



Nutrition Knowledge and Consumption Pattern of HFSS Foods amongst Adolescent Children

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Abstract

Adolescence is the age characterized by rapid growth and development at physiological, social and psychological levels. At this stage of life, good nutrition not only paves way towards a healthy adulthood but also helps in adopting good food habits. In current times, however, there is an increased consumption of unhealthy foods among adolescents due to changing lifestyle. These unhealthy foods are termed as HFSS foods as they are high in fat, sugar and salt. Such foods are energy dense and low in nutrients. High consumption of HFSS foods leads to health-related issues. Thus, the present study was done to assess the consumption pattern of HFSS foods amongst adolescents in the age group of 13-15 years. A self-administered, semi-quantitative food frequency questionnaire (FFQ) was developed to assess the dietary habits of adolescents. A total of 154 students (aged 13–15 years) attending Private schools in Delhi/NCR participated in the study. Consumption pattern of HFSS foods among participants was correlated with their nutritional knowledge. The results of the study revealed that despite having nutrition knowledge (72%) and awareness about associated health problems like obesity (53%), participants had high frequency of consumption of HFSS foods mainly pertaining to their taste (95%) and flavor. It has been concluded that HFSS food intake among school going adolescents was high. Excessive intake is, therefore, a major risk factor of obesity and related disorders. Therefore, awareness on health hazards of HFSS foods needs to be taught in schools so as to minimize their consumption.

Keywords: nutrition awareness, nutritional status, obesity, food frequency questionnaire, consumption pattern

1. Introduction

Diet plays a very important role in growth and development of adolescents, during which the development of healthy eating habits is of supreme importance. There could be problems of both under and over-nutrition in this age-group. Therefore, a balanced diet is an essential element in all age groups with special emphasis in vulnerable groups including adolescents. As per Dietary Guidelines for Indians (2011) by National Institute of Nutrition (NIN), a “balanced diet is one which provides all nutrients in required amounts and proper proportions” (1). It should provide around 50-60% of total calories from carbohydrates, preferably from complex carbohydrates, about 10-15% from proteins and 20-30% from both visible and invisible fat. In addition, it should provide other non-nutrients such as dietary fibre, antioxidants, which bestow positive health benefits.

It has been observed that lack of physical activity and outdoor sports, along with the consumption of calorie dense ‘unhealthy’ foods, are the major cause of obesity among the affluent population (2).

High Fat Sugar and Salt (HFSS) foods refers to fast food, which are low in nutritional value and have high fat, sugar and salt content. High consumption of such foods can be deleterious to the health of an individual. As per the National Institute of Nutrition (2011) “unhealthy foods are those containing little or no proteins, vitamins or minerals but are rich in salt, sugar, fats and are high in energy (calories) (1).”

Consumption of the HFSS food leads to various health issues. In the current scenario, due to easy availability, wide-variety, taste, advertisements and peer pressure; the intake of these foods is continuously increasing, especially, in the younger generation, including children. The main problems with high consumption of HFSS foods are increasing childhood overweight/obesity, which further lead to many other health complications in adult years too (3).

Besides being high in fat, sugar and salt contents, other ingredients that are of concern include caffeine used in carbonated beverages and energy drinks as an addictive stimulant; if consumed in excess, it can lead to impaired muscle and nerve functions, dehydration and a host of other disorders. Processed foods including carbonated beverages are also known to contain additives such as artificial flavours, colouring agents, preservatives and trans fats that have no nutritive value and in the long run, impact our health negatively. (4). Some of the commonly consumed HFSS foods by Indian children are listed in Table 1.1 (5).

Table 1 Most Common HFSS Foods (Ministry of Women and Child Development, 2015).

1.	Chips, fried foods
2.	Sugar sweetened carbonated beverages
3.	Sugar sweetened non-carbonated beverages
4.	Ready-to-eat noodles, pizzas, burgers
5.	Potato fries
6.	Confectionery items

[Source: Report of Working Group on Addressing Consumption of Foods High in Fat, Salt and Sugar (HFSS) and Promotion of Healthy Snacks in Schools of India, Ministry of Women & Child Development, Government of India, 2015]

Adolescence is an important phase of life between childhood and adulthood. Along with rapid physical development, many hormonal changes also occur during this period. Hence, the quality and quantity of food consumption is of utmost importance in this age group, especially among girls as it impacts the quality of their life in the reproductive age and in later years of life. Studies have revealed that poor dietary habits along with hormonal changes during adolescence lead to an increased vulnerability to obesity (6).

Lack of physical activity and outdoor sports, along with the consumption of 'junk' foods, is a major concern and adds to the problem of increasing obesity not only in the affluent population(7) but across all socio-economic strata. Nutritional intake along with physical activity during adolescence is important for growth and has long term health benefits and helps in development of life-long eating behaviour. Several physical, psychological and behavioural changes may affect food habits during adolescence and that's why the meal patterns of adolescents are often chaotic and have long term health consequences. The HFSS food consumption alters brain activity in a manner similar to addictive drugs like cocaine or heroin (8)

Today, fast food industry is getting adapted to Indian food requirement and is growing in India. It is gaining acceptance primarily from younger generations and is becoming a part of life. At the same time, consumption of traditional fast foods continues to be high (9).

Due to the scenario of increased High Fat, Sugar and Salt Food consumption, the present study has therefore, been planned with broad objective of assessing the nutrition knowledge and HFSS food consumption patterns amongst school going adolescents (13-15 years).

2. Materials & Methods

Research Design: The present study was designed to focus on the consumption pattern of foods rich in fat, sugar and salt and its relation with the nutritional knowledge of the subject. The study was collaborated with Centre for Science and Environment (CSE) to obtain permission from respective schools as they have been partners in the promotion of Green Food Program in the private schools across Delhi-NCR. Written informed consent from the parents or guardians in addition to assent from each student was obtained after providing them information and purpose of this study.

Later self-administered questionnaire along with HFSS Food Frequency Questionnaire were distributed to as many consenting students chosen randomly from in each class (8th and 9th). The cross-sectional survey was reviewed and approved by the Ethics Committee of Institute of Home Economics, University of Delhi.

Sample Size: The students were school going lying in the age group of 13-15 years, both boys and girls residing in Delhi/NCR. Sample size of 154 students who were willing to participate was selected from 6 schools across Delhi/NCR. Out of which 59 were boys and 95 were girls.

Survey Instrument: To get the relevant data Questionnaire-cum-interview schedule was designed because the oral questionnaire method is simple, less time consuming, easily explained and more feasible to get authentic information.. A large sample can be easily covered with this method and the data obtained from this method is easy to tabulate and interpret. Survey instruments comprised collecting baseline information, dietary pattern and food habits, eating behavior amongst adolescents, with special focus on consumption pattern of HFSS foods.. Assessment of nutritional knowledge was done by giving the students 10 multiple choice questions. These included questions related to balanced diet, empty calorie foods, rich sources of calories etc. All the 10 questions had four choices, out of which one was the correct answer. The students were asked to choose the right answer from among the given options.

3. Results

Socio-demographic Characteristics of Adolescents:

The selected sample (N=154) was in the age group of 13-15 years. Of the total number of students, 74.7% were between 13-14 years of age and 25.3% were in the age range of 14-15 years. The sample, thus, represented the age group 13-15 years. There were 59 boys and 95 girls. Majority of the students (81.8%) belonged to nuclear family.

Dietary & Eating Pattern:

The data on food habits shows that 58.4% of the students were non-vegetarians whereas 34.4% were vegetarians. Only 7.1% of the students reported that they were eggetarians.

Table 2: Dietary pattern of the adolescents (boys and girls)

DIETARY PATTERN		N =154 (100)
Food habits	Vegetarian	53 (34.4)
	Non- vegetarian	90 (58.4)
	Eggetarian	11 (7.1)
Number of meals per day	1-2 meals	18 (11.6)
	3-4 meals	129 (83.3)
	>4 meals	7 (4.5)

Skipping of meals by adolescents

Majority of the students (83.3%) had 3-4 meals daily; however, 11.6% of them had only 1-2 meals per day and about 4.5% of them had more than 4 meals every day. Breakfast (50%) and evening snacks (27.4%) were the most skipped meals by the students.

Eating pattern of the students during school hours

Majority of the students (94.2%) carried tiffin to the school. Of those who carried tiffin to the school, a large percentage of them (93.7%) carried home cooked food. Some of them also reported to carry fast food cooked at home (4.8%) or fast food bought from the market (1.4%) like maggi, chowmein and burger. However, none of them carried fruits / salad in their tiffin. Nearly sixty percent of children visited school canteen daily. Maggi (37%), Iced tea (34%), chips (23%) and noodles (1%) were the most commonly consumed HFSS foods from the canteen. Though, canteen served healthier options too like Rajma chawal, Chole chawal, Samber idli etc, students liked to buy HFSS foods as they preferred the taste over healthier options.

Table 3: Eating Pattern During School Hours

EATING PATTERN DURING SCHOOL HOURS		N (%)
Carrying tiffin to school	Yes	145 (94.3)
	No	9 (5.8)
	Total	154 (100)
Type of food carried in tiffin (N=145)	Home cooked food	136 (93.7)
	Fast food bought from market	2 (1.4)
	Fast food cooked at home	7 (4.8)
	Fruits	0 (0)
	Total	145 (100)
Frequency of visiting school canteen (N=103)*	Daily	62 (60.2)
	2-4 times a week	18 (17.5)
	1-2 times a week	18 (17.5)
	Occasionally	5 (4.8)
	Total	103 (100)

*2 schools did not have canteen

Table 4: Commonly consumed HFSS foods by students from school canteen

COMMONLY CONSUMED HFSS FOODS	
HFSS foods	Percent consumption N=154
Maggi	36.9%
Ice tea	34%
Chips	22.3%
Choupsey/noodles	0.9%

When students were asked about their perception of HFSS foods; majority of the students reported that these foods were tasty, delicious (56.5%) and easily available (24%). Many of them described them as time saving and a few believed that they were cost effective (1.9%) and nutritious (3.2%) too.

Most of the students reported that while ordering any HFSS foods they preferred it to be delivered at home (52.6%). However, 27.9% of the students preferred going out and eating at an outlet.

Majority of the students (72.7%) reported that HFSS foods made them eat more of it, whereas, rest of them did not agree (27.3%) for the same.

When students were asked about HFSS foods eaten as an alternative to breakfast or not, about one-fourth of them reported it as replacement for their breakfast (26.6%). Some of the students (14.3%) believed that HFSS foods can be eaten as an alternative to breakfast. About 21% students were in the category of those who did not eat breakfast, thus they might be eating some HFSS foods as an alternative to it.

Table 5: Consumption pattern of foods High in Fat Sugar and Salt (HFSS)

CONSUMPTION PATTERN OF HFSS FOODS		N=154 (100)
Consumption pattern of HFSS food	Daily/Alternate days	82 (53.3)
	1-2 times a week	28 (18.2)
	Twice a month	10 (6.5)
	Rarely	34 (22.0)
Perception of HFSS foods	Easily available	37 (24)
	Cost effective	3 (1.9)
	Tasty and delicious	87 (56.5)
	Takes less time to eat	22 (14.3)
	Nutritious	5 (3.2)
Preference while ordering HFSS foods	Eating at the outlet	43 (27.9)
	Take away	30 (19.5)
	Home delivery	81 (52.6)
HFSS foods on a daily basis makes you eat more of it	Agree	112 (72.7)
	Disagree	42 (27.3)
HFSS foods as an alternative to breakfast	Yes	22 (14.3)
	No	91 (59.1)
	Sometimes	41 (26.6)

Reasons for Consuming HFSS Foods

When students were asked whether they checked the nutrition fact label, about 39% of the students reported that they checked the nutrition fact label of products occasionally to find out about fat, sugar and salt content

in them. However, 26% of them made sure to check it regularly; 30.5% of the students never checked the nutrition fact label and surprisingly, 5.2% of the students didn't know anything about checking nutritional labeling / facts.

More than half of the students (53.2%) were aware of the association between HFSS food and obesity. Almost 46.8% of the students were not aware of it.

Majority of the students reported that they got to know about availability of new HFSS foods in the market through advertisements (57.1%). A good number (39%) of the students believed that friends/peers are also one of the sources to get to know about these products. Only 3.9% reported that they get to know from social media sites. Information regarding reasons for continuing HFSS consumption is depicted in table 3.9. A large percentage of the students (95%) reported good taste as the reason for regular consumption of HFSS foods. However, very few of them reported peer pressure and low cost as the reasons for frequently consuming such products (High in Fat, Sugar and Salt).

Table 6: Assessment of reasons for consuming High Fat Sugar and Salt (HFSS) foods

REASONS FOR CONSUMING HFSS FOODS		N=154 (100)
Checking nutritional fact label of HFSS Foods	Yes	40 (26)
	No	47 (30.5)
	Sometimes	59 (38.3)
	Don't know	8 (5.2)
Aware of association between HFSS foods and obesity	Yes	82 (53.2)
	No	72 (46.8)
New HFSS food availability in the market	Advertisement	88 (57.1)
	Friends	60 (39)
	Social media sites	6 (3.9)
Reasons for continuing HFSS food consumption	Taste	146 (94.8)
	Cost/price	3 (1.9)
	Peer pressure	5 (3.3)

Most frequently consumed products were French fries, spring rolls, noodles, namkeen and soft drinks weekly.

Association between Frequency of HFSS Food Consumption and Awareness of Obesity

The students were asked if they were aware of the association between HFSS food consumption and its ill health effects (obesity). Chi square was computed between the two groups i.e. those who were aware and those who were not aware of this. It was observed that more than 50% of them were aware about it and about 46.7% were ignorant. Despite the awareness between excessive consumption of HFSS foods and its side effects, majority of the adolescents were still eating those foods on a daily basis. However, those who were not aware (55.5%) were consuming these products daily/alternate days. Hence, it can be inferred that inspite of having knowledge about ill-effects of consuming HFSS foods, the students were still they are not practicing it. In a similar study, among male adolescents in Mangalore by Joseph et al (2015) analyzed nutrition awareness and Fast-food consumption. It was observed that awareness of harmful effects of fast-food consumption was noted in 186 (62%) students. The various harmful effects reported were as follows: It contained harmful coloring agents 5 (2.7%), contained harmful food additives/preservatives 12(6.5%), were not fresh foods 28 (15.1%), contained high fat content (5.9%), caused rapid weight gain 31(22%), caused intestinal cancer 6(3.2%), same frying oil being used repeatedly was bad for health 2 (1.1%) and poor in nutritive value. There was no association of awareness of hazards of fast-food usage with age of the students ($p>0.05$). Thus, people are aware of the ill effects still they do not practice it.

Discussion

The Background information showed that the selected sample (N=154) was in the age group of 13-15 years. The majority of the students included girls (61.7%) and rest of them were boys (38.3%). More than half (54.4%) of the students skipped meals which were mainly breakfast (50%) and evening time snacks (27%). Among students who skipped meals, 64% of them reported that it was too early for them to have breakfast at that time as they don't feel hungry and ended up eating HFSS foods in school canteen. Eating patterns of students after school hours revealed that a large percentage of them (81.2%) visited other eating places after school hours. Out of those who visited eating joints other than school canteen, most of the students (43.2%) went daily. However, 32.8% of them visited 2-4 times a week. Regarding the type of eating places visited, 64% of the students reported eating at restaurants. This shows that students preferred eating at the restaurants too. The type of food chosen included coca cola (37.6%), momos (36.8%) and paneer tikka (28.8%). Other types of foods which were commonly consumed were pizza, KFC bucket and butter chicken. According to HFSS categorization, most of these products were rich in fat, sugar and salt. Frequency of consumption of HFSS foods was computed by using HFSS food frequency questionnaire. Data

indicated that the intake of HFSS foods was much higher in overweight/ obese adolescents as compared to those who were under normal/thin category on daily/ alternate days as well on weekly basis. However, monthly intake was higher among normal/ thin students.

As adolescence is a period of drifting from the protection and security of parents to a mature adulthood. During this transition adolescents make their own identity. There is a strong desire and pressure to be accepted in the peer group which is going to reflect in food habits, dressing and group conduct. It was reported that many students (72%) had good nutrition knowledge. We noticed a big gap between knowledge and practice of students in this study. Almost 53% of these were aware of the health hazards (obesity) but still continued to eat HFSS foods. A study done in Baroda, India found that children despite knowing the harmful effects continued to eat HFSS foodss and for reasons like taste preferences, strong desire to do so and quick to eat (10). Nutrition counselling could help to reduce this gap between knowledge and practice

Conclusion

HFSS food consumption was reported by most students in this study. Commonest source of information was from television advertisements. Therefore, legislations to regulate marketing of HFSS foods need to be more stringent. Statutory warning about hazards of HFSS consumption should also accompany television advertisements promoting such foods. The message “Eat healthy foods” need to be understood and addressed appropriately. In spite of a good number of students who had good nutrition knowledge, adolescents continued the consumption of HFSS foods. As food habits learnt in childhood/adolescents tend to persist into adulthood, it becomes important to educate children about healthy eating habits and make them aware about the health hazards of fast foods right from school level onwards. It becomes equally important to have a clear understanding of the factors influencing food choices to formulate appropriate nutritional educational strategies.

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Conflict of Interest: Article is free from any conflict of interest

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