Original Research Article

Analytical cross sectional study on association of dietary habits with overweight and obesity among adolescents

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ABSTRACT

Background: India with around 1.2 billion people is the world's second most populous country and is recently facing rapid epidemiological transition. Under nutrition because of poverty which ruled in the past is being rapidly replaced by overweight and obesity.
Methods: The cross-sectional study was done among school going Adolescents. Sample size was 309. Questionnaire of Global School Health Survey (core questionnaire of site specific) was used. The independents variables were dietary habits like eating fruits, vegetables, fast food, dairy products, bakery products, sweets, chocolates and carbonated soft drinks whereas the dependent variables were overweight and obesity.
Results: The 53 (17.15%) of the students were having overweight and 22 (07.12%) of them were obese. No association observed between dietary habits like locally available fruits and vegetables with overweight and obesity. Significant association observed between dietary habits like fast food, dairy products, bakery products, sweets, chocolates and carbonated soft drinks with overweight and obesity.
Conclusions: Unhealthy dietary habits had noticeable impact on prevalence of overweight and obesity among school going adolescents.

Keywords: Adolescents, Obesity, Overweight, Dietary habits

INTRODUCTION

Adolescents constitute around sixteen percent of the total global population.[1] India is home to 253 million adolescents, accounting to approximately twenty percent of the country's total population. Adolescence is the phase of human growth and development. They exist in different circumstances and have different needs. The transition from childhood to adulthood includes dramatic physical, biological, psychological and social developmental changes; all these changes are taking place at the same time of period. Changes in adolescence affect the spectrum of diseases and health related behaviors;

they are responsible for the epidemiological transition from infectious disease to non-communicable conditions.[2] According to the world health organization, obesity and overweight is one of the most common, yet among the most ignored public health issue in both developed and developing countries.[1] According to world health statistic report 2016, globally there is one in every six adult is obese and overweight.

Childhood obesity brings a number of additional consequences in it way like poor glucose tolerance and a raised risk of type 2 diabetes, hypertension, sleep apnea, social exclusion and finally depression. The significant

health problems will be seen in the upcoming generation of adult as the present childhood obesity epidemic passes to adulthood, and their need for medical care remaining throughout life times.

The high cost to the health care services, the social loss and heavy burdens carried by the individual's involvement will be great.[2,3] Obesity is multi factorial, based on genetic factors as well as behavioral factors. On the other hand, few studies reported unhealthy dietary habits contribute as modifiable risk factors, can had noticeable impact on prevalence of overweight and obesity among adolescents which can be prevented by early identification. Keeping this in mind this study was done to assess association of dietary habits like eating junk foods, sweets and bakery items with overweight and obesity among school going Adolescents.

METHODS

Study setting, study design and study period

The study was undertaken in one of the private senior secondary schools of urban area of central India. It was a school based analytical cross sectional study. The study was done from January to July 2018.

Study participants

The study participants were had the following inclusion criteria: students were present on the day of data collection and willing to participate, age group between 10 to 18 years and were not having any physical disabilities. The study participants were had the following Exclusion criteria: sick students on the day of data collection, age below 10 years and above 18 years.

Sample size, sampling method and study tool

Sample size was calculated by using the formula, $n = (Z \alpha/2)^2 pq/d2$.[4] Where (Z) is the level of significance at 5% i.e.95% confidence interval and the value (Z=1.96), (P) is the prevalence of obesity in adolescent (27.8%) drawn from prior research and the value (p=0.278), the value of (q=0.722), (d) is the error of margin (5%=0.05) and the value of (n=309).[5] Students were included from class fifth to twelfth, to cover the age limit between 10-18 years. There was total eight classes from fifth to twelfth. To cover sample size of 309, strata of 39 students from each class was formed by stratified sampling method and got total 312 study participants (students). In each class there were three to four sections with approximately 40-45 students in each section. To cover strata of 39 students, one section randomly from each class was selected. A pre-structured and pre tested questionnaire of global school health survey (site specific core questionnaire) modules 2006 was used.[6] With the help of senior faculty few questions were modified due to demand of site-specific food items.

Study variables

Dependent variables were overweight and obesity whereas the independent variables were dietary habits like eating locally available vegetables, fruits, dairy products, bakery items, fast foods, sweets, chocolates and carbonated soft drinks.

Definition (overweight and obesity)

Overweight is defined as a BMI at or more than the 85th percentile but below the 95th percentile for children /teens of the same age and sex. Obesity is defined as a BMI at or more than the 95th percentile for children/teens of the same age and sex.[7]

Data collection technique

After explaining the study objectives, study tool andethical aspects of the research to the school higher authority and students, the students were interviewed. Body weight was measured to the nearest 100 g, with minimal /light weight clothing and without shoes, using a calibrated portable scale. Height was measured to the nearest cm with the study participant in the full standing position without shoes using measuring tape. Body mass index (BMI) was calculated as using WHO anthro plus software.

Data entry and analysis

Data entry and analysis was performed using the statistical software IBM SPSS Statistics for Windows, Version 21.0 (Released 2012) IBM Cor, Armonk, NY. Out of 312 study participants, three were excluded from the study as the information was incomplete. Data of 309 participants were analyzed.

RESULTS

Participants according to their BMI status

It was observed that majority 225 (72.82%) of them were having normal weight, followed by 53 (17.15%) were overweight and 22 (07.12%) were obese (Table 1).

Table 1: Distribution of study participants according to their BMI status (n=309).

BMI	Total, N (%)
Under weight	09 (2.91)
Normal weight	225 (72.82)
Over weight	53 (17.15)
Obese	22 (7.12)

Association of dietary habits with overweight

No association observed between eating locally available fruits and vegetables with overweight among school going adolescents.

Table 2: Association of dietary habits (past 30 days, number of times per day) with overweight.

Variables		Normal weight N=225 Frequency (%)	Overweight N=53 Frequency (%)	X2	P value
Eat locally available fruits	Did not eat during past 30 days	29 (12.89)	15 (28.30)	7.75	0.06
	One time per day	77 (34.22)	14 (26.42)		
	Two times per day	77 (34.22)	16 (30.19)		
	Three times per day	42 (18.67)	08 (15.09)		
Eat locally available vegetables	One time per day	64 (28.44)	15 (28.30)	44	0.416
	Two times per day	70 (31.11)	20 (37.73)		
	Three times per day	44 (19.55)	12 (22.64)		
	four times per day	47 (20.88)	06 (11.32)		
Drink carbonated soft drinks	Did not eat during past 30 days	82 (36.44)	06 (11.32)	88.70	0.001
	One time per day	131 (58.22)	17 (32.07)		
	Two times per day	12 (05.34)	30 (56.61)		
Eat fast food	Did not eat during past 30 days	36 (16)	01 (1.89)	8.289	0.015
	One time per day	159 (70.67)	41 (77.36)		
	Two times per day	30 (13.33)	11 (20.75)		
Eat dairy products	Did not eat during past 30 days	04 (1.78)	05 (09.43)	16.61	0.002
	One time per day	64 (28.45)	04 (07.56)		
	Two times per day	99 (44)	29 (54.72)		
	Three times per day	38 (16.89)	10 (18.86)		
	four times per day	20 (08.88)	05 (09.43)		
Eat bakery products	Did not eat during past 30 days	06 (2.67)	02 (3.78)	44.50	0.001
	One time per day	76 (33.77)	11 (20.76)		
	Two times per day	105 (46.67)	10 (18.87)		
	Three times per day	29 (12.89)	16 (30.18)		
	four times per day	09 (4)	14 (26.41)		
Eat sweets and chocolates	Did not eat during past 30 days	22 (9.77)	05 (9.43)	19.27	0.006
	One time per day	149 (66.23)	20 (37.73)		
	Two times per day	32 (14.23)	19 (35.86)		
	Three times per day	21 (9.33)	08 (15.09)		
	four times per day	01 (0.44)	01 (1.89)		

Most 131 (58.22 %) of them were drinking carbonated soft drinks one times per day had normal weight as compared to drinking two times per day 30 (56.61 %) had overweight. This difference was statistically significant (Chi-square=88.70 and p=0.001) and association between drinking of carbonated soft drink with overweight among school going adolescent observed. Also association observed between eating fast food and overweight (Chi-square=08.289 and p=0.015) and this difference was statistically significant. Most 99 (44%) of the students were eating dairy products one times per day had normal weight compared to two times per day 29 (54.72%) had overweight. This difference was statistically significant (Chi-square=16.61 and p=0.002). It was observed that majority of them were eating bakery products two times per day 105 (46.67%) had normal weight as compared to eating three times per day 16 (30.18%) had overweight. The significant association observed between eating bakery products and overweight with Chi-square (44.50) and p (0.001). Also significant association observed

between eating sweets and chocolates with overweight (Chi-square=19.27 and p= 0.006) (Table 2).

Association of dietary habits with obesity

No association observed between eating locally available vegetables and fruits with obesity among school going adolescents. It was found that most of them 131 (58.22%), were drinking carbonated soft drinks one times per day had normal weight and 11 (50%) were drinking two times per day had obesity. Statistically significant association observed between carbonated soft drink with obesity (Chi-square=50.28 and p=0.001). Maximum number of students were eating fast food one times per day 159 (70.66%) had normal weight and two times per day 15 (68.18%) had obesity. Statistically significant association observed between fast food eating habits with obesity. Most of the students were eating dairy products one times per day 99 (44%) had normal weight and three times per days 10 (45.45%) had obesity. Statistically significant association observed between eating dairy

products with obesity (Chi-square=23.90 and p=0.008). It was also observed that most of them were eating bakery products two times per day 105 (46.66%) had normal weight and four times per days 15 (68.18%) had obesity. The statistically significant association observed between

eating bakery products with obesity (Chi-square=99.49 and p=0.001). Most of them were eating sweets & chocolates one time per day 149 (66.23%) had normal weight and three times per days 10 (45.45%) had obesity. This difference was statistically significant (Table 3).

Table 3: Association of dietary habits (past 30 days, number of times per day) with obesity.

Variables		Normal weight N=225 Frequency (%)	Overweight N=53 Frequency (%)	X2	P value
Eat locally available fruits	Did not eat during past 30 days	29 (12.88)	06 (27.27)	4.706	0.194
	One time per day	77 (34.22)	04 (18.18)		
	Two times per day	77 (34.22)	07 (31.82)		
	Three times per day	42 (18.68)	05 (22.73)		
Eat locally available vegetables	One time per day	64 (28.44)	07 (31.82)	.924	0.819
	Two times per day	70 (31.12)	06 (27.27)		
	Three times per day	44 (19.55)	03 (13.64)		
	four times per day	47 (20.89)	06 (27.27)		
Drink carbonated soft drinks	Did not eat during past 30 days	82 (36.44)	08 (36.36)	50.28	0.001
	One time per day	131 (58.22)	03 (13.64)		
	Two times per day	12 (5.34)	11 (50)		
Eat fast food	Did not eat during past 30 days	36 (16)	02 (9.09)	40.65	0.001
	One time per day	159 (70.66)	05 (22.73)		
	Two times per day	30 (13.34)	15 (68.18)		
Eat dairy products	Did not eat during past 30 days	04 (1.78)	02 (9.09)	23.90	0.008
	One time per day	64 (28.45)	02 (9.09)		
	Two times per day	99 (44)	03 (13.64)		
	Three times per day	38 (16.88)	10 (45.45)		
	four times per day	20 (8.89)	05 (22.73)		
Eat bakery products	Did not eat during past 30 days	06 (2.67)	02 (9.09)	99.49	0.001
	One time per day	76 (33.78)	03 (13.64)		
	Two times per day	105 (46.66)	01 (4.54)		
	Three times per day	29 (12.89)	01 (4.54)		
	four times per day	09 (4)	15 (68.18)		
Eat sweets and chocolates	Did not eat during past 30 days	22 (9.77)	02 (9.09)	51.60	0.001
	One time per day	149 (66.23)	03 (13.64)		
	Two times per day	32 (14.22)	04 (18.18)		
	Three times per day	21 (9.33)	10 (45.45)		
	four times per day	01 (0.45)	03 (13.64)		

DISCUSSION

The present school based cross sectional study was carried out in one of the private senior secondary schools of India with the objective to assess the association between dietary habits with overweight and obesity among adolescents. In the present study 53 (17.15%) participants were overweight and 22 (07.12%) were obese.

While Study done by Daradken et al reported the overall prevalence of overweight was 18.50% and obesity was 19.10%.[8] Chan et al in their study reported 51.20 % were overweight and obese.[9] In the present study there is no association found between eating locally available vegetables and fruits with overweight and obesity.

Whereas eating fast food, dairy products, bakery products, sweets, chocolates and carbonated soft drinks were significantly associated with overweight and obesity. Vilchis et al in their study reported children with healthy dietary habits exhibited a decreased risk of obesity compared with children with unhealthy dietary habits.[10] Desalew et al and Al-Kutbe et al in their studies reported children who preferred sweetened foods more likely to be overweight or obese as compared to those who did not preferred sweetened foods.[11,12] Smetanina et al in their study explained a weak dietary influence on the etiology of obesity.[13] Zhang et al in their study mentioned overweight or obese children consumed more meat

products, fried food items and were more likely to have faster eating habits compared with underweight or normal weight children.[14]

CONCLUSION

The findings of the study provide evidence that there was an association between dietary habits with overweight and obesity. It was observed that in dietary habits factors like eating fast food, bakery products, dairy products, sweets, chocolates and carbonated soft drinks were responsible for being overweight and obesity. All these factors were having remarkable effect on prevalence on overweight and obesity among school going adolescents. This study also provides significant information about the complex nature of different dietary substances and their intake on regular diet. This will help parents to modify the dietary habits of their children that will have good impact on their health.

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