)	χ2=13.2;	
	(b)	College	27/405 (6.7)	P<0.001; S	

Table 2: Religion, residence, type of diet and family history by overweight/obesity (N=1258).

S. No.	Risk	factors	Prevalence of overweight/obesity	Statistical significance	
1	Reli	gion			
	(a)	Hindu	142/1197 (11.9)	χ2=2.75;	
	(b)	Others	3/61 (4.9)	P=0.09; NS	
2	Residence				
	(a)	Hosteller	24/367 (6.5)	χ2=12.6;	
	(b)	Day scholar	121/891 (13.6)	P<0.001; S	
3	Type of diet				
	(a)	Non-vegetarian	113/1085 (10.4)	χ2=4.66;	
	(b)	Vegetarian	32/173 (18.5)	P=0.03; S	
4	Fam	ily history of obesity			
	(a)	Yes	101/688 (14.7)	χ2=14.8;	
	(b)	No	44/570 (7.7)	P<0.001; S	

Table 3: Certain perceived opinions by overweight/obesity (N=1258).

S. No.	Risk factor	Prevalence of overweight/obesity	Statistical significance		
1	General Health Status				
	(a) Good	135/1194 (11.3)	χ2=2.78;		
	(b) Bad	10/64 (15.6)	P=0.09; NS		
2	Is physical activity good?				
	(a) Yes	142/1226 (11.6)	χ2=0.14;		
	(b) No	3/32 (9.4)	P=0.69; NS		
3	Interest in checking weight				
	(a) Yes	141/1218 (11.6)	χ2=0.09;		
	(b) No	4/40 (10.0)	P=0.75; NS		

Table 4: Certain perceived opinions by overweight/obesity (N=1258).

S. No.	Risk factor	Prevalence of overweight/obesity	Statistical significance		
1	Person's weight should be within normal limits.				
	(a) Yes	113/783 (14.4)	χ2=17.2;		
	(b) No	32/475 (6.7)	P<0.001; S		
2	Perceived stress				
	(a) Yes	55/527 (10.4)	$\chi 2=1.05$;		
	(b) No	90/731 (12.3)	P=0.30; NS		
3	Mood during most of the day				
	(a) Pleasant	109/930 (11.7)	$\chi 2=0.13;$		
	(b) Irritant	36/328 (11.0)	P=0.71; NS		

Table 5: Certain dietary practices by overweight/obesity (N=1258).

S. No.	Risk	factor	Prevalence of overweight/obesity	Statistical significance	
1	Type of predominant oil consumption				
	(a)	Palm or coconut oil	26/467 (5.6)		
	(b)	Sunflower or safflower oil	100/675 (14.8)	χ2=28.8; P<0.001; S	
	(c)	Mixed	19/116 (16.4)	1 < 0.001, 5	
2	Frui	t consumption per week			
	(a)	All days	58/352 (16.5)		
	(b)	Thrice	19/217 (8.8)	χ2=12.7;	
	(c)	Twice	26/227 (11.5)	P=0.005; S	
	(d)	Once	42/462 (9.1)		
3	Restaurant visit in a week				
	(a)	More than once	11/121 (9.1)	.2-1 14:	
	(b)	Once	43/391 (11.0)	χ2=1.14; P=0.56; NS	
	(c)	Occasional	91/746 (12.2)	1 –0.30, 115	

Table 6: Certain dietary practices by overweight/obesity contd. (N=1258).

S. No.	Risk factor	Prevalence of overweight/obesity	Statistical significance		
1	Soft drinks consumption per week				
	(a) >10 times	6/70 (8.6)	2-1.01.		
	(b) 6–10 times	23/219 (10.5)	χ2=1.01; P=0.60; NS		
	(c) 0–5 times	116/969 (12.0)	F=0.00, NS		
2	Bakery items consumption in a week				
	(a) >3 times	39/481 (8.1)	χ2=8.92;		
	(b) <3 times	106/777 (13.6)	P=0.003; S		
3	Non-vegetarian food consumption in a week(N=1085)				
	(a) Thrice	12/81 (14.8)	2-1 01.		
	(b) Twice	18/182 (9.9)	2=1.91; P=0.39; NS		
	(c) Once	82/822 (10.0)	1 –0.37, 113		

Table 7: Certain daily activities by overweight/obesity (N=1258).

S. No.	Risk factor	Prevalence of overweight/obesity	Statistical significance		
1	Hours of sleeping per day	,			
	(a) 8–10 hours	19/301 (6.3)			
	(b) 6–8 hours	79/597 (13.2)	χ2=10.6;		
	(c) 4–6 hours	40/312 (12.8)	P=0.014; S		
	(d) <4 hours	7/48 (14.6)			
2	Meditation				
	(a) Yes	30/322 (9.3)	$\chi 2=2.07;$		
	(b) No	115/936(12.3)	P=0.15; NS		
3	Yoga				
	(a) Yes	27/219 (12.3)	χ2=0.16;		
	(b) No	118/1039 (11.4)	P=0.68; NS		
4	Practicing weight reduction methods				
	(a) Yes	96/348 (27.6)	χ2=121.6; P<0.001; S		

Table 8: Final model of multivariate logistic regression analysis of overweight/obesity with significant variables.

S. No.	Variables	Odds ratio (95% CI)	P value	
1.	Type of institution	4.23 (2.64 – 6.77)	<0.001; S	
2.	Residence	2.77 (1.72 – 4.47)	<0.001; S	
3.	Family history of obesity	1.98 (1.34 – 2.92)	<0.001; S	
4.	Bakery items	0.62(0.41-0.93)	0.02; S	
5.	Type of oil	0.48(0.29 - 0.79)	0.0042; S	

DISCUSSION

The family history of obesity was found in 54.7% of study subjects while the actual prevalence of overweight and obesity as per the IOTF classification was found to be 8.8% and 2.7% respectively. Thus overall, 11.5% are found to have overweight and obesity. A higher proportion of overweight and obesity was found by Agarwal classification (Overall-14.0%; overweight alone - 9.9%; obesity-4.1%). In this study, the prevalence of overweight and obesity was found to be 29.3%. The higher prevalence may be due to differences in the study subjects by location and dietary habits. In the current study as per the IOTF classification, the prevalence of

overweight was found to be higher in females 10.4% than in males 7.3% while the proportion of obesity was almost similar. But as per the Agarwal classification, the prevalence of overweight followed the same pattern, being higher in females 10.1% compared to males 9.8% but the prevalence of obesity was higher in males 4.8% than females 3.4%. Thus overall, a slightly higher prevalence of overweight and obesity was found in males 14.6% than females 13.5% as per the Agarwal classification in contrast to IOTF classification which found a higher prevalence in females 13.0% than in male adolescents 10.1%. However much importance need not be attached to this finding as the differences between proportion of overweight and obesity among male and female adolescents based on the two classifications are

not statistically significant. In an Indian study, it was found that the prevalence was higher in males 15.2% compared to that in females 10.7%.7 Ahmedabad study had also found slightly higher prevalence in males 10.0% than females 8.8%.8 Amritsar study also demonstrated a marked difference in the prevalence between males 10.9% and females 5.6%. A study in South Karnataka also showed similar prevalence in males 14.8% and females 14.5%. 10 A study in Finland has shown an overall prevalence of 17.2% with significantly higher prevalence in males than females. 11 A study in Thiruvananthapuram showed a higher prevalence in females 20.0% than males 16.4%. 12 The Ludhiana study also had found a very high prevalence of overweight and obesity among boys 28.1% and girls 22.8%. 13 Similarly, a study in Meerut showed high prevalence of overweight and obesity among boys 29.2% and girls 25.0%. 14 In Surat city, a similar prevalence was found in males 21.8% and females 21.8%. 15 Thus varied prevalence of overweight and obesity (lower, comparable and higher) have been reported in other studies. This may be due to differences in the age distribution, geographical differences, dietary variations, socio-economic status differences and different time periods. In the current study, the prevalence of overweight and obesity based on IOTF classification was found to be higher in private school adolescents 22.5% than government school adolescents 5.2% and also higher in private college 10.7% than that in Government College 2.5%. As per the Agarwal classification also, the prevalence of overweight and obesity followed the same pattern being higher in private school 27.1% than in government school 6.8% and higher in private college 12.4% than in Government college 3.4%. Thus both classifications showed statistically significant higher level of overweight and obesity in private school and colleges compared to government school and colleges. This may be linked to higher socioeconomic status and availability of fast foods and snacks with regard to private institutions. The Thiruvananthapuram study also showed prevalence of 22.1% in private schools compared to government schools 16.9%. 12 The Karnataka study however showed a slightly higher prevalence in government schools (6.0%) compared to private schools 5.3%.16

CONCLUSION

Overweight/obesity was found to be significantly higher in school adolescents than the college going adolescents which reiterates the fact that the health education destined to inculcate healthy life style practices should be provided at an early age group.

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REFERENCES

- 1. Young X, Telama R, Viikari J, Raitakari OT. Risk of Obesity in Relation to Physical Activity Tracking from Youth to Adulthood. Med Sci Sports Exerc. 2006;38(5):919-25.
- Chopra M, Galbraith S, Darnton-Hill I. A global response to a global problem: the epidemic of over nutrition. Bull World Health Organ. 2002;80:952-8.
- 3. Kapil U, Singh P, Pathak P, Dwivedi SN, Bhasin S. Prevalance of obesity amongst the affluent adolescent school children in Delhi. Indian Pediatr. 2002;39:449-52.
- 4. Khadilkar VV, Khadilkar AV. Prevalence of obesity in affluent school boys in Pune. Indian Pediatr. 2004;41:857–8.
- 5. St-Onge MP, Keller KL, Heymsfield SB. Changes in childhood food consumption patterns:a cause for concern in light of increasing body weights. Am J ClinNutr. 2003;78(6):1068–73.
- 6. Gordon-Larsen P, Harris KM, Ward DS, Popkin BM. Acculturation and overweight-related behaviors among Hispanic immigrants to the US: the National Longitudinal Study of Adolescent Health. Soc Sci Med. 2003;57(11):2023-34.
- Goyal RK, Shah VN, Saboo BD, Phatak SR, Shah NN, Gohel MC, et al. Prevalence of Overweight and Obesity in Indian Adolescent School Going Children: Its Relationship with Socioeconomic Status and Associated Lifestyle Factors. J Assoc Physicians India. 2010;58:151-8.
- 8. Krutarth R Brahmbhatt, Umesh N Oza. Obesity among Adolescents of Ahmedabad city, Gujarat, India A Community based Cross-sectional study. Int J Biol Med Res. 2012;3(2):1554-7.
- 9. Sidhu S, Marwah G, Prabhjot. Prevalence of Overweight and Obesity among the Affluent Adolescent School Children of Amritsar, Punjab. Coll Antropol. 2005;29(1):53-5.
- Shashidhar Kotian M, Ganesh Kumar S, Kotian SS. Prevalence and Determinants of Overweight and Obesity Among Adolescent School Children of South Karnataka, India. Indian J Community Med. 2010;35(1):176-8.
- 11. Kautiainen S, Koivusilta L, Lintonen T, Virtanen SM, Rimpela A. Use of information and communication technology and prevalence of overweight and obesity among adolescents. Int J Obes. 2005;29(8):925-33.
- 12. Ramesh K. Prevalence of overweight and obesity among high school students of Thiruvananthapuram City Corporation, Kerala. AMJ. 2010;3:650-61.
- Chhatwal J, Verma M, Riar SK. Obesity among preadolescent and adolescents of a developing country. Asia Pac J ClinNutr. 2004;13(3):231-5.

- 14. Jain S, Pant B, Chopra H, Tiwari R. Obesity among Adolescents of Affluent Public Schools in Meerut. Indian J Public Health. 2010;54(3):158-60.
- Goyal JP, Kumar N, Parmar I, Shah VB, Patel B. Determinants of Overweight and Obesity in Affluent Adolescent in Surat City, South Gujarat Region, India. Indian J Community Med. 2011;36(4):296-300.
- 16. Keerthan KM, Prashanth K, Baby KE, Rao KR, Kumarkrishna B, Hegde K, et al. Prevalence of

Obesity among High School Children in Dakshina Kannada and Udupi Districts. NUJHS. 2011;1:16-20

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