



STUDY OF URBAN LIFESTYLE FACTORS AND OVERWEIGHT/OBESITY IN ADOLESCENT STUDENTS IN JABALPUR

Paediatric Medicine

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ABSTRACT

Background: This study aimed to identify urban lifestyle factors and their effect on nutritional status of adolescent students in Jabalpur, Madhya Pradesh, India. **Objectives:** we evaluated the association between multiple urban life style factors and Overweight/Obesity in adolescent children in urban school of Jabalpur. **Methods:** It was a cross-sectional study conducted in urban schools of Jabalpur, (Madhya Pradesh). All the students from class 7, 8, 9 and 10 included in study, total 239 students from urban schools of Jabalpur were included. Anthropometric assessment was done by measuring weight, height and then BMI (Body Mass Index) was calculated. BMI charted on WHO chart. All the factors present in life style of urban students like dietary factors (outside eating, sugar beverages consumption, snacks/junk food, food advertisement), mode of travel to school and sleep analyzed statistically. **Results:** 54.4% of students were overweight/obese. Urban lifestyle factors like frequency of outside eating with family, sugar beverages consumption from market, snacks and junk food, food advertisements, mode of travel to school, interval between dinner and sleep, found statistically significant. **Conclusion:** This study in urban environment suggest that outside eating with family, sugar beverages consumption from market, snacks and junk food, food advertisements, mode of travel to school, interval between dinner and sleep, are associated with overweight/obesity risk. These findings require follow up in longitudinal studies with more number of subjects and different settings other than schools.

KEYWORDS

Adolescent, urban lifestyle, overweight/obesity, Jabalpur

INTRODUCTION

Nutrition is the process of taking in food and using it for growth, metabolism and repair of the body. It consists of ingestion, digestion, absorption, transport, assimilation and excretion. Malnutrition is defined by world health organization (WHO) as excess or imbalance in person's intake of energy and/or nutrients. [1] Term malnutrition covers two broad groups of condition one is Under nutrition which includes stunting (low height for age) and wasting (low weight for height), underweight (low weight for age) and micro nutrients deficiency. The other is overweight/obesity and diet related non-communicable diseases. [1]

Childhood Overweight / obesity- defined by WHO as overweight as 1 standard deviation of body mass index for age and sex, and obesity as 2 standard deviation of body mass index for age and sex.[2] A common measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in meters). [3]

$BMI = \text{WEIGHT (IN KILOGRAM)} / \text{HEIGHT}^2 \text{ (IN METERS)}$

Indian Academy Of Pediatrics - To define Overweight / obesity in children from 5-18 years of age, adult equivalent of 23 and 27 cut-offs presented in BMI charts may be used. IAP recommends use of WHO standards for growth assessment of children below 5 years. [4, 5]

Nutritional status in adolescents may greatly affect health and subsequently impact not only a child's growth and development but also economic development in country. However nutrition studies and policies for adolescents are limited we are aiming to attract attention on malnutrition both under nutrition as well as overweight/obesity. Childhood Overweight/obesity are increasingly significant problems, and ones that are likely to endure and to have long term adverse influences on the health of individuals like diabetes, hypertension, stroke, cancers, coronary artery diseases etc unless action is taken to reverse the trend.[6] Multiple factors have been suggested as contributing to the development of childhood obesity. These include genetic factors, decreasing levels of physical activity, increased time spent in sedentary behavior and changes in diet. In addition, life style factors, including family influences, changes in society and media advertising, have been associated with the increasing incidence of obesity and overweight in childhood. [7]

MATERIAL AND METHODS

It was a cross-sectional study conducted in a urban school of Jabalpur, (Madhya Pradesh). Total 239 students from urban schools of Jabalpur were included from a urban school. Consent was taken from principal and assent was taken from students. All the students were explained the objective of the study. This was followed by a demonstration of

standard measures of cups, serving spoons; bowls and glass. Each class was explained about Pre tested researcher designed questionnaire Performa one by one and provided to them to fill it completely. All the queries were addressed to avoid incomplete or inaccurate information. All the students were from class 7, 8, 9 and 10 included in study. Anthropometric assessment was done by weight, height and BMI was calculated. Weight was recorded after removing heavy warm clothing, belt and shoes using a digital weighing machine with accuracy of up-to 100 grams. Height was measured using a wall mounted portable stadiometer with an accuracy of 0.1 centimeter. The participants were made to stand without shoes with heels slightly separated and back of head, shoulder blades, buttocks and heels brought in contact with the wall and head so positioned that the child looked directly forwards in Frankfurt plane. BMI was calculated and charted on WHO chart, compared and distributed among the students. We calculated age and sex specific BMI z-scores (z-BMI). Children with a z-BMI higher than +1 defined overweight/obese, children below this.

RESULTS

Total 239 students participated in the study we found 54.4% students overweight/obese. Out of 239 students 125 were male and 114 were female students. 71 (56.8%) male students were overweight/obese and 66 (57.9%) female students were overweight/obese. prevalence of overweight/obesity was almost same in male and female students.

Table No. - 1 Distribution Of The Subjects According To BMI And Frequency Of Outside Eating With Family

Frequency of outside eating with family	BMI <+1 SD (normal weight and underweight students)	BMI ≥+1 SD (overweight and obese students)	Total students (n = 239)
Never	33(94.2%)	02(5.8%)	35
Once in month	33(91.6%)	03(8.4%)	36
Once in week	36(26.2%)	101(73.8%)	137
>1 time in week	00(00%)	31(100%)	31

P-value - <0.0001 CHISQUARE - 231.03

This table is showing distribution according to BMI and frequency of outside eating with family. Maximum number of Overweight / obese were those who ate outside > 1 times per week, followed by students who ate outside once in week, followed by students who ate once in a month, followed by those who never ate outside. Incidence of Overweight / obesity increases with frequency of outside eating.

Table No. - 2 Distribution Of The Subjects According To BMI And Sugar Beverage Consumption From Market Per Day

Sugar Beverage consumption from market per day	BMI<+1 SD (normal weight and underweight students)	BMI ≥+1 SD (overweight and obese students)	Total students (n = 239)
<1 cup	90(45.9%)	106(54.1%)	196
1- 2 cup	10(28.5%)	25(71.5%)	35
3-4 cup	00(00%)	04(100%)	04
>4 cup	00(00%)	02(100%)	02
never	02(100%)	00(00%)	02

P-value - <0.0001 CHI SQUARE - 1.28

This table is showing distribution according to BMI and sugar beverage consumption from market per day. Maximum number of Overweight / obese were in the group of students who consumed 3-4 cups sugar Beverage from market, followed by those who consumed >4 cups per day, followed by 1-2 cups per day, followed by <1 cup per day. Incidence of Overweight / obesity increases as consumption of sugar beverages from market increase.

Table No. - 3 Distribution Of The Urban Subjects According To BMI And Frequency Of Consumption Of Unhealthy Snacks/ Junk Food Per Week

Frequency of consumption of unhealthy snacks/ junk food per week	BMI<+1 SD (normal weight and underweight students)	BMI ≥+1 SD (overweight and obese students)	Total students (n = 239)
<1-time per week	15(93.7%)	01(6.3%)	16
1-2 times per week	84(42.1%)	120(57.9%)	204
3-4 times per week	02 (25%)	06(75%)	08
>4 times per week	01(9.1%)	10(90.9%)	11

P-value - <0.0001 CHI SQUARE - 217.37

This table is showing distribution according to BMI and frequency of consumption of unhealthy snacks/ junk food per week. In this table maximum Overweight / obesity was seen in group of students who ate unhealthy snacks/ junk food > 4 times per week, followed by 3-4 times per week, followed by 1-2 times per week, was least in those who ate unhealthy snacks/ junk food <1 time per week. Incidence of Overweight / obesity is directly proportional to frequency of junk food consumption.

Table No. - 4 Distribution Of The Urban Subjects According To BMI And Perception Of Effect Of Advertisement On Food Intake

Perception of Effect of advertisement on food intake	BMI<+1 SD (normal weight and underweight students)	BMI ≥+1 SD (overweight and obese students)	Total students (n = 239)
Yes, it increases	56(32.9%)	114(67.1%)	170
Sometimes	20(52.6%)	18(47.4%)	38
it doesn't affect my desire to eat	12(80%)	03(20%)	15
Can't say anything	14(87.5%)	02(12.5%)	16

P-value - <0.0001 CHI SQUARE - 206.43

This table is showing distribution according to BMI and perception of effect of advertisement on food intake. In this table maximum Overweight / obese was seen in group of students who had perception that food intake increases while watching advertisement, followed by those whose food intake increases sometimes, followed by those who did not notice this, followed by students who could not say anything about the effect of Advertisement on food intake. Incidence of Overweight / obesity was more in students whose appetite increased by watching advertisements.

Table No. - 5 Distribution Of The Urban Subjects According To BMI And Mode Of Travel To School

Mode of travel to school	BMI<+1 SD (normal weight and underweight students)	BMI ≥+1 SD (overweight and obese students)	Total students (n = 239)
Walking	11(100%)	00(00%)	11
Bicycle	45(75%)	15(25%)	60
Car/Taxi/Auto rickshaw	10(14.2%)	60(85.8%)	70
School bus	34(35.4%)	62(64.6%)	96
OTHER	02(100%)	00(00%)	02

Walking	11(100%)	00(00%)	11
Bicycle	45(75%)	15(25%)	60
Car/Taxi/Auto rickshaw	10(14.2%)	60(85.8%)	70
School bus	34(35.4%)	62(64.6%)	96
OTHER	02(100%)	00(00%)	02

P-value - <0.0001 CHI SQUARE - 190.15

This table is showing distribution of urban Subjects according to BMI and mode of travel to school. Maximum number of overweight and obese was seen in group of students who travelled to school by car /taxi /auto, followed by those who travelled by bus, followed by those who went with bicycle. Those who went by walking are least affected

Table No. - 6 Distribution Of The Urban Subjects According To BMI And Time Interval Between Dinner And Sleep

Time Interval between dinner and sleep	BMI<+1 SD (normal weight and underweight students)	BMI ≥+1 SD (overweight and obese students)	Total students (n = 239)
Sleeps just after having dinner	31(28.4%)	78(71.6%)	109
Sleeps within 1 hour after dinner	28(33.7%)	55(66.3%)	83
Sleeps 1-2 hours after having dinner	29(93.5%)	02(6.5%)	31
>2 hours after having dinner	14(87.5%)	02(12.5%)	16

P-value - <0.0001 CHI SQUARE - 137.60

This table is showing distribution of urban Subjects according to BMI and Time interval between dinner and sleep. Maximum Overweight / obese was seen in group of students who slept just after having dinner, followed by those who slept within 1 hour after having dinner, followed by >2 hours after having dinner. This table shows that Overweight / obesity decreases as time interval between dinner and sleep increases.

DISCUSSION

1). Overweight / obesity according to frequency of Outside Eating with family

There was more incidence of overweight / obesity in frequent outside eaters and this was statistically significant (Table no. 1).

A study done by Shashi Prabha Tomar et al, in Jabalpur found that there were more overweight / obesity in students those who went for outside eating frequently 27% as compared to those who never visited or visited monthly for outside eating (10.5%, 4.5% respectively). [8]

This may be due to larger portion consumption during outside eating, ingredients used in restaurants, food preparation is highly calorie dense, more variety of food consumption in single time, and it is usually followed by desserts. Consuming large portions, in addition to frequent snacking of highly caloric foods, contribute to an excessive calorie intake. This energy imbalance can cause weight gain and obesity subsequently. [9]

2). Overweight / obesity according to homemade Sugar Beverages consumption per day

Higher sugar beverages consumption was the cause of overweight / obesity which was statistically significant. (Table no.2) A study done by D S Ludwig et al reported that, consumption of sugar sweetened drinks was associated with obesity in children. [10] The students who took more sugar beverages per day were overweight / obese because of rapid consumption and more amount of free calories (in the form of sugar) per day. [11, 12]

3). Overweight / obesity according to frequency of consumption of Unhealthy Snacks/ Junk Food

In our study, we found that there was statistical significance between frequency of consumption of Unhealthy Snacks/ Junk Food with overweight / obesity. (Table no.3). In a study done by M Steiner-Asiedu et al at Junior High School, similar results were found and there was direct significant correlation between unhealthy snack consumption and obesity. [13] Unhealthy snacks are consumed quickly hence larger portion gets consumed before fulfillment of satiety. These are more energy dense, tastier than normal food, has very less dietary fibers and

water content. These are the reasons that lead to overweight / obesity by junk food consumption.

4). Overweight / obesity in relation With Perception of Effect Of Advertisement On Food Intake

We found that out of 239 students, 170 students perceived that their desire to eat increased after watching food advertisements. Out of these 114(67.1%) were overweight / obese. 15 students perceived that their desire to eat was unaffected by advertisements, out of these only 03(20%) were overweight / obese. This was statistically significant in our study (Table no. 4).

This may be due to luring of children from attractive slogans , delicious graphics, superheroes and characters is popular among kids, false claims and messages etc .[14]

5). Overweight / obesity according to mode of travel to school

We found that there was higher prevalence of overweight/ obesity in students who travelled to school passively. A study done by OL Sarmiento et al, reported that the students who travelled passively to school were fatter as compared to the students who travelled to school actively. [15] The cause of difference in BMI between these two groups may be due to increment in physical activity during active transport to school. The cause of not traveling to school actively may be because of longer distance, unsafe walking route, fear of child predators, and children living in unsafe areas or they do not have access to safe, well-lit walking routes or have fewer opportunities for being physically active.[11]

6). Overweight / obesity in relation with Time Interval between Dinner and Sleep

In Our Study, we found that there was inverse relationship with time interval between dinner and sleep and obesity, that is, if time interval between dinner and sleep decrease there is more incidence of overweight / obesity (Table no.6). A study done by Garaulet M et al, reported that the students who ate dinner earlier at night were less obese as compared to those who ate dinner later at night. [16] It may be because sleeping just after having dinner leads to lesser physical activity and lesser energy utilization, hence more calories gets stored as fatty tissue.

CONCLUSION

This result provided an important estimate of burden of overweight / obesity in adolescents in rural and urban students in area of Jabalpur. There was high prevalence (57.3%) of childhood obesity in urban schools of Jabalpur. Therefore, an early screening of the students during school Health Programs to calculate the BMI and classify the nutritional status should be a priority at each examination .Urban life style factors associated with overweight /obesity were outside eating, junk food, sugar beverages, food advertisements, mode of travel to school, interval between dinner and sleep. Education of teachers as well as of parents about risk factors of childhood overweight / obesity is recommended. These study findings suggest a need for planning of school based intervention programs for preventing childhood obesity and increasing the level of awareness on the ill effects of obesity in community in order to control the escalating prevalence. Certain guidelines and policies like, healthy food practices, inclusion of health related topics in curriculum and compulsory physical training classes for each and every student must be introduced in the schools. There must be a multiple sector approach from the government, pediatricians, school authorities and parents to introduce policies and guidelines to curb on the obesity menace and to help today's children to live a long healthy life tomorrow.

Health care providers should address weight management and lifestyle issues with all students, regardless of presenting weight, at least each year.

- Consume 3 or more servings of fruits and vegetables per week.
- Minimize sugar-sweetened beverages as much as possible.
- Engage in at least 1 hour of daily physical activity, promotion of bicycle for travel to school if possible.

This study in urban environment suggest that outside eating with family , sugar beverages consumption from market , snacks and junk food ,food advertisements, mode of travel to school ,interval between dinner and sleep are associated with overweight/obesity risk. These findings require follow up in longitudinal studies with more number of subjects and different settings other than schools.

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