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Original Research Article

Lifestyle and nutritional status of late adolescent in an urban area of Western Maharashtra: cross sectional study

Jyoti A. Landge[1]*, Gajanan D. Khadkikar[2]

[1]Department of Community Medicine, NMC Visnagar, Gujarat, India
[2]Department of Cardiology, NHL Medical College, Ahmedabad, Gujarat, India

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***Correspondence:**
Dr. Jyoti A. Landge,
E-mail: jlandge11@gmail.com

ABSTRACT

Background: Prevalence of overweight and obesity is rapidly increasing among adolescent age. One of the reasons is change in lifestyle and behavior practices. Adolescent population and health of adolescents have a special concern. In late adolescence there is transition from school to college or university. This transition to college life often worsens lifestyle and dietary habits among late adolescents. Present study was carried out to assess lifestyle and nutritional status of late adolescent.
Methods: A cross sectional study were carried out involving 140 late adolescent students of 17-19 years after obtaining permission from college principle using preformed questionnaire. Subsequently anthropometric measurements like weight in kg and height in meters, waist and hip circumference in centimetre were measured using standard assessment measures.
Results: Out of 140 students 51 (36.4%) were boys and 89 (63.6%) were girls. Mean age of the students was 18.13±0.79 years. Overall prevalence of overweight and obesity was 49 (35%) and 29 (20.7%) respectively. No significant difference in BMI for boys and girls. Waist circumference and waist hip ratio was more in girls compared with boys. More than half 53.6% had mixed diet pattern. Among study participants 55.7% have green leafy vegetables in their diet and 62.8% have fruit in their diet. Most frequent unhealthy diet practice was intake of junk food 85% followed by fast food.
Conclusions: High prevalence of obesity and overweight in late adolescent indicate an urge to start primordial and primary intervention since childhood.

Keywords: Adolescent, Diet, Obese, Overweight, Waist hip ratio

INTRODUCTION

WHO defined adolescence is the period between 10-19 years of life? Early adolescence is between 10-13 years, middle adolescence is between 14-16 years and late adolescence is between 17-19 years.

Adolescence is crucial stage of life where changes occur in thoughts, attitude, ideas, relationships and moral standard. During this period of transition, there is an earlier physical maturity and reproductive capability, than psychological and social maturity. It is the time for acquiring new skills, mastery over environment, learning to handle responsibilities and gaining control over one's emotions and thoughts.[1]

Adolescent population and health of adolescents is a very special issue and is focus of attention globally for various reasons.[2] In late adolescence there is transition from school to college or university. This transition to college life often worsens lifestyle and dietary habits among late adolescents.

Table 1: Definition of fast food, junk food, and instant food.[7]

Type of food	Definition	Examples
Fast food	Foods sold in a restaurant or store which are rapidly prepared and quickly served in a packaged form for take away	Burgers, pizzas, fries, hamburgers, patties, and nuggets.
		Indian foods like pakora, samosa, and namkeen etc.
Junk food	Energy dense foods with high sugar/fat/salt content and low nutrient value in terms of protein, fibre, vitamin and mineral content.	Chips, chocolate, ice-cream, soft drinks, and sandwich
Instant foods	Foods that undergo special processing that are ready to be served once dissolved or dispersed in a liquid with low cooking time	Noodles, corn flakes, and soup powder.
Street foods	Ready to eat foods and beverages prepared and sold by hawkers or vendors in streets or other public places	Chaat, gol guppa, samosa, tikki, noodles, chowmein, and vadapav

They tend to eat very few fruits and green leafy vegetables on a daily basis and report high intake of fat and calories dense food.

Obesity is a disorder of energy metabolism involving excessive adipose tissue stores, which is associated with medical or psychosocial morbidity. The prevalence, as well as the severity of obesity in adolescents is increasing at an alarming rate, making it one of the most serious health problems affecting this age group.[3]

Recent investigation has shown that this epidemic of obesity has started to percolate even to the underdeveloped and developing countries, including India. WHO has compiled the prevalence of childhood obesity as over 2% in many developing countries? Rapid transition countries are more vulnerable to childhood obesity.[3]

India is experiencing an epidemiologic and nutritional transition with increasing prevalence of non-communicable diseases (NCDs).[4,5] There are reports from Indian subcontinent of increasing prevalence of overweight and obesity among children and adolescents during last decade, with co-existing high prevalence of under nutrition.[6,7] Change in dietary patterns and eating habits has been considered as one of the important modifiable risk factor for obesity.

Urbanization related intake behaviours have been shown to promote obesity which include frequent consumption of meals from fast-food outlets, consumption of oversized portions meals at home or at restaurants on weekend, consumption of high calorie foods, such as high-fat, low-fibre foods and intake of sweetened beverages. These behaviours are cultivated in an environment in which high calorie food is abundant, affordable, available, and easy to consume with minimal preparation as is the case of urban cities throughout the country. Television viewing and other sedentary activities are also other contributors. Unfortunately, these habits are growing exponentially among adolescent age group.

Limited data is available on dietary habits and lifestyle practices among late adolescent. Hence, present study was an attempt to assess diet, lifestyle practices and nutritional status among late adolescent students in an urban area of Western Maharashtra.

METHODS

It was a cross-sectional observational study conducted during November 2018 to April 2019 among late adolescent students in an urban area of Pimpri Chinchwad Municipal Corporation (PCMC). From previous study it was found that 10% participants were obese considering same proportion calculated.[8] Sample size using formula for proportionate sample size with 10% allowable error at 95% confidence interval was 139 (open epi software). A total of 140 study participants were included. College principal permission was obtained before interviewing students. Adolescent students of 17-19 years were interviewed using preformed questionnaire. Questionnaire included dietary practices, sleeping habit, physical activity, any addiction among students. Dietary practices assessed by asking questions on diet pattern, dietary preference like fast food, junk food, instant food intake, fruit consumption, intake of cold drink etc, its frequency per week. Physical activity ascertained by asking for daily exercise at least 30 minutes/day during the past 7 days and during a typical week, outdoor game, how to reach college. Subsequently anthropometric measurements like weight in kg and height in meters, Waist and hip circumference in centimetre were measured using standard assessment measures. Obesity assessment indices i.e. body mass index (BMI), waist circumference and waist to hip ratio (WHR) were calculated to find prevalence of obesity. For our study purpose BMI categorization was done as per Asia-Pacific cut off underweight <18.5 Kg/m^2; normal 18.5-22.9 Kg/m^2; overweight 23-27.49 Kg/m^2 and obese >27.5 Kg/m^2. Cut off point for increased waist circumference was >100cm (40 inch) for male and >87.5 cm (35 inch) for female. Cut off point for increased waist to hip ratio (WHR) was >0.9 for male and >0.85 for female.

Data analysis

Data were analysed using MS excel 2007 and SPSS software. Proportions were used for variables such as age, BMI category, waist/hip ratio, residence, and mode of conveyance to school, dietary practices and sedentary lifestyle measures. Chi square test was applied to find any difference in gender related to obesity. An ANOVA test was applied to see any difference in anthropometric measures in different age groups.

RESULTS

A total of 140 participants were studied, out of which 51 (36.4%) were boys and 89 (63.6%) were girls. Mean age of the students was 18.13 years with a standard deviation of 0.79 year. Mean height and weight were consistently more in boys compared to girls. BMI, waist circumference, hip circumference and WHR were found to increase with age among study participants. Overall mean BMI was 23.9±4.8 kg/m^2 BMI for boys was 24.3±4.8 kg/m^2 and girls was 23.8±4.8 kg/m^2.

There was no significant difference (p>0.05) in BMI among boys and girls. Prevalence of overweight was 22 (68.7%) among boys and 27 (58.7%) among female and prevalence of obesity was 10 (31.3%) among boys and 19 (41.3%) among female. Proportion of boys was more overweight compared to girls and proportion of girls was more obese compared to boys.

Table 2: Baseline characteristics of study participants.

Characteristics	Frequency	Percentage
Age (in years)		
16	36	25.7
17	49	35
18	55	39.3
Gender		
Female	89	63.6
Male	51	36.4
Residence		
Urban	113	80.7
Rural	27	19.3
Stay		
Hostel	65	46.4
Home/rent flat	75	54.6
BMI category		
Underweight	18	12.9
Normal	44	31.4
Overweight	49	35.0
Obese	29	20.7
Increased WHR		
Male (>0.9)	18	35.3
Female (>0.85)	44	49.4
Increased waist circumference		
Male (>40 inch)	4	7.8
Female (>0.35 inch)	13	14.6

Overall prevalence of overweight and obesity was 49 (35%) and 29 (20.7%) respectively. Waist circumference and WHR was more in girls compared with boys. More than half 53.6% had mixed diet pattern.

Out of studied participants 62.8% were having regular breakfast in the morning and 28.6% said they didn't get time to have breakfast in morning. Among study participants 55.7% have green leafy vegetables in their diet and 62.8% have fruit in their diet. Most frequent unhealthy diet practice was intake of junk food 85% followed by fast food 73.6%.

Mean hours of sleep was 7.02 hours (median 7 hours) and range 4-10 hours and mean hours of time spent on mobile was 3.05 hours (median 2 hours) and range of 0.5-15 hours. Only 40% of study participants were playing outdoor games. Maximum 92.9% were used to come college by walking.

Table 3: Diet and physical activity assessment.

Dietary assessment	Frequency	Percentage
Diet pattern		
Mix	75	53.6
Veg	62	44.3
Non veg	3	2.1
Non-veg consumption among mix diet (n=75)		
1 time per week	30	40
2 times per week	26	34.7
3 times per week	10	13.3
>3 times per week	9	12.0
Breakfast regularly in morning	88	62.8
Green leafy vegetables in your diet daily	78	55.7
Fruits in your diet daily	88	62.9
Junk food	115	85
Fast food	103	73.6
Street food	88	62.9
Instant food	82	58.6
Cold drink	70	50
Physical activity assessment		
Exercise to maintain your health	46	32.8
Eat food while watching movies/television	103	73.6
Play any outdoor game regularly	56	40
How do you reach for college?		
Vehicle	10	7.1
Walk	130	92.9
Hours you spent in using mobile phone per day		
Upto 2	78	55.7
3	30	21.4
4	11	7.9
>4	21	14.9

Table 4: Per week consumption pattern.

Per week consumption		Frequency	Percentage
Junk food (n=115)	1	38	33.0
	2	42	36.5
	3	22	19.1
	>3	13	19.1
Fast food (n=103)	1	49	47.6
	2	28	27.2
	3	14	13.6
	>3	12	11.7
Street food (n=88)	1	53	60.2
	2	18	20.5
	3	5	5.7
	>3	12	13.6
Instant food (n=82)	1	29	35.4
	2	25	30.5
	3	11	13.4
	>3	17	20.7
Cold drink (n=70)	1	29	41.4
	2	15	21.4
	3	5	7.1
	>3	8	11.4
	Daily	13	18.6

Table 5: Anthropometry assessment in different age group.

Anthro-pometry	Age in years	N	Mean±SD	P value
Weight in Kg	17	36	53.7±12.8	0.001
	18	49	57.8±15.8	
	19	55	72.4±18.2	
	Total	140	62.5±17.8	
Height in cm	17	36	157.3±10.8	0.1
	18	49	159.8±11.3	
	19	55	163.6±18.1	
	Total	140	160.7±14.4	
BMI in Kg/m^2	17	36	21.6±4.4	0.001
	18	49	22.5±4.4	
	19	55	26.7±4.1	
	Total	140	23.9±4.8	
Waist circumference (inches)	17	36	31.8±4.1	0.001
	18	49	32.2±4.9	
	19	55	36.5±8.1	
	Total	140	33.8±6.5	
Hip circumference (inches)	17	36	36.7±4.3	0.002
	18	49	37.9±4.8	
	19	55	42.4±11.6	
	Total	140	39.3±8.4	
Waist: hip ratio	17	36	0.85±0.1	0.504
	18	49	0.85±0.1	
	19	55	0.88±0.2	
	Total	140	0.86±0.1	

DISCUSSION

India is among one of country having large number of obese populations in world. According to National Family Health Survey (NFHS) 4 more than quarter of urban females and 15% males are considered overweight/obese in India. The change in lifestyle, lack of physical activity and exercise, improper eating habits and lack of awareness about obesity has become a major problem for adolescent.

India is experiencing an epidemiologic and nutritional transition with increasing prevalence of non-communicable diseases (NCDs). Reports from Indian subcontinent showing increased prevalence of overweight among children and adolescents during last decade, with co-existing high prevalence of under nutrition so India is facing double burden of disease.[6,7]

Present study in urban area of western Maharashtra according to the body mass index cut off values for Asia pacific population, 12.9% were underweight, 35% were overweight and 20.7% were obese. Prevalence of overweight was 22 (68.7%) among boys and 27 (58.7%) among female and prevalence of obesity was 10 (31.3%) among boys and 19 (41.3%) among female. Proportion of boys was more overweight compared to girls and proportion of girls was more obese compared to boys. In South Karnataka, India study was conducted on adolescent school children and it was observed that according to the body mass index cut off values, 23.9% were underweight, 60.6% were normal, 11.4% were overweight, and 4% were obese. Overall prevalence of overweight among adolescents was 9.9% and obesity was 4.8%. The prevalence of overweight was 9.3% among boys and 10.5% among girls; 5.2 and 4.3% were obese, respectively.[9] A study in another part of western Maharashtra found that The prevalence of overweight and obesity were 12.1% and 8.7% respectively.[10] Another study comparing prevalence of obesity and overweight among school children of Pune city, found that prevalence of obesity and overweight among children of government school was 2.98% and 8.23% respectively. Prevalence of obesity and overweight among children of private school was 8.83% and 12.13% respectively. Prevalence of both obesity and overweight was found to be maximum in 15 years age group both in Government schools and private schools. Overall prevalence of obesity and overweight was 5.62% and 9.99% respectively.[8] These findings from different study may not be matching with present study findings as most of them were carried among school going children and different criteria to define overweight and obesity but findings indicate that there is increased prevalence of obesity along with under nutrition since childhood and need to intervene primordial and primary prevention to reduce disease burden and future complications related to obesity.

Overweight in adolescence is a marker of overweight in adult age, and is associated with the diseases such as

diabetes mellitus and cardiovascular disease. In present study among late adolescent 35% were overweight. A study conducted by Alok et al in urban and rural areas of Surat city in the 14-16 years age group found the prevalence of obesity to be 12.8% in rural and 14.6% in urban adolescents.[11] Overall prevalence of overweight was 9.99% in Pune city study among school going adolescent.[8] Our findings of higher rates of overweight compared to existing literature indicates impact of urbanisation, change in lifestyle and dietary changes in college going adolescent and trend of increased overweight among late adolescent and adults. Lesson learnt from various study findings is that most of the studies done to assess prevalence of overweight and obesity have been carried out on adolescents in the school going age but no data related to college going adolescents is available.[13] However, in the present study, it was found that the rates for the prevalence of overweight and obesity in the college-going population were not distinctly different from those of school-going adolescents.

Body mass index for boys was 24.3±4.8 kg/m^2 and girls was 23.8±4.8 kg/m^2. There was no significant difference ($p>0.05$) in BMI among boys and girls. Proportion of boys was more overweight compared to girls and proportion of girls was more obese compared to boys. A study by Sureshbhai et al found that the prevalence of obesity and overweight was more in boys compared to girls, but the difference was very small and statistically non-significant.[12] Keerthan et al and Kaur et al observed that the prevalence of obesity and overweight was higher in boys compared to girls.[13,14]

Weight gain is the result of an imbalance between energy intake and energy output. The pathogenesis is multi-factorial and is the interplay of genetic predisposition and environmental factors. The combination of our genetic propensity to store fat, the ready availability of calorie dense foods, and sedentary lifestyle promotes overweight and obesity among children. Aggressive advertising practices and relatively low cost of energy-dense foods drive him towards foods high in saturated fat, refined carbohydrates, and sweetened carbonated beverages.[15] Students often have ready access to high-calorie foods in school/college cafeteria and fast food shops located nearby. In present study most frequent unhealthy diet practice was intake of junk food 85% followed by fast food 73.6%. Around 38.2% were having junk food 3or more times a week, 60% were having street food at least once a week and 47.6% were having fast food at least once a week, 41.4% were having cold drinks at least once a week. Study by Shete et al found frequency of eating junk food for more than once in a week was 77.3%.[10]

Activity patterns in children as well as adolescent have shifted from outdoor play to indoor entertainment like television, internet, and computer games. In many developing countries especially in urban areas there is lack of open spaces and playgrounds in schools and communities. Neighbourhoods are often considered unsafe for walking and other outdoor activities.[15]An increasing pressure on academics and reduced emphasis on physical activity in schools is another contributory factor to weight gain. In present study only 40% participants use to play outdoor games and 73.6% had hobbits to eat food while watching movies/television. Another study found that among study participants' 69.1% students spend their time on mobile/TV/laptop for more than 4 hours per day.[10]

Dramatic and rapid societal changes since few decades have contributed significantly to increase prevalence of overweight and obesity among adolescent. Individual's physical activity behaviours are heavily influenced by surrounding social and physical environmental contexts both for adults and children. Mean hours of night sleep was 7.02 hours (median 7 hours) and range 4-10 hours and mean hours of time spent on mobile was 3.05 hours (median 2 hours) and range of 0.5-15 hours. Only 40% of study participants were playing outdoor games, 73.6% had hobbits to eat food while watching movies/television, 32.8% were doing physical exercise to maintain their health and most of them were doing aerobic exercise in gym. In a study by Shete et al 69.1% students spend their time on mobile/TV/laptop for more than 4 hours per day.[10] Study by Kotian et al also found the risk of overweight was 7.3 times higher among those who reported watching television and playing games on the computer for ≥4 hours/day.[9]

In present study maximum participants were staying nearby to college or hostel accommodation inside college campus so 92.9% were reaching college by walk and 7.1% by vehicle. Sureshbhai et al study found that 54% students went to school by vehicle; 30.7% on foot; and 15.3% by bicycle.[12]

Primordial and primary prevention like reading food labels, importance of physical activity, and health education on obesity risk factors targeting children and adolescent students and their parents is need of time. Regular screening camps for obesity assessment and its complications by healthcare providers and awareness regarding healthy-balanced diet, daily physical activity, obesity and its complication arrangement by educational institute will definitely help in reducing the prevalence of overweight and obesity.

CONCLUSION

High prevalence of obesity and overweight in late adolescent indicate an urge to start primordial and primary intervention since childhood.

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