The Role of Dietary Habits in the Association Between Fast-Food Advertising and Childhood Obesity Among Urban School-Aged Children in Rawalpindi and Islamabad

PROGRAM

(BS PUBLIC HEALTH)

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2025

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Dated: 5 Dec, 2025

Thesis Approval Form

The topic of Research "**The Role of Dietary Habits in the Association Between Fast-Food Advertising and Childhood Obesity Among Urban School-Aged Children in Rawalpindi and Islamabad**"

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Acknowledgements

In the name of Allah, the Most Gracious, the Most Merciful.

First and foremost, I am deeply grateful to Allah Almighty for His endless mercy, guidance, and strength throughout this journey. I sincerely thank my supervisor, **Dr. Sidra Shahid**, for her invaluable guidance, thoughtful feedback, and constant encouragement, which shaped this work and strengthened my learning. This thesis is also **dedicated** to my parents, **Mr. Muhammad Zafar and Mrs. Farzana Zafar**, whose prayers, sacrifices, and unconditional love have been the foundation of my achievements; Papa, your discipline and belief in education inspire me every day, and Mama, your kindness and emotional support have carried me through the most challenging moments. I am equally thankful to my friends, especially **Uswa** for their companionship, support, and late-night study sessions, which made this journey easier and more meaningful, and to my teachers and mentors whose guidance and
knowledge contributed greatly to my academic growth. Lastly, I acknowledge my beloved pet, **Bella**, whose gentle presence brought comfort and calm during long study hours, making this demanding journey a little lighter and more peaceful.

Abstract

Rapid urbanization and increased media access have contributed to shifting dietary patterns among children in Pakistan. Childhood obesity is a growing public health concern in Pakistan, with fast-food advertising influencing children's dietary behaviors. This study examined whether dietary habits mediate the relationship between exposure to fast-food advertising and childhood obesity among urban school-aged children in Rawalpindi and Islamabad. A cross-sectional analytical study was conducted with 246 parents of children aged 5–12 years using a structured questionnaire. Data were analyzed in SPSS using descriptive statistics, chi-square tests, and the PROCESS Macro (Model 4) for mediation. The chisquare test showed no significant association between advertising exposure and childhood obesity ($\chi^2(3) = 0.122$, $p = 0.989$). Mediation analysis indicated that advertising exposure significantly influenced unhealthy dietary habits (Path a: $b = 1.3167$, $SE = 0.2340$, $p < 0.001$), while dietary habits were not significantly associated with obesity (Path b: $b = 0.0248$, $SE = 0.0771$, $p = 0.748$). The direct effect of advertising on obesity was nonsignificant ($c' = –0.0510$, $p = 0.864$), and the indirect effect ($a \times b = 0.0326$, 95% CI: –0.1883 to 0.2598) was also nonsignificant. These findings suggest that advertising shapes eating behaviors but does not directly contribute to obesity outcomes, highlighting the need for parental guidance and stricter regulation of food marketing.

Keywords: fast-food advertising, dietary habits, childhood obesity, mediation, parental perspectives, digital media exposure, urban Pakistan, public health

List of Abbreviations

1.	FFAs	Fast-Food Advertisements
2.	CO	Childhood Obesity
3.	DH	Dietary Habits
4.	SES	Socioeconomic Status

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CHAPTER 1

INTRODUCTION

Obesity in children is a significant universal community health issue, and its rates have been increasing significantly in the past few decades. The World Health Organization (WHO) showed that the prevalence of childhood obesity rose by greater than 18% in 2016 compared to 4% in 1975, confirming a great increase over a period of 40 years. Obesity is a key risk factor for a variety of noncommunicable diseases (NCDs) adding considerably to the global disease burden. Obesity according to the World Health Organization (WHO), is associated with at least 13 distinct forms of NCDs including heart disease, stroke, type 2 diabetes, hypertension, dyslipidemia, and numerous malignancies. Obesity-related NCDs cause an estimated 2.8 million deaths worldwide each year making it a serious public health concern (Jia et al., 2021). The increased prevalence of childhood obesity is caused by a variety of variables including dietary changes. Increased intake of calorie-dense, nutrient-poor foods, which are typically aggressively pushed has a substantial impact. Also, sedentary lifestyles, screen time, and psychological stress compound the problem (Dalton et al., 2023). According to research bad diets account for 55-75% of obesity risk with additional lifestyle variables contributing to the problem.

Even though obesity is a multifactorial cause-genetic condition, environmental factors and lifestyle behavior are most commonly cited as the reasons to support the correlation between nutrition and obesity as excessive intake of energy-dense food. Unhealthy food intake is linked to impulsivity and the observed positive correlation of frequency of advertised foods on television and its consumption suggests an influence of television advertisements exposure on food choices (Delfino et al., 2020). The absence of healthy foods and the lure to the unhealthy foods are obstacles to healthy living among the adolescents regardless of race, gender, and age.

In Pakistan the frequency of overweight children under the age of five has risen to 9.5% more than double the World Health Assembly's objective (Ahmad et al., 2022). This tendency is especially noticeable in cities where greater consumption of energy-dense meals and changing lifestyles lead to higher obesity rates. Among Pakistan urbanization has had a considerable impact on food choices particularly among children. Fast food is more accessible and affordable in urban

regions resulting in increased intake of energy-dense, nutrient-poor diets by urban youngsters. Rural communities on the other hand frequently experience economic restrictions that limit their access to such food alternatives resulting in distinct eating patterns. Such a nutritional imbalance between urban and rural regions is associated with an increased rate of obesity-related health issues in urban children. Recent research has found a link between the intake of processed snacks, sugary beverages, and sweets and the increasing prevalence of children obesity in Pakistan (Kumar et al., 2023). Approximately 40% of Pakistani youngsters are overweight or obese a development mostly ascribed to poor eating habits and sedentary lifestyles (Javed et al., 2022). Fast-food advertising has a substantial impact on children's eating patterns, directing them toward high-calorie, low-nutrient foods. According to studies excessive exposure to these adverts influences children's tastes and purchasing behavior which commonly leads to poor eating habits that contribute to obesity (Agarwal et al., 2024). Despite growing awareness there is still a lack of regulation of fast-food advertising directed at youngsters which must be addressed immediately to mitigate long-term consequences.

Fast food is high in calories, cooked rapidly and often lacking in nutrition (Ertz & Le Bouhart, 2022). The term refers to a variety of unhealthy high-energy foods and drinks heavy in fat, sugar, and salt (World Health Organization, 2013). Fast food consumption among 2–18-year- olds has grown from 2% of total caloric intake in 1977–1978 to 13.8% in 2015–2018 (Herédia et al., 2018).

Unhealthy eating habits has been related to iron and vitamins A and C deficiencies, which may lead to physical growth and intellectual activity impairment, as well as higher risk of morbidity and mortality, being a public health issue even in those not obese (Kumar et al., 2023).

A meta-analysis with over 25,000 children observed that high consumption of sugary drinks has been linked to weight gain in children (Delfino et al., 2020). In addition, there is an increment in the consumption of high-energy foods when there are activities that are screen-based. The beliefs regarding the use of unhealthy foods and health effects are likely to be different with the amount of TV exposure: the more time one spends in front of the TV, the less negative and more positive the beliefs about the effects of unhealthy food consumption are. The other study noted that television watching and eating snacks predicted high consumption of energy foods.

The recent study by the World Health Organization has indicated that the rate of obesity in children has been on the rise. The connection between advertisement and high-calorie food consumption is one of the reasons that cause this rise (Kumar et al., 2023). The most effective tool of marketing food and beverages to children is the communication media, particularly the TV. Even those who think they are buying healthy products are fooled by some of the adverts on food with minimal nutritional value whereas those by food and beverage companies do not comply with the regulations. It has been highly recommended that advertisements of products low in nutritional value should be restricted, as childhood obesity can be reduced if the advertising of unhealthy food is limited (Agarwal et al., 2024). However, little is known about the specific effects of marketing through the types of media mostly used by children. Advertising for low-nutrition food uses more visual and audio effects than advertisements for typically nutritious food and viewing food advertisements activates areas in the brain related to decisionmaking (Javed et al., 2022). In addition, fictional characters popular among children are combined with messages about health and nutritional quality in food advertisements. Because children respond to these attentiongrabbing advertisements, there are negative ramifications for their health, including obesity (Ertz & Le Bouhart, 2022). People who want to enrich their emotional needs by eating are also a cause of concern (i.e. emotional eaters), particularly when it comes to energy giving foods that are low in nutritional value.

Due to their cognitive immaturity children are more susceptible to persuasive marketing which can lead to poor eating behaviors (Agarwal et al., 2024). To attract young consumers the fast-food sector uses TV ads, digital media promotions, and packaging with toys and incentives. Exposure to fast-food advertising increases consumption of high-calorie, nutrient-poor items resulting to obesity and a wider range of malnutrition (Emond et al., 2021). Fast food typically lacks vitamins and minerals which can lead to micronutrient deficiencies and obesity. This nutrition imbalance increases childhood obesity and health hazards.

Globally, childhood obesity is pandemic. Over 20% of US preschoolers are overweight or obese and fast-food marketing is a key cause (Dalton et al., 2017). In 2009, fast-food companies spent $583 million on child-targeted marketing, encouraging unhealthy eating (Dalton et al., 2017). Studies also demonstrate that television food ads impact children's meal choices making them choose unhealthy options (Gatou et al., 2016).

Childhood obesity has increased over time and has different prevalence rates among different countries. In the United States, for example, the prevalence of childhood obesity increased from 12.4% in 2010 to 30% in 2014, whereas in South Korea, it increased from 14.3% in 2010 to 15.3% in 2013 (Liberali, Kupek, & Assis, 2020). In 2011, in China, the prevalence of obese children was 10.1% and the prevalence was 7% in Portugal. Between 2012 and 2016, the increase in the prevalence of obese children was 30%–35% in Mexico, 12% in Indonesia, 11% in Thailand, and 5%–15% in Latin American countries, with lower prevalence rates in Asian countries, such as 5% in the Philippines, 3% in Myanmar, 2% in Laos, and 2% in Cambodia (Javed et al., 2022).

As a complex condition, childhood obesity is a risk factor for several noncommunicable diseases, such as hypertension, dyslipidemia, liver disease, diabetes, polycystic ovary syndrome, and obstructive sleep apnea, as well as psychosocial problems, including discrimination, social isolation, and low self-esteem, which can affect health, education, and quality of life (Liberali, Kupek, & Assis, 2020).

It is estimated that 40% to 60% of obese children will become obese adults, with consequences for their health and the world economy, thus it is necessary to develop effective approaches to prevent childhood obesity as a public health priority (Folkvord & Hermans, 2020). Since the lifestyle patterns followed during childhood are probably to be followed in adulthood, dietary analysis or dietary patterns are one of the methods that can be conducted.

Since dietary intake, by definition, is a pattern of consumption and diet, per se, is a risk factor that can be modified, a knowledge of dietary patterns can be helpful information on the relationship between diet quality and its impact on health, particularly in terms of obesity. The analysis of dietary patterns has been identified as a more realistic representation of dietary habits, since it takes into account the complex interactions between nutrients and other components of a diet, thus making interventions to change eating habits possible (Liberali, Kupek, & Assis, 2020). However, Shi et al. (2019) suggested that the ideal is to interpret an eating pattern as a predictor of the risk of being overweight in childhood or childhood obesity, beyond associating eating patterns with nutrient intake.

Recent research has found a significant increase in childhood obesity in Pakistan. For example, 2022 research found that 66.9% of Punjab's school-aged children were overweight with 5.8% obese (Ahmad et al., 2022). Another study discovered that 40% of Pakistani youngsters are overweight or obese owing to sedentary lifestyles and poor nutrition. 2011 research in Lahore Pakistan, covering 1,860 children aged 5 to 12 years revealed that 17% were overweight and 7.5% were obese underscoring the country's growing concern about childhood obesity (Akbar et al., 2016). WHO suggests that the daily sugar consumption of children must not exceed 10 percent of the overall energy consumption with an optimal limit of 5 percent (approximately 25 grams per day) to achieve the added health benefit. But, according to the research, Pakistani children consume 134.3 grams of sugar daily, primarily in the form of sweet drinks, sweets, and fruit juices which is significantly above the recommended amount and leads to significant health risks (Javed et al., 2022). The growing popularity of fast food and intensive advertising remains having an impact on eating habits, and childhood obesity is a serious social health issue.

Childhood obesity rates have been on the rise in the past decades across the world. One out of five children aged between 2-3 years is overweight in Australia. The Commission on Ending Childhood Obesity created by the World Health Organization provides a list of measures that governments might implement to prevent and control childhood obesity (Esdaile et al., 2021). According to the available information, fast-food advertisements are significant influences of food preferences among children leading to inadequate food consumption patterns which are factors that cause obesity. New studies however indicate that this may not be a direct relationship but instead the eating habits of children shaped by exposure to such commercials may be the main mediator (Cairns et al., 2023). The understanding of this pathway can guide policymakers and health workers in society to focus more on the behavioral problems underlying it.

The research will contribute to the existing knowledge by examining the relationship between dietary habits and the relationship between fast-food advertising and childhood obesity in urban school-going children in Rawalpindi and Islamabad. Although the link between fast-food advertising and childhood obesity has been demonstrated worldwide, little has been done to establish the behavioral mechanisms underlying the phenomenon, especially in Pakistan. The present study addresses a considerable gap in literature because it explores the role that food patterns in children can play as a medium through which advertising can cause obesity.

1.1 Problem Statement

Children's exposure to fast-food advertisements, especially online, is increasing poor dietary habits, contributing to the rising childhood obesity in Pakistan, where 12–14% of school-aged children are overweight or obese. Limited research has explored how these eating habits mediate the relationship between fast-food advertising and obesity. This study examines the impact of digital fast-food advertisements on childhood obesity, focusing on the mediating role of children's dietary patterns, to inform targeted interventions promoting healthy eating.

1.2 Research Gap

Even though the world has evidence of fast-food advertising being a contributor to poor dietary habits and obesity in children, there is little research done in low- and middle-income countries, such as Pakistan. Most of the existing literature is high-income based and does not represent the socio-cultural, digital and economic reality of urban Pakistani children. There is also no research that addresses the impact of fast-food advertisements on the perceptions and screentime patterns and food preferences of children in families. Although the use of smartphones has increased and there is a fast transition to digital marketing, the influence of online marketing on children or the opinions of parents have been studied very scarcely locally.

The other big gap is the lack of knowledge on the mechanism that advertising uses to cause childhood obesity. Although the world literature appreciates this relationship, the mediation role of dietary habits of children is hardly studied and hardly any research has been done on this route in Pakistan. The current studies tend to be short-term or just descriptive, so there is little information on how exposure to advertising can be converted into unhealthy eating habits and, consequently, weight gain. This study fills a significant and under-investigated gap by considering these relationships and using parental perceptions in the context of urban Pakistani children.

1.3 Significance of Study

This research is important since it addresses the increasing issue of children obesity in Rawalpindi and Islamabad especially through exploring how fast-food advertising shapes the eating habits of children. The research will illuminate one of the most important problems in urban Pakistani society by investigating the way in which adverts influence children and their eating habits and obesity rates. The results will highlight how dietary choices mediate the relationship between fast-food

advertising and childhood obesity to give crucial information on the development of more effective regulatory measures. The results can be used by lawmakers, medical professionals, and parents to establish healthier eating environments and promote stricter advertising regulations. Finally, this study intends to add to public health measures that help prevent childhood obesity and promote healthy eating habits among urban children.

1.4 Objectives

1. To identify the prevalence of childhood obesity among urban school-aged children in Rawalpindi and Islamabad.

2. To assess the relationship between fast-food advertising and childhood obesity in urban schoolaged children.

3. To analyze the role of dietary habits as a mediator between fast-food advertising and childhood obesity.

1.5 Research Questions

Q1. What proportion of school-aged children in Rawalpindi and Islamabad are overweight or obese according to WHO growth standards?

Q2. How does exposure to fast food advertising influence the weight status of children aged 5-12 in urban areas?

Q3. To what extent do children dietary habits explain the link between fast food advertisement exposure and obesity?

1.6 Hypotheses

H1: Greater exposure to fast-food advertising is positively associated with higher rates of childhood obesity among urban school-aged children.

H0: There is no significant relationship between exposure to fast-food advertising and childhood obesity.

H2: Dietary habits mediate the relationship between fast-food advertising and childhood obesity.
H0: Dietary habits do not mediate the relationship between fast-food advertising and childhood obesity.

CHAPTER 2

LITERATURE REVIEW

This chapter provides a comprehensive review of the existing literature related to childhood obesity and the influence of fast-food advertising on children's dietary habits. It highlights key concepts, theoretical frameworks, global and local trends, regulatory approaches, and digital media exposure, providing the context and rationale for the present study. The review synthesizes evidence from peer-reviewed studies, reports, and policy documents to establish the background, identify gaps, and support the research objectives.

2.1 Global Marketing Trends and Children's Vulnerability

Over the last few years there has been markedly growing access and influence of fast-food advertising aimed at children globally, contributing to alarming childhood obesity rates. The World Health Organization (WHO, 2023) mentions that approximately 6 percent of children across the world are obese with studies showing that fast food advertisements are a major factor. To illustrate this, a study conducted by Boyland et al. (2022) discovered that children who receive advertisements for fast foods are 40% prone to embrace poor eating behaviors, which in turn result in higher rates of obesity. The digital revolution and the growing screen time have allowed food marketers to target young audiences in a multitude of channels often with less parental oversight. Advertisers in the United States allegedly spend more than $13 billion per year targeting youngsters with children seeing more than 45,000 food-related advertisements each year the majority of which promote high-calorie, low-nutrient goods (WHO, 2023; Harris et al., 2021). Even a single encounter with these commercials can alter children's eating preferences whereas repeated exposure increases their consumption of unhealthy foods (Smith et al., 2022).

A study by Kelly et al. (2022) conducted in China, Indonesia, Malaysia, and South Korea attempted to determine the reach of television advertising and marketing of food for children. They discovered that the most common products that were being advertised in all these countries were sugary beverages and the rates of advertising of vegetables and fruits were low.

Some studies with children in different parts of the world also show this trend of consuming potentially obesogenic foods (baked goods, rich in sugar, such as breads, cakes, and cookies), such as that of Aranceta et al. (2019) with 3534 children and adolescents in Spain, Ritchie et al. (2017) in the United States with 2371 children aged 9 to 10 years, Fernández-Alvira with 8341 European children (regions in Italy, Estonia, Cyprus, Belgium, Sweden, Hungary, Germany, and Spain), and Santos et al. (2022) with 1247 children aged 6 to 12 years in Brazil. According to Romero-Polvo et al. (2015), the risk of insulin resistance in 916 Mexican children and adolescents was associated with the Western diet (high carbohydrates intake, soft drinks, snacks, and corn tortillas and lower intake of fresh fruits and orange juice).

In a study by Chen, Xu, and Wang (2020) the dietary patterns that presented the weakest association with the risk of becoming overweight or obese were those in which children consumed more nonobesogenic foods (fruits, vegetables, whole grains, fish, nuts, legumes, and yogurt), that is, food classified as healthy with low levels of sugar and fat. Dietary patterns may also vary depending on the cultural and economic context,as well as other factors, such as lifestyle and level of physical activity. Alshammari et al. (2020) highlighted that, currently, living standards are on the rise, leading to complex changes in diet, lifestyle, and health.

Children under the age of eight are developmentally incapable of comprehending the persuasive aim of advertising leaving them extremely sensitive to marketing messages. These communications are frequently meant to capitalize on this psychological restriction, strengthening "pester power," in which children influence their parents' purchase decisions (Nasser et al., 2021). Repeated exposure to fast food marketing not only influences children's eating habits but it also increases family conflict when parental rejection follows advertising- induced requests. Research claims that optimistic images of fast food and sweetened beverages affect early eating habits, which predisposes the development of obesity and noncommunicable diseases over time (Lee et al., 2020).

2.2 Childhood Obesity and Fast-Food Advertising in Pakistan

Recent research by Shaheen et al. (2024) indicates that obesity in children is widespread in. The urban Pakistan is estimated at 27.7%. This fact shows the rising social health issue of childhood obesity that has a close relationship with the increased exposure to fast food advertising, especially through digital media.

Childhood obesity has become a common phenomenon in Pakistan, and this can be attributed to various factors such as the exposure to commercials on fast food. Khan et al. (2023) found out that in cities like Rawalpindi and Islamabad, fast food advertisements commonly reach children and significantly affect their eating habits as well as predisposing them to consumption of highenergy, low-nutrient foods.

Pakistan is a country where socioeconomic factors play a role in determining the exposure of children to fast foods and vulnerability to the effects of advertising. Families that have stronger income levels are more likely to have easy access to fast food restaurants and their children are more exposed to digital advertising that increases the risk of obesity and other health issues (Ahmed et al.,2022).

2.3 Media Influence and Advertising Channels

Television has continued to be one of the most useful advertising mediums with a significant connection between commercial TV watching and consumption of fast food and sweet beverages among children (Chen et al., 2020). Children who do not skip advertisements or who watch live television that does not allow for ad-skipping are more exposed to fast food advertising. However, digital platforms have offered more aggressive and sophisticated marketing strategies. YouTube, TikTok, and Instagram all include embedded commercials, influencer promotions and advergames that appeal to children's emotions and cause unconscious food connections (Lobstein & Temple, 2022). Fast food advertisements are frequently disguised as entertainment, making them difficult for youngsters to identify as marketing.

Unhealthy food commercials are frequently displayed during children's television shows and many of these items are heavy in sugar, salt, and saturated fats while lacking critical nutrients (Emond et al., 2021). Repeated exposure to such advertisements raises children's demand for these goods while normalizing bad eating behaviors. McCarthy et al. (2022) found that youngsters who were exposed to sugar-sweetened beverage advertisements drank much more of them than their counterparts who were not exposed. Similarly, brand impact may change taste perception—children express more satisfaction when they assume a product is from a known fast-food brand even if the meal is the same (Kiefner-Burmeister et al., 2020).

Marketing methods go beyond screens. Packaging, avatars, and collectibles such as toys with fast food meals are extremely successful at shaping children's tastes. Cartoon characters and branded objects improve product attractiveness and can even influence how youngsters perceive taste (Roberto et al., 2021). These strategies while frequently condemned, are so effective that public health experts propose repurposing them to encourage healthy eating if properly controlled.

Beyond behavioral mechanisms, economic and media-based analyses have further explored how advertising exposure affects consumption patterns and obesity outcomes among youth. Economic studies have concentrated on whether brand advertising has the effect of raising the total demand of a product line (i.e., soda or fast food) or only the demand of the brand per se, decreasing the market share of the rivals with no impact on the consumption of, say, soda. The facts indicate that advertising will be able to accomplish both, i.e., raise the aggregate demand and encourage brand switching. Empirical evidence is widely broad that brand advertising has the propensity to steal share of rival brands and therefore advertising is a type of competition (Bagwell 2023). There is,

however, mixed evidence on the impact of brand advertising on the overall demand, and in this case, the results differ across industries. The overall testing of such hypotheses concerning food advertising, especially concerning youth effects, has had little research. The hypothesis that advertising contributes to obesity assumes that advertisements for food products alter consumers' preferences for food, so that they consume more or different types of products than they would have otherwise, resulting in higher total caloric intake (Ertz & Le Bouhart, 2022). The food industry has argued that the causes of obesity are complex and advertising aims to change brand preference and has little or no effect on aggregate demand (Hoek and Gendall 2019). However, it is argued that particularly among youth, advertising may contribute to excessive consumption by normalizing a behavior. For example, "advertising of fast food [i.e., promotions and super sizing] maintains the impression that consumption of these products is consistent with a healthy diet, but offers little or no guidance about what is required to achieve a balanced and moderate food intake." (Hoek and Gendall 2019).

A 2016 Institute of Medicine (IOM) report concluded there was strong evidence for children aged 2–11 that television advertisements influenced short-term food consumption patterns and moderate evidence that they influenced usual dietary intake but insufficient corresponding evidence for teens aged 12–18 and evidence for both age groups that exposure to television advertising was significantly associated with adiposity (Institute of Medicine, 2020). However, the latter body of evidence was based on associations with television viewing that did not disentangle the causal pathway of advertising effects since television viewing may contribute to obesity through several mechanisms including the displacement of physical activity, snacking while watching television, and the influence of food advertising (Powell et al., 2021).

After the 2006 IOM report, few earlier papers have connected television advertising statistics to nationally representative individual-level statistics on the consumption and/or body weight consequences of children and adolescents, with the adjustment of television viewing. In a pioneering study, Chou, Rashad and Grossman (2018) found that greater exposure to fast-food advertising was statistically significantly associated with higher body mass index (BMI). But when the length of time watching TV was controlled, more advertisements were only loosely linked with increased BMI in the youth 1218 years old and not linked to increased BMI in the 311-year-olds. Their advertising measure was based on occurrences of the annual number of seconds of fast food restaurant messages aired (but not necessarily viewed) on local spot television in the largest 75 designated market areas provided by Competitive Media Reporting (Powell et al., 2021). Although

this study did not take advantage of the individual-level longitudinal nature of their data, they did control for media market-level fixed effects. Andreyeva, Kelly and Harris (2022) estimated a cross-sectional model that linked Nielsen advertising exposure data from the top 55 media markets to 5th grade students' data and found that exposure to 100 additional regular carbonated soft drink advertisements in the years 2002 through 2004 was associated with 9.4% higher SSB consumption in 2004 and a similar increase in exposure to fast-food advertisements was associated with 1.1% higher fast-food consumption. The exposure to advertisements did not indicate any relationship with the body weight of children except that fast-food advertising had a significant relationship with those who were already overweight. The existing literature has focused on the cross-sectional association of television advertising with obesity as measured by body mass index (BMI) – but not longitudinal analyses or adiposity measures (Andreyeva, Kelly and Harris 2011; Chou, Rashad and Grossman 2023).

2.4 Socioeconomic Disparities and Policy Gaps

Children from lower socioeconomic backgrounds are more likely to be exposed to fast food advertising, have restricted access to healthy food options and spend more time on screens owing to a lack of recreational options. Marketing near schools particularly in low-income districts, exacerbates these gaps and encourages bad food choices (Livingstone and Boyland, 2021). This exposure increases brand awareness and alters long-term eating patterns exacerbating health disparities.

Although several nations have implemented voluntary codes of conduct to control food marketing to children, these initiatives are frequently ambiguous, poorly enforced, and not legally enforceable (UNICEF, 2023). Any efforts by the government to implement stricter regulations have faced enormous opposition by powerful food industry actors (Global Center for Preventive Health, 2024). Consequently, children are largely not exposed to misleading advertising policies that promote unhealthy eating habits.

2.5 Psychological and Behavioral Effects of Fast-Food Advertising

Advertising is especially harmful to children due to their underdeveloped thinking abilities. Marketers use this by applying jingles, celebrity sponsorships, cartoon characters, and attractive packaging to make unhealthy foods more appetizing (Russell et al., 2022). These strategies influence the preferences of children and increase their food-related expectations therefore defining the buying behavior of households and the food environment.

The long-term evidence shows that the exposure to advertisements results in the consumption of harmful foods. Qutteina et al. (2021) assert that children aged 5-11 who viewed fast food advertisements took 13% more energy-dense snacks and sugary drinks weekly. This exposure was also associated with a greater BMI and a reduced consumption of fruits and vegetables.

Brand identification originates in early infancy and has a strong emotional appeal. Valkenburg et al. (2020) shown that brand connections strongly influence children's food preferences frequently overcoming genuine taste or nutritional value. Lapierre et al. (2018) discovered that children preferred snacks packaged with cartoon characters even when the food was similar to the plain packaging.

Experimental and review-based evidence further supports these behavioral effects of food advertising. Obesogenic food environments are thought to be a key driver of the obesity epidemic. Because of this association, environmental factors that promote unhealthy dietary habits and excess consumption are of public health concern (Freeman et al., 2021). Specifically, the role of food marketing, particularly to children because of concerns about their comprehension of marketing and its persuasive intent, has been closely scrutinized. Such marketing is extensive, perhaps most notable on television and the Internet, and almost entirely promotes high-fat, -sugar, and -salt foods (Boyland et al., 2022). However, despite guidance from the WHO and numerous policy initiatives, few countries have enforced effective restrictions in this area.

A small number of systematic reviews have sought to capture and evaluate the evidence base that links unhealthy food promotion to diet-related outcomes for the purposes of informing policy action.These narrative reviews have been in broad agreement that unhealthy food marketing has a detrimental impact on children, although the data relating to adults was deemed too limited to draw firm conclusions (Freeman et al., 2021).

An increasing amount of literature that examines the acute experimental impact of unhealthy food advertising [the most noticeable type of marketing on food consumption] is growing. The importance of such studies is due to the fact that they have reported the possible effects of exposure to food advertising over a longer period that is harder to quantify in fully controlled paradigms. Several studies have shown that, relative to control conditions (nonfood advertisements or no advertisements), ad libitum food intake of participants was greater after exposure to unhealthy food advertising in terms of the amount consumed and/or caloric load (Pew Research Center, 2022). However, some studies have either failed to show an effect or produced mixed findings (Boyland et al., 2022). Moreover, where effects have been shown, in some studies they were moderated by food neophobia and weight status, which indicated that the potentially harmful effects that food advertising has on food intake may be particularly exhibited in specific population subgroups.

Bruce et al. (2021) used fMRI scans to show that food advertising stimulate brain areas associated with decision-making and reward processing. This neurological impact shows that advertising impacts not just emotional responses but also biological dietary choices. Even though Brownell et al. (2016) called upon the necessity of conducting additional longitudinal studies, the available data indicates the existence of a strong correlation between food marketing and the development of long-term habits.

The frequent exposure of advertising results in increased brand-specific demands of youngsters pressuring parents. Coon et al. (2019) and Tucker et al. (2018) found significant brandinfluenced food requirements of children to be strongly associated with ad exposure. The dynamics affect the buying behavior of families and contribute to the normalization of poor diets.

Delfino et al. (2020) noted that adolescents had dietary habits of eating energy-dense foods like fried foods, sweets, and soft drinks when watching television. Sweet and fast food were the most coveted foods following the TV advertisements and the consumption rate rose by 36, 69, and 57, respectively. Such findings can be related to the study by Boyland et al. (2016) who have revealed that the viewing of unhealthy food advertisements triggers immediate food consumption and promotes the rise of caloric consumption in children and adolescents. Equally, Powell et al. (2017)

have discovered that television advertising exposure has a positive relationship with youth consumption patterns, body mass index (BMI), and adiposity outcomes.

It was also reported in previous research that the intake of fruit and vegetables is most likely to decline over time, and long screen time (more than 2 hours per day) is linked to the increased consumption of sugary beverages and salty snacks (Watson et al., 2014; Agarwal et al., 2024). Esdaile et al. (2021) also pointed out that the intervention of public policy focusing on obesogenic environments will help to minimize the exposure of young people to obesogenic marketing stimuli. According to the cultivation theory, the perceptions are shaped by repeated exposure to food advertisements, which normalize unhealthy eating habits (Boyland et al., 2016). Advertising minimizes the chances of identifying such behaviors as being harmful, hence affecting the longterm dietary habits. Often, as Delfino et al. (2020) also emphasized, an adolescent is more likely to feel cravings and eat more than hungry, which proves the persuasive force of marketing to override natural signals of satiety.

The socioeconomic and environmental factors are equally important. Fruits and vegetables are not marketed as aggressively as unhealthy products that are rich in fats, sugars, and refined carbohydrates (Kelly et al., 2014; Liberali et al., 2020). This difference is further strained by the high prices of healthy foods as was observed in European studies that correlated the high price of healthy foods with increased intake of fruits and vegetables. As a result, families with low incomes are more likely to purchase unhealthy foods with high energy content, which supports poor dietary habits (Delfino et al., 2020; Powell et al., 2017).

These behaviors are also affected by family and social factors. Lower socioeconomic status adolescents or those whose parents have higher education levels are more likely to consume processed and fast foods (Delfino et al., 2020). In the meantime, girls tend to have healthier diets, such as more fruit and vegetable consumption, than boys (Agarwal et al., 2024). These studies, taken together, all point to the same direction: exposure to food advertising does not only influence the short-term food preferences of adolescents but also supports the reinforcement of poor dietary patterns in the long-term- these are the factors which contribute to the growing cases of childhood obesity across the world.

2.6 Digital Platforms and Social Media Exposure

The rapid growth of digital platforms has transformed how children encounter food marketing. Today's online environment is designed for constant engagement, which means that once a child interacts with any fast-food–related content, the platform's algorithm quickly learns this behavior and begins to show similar posts more frequently. Studies on digital media literacy note that algorithms are built to reinforce prior interests—when a child watches a food vlog, likes an influencer's meal review, or pauses on a fast-food reel, the system interprets these actions as preferences and increases the visibility of such content on their feed. Over time, this repeated exposure normalizes fast-food messaging and makes these brands appear more familiar and appealing (Montgomery & Chester, 2019; Nouri et al., 2020).

Children and teens now spend a significant portion of their daily screen time on platforms such as YouTube, TikTok, and Instagram. Pew Research Center (2022) reports that almost all teenagers in the United States use YouTube regularly, and more than two-thirds use TikTok every day. This pattern is seen globally, where young users encounter fast-food promotions not as obvious advertisements but embedded within entertainment, memes, food reviews, influencer content, and branded challenges. The World Health Organization (WHO, 2023) and Freeman et al. (2021) note that such "immersive marketing" is particularly powerful because it merges advertisements with enjoyable content, making it harder for children to recognize commercial intentions.

Unlike traditional TV commercials, digital advertisements are interactive, personalized, and often disguised as organic content. Influencer marketing is a major component of this environment. Demers-Potvin (2022) highlights that when children see their favorite influencers casually consuming or praising fast food, it lowers their critical thinking and increases trust in the promoted product. Because these interactions appear authentic, children perceive them as friendly recommendations rather than paid endorsements.

A common limitation in existing research is the reliance on self-reported exposure data. Digital marketing strategies are intentionally subtle and often not recognized by children, leading to underestimation of real exposure levels (Freeman et al., 2021). This makes it difficult for researchers and policymakers to trace the full influence of online food marketing.

Cross-cultural studies also show that digital platforms shape food preferences differently across populations. Mwansa et al. (2021) found that Zambian adolescents reported strong influence of social media on trying new fast-food items. In the UK, Johnson et al. (2020) noted that teenagers openly relate their diet choices to what their peers share online or what appears frequently on their social media feeds. Even in regions where children claim limited awareness of digital marketing, continuous exposure still contributes to brand familiarity and early brand loyalty (Lithuanian Consumer Agency, 2022).

2.7 Regulatory Challenges and Commercial Determinants of Health

Voluntary regulatory systems have been insufficient to safeguard children from harmful food advertising. Canada's Children's Food and Beverage Advertising Initiative (CAI) has been heavily criticized for failing to reduce high-fat, sugar, and salt (HFSS) product advertisements (Potvin Kent & Pauzé, 2023). In many nations, self-regulation lacks enforcement and allows businesses to choose their own conditions, resulting in little change.

Policy reviews from Australia, New Zealand, and Fiji show that present restrictions frequently only apply to children under the age of 12, ignoring digital media platforms where teenagers are most active (Jones et al., 2022). As a result, older children and teenagers are mostly unprotected.

The prevalence of childhood obesity in the world has been on the rise in the past decades. One out of every five children aged between 2-3 years in Australia is overweight. The World Health Organization (WHO) Report of the Commission on Ending Childhood Obesity listed a set of health promotion measures that governments can implement to prevent (and manage) childhood obesity through the continuum of available governmental responses to obesity (Jones et al., 2022). These strategies encompass socio-ecological (eg food and physical activity environments, behavioral (eg education of families and carers, and health care action areas.4 The WHO report has identified the early years, the first 5 years of life, as one of the life stages that governments should act.

According to Esdaile et al. (2021), Australia has federal, state/territory and local governments, and policies intended to achieve the same outcome can be tailored for implementation at these three different levels of government. For example, consider if the outcome is to reduce exposure of children to marketing of discretionary choices. At the national level, a policy to achieve this could be regulations in broadcasting and online/app-based media (Lobstein & Temple, 2022). In contrast,

at the state/territory and local levels a policy could include stipulations within advertising contractual agreements about what products may or may not be advertised in the public arena, such as on publicly owned or controlled assets like public transport spaces or community centres (Esdaile et al., 2021).

Digital food marketing has a disproportionate impact on children from structurally underprivileged groups. WHO (2023) and UNICEF (2022) have noted that children from lower- income families are more likely to be exposed to unhealthy food advertisements due to increased screen time, less parental mediation, and less availability to nutritional alternatives. This exacerbates health disparities and underscores the importance of taking commercial determinants of health into account when developing public policie (Jones et al., 2022).

Food businesses can evade local advertising rules thanks to social media's worldwide reach. Potvin Kent and Pauzé (2023) examined 54 million web advertising and discovered that 7.6 million promoted brands alone, without particular product names, so avoiding health legislation criteria. Furthermore, tech corporations frequently limit data access, limiting public health researchers from monitoring or analyzing real ad content and kid exposure (Freeman et al., 2021).

2.7.1 International Regulatory Frameworks for Food Marketing to Children

Internationally, industry self-regulation is the most common approach to regulating food marketing to children. In Australia, there is limited government regulation dealing with food advertising to children on television, and no regulation specifically addressing food advertising to children through other media (Qutteina et al., 2021). Two voluntary initiatives of the food industry are the Quick Service Restaurant Initiative (QSRI), which is applicable to fast food restaurants, and the Responsible Children's Marketing Initiative (RCMI), which is applicable to food and grocery manufacturers. Research has shown that these initiatives have not reduced children's exposure to unhealthy food advertising over time (Watson et al., 2022).

Any policies restricting the marketing of foods and beverages to children require clear definitions of the foods that are subject to restrictions (Pew Research Center, 2022). The nutrient profiling model that was created by the Food Standards Agency (FSA) in the United Kingdom (UK) has served to maintain consistency in the determination of nutritional quality of food products, as a

foundation to restrict advertising to children. The application of nutrient profiling has been identified as useful in a range of spheres of nutrition in public health, such as food marketing to children, as the success of the UK model demonstrates (Lobstein and Temple, 2022).

The Food Standards Australia New Zealand (FSANZ), the Australian food regulator, modified the FSA nutrient profiling model to come up with the nutrient profiling scoring criterion (NPSC) in determining whether foods qualify as having health claims on their labels (Johnson et al., 2020). The first step that foods are classified under the nutrient profiling model is into three categories, including beverages; foods or oils; and cheeses with a calcium level of above 3200mg/100g (Johnson et al., 2020). The model provides a score consideration of the content of energy, saturated fat, sodium, sugars, protein, dietary fiber, and the content of fruits, vegetables, nuts and legumes in food. The FSANZ criteria have been put to test on a database of more than 10000 Australian and New Zealand foods.

The NPSC is employed to minimize the danger of misleading and deceptive health claims on foodstuff and the prevention of health claims on high energy, saturated fat, sugar or salt foods. The foods that the NPSC stated could not carry a health claim are the same categories of foods that were stated that needed to be limited in the recommendations to minimize the effect of food marketing on children (Potvin Kent & Pauzé, 2023). Where a food classification system is already in place, the World Health Organization suggests that the same system should be applied to other food regulation purposes to eliminate any inconsistencies and redundancy. As such, it can be possible to apply to the NPSC to categorize foods that can be marketed to children.

The existing Australian self-regulatory programs have different definitions of what constitutes healthy foods that should be advertised to children. The individual signatory companies in the RCMI set their own nutrition standards to define which foods they should market to children as part of their company action plans (Watson et al., 2022). Most of the action plans of companies fail to set criteria because the companies say that they do not advertise to children below the age of 12. The QSRI uses one standard of nutrition on prescribed children's meals and fails to consider other food items that are sold to all ages.

2.7.2 National Regulatory Framework for Food Marketing to Children

In Pakistan, the regulation of food marketing to children remains limited, with most policies focusing on general food safety rather than targeted restrictions on persuasive advertising. National health bodies, including the Ministry of National Health Services and the Pakistan Telecommunication Authority (PTA), have acknowledged the rising concerns around digital marketing of unhealthy foods; however, no comprehensive national legislation exists that directly restricts fast-food advertising aimed at children (UNICEF Pakistan, 2021). The absence of agespecific advertising guidelines creates regulatory gaps that allow companies to freely promote high-fat, high-sugar products across television, billboards, and digital platforms frequently accessed by young audiences.

Research from Pakistan Nutrition and Health Survey reports that children are heavily exposed to digital food promotions due to increasing screen time and smartphone access, yet national policy responses remain fragmented (NIPS, 2022). While some advertising restrictions exist under the Pakistan Electronic Media Regulatory Authority (PEMRA), these mainly control misleading claims rather than the nutritional content or target audience. As a result, fast-food brands continue to use child-appealing techniques—cartoon characters, influencers, animation, and discount-based gamification—which remain unregulated and highly effective at shaping children's preferences (Khan et al., 2023).

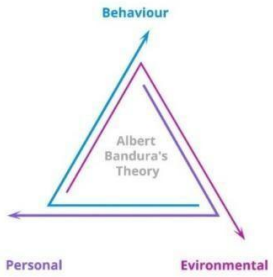
The government has taken partial steps through the **National Action Plan on NonCommunicable Diseases**, which highlights unhealthy diet as a public health priority, but still lacks enforceable measures against marketing unhealthy products to minors (Mohan et al., 2021). Public health organizations, including the Pakistan Nutrition and Dietetic Society (PNDS) and Pakistan National Heart Association (PANAH), have repeatedly called for mandatory restrictions, arguing that voluntary industry commitments are insufficient and inconsistent. Their advocacy reports emphasize that children remain vulnerable targets because Pakistani food companies often align their strategies with global marketing patterns without local oversight (PANAH, 2022).

Recent studies evaluating school environments further indicate that children are continuously exposed to branded fast-food promotions through sponsorships, delivery services, and schooladjacent billboards (Rizvi & Raza, 2022). These findings suggest that even within

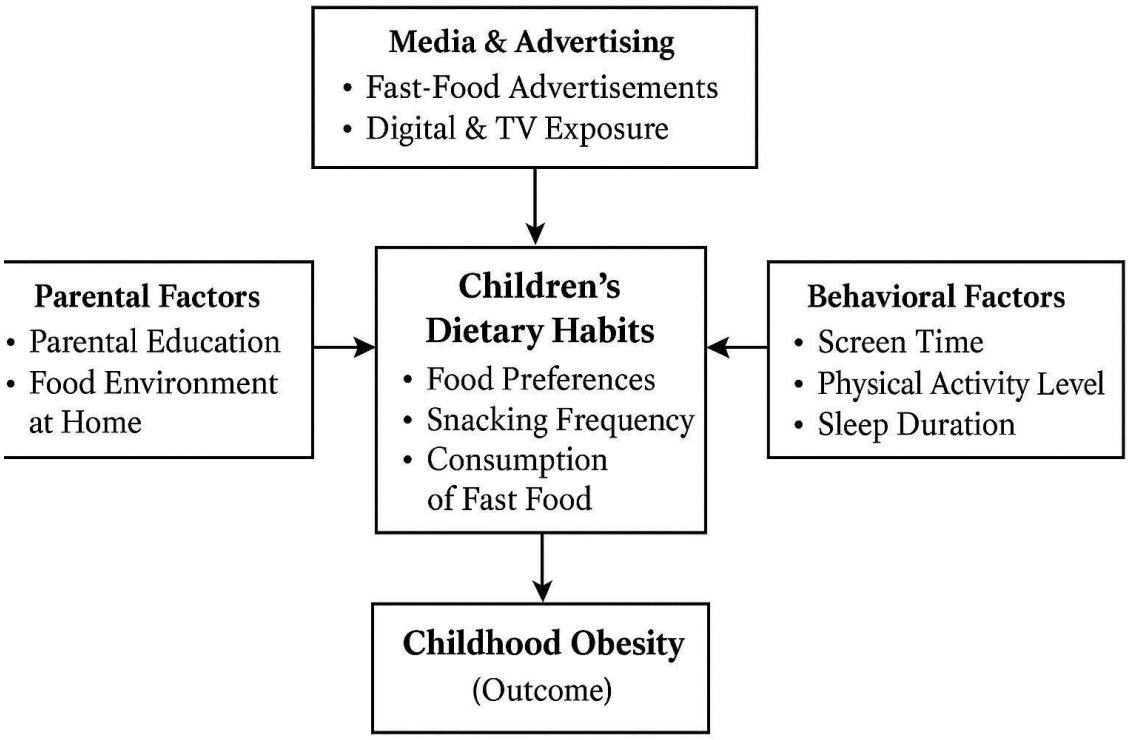
educational settings—traditionally considered safe spaces—there is no regulatory mechanism to limit the visibility of unhealthy food brands. Moreover, Pakistan lacks a standardized nutrient-profiling model to classify foods for advertising purposes, unlike countries such as the UK or Australia. This absence complicates enforcement and allows companies to self-determine what they classify as "healthy," replicating the same challenges seen in international self-regulation frameworks (Yousaf et al., 2023).

2.8 Theoretical Framework

The present study is based on the **Social Cognitive Theory (SCT)** developed by Bandura (1986), which explains how children's behaviors are shaped by the interaction of personal, behavioral, and environmental factors. In this context, fast-food advertisements act as environmental stimuli that influence children's food choices and consumption habits through **observational learning** and **reinforcement** (Bandura, 2001). SCT emphasizes that children's attitudes, preferences, and intentions toward such advertisements can be shaped by repeated exposure, which may subsequently be translated into actual dietary behaviors. These behaviors, if sustained, can contribute to overweight and obesity over time. Using SCT, this study examines the interaction between environmental factors, such as advertising, and behavioral factors, such as dietary habits, while considering moderating factors including parental education, socioeconomic status, and screen time, in influencing childhood obesity.



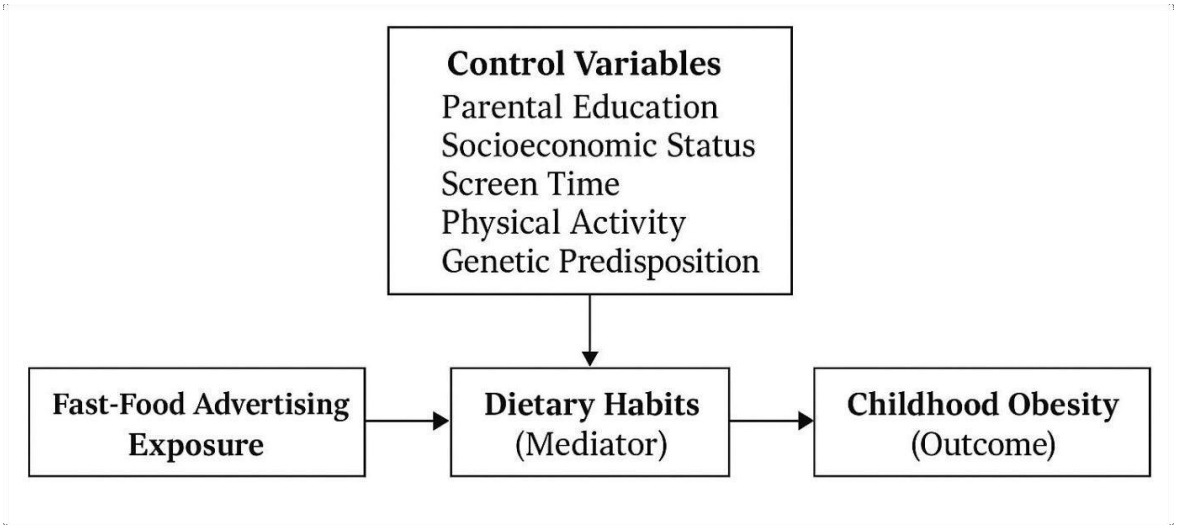
2.9 Conceptual Framework



The conceptual framework of this study is based on the premise that fast-food advertising acts as an external environmental influence that shapes children's dietary behaviors and long-term health outcomes. Exposure to fast-food advertisements, particularly through television, online platforms, and digital media, creates strong food preferences, increases craving for calorie-dense meals, and encourages frequent consumption of unhealthy foods. These advertising-driven shifts in dietary habits form the central pathway linking media exposure to childhood obesity. However, children's weight outcomes do not exist in isolation; they are shaped by a wide set of interacting factors. Parental characteristics such as education level and the home food environment influence how children interpret and respond to advertising. Behavioral factors like screen time, physical activity level, and sleep duration also play a substantial role in determining energy balance and susceptibility to weight gain. Additionally, individual biological factors, including genetics, age, and metabolism, affect how children respond to dietary exposures. Together, these elements form an integrated conceptual framework illustrating how fast-food advertising, dietary habits, and

multiple contextual influences collectively contribute to childhood obesity among school-aged children.

2.10 Research Model



CHAPTER 3

RESEARCH METHODOLOGY

Operational Definitions

Fast-food advertising exposure (FFA) was measured through parent-reported questionnaires on children's exposure to fast-food promotions on TV, social media, and digital platforms, and categorized into high and low exposure using the sample mean as the cut-off. Dietary habits referred to children's consumption of energy-dense, nutrient-poor foods, assessed via parentreported frequency, and classified into healthier and unhealthier patterns based on the mean. Childhood obesity was determined using BMI-for-age categories from WHO standards, classified as underweight, normal weight, overweight, and obese, with overweight and obesity roughly corresponding to the 85th and 95th percentiles, respectively. Control variables included parental education, socioeconomic status, and children's screen time, measured via parent-reported information.

3.1 Research Design

The analytical design of the study was a quantitative cross-sectional study aimed at measuring the association between exposure to fast-food ads and childhood obesity with partiality to the mediating effect of dietary habits among urban school-going children in Rawalpindi and Islamabad. The cross-sectional design was suitable because it allowed collecting data at one time to help establish relationships among advertisement exposure, eating habits, and the effects of obesity.

3.2 Study Setting and Duration

The research was conducted in several urban areas in Rawalpindi and Islamabad such as community centers, parks, shopping malls, and health clinics. The period of data collection was approximately one and a half months, the months of July through mid-August 2025.

3.3 Study Population and Sample Framework

The research was conducted in several urban areas in Rawalpindi and Islamabad such as community centers, parks, shopping malls, and health clinics. The period of data collection was approximately one and a half months, the months of July through mid-August 2025.

3.3.1 Inclusion Criteria

This study targeted parents living in Rawalpindi or Islamabad and had at least one child aged between 5 and 12 years.

3.3.2 Exclusion Criteria

Children with chronic illnesses, including endocrine disorders, genetic syndromes, or long-term drug users might have experienced some modification in their weight or food habits.

3.4 Sampling Technique

This study employed a convenience sampling technique to select participants from the target population. The study population consisted of parents of school-going children aged 5–12 years residing in the urban areas of Rawalpindi and Islamabad. Participants were recruited based on their availability and willingness to participate at the time of data collection.

3.5 Sample Size Calculation

The sample size of the study was calculated with the help of the OpenEPI calculator with the prevalence of childhood obesity in urban Pakistan of 27.7% (Shaheen et al., 2024). It was conducted at the 95% confidence level and 5 percent margin of error. The technique needed a sample size of 246 individuals to guarantee the reliability and statistical power of the study.

3.6 Instrument for Data Collection

A validated questionnaire was used to collect data, adapted from Dalton et al. (2017), covering three domains: demographic information for parents and children, children's exposure to digital media and fast-food advertising, and their fast-food consumption. To gauge parents' perceptions and awareness, additional items assessed whether they set restrictions on their child's fast-food intake, support policies limiting fast-food advertisements aimed at children, and their views on effective strategies to reduce childhood obesity. These perception items were adapted from prior research on parental attitudes toward digital food marketing (Pettigrew et al., 2018; Freeman et al.,

2024).

3.7 Data Analysis Technique

This study employed a quantitative research design. Data were analyzed using SPSS (Statistical Package for the Social Sciences) to summarize demographic characteristics and key survey findings in terms of frequencies, percentages, means, and standard deviations. Associations between categorical variables, such as fast-food advertising exposure and childhood obesity categories, were assessed using chi-square tests.

To examine the proposed conceptual framework and test the mediation effect of dietary habits between fast-food advertising exposure and childhood obesity, the PROCESS macro (Model 4) was applied. This method allowed for evaluation of both direct and indirect effects, providing a clear understanding of the relationships between variables and helping to determine the significance of the pathways within the study setting.

3.8 Ethical considerations

The research process adhered to ethical standards to safeguard the rights, privacy, and safety of the participants. They were requested to provide written informed consent to participate in the study by all the participating parents. They were assured that this information they would give about their children would be used for academic purposes only and no information related to them would be disclosed at any point.

CHAPTER 4

RESULTS

Data for this study were collected from 246 parents of school-going children in Rawalpindi and Islamabad. The responses were largely complete, ensuring a robust and reliable dataset for analysis. The following sections present the results of the study, starting with the demographic characteristics of the participants, followed by analyses of exposure to fast-food advertising, dietary habits, and childhood obesity outcomes.

Table 4.1

Demographic Characteristics of Participants (N = 246)

Variable	Category	n (%)
Child Age (years)	5–7	66 (26.8%)
	8–10	95 (38.6%)
	11–12	85 (34.6%)
Child Gender	Male	101 (41.1%)
	Female	145 (58.9%)
School Type	Public	61 (24.8%)
	Private	168 (68.3%)
	Madrassa	17 (6.9%)
Father's Education	Primary School	8 (3.3%)
	Secondary School	44 (17.9%)
	Bachelor's Degree	113 (45.9%)
	Master's Degree or Higher	81 (32.9%)

Mother's Education	Primary School	8 (3.3%)
	Secondary School	32 (13.0%)
	Bachelor's Degree	126 (51.2%)
	Master's Degree or Higher	80 (32.5%)
Father's Occupation	Government Employee	63 (25.6%)
	Private Sector Employee	92 (37.4%)
	Business / Self-Employed	88 (35.8%)
	Other	2 (0.8%)
Mother's Occupation	Housewife	98 (39.8%)
	Working (Full-time)	51 (20.7%)
	Working (Part-time)	74 (30.1%)
	Self-employed / Business	23 (9.3%)
Household Monthly Income (PKR)	Less than 50,000	12 (4.9%)
	50,000 – 100,000	83 (33.7%)
	More than 100,000	150 (61.0%)

Table 4.1 shows the demographic profile of the 246 parents who are the participants in this study. The distribution of age of children was close with the highest percentage of children falling in the 8-10 age group (38.6%), then they were 11-12 years (34.6%) and 5-7 years (26.8%). The population was majority females (58.9%).

The majority of children attended private schools (68.3%), 24.8% of the children went to the public schools and 6.9% attended madrassas. The level of education of the parents was high in most cases: 45.9% of fathers and 51.2% of mothers had a bachelor's degree and 32.9 and 32.5% of them had a postgraduate degree respectively.

The occupational profiles were of an urban environment, with the fathers predominantly working in the private sector (37.4%), or as self-employed/business owners (35.8%). Mothers were mostly housewives (39.8) with 30.1% working part-time and 20. 7% full-time. The household income statistics revealed that majority of the families earned PKR 100,000 and above per month (61.0%). Altogether, the demographic patterns demonstrate an urban, well-educated population with various backgrounds of schooling and employment that are significant to interpret the following results on parental awareness, media exposure, and health behavior of children.

Table 4.2

Parental Awareness and Child Health Behaviors

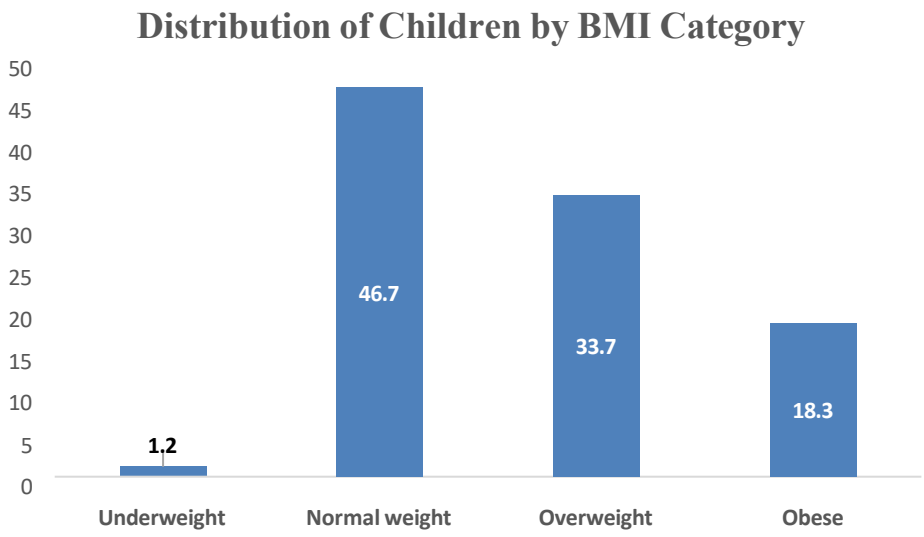
Variable	Response Options	n (%)
Fruit & vegetable intake	Yes	129 (52.4%)
	No	62 (25.2%)
	Not sure	55 (22.4%)
Weekly physical activity (≥60 min/day)	Daily	4 (1.6%)
	5–6 days	13 (5.3%)
	3–4 days	75 (30.5%)
	1–2 days	104 (42.3%)
	Rarely/Never	49 (19.9%)
Awareness of fast-food ad influence	Yes	189 (76.8%)
	No	25 (10.2%)
	Not sure	29 (11.8%)
Awareness of fast-food health risks	Yes	176 (71.5%)
	No	26 (10.6%)
	Not sure	44 (17.9%)

Table 4.2 shows parents' level of awareness and the major health behavior of their children. Only a little more than half of the children (52.4) ate fruits and vegetables every day, 25.2% did not eat fruits and vegetables and 22.4% of parents were indecisive. The level of physical activity was low; 30.5% of the children had 3-4 days of physical activity per week, the highest number (42.3% of children) exercised 60 minutes or more per week, and 19.9% exercised infrequently or not at all.

Parental awareness was also relatively good. A huge percentage of the respondents (76.8) were aware that fast-food advertisements affected the preferences of children towards food and 71.5% were aware that regular consumption of fast-food elevated the probability of developing childhood obesity and associated health issues. Only minor percentages said they were not aware or knew not. Such results present valuable background to the later results that will be conducted on the exposure of children to media and eating habits of fast food.

Figure 4.1

Distribution of Children by BMI Category



The figure above (4.1) shows the distribution of children by BMI. Almost half of the children were of normal weight (46.7%), with a significant percentage of overweight (33.7%), and (18.3) were obese. There were few that were underweight (1.2%). This distribution shows that excess weight is a salient concern within the sample which will be of relevance to the analysis proceeding on the advertisement of fast-food and health behaviors associated with it.

Table 4.3

Exposure to Fast-Food Advertising

Variable	Response Options	n (%)
Daily screen time	Less than 1 hour	14 (5.7%)
	1–2 hours	49 (19.9%)
	3–4 hours	121 (49.2%)
	More than 4 hours	61 (24.8%)
Child's interest after ads	Never	8 (3.3%)
	Sometimes	80 (32.5%)
	Often	102 (41.5%)
	Always	56 (22.8%)
Requests for fast-food items after ads	Yes	220 (89.4%)
	No	26 (10.6%)

Table 4.3 shows how children are exposed to the digital media and respond to fast-food advertisements. Almost fifty percent of children (49.2) spend three to four hours daily on screens, and 24.8% spend more than four hours, which means that they have extensive digital exposure daily. The advertising effect was also noted as most of the children said they were interested in going to fast-food restaurants after watching online material: 41.5% said it often and 32.5 said it sometimes. An impressive majority (89.4%) had ordered fast-food products after viewing recipes posted online, which is the high persuasiveness of digital marketing in relation to the tastes of children regarding food. These trends assist in setting the context of further discussion of consumption patterns and health consequences.

Figure 4.2

Exposure to Fast-Food Advertising Platforms

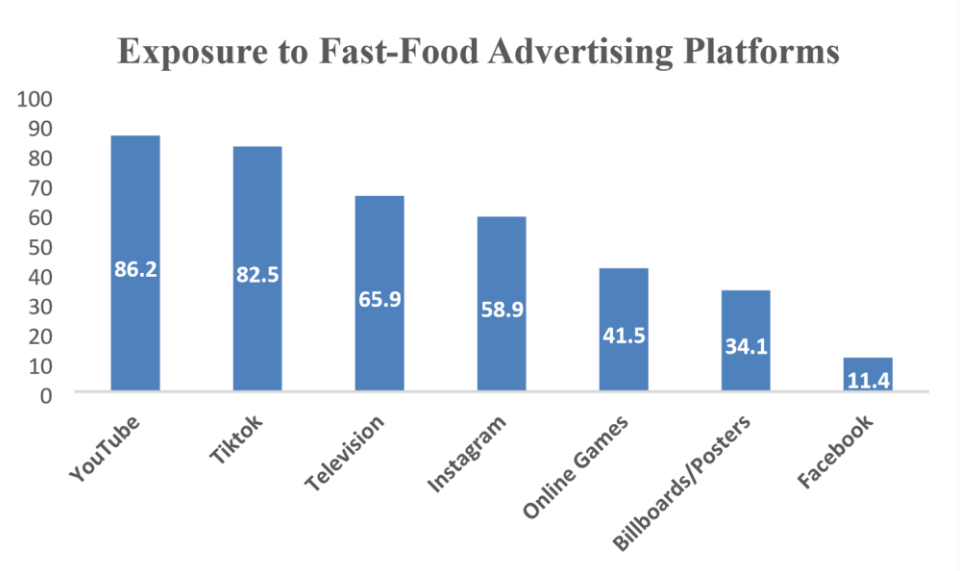


Figure 4.2 indicates the exposure of children to fast-food advertisement across different media. The most popular source was YouTube (86.2% of all children were exposed), followed by TikTok (82.5%) and television (65.9%). Instagram and online games accounted for 58.9% and 41.5% of exposure, respectively, while billboards/posters (34.1%) and Facebook (11.4%) were less common. The questionnaire used a "select all that apply" format, allowing parents to indicate multiple media sources to which their children were exposed. These findings reflect the overall media consumption habits of children and the prevalence of digital media in delivering fast-food advertisements, suggesting that online marketing may influence children's food preferences and consumption habits.

Table 4.4

Fast-Food Consumption Habits

Variable	Response Options	n (%)
Child's fast-food consumption	Never	6 (2.4%)
	1–2 times a month	28 (11.4%)
	1–2 times a week	38 (15.4%)
	More than twice a week	104 (42.3%)
	Daily	70 (28.5%)
Parent's fast-food consumption	Never	18 (7.3%)
	1–2 times a month	61 (24.8%)
	1–2 times a week	110 (44.7%)
	More than twice a week	46 (18.7%)
	Daily	11 (4.5%)
Child prefers fast-food meals with toys/gifts	Yes	210 (85.4%)
	No	36 (14.6%)

Table 4.4 gives an overview of consumption patterns of fast food in children, as well as their parents. A huge percentage of children ate fast foods often and 42.3% of them ate fast foods more than once every week and 28.5% of them ate fast foods daily. The same was true of parental intake as 44.7% of the participants reported eating fast food 1-2 times per week and 18.7% more than once a week. Also, the vast majority of children (85.4) favored dishes that contained toys or presents, which underlines the great popularity of marketing promotions typically employed by fast-food companies. Such patterns of consumption correlate with previous research on the effects of the media and give grounds to the analysis of correlations with weight status and health behaviors later.

Figure 4.3

Preferred Types of Fast Food Among Children

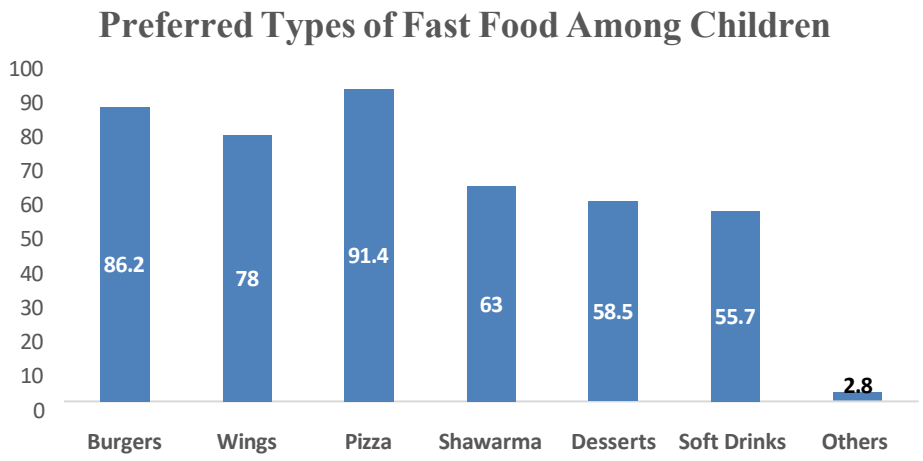
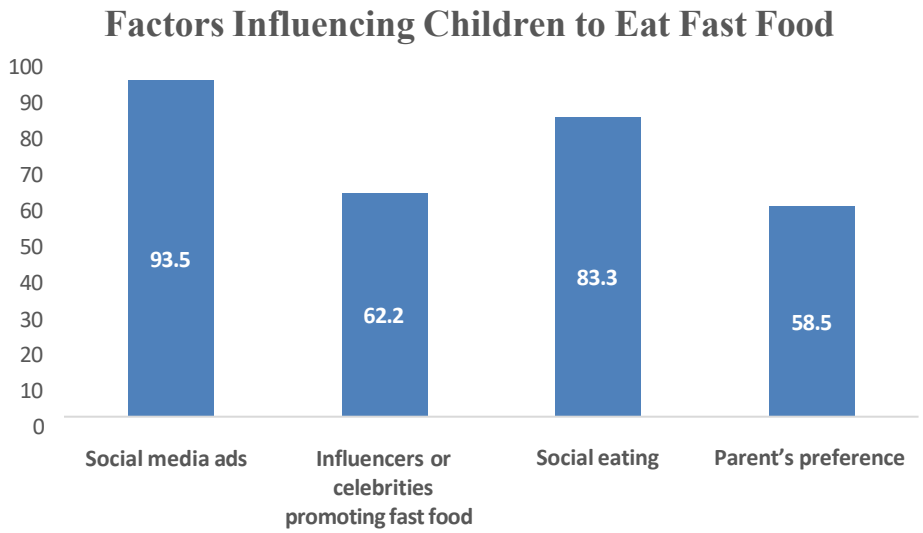


Figure 4.3 represents the preference of children to various kinds of fast food. The most favorite was pizza, 91.4 percent of children preferred pizza, then burgers (86.2) and wings (78.0). Shawarma or roll paratha was popular among 63.0, desserts 58.5 and soft drinks 55.7. The percentage of those who liked other snacks like pasta, noodles, or chips was very minimal (2.8). Such tastes demonstrate the great inclination of children to high calories, commercially advertised foods and give a basis to the analysis of the associations with media exposure, fast-food advertisement, and BMI in further analyses.

Figure 4.4

Factors Influencing Children's Fast-Food Consumption



The key factors that affect children to consume fast foods are shown in Figure 4.4. Advertisements on social media had the strongest impact since 93.5 percent of the children were influenced by it and the second one was social eating among friends or at school (83.3 percent). 62.2 percent of children were influenced by the fast-food promoters or celebrities, and 58.5 percent of children were influenced by their parents. These results indicate the joint effect of digital marketing, peer pressure, and family lifestyles on children eating habits and give background information on their fast-food eating habits and health consequences in later studies.

Table 4.5

Parent's Perceptions and Awareness

Variable	**Response Options**	**n (%)**
Restrictions on child's fast-food intake	Yes, strictly	73 (29.7%)
	Yes, but occasionally allow	117 (47.6%)
	No, I let them eat whatever they like	54 (22.0%)
Support for policies restricting fast-food advertisements targeting children	Yes	199 (80.9%)
	No	5 (2.0%)
	Not sure	39 (15.9%)

Table 4.5 shows the awareness and perception of parents on consumption and advertising of fast food by children. Almost half of the parents (47.6) permitted occasional use, 29.7% imposed tight restrictions and 22.0% had no restrictions. Policies limiting fast-food advertisements to children got a strong majority (80.9 percent) with only 2.0 percent against and 15.9 percent undecided. These results illuminate proactive parental control of the diets of children and popular support of controls on the situation, which is important to understand the connection between media exposure, the intake of fast-food and child health outcomes in later studies.

Figure 4.5

Parent Opinions on Strategies to Reduce Childhood Obesity

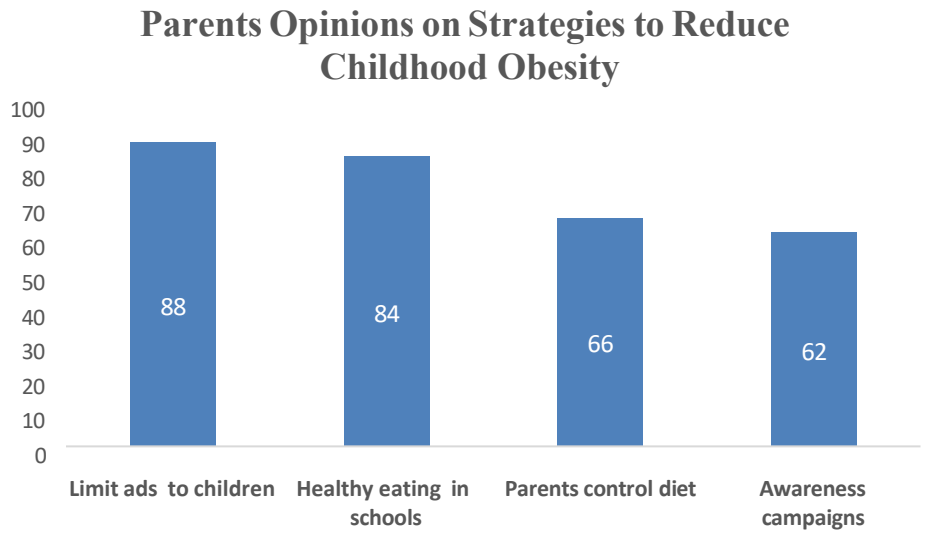


Figure 4.5 depicts the views of parents concerning the measures that could be taken to curb childhood obesity. Most parents agreed with restricting advertising of fast food to children (88) and encouraging healthy diets in schools (84). Most people also preferred to promote parental monitoring of children's eating habits (66%) and more awareness about fast food and health (62%). These results show that the policy and educational interventions are highly supported by parents, which is directly associated with the dietary habits and fast-food advertising exposure of children, and preconditions the discussion of possible measures to improve the health outcomes of children.

Table 4.6

Correlations Between Parental Awareness and Demographic Characteristics

Demographic Variable	Awareness of Fast-Food Ads		Awareness of Obesity Risks	
	ρ	p	ρ	p
School Type	–0.152	0.017	–0.208	0.001
Father's Education	–0.243	<0.001	–0.198	0.002

Mother's Education	–0.186	0.003	–0.314	<0.001
Father's Occupation	0.224	<0.001	0.211	0.001
Mother's Occupation	–	–	–0.210	0.001
Household Monthly Income	–0.168	0.009	–0.191	0.003

Table 4.6 shows the Spearman correlation analysis discussing the correlation of parental awareness with the major demographic variables. The results indicate that there are several relationships that are statistically significant. School type showed a low but significant relationship with the awareness of fast-food advertising (ρ = -0.152, p =.017) and the awareness of obesity risk (p =-0.208, p =.001).Parental education also showed significant associations: fathers' education level correlated with awareness of fast-food advertisements (ρ = –0.243, p < .001) and obesity risks (ρ = –0.198, p = .002), while mothers' education demonstrated a similar pattern (ρ = –0.186, p = .003; ρ = –0.314, p < .001 respectively).

It is important to note that the education variables were coded such that higher numerical values represented lower educational attainment. Therefore, the negative coefficients reflect an inverse coding effect rather than a true decrease in awareness. In practical terms, these results indicate that parents with higher levels of education were more aware of the influence of fast-food advertising and the associated risks of childhood obesity, while parents with lower educational levels demonstrated comparatively lower awareness. Parental occupation and household income also showed small but significant correlations with obesity-risk awareness, suggesting that socioeconomic differences shape how parents perceive health-related risks.

Overall, these findings demonstrate that demographic and socioeconomic characteristics meaningfully influence parental awareness, providing continuity for the further analysis presented in the subsequent sections.

Table 4.7

Association Between Demographic Characteristics and BMI Categories

Variable	Underweight	Normal	Overweight	Obese	p-value
Child's Age					**.005**
5–7 years	3 (1.2%)	25 (10.2%)	22 (8.9%)	16 (6.5%)	
8–10 years	0 (0%)	44 (17.9%)	40 (16.3%)	11 (4.5%)	
11–12 years	0 (0%)	46 (18.7%)	21 (8.5%)	18 (7.3%)	
Child's Gender					.524
Male	2 (0.8%)	43 (17.5%)	38 (15.4%)	18 (7.3%)	
Female	1 (0.4%)	72 (29.3%)	45 (18.3%)	27 (11.0%)	
School Type					.175
Public	0 (0%)	20 (8.1%)	28 (11.4%)	13 (5.3%)	
Private	3 (1.2%)	87 (35.4%)	49 (19.9%)	29 (11.8%)	
Madrassa	0 (0%)	8 (3.3%)	6 (2.4%)	3 (1.2%)	
Father's Education					.784
Primary	0 (0%)	4 (1.6%)	3 (1.2%)	1 (0.4%)	
Secondary	1 (0.4%)	19 (7.7%)	16 (6.5%)	8 (3.3%)	
Bachelor	2 (0.8%)	47 (19.1%)	41 (16.7%)	23 (9.3%)	
Masters+	0 (0%)	45 (18.3%)	23 (9.3%)	13 (5.3%)	
Mother's Education					.700
Primary	0 (0%)	5 (2.0%)	2 (0.8%)	1 (0.4%)	
Secondary	1 (0.4%)	14 (5.7%)	9 (3.7%)	8 (3.3%)	
Bachelor	0 (0%)	58 (23.6%)	47 (19.1%)	21 (8.5%)	
Masters+	2 (0.8%)	38 (15.4%)	25 (10.2%)	15 (6.1%)	
Father's Occupation					.850
Government	1 (0.4%)	32 (13.0%)	15 (6.1%)	15 (6.1%)	
Private	1 (0.4%)	41 (16.7%)	35 (14.2%)	15 (6.1%)	

Business	1 (0.4%)	40 (16.3%)	32 (13.0%)	15 (6.1%)	
Other	0 (0%)	1 (0.4%)	1 (0.4%)	0 (0%)	
Mother's Occupation					.512
Housewife	1 (0.4%)	44 (17.9%)	32 (13.0%)	21 (8.5%)	
Full-time	1 (0.4%)	25 (10.2%)	15 (6.1%)	10 (4.1%)	
Part-time	1 (0.4%)	32 (13.0%)	32 (13.0%)	9 (3.7%)	
Self-employed	0 (0%)	14 (5.7%)	4 (1.6%)	5 (2.0%)	
Household Income (PKR)					.612
<50k	0 (0%)	4 (1.6%)	4 (1.6%)	4 (1.6%)	
50–100k	1 (0.4%)	36 (14.6%)	33 (13.4%)	13 (5.3%)	
>100k	2 (0.8%)	75 (30.5%)	45 (18.3%)	28 (11.4%)	
Awareness: Ads Influence Children					.298
Yes	2 (0.8%)	91 (37.0%)	61 (24.8%)	37 (15.0%)	
No	0 (0%)	14 (5.7%)	7 (2.8%)	5 (2.0%)	
Not sure	1 (0.4%)	10 (4.1%)	15 (6.1%)	3 (1.2%)	
Awareness: Fast Food Increases Obesity Risk					**.049**
Yes	3 (1.2%)	89 (36.2%)	53 (21.5%)	31 (12.6%)	
No	0 (0%)	12 (4.9%)	8 (3.3%)	6 (2.4%)	
Not sure	0 (0%)	14 (5.7%)	22 (8.9%)	8 (3.3%)	
Physical Activity (≥60 min/day)					.242
Daily	0 (0%)	4 (1.6%)	0 (0%)	0 (0%)	
5–6 days	0 (0%)	3 (1.2%)	7 (2.8%)	3 (1.2%)	
3–4 days	0 (0%)	42 (17.1%)	21 (8.5%)	12 (4.9%)	

1–2 days	2 (0.8%)	41 (16.7%)	39 (15.9%)	23 (9.3%)	
Rarely/Never	1 (0.4%)	25 (10.2%)	16 (6.5%)	7 (2.8%)	
Daily Fruit/Vegetable Intake					.144
Yes	2 (0.8%)	69 (28.0%)	33 (13.4%)	25 (10.2%)	
No	1 (0.4%)	25 (10.2%)	27 (11.0%)	9 (3.7%)	
Not sure	0 (0%)	21 (8.5%)	23 (9.3%)	11 (4.5%)	

Table 4.7 summarizes the association between demographic characteristics, parental awareness, lifestyle behavior's, and children's BMI categories. Most demographic factors, including gender, school type, parental education, occupation, and household income, showed no significant association with BMI status. This suggests that weight differences among children in this sample were not determined by typical socioeconomic indicators.

However, two variables demonstrated statistically significant associations. Child age was significantly related to BMI category ($p = .005$), with overweight and obesity more frequently observed in older children. Additionally, parental awareness that fast-food consumption increases the risk of childhood obesity showed a significant association with BMI ($p = .049$). Children whose parents acknowledged these risks were more often represented in the normal-weight category, whereas lower awareness was more common among parents of overweight or obese children.

Overall, these findings indicate that age and parental risk awareness play a more meaningful role in children's BMI outcomes than socioeconomic factors, providing a strong basis for the subsequent analytical interpretations in this chapter.

Table 4.8

Association Between Fast-Food Advertisement Exposure and Childhood Obesity

Fast-Food Advertising Exposure	Underweight n (%)	Normal n (%)	Overweight n (%)	Obese n (%)	Total n (%)
Low Exposure (n = 83)	1 (1.2	39 (47.0)	27 (32.5)	16 (19.3)	83 (33.7)
High Exposure (n = 163)	2 (1.2)	76 (46.6)	56 (34.4)	29 (17.8)	163 (66.3)

$\chi^2(3) = 0.122$, $p = 0.989$.

Note: Two cells (25%) have expected counts < 5; minimum expected count = 1.01.

Table 4.8 presents the association between children's exposure to fast-food advertisements and their BMI categories. Among children with low advertising exposure, 47.0% were of normal weight, 32.5% were overweight, 19.3% were obese, and 1.2% were underweight. In the high exposure group, 46.6% were of normal weight, 34.4% were overweight, 17.8% were obese, and 1.2% were underweight. Overall, the distribution of BMI categories was very similar across the low and high exposure groups.

The chi-square analysis indicates that there is no statistically significant association between fastfood advertisement exposure and childhood obesity in this sample ($\chi^2 = 0.122$, $p = 0.989$). Although there are variations in the proportions, the variations are small and may be as a result of chance. The lowest anticipated number was just under five on two cells, which does not have a significant impact on the validity of the test.

The given findings can lead to the conclusion that in this urban sample of 246 children, the exposure to fast-food advertising does not seem to be directly related to the weight status of children, which can be explained by the fact that there is a possibility of other behavioral, dietary, and environmental factors. This provides continuity for examining additional parental and lifestyle factors in subsequent analyses.

Table 4.9

Combined Model Summary for PROCESS Model 4

Model	R	R^2	MSE	F (df)	p-value
1. Predicting FF_EH1	0.3618	0.1309	0.9504	36.7526 (1, 244)	<0.001
2. Predicting FF_EH2	0.2113	0.0446	0.8598	11.3985 (1, 244)	0.0009
3. Predicting BMI (Outcome)	0.0871	0.0076	0.6091	0.6164 (3, 242)	0.6050

Table 4.9 summarizes the three regression models in PROCESS Model 4. Advertising exposure significantly predicted both components of dietary habits (FF_EH1 and FF_EH2), explaining 13.1% and 4.5% of variance, respectively. However, the model predicting BMI had a very low R^2 (0.0076) and was non-significant (p = 0.605), indicating that neither advertising exposure nor dietary habits explained BMI. These results support the mediation findings that no indirect effect was observed.

Table 4.10

Mediation Analysis Results (PROCESS Model 4)

Effect Type	Effect (b)	SE	p-value	95% CI
Path a (X → M)	1.3167	0.2340	<0.001	0.8558–1.7776
Path b (M → Y)	0.0248	0.0771	0.748	–0.1263–0.1758
Direct effect (c′) (X → Y)	–0.0510	0.2985	0.864	–0.6361–0.5341
Indirect effect (a×b)	0.0326	0.1102	—	–0.1883–0.2598*

Bootstrapped 95% CI (5000 samples).

CI includes zero → indirect effect not significant.

Table 4.10 presents the PROCESS Model 4 mediation analysis testing whether dietary habits (M) mediate the effect of fast-food advertising exposure (X) on children's BMI (Y). Path a shows a strong, statistically significant association between advertising exposure and dietary habits ($b = 1.3167$, $SE = 0.2340$, $p < 0.001$), indicating that greater exposure to fast-food advertisements was associated with less healthy dietary habits. Path b (the association of dietary habits with BMI) was small and not significant ($b = 0.0248$, $SE = 0.0771$, $p = 0.748$), and the direct effect of exposure on BMI (c') was also non-significant ($b = –0.0510$, $SE = 0.2985$, $p = 0.864$). The bootstrapped indirect effect ($a \times b = 0.0326$; 95% CI = –0.1883 to 0.2598, 5,000 samples) includes zero, confirming that dietary habits did not significantly mediate the relationship between advertising exposure and BMI in this sample.

In short: X significantly predicts M (advertising relates to poorer dietary habits), but M does not predict Y, and neither the direct nor indirect paths to BMI reached significance. These findings indicate that although advertising seems to influence the dietary habits of children, it did not translate into differences in BMI that could be detected in the current dataset and indicates that other behavioral, temporal or environmental factors may have contributed to the same.

Hypothesis Testing

The results of this study indicate that exposure to fast-food advertising among urban school-aged children in Rawalpindi and Islamabad did not significantly influence childhood obesity (BMI). Although fast-food advertising significantly affected children's dietary habits, these changes did not translate into significant changes in BMI, and the mediation pathway through dietary habits was not significant.

H1 is rejected, as there is no significant direct association between fast-food advertising and childhood obesity.

H2 is rejected, as dietary habits did not significantly mediate the relationship, although X did influence the mediator.

These findings suggest that while fast-food advertising may shape eating behaviors, other factors likely play a stronger role in childhood obesity outcomes in urban Pakistan.

Table 4.11

Hypotheses Summary

Hypothesis	Statement	Result
H1	Greater exposure to fast-food advertising is positively associated with higher rates of childhood obesity among urban school-aged children	Rejected ($p > 0.05$)
H2	Dietary habits mediate the relationship between fast-food advertising and childhood obesity	Rejected (mediator not significant, $X \rightarrow M$ observed)

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Discussion

The study aimed to investigate the influence of fast-food advertising on children's eating habits, preferences, and weight status in the twin cities of Rawalpindi and Islamabad. Several important trends emerged, offering insight into how digital media exposure interacts with childhood obesity within an urban Pakistani context. Consistent with international literature, the present findings show that children are highly active on online platforms, particularly YouTube and TikTok, where fast-food advertising is extremely common. Over 80% of the sample reported high exposure to such advertisements, aligning with global evidence identifying digital platforms as the most dominant food marketing channels targeting children (Kelly et al., 2019; Smith et al., 2021).

One of the strongest patterns documented in global research is that fast-food advertisements shape children's food preferences and increase their "pester power" toward parents (Boyland & Whalen, 2015). This study supports these observations. A considerable proportion of parents reported that their children requested fast-food items after seeing online advertisements, and more than 40% stated that their children desired restaurant visits following exposure. These outcomes are consistent with findings from Pakistan and other regions showing that persuasive design, celebrity endorsements, and influencer-driven content significantly enhance children's attraction toward fast food (Hastings et al., 2017; Malik & Raza, 2020).

In this sample, exposure to fast-food advertising was not significantly associated with BMI, despite clear behavioral effects. This aligns with research suggesting that immediate behavioral responses do not always translate into measurable weight outcomes, especially in cross-sectional designs (Rummo et al., 2020). BMI is influenced by multiple genetic, lifestyle, and environmental factors, and single-time measurements may fail to capture cumulative effects of sustained exposure.

However, contrasting evidence also exists. Several studies have found a direct and significant association between fast-food advertising exposure and increased BMI among children, a pattern not observed here. For example, Zimmerman and Bell (2010) reported that greater television fast-

food advertising exposure significantly predicted higher BMI in children aged 6–11 years. Similarly, Andreyeva et al. (2011) found that food marketing exposure increased the likelihood of obesity, even after adjusting for physical activity and socioeconomic factors. These contrasting findings suggest that contextual factors, such as dietary autonomy, parental regulation, and media literacy, may moderate the strength of this relationship in different populations.

Mediation analysis from the present data provides deeper insight. Advertising exposure significantly predicted children's dietary behavior, indicating that highly exposed children had lower chances of adhering to healthier diets. This is consistent with international findings showing that fast-food marketing directly shapes consumption patterns (Stoltze et al., 2021). However, dietary behavior did not significantly predict BMI in this sample and therefore did not mediate the relationship between advertising exposure and obesity. Earlier behavioral research similarly notes that dietary changes may take substantial time to manifest as measurable weight change, and this delay is especially common in heterogeneous, mixed-activity groups (Mazarello Paes et al., 2015). This suggests that while advertising clearly shapes behavior, its health consequences unfold more gradually.

Another important finding was the influence of parental demographics, particularly education. Parents with bachelor's and master's degrees demonstrated greater awareness of fast-food marketing practices and obesity risks. Although some negative Spearman coefficients suggested inverse correlations, the broader trend indicates that higher education supports greater health literacy and healthier household practices. These results align with existing research identifying parental education as a strong predictor of health-protective behaviors (Vikram et al., 2018). This is highly relevant to Pakistan, where large variations in health literacy may shape children's exposure, diet, and weight trajectories.

Regarding demographic correlates of BMI, older children were more likely to be overweight or obese, consistent with other studies in South Asia, where increased age often corresponds with greater dietary autonomy and greater fast-food intake (Shinwari et al., 2022). However, no significant associations emerged between BMI and gender, school type, parental occupation, or income. This contrasts with literature proposing socioeconomic status as a key obesity determinant. A possible explanation is that urban families in Islamabad and Rawalpindi, regardless

of SES, may have similar exposure to fast-food options, minimizing SES-related disparities in consumption.

Lastly, parents expressed strong support for interventions such as restricting fast-food advertising and promoting healthy diets in schools, yet these attitudes were not directly reflected in children's BMI outcomes. This awareness–behavior gap is well documented in public health research and typically reflects broader structural barriers, such as easy availability of fast food, aggressive marketing, and normalization of unhealthy eating in urban settings (Swinburn et al., 2019).

Overall, the findings largely align with global evidence showing that fast-food advertising significantly shapes children's dietary behavior, while also highlighting unique contextual factors within Pakistan. Although advertising exposure did not correlate directly with BMI in this sample, the clear behavioral effects suggest that prevention efforts must begin early, focusing on media literacy, healthier food environments, and stronger regulation of child-targeted digital marketing. The results also underscore the need for longitudinal studies to better capture how early exposure and dietary patterns evolve into obesity during later childhood and adolescence.

5.2 Limitations

Although this study provides important insights into the link between fast-food advertising and childhood obesity in Rawalpindi and Islamabad, several limitations must be noted. While stratified random sampling ensured representation of different socioeconomic groups, part of the data came from self-reported online questionnaires, which are prone to recall and social desirability bias. In contrast, about 40% of responses were collected face-to-face in clinics, allowing accurate height and weight measurement, but the use of two data collection modes may have caused slight differences in how questions were interpreted.

The cross-sectional design also limits causal interpretation, as exposure and outcomes were measured at one point in time and may vary with seasonal or behavioral changes. Additionally, the study focused only on urban populations, restricting generalizability to rural areas where media access and lifestyle patterns differ. Voluntary participation may have attracted more healthconscious parents, introducing potential response bias. Despite these limitations, the study

offers meaningful evidence on fast-food marketing and child health behaviors within an urban Pakistani context.

5.3 Future Recommendations

Based on the findings and limitations of this study, several recommendations can guide future research and public health planning. Future studies should use longitudinal designs, as tracking children's eating habits, media exposure, and weight changes over time would help clarify how advertising influences obesity. It is also important to expand research beyond urban areas to include semi urban and rural populations, since differences in lifestyle, media access, and cultural practices may reveal additional risk factors and guide targeted interventions.

Future research should incorporate more objective measures of dietary behavior and media exposure, such as observation, school meal assessments, or digital screen time tracking, to reduce the limitations of self-reported data. Mixed methods can further strengthen evidence, with qualitative interviews offering deeper insight into how children react to fast food advertising and how family routines influence eating habits. At the policy level, stronger regulations on fast food marketing directed at children, especially on platforms like YouTube, TikTok, and online gaming, are needed along with school and community programs that promote media literacy and healthier eating. Finally, future studies should continue examining parental awareness and dietary habits as potential mediators or moderators using larger and more diverse samples. These steps can support stronger research and more effective strategies for reducing childhood obesity in Pakistan.

5.4 Conclusion

This study found that fast-food advertising influences children's dietary habits but does not have a direct or indirect effect on childhood obesity. While advertising shapes food preferences and cravings, it does not independently predict BMI in this sample.

The findings emphasize that childhood obesity is influenced by multiple interconnected factors, including lifestyle behaviors, parental supervision, physical activity, and family routines, rather than advertising exposure alone. Although the hypotheses were not supported, this study highlights the complexity of childhood obesity and underscores the need for comprehensive approaches that address broader environmental and behavioral determinants of children's health.

REFERENCES

1. Agarwal, A., Esmaeel, S. E., Alrawili, R. A., Alanazi, F. B., Alanazi, E., & Alhazimi, A. F. (2024). Perception and Impact of Food and Beverage Marketing on Children's Eating Behaviors and Associated Health Issues. Cureus, 16(5), e61210.

2. Ahmad, A., Riaz, H., & Imran, S. (2022). Impact of television food advertisements on children's dietary behavior in Pakistan. Pakistan Journal of Public Health, 12(1), 14–19.

3. Akbar, R., Nisar, H., & Khan, S. (2022). Food policy and regulation in Pakistan: A review of the Punjab Food Authority's interventions. Asian Social Science, 18(3), 23–30.

4. Cairns, G., Angus, K., Hastings, G., & Caraher, M. (2022). The extent, nature and effects of food promotion to children: A review of the evidence. World Health Organization.

5. Cairns, G., Angus, K., Hastings, G., & Caraher, M. (2023). Systematic reviews of the evidence on the nature, extent, and effects of food marketing to children. Public Health Nutrition, 26(2), 341–356.

6. Cancer Council Australia. (2023). Unhealthy food marketing to children: Trends and impacts.

7. Castelló-Martínez, A., & Tur-Viñes, V. (2020). Obesity and food-related content aimed at children on YouTube. Clinical obesity, 10(5), e12389.

8. Centers for Disease Control and Prevention (CDC). (2023). Childhood Obesity Facts. Retrieved from https://www.cdc.gov/obesity/data/childhood.html

9. Chen, L., Xu, H., & Wang, Y. (2020). Effects of TV and digital food advertising on children's dietary intake: A systematic review. International Journal of Obesity, 44(5), 903–913.

10. Dalton, M. A., Longacre, M. R., Drake, K. M., Cleveland, L. P., Harris, J. L., Hendricks, K., & Titus, L. J. (2017). Child-targeted fast-food television advertising exposure is linked with fast- food intake among pre-school children. Public Health Nutrition, 20(9), 1548–1556. doi:10.1017/S1368980017000520

11. Dalton, M. A., Longacre, M. R., Drake, K. M., Cleveland, L. P., Harris, J. L., Hendricks, K.,
& Titus, L. J. (2017). Child-targeted fast-food television advertising exposure is linked

with Demers-Potvin S. (2021). Unseen Influence: The role of covert digital marketing in children's food choices. Public Health Nutrition, 24(3), 421–430.

12. Emond, J. A., Lansigan, R. K., & Gilbert-Diamond, D. (2021). Food and beverage cues in children's media: A content analysis and implications for obesity prevention. Childhood Obesity, 17(6), 387–393.

13. Emond, J. A., Utter, H., Eschholz, A., Chang, V., Gottlieb, M. A., & Sargent, J. D. (2021). Promotion of Meal Premiums in Child-Directed TV Advertising for Children's Fast-food Meals. Pediatrics, 147(6), e2020042994.

14. Ertz, M., & Le Bouhart, G. (2022). The other pandemic: a conceptual framework and future research directions of junk food marketing to children and childhood obesity. Journal of Macromarketing, 42(1), 30-50.

15. Folkvord, F., & Hermans, R. (2020). Food marketing and eating behavior in children and adolescents: A review of experimental studies. Appetite, 148, 104–122.

16. Gatou, T., Mamai-Homata, E., Koletsi-Kounari, H., & Polychronopoulou, A. (2016). The short- term effects of television advertisements of cariogenic foods on children's dietary

17. Global Center for Preventive Health. (2024). Food advertising regulations and gaps in global child protection.

18. Hameed, A., Zahid, S., & Ali, S. (2021). Fast food consumption and its association with overweight in children aged 6–12 years in Lahore, Pakistan. BMC Nutrition, 7(1), 27.

19. Haroon, M., Qureshi, T. M., Zia-ur-Rehman, M., & Nisar, M. (2011). Does the food advertisement on television have the impact on Children's food purchasing behavior? A study based on Pakistan food advertisement. International Journal of Business and Management, 6(1), 283

20. Harris, J. L., Fleming-Milici, F., & Frazier, W. (2022). Fast food advertising in 2021: Youth exposure and company pledges. Rudd Center for Food Policy and Health.

21. Harris, J. L., Graff, S. K., & Ustjanauskas, A. (2021). Fast food marketing to children and adolescents. Annual Review of Public Health, 42, 345–363.

22. Herédia, A. M., Hipólito, J., Nunes, O., Ribeiro, L., Moura, T., & Laneiro, T. (2017).

FastFood Marketing strategies and their impact on childhood obesity. Journal of Spatial and Organizational Dynamics, 5(3), 296-315.

23. Iqbal, M., Tariq, R., & Ahmad, M. (2023). Psychosocial outcomes of childhood obesity in urban Pakistan: A mixed-methods study. Journal of Adolescent Health in South Asia, 2(2), 44–53.

24. Jia, P., Luo, M., Li, Y., Zheng, J. S., Xiao, Q., & Luo, J. (2021). Fast-food restaurant, unhealthy eating, and childhood obesity: a systematic review and meta-analysis. Obesity Reviews, 22, e12944.

25. Junk food television advertisements in pakistan and eating behavior of children. (2022). Pakistan Journal of Social Research, 4(03), 1075-1082.

26. Kashif, M., Ayyaz, M. and Basharat, S. (2014), "TV food advertising aimed at children: qualitative study of Pakistani fathers' views", Asia Pacific Journal of Marketing and Logistics, Vol. 26 No. 4, pp. 647-658. https://doi.org/10.1108/APJML-04-2014-0063

27. Kelly B, Vandevijvere S, Ng S, et al. (2020). Global benchmarking of children's exposure to television advertising of unhealthy foods and beverages across 22 countries. Obesity Reviews, 20(S2), 116–128.

28. Khan, A., Baig, S., & Hussain, R. (2021). Eating habits of working families and their impact on child health in Pakistan. International Journal of Community Medicine and Public Health, 8(4), 1901–1907.

29. Kiefner-Burmeister, A. E., Hoffmann, D. A., & Meers, M. R. (2020). Food marketing and children's taste preferences: The role of branding in shaping eating behavior. Appetite, 144, 104475.

30. Kumar, A., Kulchar, R. J., Khadka, N., et al. (2023). Maternal–child consumption of ultraprocessed foods and sugar-sweetened beverages in informal settlements in Mumbai, India.
Journal of Health, Population and Nutrition, 42, 142.

31. Lee, A., Khine, M., & Kumar, R. (2020). Fast food marketing and dietary behaviors among children: Evidence from global school-based surveys. Nutrients, 12(11), 3278.

32. Livingstone, S., & Boyland, E. (2021). Food marketing and children's rights. Obesity

Reviews, 22(S1), e13211.

33. Lobstein, T., & Temple, N. J. (2022). Digital food marketing: New risks for childhood obesity. World Nutrition Journal, 13(1), 10–19.

34. Lobstein, T., Jackson-Leach, R., & Moodie, M. (2023). Evaluating the effectiveness of food marketing regulations on children's dietary behaviors and obesity risk: A global review. Obesity Reviews, 24(1), e13500.

35. Malik, S., Rafiq, M., & Bashir, N. (2021). Nutritional profiling of urban Pakistani children: A quantitative dietary assessment. Pakistan Journal of Nutrition, 20(2), 88–95.

36. McCarthy, M., Holub, C. K., & Wright, J. (2022). Associations between exposure to sugary drink ads and consumption patterns in children: A cross-sectional study. BMC Public Health, 22(1), 1243.

37. Nasser, R., Abu Shady, M., & Saad, R. (2021). Advertising, children, and family food choices in the Middle East: A cross-cultural analysis. Health Promotion International, 36(1), 173–181.

38. Norman, J., Kelly, B., Boyland, E., & McMahon, A. T. (2016). The impact of marketing and advertising on food behaviours: evaluating the evidence for a causal relationship. Current Nutrition Reports, 5, 139-149.

39. Pew Research Center. (2022). Teens, Social Media and Technology.

40. Qutteina, Y., Hallez, L., Raedschelders, M., De Backer, C., & Smits, T. (2021). The development and evaluation of food marketing literacy among children: An integrative review. Appetite, 163, 105223.

41. Roberto, C. A., Baik, J., Harris, J. L., & Brownell, K. D. (2021). Influence of branding and packaging on children's food preferences. Appetite, 157, 104985.

42. Russell, S. J., Croker, H., & Viner, R. M. (2022). The effect of screen advertising on children's dietary intake: A systematic review and meta-analysis. Obesity Reviews, 23(2), e13401.

43. Shaheen, R., et al. (2024). Prevalence of obesity among children in urban Pakistan: A community-based study. Frontiers in Public Health, 12, 1475455.

44. Smith, R., Freeman, B., & Jenkin, G. (2022). The impact of food marketing exposure on children's dietary behavior: A rapid review. BMJ Global Health, 7(8), e008706.

45. Swinburn B, Egger G, Raza F. (1999). Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. Preventive Medicine, 29(6), 563–570.

46. UNICEF. (2023). Marketing unhealthy food to children: Policy gaps and opportunities.

47. Veerman, J. L., Van Beeck, E. F., Barendregt, J. J., & Mackenbach, J. P. (2020). By how much would limiting TV food advertising reduce childhood obesity? The European Journal of Public Health, 30(4), 609–614.

48. Waheed, H., Jamil, M., & Saleem, F. (2020). Influence of neighborhood food environment on children's dietary choices in urban Pakistan. Health Promotion Perspectives, 10(4), 276–283.

49. WHO. (2022). Digital marketing of food and beverages to children.

50. World Health Organization. (2023). Monitoring and restricting digital marketing of unhealthy products to children and adolescents.

51. World Obesity Federation. (2022). Childhood obesity and food marketing: Global statistics and policy response.

52. Agarwal, A., Esmaeel, S. E., Alrawili, R. A., Alanazi, F. B., Alanazi, E., & Alhazimi, A. F. (2024). Perception and Impact of Food and Beverage Marketing on Children's Eating Behaviors and Associated Health Issues. *Cureus*, *16*(5), e61210.

53. Watson, W. L., Johnston, A., Hughes, C., & Chapman, K. (2014). Determining the 'healthiness' of foods marketed to children on television using the F ood S tandards A ustralia N ew Z ealand nutrient profiling criteria. Nutrition & Dietetics, 71(3), 178-183.

54. Esdaile, E., Owen, K. B., Xu, H., Baur, L. A., Rissel, C., & Wen, L. M. (2021). Strong support for broad policies to prevent childhood obesity among mothers in New South Wales, Australia. Health promotion journal of Australia : official journal of Australian Association of Health Promotion Professionals, 32(2), 197–207.

55. Boyland, E. J., Nolan, S., Kelly, B., Tudur-Smith, C., Jones, A., Halford, J. C., & Robinson, E. (2016). 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. The American journal of clinical nutrition, 103(2), 519–533. https://doi.org/10.3945/ajcn.115.120022.

56. Powell, L. M., Wada, R., Khan, T., & Emery, S. L. (2017). Food and beverage television advertising exposure and youth consumption, body mass index and adiposity outcomes. The Canadian journal of economics. Revue canadienne d'economique, 50(2), 345–364. https://doi.org/10.1111/caje.12261

57. Liberali, R., Kupek, E., & Assis, M. A. A. D. (2020). Dietary patterns and childhood obesity risk: a systematic review. Childhood obesity, 16(2), 70-85.

Parental Survey on Fast Food Advertising and Childhood Obesity

Informed Consent

Please read the following information before beginning the questionnaire:

This survey is part of an undergraduate research study examining how exposure to fast-food advertising influences childhood obesity among school-aged children in Rawalpindi and Islamabad. Your participation is completely voluntary. You may skip any question or withdraw at any time without any penalty.

All information you provide will remain anonymous and confidential, and no names or identifying details will be collected. There are no risks associated with participating in this study. Although you may not receive any direct personal benefit, your responses will contribute valuable insights for public health research.

By selecting *"Yes, I agree,"* you confirm that:

- You have read and understood the above information.
- You are the parent/guardian of a child aged 5–12 years.
- You voluntarily agree to participate in this study and allow your child's information to be used for research purposes.

Do you agree to participate in this study?

☐ **Yes, I agree to participate**

☐ **No, I do not agree to participate**

Section A: Demographic Information

1. Child's Age: ___years

2. Child's Gender:
   ☐ Male
   ☐ Female

3. Child's Height (in inches): _____inches

4. Child's Weight (in kilograms): _____kg

5. School Type:
   - ☐ Public
   - ☐ Private
   - ☐ Madrassa

6. Parent's Education Level:
   - ☐ No formal education
   - ☐ Primary school
   - ☐ Secondary school
   - ☐ Bachelor's degree
   - ☐ Master's degree or higher

7. Household Monthly Income (PKR): _____

Section B: Digital Media & Fast-Food Advertising Exposure

8. How much time does your child spend on screens (TV, mobile, tablet, laptop) daily?

9. Which media platforms does your child use most frequently? (Select all that apply)
   - ☐ Television
   - ☐ YouTube/YouTube Kids
   - ☐ TikTok
   - ☐ Instagram
   - ☐ Facebook
   - ☐ Gaming apps (e.g., PUBG, Free Fire)
   - ☐ Other (please specify): _____

10. Where does your child mostly see fast-food advertisements? (Select all that apply)
    - ☐ Television commercials
    - ☐ YouTube ads
    - ☐ TikTok videos/reels
    - ☐ Instagram ads/stories
    - ☐ Facebook ads
    - ☐ Gaming apps (ads inside mobile games)
    - ☐ Other (please specify): _____

11. Which type of fast food has your child been exposed to through digital advertisements or influencers?

(Select all that apply)

- ☐ Burgers
- ☐ Fried chicken
- ☐ Pizza
- ☐ Sandwiches/subs
- ☐ Desserts (ice cream, donuts, etc.)
- ☐ Other (please specify): _____

12. Does your child express interest in visiting fast-food restaurants after watching digital advertisements or influencers promoting them?

- ☐ Never
- ☐ Sometimes
- ☐ Often
- ☐ Always
- ☐ Depends on how appealing the advertisement is

13. Has your child ever requested specific fast-food items after seeing an online advertisement?

- ☐ Yes
- ☐ No

Section C: Fast-Food Consumption Habits & Frequency

14. How often does your child consume fast food?

- ☐ Never
- ☐ 1-2 times a month
- ☐ 1-2 times a week
- ☐ More than twice a week

15. Which type of fast food does your child prefer the most? (Select all that apply)

- ☐ Burgers
- ☐ Fried chicken
- ☐ Pizza
- ☐ Sandwiches/subs
- ☐ Shawarma/Roll Paratha

☐ Desserts (ice cream, donuts, etc.)
☐ Other (please specify): _____

16. What influences your child the most to eat fast food? (Select all that apply)

☐ Social media ads (YouTube, TikTok, Instagram, etc.)
☐ Influencers or celebrities promoting fast food
☐ Social eating (friends, school environment)
☐ Parent's preference
☐ Taste and fun experience

17. Does your child prefer fast-food meals that come with toys/gifts (like Happy Meals)?

☐ Yes
☐ No

Section D: Parental Attitudes & Policy Support

18. Do you set any restrictions on your child's fast-food intake?

☐ Yes, strictly
☐ Yes, but occasionally allow
☐ No, I let them eat whatever they like

19. Would you support policies restricting fast-food advertisements targeting children?

☐ Yes
☐ No
☐ Not sure

20. In your opinion, what would be the best way to reduce childhood obesity related to fast food?

(Select all that apply)

☐ Limiting fast-food advertising to children
☐ Promoting healthy eating habits in schools
☐ Encouraging parents to control their child's diet
☐ Increasing awareness campaigns about fast food and health

Sidra Shahid

Fateha Zafar Thesis 01-152221-006 BS PH-8A

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