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# BODY MASS INDEX, DIETARY HABITS AND PHYSICAL EXERCISE AMONG SCHOOL GOING ADOLESCENT: A CROSS SECTIONAL STUDY IN AHMEDABAD

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**Financial Support:** None declared

**Conflict of interest:** None declared

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**How to cite this article:**

Shah TA, Bhatt RJ, Patel M, Patel PG. Body Mass Index, Dietary habits and Physical exercise among School going adolescent: A cross sectional study in Ahmedabad. Natl J Community Med 2013; 4(2): 314-317.

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**Date of Submission:** 07-04-13

**Date of Acceptance:** 15-05-13

**Date of Publication:** 30-06-13

## ABSTRACT

**Background:** The high prevalence of obesity in adolescence is serious public health concern. Longitudinal studies confirm that health consequences of obesity during adolescence track into adulthood and it can be reduced by successfully decreasing body fat among adolescents.

**Objectives:** "The objectives of the study were to assess Body Mass Index of study participants and also to explore their lifestyle like physical exercise, television viewing etc."

**Methodology:** A cross-sectional study was conducted among randomly selected adolescent students of various secondary and higher secondary schools of Ahmedabad. A pre-tested and pre-designed questionnaire was used to assess the socio demographic variables. BMI was calculated for every student participating in the study. The analysis of data was done using Epi info version-7 software.

**Results:** Out of 112 students participated in the study, as per the BMI 34% students were found to be obese (M=25.7% & F=45.7%) Consumption of junk foods was reported high among boys (66.4%) as compared to girls (33.4%). We found that 57.2% students were spending  $\geq 1$  hour in watching television. One third of students were not doing any kind of exercise.

**Conclusion:** Marked gender differences were observed in relation to parameters selected for study. Females were found to be comparatively spending more leisure time watching TV/Computer, doing less exercise and having more physical complaints than their male counterpart. This partly explains more obesity prevalent in adolescent females than males.

**Key words:** Physical Activity, BMI, Gender difference

## INTRODUCTION

Adolescence is a Latin word *adolescencia* from *adolescere*. One in every five people is an adolescent. Today, 1.2 billion adolescents stand at the crossroads between childhood and the adult world. Around 243 million of them live in India.<sup>1</sup> It is a period for psychological, social and physical transaction between childhood and adult-

hood. It is gender specific manhood or womanhood. One of the biggest questions guys and girls have as they grow and develop is whether they're the right weight. One place to start is by learning about body mass index, or BMI, a calculation that estimates how much body fat a person has based on his or her weight and height<sup>2</sup>.

The body mass index (BMI), or Quetelet index, is a heuristic proxy for human body fat based on an individual's weight and height. It is a simple index of weight for height that is commonly used to classify underweight, overweight and obesity in adults. Body mass index is defined as the individual's body mass(kg) divided by the square of his or her height(mt)<sup>2</sup>. Present study calculated the BMI of School going adolescents and correlated them with socio- demographic factors. Gender-wise differences in the life style of adolescents were also analysed.

## MATERIAL AND METHODS:

A cross- sectional study was conducted among adolescent students of randomly selected secondary school of Ahmedabad. Permission from the authority was taken prior to conducting the study. Students from age group 13-15 years were selected purposefully so as to know their lifestyle habit during these middle stages of adolescence. Inclusion criteria: All the students of class 8 (13-15 yrs) were included in the study. At the time of study total number of students enrolled in standard Eight was 125. Number of students who were present on the day of study was 112. All those who were present were interviewed. A pre-tested and pre-designed questionnaire was used to assess the socio demographic variables. The students were interviewed by the resident doctors in the school and their privacy and confidentiality was maintained. Informed verbal consent was taken from each participant. BMI was calculated for every student participating in the study. Data were analyzed using appropriate statistical test. The statistical analysis was done using Epi-info version 7 software.

## RESULTS

BMI was calculated using guidelines prepared for Asian population including Indians.<sup>3</sup> They have graded obesity in three grades; Underweight (<18.5), Normal weight (18.5-23), Pre-obese and Obese (>23). Out of 112 students, 38(34%) students were obese. 21(45.7%) females belonged to Pre-obese and above grade whereas 17(25.7%) males were belonged to same. Difference between two was statistically significant (P<0.05) (Table 1).

Eating habits of the study participant was studied. Questions related to frequent outside eating, eating junk food and carbonated drink

were asked. Frequency of eating twice or more than twice a week was considered as faulty eating habit by the authors. Out of 112, 46 (41.0%) were having such dietary habits. Among them males were having more faulty eating habits as compared to females. Difference was not significant statistically. (Table 2)

**Table1. Distribution of adolescent according to Body Mass Index (BMI)**

Body Mass Index	Male (%)	Female (%)	Total (%)	P value
Underweight (<18.5)	14 (21.2)	7 (15.2)	21 (18.7)	>0.05
Normal (18.5-23)	35 (53.1)	18 (39.1)	53 (47.3)	>0.05
Pre- Obese & Obese (>23)	17 (25.7)	21 (45.7)	38 (34)	<0.05
Total	66 (100)	46 (100)	112 (100)	>0.05

**Table 2. Gender wise distribution of adolescent according to their faulty eating habits (n=46)**

Eating Habit (Twice or more per week)	Male (%)	Female (%)	Total (%)
Eating in restaurant	3 (60)	2 (40)	5 (10.8)
Eating junk foods	24 (66.6)	12 (33.4)	36 (78.4)
Consume carbonated drinks	2 (40)	3 (60)	5 (10.8)
Total	29 (63.1)	17 (36.9)	46 (100)

Chi square=1.3, p value =0.5

**Table 3: Gender-wise distribution of adolescent according to the mode of transport used to reach school**

Mode of transport	Male (%)	Female (%)	Total (%)
Auto	27 (45.7)	32 (54.2)	59 (52.7)
Bicycle	21 (75)	7 (25)	28 (40.2)
Walk	12 (70.5)	5 (29.4)	17 (15.1)
Car	6 (75)	2 (25)	8 (7.1)
Total	66 (100)	46 (100)	112 (100)

Chi square=9.2, p value <0.05

Mode of transport is important parameter in relation to obesity. Those who are using bicycle or going school on foot are likely to burn the calories as compared to those who are using car or Auto. In present study male were more commonly using bicycle (M: 75%, F: 25%) and going on foot (M: 70.5%, F: 29.4%) as compared to females. Difference was significant statistically with p value < 0.05 (Table 3)

Any kind of exercise is helpful in reducing weight and thereby BMI. Out of 112 adolescent, one third of them were not doing any kind of

exercise. Among those who were doing regular exercise, only 17 (15.3%) were doing it daily. Males were doing more exercise than females. But the difference was not significant. (Table 4)

**Table 4. Gender wise distribution of adolescent according to their regular exercise schedule**

Exercise	Male (%)	Female (%)	Total (%)
Weekly	40 (63.4)	23 (36.6)	63 (56.3)
None	18 (56.2)	14 (43.8)	32 (28.5)
Daily	8 (47.0)	9 (53.0)	17 (15.2)
Total	66 (58.9)	46 (41.1)	112 (100)

Chi square=1.6, p value = 0.4

**Table 5. Gender wise distribution of adolescent according to time spent watching Television**

Time watching Television (hrs)	Male (%)	Female (%)	Total (%)
>1	10 (30.3)	23 (69.6)	33 (29.5)
1	18 (58.0)	13 (41.9)	31 (27.7)
<1	38 (79.1)	10 (20.8)	48 (42.8)
Total	66 (58.9)	46 (41.1)	112 (100)

Chi square= 19.3, p<0.001

Gender wise distribution of time spent in watching television was studied. Watching television for longer duration gives idea about the sedentary lifestyle. Out of 112, 64 (57.2%) students were spending  $\geq 1$  hour in watching television. It was found that males were spending comparatively lesser time in watching television and the difference between two was significant statistically. (Table 5)

## DISCUSSION

Obesity rates have doubled since 1980 among children and have tripled for adolescents. In the past 20 years, the proportion of adolescents aged 12 to 19 who are obese increased from 5 percent to 18 percent.<sup>4</sup> Present study measures the BMI of school going adolescents of 13-15 yrs. Among the surveyed adolescents 66(58.9%) were male and 46 (41.1%) were female. The male/female ratio among them was found to be 1.4:1.

As per the BMI 33.9% students were found to be obese. Females (45.7%) were found more obese than males (25.7%). The difference observed was statistically significant (Chi square=3.9, p<0.05). Findings were different from the study carried out by Ramachandran et al who did study among 4700 adolescents (13-18 year) of urban India. They mentioned that age-adjusted preva-

lence of overweight was 17.8% for boys and 15.8% for girls in their study.<sup>5</sup>

Consumption of junk foods and carbonated drinks was observed high among surveyed adolescents (89.2%). Males (66.6%) were consuming more junk food as compared to females (33.4%). Brownell et al describe adolescents' increased vulnerability to food marketing messages because of developmental concerns related to appearance, self-identity, belonging, and their reduced ability to inhibit impulsive behaviors and delayed gratification<sup>6</sup>. A similar study conducted by Montgomery and Chester in USA also observed that more males were consuming junk foods and soft drinks than females<sup>7</sup>. Over the past few decades, the cost of high-calorie, low-nutrition foods has decreased whereas the cost of more healthful foods such as fruits and vegetables has increased. Middle and high schools frequently sell high-calorie, low-nutrition beverages and foods in vending machines and a la carte in the cafeteria<sup>8</sup>. One public health measure currently being evaluated to help prevent obesity and as a potential measure to generate revenue for health reform efforts is taxing soft drinks<sup>9</sup>.

Daily regular exercise for maintaining good health was observed in only 15% of adolescents. Majority of females were using auto (54.2%) to come to school, while majority of males (75%) used bicycle. Since cycling is good for maintaining body weight, males were found comparatively more physically fit than females. In study carried out by Leticia Grize et al, they mentioned that there has been a significant decrease in the number of youth who walk or bike to school. They also mentioned that in urban areas transportation increased since 1994 (p = 0.02).<sup>10</sup>

Sedentary life style contributes significantly for obesity. Daily time spent in watching television showed that males were spending comparatively lesser time in watching television and the difference between two was significant statistically. Rideout V et al also mentioned that in adolescents are spending more sedentary time using electronic media, such as television, computer games, and the Internet<sup>11</sup>. In the past three to four decades, there have been major societal changes affecting physical activity, such as increased opportunities for sedentary recreation and fewer opportunities for active transport, with physical activity being engineered out of adolescents' daily routines<sup>12</sup>.

## CONCLUSION

Gender differences were observed in relation to parameters selected for study. Females were found to be comparatively spending more leisure time watching TV/Computer, and were doing less exercise than their male counterpart. This partly explains more obesity prevalent in adolescent females than males.

## REFERENCES

1. Adolescent: An age of opportunity. Available at: [http://www.unicef.org/india/media\\_6785.htm](http://www.unicef.org/india/media_6785.htm) (Last accessed on May 18, 2013)
2. Teen fitness guide. Available at: [http://kidshealth.org/teen/food\\_fitness/dieting/bmi.html](http://kidshealth.org/teen/food_fitness/dieting/bmi.html). (Accessed November 21st, 2012)
3. Astrup A. Obesity. In: Human Nutrition, Editors: Geissler C, Powers H, 8. 2005, 380 – 39
4. A guide to healthy adolescent development, John Hopkins Bloomberg school of public health. Available at: [http://www.jhsph.edu/research/centers-and-institutes/center-for-adolescent-health/\\_includes/Obesity\\_Standalone.pdf](http://www.jhsph.edu/research/centers-and-institutes/center-for-adolescent-health/_includes/Obesity_Standalone.pdf). Accessed on November 24th, 2012
5. Ramachandran A, Snehalatha C, Vinitha R, Thayyil M, et al Prevalence of overweight in urban Indian adolescent school children. *Diabetes Res Clin Pract.* 2002; 57(3):185-90.
6. Brownell KD, Frieden TR. Ounces of prevention—the public policy case for taxes on sugared beverages. *N Engl J Med.* 2009;360:1805–1808
7. Montgomery KC, Chester J. Interactive food and beverage marketing: Targeting adolescents in the digital age. *J Adolesc Health.* 2009; 45: S18–S29
8. Fox MK, Gordon A, Nogales R, et al. Availability and consumption of competitive foods in US public schools. *J Am Diet Assoc.* 2009;109(2 Suppl):S57–S66
9. Powell LM, Chaloupka FJ. Food prices and obesity: Evidence and policy implications for taxes and subsidies. *Milbank Q.* 2009;87:229–257
10. Leticia Grize, Bettina Bringolf-Isler, Eva Martin, et al. Trend in active transportation to school among Swiss school children and its associated factors: three cross-sectional surveys 1994, 2000 and 2005. *Int J Behav Nutr Phys Act.* 2010; 7: 28.
11. Rideout V, Roberts, D. F., & Foehr, U. G. (2005). *Generation M: Media in the lives of 8-18 year-olds*. Menlo Park, CA: Kaiser Family Foundation
12. McDonald NC. Active transportation to school: Trends among US school children, 1969–2001. *Am J Prev Med.* 2007;32:509–516