RESEARCH ARTICLE

PATTERN OF FAULTY FOOD HABITS AND ITS ASSOCIATION WITH OVERWEIGHT AND OBESITY AMONG RURAL SCHOOL GOING ADOLESCENTS IN ROHTAK DISTRICT, HARYANA

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ABSTRACT

Introduction: Adolescence is the period during which a child's body transforms into that of an adult. Among other things, an adolescent has increased energy needs. Eating too much food, particularly unhealthy food puts children at risk of overweight and obesity. An overweight or obese child is at an increased risk of type-2 diabetes, sleep apnoea and hip and joint problems. Long-term effects include an increased risk of heart diseases and some cancers.

Aim and Objectives: To study the faulty food habits and their association with overweight and obesity among rural school going adolescents. Material and Methods: The present study was conducted in Lakhanmajra block of Rohtak district over a period of one year from July 2016 to June 2017. 750 students from six co-educational government senior secondary schools were included in the study. Data were collected using pre-designed, pre-tested, semi structured interview schedule. Collected data were analysed using SPSS version 20.0.

Results: Prevalence of overweight and obesity was 6.7% and 1.1% respectively. All the study subjects consumed fruits. 29.2% of the study subjects who used to eat fruits only once/twice a month were obese/ overweight. Obesity/overweight was more prevalent among study subjects who were in the habit of eating deep fried foods (14.8%), snacks (18.4%), bakery foods (24.4%), fast foods (18%) and those who consumed carbonated drinks (15.1%) in comparison to those who did not have these habits.

Conclusion: In India, the problem of overweight and obesity are increasing among adolescents. If we allow this to continue, our country will top the world in Diabetes and Coronary Heart Disease (CHD) much earlier than projected. Only community based intervention approaches can address this problem. Since the lifestyle habits are amenable to change, the future epidemic of NCDs can be prevented by incorporating healthy lifestyle among children and adolescents especially regarding consumption of healthy foods.

Key words: Faulty food habits, overweight, obesity, adolescents, rural

INTRODUCTION

Adolescence is the period when a child's body changes into that of an adult. Among other things, an adolescent has increased nutrient needs. Peer pressure can affect their eating behaviour and result in either over-eating or under-eating (Nestle, 2015). As children grow and develop, it is normal for them to start eating a lot and more because the child's body is going through a major growth spurt and extra food provides extra nutrients and energy to support the growth (Raising Children Network, 2017).

It is common for adolescents to start eating fewer fruit and vegetables and more fatty and sugary foods. It could be because their friends are into the habit of eating junk foods or because they have their own money to spend on food (Raising Children Network, 2018). Eating too much food, particularly unhealthy food puts children at risk of overweight and obesity. An overweight or obese child is at an increased risk of type-2 diabetes, sleep apnoea, hip and joint problems. Long-term effects include an increased risk of heart diseases and some cancers (Raising Children Network, 2018).

Childhood obesity

Childhood obesity is one of the most serious public health challenges of the 21st century.

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The problem is global and is steadily affecting many low and middle-income countries. The prevalence has increased at an alarming rate. Globally, in 2015 the number of overweight children under the age of five is estimated to be over 42 million. Almost half of all overweight children under five years of age were from Asia (World Health Organization, 2017).

Rationale

There is transition in nutrition of adolescents from conventional home made healthy foods to fast foods and soft drinks due to their popularity through advertisements. The availability of these items has penetrated even into remote areas. The plight is such that children from even remote areas are familiar with these junk foods and prefer them rather than healthy foods available in their homes. Because of small family size, the parents also try to provide their children such junk foods out of love, affection or adamant behaviour of their children. This is considered as a sign of modern living reflecting high societal culture. Hence, it becomes essential to study the faulty food habits in adolescents and make them aware of their health status and encourage them to adopt healthy food habits so that the emergence of non-communicable diseases (NCDs) can be avoided. The present study was thus conducted with the aim to study the faulty food habits and their association with overweight and obesity among rural school going adolescents.

MATERIALS AND METHODS

A cross sectional study was conducted in the community development block Lakhan Majra (district Rohtak), which is a rural field practice area attached to the Department of Community Medicine, Pt. B. D. Sharma PGIMS, Rohtak over a period of one year from July 2016 to June 2017. The school going adolescents in the age group 13-19 years studying in classes 8th to 12th in six co-educational government senior secondary schools of the block formed the study population.

Sample Size

According to the study conducted by Kowsalya et al in Salem district of Tamil Nadu, the prevalence of overweight/obese among school going adolescents was 12.11%. Considering the prevalence as 12.11%, with 95% confidence interval and allowable error of 20%,

The sample size was thus calculated by using the formula:

$$n = \frac{(Z_{1-a/2})^2 \times p \times q}{d^2}$$

Sample size came out to be 696. By assuming a non-response rate of 5 %, a sample of 750 eligible subjects was included in the study.

Sampling technique

The list of all students currently studying from Class 8th to 12th was sought from the Principals of the respective schools. From each school, 125 students were selected which was proportionate to the strength of eligible students in each class. Simple random sampling for selection of students from each class was done using random number generator software.

Inclusion Criteria

- Students in the age group 13-19 years studying in classes 8th – 12th.

Exclusion Criteria

- Students not willing to participate in the study.
- Students not present in the respective schools on the days of the visit.

Study Instruments

A pre-designed, pre-tested, semi-structured interview schedule was used to interview the study participants to elicit the information on their socio-demographic profile and information on individual characteristics like intake of fruits, junk foods and consumption of carbonated drinks. Anthropometric measurements such as Height, Weight were recorded and Body mass index (BMI) for each student was calculated.

METHODOLOGY

The selected schools were visited in advance and prior permission was sought from the concerned Principals of the respective schools for conducting the study. The students were briefed about the nature and purpose of study and consent forms were distributed to them to get them signed from their parents/guardians. Only those students, who themselves along with their parents consented for the study, were interviewed. The students were interviewed one by one separately and their responses were noted. Confidentiality of the obtained information was maintained. Study subjects were categorised into underweight, normal, overweight and obese using WHO reference 2007 standards for BMI for boys and girls aged 5-19 years (http://www.who.int/growthref/ bmifa_girls_ 5_ 19 years_per.pdf?ua=1; http://www.who.int/growthref/ bmifa_ boys_ 5_19 years_per.pdf?ua=1).

Data Analysis

Data collected were compiled, coded appropriately and entered in the MS Excel spread sheet and analysed using statistical package for social sciences (SPSS) software version 20.0. The data were represented as frequency and proportions. Appropriate tests of significance were applied wherever necessary.

RESULTS

A total of 750 adolescents aged 13-19 years studying in 8th - 12th classes were included in the study. The majority (60.7%) of the study subjects were in the age group 15 -17 years followed by 13-14 years (31.1%) and 18-19 years (8.2%). The mean age of the study subjects was 15.38 + 1.493 years. Majority (24.4%) of the study subjects belonged to 10th class followed by 9th (20.9%), 11th (20%), 12th (18.3%) and 8th (16.4%) classes. 61.7% of the study subjects belonged to Nuclear family followed by Joint family (20.5%) and Three generation family (17.8%) respectively. More than half (54.7%) of the study subjects had upto 5 family members followed by 44.7% with 6 – 10 family members and only very few (0.6%) had more than 10 family members.

By monthly family income, 38.3% of the study subjects had monthly family income between Rs 10,000 to 15,000 followed by 30.7% with income less than 10,000 rupees while 19.8% and 11.2% belonging to income range of more than 15,000 to 20,000 rupees and more than 20,000 rupees respectively. All the study subjects were consuming fruits (Table 1).

Table 1. Distribution of study subjects according to fruits consumption (n=750)

Characteristic		Frequency	Percentage
Eating fruits	Yes	750	100
Frequency of consumption	Once in a week	567	75.6
	Twice in a week	94	12.5
	Thrice in a week	26	3.5
	Once/Twice in a month	48	6.4
	Daily	15	2

Among them, three fourth (75.6%) consumed fruits once in a week. 12.5%. 6.4% and 3.5% consumed fruits twice a week, once or twice in a month and thrice a week respectively. Only 2% had the habit of eating fruits daily which is only one serving per day. Table 2 shows the distribution of study subjects according to intake of food items. More than one fourth (27.9%) of the study subjects had the habit of eating deep fried foods. 20.1% had the habit of eating deep fried foods once in a week. 4.7%, 2.93% and 0.13% had the habit of eating deep fried foods twice a week, once or twice a month and thrice a week respectively. None of the study subjects had the habit of eating deep fried foods daily.

Regarding the habit of eating snacks, about one third (33.7%) of the study subjects had the habit of eating snacks. 22.1% had the habit of eating snacks once in a week followed by 9.3%, 1.5% and 0.8% eating snacks twice a week, thrice a week and once/twice in a month respectively. None of the study subjects had the habit of eating snacks daily. Almost one fourth (25.7%) of the study subjects were in the habit of eating bakery foods. 19.2% consumed bakery foods once in a week followed by 4.4% eating twice a week and 2.1 % once or twice a month. None of the study subjects had the habit of eating bakery foods daily. Regarding fast foods consumption, 24.4% of the study subjects were in the habit of eating fast foods. 21.5% had the habit of eating fast foods once in a week followed by 2% eating twice a week and 0.8%, 0.1% eating once/twice a month and thrice a week respectively. None had the habit of eating fast foods daily. About two fifth (39.7%) of the study subjects had the habit of taking carbonated drinks. 30.1% had the habit of consuming carbonated drinks once a week followed by 4.5% once/twice a month and 4.3%, 0.8% twice a week and thrice a week respectively. Table 3 shows the distribution of study subjects according to WHO BMI cut off values. 6.7% and 1.1% of the study subjects were found to be overweight and obese respectively. 8.9% were underweight. Obesity/overweight was not observed among the study subjects who ate fruits daily. 29.2% of the study subjects who used to eat fruits only once/twice a month were obese/overweight. 8.5%, 7.7% and 6% of the study subjects who used to eat fruits twice a week, thrice a week and once a week respectively were obese/overweight.

Table 2. Distribution of study participants according to intake of food items (n=750)

Characteristic		Frequency	Percentage
Habit of eating deep fried foods	No	541	72.1
	Yes	209	27.9
Frequency of consumption of deep fried foods	Not applicable	541	72.1
	Once a week	151	20.13
	Twice a week	35	4.7
	Thrice a week	1	0.13
	Once/Twice in a month	22	2.93
Habit of eating snacks	No	497	66.3
	Yes	253	33.7
Frequency of consumption of snacks	Not applicable	497	66.3
	Once a week	166	22.1
	Twice a week	70	9.3
	Thrice a week	11	1.5
	Once/Twice in a month	6	0.8
Habit of eating bakery foods	No	557	74.3
	Yes	193	25.7
Frequency of consumption of bakery foods	Not applicable	557	74.3
	Once a week	144	19.2
	Twice a week	33	4.4
	Thrice a week	0	0
	Once/Twice in a month	16	2.1
Habit of eating fast foods	No	567	75.6
	Yes	183	24.4
Frequency of consumption of fast foods	Not applicable	567	75.6
	Once a week	161	21.5
	Twice a week	15	2
	Thrice a week	1	0.1
	Once/Twice in a month	6	0.8
Habit of drinking carbonated drinks	No	452	60.3
	Yes	298	39.7
Frequency of consumption of carbonated drinks	Not applicable	452	60.3
	Once a week	226	30.1
	Twice a week	32	4.3
	Thrice a week	6	0.8
	Once/Twice in a month	34	4.5

Table 3. Distribution of study subjects according to WHO BMI cut off values

Category	Frequency	Percentage
Underweight	67	8.9
Normal	625	83.3
Overweight	50	6.7
Obese	8	1.1
Total	750	100

This finding was statistically significant. Table 5 shows the association of obesity/ overweight with intake of food items. Obesity/overweight was higher among study subjects who were in the habit of eating deep fried foods, snacks, bakery foods, fast foods and consuming carbonated drinks in comparison to those who were not in the habit of eating these items. 14.8% of the study subjects who had the habit of eating deep fried foods were obese/ overweight in comparison to those who did not (5%).

The prevalence was more among those study subjects who had deep fried foods once/twice in a month (36.4%) followed by twice a week (14.3%) and once a week (11.9%) respectively. 18.4% of the study subjects who had the habit of eating snacks were obese/ overweight, whereas, only 2.2% of those who didn't have the habit were obese/ overweight. The prevalence was more among those who had snacks thrice in a week (54.5%) and twice a week (27.1%). Regarding eating bakery foods, about one fourth (24.4%) of the study subjects who were in the habit of eating bakery foods were obese/overweight in comparison to only very few (2%) obese/overweight among those who were not having this habit. 81.2% of the study subjects who consumed bakery foods once/twice a month were obese/overweight followed by those who consumed these twice (30.3%) and once a week (16.7%). 18% of the study subjects who had the habit of eating fast foods were obese/ overweight, whereas, only 4.4% of those who were not in the habit were obese/ overweight.

Table 4. Association of obesity/overweight with consumption of fruits

Fruit consumption		Obese/Overweight				χ^2 value	df	p value
		Yes		No				
		Freq	%	Freq	%			
Frequency	Once a week	34	6	533	94	34.63767	4	0.000[*]
	Twice a week	8	8.5	86	91.5			
	Thrice a week	2	7.7	24	92.3			
	Once/Twice in a month	14	29.2	34	70.8			
	Daily	0	0	15	100			

Significant (*)

Table 5. Association of obesity/overweight with intake of food items

		Obese/Overweight				χ^2 value	df	p value
		Yes		No				
		Freq	%	Freq	%			
Habit of eating deep fried foods	No	27	5	514	95	20.46529	1	0.000[*]
	Yes	31	14.8	178	85.2			
Frequency of consumption								0.000[*]
	Once a week	18	11.9	133	88.1			
	Twice a week	5	14.3	30	85.7			
	Thrice a week	0	0	1	100			
	Once/Twice in a month	8	36.4	14	63.6			
Habit of eating snacks	No	11	2.2	484	97.8	61.97165	1	0.000[*]
	Yes	47	18.4	208	81.6			
Frequency of consumption of snacks								0.001[*]
	Once a week	21	12.7	145	87.3			
	Twice a week	19	27.1	51	72.9			
	Thrice a week	6	54.5	5	45.5			
	Once/Twice in a month	1	16.7	5	83.3			
Habit of eating bakery foods	No	11	2	546	98	100.5916	1	0.000[*]
	Yes	47	24.4	146	75.6			
Frequency of consumption of bakery foods								0.000[*]
	Once a week	24	16.7	120	83.3			
	Twice a week	10	30.3	23	69.7			
	Once/Twice in a month	13	81.2	3	18.8			
Habit of eating fast foods	No	25	4.4	542	95.6	35.98704	1	0.000[*]
	Yes	33	18	150	82			
Frequency of consumption of fast foods								0.001[*]
	Once a week	31	19.3	130	80.7			
	Twice a week	1	6.7	14	93.3			
	Thrice a week	0	0	1	100			
	Once/Twice in a month	1	16.7	5	83.3			
Use of carbonated drinks	No	13	2.9	439	97.1	37.61393	1	0.000[*]
	Yes	45	15.1	253	84.9			
Frequency of consumption of carbonated drinks								0.000[*]
	Once a week	20	8.8	206	91.2			
	Twice a week	4	12.5	28	87.5			
	Thrice a week	0	0	6	100			
	Once/Twice in a month	21	61.8	13	38.2			

significant (*), those without Chi square values are Fischer exact values

The prevalence was more among those who had fast foods once a week (19.3%) followed by once/twice a month (16.7%) and twice a week (6.7%). Regarding consumption of carbonated drinks, it was found that 15.1% of the study subjects who had this habit were obese/ overweight in comparison to only 2.9% among those who didn't have the habit. The prevalence was found to be higher among those who were in the habit of taking them once/twice in a month (61.8%) followed by twice a week (12.5%) and once a week (8.8%).

DISCUSSION

The present study included 750 school going adolescents aged 13-19 years studying in classes 8th-12th in Govt. Sr. Sec Schools of Lakhan Majra block in Rohtak district. Out of the total study subjects, majority (60.7%) were in the age group 15-17 years. Males (72.5%) outnumbered the females (27.5%). 24.4% of the study subjects belonged to class 10th followed by 20.9% belonging to 9th class. 61.7% of the study subjects belonged to nuclear family. More than half (54.7%) of the study subjects had upto5 family members. 38.3% of the study subjects had monthly family income between 10.000 to 15,000 rupees followed by 30.7% with monthly income less than 10,000 rupees. In the present study, the prevalence of overweight and obesity was found to be 6.7% and 1.1% respectively (Table 3) among rural school going adolescents of Rohtak districtin Haryana. Similar prevalence of overweight (6.6%) and obesity (1.1%) was observed in the study conducted by Tiwari et al[7] in Allahabad in which WHO- BMI cut off values were used to categorize the study subjects as overweight and obese. Higher prevalence of overweight and obesity were reported in studies conducted by Choudharyet al in Patna (6.3% obese and 10.3% overweight), Prajapati et al in Vidarbha (11.8% obese and 15.8% overweight). This may be because studies were conducted in different areas and included different age groups. A study conducted by Mithraet al[10] in Udupi district of Karnataka reported prevalence of overweight and obesity to be 2.4% and 1.4%. This was much lower compared to the present study. The reason may be attributed to larger sample size (2963 students) and inclusion of students belonging to age group 10 – 18 years.

Overweight/obesity and intake of different food items

All the study subjects in the present study had the habit of eating fruits (Table 1). None of those students who consumed fruits daily were obese/ overweight. 29.2% of those who consumed fruits only once/twice in a month were overweight /obese followed by 8.5% and 7.7% of those who ate fruits twice a week and thrice a week respectively (Table 4). This finding was statistically significant. Watharkar et al. (2015) also found overweight /obesity to be higher (16.6%) among students who ate fruits only occasionally compared to those who consumed fruits regularly (9.7%). The present study also revealed that obesity/overweight was more among study subjects who were in the habit of consuming deep fried foods (14.8%), snacks (18.4%), bakery foods (24.4%), fast foods (18%) and carbonated drinks (15.1%) in comparison to those who did not have these habits (Table 5). The findings were statistically significant. In the present study, 14.8% of the study subjects who were in the habit of eating deep fried foods were overweight/ obese in comparison to those who did not eat such foods (5%). The prevalence was more among those study subjects who had deep fried foods once/twice in a month (36.4%) followed by twice a week (14.3%) and once a week

(11.9%) respectively. The study conducted by Prajapatiet al[9] showed that 7.76% and 6.52% of the study participants having the habit of eating deep fried foods were overweight and obese. The present study found that 18.4% of the study subjects who had the habit of eating snacks were obese/ overweight, whereas, only 2.2% of those who didn't have the habit were obese/ overweight. The prevalence was more among those who had snacks thrice in a week (54.5%) and twice in a week (27.1%). Choudhary et al[8] reported higher prevalence of overweight (50%) and obesity (52.9%) among study participants who were in the habit of eating snacks regularly as compared to those who consumed them occasionally (32.1% overweight and 29.4% obese). Prajapatiet al[9] found the prevalence of overweight and obesity to be 16.45% and 3.7% respectively among students consuming snacks regularly. About one fourth (24.4%) of the study subjects who consumed bakery foods were obese/overweight in comparison to only very few (2%) obese/overweight among those not having this habit. 81.2% of the study subjects who consumed bakery foods once/twice a month were obese/ overweight followed by those who had them twice (30.3%) and once a week (16.7%).

In the present study, 18% of the study subjects eating fast foods were obese/ overweight compared to those not consuming such foods (4.4%). The prevalence was more among those who had fast foods once a week (19.3%) followed by once/twice a month (16.7%) and twice a week (6.7%). Vohra et al found higher (6.8%) prevalence of overweight/obesity among students who had the habit of eating fast foods than those not having this habit (0.8%). Tiwari et al found the prevalence of overweight/obesity to be 11.3% and 6.7% respectively for students who consumed fast foods thrice/ more in a week and less than three times a week. The difference was statistically significant. The study conducted by Watharkar et al also reported significantly higher (16%) prevalence of overweight/obesity among study participants who were in the habit of eating fast foods regularly as compared to those eating them occasionally (8.3%). Similar results were also reported by Choudhary et al where the prevalence of overweight and obesity among students who were in the habit of eating fast foods was 57.14% and 58.8% respectively in comparison with those who had them occasionally (32.14% overweight and 29.4% obese). In the present study, 15.1% of the students who consumed carbonated drinks were obese/ overweight in comparison to only 2.9% among those who did not have this habit. The prevalence was found to be higher among those who were in the habit of consuming such drinks once/twice in a month (61.8%) followed by twice in a week (12.5%) and once a week (8.8%) respectively. Prajapati et al reported the prevalence of overweight and obesity to be 6.2% and 11.1% respectively among the students who consumed cold drinks. Watharkar et al reported significantly higher (16.9%) prevalence of overweight/obesity among the study participants who had the habit of consuming carbonated drinks regularly in comparison to those who consumed them occasionally (5.3%). Kumar et al reported higher prevalence of overweight (4.9%) and obesity (4.4%) among the students who consumed energy dense foods regularly as compared to those who had them occasionally (0.8% overweight and 0.8% obese). These findings can be attributed to the fact that the consumption of large quantities of energy dense foods, such as processed foods which are high in fats and sugars, promote obesity compared to low-energy foods such as fruits and vegetables. The difference in

prevalence of overweight and obesity in the studies could be due to difference in sample size, age groups of participants and difference in geographical areas and difference in cultural values relating to food habits.

Conclusion

The prevalence of overweight and obesity among adolescents is on an increasing trend in rural areas. In the present study, it was found that frequency of fruits consumption, habit of consumption of deep fried foods, snacks, fast foods and carbonated drinks were significantly associated with the overweight/obesity among adolescents. In India, the problem of overweight and obesity are increasing among adolescents. If this continues, our country will top the world in Diabetes and CHD much earlier than projected. Only community based approaches can address this problem. Since the lifestyle habits are amenable to change, the future epidemic of NCDs can be prevented by incorporating healthy lifestyle among children and adolescents especially regarding consumption of healthy foods.

Recommendations

To decrease the prevalence of overweight and obesity among children and thus preventing the overt complications (Diabetes, CHD and Hypertension) arising from it, the following suggestions are recommended:

- Children should be taught about the traditional healthy food items available in their homes and be discouraged for eating energy dense foods (e.g., pre-packaged snacks, ice creams and chocolates).
- The school canteen should not provide fast/ junk foods and cold drinks. Wherever possible the parents should be asked to send home made foods for their wards for the school lunch. The hawkers outside the school should also be checked frequently for not selling unhealthy food items to the school children.

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