

Review Article

Exploring the impact of screen time, food advertising, and nutritional knowledge of parents on eating habits in preschoolers: a comprehensive review

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ABSTRACT

This review delves into the multifaceted relationship between screen time exposure and food advertising on the food preferences of preschool-aged children. With the pervasive nature of screens in contemporary society, coupled with the abundance of food advertisements targeted at young audiences, understanding their combined impact on dietary choices is crucial. Through a comprehensive literature review and empirical this research investigates how varying levels of screen time and exposure to food advertisements influence the development of food preferences, consequences of media exposure, and mental health, among preschoolers. Additionally, this review explores potential mitigating factors and strategies for parents and caregivers to promote healthier dietary habits in this demographic. The comprehensive findings shed light on the complex interplay between media exposure and dietary preferences, mental health informing strategies for promoting healthier eating behaviors in preschool children.

Keywords: Screen time, Food advertisement, Preschool children

INTRODUCTION

The influence of screen time and food advertising on preschoolers' food preferences and consumption is well-documented. Previous research indicates that prolonged exposure to screens is associated with adverse dietary habits, such as reduced intake of fruits and vegetables, increased consumption of snacks, sugary drinks, and fast food, as well as higher overall energy intake. Moreover, exposure to television advertisements promoting unhealthy food products has been linked to an increased risk of obesity in children. Additionally, television advertising plays a significant role in shaping food familiarity and preferences among preschoolers, with children exposed to advertisements showing a preference for branded foods.¹

Notably, commercials featuring individuals consuming a product tend to be more influential than those solely

showcasing the product itself, potentially prompting children to imitate and desire the advertised items. Given these findings, it is imperative to investigate the impact of screen time and food advertising on preschoolers comprehensively. Such research is essential for understanding various aspects, including early developmental influences, public health implications, media literacy, policy considerations, and the role of parental guidance. Ultimately, studying this impact is crucial for promoting the health and well-being of young children and fostering environments conducive to healthy development.²

PURPOSE OF THE REVIEW

The purpose of investigating the impact of food advertising and screen time on preschoolers' food preferences is to gain insight into their immediate consumption patterns and eating behaviors. Advertisements targeting children often

leverage popular characters, themes of fun, fantasy, and adventure to create positive brand associations. Extensive research has demonstrated a strong correlation between heightened advertising for non-nutritious foods and childhood obesity rates.

"Exploring the impact of screen time and food advertising on food preferences in preschool children" is designed to prove how exposure to various screens television, computers, tablets, and smartphones and food advertising influences the dietary preferences of young children. The study aims to discern whether prolonged screen exposure, typically featuring advertisements for unhealthy foods, shapes the food choices and tastes of preschool children. It intends to investigate any potential correlation between screen time duration and preferences for specific food types, particularly those extensively marketed to this demographic.

Increased screen time often coincides with reduced sleep duration, which may trigger overeating and subsequently contribute to obesity through disrupted regulation of appetite-controlling hormones and heightened hunger levels.³ Moreover, behavioral theories posit a potential association between decreased sleep and increased eating time.⁴ Notably, there is a gap in the existing literature regarding a comprehensive review focusing on the intersection of food advertisements, screen time, and nutritional status in preschool children, underscoring the necessity of this succinct review.

THE ROLE OF FOOD ADVERTISING AND SCREEN TIME IN FOOD PREFERENCES OF PRESCHOOLERS

Effect of food advertisements on preschoolers

According to the Food Safety and Standards Regulations, an "Advertisement" is defined as any form of audio or visual promotion, representation, or announcement made via any medium such as light, sound, smoke, gas, print, electronic media and internet.

In countries like India, where there is limited knowledge about nutrition, television ads from the food industry are seen as a major obstacle to promoting healthy eating habits among preschoolers.⁵ Food marketing communication impacts children's dietary behavior children who watch more television are more likely to be influenced by food advertisements and are at an increased risk of developing childhood obesity.⁶

Food advertisements can shape children's food choices, buying habits, and overall eating patterns. Advertisements often promote unhealthy food options like fast food, calorie-dense snacks, and sugary beverages, which are linked to an increased risk of obesity. Studies have shown that exposure to these types of ads can result in higher consumption of sugary drinks, fast food, and red and processed meats, along with a general increase in calorie

intake. Specifically, Gable et al found that each additional hour of television watched per day is associated with an increase in the consumption of these foods and an additional 48.7 calories.⁷ Television is typically the initial platform where children encounter advertisements for commercial food products.⁸ Despite the rise of alternative media sources, television remains the preferred activity for children aged 5–15, who spend more time watching TV. An average of 14.6 hours per week than engaging in any other media activity.⁹ As a result, television continues to be the dominant channel for food and beverage advertising worldwide.¹⁰

Association between exposure to food advertisements and dietary habits

Almost all studies found a positive association between food advertisement and obesity or overweight and/or the choice to consume unhealthy foods and beverages. Specifically, showed that exposure to advertisements for soft drinks and sugary drinks was significantly associated with a higher frequency of their consumption among young people but noted that the association between fast-food advertising and its consumption was not confirmed.¹¹ Notably, the systematic review and meta-analysis of 18 studies showed that acute exposure to food advertising for unhealthy food and non-alcoholic beverages increased food intake in children.¹² Children who watch television food commercials are at an increased risk of obesity.⁵ Further, a majority of food advertisements which were broadcast during children's programs included confectionery, ice cream and dairy products, baked products and ready-to-cook food items.

EFFECT OF SCREEN TIME IN PRESCHOOLERS

Indian research indicates trends similar to those in the Western world, with children being exposed to screen-based media as early as 2 months old, and the median age for initial screen exposure at 10 months. By the age of 18 months, most children have been exposed to screen-based media, with a higher prevalence of smart phone use compared to television viewing.¹³ Additionally, about 65 percent of families have the television on during dinner.¹⁴ Another study in India by Shah et al found that four out of five preschool children use smart phones, mainly for playing games and watching videos.¹⁵

Additionally, the impact of screen time on the mental health and nutrition of preschool children can be attributed to three main factors. First, the sedentary nature of screen viewing limits physical activity and thus energy expenditure.¹⁶ Second, the frequent exposure to food marketing on screens encourages the consumption of larger portions and nutrient-poor foods high in fats, sugars, or salts, and leads to decreased fruit and vegetable intake.¹⁷ Finally, increased screen time is often associated with reduced sleep duration, which may cause overeating and subsequently lead to obesity due to disrupted regulation of appetite-controlling hormones and elevated hunger levels.³

Factors that influence screen time can be associated with several elements, including those related to children; parents and caregivers; as well as demographic and environmental aspects.¹⁸⁻²¹

By understanding these potential influences, researchers can provide insights on how to promote healthier eating habits among young children and mitigate the negative effects of excessive screen time and exposure to food advertising. This could inform public health initiatives, parental guidance, and educational strategies aimed at promoting healthier diets and lifestyles for children.

Harmful effects of television exposure and screen time

Excessive television watching, more than 2 hours per day, has also been linked to obesity in preschool children. Other mechanisms by which screen exposure contributes to obesity include reduced physical activity, increased consumption of high-calorie, low-nutrient foods, and reduced sleep.²² Sleep deprivation alters the levels of hormones like ghrelin and leptin, leading to increased hunger and decreased satiety. Furthermore, short sleep duration encourages increased snacking and eating at non-traditional times, particularly at night, which results in the intake of unhealthy calories. The use of light-emitting media before bedtime is associated with reduced subjective sleepiness and suppressed melatonin production in the late evening.²³ The blue light from electronic screens can disrupt and suppress melatonin secretion, affecting sleep patterns. High exposure to background television has been found to negatively affect language use and acquisition, attention, cognitive development, and executive function in children younger than 5 years.

Some recommendations for mitigating the risks of screen time include: being present and engaged when children use screens, prioritizing educational, age-appropriate, and interactive programming, avoiding screens for at least one hour before bedtime, developing a family media plan, helping children recognize and question advertising messages, and modeling healthy screen use.

Overall, screen time can play a significant role in shaping food preferences of preschool children by exposing them to unhealthy food advertising, influencing their behavior through modeling, creating associations between screen time and unhealthy foods, limiting exposure to healthier options, and impacting their eating habits. Understanding these influences is important for promoting healthy dietary habits and mitigating the negative effects of excessive screen time on children's health and development.²⁴

Early television exposure

Screen-based activities can offer educational and entertainment benefits, but excessive exposure to screens can adversely affect children's nutrition, physical health, cognitive development, and psychosocial well-being. Early television exposure from ages 1 to 3 has been linked

to attention problems by the age of 7.² Background television can also reduce the quality and amount of parent-child interactions and hinder sustained toy play among young children.²⁵ Furthermore, children who engage in excessive screen time face higher risks of delayed language development, learning difficulties, reading challenges, and poor nutrition.²⁶

Physiologically, screen time as a sedentary activity contributes to lower energy expenditure. Its impact on dietary intake and quality is complex, often leading to increased consumption of snacks that are high in calories but low in nutrients. Excessive screen time in children is associated with various health risks, including early onset of hypertension, cardiac issues, hyperlipidemia, and other conditions linked to sedentary behavior due to decreased physical activity and poor sleep quality.²⁷ Psychologically, screen use during meals can distract from mindful eating, disrupting children's ability to perceive fullness signals, which can result in overeating or insufficient intake of nutritious foods. Additionally, screen content, such as advertisements for unhealthy food, significantly shapes children's food preferences and choices.²⁷

Guidelines on screen time for preschoolers

Screen time and advertisement exposure begin in infancy and are prevalent across all countries. The average daily screen time for children under five ranges from 0.9 to 3.5 hours, and for preschool children, it's between 1.0 and 3.1 hours.²⁸ With the increasing integration of digital technology into childhood for learning and socializing, screen time has become a regular part of life. The Indian Academy of Pediatrics advises no screen time for children under two years of age. For those aged 24 to 59 months, screen time should be kept to a maximum of one hour per day, and for children aged 5 to 10 years, it should not exceed two hours per day. These guidelines emphasize that screen time should not substitute essential activities such as outdoor play, sleep, interactions with family and peers, academic study, skill development, and maintaining a balanced diet.

According to Pfeifer et al, German guidelines recommend minimizing screen time: infants and toddlers should not use electronic devices at all, preschoolers should be restricted to 30 minutes per day, and primary school children to 60 minutes daily.²⁹

According to the Oxford Academic, screen time is not recommended for children under two years old, and children between two and five years old should limit their screen time to less than one hour per day.²⁴

Indian research indicates trends similar to those in the Western world, with children being exposed to screen-based media as early as 2 months old, and the median age for initial screen exposure at 10 months. By the age of 18 months, most children have been exposed to screen-based media, with a higher prevalence of smart phone use (96

percent) compared to television viewing (89 percent). Additionally, about 65 percent of families have the television on during dinner.¹⁴ Another study in India by Shah et al, found that four out of five preschool children use smart phones, mainly for playing games and watching videos.¹⁵

ADDRESSING THE IMPACT OF FOOD ADVERTISEMENTS AND SCREEN TIME ON THE NUTRITIONAL STATUS OF PRESCHOOLERS

An association between unhealthy dietary behaviors, feeding difficulties, and screen time and mealtime media use among preschool children.³⁰ Some of the key approaches include the following.

Parental monitoring and engagement

Set limits

Parents should establish clear rules about the duration and type of screen time that is appropriate, keeping within the recommended limits to prevent excessive exposure.

Co-viewing

Engaging with children during screen time can help parents guide their child's interpretation of what they see, including advertisements, and discuss healthier food choices.

Educational choices

Selecting educational and age-appropriate programs can minimize exposure to inappropriate content, including pervasive food advertisements.

Healthy lifestyle modeling

Be a role model

Parents and caregivers should model healthy eating and moderate screen usage. Children learn behaviors from observing adults, so positive role modelling is crucial.

Encourage physical activity

Limit sedentary screen time by promoting active play, which not only counteracts the effects of prolonged sitting but also reinforces healthy habits.

Dietary education

Teach nutritional values

Education about food should start at home and be reinforced in preschool settings. Teaching children about healthy eating habits and the downsides of processed foods can help them make better choices.

Healthy snacks

Instead of snacking on processed foods during screen time, parents and educators can offer healthy alternatives like fruits and vegetables.

Environmental control

Manage screen placement

Keep televisions and computers in common areas where it is easier to monitor use. Avoid installing screens in children's bedrooms.

Ad-blocking tools

Use technology solutions like ad blockers to reduce the number of advertisements children see when they are online.

Collaborative efforts in education

Curriculum integration

Schools and preschools should integrate media literacy into the curriculum teaching children about the persuasive intent of advertisements.

Incorporate nutrition education

Preschools can include lessons on healthy eating habits and the influence of advertisements, which can be powerful tools against the effects of media on diet.

Community and policy engagement

Advocate for regulations

Parents and educators can advocate stricter regulations on food advertising directed at children, working towards a reduction in the exposure of unhealthy food ads.

Community programs

Support or initiate community programs that promote healthy living and provide alternatives to screen time, such as sports leagues, cooking classes, and nature exploration activities.

By implementing these strategies, parents and educators can significantly mitigate the negative impacts of screen time and food advertising, helping preschoolers develop a healthier relationship with food and media from a young age.³¹

This information highlights the importance of a balanced approach to screen time for both parents and educators, emphasizing the role of proper nutrition in children's overall health and well-being. Parents are urged to actively

manage their children's screen use by establishing explicit boundaries around when and how long devices can be used. Additionally, creating specific times that are free from digital devices can encourage family discussions and strengthen relationships. Mealtimes, for example, present an excellent opportunity for family interaction. By advocating for meals free from screen distractions, parents can significantly improve the quality of these communal moments, fostering more meaningful connections and attentive eating practices.²⁷

Strategies to deal with screen time

Most interventions aiming to modify behavior are grounded on theories of behavioural change, with a predominant number of studies originating from the Western context and only a sparse amount of data from India. The most successful interventions generally focused on specific targets like reducing time spent watching television or using other screen media. Techniques used included electronic monitoring devices, systems providing contingent feedback, or clinic-based counseling. These interventions were particularly effective when they involved a high degree of parental participation, were directed at participants who were overweight or obese from the start, limited access to television or computers, or provided increased opportunities for physical activity.³² A systematic review by Altenburg et al, of 21 studies involving children aged 3 to 11 years highlighted the efficacy of the 'television turnoff week' strategy in reducing screen time.³³ Interventions targeted at preschool children can thus serve as a proactive and effective means to address the nutritional, physiological, and psychological challenges associated with food marketing through television and excessive screen time.

The policy-makers and associations like Indian Academy of Pediatrics should formulate guidelines on permissible limits of screen time among children. As there is a paucity of data on the prevalence of screen time among under-fives from LMICs, such studies should be planned to understand the cultural context of screen time use in these settings.³⁴

DISCUSSION

The findings from this review indicate a strong association between screen time, food advertising, and the development of unhealthy food preferences in preschoolers. Numerous studies have highlighted that increased exposure to food advertising, especially on television, significantly influences children's preferences towards calorie-dense, nutrient-poor foods. This observation aligns with the findings of Boyland et al, who noted that acute exposure to such advertisements directly increases caloric intake among children.³

Our review also supports the evidence that prolonged screen time contributes to reduced physical activity and disrupted sleep patterns, both of which are contributing factors to childhood obesity. These outcomes are

consistent with studies by Robinson et al, who reported that excessive screen use reduces sleep duration, which in turn affects appetite-regulating hormones, encouraging overeating.³

Furthermore, parental influence plays a pivotal role. Children mimic parental media usage habits, and co-viewing can either reinforce or mitigate the effects of advertising. Jago et al identified parental screen time and attitudes as key determinants of children's screen behavior.¹⁹ This highlights the importance of interventions that include parent education and behavioral modeling.

When comparing dietary impacts, our findings echo those of Powell et al, who observed a correlation between screen time and increased consumption of sugar-sweetened beverages and fast food.¹¹ Notably, Indian studies by Meena et al, and Shah et al, also corroborate the early and pervasive nature of screen exposure in the Indian context, emphasizing the need for culturally specific guidelines.^{14,15}

In light of these comparisons, it is evident that the influence of screen time and food advertising on preschoolers' food preferences is both direct and substantial. Interventions should therefore prioritize reducing screen exposure, limiting access to unhealthy food advertising, and increasing awareness among parents and caregivers.

This review highlights several critical themes regarding the influence of screen time and food advertising on preschoolers' food preferences. These themes screen exposure, advertising influence, sleep patterns, dietary behaviors, and parental involvement reflect the multifactorial impact of media on early childhood nutrition and development.

Screen time and sedentary behavior

Increased screen time is associated with sedentary behaviors, which can displace physical activities essential for preschoolers' growth. Studies have shown that children exposed to screens for more than 2 hours daily are more likely to exhibit reduced physical activity levels and higher BMI scores.^{38,41} These findings align with those reported by Epstein et al, who highlighted a direct correlation between prolonged screen use and low energy expenditure in children.¹⁶

Influence of food advertising

Food advertising significantly shapes children's food preferences by repeatedly exposing them to calorie-dense, nutrient-poor food options. Boyland et al demonstrated that food advertisements increase short-term consumption, especially of unhealthy snacks and beverages.¹² These effects are magnified when advertisements include characters or social modeling, as shown by Robinson et al.³ The preference for branded foods among children further reinforces the persuasive power of marketing.

Sleep disruption and dietary impact

Screen exposure before bedtime has been linked to delayed sleep onset, reduced melatonin secretion, and disrupted sleep cycles. Shorter sleep duration can dysregulate hunger hormones like ghrelin and leptin, contributing to increased appetite and energy intake. This hormonal imbalance may indirectly promote obesity, as noted by Patel et al.⁴

Dietary preferences and nutritional risks

There is a consistent association between increased screen time and decreased consumption of fruits and vegetables. Instead, children tend to favor high-calorie snacks and sugar-sweetened beverages. Similar patterns were reported by Taveras et al and Gable et al, emphasizing the role of screen media in promoting poor dietary habits and early onset of non-communicable diseases.^{7,17}

Role of parental influence

Parental behaviors strongly influence children's screen exposure and food choices. Jago et al found that high parental screen use, lack of regulation, and use of screens during meals were associated with greater screen dependency and unhealthy eating in children.¹⁹ Interventions involving parental co-viewing, media literacy, and positive role modeling have been shown to mitigate these effects.

By organizing findings around these themes, the review underscores the complex yet modifiable risk factors contributing to unhealthy food preferences among preschoolers. Policies, parental engagement, and community awareness are essential to mitigating these risks and promoting healthy developmental environments.

CONCLUSION

Food advertisements pervade our everyday surroundings. Short-term exposure to these ads notably increases food consumption in children, with a more pronounced effect observed in preschoolers. Notably, the right middle occipital gyrus shows heightened activation in response to food advertisement exposure, highlighting its potential role in processing food-related marketing stimuli. While screens are an integral part of contemporary childhood, it is essential to exercise caution regarding their influence on child development. Understanding the complex relationship between screen time and children's nutrition is critical. The interplay between screen time and nutrition in children is a complex issue that extends beyond a straightforward cause-and-effect relationship. As we continue to navigate the digital era, grasping these complexities and deploying strategies that foster healthy eating habits and appropriate screen time is crucial. Such measures will support the overall health and well-being of preschool children, helping establish a healthier relationship with food and technology. Additionally, further research into contemporary forms of food

advertising on social media, including influencer involvement and sponsored content, is essential. Further research should explore effective strategies for reducing children's screen time with various visual aids.

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