Research Note
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IMPACT OF TELEVISION ADVERTISEMENTS ON HIGH FAT, SALT, AND SUGAR (HFSS) FOOD CONSUMPTION IN SCHOOL CHILDREN

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India is predicted to have more than 27 million obese children, representing one in 10 children globally, and over half of the obese children in the South East Asian region by 2030 (World Obesity Federation, 2022). A diet high in fat, salt, and sugar (HFSS) is an important modifiable risk factor for childhood obesity and other diet-related non-communicable diseases (Brown *et al.*, 2018).

In a study that evaluated the frequency and typology of food advertisements on popular television channels watched by young school going adolescents in Delhi, it was found that 69.3 per cent of the food item advertisements were of candies, chocolates, or confectionaries and 14.8 per cent were of salty snacks; 85 per cent of the beverage advertisements were of sugar sweetened beverages and 95 per cent of the advertised food outlets were fast food joints (Gupta *et al.*, 2017).The present study was planned with an objective to explore whether television advertisements influence HFSS food consumption in school children.

This cross-sectional study was carried out in a purposively selected English medium private school from urban Vadodara, Gujarat, India. All the children studying from 6th to 12th standard for whom parent's informed consent and child's assent were obtained were enrolled in the study (n=378). An online self-administered pre-tested questionnaire was circulated among the children. Data on background information, self-reported anthropometric measurements, HFSS food consumption (previous 24-hour consumption, sources of information, reasons for consumption), spending of pocket money and television advertisement properties was collected.

Nutritional status assessment of children using anthropometric measurements was done with the help of WHO AnthroPlus software based on WHO reference 2007 for children aged 5-19 years. Age (months), height (cm) and weight (Kg) values were entered and Z-scores for the Body Mass Index (BMI)-for-age indicator were derived with the help of the software. Nutritional status was classified as severe thinness (<-3SD), thinness (≥ -3SD to <-2SD), normal (≥ -2SD to ≤+1SD), overweight (>+1SD to ≤ +2SD) and obesity (>+2SD) for BMI-for-age. Results are expressed as Mean ± S.D and percentages. The study was approved by the Institutional Ethics Committee for Human Research (No. IECHR/FCSc/2020/50).

A total of 378 children (208 girls and 170 boys) submitted their responses. The mean age of the children was 14.4 ± 2.04 years (Age range: 10-19 years). Anthropometric

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measurements were obtained for 319 children. Based on their nutritional status, around 5.3 per cent children were in the thin category, 61.1 per cent in the normal category, 26 per cent in the overweight category and 7.5 per cent in the obese category. The prevalence of overweight (28.8% vs. 23.6%) and obesity (11.6% vs. 4%) was higher among boys as compared to girls.

Around 70.6 per cent, 81.7 per cent, 73.2 per cent and 83.3 per cent of thin, normal, overweight, and obese children reported HFSS food consumption in the previous 24 hours respectively. Around 44.9 per cent, 23.5 per cent, and 31.6 per cent children reported consumption of one, two, and three or more HFSS food products in the previous 24 hours respectively. In Rohtak, Haryana, around 84.5 per cent school children reported consumption of junk food in the last 24 hours with two or more junk food items being consumed by 54.5 per cent of the children (Agrawal *et al.*, 2019). Around 58.1 per cent, 47.8 per cent, 21.3 per cent, and 20.6 per cent children reported consumption of food items high in salt and fat, high in fat, high in sugar and fat, and high in sugar respectively (Table 1).

Majority of the children (67.5%) reported getting information about HFSS food items from television advertisements (Table 2). Friends, internet, and the social media were information sources for 45.1 per cent, 44.3 per cent and 37.0 per cent of the children respectively. Adolescents from across six countries have reported exposure to unhealthy food advertisements in the past 30 days to be highest on television and digital media (Demers-Potvin *et al.*, 2022).

When asked whether they like to try out the new food products shown in television advertisements, 59.1 per cent of the children replied in the affirmative. Around 52.1 per cent children reported that they try out the new food products shown in television advertisements within a month. In the China health and nutrition survey, children's request and purchase of television advertised foods were positively associated with children's overweight/obesity and dietary intake of energy, protein, fat and carbohydrate (Xian *et al.*, 2021).

Taste (94.9%), easy accessibility (14.9%) and time saving (as they are easy to eat) (9.1%) were the predominant reasons reported by the children for consumption of HFSS foods. In Puducherry, a school-based study found that the leading self-perceived reasons for unhealthy eating habits among adolescents were taste of junk/fast foods, increased online food delivery, attractive advertisements, negative peer influences and, easy readymade food preparations (Nancy *et al.*, 2022).

Table 1. Consumption of HFSS food items according to HFSS category in the last 24 hours

(n=272)

S.No.	Category	Yes		No	
		Frequency	Percentage	Frequency	Percentage
1	Food high in fat	130	47.8	142	52.2
2	Food high in sugar and fat	58	21.3	214	78.7
3	Food high in sugar	56	20.6	216	79.4
4	Food high in salt and fat	158	58.1	114	41.9
5	Food high in salt	27	9.9	245	90.1

Table 2. Sources of information about HFSS food (n=357)

S.No.	Sources of information about HFSS food	Frequency	Percentage
1	Television advertisements	241	67.5
2	Parents/Siblings/Relatives	72	20.2
3	Friends	161	45.1
4	Social Media	132	37.0
5	Flyers/newspaper	65	18.2
6	Internet	158	44.3
7	Others	4	1.1

Around 33.1 per cent children reported receiving pocket money. Majority of the children (49.6%) spent their pocket money on buying food items followed by books/ magazines (39.1%) (Table 3). A cross-sectional study on Thai adolescents found that among underweight adolescents, higher snack consumption was associated with receiving a higher daily allowance and among overweight and obese adolescents, higher daily pocket money was associated with increased consumption of processed foods (Kunset *et al.*, 2023).

Table 4 shows data on various television advertisement properties that attract children's attention. Most of the children reported that they were attracted by the humour element (41.9%) in the advertisements, followed by animation (41.3%), visual and special effects (38.3%), and music/advertisement jingles (31.3%).

To conclude, around 31.6 per cent children in the present study reportedly consumed three or more HFSS food products in the previous 24 hours. Television advertisements were the major source of information about HFSS food items for 67.5 per cent of the children. New food products shown in television advertisements were tried out within a month by 52.1 per cent of the children. HFSS food attributes like taste (94.9%) and easy accessibility (14.9%) were driving factors for HFSS food intake among these children. Pocket money received was spent by most of the children (49.6%) on buying food items. Television advertisement properties like humour (41.9%), animation (41.3%), visual and special effects (38.3%), and music/ advertisement jingles (31.3%) were found to

Table 3.Information onspending of pocket money by the children (n=115)

S.No.	Spending ofpocket money	Frequency	Percentage
1	Food	57	49.6
2	Video games	9	7.8
3	Music/Movies (CD/DVD)	6	5.2
4	Movies at a theatre	13	11.3
5	Books/Magazine	45	39.1
6	Saving money or buying other items	44	38.3

Table 4.Television advertisement properties attracting children's attention (n=332)

S.No.	Properties	Frequency	Percentage
1	Humor	139	41.9
2	Animation	137	41.3
3	Endorsement by celebrities or sports persons	46	13.9
4	Premium offers like free gifts, discounts etc.	64	19.3
5	Visuals and special effects	127	38.3
6	Music / Advertisement jingles	104	31.3
7	Others	2	0.6

attract children's attention. The results indicate regular consumption of HFSS foods by the children which may lead to poor growth outcomes. Hence, children need to be sensitized about the possible health consequences of consuming HFSS food and should be encouraged to make healthy lifestyle choices. It is necessary to implement and enforce existing laws to regulate the advertising of HFSS foods. Additionally, healthy food advertising needs to be promoted. Promoting healthy food consumption behaviours along with regular physical activity through the medium of television could help in addressing the rapidly growing childhood obesity problem and its associated health risks.

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