Indian Journal of Youth and Adolescent Health
Volume 10, Issue 4 - 2023, Pg. No. 28-35
Peer Reviewed & Open Access Journal

Research Article

Knowledge, Attitude and Behaviour Toward Food Advertising and its Relationship with Nutritional Status among Indian Adolescent Girls Residing in Riyadh

Fatima Qadri[1], Mesa Aruna[2], Layam Anitha[3]

[1]Sri Padmavati Mahila Visvavidyalayam, Tirupati, Andhra Pradesh, India.
[2,3]Department of Home Science, Sri Padmavati Mahila Visvavidyalayam, Tirupati, Andhra Pradesh, India.
DOI: https://doi.org/10.24321/2349.2880.202314

I N F O

Corresponding Author:
Fatima Qadri, Sri Padmavati Mahila Visvavidyalayam, Tirupati, Andhra Pradesh, India.
E-mail Id:
far.qadri18@gmail.com
Orcid Id:
https://orcid.org/0000-0002-8178-2627
How to cite this article:
Qadri F, Aruna M, Anitha L. Knowledge, Attitude and Behaviour Toward Food Advertising and its Relationship with Nutritional Status among Indian Adolescent Girls Residing in Riyadh. Ind J Youth Adol Health. 2023;10(4):28-35.

Date of Submission: 2023-10-18
Date of Acceptance: 2023-11-23

A B S T R A C T

Introduction: In light of several studies highlighting the role of advertisements in the aetiology of obesity, this study aims to examine the knowledge, attitude and behaviour toward food advertisements and its relationship with the nutritional status of adolescent Indian girls residing in Riyadh, Saudi Arabia.

Method: A cross-sectional study was conducted among 221 Indian expatriate adolescent girls residing in Riyadh, Saudi Arabia. Data regarding knowledge and attitude towards food advertisements was collected using Diehl's questionnaire. Self-reported height and weight were used to assess the nutritional status.

Results: The mean BMI of the study sample was found to be 21.42 ± 3.47. The total mean score for the dimensions of credibility and usefulness, suspiciousness towards food advertisements, and entertainment factor were -1.61 ± 2.96, 1.75 ± 3.09, and 1.35 ± 2.72, respectively. The dimension of credibility and usefulness was found to be significantly associated with nutritional status ($p = 0.002$) and was significantly different between early and middle-aged adolescents ($p = 0.012$). The frequency of viewing unhealthy food advertisements was also significantly related to the age groups ($p = 0.031$).

Conclusion: The dimension of credibility and usefulness of advertisements was found to be important in relation to nutritional status. Further studies are needed to determine how advertisements impact nutritional status.

Keywords: Food Marketing, Teenagers, Obesity, Overweight, Awareness

Introduction

Obesity is a critical public health issue among children and adolescents demonstrating a staggering eightfold increase in the global prevalence among the age group of 5- to 19-year-olds between 1975 and 2016 reaching nearly 5.6% and 7.8% among girls and boys respectively.[1] This is alarming given the evidence linking adolescent obesity with a variety of adverse health outcomes including menstrual irregularities in girls,[2,3] obstructive sleep apnea,[2,4] prediabetes, type 2 diabetes, high cholesterol levels, and hypertension.[2,5]

Obesity occurs as a result of complex multiple factors on various levels including individual-level genetic and biological factors as well as behavioural and environmental factors, including advertisements.[6–9] Specific to advertisements, an estimated $1.8 billion is spent on food advertising annually out of which nearly 80% is spent on promoting foods high in saturated fat, trans fat, sugar, and sodium.[10] Content analysis of advertisements conducted in different countries has revealed worrying results.[11,12] In India, Sukumaran et al. recorded 128 hours of two Tamil television channels and found that advertisements made up 10.15% of the total time and sugar-rich foods accounted for 50.36% of the advertisement time.[13] In the Saudi Arabian context, Al-Jaaly reported that 21.5% of the advertisements belonged to the food and drinks category. The maximum duration was allotted for meat and meat product advertisements (82.5 ± 43.3 seconds) while fruit and nut advertisements had the least broadcast time (16.3 ± 6.5 seconds). The leading categories of food advertised on three channels included milk and milk products (n = 214, 19.4%), followed by sugars, preserves and confectionery (n = 198, 18.0%).[14]

Thus, the food marketing industry has come under criticism since exposure to food advertisements has been suggested to influence nutritional knowledge, food preference, purchasing behaviour, eating habits, and diet-related health.[15] Advertisement viewing was found to significantly impact body mass index in children and adolescents,[16,17] and was found to be associated with a higher prevalence of dental caries.[18] This has been suggested to be a result of increased purchasing of unhealthy food items such as fried foods, snacks and sweets after advertisement viewing.[19] Moreover, as advertisements have penetrated across different media, there has been an increased exposure to food advertisements, particularly among adolescents, since they have access to a larger variety of media tools such as television, smartphones, internet, and social media.[20,21] Additionally, several marketing strategies have been employed by the food advertisers to promote the consumption of unhealthy foods such as claims of enhanced performance in sports or school,[22] use of cartoon characters,[23] price incentives, free gifts, and celebrity endorsements.[14] It appears that children and adolescents are more vulnerable than adults to the effects of the persuasive techniques used by food marketers.[24–26] Moreover, according to Thai et al. adolescents who positively perceived and trusted advertisements, were more likely to consume foods such as candies and sugar-sweetened beverages.[27]

Since factors related to the obesogenic environment (through food advertisements) can be modified, they play an important role in obesity prevention.[28] Thus, the present study examines the knowledge, attitude and behaviour toward food advertisements of adolescent Indian girls residing in Riyadh, Saudi Arabia in relation to their nutritional status. Information related to this will enable the development of tailored interventions related to obesity prevention among the target population.

Method

A cross-sectional study was conducted among 221 Indian expatriate adolescent girls residing in Riyadh, Saudi Arabia using convenience sampling technique.

Parental consent was required for each girl to be included in the study. Other than providing informed consent, the eligibility criteria were girls aged between 10 and 17 years, residents of Riyadh city, Indian nationality, and studying in Indian schools in Riyadh. The exclusion criteria consisted of male gender, girls that were younger than 10 years and older than 17 years, students of non-Indian nationality, and residents of places other than Riyadh.

Study Instrument

The study tool consisted of a self-administered questionnaire in the English language with close-ended questions. The first section included questions related to sociodemographic characteristics such as age, nationality, years of residence in Saudi Arabia, family size, height (in centimetres) and weight (in kilograms).

Knowledge and attitude toward food advertisements were assessed using the shortened version of the tool developed and validated by Diehl.[29,30] The instrument consists of three dimensions. The first dimension is related to the credibility and usefulness of food advertisements. If the respondents consider TV advertisements as a good way to learn about food and drinks, they are more likely to trust what they are being told. The second dimension is concerned with the suspiciousness towards food advertisements and assumes that children who are suspicious of food advertisements on television are aware of the fact that not all information can be trusted, and are therefore more likely to question the advertising content.[29] The third dimension is about the entertainment factor of advertisements. According to Diehl, children with higher suspicion and lower trust in the credibility of television commercials may find

ISSN: 2349-2880
DOI: https://doi.org/10.24321/2349.2880.202314

advertisements less enjoyable than children with lower levels of suspicion.[30] This implies that when children become more aware of how advertising works, they may not find commercials as enjoyable as before.[31] Overall, children's knowledge related to food advertising is evaluated based on the credibility and usefulness dimension as well as the entertainment factor while attitude is assessed based on the suspiciousness dimension. The response was measured on a four-point scale i.e., "disagree fully" (-2), "disagree somewhat" (-1), "agree somewhat" (+1), and "agree fully" (+2).[30,31]

To examine the behaviour related to food advertisements, two questions were asked. The first question asked the frequency of viewing advertisements related to unhealthy foods such as fast food, soft drinks and snacks and the second question asked the frequency of purchasing unhealthy foods after viewing advertisements. The responses were measured using a five-point scale ranging from "never" to "always".

Nutritional status was measured in terms of Body Mass Index (BMI) using self-reported height and weight. Participants were asked to enter their height (in centimetres) and weight (in kilograms). BMI was interpreted using the Centers for Disease Control and Prevention growth charts percentiles for sex and age; the BMI level was categorised as underweight if the percentile < 5th, normal weight if between 5th and < 85th, overweight if between 85th and < 95th, or obese if 95th or greater.[32]

Administration of the Questionnaire

An online version of the questionnaire was developed and administered via SurveyMonkey. The survey invitation was sent by the designated grade supervisor who forwarded it to each class WhatsApp group.

Study Variables

The outcome variable was adolescent nutritional status in terms of body mass index (BMI). The independent variables included the sociodemographic factors, knowledge, attitude, and behaviour related to food advertisements.

Statistical Analysis

Data were analysed using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean ± standard deviation and categorical variables were expressed as percentages. Kruskal-Wallis Test was used for continuous variables. The chi-square test was used for categorical variables. A p value < 0.05 was considered statistically significant.

Ethical Considerations

Ethical clearance for this study was obtained by the ethical review committee of Sri Padmavati Mahila Visvavidyalayam, Andhra Pradesh, India. Informed consent was taken from the parents of the adolescent girls prior to participating in the study where complete information regarding the purpose of the study was given.

Results

A total of 221 girls participated in the study. Table 1 depicts the sociodemographic characteristics as well as the nutritional status of the study sample. The majority of the participants belonged to the age group of middle adolescence (n = 136, 61.5%), while 38.5% (n = 85) were in the early adolescence age group. All the participants were Indian nationals (n = 221, 100%), with more than half (n = 127, 57.5%) having lived in Saudi Arabia for 11–15 years, and only 6.8% (n = 15) having lived there for 0–5 years. Regarding family size, the majority (n = 121, 54.7%) had 4–5 family members.

With regard to nutritional status, the majority of the participants (n = 155, 70.1%) were of normal weight. 22.1% of the participants (n = 49) were overweight, 5% (n = 11) were found to be obese, and 2.7% (n = 6) were underweight. The mean BMI of the study sample was 21.42 ± 3.47.

Table 1.Sociodemographic Characteristics of Participants

Characteristics	Values	Number	Percentage
Age distribution (years)	Early adolescence (10–13)	85	38.5
	Middle adolescence (14–17)	136	61.5
Nationality	Indian	221	100.0
Years in KSA	0–5	15	6.8
	6–10	58	26.2
	11–15	127	57.5
	> 15	21	9.5
Total no. of family members	< 4	86	38.9
	4–5	121	54.7
	> 5	14	6.3
Nutritional status	Underweight	6	2.7
	Normal	155	70.1
	Overweight	49	22.2
	Obese	11	5.0

KSA: Kingdom of Saudi Arabia

ISSN: 2349-2880
DOI: https://doi.org/10.24321/2349.2880.202314

As seen in Table 2, with regard to the attitude towards advertisements, the total mean score of the credibility and usefulness dimension was -1.61 ± 2.96, suspiciousness towards food advertisements scored 1.75 ± 3.09 while the dimension related to entertainment factor scored 1.35 ± 2.72.

Table 3 shows the association between nutritional status and attitude towards advertisements. A significant association was found between nutritional status and the dimension of credibility and usefulness (p = 0.002) but no significant association was seen between nutritional status and the dimensions of suspiciousness towards food advertisements and entertainment factor of advertisements (p values 0.093 and 0.145, respectively).

Table 4 shows the association between age group and attitude towards advertisements. There was a significant association between age group and the dimension of credibility and usefulness (p = 0.012) but there was no significant association of age group with dimensions of suspiciousness towards food advertisements and entertainment factor of advertisements (p values 0.258 and 0.210, respectively).

As seen in Table 5, the majority of the participants (n = 68, 30.8%) reported viewing unhealthy food advertisements sometimes, followed by 24.9% (n = 55) responding rarely. Only 7.2% (n = 16) responded always. Regarding the frequency of purchasing unhealthy foods after viewing advertisements, a majority of the participants (n = 80, 36.2%) reported never while almost an equal number (n = 77, 34.8%) reported rarely. Only 2 participants (0.9%) responded always.

With regard to the association between nutritional status and behaviour related to advertisements, no significant relationship was found between nutritional status and frequency of viewing unhealthy food advertisements and frequency of purchasing unhealthy foods after viewing advertisements (p values 0.483 and 0.954, respectively) (Table 6).

Table 2.Mean Score of the Dimensions of the Attitude towards Advertisements

Dimensions	Mean	Standard Deviation
Credibility and usefulness	-1.61	2.96
Suspiciousness towards food advertisements	1.75	3.09
Entertainment factor of advertisements	1.35	2.72

Table 3.Association between Nutritional Status and Attitude towards Advertisements

Dimensions of the Attitude towards Advertisements	Nutritional Status								p Value
	Underweight		Normal		Overweight		Obese		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Credibility and usefulness	2.17	1.94	-1.76	2.89	-1.45	3.10	-2.18	2.60	0.002*
Suspiciousness towards food advertisements	-0.83	1.72	1.99	3.02	1.33	3.25	1.64	3.29	0.093
Entertainment factor of advertisements	2.83	2.79	1.19	2.79	1.82	2.54	0.64	2.16	0.145

*Significant p value

Table 4.Association between Age Group and Attitude towards Advertisements

Dimensions of the Attitude towards Advertisements	Age Group				p Value
	Early Adolescence (10–13 Years)		Middle Adolescence (14–17 Years)		
	Mean	SD	Mean	SD	
Credibility and usefulness	-0.94	3.07	-2.02	2.83	0.012*

ISSN: 2349-2880
DOI: https://doi.org/10.24321/2349.2880.202314

Suspiciousness towards food advertisements	1.47	3.09	1.93	3.08	0.258
Entertainment factor of advertisements	1.08	2.82	1.51	2.66	0.210

*Significant p value

Table 5.Behaviour related to Advertisements

Behaviour related to Advertisements	Values	Number	%
Frequency of viewing unhealthy food advertisements	Never	41	18.6
	Rarely	55	24.9
	Sometimes	68	30.8
	Very often	41	18.6
	Always	16	7.2
Frequency of purchasing unhealthy foods after viewing advertisements	Never	80	36.2
	Rarely	77	34.8
	Sometimes	50	22.6
	Very often	12	5.4
	Always	2	0.9

Table 6.Association between Nutritional Status and Behaviour related to Advertisements

Behaviour related to Advertisements	Values	Nutritional Status								p Value
		Underweight		Normal		Overweight		Obese		
		Number	%	Number	%	Number	%	Number	%	
Frequency of viewing unhealthy food advertisements	Never	0	0.00	28	18.06	9	18.37	4	36.36	0.483
	Rarely	1	16.67	41	26.45	12	24.49	1	9.09	
	Sometimes	3	50.00	49	31.61	14	28.57	2	18.18	
	Very often	1	16.67	28	18.06	8	16.33	4	36.36	
	Always	1	16.67	9	5.81	6	12.24	0	0.00	
Frequency of purchasing unhealthy foods after viewing advertisements	Never	3	50.00	55	35.48	18	36.73	4	36.36	0.954
	Rarely	2	33.33	54	34.84	17	34.69	4	36.36	
	Sometimes	1	16.67	37	23.87	9	18.37	3	27.27	
	Very often	0	0.00	7	4.52	5	10.20	0	0.00	
	Always	0	0.00	2	1.29	0	0.00	0	0.00	

Table 7.Association between Age Group and Behaviour related to Advertisements

Behaviour related to Advertisements	Values	Age Group				p Value
		Early Adolescence (10–13 Years)		Middle Adolescence (14–17 Years)		
		Number	%	Number	%	
Frequency of viewing unhealthy food advertisements	Never	17	20.0	24	17.6	0.031*
	Rarely	26	30.6	29	21.3	
	Sometimes	16	18.8	52	38.2	
	Very often	17	20.0	24	17.6	
	Always	9	10.6	7	5.1	

ISSN: 2349-2880
DOI: https://doi.org/10.24321/2349.2880.202314

Frequency of purchasing unhealthy foods after viewing advertisements	Never	37	43.5	43	31.6	0.215
	Rarely	25	29.4	52	38.2	
	Sometimes	20	23.5	30	22.1	
	Very often	2	2.4	10	7.4	
	Always	1	1.2	1	0.7	

*Significant p value

Regarding the association between age group and behaviour related to advertisements, a significant association was seen between the frequency of viewing unhealthy food advertisements and the age groups (p = 0.031). No significant relationship was found between the frequency of purchasing unhealthy foods after viewing advertisements and age group (p = 0.215) (Table 7).

Discussion

The present study revealed the mean BMI of the study sample to be 21.42 ± 3.47 (kg/m^2) with the majority of the participants (70.1%) having a normal weight. However, 22.1% of the participants were overweight, 5% were obese and 2.7% were underweight. In comparison to the local Saudi adolescent girls, Al Baker et al. conducted a study among 6 to 19-year-old students in the Eastern Province and reported 43.6% of the female participants to be normal weight, while 30.5%, 15.1%, and 10.8% of the participants were underweight, overweight, and obese respectively.[33]

Regarding the findings from Diehl's instrument, knowledge regarding food advertisements, as assessed from the mean score of credibility and usefulness dimension was found to be -1.61 ± 2.96 (indicating more distrust in advertisements) and was significantly related to nutritional status (p = 0.002) and significantly different between early and middle-aged adolescents (p = 0.012). However, with regard to knowledge in terms of entertainment factor, there was more agreement with statements (indicating the participants considered advertisements enjoyable) with a higher mean score among middle adolescents as compared to early adolescents (1.51 ± 2.66 vs 1.08 ± 2.82). Relevantly, a qualitative study among university students in Jeddah, Saudi Arabia reported passing time/ enjoyment as a sought gratification from advertisements by young adults.[34] Thus, it is important to increase awareness regarding the harmful effects of advertisements (particularly regarding the entertainment factor) in relation to healthy eating from an early age.

Attitude related to advertisements was assessed from the mean score of suspiciousness toward advertisements (1.75 ± 3.09) where more participants agreed and, thus, were sceptical about the advertising content. From a public policy point of view, scepticism towards advertisements is beneficial because it suggests that teens are confident enough to use their judgment to identify misleading claims in advertisements.[35]

With regard to behaviour, a significant difference between early and middle-aged adolescents was found with regard to the frequency of viewing unhealthy food advertisements (p = 0.031) with more early adolescents (50.6%) reporting the frequency as 'never' or 'rarely' as compared to middle adolescents (38.9%). This finding must be explored further in relation to accessibility to social media, internet and parental control among older adolescents which may be responsible for the behaviour.

Moreover, a significant association was found between nutritional status and the dimension of credibility and usefulness (p = 0.002). Furthermore, the credibility and usefulness dimension was found to be significantly associated with the age group of the participants (p = 0.012) with lower agreement seen in middle adolescence. Taken together, lower agreement related to the usefulness and credibility of advertisements may be due to the age-related increase in cognitive development among adolescents.[36]

This study has limitations in terms of small sample size and convenience sampling. Moreover, owing to its cross-sectional nature, the study findings are not generalisable. Nevertheless, the study will help shape nutritional and health promotion programs by highlighting the role of advertisements in the spread of obesity.

Recommendations

Further studies with a larger sample size and inclusion of male participants are needed. Moreover, the influence of accessibility to media tools including social media and internet usage must be studied closely, especially with regard to social media advertisements.

Conclusion

This study shows, with regard to knowledge, that the credibility and usefulness dimension is significantly related to the nutritional status and differs significantly between the early and middle-aged adolescents. Moreover, the frequency of viewing unhealthy food advertisements was shown to be significantly different among early and middle-aged adolescents.

Acknowledgements

The authors would like to thank all the students who

participated in this study.

Source of Funding: None

Conflict of Interest: None

References

1. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents, and adults. Lancet. 2017;390(10113):2627-42. [PubMed] [Google Scholar]
2. Gurnani M, Birken C, Hamilton J. Childhood obesity: causes, consequences, and management. Pediatr Clin North Am. 2015;62(4):821-40. [PubMed] [Google Scholar]
3. Witchel SF, Burghard AC, Tao RH, Oberfield SE. The diagnosis and treatment of PCOS in adolescents: an update. Curr Opin Pediatr. 2019;31(4):562-9. [PubMed] [Google Scholar]
4. Marcus CL, Brooks LJ, Draper KA, Gozal D, Halbower AC, Jones J, Schechter MS, Sheldon SH, Spruyt K, Ward SD, Lehmann C, Shiffman RN; American Academy of Pediatrics. Diagnosis and management of childhood obstructive sleep apnea syndrome. Pediatrics. 2012;130(3):576-84. [PubMed] [Google Scholar]
5. Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS. Childhood obesity: causes and consequences. J Family Med Prim Care. 2015;4(2):187-92. [PubMed] [Google Scholar]
6. Lytle LA. Examining the etiology of childhood obesity: The IDEA study. Am J Community Psychol. 2009;44(3-4):338-49. [PubMed] [Google Scholar]
7. Kostovski M, Tasic V, Laban N, Polenakovic M, Danilovski D, Gucev Z. Obesity in childhood and adolescence, genetic factors. Pril (Makedon Akad Nauk Umet Odd Med Nauki). 2017;38(3):121-33. [PubMed] [Google Scholar]
8. Jebeile H, Kelly AS, O'Malley G, Baur LA. Obesity in children and adolescents: epidemiology, causes, assessment, and management. Lancet Diabetes Endocrinol. 2022;10(5):351-65. [PubMed] [Google Scholar]
9. Coleman PC, Hanson P, van Rens T, Oyebode O. A rapid review of the evidence for children's TV and online advertisement restrictions to fight obesity. Prev Med Rep. 2022;26:101717. [PubMed] [Google Scholar]
10. Powell LM, Schermbeck RM, Chaloupka FJ. Nutritional content of food and beverage products in television advertisements seen on children's programming. Child Obes. 2013;9(6):524-31. [PubMed] [Google Scholar]
11. Zhou Z, Diao Q, Shao N, Liang Y, Lin L, Lei Y, Zheng L. The frequency of unhealthy food advertising on mainland Chinese television (TV) and children and adolescents' risk of exposure to them. PLoS One. 2015;10(7):e0128746. [PubMed] [Google Scholar]
12. Morgan M, Fairchild R, Phillips A, Stewart K, Hunter L. A content analysis of children's television advertising: focus on food and oral health. Public Health Nutr. 2009;12(6):748-55. [PubMed] [Google Scholar]
13. Sukumaran A, Diwakar MP, Shastry SM. A content analysis of advertisements related to oral health in children's Tamil television channels–a preliminary report. Int J Paediatr Dent. 2012 May;22(3):232-8. [PubMed] [Google Scholar]
14. Al-Jaaly E. Food advertising watched by adolescent girls in Saudi Arabia. Int J Food Nutr Public Health. 2012;5(4):249. [Google Scholar]
15. Cairns G, Angus K, Hastings G, Caraher M. Systematic reviews of the evidence on the nature, extent and effects of food marketing to children. A retrospective summary. Appetite. 2013;62:209-15. [PubMed] [Google Scholar]
16. Pourmoradian S, Ostadrahimi A, Bonab AM, Roudsari AH, Jabbari M, Irandoost P. Television food advertisements and childhood obesity: a systematic review. Int J Vitam Nutr Res. 2021;91(1-2):3-9. [PubMed] [Google Scholar]
17. Dikmen D, Bellikci-Koyu E, Isgin-Atici K, Inan-Eroglu E, Akyol A, Ayaz A, Nergiz-Unal R, Buyuktuncer Z. Cross-sectional evaluation of food items preferred by adolescents under the influence of television advertisements. J Res Health Sci. 2021;22(1):e00539. [PubMed] [Google Scholar]
18. Kearney J, Fitzgerald R, Burnside G, Higham S, Flannigan N, Halford JC, Boyland EJ. Television advertisements for high-sugar foods and beverages: effect on children's snack food intake. Br J Nutr. 2021;125(5):591-7. [PubMed] [Google Scholar]
19. Delfino LD, Tebar WR, Silva DA, Gil FC, Mota J, Christofaro DG. Food advertisements on television and eating habits in adolescents: a school-based study. Rev Saude Publica. 2020;54:55. [PubMed] [Google Scholar]
20. Potvin Kent M, Pauzé E, Roy EA, de Billy N, Czoli C. Children and adolescents' exposure to food and beverage marketing in social media apps. Pediatr Obes. 2019;14(6):e12508. [PubMed] [Google Scholar]
21. Anderson M, Jiang J. Teens, social media & technology 2018. Pew Research Center; 2018. p. 1673-89. [Google Scholar]
22. Oyero O, Salawu A. A thematic analysis of children's food commercials on Nigerian TV stations. J Commun. 2014;5(2):85-94. [Google Scholar]
23. Connor SM. Food-related advertising on preschool television: building brand recognition in young viewers. Pediatrics. 2006;118(4):1478-85. [PubMed] [Google Scholar]
24. Boyland EJ, Nolan S, Kelly B, Tudur-Smith C, Jones A,

Halford JC, Robinson E. Advertising as a cue to consume: a systematic review and meta-analysis of the effects of acute exposure to unhealthy food and nonalcoholic beverage advertising on intake in children and adults. Am J Clin Nutr. 2016;103(2):519-33. [PubMed] [Google Scholar]
25. Bruce AS, Pruitt SW, Ha OR, Cherry JB, Smith TR, Bruce JM, Lim SL. The influence of televised food commercials on children's food choices: evidence from ventromedial prefrontal cortex activations. J Pediatr. 2016;177:27-32. e1. [PubMed] [Google Scholar]
26. Story M, French S. Food advertising and marketing directed at children and adolescents in the US. Int J Behav Nutr Phys Act. 2004;1(1):3. [PubMed] [Google Scholar]
27. Thai CL, Serrano KJ, Yaroch AL, Nebeling L, Oh A. Perceptions of food advertising and association with consumption of energy-dense nutrient-poor foods among adolescents in the United States: results from a national survey. J Health Commun. 2017;22(8):638-46. [PubMed] [Google Scholar]
28. Lawlor DA, Benfield L, Logue J, Tilling K, Howe LD, Fraser A, Cherry L, Watt P, Ness AR, Davey Smith G, Sattar N. Association between general and central adiposity in childhood, and change in these, with cardiovascular risk factors in adolescence: prospective cohort study. BMJ. 2010;341:c6224. [PubMed] [Google Scholar]
29. Diehl JM, Hopf A. Fernsehen, süßwarenkonsum und übergewicht bei jugendlichen an allgemein- und berufsbildenden schulen. Gießen: Fachbereich Psychologie, Justus-Liebig-Universität Gießen; 2004. German.
30. Diehl JM. Macht Werbung dick? Einfluss der lebensmittelwerbung auf kinder und jugendliche. Ernahr Umsch. 2005;52(2):40-6. German.
31. Gwozdz W, Reisch LA. Instruments for assessing the role of commercials on children's food choices. In: Bammann K, Lissner L, Pigeot I, Ahrens W, editors. Instruments for health surveys in children and adolescents. Springer; 2019. p. 209-30. [Google Scholar]
32. National Center for Health Statistics [Internet]. Clinical growth charts; [cited 2021 Jun 3]. Available from: https://www.cdc.gov/growthcharts/clinical_charts.htm
33. Albaker W, Saklawi R, Bah S, Motawei K, Futa B, Al-Hariri M. What is the current status of childhood obesity in Saudi Arabia?: evidence from 20,000 cases in the Eastern Province: a cross-sectional study. Medicine (Baltimore). 2022;101(27):e29800. [PubMed] [Google Scholar]
34. Alhothali GT, Aljefree NM. Young adults' sought gratifications from, and perceptions of food advertising by, social media influencers: a qualitative approach. J Health Popul Nutr. 2023;42(1):103. [PubMed] [Google Scholar]
35. Boush DM, Friestad M, Rose GM. Adolescent skepticism toward TV advertising and knowledge of advertiser tactics. J Consum Res. 1994;21(1):165-75. [Google Scholar]
36. Reisch LA, Gwozdz W, Barba G, De Henauw S, Lascorz N, Pigeot I. Experimental evidence on the impact of food advertising on children's knowledge about and preferences for healthful food. J Obes. 2013;2013:408582. [PubMed] [Google Scholar]

ISSN: 2349-2880
DOI: https://doi.org/10.24321/2349.2880.202314