

Exploring The Mediating Role Of Junk Food Advertisements In The Relationship Between Malnutrition And Cognitive Development In Children

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Abstract

Background: Malnutrition is a major public health issue in India, affecting a large proportion of children. It leads to stunted growth, weakened immune systems, and negatively impacts a child's learning abilities. Studies have shown that television advertisements for junk foods can have a significant impact on children's food attitudes, preferences, and choices, which can negatively affect children's nutrition needs. **Objectives:** This study shows how television advertisements of junk food items influence children's malnutrition and their learning skills by exploring the relationship between them and what makes children so vulnerable to the promotion of unhealthy food. Then, the paper explores how regulations and parenting cultures can be utilized to mitigate the possible negative impact of food promotions on the health of children. **Methods:** The area of the study chosen for the data collection was the Chennai district and the cluster sample taken, there are 187 children from the age group of 11-15 were selected. Further, conduct univariate and multivariate analyses for understanding the causes, and relationships among the factors of the study. **Findings:** The study noted that, an indirect effect of both factors mediated by advertisements for junk foods. A study into the relationship between malnutrition and the cognitive skills of children holds a number of implications in the current era, therefore managing the nutrition of children is evolved with new dimensions.

Keywords: Junk-food, advertising, malnutrition, cognitive development, children

Introduction

Today's children, between the ages of 4 and 15, are spending a significant amount of time-consuming different types of media, including television, mobile phones, and gaming screens.

Unfortunately, most children cannot differentiate between programming and advertising, while those below 8 do not grasp the persuasive intent of advertising. This type of advertising is inherently exploitative, taking advantage of children's inability to discern and understand its intent. Advertising aimed at children can have a lasting effect on their memory, with children able to recall content from ads they have seen. Even with a single exposure, product preference can be formed and further strengthened with repeated exposures. Children's product preferences significantly impact their product purchase requests, which in turn influence their parents' purchasing decisions. Research has revealed a strong link between increased advertising for non-nutritious foods and the rise in childhood malnutrition rates. These advertisements often promote foods that are high in sugar, salt, and unhealthy fats, leading to poor dietary habits and an increased risk of obesity and related health problems. Children who are exposed to a high volume of junk food advertisements may experience cognitive effects such as poor memory, reduced impulse control, and lower academic performance. Additionally, consuming excessive amounts of sugar and unhealthy fats can negatively impact brain function, including memory, attention, and learning. Moreover, when children are frequently exposed to junk food advertisements, they can become desensitized to them, making it harder for them to recognize healthy food choices. This can lead to a cycle of poor nutrition habits that are difficult to break. Therefore, it is essential to promote healthy eating habits and limit children's exposure to junk food advertisements. Parents, educators, and policymakers can work together to create a healthier food environment for children and promote positive lifestyle choices.

Review of literature

Several studies have shown that exposure to advertisements for unhealthy food can have a negative impact on children's dietary habits. For example, a study by Boyland, et.al (2011), found that children who were exposed to fast food advertisements on television developed a greater liking for fast food, but this did not translate into healthier food choices. Similarly, Dixon (2014) found that food advertisements featuring nutrient content claims, sports celebrity endorsements, and premium offers influenced children's food preferences, leading them to choose unhealthy options. Halford, et.al (2008), found that television advertisements promoting unhealthy food significantly influenced the food choices and caloric intake of 5-7-year-old children. A study by Harris and colleagues in 2012, analyzed the nutritional content of food

advertisements on television and found that the majority of food advertised to children was high in sugar, fat, and sodium, contributing to poor dietary habits. In India, a study by Mohan and Shanthirani in 2015, analyzed the content of food and beverage advertisements on television and found that a significant proportion of ads were for unhealthy food and beverage products, highlighting the need for policy interventions to address the impact of junk food advertising on children's health. A review by Gupta and Arora in 2019, found that food marketing, particularly the advertising of junk food, has a significant impact on Indian children's food preferences and purchase requests. The review also found that parents play an important role in mediating the impact of food marketing on their children's health by setting rules around food consumption and providing healthier food options. These findings underscore the importance of regulating food advertising to protect children's health and promote healthy eating habits at home.

Hypothesis framework

Recent studies have identified several components of junk food as contributors to poor nutrition and cognitive development in children (Powell et al., 2013). However, research has also highlighted the significant impact of television advertising on children's health (Mohan and Shanthirani, 2015). The researchers conducted an analysis of the advertised products, evaluated the nutritional quality of the items, and scrutinized the advertising techniques employed to promote unhealthy food. There is a possible hypothesis as “the existence of junk food ads will be significantly negatively related to malnutrition” (H1).

In 2019, Gupta and Arora performed a comprehensive review of research studies examining the effects of food advertising on Indian children, the review encompassed various factors, such as children's health and learning skills and development. There is a possible hypothesis as “the existence of malnutrition will be significantly negatively related to cognitive development” (H2). This study aims to explore the mediating role of junk food ads in the relationship between malnutrition and cognitive development. In 2013, Cairns and colleagues conducted a thorough analysis of research studies investigating the impacts of food advertising on children's food choices, and health outcomes. The review encompassed various factors, such as characteristics of food ads, the frequency, and duration of exposure, as well as other influential factors, including peer pressure and parental attitudes. The hypothesis is that “junk food advertisements will act as a mediator for the relationship between malnutrition caused by (a) avoiding home-cooked meals,

(b) consuming chocolates/baked items, and (c) irregular meal times, and cognitive development related to (a) perception abilities, (b) problem-solving skills, and (c) memory skill” (H3).

Research Methodology

This study employed a descriptive approach, correlation analysis, and structural equation modeling to examine the association between malnutrition and cognitive development. To achieve the research objectives, both qualitative and quantitative methods were utilized. The sample size, determined by Krejcie and Morgan’s (1970) method, included 187 children aged 11 to 15, both boy and girl, selected through cluster sampling. The data was collected using a questionnaire model, consisting of items related to malnutrition and cognitive skills assessed through a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Additionally, secondary data was gathered from prior research studies and performance reports.

Measurements

1. Junk-food advertisement factors

For measuring junk-food advertisement factors the study used 14 items with 3 sub-categories such as contents (4 items) discussed advertisement design and materials. The second category was communication (6 items) stating messages, and attributes. Finally, the food items (4 items) are assessed by sugar and packed items. All the items were measured by reliability and validity, and factor analysis showed that all the factors were framed in good and loaded above 0.5 showing their relativeness. Where Cronbach’s alpha is found 0.692, eigenvalue at 3.30, the variation is 66.7 per cent.

2. Malnutrition

In part of the study, malnutrition is assumed the cause of junk-foods and it was measured by 12 items as categorized into avoiding home-cooked meals (4 items). Further, consuming chocolates/baked items (4 items) is assessed by interest and routines. The third category is irregular meal times (4 items) measured. The questionnaire was assessed by reliability and validity, and factor analysis was performed. Interestingly, all the items were loaded and granted above 0.5 including the value of Cronbach’s alpha is 0.704, the eigenvalue of 3.48, and the variation is 70.7 per cent.

3. Cognitive Development

It was measured by the 12 items and categorized as perception skill (4 items) stated knowledge of subjects and environment dynamics. Importantly, how children approach their problem-solving skills (4 items) stated that discussion over subjects and personal thought processes. Finally, memory skill was measured (4 items) by their class performance and follow-up of their activities. Where all items got the value of Cronbach's alpha of 0.672, the eigenvalue of 3.60, and explained variation of 69.6 per cent.

Results

Respondents were instructed about the objective of the study and their responses were anonymous. The well-structured questionnaire was distributed to 210 respondents but only 187 completed questionnaires were received and yielded a response rate of 89 per cent. The socio-demographic characteristics of the respondents were also examined. A major part of the sample consisted of girls who weighed more than 40 kg and were in the eighth grade. This indicates that young girls are particularly susceptible to the negative effects of fast food. Additionally, a significant portion of the respondents had parents who were employed and struggled to find time to prepare healthy meals at home. As a result, they often relied on fast food items such as fries and other snack foods.

Correlation and Structural Equation Model among the variables

The results of a study that investigated the correlation among variables related to food consumption in children. Specifically, the Table.1 looked at the relationship between variables such as advertisement design and materials (ADM), consuming chocolates/baked items (CCB), irregular meal times (IRM), and problem-solving skills (PSS). The study found that the correlation between ADM and CCB is moderately high at .487. This suggests that the design and materials used in food advertisements may have a significant impact on children's consumption of chocolate and baked items. Additionally, the study found a high correlation of .436 between IRM and PSS, suggesting that children who have better problem-solving skills are more likely to have regular meal times. The study also found that children are exposed to a lot of food-related advertisements during their daily lives, which can be their first communication of fast-food items, and that the consumption of these items is correlated with exposure to advertising. This highlights the need for greater regulation and monitoring of food advertisements targeted at children. Hence, the study suggests that there are complex relationships among the variables

related to food consumption in children. It highlights the need for more research to understand these relationships and to develop effective strategies for promoting healthy eating habits among children. The findings also suggest the importance of considering multiple factors, such as advertisement design, irregular meal times, and problem-solving skills, when developing interventions to promote healthy eating habits in children.

Variables	1	2	3	4	5	6	7	8	9
Ad design	1								
Comm.	.188**	1							
Food items-Sugar	-.173**	.232**	1						
Avoid Home cooked meal	.007	.127**	.056	1					
Consume Baked items	.487**	-.003	.241**	.032**	1				
Irregular meal time	-.082**	.033*	.101**	.379**	.156**	1			
Perception skill	.126**	.283**	.084**	-.074**	.038*	-.028	1		
Problem-solving skill	-.068**	-.019	.215**	-.017	.093**	.436**	.087**	1	
Memory skill	.147**	-.064**	.083**	.002	-.196**	.223**	.057*	-.242**	1

** Significant at 0.01 level (2-tailed), * significant at 0.05 level (2-tailed)

Table 1. Junk-food advertisements, malnutrition, and cognitive development

The study evaluated the model's goodness-of-fit using several metrics, including degrees of freedom (df), Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Tucker-Lewis Index, and Root Mean Square Error of Approximation (RMSEA), as shown in Table 2.

Steps	Model description	P value	X^2/df	GFI	CFI	TLI	RMESA
1	Primary	0.001	13.76	0.712	0.790	0.861	0.047

Table 2. Goodness-of-fit statistics of the model

The study found that the relationships among the variables were reliable in theoretical considerations and that the covariance measurements studied in the model fit well with the primary model. The study also explored the direct and indirect relationships between the

variables, which satisfied the hypothesis of the study. Specifically, hypotheses H1 and H2 were supported, and all sub-variables of the hypothesis of the study were accepted as H3. Additionally, the study found that malnutrition and cognitive skill mediated the relationship between junk food advertisements and food consumption. This suggests that the effects of junk food advertisements on food consumption are fully mediated by malnutrition and cognitive skill. Furthermore, the squared multiple correlations of .483 suggest that malnutrition and cognitive skill in junk food advertisements account for 48% of the variation in junk food advertisements. This indicates that malnutrition and cognitive skill are significant predictors of junk food consumption and that these factors explain a substantial amount of the variation in junk food advertisements.

Path Factors	Results	Standardised regression estimate: Direct effect	Standardised regression estimate: Indirect effect	Squared Multiple correlations
Malnutrition ← Junk food advertisements	Supported H1 (a) Avoid home meals	-.443***	.003	.483
	Supported H1 (b) Consume baked items	.152*		
	Supported H1 (c) Irregular meal times	-.175*		
Cognitive development ← Junk food advertisements	Supported H2 (a) Perception skill	-.112*	.051	
	Supported H2 (b) Problem-solving skill	.322***		
	Supported H2 (c) Memory skill	-.189*		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3. Result summary and structural model coefficients

It is important to note that the study found both direct and indirect relationships between consuming baked items, avoiding home foods, and personal thought processes. Specifically, the study found a direct relationship between these variables and food consumption, as well as an indirect relationship mediated by junk food advertisements.

Conclusion and future study

The advertising of unhealthy food has a significant impact on children's nutrition and cognitive development, highlighting the need for promoting healthy eating habits. To tackle this issue, innovative solutions can be implemented, including leveraging technology to educate children and their families about healthy food choices. Interactive mobile applications can be developed that use gamification techniques to make learning about healthy eating fun and engaging for children. Another effective approach could be to increase the availability of healthy food options in public places such as schools and hospitals. Governments can play a significant role in this by regulating junk food advertising and encouraging the provision of healthy food options in public places. Collaboration between governments and non-profit organizations can also lead to the development of initiatives that increase access to healthy food options in underserved communities through community gardens, farmers' markets, and food co-ops. There are several avenues for future research to explore regarding the relationship between cognitive function, nutrition, and junk food advertising. One possibility is to investigate additional variables that may impact this relationship. Another avenue is to delve into specific issues related to junk food or to take a cross-sectional approach to better understand how food advertisements affect different groups. Additionally, it may be useful to explore the impact of junk food advertising on both children and adults, as this can provide valuable insights into the issue as a whole.

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