

Multipronged effects of increased screen time on the nutritional imbalance: A cross-sectional study of students of Amritsar aged 6-16 years

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ABSTRACT

Background: Intense marketing of fast-food items impacts the eating habits among children and adolescents. Various studies suggest that increased screen time leads to increased fast-food consumption and decreased sleep duration, both of which are linked to obesity in growing age. **Objectives:** To assess screen time and dietary habits among the study group and to estimate their effect on sleep deprivation and obesity. **Methods:** This cross-sectional study was conducted from January 2019 to December 2019 in three schools in Amritsar selected by lottery method of simple random sampling. Out of 4,226 students, 355 overweight and obese students were interviewed regarding their dietary habits. An informed written assent was taken from the mothers. The information was collected on a semi-structured, pre-designed questionnaire by interviewing the mothers of students between 6 and 11 years of age and the students of 12–16 years. **Results:** 94.4% of students preferred fast foods to regular meals and 58.3% were in the habit of skipping breakfast. 59.4% had a history of daily intake of fast foods while 76.1% had a habit of consuming fast foods while watching television. Only 31.7% had an adequate sleeping pattern of 9–11 hours and 79.7% of the students had a screen time of over 3 hours. **Conclusions:** More the screen time, the more the chances of missing meals. Being awake for a long odd time leads to increased consumption of foods/snacks furthermore. Regarding the harmful effects of fast foods, the source of information was from schools, but only 41.4% were aware about these effects.

Keywords: BMI, dietary habits, pediatric obesity, screen time, sleep deprivation

Introduction

In the context of a changing global nutrition landscape, diet-related epidemiology has passed through significant drift. Obesity has reached a pandemic status throughout the developing world and may mar health giving rise to a cluster of diseases called the New World Syndrome.^[1] Out of over a billion obese people

worldwide, 39 million are children.^[2] Being obese is directly related to the number of calories consumed or stored vis-à-vis how much is burnt up. But each of these factors is determined by an amalgamation of genes and environment which can directly or indirectly affect the behavior as well as physiology. Changes in lifestyle, the rise in urbanization, dietary habits, lack of exercise, or a combination of these can be involved.^[3]

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Nowadays, numerous children spend their valuable time being indolent which may or may not be due to the terrain created by their parents. Mobiles, watching TV, so on and so forth are all

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preferred to being physically active. Media has been implicated in causing obesity, both directly and indirectly, especially in children.^[4] Intense marketing of fast-food items using mass/print media and use of celebrities for the publicity also impact the eating habits among children and adolescents.^[5] In a study from Mangalore city, it was found that approximately 64% of participants were introduced to fast foods through television commercials^[6] and in another New Delhi study, 68% of the participants in urban areas spent more than 3 hours in front of screens which included television, mobile screens, video games, etc.^[7] Various studies suggest that increased screen time leads to increased snacking (fast food/unhealthy) and decreased sleep duration, both of which are linked to obesity in growing age. Mathew *et al.*^[8] conducted a study in Kerala where it was revealed that 60% of the total participants had inadequate sleeping hours of between 9–11 hours.

Data regarding dietary habits, screen time, effect on sleep, and obesity among the specified age group were not available for this part of the country. Hence, this study was conducted with the aim to know the same along with other factors.

Materials and Methods

Study design

This was an observational cross-sectional study.

Study setting

The study was carried out in three schools of Amritsar, i.e., peri-urban, urban, and rural.

Study tool

The information was collected on a semi-structured, pre-designed questionnaire which included skipping meal pattern, fast food

consumption habit, source of information, and their knowledge regarding its harmful effects, screen time, and sleeping habits. The weight and height were measured using the calibrated weighing scale and measuring tape, respectively.

Sampling technique

A list of schools with the strength of more than 1,000 students was procured from the education department and it was divided into three categories according to their location. Three schools were selected by lottery method of simple random sampling. Another list of 6–16-year-old students from each class in all three schools was prepared by the principal investigator himself with the help of the class in charge [Figure 1].

Study population and study duration

Data was collected between the period of January to December 2019. Body mass index (BMI) of all the students from these three schools was calculated, and overweight and obese school students aged 6–16 years were singled out for inclusion.

Ethical consideration and clearance

Ethical consideration and clearance before data collection was obtained from the Institutional Ethical Committee. An informed written assent was taken from the mothers. The study was granted permission by the Institutional Ethic Committee vide letter no. BFUHS/2K19p-TH/862 dated – 16.09.19.

Sampling criteria

a. Inclusion Criteria

Students in the age group of 6–16 years who were willing to participate and gave written consent from parents were included in the study.

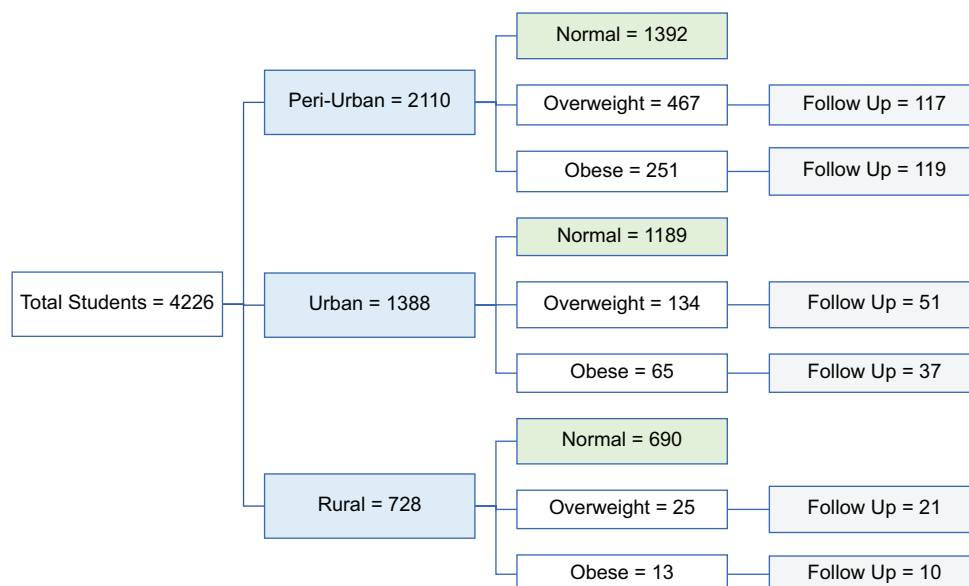


Figure 1: Selection of study sample

b. Exclusion Criteria

Those who were not available even after the third visit were excluded from the study.

Method of data collection

The information was collected on a semi-structured, pre-designed questionnaire by interviewing the mothers of students between 6 and 11 years of age and the students of 12–16 years. The height and weight of each student were measured and based on the WHO-based BMI charts, as per their age and gender.^[9] The weight of the participants of the study was measured with an ISI-marked analog weighing machine calibrated up to 100 g with minimum clothing and without shoes. The student was asked to stand still in the middle of the scale without leaning or holding on to anything. The height was measured in centimeters up to the accuracy of 0.1 cm with the help of ISI-marked measuring tape. The head was directed parallel to the floor to minimize any error on the part of the investigator. Calculation of BMI was done as per the equation: $BMI = \text{Weight (in kg)} / \text{Height (in m)}^2$. The students were classified into normal, overweight, and obese. Out of the total, 355 overweight and obese students were interviewed regarding their dietary habits.

Statistical methods

The information was collected and recorded in Microsoft Excel 2019. Data were cleaned, descriptive and inferential statistics were applied, and valid conclusions were drawn. Chi-square test was applied and value less than 0.05 was taken as significant.

Variable	Yes, n (%)	No, n (%)	P
Skipping meals			
Breakfast	207 (58.3)	148 (41.7)	$\chi^2=19.5731$, $P=0.000056$
Lunch	155 (43.7)	200 (56.3)	
Dinner	157 (44.2)	198 (55.8)	
Fast foods			
Preference over regular meals	335 (94.4)	20 (5.6)	$\chi^2=120.9856$, $P<0.00001$
Daily Intake	211 (59.4)	144 (40.6)	
Eating FF while watching	270 (76.1)	85 (23.9)	
Improper habits			
Adequate sleep of 9 hours	112 (31.5)	243 (68.5)	$\chi^2=166.8564$, $P<0.00001$
Screen time more than 3 hours	283 (79.7)	72 (20.3)	

χ^2 =Chi-square test, $P<0.5$ =Statistically significant, $P<0.001$ =Statistically highly significant

Results

Table 1 shows the distribution of the participants as per their habits. It was seen that out of the total 355 students enrolled, 207 (58.3%) were in the habit of skipping breakfast while 155 (43.7%) and 157 (44.2%) skipped lunch and dinner, respectively. Similarly, majority i.e., 335 (94.4%) students preferred fast foods to regular meals, 211 (59.4%) had a history of fast food intake on a daily basis while 270 (76.1%) had a habit of consuming fast foods while watching television. Almost 80% of the students had a screen time of more than 3 hours and it hampered their sleeping pattern as is evident by the fact that around two-thirds did not have adequate sleep of 9 hours in this sample. Additionally, students who spent more than 3 hours on screens were found to have a higher prevalence of obesity (82.5%) [Table 2]. In Figure 2, which shows the distribution of the overweight and obese students according to their knowledge about nutrition, it was revealed that out of 355 students, only 176 (49.6%) had information regarding the nutritional content of foods while 208 (58.6%) had no knowledge about the harmful effects of the fast foods consumed. The study [Figure 3] also revealed that the major source of information regarding nutrition was from schools (40%) followed by home (26%).

Discussion

Regular meal consumption is a fundamental dietary recommendation, particularly for children and adolescents.

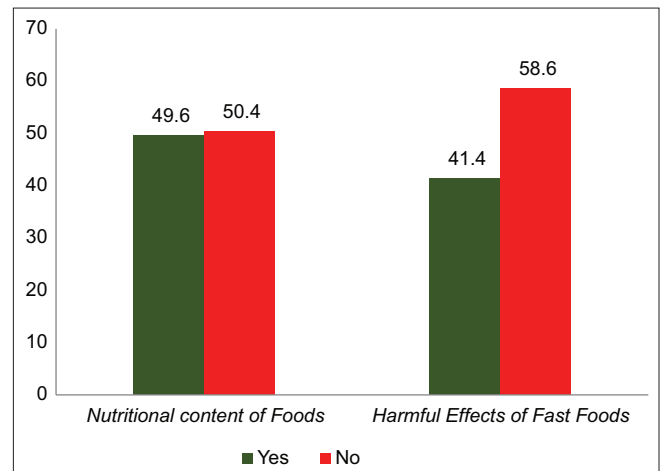


Figure 2: Distribution of students according to their knowledge regarding nutrition

		Screen time below 3 hours	Screen time above 3 hours	Total	OR	CI	P
Eating fast foods while watching TV	Yes	46 (17.0%)	224 (83.0%)	270 (100.0%)	2.1459	1.2258 to 3.7565	$\chi^2=7.343$, $P=0.007$
	No	26 (30.6%)	59 (69.4%)	85 (100.0%)			
Adequate sleep of 9 hours	Yes	24 (21.4%)	88 (78.6%)	112 (100.0%)	0.9026	0.5203 to 1.5657	$\chi^2=1.33$, $P=0.715$
	No	48 (19.8%)	195 (80.2%)	243 (100.0%)			
Overweight	Yes	33 (17.5%)	127 (76.5%)	166 (100.0%)	0.9621	0.5723 to 1.6174	$\chi^2=1.99$, $P=0.158$
	No	39 (23.5%)	156 (82.5%)	189 (100.0%)			

χ^2 =Chi-square test, $P<0.5$ =Statistically significant, $P<0.001$ =Statistically highly significant

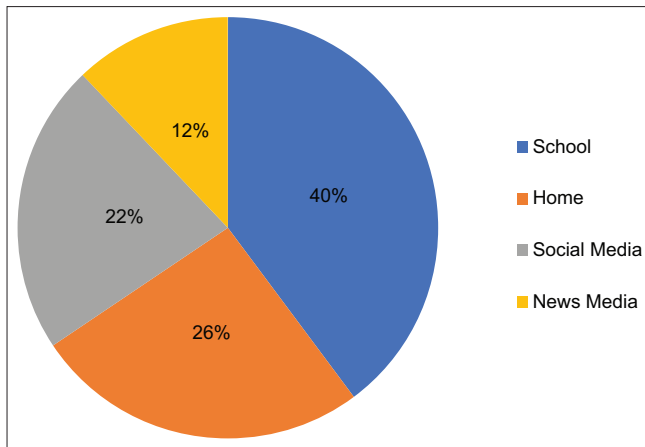


Figure 3: Distribution of overweight and obese according to the source of information about the nutrition

However, there is a concerning trend of meal skipping, notably among school-going children.

In the present study [Table 1], out of the total 355 students, the students who skipped breakfast was 58.3% which is in concordance with the study by Goyal and Julka 2014^[10] in Indore and is statistically significant. However, in another study, skipping breakfast ranged from 7.3% to 13.1%.^[11-13] The difference could be due to difference in geographical setting and the cultural practices present there. It was observed that the reason for skipping breakfast was irregular timings reported by the students, along with the fact that most of the mothers, especially in the working class, encouraged their wards to take their breakfast from the school canteen due to shortage of time. This is a worrying trend, as skipping breakfast can have negative consequences for a child's health and academic performance.

Similarly, it was revealed that 43.7% of students were in the habit of skipping lunch on a daily basis. However, a study by Bhargava *et al.* 2016^[14] showed that 14.3% of students skipped lunch. The data of the present study were not in concordance due to the involvement of only overweight and obese students in the present study. The reason reported by the students was that they consumed heavy snacks (late breakfast) from the canteen which was predominantly junk food and felt no hunger during lunch time. Provision of healthy and affordable lunch options for students at school may address this concerning trend.

Also, the data revealed that skipping dinner observed in the overweight/obese students in the present study [Table 1] was in concordance with the study conducted in Baroda^[10] in 2013. However, in a study,^[14] it was observed that nearly 9% overweight and 5.3% obese out of the total students were in the habit of skipping meals, the results of which are not similar to the present study owing to the involvement of only overweight and obese students in the present study. The reason reported by overweight/obese students was irregular dietary habits shown by the students as most of them preferred eating fried snacks to wholesome foods cooked for dinner.

Preference of fast foods to usual regular meals was observed as 94% in the present study [Table 1] which was statistically significant. In a study by Joseph *et al.* 2012^[6] among school children in Mangalore city, it was reported that as many as 22% of participants preferred fast foods over usual meals which shows a much lower prevalence than the present study due to involvement of different age group, geographical area, and time period in the quoted study. Another similar study^[15] conducted among students in Chandigarh also observed a higher preference for fast foods over regular meals which is almost in concordance with the present study.

Majority, i.e., 59.4%, consumed fast foods on a daily basis as observed in the present study [Table 1] which is in concordance with other studies.^[6,7] However, the results showed that approximately 30% of students had daily fast food consumption^[16,17] in different studies conducted at other places. The variation in findings could be due to differences in study participants, with previous studies focusing on all high school children, while the current study included specifically targeting overweight and obese students.

Excessive screen time causes a shift in a child's lifestyle from an active to a largely sedentary one. In the current study it was revealed that 76.1% of students preferred eating fast foods in front of television whose results are in concordance with the study conducted by Dubey *et al.* 2018^[7] and Shah *et al.* 2019.^[18]

It was revealed in the same table that 79.7% of students spent more than 3 hours in front of screens be it television, mobile, etc., which is almost in concordance with the study conducted by Dubey *et al.* 2018^[7] among adolescent students in Delhi (68%) and was statistically significant. However, in a study conducted by Bhavne *et al.* 2017^[19] among students in Pune, the baseline data revealed that the percentage of students who spent more than 3 hours in front of screens was around 64.7%. The reason for the difference in results is probably because the study period in the quoted study was of longer duration (3 years).

With increased screen usage, the sleep duration among children has reduced drastically where it was seen that only 68.5% of students had inadequate sleep pattern of 9–11 hours. In a study by Mathew *et al.* 2019^[8] in Kerala, 60% of the total participants had an inadequate sleep duration of 9–11 hours which has almost similar results as the present study. Observations revealed that students attributed their adoption of this sleep pattern to early exposure to gadgets.

In Table 2, the study revealed a significant association between students who had improper dietary habits such as consuming fast food while watching television/other media and their increased screen time (83%). Additionally, students who consumed fast food daily tended to have higher screen time, although this was not statistically significant. It was also seen that students who had a screen time of above 3 hours were obese and had inadequate sleep (82.5% and 80%, respectively). The results however were not statistically significant.

Knowledge and attitudes toward nutrition significantly impact childhood growth. Fast food usually consists of high-calorie preparations with harmful effects and children are not usually aware of. The present study stated that 49.6% of the students had knowledge about the nutritional content of food and only 41.4% of the students were aware of the harmful effects of the fast foods consumed from outside which is statistically significant. In other studies,^[15,16] however, the awareness regarding the harmful effects of fast foods ranged from 52% to 65% which could be attributed to the inclusion of different age groups in the quoted study [Figure 2].

As shown in Figure 3, it was observed that 40% and 26% of the overweight/obese students reported that their major source of information was school followed by home (from television commercials), respectively which was found to be statistically significant. However, the results in the study differ from the study conducted by Joseph *et al.* 2012^[6] among school children in Mangalore city due to geographical and time period variations in the quoted study.

Since family physicians are the first contact with the family they can advise parents as well as children about healthy dietary, sleeping habits, avoidance of junk food, and decreasing their screen time so they can be tackled at the primary level.

Strength and Limitation of the Study

Study is limited to only one district in Punjab, and it cannot be extrapolated to the whole country of different socio-cultural practices at different places.

Conclusion

Of the total students of 6–16 years age group studied, it was found that 58.3% of the overweight/obese students skip breakfast while 43.7% and 44.2% skip lunch and dinner, respectively. Students who skip meals and eat unhealthy foods are more likely to be overweight or obese. Increased screen time observed in these students affected their sleep pattern and dietary habits of the students. Being awake for a long odd time leads to increased consumption of foods/snacks. Only 41.4% of the students knew the harmful effects of the foods, hence, level of awareness should be increased.

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Conflicts of interest

There are no conflicts of interest.

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