Original Research Article

Association of dietary habits with obesity among school adolescents in Central India

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ABSTRACT

Background: The growing prevalence of obesity among school adolescents is a major public health concern. It can be seen mostly as a result of modifiable risk factors like lack of required physical activity and rapid change in dietary habits among them.

Methods: The present cross sectional descriptive study was done among adolescents studying in schools (government and private) of Bhopal city. School adolescents were classified as obese and non-obese as per the WHO criteria used for obesity in South East Asia Region (SEAR). Pre-tested, self-administered questionnaire was used to collect data which comprised of socio demographic information and various dietary habits like frequent consumption of fast & fried food, bakery products and little dietary behavior.

Results: Out of total 6.6% obese school adolescents, majority of them consume fast foods (82%), fried foods (89%) and bakery products (79.5%) and all of these were positively associated with increased risk of obesity. Few eating behaviours like skipping breakfast, frequent snacking and eating outside were also found positively associated.

Conclusions: There is definitely a major role of dietary habits for increased risk of obesity among school adolescents. So, it is the need of hour to create awareness among school adolescents regarding their dietary habits.

Keywords: Obesity, Dietary habits, Adolescents, Fast food, Skipping breakfast

INTRODUCTION

WHO defines adolescents as persons in the age group of 10 to 19 years.[1] It is an age of transition when an individual experiences rapid growth and development, both physical and psychological and changes from being a child to an adult.[2] So, it forms the base of future health and social life. Adolescents represent around 20% of the global world population and around 84% of them in developing countries.[3] In India, there are an estimated 190 million adolescents comprising over one fifth of the entire population.[4]

Whatever health problems and habits acquired during this phase, these prove a lifelong hindrance in well-being. In this context, the development of healthy eating habits is important as the rapid physical growth in adolescence is associated with increasing nutritional needs.[5]

Now-a-days, fast food culture is an emerging trend among younger generation. The ready availability of fast food, its taste, marketing strategies and peer pressure make them popular, but this trend has worse effect on adolescent often more than adults in terms of being obese due to increased vulnerability.[6,7]

Apart from this, some dietary patterns appear quite common among adolescents like snacking on energy dense foods, meal skipping, particularly breakfast and low consumption of fruits and vegetables.[8,9] In Indian families, there is already a tendency of consuming food rich in oil means fried food due to its more palatability. Therefore, these faulty dietary habits hamper the

nutritional health of adolescents. So, consumption of diet high in sugar, saturated fat, salt and calorie content in adolescents can lead to early development of obesity, hypertension, dyslipidaemia and impaired glucose tolerance.[10]

Therefore, the present study were planned to find out the association between dietary habits and obesity among adolescents.

The aim of the present study was to find out the association of various dietary habits with obesity among school adolescents and to suggest the recommendations based on findings.

METHODS

The present cross sectional descriptive study was conducted among 4560 adolescents studying in government and private schools of Bhopal city from a period of 28 months.(from July 2011 to October 2013). The sample size was calculated by using the formula n=$\frac{Z p q}{l^2}$, where Z=1.96, p=prevalence of obesity in previous study (9%).[11]

q=1−p, l=allowable error.

So, finally, obtained sample size was 4448 after adding 10% allowable error and 10% non-response error.

Inclusion criteria

Those students studying in IX, X, XI, XII class in government and private schools of Bhopal willing to participate in study.

Exclusion criteria

Those students absent from school on the day of examination.

Sampling procedure

Multistage simple random sampling method was used to select schools in Bhopal. First of all, a list of all government and private higher secondary schools was obtained from the Ministry of education, Government of Madhya Pradesh. Total 38 schools (19 government and 19 private) were selected by lottery method and from each school, four classes i.e., IX, X, XI, XII were considered for study. Minimum 120 students from each school were included in the study. Considering 30 students in each class, which is government norm, were selected to fulfill the calculated sample size. On the day of examination, one section from each class was selected by Lottery method. In each section, first 30 students were selected from the attendance register and included under study as per sampling frame.

Method of data collection

After obtaining approval from Institutional Ethical Committee of medical college, informed written consent was obtained from principals of all selected schools. Students were explained in detail about study and verbal consent was obtained from all participants. Data was collected by taking anthropometric measurements of school adolescents and through a self-administered questionnaire filled by them.

Anthropometric measurements were done to calculate body mass index (BMI). BMI classification for South East Asians given by WHO is used to calculate obesity in present study.[12]

Body weight was measured (to the nearest 0.5 kg) with the subject standing motionless in the centre of the platform of weighing machine without shoes and to look straight ahead and after that weight was recorded.

Height was measured (to the nearest 0.5 cm) with the subject standing in an erect position against a vertical scale of the portable stadiometer and with the head positioned so that the top of the external auditory meatus was in the level with the inferior margin of the bony orbit.

In present study, all participants were classified into obese and non-obese category as per BMI criteria for South East Asian region.[12]

Pretested self-administered questionnaire was used for data collection which comprised of socio demographic information and various dietary habits like frequent consumption of fast food, fried food, bakery products and non-vegetarian food. Frequency of taking these food items were also to be asked. It also contained few questions regarding eating behaviors like eating food in restaurants usually, skipping breakfast and taking frequent snacks replacing meals etc.

Statistical analysis

The data was processed and analyzed by the Statistical Packages for Social Sciences (SPSS) version 20 software programme. Data entry was checked by examining frequency tables. A descriptive analysis was used to describe the prevalence of obesity as well as various dietary habits. Chi-square test was applied to test the association between obesity and various dietary habits.

RESULTS

The present study was carried out to determine the association between obesity and various dietary habits among school adolescents. Out of 4560 students, 53% were from private schools while 47% from government schools. Majority of students were girls (57%) as contrast

with boys (43%) with the commonest (61%) age group between 15 to 17 years.

In present study, 6.6% school adolescents were found to be obese and out of them, 82% consume fast foods, 89% fried oil rich foods, 83.4% take bakery products frequently and 79.5% take sweets more. Frequent consumption of fast foods (OR=1.3), fried foods (OR=1.11), bakery products (OR=1.39) and sweets (OR=1.09) were associated with increased risk of obesity among school adolescents (Table 1).

Table 1: Association between various food items with obesity among school adolescents (n=4560).

Food items	Consumption	Obese N (%)	Non-obese N (%)	Odds ratio (95% CI)	x^2 (p value)
Fast food	Yes	248 (82)	3315 (78)	1.3 (0.96-1.76)	3.00 (0.083)
	No	54 (18)	943 (22)		
Fried food	Yes	268 (89)	3731 (87.6)	1.11 (0.77-1.60)	5.03 (0.56)
	No	34 (11)	527 (12.4)		
Bakery products	Yes	252 (83.4)	3335 (78.3)	1.39 (1.02-1.9)	4.40 (0.035)
	No	50 (16.6))	923 (21.7)		
Sweets	Regular	240 (79.5)	3320 (78)	1.09 (0.81-1.45)	0.37 (0.54)
	Sometimes	62 (20.5)	938 (22)		
Fruits	Regular	35 (11.6)	3523 (82.7)	1.59 (1.10-2.28)	6.46 (0.01)
	Sometimes	267 (88.4)	735 (17.3)		
Vegetables	Regular	22 (7.3)	3857 (90.6)	1.32 (0.84-2.06)	1.52 (0.21)
	Sometimes	280 (92.7)	401 (9.4)		

Table 2: Association between types of diet with obesity among school adolescents (n=4560).

Type of diet	Obese N (%)	Non-obese N (%)	Odds ratio (95%CI)	x^2 (p value)
Vegetarian	171 (56.6)	2753 (64.6)	1.4 (1.10-1.77)	7.90 (0.004)
Non-vegetarian	131(43.4)	1505 (35.4)		

Table 3: Association between eating behaviours with obesity among school adolescents (n=4560).

Eating behaviours		Obese N (%)	Non-obese N (%)	Odds ratio (95% CI)	x^2 (p value)
Skipping breakfast	Yes	1560 (36.6)	123 (41)	1.18 (0.93-1.50)	2.02 (0.15)
	No	2698 (63.3)	179 (59)		
Snacking replacing meals	Yes	1760 (41.3)	136 (45)	1.16 (0.91-1.47)	1.58 (0.20)
	No	2498 (58.7)	166 (55)		
Frequent eating out at restaurants	Yes	2560 (60.1)	193 (64)	1.17 (0.92-1.49)	1.68 (0.19)
	No	1698 (39.9)	109 (36)		

This study also found very less consumption of protective foods by obese adolescents like only 11.6% obese take fruits regularly whereas only 7.3% take vegetables on regular basis. This finding also shows positively associated with obesity as shown in Table 1.

On analyzing the type of diet, the present study found that 43.5% were non vegetarians among obese adolescents. It was associated with increased risk of obesity (OR=1.4) and this finding was also found highly statistically significant (x^2=7.9, p=0.004) (Table 2).

The current study also focused on few eating behaviours associated with obesity among adolescents. Table 3 shows that out of total obese school adolescents, 41% skipping breakfast and 45% had habit of taking snacks daily. Both of these were associated with increased risk of obesity (OR=1.18, OR=1.16) respectively.

Out of total obese school adolescents, 64% had habit of frequently eating outside at restaurants and it is found positively associated with increased risk of obesity (OR=1.17).

DISCUSSION

In today's scenario, obesity is one of the most prevalent nutritional problems among children and adolescents in developed as well as developing nations. In our country, it also started increasing day by day among adolescents

due to various provocative but reversible factors like longer duration of sedentary lifestyle, more dependency on mechanization, more psychological stress due to academic burden and rapidly changing dietary preferences and many more.

The present study throws light on various dietary factors related with obesity among school adolescents. It was found that higher proportion of obesity among those with more consumption of fast foods. This finding is almost similar to study done by Rajshree et al at Shivmogga city in which 56.79% obese students take junk foods whereas it is more common among 63.2% and 79.5% obese adolescents in another studies conducted by Panda at Odisha and Nirmala et al at Tamil Nadu respectively.[13-15]

This may be due to increasing tendency of accepting western culture in routine life style in our country. Basically, these kinds of food items are rich in fat, carbohydrates and salt which is responsible for weight gain.

On observing effect of protective foods on obesity, it was found in current study that 11.6% and 7.3% obese school adolescents consume fruits and vegetables on regular basis respectively. It is quite similar with study done by Morroco et al.[16]

Consumption of having more frequent non vegetarian food in diet is found significantly associated with obesity among 43.4% school adolescents in our study. This finding contrasts with study done by Rajshree et al in which almost 80.25% obese adolescents have mixed diet frequently and it was not found significant.[13]

In our study, eating frequently outside at restaurants was predominately associated with obesity. It is same with study done by Sivakumar et al at Kerala, Zelalem in North West Ethopia.[17,18] It might be due to better economy of families as compared with previous scenario and increased preference for high energy dense foods due to its palatability. Regular eating outside at restaurants contributes to cumulative energy intake which leads to weight gain in future.

Another important eating habit like skipping breakfast also contributed to become obese in present study. It is 1.18 times more associated with obesity. Similar findings are reported with study done by Sivakumar et al, Panda at Odisha, Nirmala et al, 16. Kabbaoui et al in which it was 2.5 times more associated with obesity.[14-17]

Along with this, having snacks more on daily basis was also found among 45% of obese adolescents in present study. The same is reported with studies done by Zelalem in North West Ethopia and Kabbaoui et al but another study by Nirmala et al found this snacking habit among 85.9% obese students which is much higher.[15,16,18]

Frequent snacking can adversely affect the adolescent's health due to excess intake of energy dense food rich in fat ingredients they contain. This may have an association with breakfast skipping habits because it may lead to have more snacks whenever adolescents feel hungry. Basically, taking breakfast regularly helps to maintain energy level in its normal limit for daily activities and it is also important for running cycle of satiety and appetite normally. Therefore, it indirectly helps in preventing excess weight gain.

CONCLUSION

The present study found 6.6% obesity among school adolescents and majority of them consume fast and fried food, bakery products frequently. Few eating behaviours like skipping breakfast, frequent snacking and frequent eating out at restaurants were also found responsible for increased risk of obesity among them.

Recommendations

There is a crucial need to create awareness among school adolescents regarding their dietary habits with the help of school authorities and teachers. Regular sessions should be conducted at schools to motivate adolescents to adopt healthy dietary habits. They should also be warned about unhealthy dietary habits and its hazards in future.

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