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Trinity Saint David
BIRMINGHAM

**MSc Public Health and
Social Care in Practice**

**THE IMPACT OF FOOD ENVIRONMENT IN CHILDHOOD OBESITY IN THE UK:
A SYSTEMATIC REVIEW**

Full Name - NAVEENA DOORU

Student Number - 2309989

Supervisor Name – Dr Fahad Khan

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DECLARATION

I, Naveena Dooru declare that this dissertation has been composed by myself, that the work contained herein is entirely my own except where explicitly stated otherwise in the text, and that this work has not been submitted for any other degree or qualification, in whole or in part, except as specified.

Signature: Naveena Dooru

Date: 10- 09- 2024

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ABSTRACT

In the UK, childhood obesity is becoming a more serious public health issue that has a big impact on people's health as well as healthcare systems. It has been shown that one of the main factors impacting children's eating habits is the food environment, which includes the availability, accessibility, affordability, and marketing of unhealthy food alternatives. In order to better understand how the food environment affects childhood obesity in the UK, this dissertation will concentrate on the many ways that different factors influence children's unhealthy eating patterns. The study examined data from children aged 5 to 18 with the aim to determine whether exposure to food environments and obesity rates are related. Qualitative studies also shed light on the perceived difficulties and obstacles parents encounter when trying to encourage healthy eating in the contemporary food environment. The results show a substantial correlation between children's obesity rates and exposure to unhealthful eating situations. Poor dietary choices are mostly caused by factors like the abundance of fast-food restaurants, the aggressive marketing of high-calorie, low-nutrient meals, and the difficulty in finding reasonably priced, healthful options.

The study comes to the conclusion that while the food environment is a major contributing factor to childhood obesity, further investigation is necessary to completely comprehend the interactions between a number of variables, such as socioeconomic position, education, and governmental laws. To effectively reduce childhood obesity in the UK, comprehensive interventions addressing individual behaviours as well as systemic changes in the food environment are required.

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ABBREVIATIONS

PA – Physical activity

UK – United Kingdom

NHS – National health service

WHO – World Health Organization

BMI - Body mass index

NICE - National Institute for Health and Care Excellence

NCMP - National Child Measurement Programme

WAVES -West Midlands Active lifestyle and healthy eating in school children

QATSDD - Quality Assessment Tool for Studies with Diverse Designs

LEAF - Lifestyles, Eating and Activity for Families

RCT - Randomised controlled trials

NGO – Nongovernmental organisation

SLR – Systematic literature review

CASP – Critical appraisal skills programme

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction to the topic

The World Health Organisation lists childhood obesity as one of the most significant public health issues of the twenty-first century, given its sharp rise over the previous three decades. (World Health Organisation, 2024).

A modern condition that starts in early childhood is obesity. When they first start school, more than one in five children in the UK are overweight (National Health Service, 2024).

This is concerning because obese kids are said to have low self-esteem and are more likely to acquire conditions like asthma and type 2 diabetes mellitus. Once acquired, obesity persists into adulthood and is associated with an increased risk of heart disease and many cancers. Thus, reducing obesity is an important public health objective (Zayadeen et al., 2024).

Worldwide, it was estimated that over 43 million children over the age of five were overweight in 2010. Governments and researchers now prioritise preventing childhood obesity. In order to avoid excessive childhood weight growth, a lot of obesity therapies have concentrated on changing an individual's behaviour. However, this approach has typically only shown temporary reductions in obesity and associated risk factors. This is partly because it is challenging to alter behaviour in a setting that is increasingly encouraging of a high energy intake and sedentary lifestyle (Stewart, 2024).

The food environment includes all of the external factors that impact a person's dietary preferences and calorie intake. These elements include food's physical availability and accessibility, economic considerations like food pricing and household income, and social impacts like marketing strategies and societal standards. The interaction of these components influences dietary behaviors and, as a result, health outcomes. In the context of childhood obesity, the food environment has a considerable influence on children's eating habits, either encouraging healthy choices or allowing the intake of high-calorie, low-nutrient items (Jia, 2021).

1.2 Background and Current Context

Key issues being investigated include the availability, accessibility and affordability of healthy and unhealthy foods, marketing techniques, socioeconomic impacts, and interventions. Food availability, affordability and accessibility refer to how simple or difficult it is for children and their families to get nutritious foods such as fruits, vegetables, and whole grains, as opposed to processed, calorie-dense choices such as fast food and sugary snacks (Daniels et al., 2021).

Matsuzaki et al., (2020) states that Marketing techniques are the strategies that food firms employ to encourage unhealthy eating choices. Specifically, how marketing targeting youngsters might influence their choices and purchasing behaviours. Socioeconomic impacts include the impact of family income, education, and social standing on dietary choices.

A lower socioeconomic level is frequently associated with greater rates of obesity due to the restricted availability of healthful foods and recreational activities. Urban planning is concerned with the physical layout and infrastructure of communities, such as the density of fast-food outlets and grocery shops, the availability of safe physical exercise places, and the general form of neighbourhoods, all of which either assist or impede healthy living (Pineda et al., 2021).

Boyd Swinburn coined the term "obesogenic," defining it as "the collection of factors that the environment, opportunities, or conditions of life have on fostering obesity in individuals or populations." (Reis et al., 2020).

Drichoutis et al., (2015) states that obesogenic environment refers to an atmosphere that encourages weight increase while discouraging weight reduction. It describes numerous features of the food environment that lead to increased obesity rates, particularly among children.

The obesogenic environment includes the widespread availability of unhealthy foods, heavy marketing of high-calorie snacks and sugary beverages, socioeconomic inequities that limit access to healthier choices, and urban designs that discourage physical activity. Understanding these aspects is critical in combating the worldwide epidemic of obesity (Rahman et al., 2011).

Individuals are involved in many micro-environments, such as schools, homes, and neighborhoods. As a result, larger macroenvironments such as the food industry, government, health systems, and societal perspectives have an impact on them.

Reducing childhood obesity can be achieved by long-term behavioural changes brought about by altering the "obesogenic" environment (Gittelsohn et al., 2017).

The UK government has launched multiple initiatives aiming at improving the food environment and encouraging children to live healthier lifestyles. For example, the Soft Drinks Industry Levy also referred to as the sugar tax, was implemented to limit the consumption of sugary beverages. Despite the efforts, there are still obstacles to developing a food environment that promotes healthy eating for all children (Dietz et al., 2022).

Miller et al., (2014) emphasised that there is a need for more comprehensive and integrated policies that cover all aspects of the food system. For example, urban planning strategies must emphasize the creation of communities that promote access to nutritious foods and safe physical activity areas.

Low levels of physical activity and an increase in sedentary behavior which includes screen-based activities like social media, computer/tablet/phone gaming, and television are strongly associated with chronic illnesses, including obesity. According to guidelines in the UK and many other countries, pre-schoolers should be physically active for three hours each day, and school-aged children should participate in moderate-to-intense physical exercise for at least sixty minutes each day. However, a lot of children don't achieve these goals (Crocker et al., 2012).

The use of body mass index (BMI) centiles for the clinical evaluation of obesity in children under the age of two is not advised. Weight at or above the 95th centile for height for age and gender in this age group denotes greater risk. Plotting weight and height on the proper growth reference should be done with calibrated equipment. The UK growth chart for the 0-4 years and the UK growth chart for the 2-18 years are among the charts.

Overweight is defined as a BMI at or above the 91st centile, and obesity as a BMI at or above the 98th centile, based on the UK guideline for children over the age of two (Olstad et al., 2020).

Existing research on the food environment and childhood obesity has shed light on the elements that influence children's poor eating habits and weight increase.

Studies have consistently demonstrated that the availability of unhealthy foods, aggressive marketing methods, socioeconomic inequities, and poor urban design all contribute significantly to childhood obesity. However, there are still research gaps that must be addressed to produce more effective interventions (Anderson Steeves et al., 2014).

The influence of internet marketing on children's food choices is one area that needs to be explored further. Understanding how internet marketing impacts children's eating behaviours is critical as they utilize digital media more often.

Therefore, there are still gaps that must be filled to build a holistic strategy to enhance the food environment. This research endeavour seeks to produce recommendations based on evidence that can impact policy and practice, eventually contributing to the decrease of childhood obesity in the United Kingdom (Welker et al., 2016).

1.3 Rationale for Research or Problem Statement-

Childhood obesity is a major public health concern in the UK, with roughly one in every five children aged 10 to 11 categorized as obese. This study subject was chosen because it has major health, social, and economic implications. The goal of studying the effects of the food environment on childhood obesity is to find actionable insights that can be used to guide successful public health policies and treatments. This study intends to shed light on how factors such as food availability, marketing strategies, socioeconomic position, and urban planning contribute to childhood obesity by conducting a comprehensive review of current literature. The scope of this study is characterized by a concentration on research undertaken in the United Kingdom, addressing children aged 5 to 18.

1.4 Research question

What is the impact of the food environment on childhood obesity in the UK, and how are specific factors of the food environment most influential in contributing to childhood obesity?

1.5 Research Aim –

To comprehensively evaluate and synthesize existing research on determining specific factors of the food environment such as food availability, accessibility, affordability, marketing, and socioeconomic factors, influence childhood obesity in the United Kingdom, and to provide evidence-based recommendations for effective interventions and policy measures to address this public health issue.

1.6 Research Objectives

- Evaluate the Relationship Between Childhood Obesity and the Food Environment
- To identify potential barriers to addressing childhood obesity.
- Provide Evidence-Based Policy Recommendations to address the issue.

1.7 Chapter summary

The significance of the food environment in impacting childhood obesity in the UK is examined in the introduction chapter. It draws attention to the dramatic rise in the rates of childhood obesity and links these trends to things like greater adverse food options available, aggressive marketing, and socioeconomic inequality. In order to improve children's health outcomes, this chapter sets the scene by highlighting the significance of addressing the obesogenic dietary environment. Key research topics and objectives that will direct the investigation are also presented. A thorough overview of research on childhood obesity and the food environment in the UK will be provided in the second chapter, which will go further into the body of current literature.

CHAPTER 2: LITERATURE REVIEW -

2.1 Introduction to Literature Review Chapter

This literature review investigates the effect of the food environment on childhood obesity in the United Kingdom. It thoroughly examines existing studies, concentrating on how many aspects of the food environment, such as food availability, accessibility, affordability, marketing, and socioeconomic variables, impact dietary behaviours and obesity rates in children. The chapter critically analyses historical patterns, current findings, and analytical methods, highlighting major topics and identifying gaps in the literature. Its goal is to contextualize the present study within the larger academic discourse, defining its importance and directing the development of research questions.

2.2 Literature review:

Childhood Obesity has become a significant public health issue in the UK and globally, with an increase in prevalence over the past 30 years (WHO, 2023). Obesity has doubled in the UK over the last 25 years, with projections of 40% of adults becoming obese by 2025 (NHS, 2020).

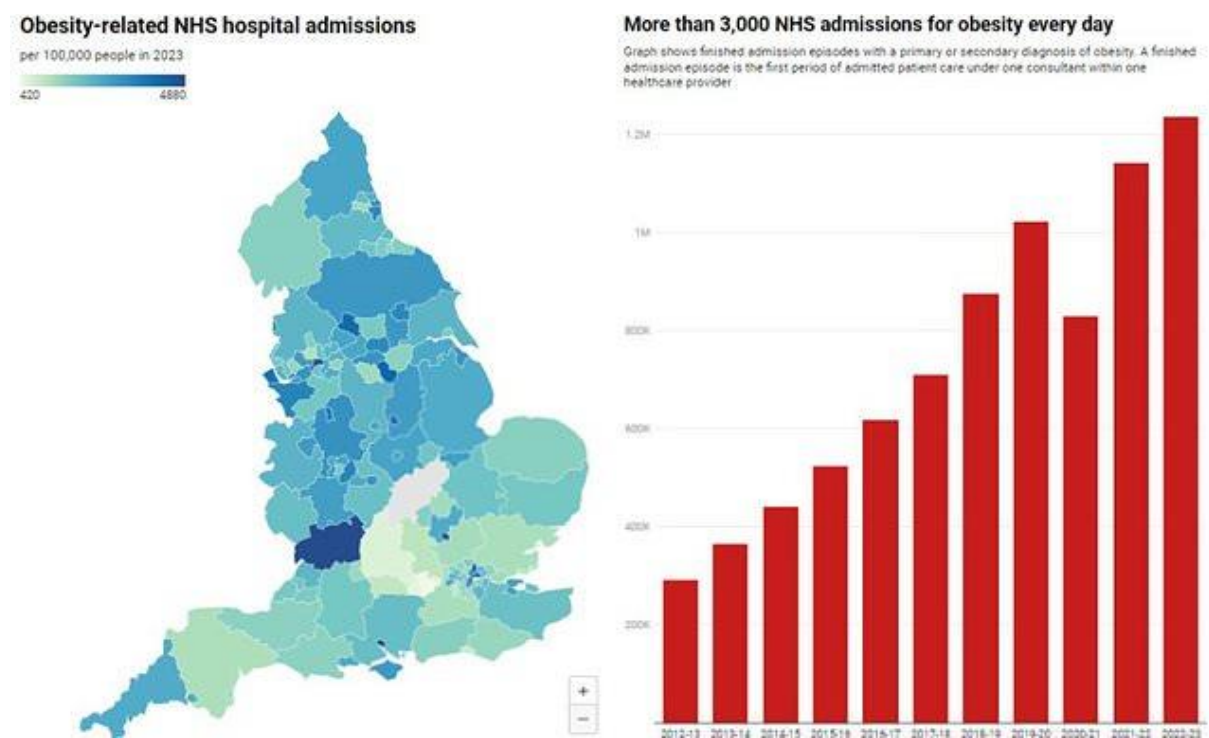


Figure 1 - 1.2million NHS hospitalisations involving obesity in England in 2023 (NHS, 2023)

More than one child in five who enters school in the United Kingdom is overweight. This is important since children who are obese are more prone to develop low self-esteem and conditions like asthma and type 2 diabetes mellitus. Once developed, obesity lasts into adulthood and is associated with a higher risk of heart disease and some types of cancer. Therefore, reducing obesity is a crucial public health objective (Lanigan and Brandreth, 2019).

This literature review covers previous studies on how the food environment leads to childhood obesity, giving a systematic and logical argument that serves as a solid foundation for the current investigation (Lockyer and Spiro, 2019).

Food Availability and Accessibility –

Qualitative research has shown that food availability and accessibility are important in changing dietary behaviours. Olstad et al., (2020) conducted focus groups with parents and children in metropolitan settings to investigate views of local food ecosystems. Participants commonly highlighted the prevalence of fast-food restaurants and the lack of supermarkets that sell fresh produce as major impediments to healthy eating. Children said that the ease and availability of fast-food outlets made it difficult to select healthy choices.

Similarly, Lopez-Carmen et al., (2021) interviewed low-income families and discovered that limited access to supermarkets pushed them to rely on local convenience stores, which frequently lacked healthful food selections. Parents expressed annoyance with the difficulties of getting inexpensive, fresh vegetables, emphasizing the impact of these limits on their children's nutrition quality.

The findings from Sawyer et al., (2021) show that Low-income communities' poor nutritional consumption is an emergent feature of a complex adaptive system that keeps unhealthy foods more widely available, reasonably priced, and socially acceptable. Simultaneous, diverse, and innovative approaches are needed to support long-term management of household finances and socially conscious activities centred around the production, supply, and consumption of healthy food in order to change the system dynamics that underpin unhealthy food environments. Lastly, a system paradigm that places a high priority on health is required to enable such initiatives.

However, Griffiths et al., (2014) conducted a cross-sectional study that found no evidence to support the hypothesis that exposure to food outlets in the home, school, and commute areas increases children's obesity risk. The data does not appear strong enough to justify the present government interventions/recommendations, and policymakers should proceed with care when developing regulations to limit food outlets.

Affordability –

Belon et al., (2020) found that families from diverse socioeconomic backgrounds understand the economic barriers to healthy eating. Many low-income participants said the high cost of fresh fruits, vegetables, and lean proteins frequently drove them to buy less nutritious meals. Parents felt guilty and concerned about their inability to offer healthier meals for their children owing to budgetary restrictions.

Furthermore, Dammann and Smith, (2021) used photo-elicitation interviews to investigate low-income parents' food shopping behaviours. Participants submitted photographs of their shopping receipts and spoke about how difficult it is to balance their budget while purchasing nutritional items. The study indicated that economic pressures usually resulted in concessions on food quality, adding to unhealthy eating habits among children.

Similarly, Puddephatt et al., (2020) found Income was the most important issue impacting participants' dietary choices, with all expressing a continual struggle to purchase food. Food choices were mostly cost-driven; most participants appreciated eating healthily but couldn't afford to do so. Food constraint strategies included skipping meals, eating tiny quantities, preparing in bulk, and emphasizing children's food consumption.

Consequently, a large number of participants disclosed pre-existing issues with their physical and mental health, which were made worse by their restricted food options, leading to a vicious cycle of stress and deteriorating health.

Socioeconomic factors –

Adams et al., (2019) used ethnographic approaches to investigate the eating patterns of children from low-income neighbourhoods. The study discovered that socioeconomic deprivation was associated with higher levels of stress and time restrictions, which led to increased reliance on fast food and pre-packaged meals. Parents frequently worked several jobs, leaving little time for food planning, and exacerbating poor eating habits.

Furthermore, Swinburn et al., (2020) conducted narrative interviews with teenagers to investigate how socioeconomic status influences dietary choices. Adolescents from poorer socioeconomic backgrounds reported feeling marginalized and having little control over food environments. Therefore, they claimed that a shortage of inexpensive, nutritious food options in their localities limited their dietary choices and contributed to weight increase.

Marketing and Media –

Marketing and media greatly impact children's food preferences and consumption behaviours. Sigala and Stanhope, (2021) found Children were extremely vulnerable to marketing strategies, with commercials for sugary cereals, snacks, and fast food influencing their food preferences and purchase requests. Parents were concerned about the prevalence of harmful food marketing and its influence on their children's eating habits.

Griffiths et al., (2014) Study shows little support for the idea that children's obesity risk increases when they are exposed to food outlets in their homes, schools, and commuter areas. The data appears to be insufficient to justify the present suggested government interventions/recommendations, and policymakers should proceed with care when implementing laws to limit food outlets.

A sedentary lifestyle and an excessive consumption of foods and beverages high in energy but low in nutrients are two major behavioural patterns that increase a child's risk of obesity (WHO, 2023).

However, advice to 'eat less, exercise more' fails to account for the adverse obesogenic environment and everyday problems that are being confronted, particularly by poor families.

The most recent Cochrane review discovered that school-based obesity prevention programs can result in minor improvements in standardized body mass index (BMI) over a school year. However, because interventions vary greatly in their design and degree of efficacy, the evaluation needs to inform public health practitioners about which intervention characteristics work best, for whom, and in what settings. Systematic reviews can assist in addressing these concerns by identifying contexts and mechanisms related to intervention results (Lockyer and Spiro, 2019).

Research conducted in developed nations indicates that there are more fast-food restaurants and convenience stores than healthful retail food enterprises near schools. Kids have been known to choose foods high in energy when these outlets are closer to schools and more densely populated area. The age, sex, and educational attainment of the parents are among the confounding variables that do not change this association (da Costa Peres et al., 2020).

Rather than focusing on obesity, the outcomes examined in this intervention research include food intake or acquisition. A few trial protocols have been released in the last few years, but no results are yet available. The majority of research concentrates on improving the school's internal environment or raising parents' knowledge of the food environments in which their children grow; they do not address the surroundings of schools; therefore, the role of food environment plays an important role in children's health and wellbeing which needs to be considered.

Interventions -

Community-based and environmental interventions have been recommended to alleviate dietary inequities and lower childhood obesity rates.

Community initiatives

Several studies have demonstrated the usefulness of community-based efforts targeted at improving food environments. Buttriss et al., (2017) emphasized the efficacy of community gardens and urban agricultural programs in supplying low-income households with fresh, inexpensive vegetables. These projects not only increase food availability but also encourage communities to adopt healthy eating habits.

Policy Measures

Policies have an important influence in influencing food ecosystems. Knai et al., (2018) conducted an assessment of several policy initiatives, which included the establishment of sugary beverage imposes, subsidies for fruits and vegetables, and limitations on promoting unhealthy meals to children. These measures have been demonstrated to positively affect dietary behaviours and lower childhood obesity rates.

The Office for Health Improvement and Disparities governs the National Child Measurement Programme (NCMP), which collects, analyses, and reports data on children's height and weight in England every year. The NCMP provides information on the proportion of underweight, healthy weight, overweight, obese, or severely obese children in reception and year 6.

School-based interventions

Schools are crucial locations for initiatives aimed at encouraging healthy eating habits and reducing childhood obesity. Several studies have looked into the effect of school-based programs on children's food habits.

Nutritional value of school meals.

Improving the nutritional content of school meals has been a primary goal of several strategies. Spence et al., (2014) discovered that delivering healthier school meals dramatically increased children's nutritional intake while decreasing obesity rates. The study emphasized the necessity of ensuring that school meals are nutritionally sound and attractive to youngsters.

Nutrition Education

Nutrition education programs linked to school curricula have also demonstrated promise. Evans et al., (2016) investigated the efficacy of nutrition education programs in elementary schools and discovered that these programs increased children's understanding of healthy eating and encouraged healthier food choices. The study suggested that regular nutrition education sessions be included in the school curriculum to maintain these favourable results.

For children, the best way to prevent obesity is through community-based multicomponent treatments that focus on food, physical activity, and behaviour modification, according to the UK's National Institute for Health and Care Excellence (NICE). The younger children (age ≤ 6 years) are the ones for whom interventions work best (El-Sayed et al., 2012).

Programs should involve at least one more family member and can be accessed through general practitioners or self-referral. Pre-schoolers are the target of very few of the evidence-based programs that are currently accessible. One program that promotes a healthy lifestyle and has been proven to be beneficial in lowering pre-schoolers' risk of obesity is Planet Munch (Lanigan et al., 2019).

Trim Tots, another name for Planet Munch, were created in compliance with UK NICE guideline CG189. The 24-week curriculum consists of multiple components, with a focus on involving families and promoting learning via play and art. Nearly 25% of children under the age of five in England are already overweight, and the number of children experiencing severe obesity in year 6 (ages 10 to 11) has increased to its highest level since the National Child Measurement Programme began in 2006. Therefore, family and child obesity control services are desperately needed. The Lifestyles, Eating and Activity for Families (LEAF) initiative has been effective in addressing childhood obesity (Stewart, 2015).

Families with young, extremely obese children (≤ 6 years) in Cornwall and the nearby Isles of Scilly can apply for the program, which supports and empowers them to adopt healthier lifestyles. Due to the strong correlation between obesity and socioeconomic position, families in high-privilege areas are given priority.

The team's physical activity advisor and paediatric nutritionist makes an initial home visit. This makes it possible to evaluate lifestyle habits and the family's desire for change. After that, a comprehensive evaluation is conducted in a clinic setting by a multidisciplinary team that includes a paediatrician, covering anthropometry, beverage consumption, physical activity level, sedentary time, and sleep habits (Stewart, 2015).

Limitations and gaps in the literature

While the present research provides useful information about the influence of the food environment on childhood obesity in the United Kingdom, there are significant limitations and gaps.

Limited longitudinal studies –

Many studies are cross-sectional, meaning they provide a snapshot in time rather than evaluating trends across longer periods. Longitudinal studies are required to better understand the long-term effects of food environment changes on childhood obesity.

Limited consideration of cultural factors -

Cultural elements, such as dietary customs and family food habits, are sometimes overlooked. Understanding how cultural circumstances impact eating choices might help treatments work more effectively.

Focus on Urban Areas -

Much of the study is focused on urban surroundings, which may neglect the specific issues that rural communities confront. Future research should investigate how rural food situations relate to childhood obesity.

Insufficient evaluation of interventions-

To evaluate the long-term effectiveness of community and policy initiatives, more detailed studies are required. Many research report preliminary findings without assessing long-term effects.

2.3 Chapter summary –

The studies conducted over the last ten years give useful insights into the intricate interplay of variables impacting childhood obesity. Food availability, affordability, accessibility, socioeconomic status, and marketing all influence children's dietary habits and health consequences. Addressing childhood obesity necessitates multifaceted measures that include community activities, regulatory changes, and educational efforts. Obesity rates can be reduced, and children's general health improved by providing an atmosphere that encourages healthy eating and restricts exposure to unhealthy food marketing.

CHAPTER 3: RESEARCH METHODOLOGY –

3.1 INTRODUCTION -

This chapter describes the systematic methodology Conducted in the United Kingdom to investigate how the food environment affects childhood obesity. It involves a thorough search approach directed by certain inclusion and exclusion criteria across databases. Transparency is ensured throughout the research selection process, from the first search results to the final study inclusion, as shown by a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart, ensuring that the conclusions drawn are firmly grounded in the evidence.

3.2 SYSTEMATIC LITERATURE REVIEW –

A systematic literature review, or SLR, is a comprehensive and deliberate way to examine previous studies that have been done on a certain subject. To respond to predetermined research questions, it seeks to identify, evaluate, and compile all relevant research. To reduce prejudice and produce accurate results, the procedure uses an organized and open methodology (Okoli and Schabram, 2015).

A systematic literature review (SLR) Aims to offer a comprehensive and objective overview of the available information, promoting well-informed decision-making in practice, policy, and research. It offers recommendations for future study directions and aids in identifying knowledge gaps (Vicente-Saez et al., 2018).

A thorough Systematic Literature Review (SLR) may be completed quickly and easily using the following seven steps:

- Formulate the research question.
- Develop a protocol.
- Search for all relevant studies
- Apply the selection criteria.
- Extract the data.
- Synthesise the data.
- Write and publish a report.

Each step builds on the previous one, creating a structured approach that enhances the credibility and utility of the review (Vicente-Saez et al., 2018).

According to Okoli and Schabram (2015), A systematic review is the best method for this research because it provides a thorough, unbiased, and methodologically rigorous synthesis of available information on the impact of the food environment on childhood obesity in the United Kingdom. It enables a thorough quality evaluation as well as the identification of research gaps, laying the groundwork for future study.

Unlike literature reviews, which lack systematic and reproducible search and selection methods, systematic reviews use a structured strategy to discover and assess all relevant research, reducing bias and increasing accuracy. It also contains a thorough quality evaluation of the included study, ensuring the results' validity (Bramer et al., 2018).

3.3 SEARCH STRATEGY –

In research, a search strategy is a systematic approach created to find appropriate information on a certain subject in an organized manner. It entails using inclusion/exclusion criteria and choosing relevant databases, search filters, and keywords to ensure the retrieval of pertinent research (Aromataris and Riitano, 2014).

It was possible to do a thorough search by looking through several databases, including PubMed, ProQuest, and Cochrane. Boolean operators (AND, OR) were used to combine relevant search keywords associated with the PICO components to ensure a comprehensive literature retrieval. Relevant research from peer-reviewed journals and government reports, among other grey literature sources, was also taken into account (MacFarlane et al., 2022).

Since childhood obesity and the food environment are dynamic topics influenced by societal changes and ongoing research, a time limit of the last 10 years is typically appropriate.

Therefore, research that had been published in the previous 10 years was included in the search. To represent the current knowledge of the link between the food environment and childhood obesity, this period prioritizes newer research while still acknowledging that older studies may offer insightful information (Vicente-Saez and Martinez-Fuentes, 2018).

3.4 SEARCH TERMS

Search terms are certain words or phrases that are used to find appropriate information in databases or other sources. The fundamental elements of the study topic are reflected in the carefully chosen terms. Search terms are important since they help find needed information and ensure the search is comprehensive (Bramer et al., 2018).

According to Vicente-Saez et al., (2018) Synonyms can serve to explain unclear terminology or concepts, lowering the possibility of misinterpretation. This clarity enhances the quality and precision of the search results, ensuring that studies closely match the research question or topic of interest.

The **PICO** framework can guide the formulation of research questions and the development of search strategies. Here's how it can be applied (Eriksen and Frandsen, 2018).

Table 1 – PICO framework

P (POPULATION)	Children (5-18 Years)
I (INTERVENTION)	Food environment, including food marketing, availability, affordability, accessibility, cost, and socioeconomic status.
C (COMPARISON)	Comparison between Different types of food environment exposure (e.g., the areas with high vs. low availability of unhealthy foods).
O (OUTCOME)	The Prevalence and Incidence of childhood obesity Influenced by the food environment.

TABLE 1 PICO framework (source – self created)

Frandsen et al., (2020) mentioned that creating a precise, well-defined research question that integrates the PICO framework's components is one way to develop a research question utilizing the framework. In this case: "Among children aged 5-18 years (Population), does exposure to unhealthy food environments (Intervention/Exposure) compared to healthy food environments (Comparison) influence the prevalence of obesity (Outcome)?"

The PICO framework is appropriate because it allows for quantifying and comparing the effect of the food environment on childhood obesity across various contexts and interventions.

PICO makes it possible to evaluate certain food environment modifications or interventions and their direct effects on the prevalence of childhood obesity (Scells et al., 2017).

PICO offers an organized and clarified method for combining analytical information from much research, which facilitates the process of deriving thorough and fact-based conclusions (Atkinson and Cipriani, 2018).

According to Morgan et al., (2018) PEO is used to comprehend the subjective processes that don't coincide with the analytical assessment of the influence of the food environment on obesity rates.

PEO does not specifically include a comparison component, which is essential for systematic reviews that compare and assess the efficacy of various interventions. PEO lacks the comparative and quantitative emphasis required to thoroughly assess the influence of the food environment on childhood obesity.

However, it is useful for studying specific, qualitative elements of how individuals interact with their environment and the subsequent health implications. PICO offers a more suitable framework for this kind of systematic review because of its organized approach to interventions, comparisons, and outcomes (Scells et al., 2017).

SEARCH STRATEGY -

PubMed:

- Search strategy used:
 - ("childhood obesity" OR "paediatric obesity") AND ("food environment" OR "nutrition environment")

In PubMed, Medical Subject Headings (MeSH) are standardized terms used to index and categorize articles based on their content.

While the MeSH database evolves, and new terms are added to reflect current research trends, there may not be a specific MeSH term that precisely matches the topic but few of them were included in the search (Lu, Z., 2011).

1. Childhood Obesity:

- MeSH term: Obesity, Paediatric

2. Food Environment:

- MeSH term: Food Supply, Food Habits, Environment Design.

Cochrane Library:

- Search strategy used:
 - "Childhood obesity" OR "juvenile obesity" AND "food culture" OR "nutrition-rich food"

3.5 Key Words -

Keywords are precise words or phrases that indicate the primary themes or subjects of interest in a research study. They function as identifiers, allowing scholars to access relevant literature from databases or other sources. Using the right keywords is critical for efficiently searching and finding relevant material on a specific topic (Nightingale, 2009).

The main keywords used:

- Childhood obesity
- Paediatric obesity
- Food environment
- Nutrition environment
- Food Access
- Food availability
- Healthy food options
- Unhealthy food options
- Fast food
- Diet quality
- Obesity prevention
- Environmental factors
- Socioeconomic status

These keywords represent the key concepts of the research topic and are combined using Boolean operators (e.g., AND, OR) to construct search strings for database searches.

3.6 Databases

To perform a systematic review of the impact of the food environment on childhood obesity, the following organized strategy was adopted to find information:

Started by framing the research question: "What is the impact of the food environment on childhood obesity?"

Developing search strategy by Synonyms and related phrases which include "childhood overweight," "food accessibility," "food availability," and "dietary habits."

Combining search phrases with Boolean operators: for example, "Childhood obesity AND food environment," "Food environment OR food accessibility AND childhood overweight."

According to Bramer et al., (2017) Searching for suitable databases is important as it gives Focused and Specialised Information, Relevant databases include specialized knowledge focused on certain academic subjects or specializations. For example, PubMed focuses on biomedical and health literature, which is critical for researching childhood obesity and the eating environment.

Accessing specialized databases guarantees that the information obtained is immediately pertinent to the research subject, resulting in more precise and relevant results. Academic databases filter peer-reviewed and academic content, ensuring high-quality and credible sources. This guarantees that the research is founded on reliable and scientifically accurate data.

For example, the Cochrane Library is well-known for its systematic reviews and meta-analyses, which are held to the highest methodological standards (McGowan and Sampson, 2005).

Therefore, A single database is unlikely to include all relevant studies on a topic. Cross-referencing findings from several databases improves the validity of the systematic review. It guarantees that the findings reached are based on a solid body of information from several sources.

The Cochrane Library's systematic reviews offer a solid basis for evidence-based research, while PubMed and ProQuest give additional studies and viewpoints. Using these three databases assures complete literature coverage, including all relevant research on the influence of the food environment on childhood obesity in the United Kingdom (Bramer et al., 2017).

3.7 INCLUSION AND EXCLUSION –

Inclusion/exclusion criteria are present standards that decide whether research is relevant and should be included or eliminated from a systematic review.

- It Ensures that only research relevant to the study issue is included, increasing the review's focus and quality.
- It Reduces selection bias, producing more trustworthy and valid findings.
- It Provides precise, objective standards that make the evaluation more replicable (Doak et al., 2009).

3.7.1 Inclusion Criteria

- Research including children (aged 5-18) in the United Kingdom.
- Studies on the food environment, including food availability, accessibility, dietary patterns, food policy, and socioeconomic implications on diet.
- Studies assess childhood obesity outcomes, including BMI, weight increase, prevalence, and physical wellness.
- Peer-reviewed publications, including observational studies (cohort, case-control, cross-sectional), intervention studies, and systematic reviews/meta-analyses.
- Studies published in English.

- Studies published during the previous 10 years are relevant to contemporary food situations and policies.

3.7.2 Exclusion Criteria

- Studies that concentrate on older age groups or non-UK populations.
- Studies that do not directly look at the dietary environment (for example, those that focus only on physical activity or genetics).
- Studies that do not measure obesity-related outcomes.
- Non-peer-reviewed papers include editorials, opinions, letters, and conference abstracts.
- Studies written in languages other than English.
- Studies published more than 10 years ago unless they are key publications that provide fundamental information.

3.8 SEARCH RESULTS –

PRISMA FLOW CHART -

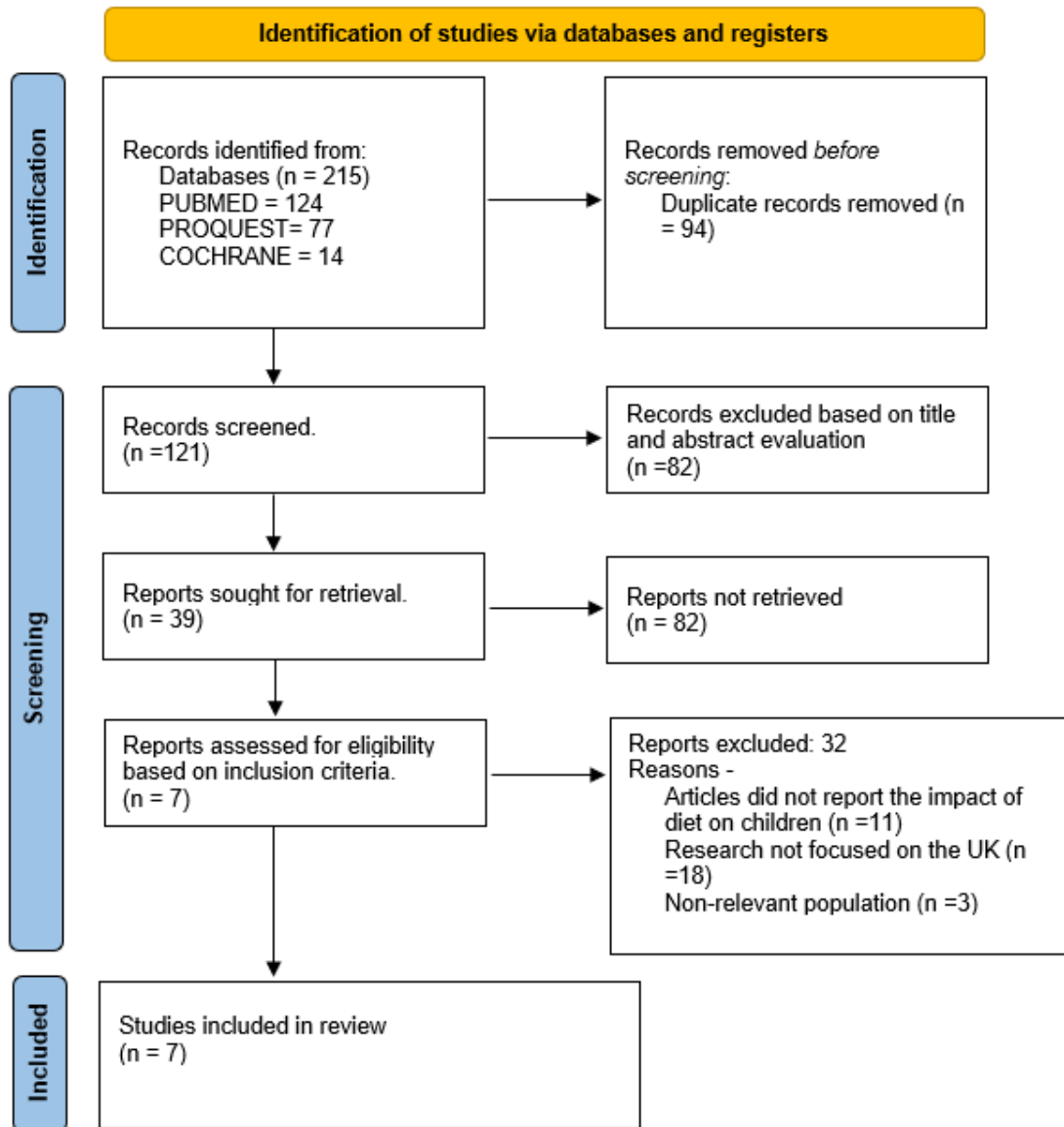


Figure 2 - PRISMA FLOW CHART (Source – Self created)

The systematic review of the impact of the food environment on childhood obesity in the UK comprised 7 studies. An organized and open method was used to exclude extraneous research, guided by the PRISMA framework.

Identification:

The initial database search produced 215 results from PubMed, Cochrane Library, and ProQuest.

Screening:

After deleting 94 duplicate records, 121 unique records remained.

The titles and abstracts of these 121 records were evaluated, and 82 records were excluded because they did not fit the inclusion criteria.

Eligibility:

39 full-text papers were reviewed for eligibility.

Following a thorough evaluation, 32 articles were removed for the following reasons:

The population is not within the stated age range.

The studies were not done in the United Kingdom.

Outcomes do not directly measure childhood obesity.

Included: 7 qualitative studies met all inclusion criteria and were included in the final systematic review.

3.9 ETHICAL CONSIDERATION -

Ethics in research entails adhering to ideals such as integrity, openness, and respect for participants, as well as avoiding damage and protecting anonymity.

In this systematic review, ethics were taken into account by choosing peer-reviewed publications from trustworthy sources (PubMed, Cochrane Library, and ProQuest), and confirming that all included research received ethical approval. This was accomplished by ensuring that each study documented adherence to ethical standards and the Institutional Review Board clearance. This assures that the study findings are trustworthy, and done ethically, and respectfully (Suri, 2020).

3.10 CHAPTER SUMMARY-

This chapter describes the systematic review approach used to analyse the impact of the food environment on childhood obesity in the United Kingdom. The key procedures were creating inclusion and exclusion criteria, doing exhaustive searches in PubMed, Cochrane Library, and ProQuest, and using the PRISMA framework to filter and select eligible studies. Ethical concerns were handled by ensuring that all studies received ethical approval.

The following chapter will cover data extraction and evaluation. It will describe the procedures used to extract important data from the selected research, assess the quality and reliability of the findings, and provide a comprehensive analysis of the evidence acquired.

CHAPTER 4: DATA EXTRACTION AND EVALUATION

4.1 Introduction to Chapter-

This chapter provides a thorough analysis of the information acquired for a systematic review of the literature on the relationship between childhood obesity and the food environment. It will go over the inclusion and exclusion criteria as well as the methods for choosing pertinent research. This chapter will examine the several aspects of the food environment, including the marketing, availability, affordability, and accessibility of unhealthy food. It will also look at the statistical techniques applied in the research and evaluate the accuracy and dependability of the data sources. In order to pinpoint important trends, connections, and gaps in the body of current research, the chapter will ultimately synthesise its results.

4.2 Data Extraction

Gathering appropriate information from research in a methodical manner so that it may be examined and combined into a review. The Cochrane Handbook states that in order to aid in comparison and summary, it entails locating and documenting certain data points from the included studies (Schmidt et al., 2020).

Data on study characteristics, such as author, year, and location, population details, such as sample size and demographics, food environment variables, such as food availability, pricing, and marketing, and outcomes linked to childhood obesity, like BMI, dietary habits, and physical activity levels, will be extracted specifically for this systematic review. A data extraction form will be used to collect this data into a characteristic table, guaranteeing a methodical and uniform process for assessing the influence of the food environment on childhood obesity.

Data extraction of all the studies is listed in TABLE 4 in Appendices (pg - 78).

4.3 Brief introduction to critical appraisal and paper quality assessment -

Critical appraisal is the process of methodically analysing research findings to determine their reliability, validity, and relevance. This procedure entails evaluating the research's strength and potential biases by closely examining the methodology, data analysis, and results (Pati and Lorusso, 2018).

In order to ensure that the conclusions are supported by solid data, critical evaluation is essential as it aids in determining the calibre and reliability of the studies that are included in a review.

This makes it possible for researchers to distinguish between high-calibre studies with sound methodology and those with restrictions that might affect their findings (Long et al., 2020).

Research paper evaluation is important for a number of reasons. First and foremost, it guarantees that choices made regarding clinical practice, legislation, and future research are supported by solid evidence. Relying on high-quality research is essential for improving results in the context of evidence-based practice, whether in social policy, education, or healthcare. Finding research that are methodologically sound is made easier with the use of critical assessment, which offers a strong basis for making decisions (Buccheri and Sharifi, 2017).

Second, critical evaluation guards against the use and distribution of biased research. Low-quality research can provide false results that, if put into practice, can have negative consequences like inappropriate public health policies or inefficient medical treatments. Risks are reduced by evaluating research articles attentively. Finally, the critical assessment method encourages responsibility and openness in research. It motivates us to follow strict guidelines in the planning and reporting of their study since they are aware that their efforts will be closely examined. Consequently, this improves the overall calibre of research results and advances our understanding (Frias-Goytia et al., 2024).

Therefore, critical appraisal is an essential research practise that guarantees the dependability and relevance of study findings. It also protects against the effect of substandard evidence in decision-making and promotes an excellence in research culture (Purssell, 2020).

4.4 Critical Appraisal Tools -

Research papers are carefully evaluated for quality, validity, and relevance using standardised instruments called critical appraisal tools. These resources offer a series of standards or check lists customised for various research designs, including qualitative, cohort, and randomised controlled trials. This guarantees a comprehensive and impartial evaluation of the methodological strengths and weaknesses of the investigations (Quigley et al., 2019).

Making sure that the evaluation process is comprehensive, accurate, and pertinent to the kind of study being assessed requires careful consideration of the critical appraisal method to be used.

There are particular methodological issues for each type of study design, including qualitative research, systematic reviews, cohort studies, and randomised controlled trials (RCTs). As such, a one-size-fits-all method of evaluation is insufficient. It is easier to identify the advantages and disadvantages that are most relevant to the research design while using a tool that has been specially created for it (Purssell, 2020).

Selecting the appropriate critical appraisal tool is essential as it guarantees the assessment is suitable for the research topic and study design. An inappropriate instrument might undervalue important details or overemphasise unimportant details, producing an inaccurate or partial assessment. A suitable tool promotes a transparent and uniform evaluation procedure, strengthening the review's reliability and consistency (Schmidt et al., 2020).

It is predicted that critical evaluation tools would assess several facets of research publications, such as:

Study Design: Making sure the methodology is suitable for the given question.

Sample Size and Selection: Determining the appropriateness and representativeness of the sample size.

Techniques for Gathering Data: assessing the authenticity and dependability of the tools and techniques utilised in data collection.

Bias and Confounding: Recognising potential sources of bias and confounding factors that may have an impact on the outcomes.

Analysing data involves determining whether statistical or qualitative analysis techniques are acceptable and rigorous.

Results and Conclusions: Ensuring that the data is used to support the conclusions and that the results are correctly stated (Sivarajah et al., 2017).

Selecting the incorrect evaluation tool might result in judgements that are erroneous or incomplete, sometimes omitting important methodological errors or neglecting to highlight the advantages of a well-executed study.

When weak data is given excessive weight or important insights are ignored, it can lead to poor decision-making.

Therefore, critical evaluation techniques assist guarantee that results and recommendations are based solely on credible, high-quality studies by taking into account these factors (Pati and Lorusso, 2018).

4.5 Evaluation of Qualitative Studies using Critical Appraisal Skills Programme (CASP) Tools

Qualitative research was preferred over quantitative research for examining the relationship between the food environment and childhood obesity in the UK because of its special advantages in examining intricate, varied, and contextual topics such as childhood obesity. The complexity and subtleties of the social, cultural, and environmental elements that contribute to childhood obesity may not be fully captured by quantitative research, although its effectiveness in quantifying and analysing statistical connections (Maeda et al., 2023).

CASP checklist for qualitative studies refer appendices TABLE 3 (pg - 73).

Reasons for Choosing Qualitative Studies -

Examining Complex Interactions: A variety of elements make up the food environment, such as availability, accessibility, marketing, and societal perceptions on food. These variables interact in complex ways that are challenging to measure. Studies that use qualitative methods are especially well-suited to investigate these issues because they provide a thorough analysis of the ways in which various components of the food environment affect children's eating habits and attitudes towards food (Maxwell, 2021).

Comprehending Views and Experiences: Qualitative research is the best method for collecting the viewpoints and actual experiences of different stakeholders, such as kids, parents, teachers, and community members. Creating effective interventions requires an understanding of how different groups view the food environment and how it affects their decisions (Polit and Beck, 2010).

For instance, focus groups and interviews, can shed light on the difficulties families have in obtaining wholesome food, the societal forces that shape kids' eating preferences, and the strategies used by the food industry to appeal to young consumers.

Contextualising Obesity within Social and Cultural Norms: Childhood obesity is heavily influenced by social and cultural circumstances and is not only a biology problem. Ethnography and case studies are examples of qualitative research approaches that enable to investigate the ways in which cultural norms, family dynamics, and social norms contribute to obesity. Designing solutions that are culturally responsive and more likely to be successful requires this contextual information (Crossley, 2007).

Creating New Hypotheses for Future Research: Because qualitative research is exploratory in nature, it will provide new hypotheses for future investigation, whereas quantitative studies frequently test preconceived notions. Qualitative research can open up new avenues for future quantitative investigations by revealing aspects or links that were not previously recognised (Fossey et al., 2002).

Qualitative research is crucial for comprehending the intricate problems associated with childhood obesity because it offers insights not possible from quantitative data. They examine the "why" and "how" of obesity, examining the reasons why certain children are more prone to unhealthy eating habits and the ways in which environmental influences may either increase or decrease these risks. This level of comprehension is essential for treating the underlying causes of obesity instead than merely tracking its incidence. Furthermore, policymakers and practitioners may create solutions that are closely linked with the lived reality of impacted groups because to the extensive, thorough data that qualitative research provides (Hammersley, 2000).

I chose to utilise the Critical Appraisal Skills Programme (CASP) method to evaluate qualitative studies. The CASP tool is well known for having a strong foundation for evaluating the calibre and accuracy of qualitative research. It provides a methodical and structured way to assess many aspects of qualitative research, such as the methodology, study design, ethical issues, data analysis, and conclusions. Because it is user-friendly, accessible, and thorough, this tool is recommended for both novice and experienced researchers (Sivarajah et al., 2017).

For Data evaluation of the qualitative studies identified refer appendices (Table 5 – pg 82)

Strengths and Limitations of the CASP Tool

Strengths:

Comprehensive Framework: CASP addresses a broad variety of factors that are critical to assessing the validity and rigour of qualitative research. This covers concise sections on the purpose of the study, methods, collecting and evaluating data, moral considerations, and the study's significance.

Friendly to Users: The programme offers clear instructions on what to look for in each component of a qualitative study and is simple to use. Because of this, scholars with different degrees of experience can use it (Zeng et al., 2015).

Reputable and extensively Used: The CASP tool's credibility and dependability are increased by the fact that it is extensively acknowledged and utilised in clinical and academic research contexts.

Flexibility: Its adaptability to many qualitative research designs and procedures renders it suitable for a multitude of study kinds (Pieper et al., 2014).

Limitations –

Subjectivity: The CASP tool, like many other qualitative appraisal tools, depends on subjective assessment, which may cause differences in reviews from various reviewers.

Pay Attention to Tough Criteria: The technique is thorough, but it could miss certain subtle nuances of qualitative research, such the depth of theoretical ideas or the complexity of the data.

Restricted to Qualitative Studies: The tool's application for mixed-methods studies or quantitative research is limited because it was created especially for qualitative research (Majid and Vanstone, 2018).

Therefore, the CASP tool provides a thorough, flexible, and easy-to-use framework for critically evaluating research papers. It is a useful and popular tool. Important factors to take into account include its reliance on subjective assessment, its universality in managing a variety of research approaches, and its narrow focus on certain topics like ethics and policy effect. Although the CASP tool works very well for many kinds of research assessment, when a more in-depth or specialised analysis is needed, it might need to be used in conjunction with other tools or frameworks (Quigley et al., 2019).

The CASP tool is particularly user-friendly and clear when compared to other assessment methods like the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) or the Joanna Briggs Institute (JBI) checklist. However, it has the comprehensive standards offered by the JBI checklist, which are useful for more thorough analyses (Maeda et al., 2023).

4.6 Chapter Summary

The procedure for extracting and evaluating data was covered in detail in this chapter. Among the key achievements were the gathering and methodical arrangement of data from different studies. The Critical Appraisal Skills Programme (CASP) tool was used to guarantee the calibre and reliability of these studies. This tool offered a systematic framework for evaluation, aiding in the assessment of each study's methodological rigour and applicability. In order to ensure the integrity of the next analysis, the chapter illustrated how to use CASP to successfully select high-quality research. The next chapter will concentrate on data synthesis and analysis, in which the taken data will be carefully examined and combined in order to derive significant conclusions and understandings from the study results in the form of themes.

CHAPTER 5: DATA ANALYSIS AND SYNTHESIS

5.1 Introduction to Chapter-

This chapter explores the synthesis and data analysis of pertinent research. The main goal will be to do a comprehensive thematic analysis of the data using a structured thematic analysis framework in order to methodically find, examine, and present patterns in the data. It starts by going into great depth on the traits of the studies that were found, giving a thorough rundown of their significant qualities. The chapter will next examine the recurring themes that emerged from the included research, emphasising important trends and revelations. With the goal of providing an in-depth overview of the field of study and guiding subsequent discussions and decisions, this analysis attempts to synthesise the data that has been retrieved.

5.2 Thematic Analysis –

Thematic analysis is a qualitative technique that provides a thorough and comprehensive knowledge of complex events by identifying, analysing, and reporting patterns or themes within data (Ambad, 2022).

It is usually used to analyse qualitative data, including answers to open-ended surveys or transcripts of interviews. It is known as topic synthesis when used with secondary data in systematic literature reviews (SLRs). By coding and classifying numerical data, this method may also be used for quantitative research, allowing researchers to find recurring themes and patterns in various studies. This hybrid tool adds value to the investigation by offering a thorough viewpoint that blends qualitative variance with rigorous quantitative analysis (Cabrera, 2023).

5.3 Data analysis tool –

The theme framework developed by Braun and Clarke (2006) was selected for this study. This six-step process entails getting familiar with the data, generating preliminary codes, looking for themes, evaluating themes, defining, and labelling themes, and creating the report (Hole, 2024).

This methodology ensures thorough and cogent synthesis by offering a methodical and rigorous approach to finding and analysing patterns within data.

Its flexibility and clarity which enable researchers to get significant insights while upholding methodological rigour and consistency throughout the study process are what make it so important (Clarke and Braun, 2017).

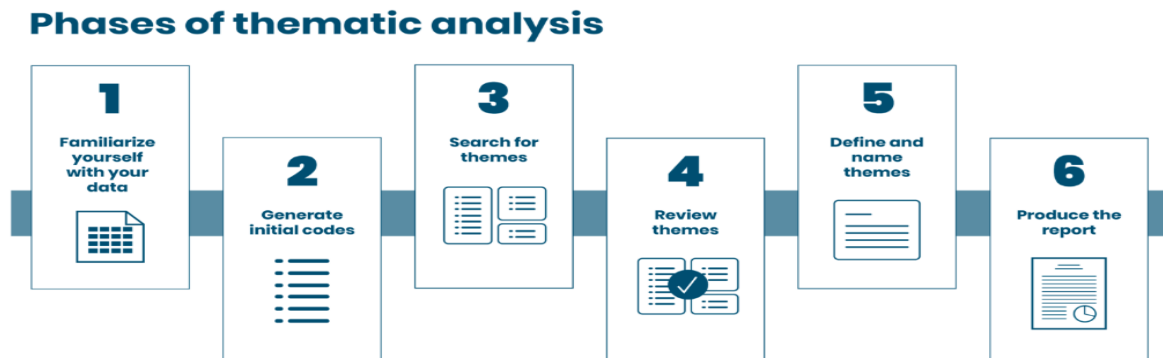


Figure 3 – Six step process of thematic analysis by Braun and Clarke (2006)

5.4 Characteristics of the identified studies-

The studies that were discovered were carried out in the United Kingdom. These seven studies (Turner et al., 2012; Clarke et al., 2015; Wilkie et al., 2016; McGuffin et al., 2015; Hilton et al., 2023; Bijlani et al., 2024; Pallan et al., 2012) were specifically carried out focusing on the relationship between the food environment and childhood obesity. The studies cover a wide range of topics, such as expert opinions on food marketing policies, community-wide interventions, parental perspectives on managing childhood obesity, school-based obesity prevention, various lifestyle behaviours related to obesity, and contextual influences on children's obesity development. Please refer to the Data Extraction Tables in the Appendices for more information on data extraction.

5.5 Emerging Themes from included studies (Analysis/Synthesis of included studies) –

The following overarching themes and sub-themes were found through analysis of the included studies:

These topics highlight the complexity of childhood obesity and the range of variables affecting its management and prevalence. The themes and sub-themes found in the studies are compiled in the following table.

The articles that specifically address each subject are highlighted, and the results are combined to provide a more comprehensive understanding of the larger trends and revelations.

TABLE 2 – THEMATIC ANALYSIS

Themes	Sub themes	Articles
1. Parental Perceptions and Involvement	a. Barriers to managing childhood obesity. b. Role of primary care c. Views on school-based interventions	Turner et al., 2012; McGuffin et al., 2015 Clarke et al., 2015
2. Environmental and Community Influences	a. School environment b. Community programs and interventions	Clarke et al., 2015, Bijlani et al., 2024.
3. Lifestyle Behaviors	a. Physical activity b. Eating habits	Wilkie et al., 2016; Bijlani et al., 2024, McGuffin et al., 2015.
4. Policy and Marketing Influence	a. Marketing of unhealthy foods b. Policy effectiveness	Hilton et al., 2023
5. Cultural and Contextual Factors	a. Influence of cultural background b. Socioeconomic factors	Pallan et al., 2012, Bijlani et al., 2024.

TABLE 2 – THEMATIC ANALYSIS (source – self created)

THEME 1. Parental Perceptions and Involvement

One key aspect that has been found to improve the benefits of child health promotion interventions is parental involvement. The results of this study indicate that parental involvement increases parental knowledge and makes it easier for messages to be consistent across the home and the school (Clarke et al., 2015).

a. Barriers to managing childhood obesity: Turner et al., (2012) and McGuffin et al., (2015) emphasised the difficulties parents have while attempting to control childhood obesity. According to Turner et al., (2012) parents frequently feel abandoned by healthcare professionals since they don't receive sufficient guidance or useful counsel. Similar to this, McGuffin et al., (2015) highlighted the challenges parents have in regulating their children's eating habits outside the house and showed that eating out commonly results in harmful food choices.

According to Turner et al., (2012), Parents expressed concern that their general practitioner would hold them accountable for their child's circumstances, and a few of them admitted to partially placing the blame on themselves.

This unwillingness to seek advice may be the reason why so many parents had put off getting assistance. Frequently, a specific incident that affected the child's mental health and quality of life such as a parent's anxiety about bullying or their inability to purchase clothes that fit their child was what set off the choice to seek advice.

However, Clarke et al., (2015) states parents are not concerned about seeking advice from a professional. Few parents did not hold themselves responsible for their child's weight and spoke positively about their choice to visit their general practitioner (they were taking proactive measures to address their child's weight). Another parent who was similarly affected said that he used the session to help his child understand that she needed to get her weight under control.

b. Role of primary care:

Turner et al., (2012) states that the vital part primary care physicians play in combating childhood obesity. Parents said that their primary care physicians should be more proactive in providing guidance and assistance. They also said that personalised counsel and efficient communication should improve efforts to manage obesity.

However, Clarke et al., (2015) mentioned GPs advised parents to ask the practice nurse to keep an eye on their child's height and weight, tested blood for diabetes or thyroid issues, gave dietary and exercise advice or referred the child to secondary care. Just one parent stated that their doctor had recommended a follow-up visit. Parents whose children had received referrals or undergone blood testing expressed satisfaction with the response.

According to parent experiences, general practitioners (GPs) only spend a limited amount of time with parents and children, mostly addressing the child's weight. In contrast, school nurses offer continuous assistance and address a variety of issues, including low self-esteem and other weight-related concerns.

c. Perceptions of school-based interventions:

According to Clarke et al., (2015) parents and kids had a generally good perception of school-based obesity prevention programs. These activities were thought to be helpful in encouraging healthy habits, but it was also emphasised how crucial it is to make sure they are thorough and interesting.

An ongoing cluster randomised controlled trial, known as the West Midlands Active lifestyle and healthy eating in school children (WAVES) project, was launched assessing the efficacy of an obesity prevention intervention for children aged 6-7 years (Turner et al., 2012).

Bijlani et al., (2024) emphasised parents feel empowered when schools help them in their efforts to encourage healthy lifestyles for their children because they see teachers as authoritative messengers and role models in the intervention delivery process.

There was evidence that children themselves played a significant role in persuading parents to make lifestyle changes at home, in addition to parental empowerment and the impact of educators. The fostering result is comparable to a recent study that proved enabling elementary school students to educate their families has a positive impact on reducing salt intake (McGuffin et al., 2015).

THEME 2. Community and Environmental Factors

a. School environment: Research conducted by Clarke et al., (2015) showed that children's dietary preferences and levels of physical activity were significantly influenced by their school environment.

Schools may positively affect children's behaviours and help prevent obesity by promoting healthy food and offering plenty of opportunity for physical activity.

b. Community initiatives and programs: Bijlani et al., (2024) emphasised the value of community-wide initiatives in raising children's levels of physical activity and nutrition, especially in underprivileged communities. The results of this study indicate that customised interventions and community involvement are essential for effective obesity prevention in a range of socioeconomic settings.

Wilkie et al., (2016) Go-Golborne was a large-scale childhood obesity prevention initiative administered by the local government. Its goal was to work with community partners in an impoverished community of London to co-produce and implement a locally practicable intervention.

Mixed findings were obtained from the annual assessment of physical and nutritional targets. Water consumption, fruit and vegetable consumption, and sugar-sweetened beverage consumption all decreased during the course of the three-year intervention. Over the course of three years, there were persistent decreases in the amount of time spent driving to and from school; but, in the last year of the intervention, there was no indication of any improvements in active play, and there was evidence of an increase in the number of children who spent more time on screens (Bijlani et al., 2024).

THEME 3. Lifestyle behaviour

a. Physical exercise: The significance of physical activity in avoiding childhood obesity has been highlighted by Wilkie et al., (2016) and Bijlani et al., (2024). According to Wilkie et al., (2016) a variety of lifestyle choices, such as physical exercise, have a major impact on children's obesity rates. Similarly, community-wide initiatives have been shown to improve children's levels of physical activity (Bijlani et al., 2022).

There has been less research on the impact of sleep on childhood obesity in the UK. However, data from a study on teenagers supports our findings that there is a link between short sleep duration and overweight/obesity, and that day sleep contributes to obesity over the long run (Wilkie et al., 2016).

b. Eating patterns: Wilkie et al., (2016) and McGuffin et al., (2015) both covered the importance of eating patterns in controlling obesity. McGuffin et al., (2015) emphasised the difficulties in upholding good eating practices when dining out, and Wilkie et al., (2016) observed the general effect of nutrition on children obesity, suggesting that a variety of lifestyle choices take into account when determining obesity outcomes.

McGuffin et al., (2015) states Children generally had the most control over the final decision about what to eat, and the amount of parental input varied according to the child's age, with younger children receiving less input.

It was clear that children have opinions on what influences their eating choices, and the top three were clearly "taste/food preference," "cost/value for money," and "health and sport." Parents also shared their perspectives on the elements they felt influenced their children's eating preferences, which included "food presentation," "marketing," and "peer influence" (Wilkie et al., 2016).

The COM-B model, which outlines the three requirements—capability, opportunity, and motivation—that must exist for behaviour change to take place have been applied in the interventions (Turner et al., 2012).

The reported lifestyle modifications brought about by the intervention can be conceptually explained by using this conceptual model.

Better physical and nutritional skills (physical capability) combined with parental empowerment to make changes with their kids (psychological capability leading to increased motivation) are a few examples. Other examples include the normalisation of healthy lifestyle behaviours both inside and outside of the classroom, such as at the football club (reflective motivation); positive role modelling from teachers and the football team (automatic motivation).

Future interventions may be more likely to lead to a change in family conduct if they target the capacity, opportunity, and motivation of children, parents, schools, and their staff (Clarke et al., 2015).

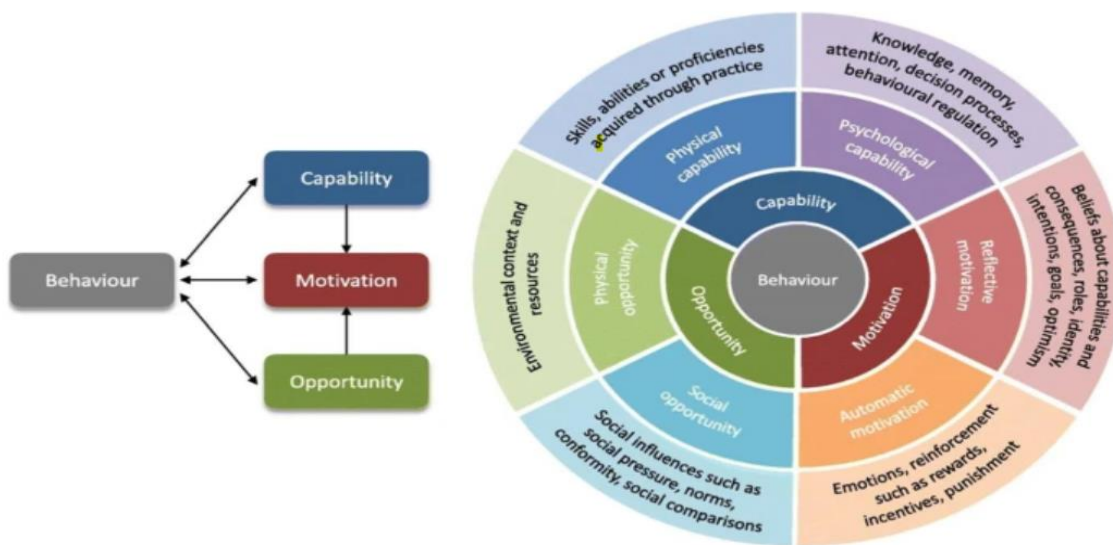


Figure 4 – COM -B model

THEME 4. Marketing and Policy Influence

Marketing of unhealthy foods: Hilton et al., (2023) talked about how children's eating habits are greatly impacted by the widespread promotion of high-fat, salt, and sugar (HFSS) items. The study's conclusion that aggressive marketing tactics strongly influence children's unhealthy eating habits highlights the need for more stringent laws.

Since the industry understands the present UK nutrient profiling model (NPM) well and it can be applied uniformly to all policies, it was considered useful. Significantly, though, the model was created with a specific goal in mind—regulating children's exposure to TV advertising—and even if it is presently being reviewed, there would still be certain drawbacks if it were to be used more broadly (Turner et al., 2012).

Hilton et al., (2023) Stakeholders in advocacy and policy were worried about the possible "balloon effect" of marketing limitations, especially with regard to advertising, as regulating one kind of advertising could just encourage more investment in another. They emphasised that in order for any limitations on advertising to be effective, they must be all-encompassing and apply to all potential settings, such as workplaces, hospitals, public and sporting areas, all media, and digital platforms. They understood, however, that this would be challenging to do and would encounter strong opposition.

Turner et al., (2012) Children classified food items as either "good" or "bad," with all children considering "good" food to be anything that included fruits, vegetables, milk, and water. With age came an improvement in health knowledge, and older kids could explain why certain meals were healthier in greater detail.

Parents felt that their child's choice of food was greatly impacted by the marketing strategies employed by OH establishments or the way food was presented. It has been noted that appealing packaging, foods served in shapes, free toys, and advertisements on television have an impact on younger kids in particular (Hilton et al., 2023).

The efficacy of current legislation aiming at curbing HFSS food marketing was assessed by Hilton et al., (2023). The study concluded that the existing rules are insufficient and suggested stronger measures, such as more stringent marketing regulations and extensive public health campaigns, to safeguard children's health.

THEME 5. Contextual and Cultural Aspects

a. Cultural background: Pallan et al., (2012) investigated the role that cultural backgrounds have in the development of childhood obesity, with a focus on South Asian populations in the United Kingdom. They discovered that cultural practices and beliefs have a big influence on eating patterns and levels of physical activity, which means that in order to successfully combat obesity, sensible approaches are required.

Hilton et al., (2023) emphasised the risks of making erroneous assumptions and the significance of comprehending the cultural and contextual effects on the development of childhood obesity. In conceptual models of childhood obesity development, cultural factors must be clearly stated because doing so will direct researchers in their quest to comprehend this context-specific element when creating interventions for childhood obesity.

Pallan et al., (2012) The intricacy of community-based treatments must be matched by evaluations using a comprehensive approach to identify system-wide changes in order to precisely measure the true impact. This demonstrates the necessity of a well-organised, coordinated local and national policy response to facilitate improvements in broader environmental and socioeconomic conditions.

Hilton et al., (2023) states some cultural context-related elements help to explain why some South Asian groups practise certain health practices. For instance, hierarchical systems within extended families frequently allow the grandmother to have power over family decisions and the children's nutrition. Furthermore, older family members are frequently first-generation immigrants who may have come from a place where food was scarcer and hence have a different perspective on food than other people. These considerations explain why food is showered on youngsters as a symbol of care and why 'fat' children are perceived as healthy.

Pallan et al., (2012) Islamic communities, which have a strong religious identity, provide another example. Religious leaders play a major role in the community and spend a lot of time at the mosque (house of worship). Children must attend the mosque every day after school starting at age five, which has an impact on their eating and exercise habits. There is less time for after-school physical activity, less time for preparing and consuming dinner, and less time to get from home to the mosque. This results in the usage of cars rather than walking and the eating of energy-dense snacks. These instances highlight how crucial it is to comprehend the cultural background. When considered in these conditions, unhealthy eating and physical activity patterns hold logic.

b. Socioeconomic variables: Bijlani et al., (2024) emphasised the significance of socioeconomic factors in the prevalence of childhood obesity, pointing out that children from underprivileged backgrounds have more difficulty leading healthy lives.

The study showed how community-based initiatives in these domains might aid in closing the gap and encouraging better lifestyle choices among marginalised groups.

Several important trends and insights into the management of childhood obesity are shown by synthesising the results of the included studies:

Parental Involvement and support: Parents are essential in reducing childhood obesity, but they encounter several obstacles, such as difficulty in regulating their children's eating habits outside the house and a lack of help from healthcare professionals. Improved parental support and participation in managing obesity may be achieved via improved communication and customised guidance from primary care professionals.

Environmental and Community Influence: Children's eating and physical activity habits are greatly influenced by their school and community settings. Schools may have a good impact on children's behaviours by encouraging physical exercise and a healthy diet, and community-wide programs can effectively reduce obesity in underprivileged regions by offering resources and focused assistance.

The significance of eating habits and physical activity: A variety of lifestyle factors, such as nutrition and physical activity, have a major impact on childhood obesity. Prevention of obesity and enhancement of general health outcomes in children require interventions that encourage physical activity and wholesome eating habits.

Policy and Marketing Impact: Children's eating habits are significantly influenced by the marketing of harmful foods, indicating the need for more stringent laws. Stronger regulations are needed to safeguard children's health from the harmful impacts of HFSS food marketing, as the current ones are insufficient.

Cultural and Socioeconomic Aspects: Childhood obesity is significantly influenced by cultural and socioeconomic variables. Cultural sensitivity and customisation are essential for interventions that cater to the distinct requirements of various populations. In order to promote healthy behaviours among underprivileged groups, specific community activities and policies are also necessary to address socioeconomic inequities.

When these results are combined, it is clear that addressing childhood obesity requires a multifaceted strategy. Supportive primary care, interesting school initiatives, community-wide interventions, strict marketing laws, and culturally aware tactics should all be a part of this strategy. A comprehensive approach like this can encourage children to lead healthy lives in a variety of situations and more effectively address the many variables that contribute to childhood obesity.

5.6 Chapter Summary

This chapter examined the relationship between the food environment and childhood obesity in the UK by using thematic analysis to collect and synthesise data. Themes were examined to see how environmental influences affect children's obesity and eating habits.

The chapter also highlighted how critical it is to address more general systemic problems, such education and food accessibility, in order to slow the rise in childhood obesity rates. The results lay the groundwork for well-informed public health initiatives.

CHAPTER 6: DISCUSSION-

6.1 Introduction to Chapter -

The interpretation and analysis of the results from the Systematic Literature Review (SLR) carried out for this study are covered in detail in the discussion chapter. The first section of this chapter compares the findings with the body of knowledge in the subject to identify areas in which the results support or contradict earlier studies. By making these comparisons, the study's contributions to the larger academic debate will be placed in perspective and any developing trends or gaps in the literature will be pointed out.

The chapter then discusses the SLR's strengths and drawbacks. The thorough approach, the breadth of the literature evaluated, and the findings' applicability to the study objectives are highlighted as the main strengths.

However, limitations will also be mentioned, including possible biases in the studies chosen, the limitations of the search plan, and the difficulties in combining various kinds of data.

The chapter will close with a summary that covers the main ideas covered, offering a concise synthesis of the results' contributions to the field and establishing the framework for the conclusions and recommendations that will be covered in the next chapters.

6.2 Discussion of Key findings –

The systematic review of seven studies found evidence highlighting the adverse impact of food environment on childhood obesity in the UK.

Two of seven studies reported a variety of lifestyle choices are causing overweight and obesity in children in the UK. They also highlighted how complicated the environment is impacting these choices Wilkie et al., (2016) After analysing the family dynamics around eating out of the house McGuffin et al., (2015) discovered that parents as well as children were aware of the difficulties in choosing a healthy diet when dining out, which is frequently affected by food marketing and convenience.

Hilton et al., (2023) outlined the opinions of experts about food marketing practices that promote foods rich in fat, salt, and sugar (HFSS), emphasising the necessity for more stringent rules to prevent unhealthy eating habits. However, A community-wide intervention in an impoverished London ward was documented by Bijlani et al., (2024), who noted the problems that persist in maintaining the positive changes in physical activity and food.

Additionally, Pallan, Parry, and Adab, (2012) examined the contextual variables that impact obesity in South Asian populations in the UK. They identified environmental and cultural factors that raise the risk of obesity and emphasised the need for treatments that are sensitive to cultural differences.

Together, these studies highlight how difficult it is to combat childhood obesity and highlight the ways in which behavioural, cultural, and environmental variables interact to influence results.

Parents' experiences with managing children obesity in primary care were investigated by Turner, Salisbury, and Shield, (2012). They found that parents were not happy with the help that they received from healthcare professionals, especially when it came to the sensitivity and effectiveness of treatments.

When Clarke et al., (2015) looked at how people felt about school-based obesity prevention, they found that parents and kids had different opinions about how beneficial these programs were, with parents often believing that they weren't adequately individualised.

This research presents the findings of a systematic review that incorporated data from qualitative studies which indicated a significant relationship between the food environment and childhood obesity in the UK. However, further interventions are required to address this public health concern.

Lifestyle Choices

Physical and mental well-being are enhanced by engaging in physical activity (PA). To get health benefits, many teenagers, however, do not engage in enough PA and do not fulfil age-appropriate PA requirements. Adolescence often sees a sharp fall in PA levels, and gender, rurality, and socioeconomic status (SES) are all strongly correlated with PA levels which ultimately leads to obesity.

In particular, adolescents from socioeconomically deprived groups have lower levels of physical activity (PA), females are less active than boys, and adolescents who live in rural areas sometimes have fewer access to resources and facilities, all of which have an adverse impact on health (Leone et al., 2016).

However, Apperley et al., (2022) states that along with physical activity there are also few significant factors like modifications in eating habits and nutritional patterns are probably connected to the rise in childhood obesity cases.

Snacking is becoming more and more recognised as a possible obesity risk factor. Snacking is frequently linked to consuming more food overall or more energy-dense foods (and drinks), especially when it occurs outside the home where the typical snack foods are frequently heavy in fat or high in carbohydrates.

Youngsters who miss breakfast may be more likely to become obese later in life. The exact mechanism is unknown, however it might something to do with breakfast consumption serving as a barometer of overall healthful behaviour with consuming less fat and eating fewer snacks during the day.

Findings from the present review suggest that the issue of obesity is also exacerbated by screen time, which includes watching television, playing video games, and engaging in internet activities. Promoting a balanced diet and frequent exercise, however, calls for more than just changes in personal behaviour; it also calls for laws and settings that encourage good choices. Thus, lifestyle behaviour modification techniques, such school-based programs that encourage physical activity and nutritional education, must be included in interventions meant to lower childhood obesity (Murphy and Demaio, 2018).

Environmental and Community Influences –

Numerous individual-level factors, including biological, social, and behavioural risks, combine with the familial context of the child, which is impacted by the community environment, to induce childhood obesity (Banwell et al., 2011).

Cultural customs among immigrant populations may also have an effect on childhood obesity. In the UK, for instance, children from South Asian and Afro-Caribbean populations have greater rates of obesity, in part because of traditional meals that can be heavy in fat and carbohydrates.

Additionally, there are some cultures where being overweight is seen as a sign of riches and good health, which could lead to a lessened focus on weight control during young age (Salm et al., 2023).

However, Finney Rutten et al., (2010) states that environmental elements, such the presence of green areas and walkable communities, are important. Having access to parks and recreational places encourages people to get outside, and walking-friendly neighbourhoods can help reduce childhood obesity. But in many UK cities, there is still insufficient infrastructure to support physical activity, which raises the risk of obesity.

Child diet may also be impacted by child's tastes and their peer and/or social surroundings. Given the significant influence parents have on the formation and upkeep of their children's health-related behaviours, early intervention and obesity prevention efforts in children can benefit from addressing parental misunderstandings and unhealthful views on the quality of the child's diet (Murphy and Demaio, 2018).

It is significant not to ignore that a child or adolescent who is obese may experience a wide range of effects from psychological and psychosocial factors. There are some obese children who do not have negative psychological effects or psychological deficits. While some people do not suffer greatly from co-morbid mental health conditions (such as depression, anxiety, and eating disorders), others do. While some children and adolescents feel higher levels of stress, stigma, bullying, and teasing, or have lower levels of confidence in themselves, others do not, and have lower coping and communication abilities (Newson and Abayomi, 2024).

Policy and Marketing Influence -

In an effort to guarantee children eat better meals during school hours, the UK government has recently mandated required nutritional requirements for school meals. These regulations aim to promote healthy eating habits from an early age by limiting the amount of sugar, fat, and salt in school-provided meals.

The NCMP, or National Child Measurement Programme, this project weights and measures kids in elementary schools all throughout England in an effort to track and combat obesity trends.

Public health measures are shaped in part by the data collected; However, the program has come under criticism for not being fully linked with larger community efforts (Raine et al., 2013).

Studies have also indicated that children's dietary preferences are greatly influenced by advertising, which promotes the intake of high-energy snacks and drinks. In response, the UK government has passed laws to limit the promotion of junk food during children's programming, however enforcement of these laws and the growth of internet marketing still provide difficulties.

Although implementation of package and labelling restrictions has been sluggish, they have been explored as part of larger initiatives to fight childhood obesity (Garde et al., 2017).

Food and beverage firms have taken voluntary steps to promote healthier goods in addition to government policies. These initiatives, however, have not always been successful and frequently fail to produce significant change. Critics contend that more stringent regulations are required to guarantee that businesses put the public's health ahead of their own profits and that voluntary efforts are insufficient (Wickramasinghe et al., 2021).

Parental Perceptions and Involvement –

Encouraging healthy habits from parents is essential to preventing childhood obesity. According to research, there is a lower likelihood of obesity in kids whose parents actively encourage a balanced diet and regular exercise. This includes cooking wholesome meals, setting screen time limits, and promoting outside play (Robinson and Sutin, 2017).

Nevertheless, obstacles including time restraints, financial limits, and inadequate understanding of nutrition sometimes hinder parents from completely participating in these activities. For example, parents in lower-income households may realise that fast food is unhealthy, yet they nevertheless rely on it because of time restrictions or budgetary limitations (Wright et al., 2016).

Parent-involved programs, such family-based weight management initiatives, typically yield better results. However, there are times when participation rates are low, especially in the case of underprivileged families who might not have the means, the time, or the desire to get involved (Adamo and Brett, 2014).

According to existing research, interventions that are specifically designed to address the needs and difficulties of various socioeconomic and cultural groups tend to be more successful.

Program engagement and results can be enhanced, for instance, by providing support to parents facing financial difficulties or by using specialised messaging that speaks to the cultural values of ethnic minority families (Puma et al., 2023).

Jones et al., (2011) states There was a limited ability of parents to recognise when their child met conventional criteria for overweight. Parents employed alternative strategies that were mostly dependent on extreme circumstances and did not apply or trust therapeutic methods. Their rationale for keeping away from the issue was supported by such methods. This study emphasises how important it is to figure out how to help parents become more aware of and involved in the fight against childhood obesity.

For families to participate in interventions, parental awareness of the health hazards linked to their child's overweight status is essential; otherwise, attempts to address the childhood obesity epidemic on a population-wide scale may be hampered. Interventions aimed at narrowing the gap between the awareness of the health hazards associated with childhood obesity and improving the recognition of overweight status in children are required. A deeper comprehension of how parental views of health risk are formed should help health practitioners better teach parents about the dangers of being overweight and encourage their participation in intervention efforts (Park et al., 2013).

Health promotion initiatives generally focus on lifestyle variables, even though there is growing evidence that more comprehensive environmental preventative strategies are also important. Policies to lower the costs of making healthy food choices are required, as well as family-based interventions to enhance the eating environment and parenting style at home (Jones et al., 2011).

6.3 Strengths and Limitations-

A thorough and complete synthesis of the available evidence is provided by a Systematic Literature Review (SLR) on the effect of the food environment on childhood obesity in the UK.

One of its key strengths is its methodical approach, which uses preset inclusion criteria to reduce prejudice and increase transparency (Krüger et al., 2020).

By combining the results of several research that look at different facets of the food environment, like fast food accessibility, school food policies, and food marketing, this helps guarantee that the review offers a fair and comprehensive understanding of the subject. SLRs also assist in identifying research gaps by highlighting regions that require more study, which is helpful in directing future research (Al-Zubidy and Carver, 2019).

SLRs are particularly helpful to policymakers because they condense vast amounts of research into practical insights that can guide initiatives aimed at reducing childhood obesity, including laws governing food labels or urban planning (Krüger et al., 2020).

However, the review has some limitations. The quality of the included studies determines the quality of an SLR's conclusions. The overall results may be less reliable if a large number of the studies contain methodological flaws, such as small sample numbers or non-randomized designs. It is challenging to draw generalisable conclusions due to the variety of the studies included in the review, since various studies may utilise different methodology, definitions, and measurements of both food environments and obesity outcomes (Cruz-Benito, 2016).

Another drawback is publication bias, which can distort the overall results because research with noteworthy findings is more likely to be published. Additionally, doing an SLR requires a lot of resources, and as new research is published, its conclusions may become old.

Language barriers in some countries may have made studies harder to find, and variations in the methods used to gather and describe the data made it impossible to perform a meta-analysis (Carver et al., 2013).

6.4 Chapter Summary -

This chapter identifies a number of important variables, such as the high concentration of fast-food restaurants, the ease of access to items high in calories and low in nutrients, and the aggressive marketing of unhealthy products.

Children from lower-income homes are more likely to be exposed to poor eating situations, which is another way that socioeconomic inequities worsen these problems.

The chapter addresses how well interventions like public health campaigns, school-based initiatives, and legislative changes work to address these problems. It emphasises how crucial it is to take a multifaceted approach to creating a better food environment, including community involvement, government legislation, and education. Stronger, evidence-based regulations are required, as is a cooperative strategy involving legislators, communities, and healthcare professionals to establish a welcoming food environment that promotes better eating practices and lowers the rate of childhood obesity. The chapter ends with suggestions for further study to examine long-term effects and get a deeper comprehension of the connection between the food environment and childhood obesity in the UK.

CHAPTER 7: RECOMMENDATIONS AND CONCLUSION

7.1 Introduction to Chapter–

The study's main conclusions are outlined in this chapter, along with their potential implications and recommendations for further research and execution. The study's goal was to look at the impact of food environment on childhood obesity in the UK. The discovered results facilitate practical applications and provide strategies for future study in this area while also contributing to a deeper knowledge of obesity. The first thing this chapter will do is discuss how these findings may be interpreted in relation to food environment and childhood obesity. It will provide practitioners practical suggestions on how to put these insights to good use. It will also point out areas where further study might improve or build upon the findings. The chapter ends with a summary of the study's overall contributions, a statement of its importance, and a focus on the key findings derived from the research.

7.2 implications of findings –

The results of this study on how the food environment affects childhood obesity in the UK have a number of significant implications for intervention plans and public health legislation. Firstly, the findings imply that increased obesity rates are a result of unhealthy food alternatives being easily accessible and available in children's contexts, such as fast-food restaurants close to residential areas and schools (Gooley et al., 2022).

Heerman et al., (2024) suggests that in certain places, local governments should need to impose more stringent laws on food establishments and encourage the use of healthier substitutes. The study also emphasises the importance of socioeconomic issues, showing that children from lower-income families are more susceptible to the negative impacts of eating environments on obesity. This necessitates focused measures to help these groups, such educational campaigns, and incentives for healthy food alternatives.

Furthermore, the research indicates that effective management of childhood obesity requires multi-sectoral coordination among educational institutions, government agencies, and food sellers. The implications highlight the necessity of all-encompassing, systemic strategies to lower obesity prevalence and enhance public health outcomes (Lister et al., 2023).

7.3 Recommendations for Practice -

Newson and Abayomi, (2024) states many important practice recommendations may be put into place to lessen the impact of the food environment on childhood obesity in the UK. Initially, by introducing nutrition instruction into the curriculum and offering better meal alternatives in school cafeterias, schools should collaborate with the local health authorities to create healthier eating environments.

Second, to improve access to reasonably priced, nutrient-dense meals, community-level initiatives like the creation of neighbourhood farmer's markets or funded healthy food programs might be implemented in low-income regions. Third, zoning laws that restrict the number of fast-food restaurants in close proximity to residential areas and schools should be implemented by local governments. This would lessen the ease with which kids may get harmful food selections (Spiga et al., 2024).

Serving populations where children obesity is most prevalent, federal nutrition assistance programs have the best evidence to support efforts to reduce childhood obesity (Heerman et al., 2024).

Another recognised factor of obesity is physical activity, or energy expenditure. Hence, measures to increase energy expenditure in children are necessary. Diet, physical activity, and counselling are the three key components of recommendation.

In order to avoid childhood obesity, clinicians who interact with children and their families must educate parents and kids about growth monitoring and stress the value of adopting good lifestyle habits (Gooley et al., 2022).

Furthermore, partnering with food merchants, public health officials, and local governments might facilitate the development of incentive programs that encourage businesses to stock more healthy alternatives than processed foods. Last but not least, focused public health initiatives have to emphasise educating parents and other carers on the connection between childhood obesity and the food environment and promoting healthy eating habits at home (Richardson et al., 2013).

Proposals, however, also need to include specific budgets, schedules, and ownership, training, and coordination information for local groups in order to be

carried out successfully. Clinicians and academics involved in developing recommendations and policies should consult with public health specialists who have more experience with actually carrying out the specified activities to ensure that their recommendations are realistic for successful implementation (Poobalan et al., 2010).

It is necessary to use objective metrics to look into and evaluate the unique needs and experiences of every child and adolescent who is living with obesity. After these issues have been thoroughly examined throughout the assessment, a suitable, personalised intervention can be provided (Newson and Abayomi, 2024).

7.4 Recommendations for Future Research-

To expand on current knowledge and guide successful interventions, future research should concentrate on a number of significant issues. First, long-term studies that monitor children over time may offer insightful information about how alterations in the food environment impact long-term health outcomes and obesity patterns. Furthermore, studies should examine how well zoning laws and other regulations work to limit the availability of unhealthy food alternatives in different regions, especially in places with lower incomes (Richardson et al., 2013).

Since internet advertising is influencing dietary behaviours more and more, a lot of research is required to determine how children's food choices and obesity rates are affected by digital food marketing.

The most efficient methods for lowering children obesity would also be identified with the aid of research on the function of school- and community-based interventions, such as expanding access to healthful foods and nutrition education initiatives (Alkhatib et al., 2024).

Living with obesity adds stress, which further lowers self-esteem, wellbeing, and quality of life. Adverse childhood experiences and stress are common among obese children, and young people can remember the effects of psychological concerns including discrimination and stigma.

Weight control, healthy eating, and childhood obesity therapies usually do not prioritise psychological health. However, the UK's National Institute of Health and Care Excellence (NICE) clinical guidelines mention self-esteem and recommend it as a possible intervention outcome (Newson and Abayomi, 2024).

Additionally, a more thorough knowledge of the ways in which environmental and socioeconomic variables interact to promote childhood obesity may be obtained through multidisciplinary study integrating public health, urban planning, and socioeconomic behaviour (Poobalan et al., 2010).

Therefore, those commissioning, creating, and implementing interventions for childhood obesity should consider a more holistic approach that considers the psychological and emotional requirements as well as the underlying mechanisms of action. This may lead to the development of a childhood obesity treatment that is more potent and durable (Newson and Abayomi, 2024).

7.5 Conclusion

Overall, the systematic research found a link between childhood obesity in the UK and the food environment. Children who were exposed to an obesogenic environment, low-income people, low socioeconomic level, and rural living conditions were also included. The study concentrated on the ways that children's eating habits are influenced by variables including the presence of fast-food restaurants nearby, ultra processed foods in the supermarkets, the availability of good vs unhealthy food alternatives, and socioeconomic circumstances, all of which can lead to obesity.

The study emphasises the necessity of a thorough strategy to combat childhood obesity that targets the larger environmental variables influencing unhealthy eating patterns in addition to individual behavioural modifications. The results specifically recommend that local governments take into account enacting zoning regulations in order to increase access to healthy food alternatives in all neighbourhoods and reduce the concentration of fast-food restaurants close to schools. Schools also have an important role to play and need to keep improving nutrition instruction and making better lunch options available to pupils.

It will take structural reforms to address this issue, especially in communities with limited resources, where better eating environments are prioritised.

The results highlight the significance of modifying food environments through policy interventions and indicate that continuous cooperation between public health experts, educators, legislators, and the food business is crucial.

These initiatives have the potential to lower childhood obesity rates and enhance children's long-term health outcomes throughout the United Kingdom.

However, it will be crucial for policymakers to have plans and procedures established for public health preventative measures in order to be prepared to face the childhood obesity crisis.

Therefore, the government policies and programmes should be taken forward through government organisations, non-government organisations (NGO), volunteers, media influencers and celebrities for impactful outcome.

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APPENDICES

TABLE 3- CASP CHECK LIST-

CHECKLIST QUESTION	Hilton et al., 2023	Bijlani et al., 2024	Wilkie et al., 2016	McGuffin et al., 2015	Clarke et al., 2015	Pallan et al., 2012	Turner et al., 2012
1. Was there a clear statement of the aims of the research?	Yes "To understand the perceptions of pupils and staff in relation to school food provision and their perceptions of the intervention"	Yes "To understand the changes in diet and physical activity interventions to tackle childhood obesity"	Yes "To understand the relation between lifestyle behaviour and obesity in children"	Yes "To explore the factors influencing family out-of-home (OH) eating events"	Yes "To Know Parent and child perceptions of school-based obesity prevention in England"	Yes "To know the factors contributing to the development of childhood obesity"	Yes "To explore parents' views and experiences of primary care as a treatment setting for childhood obesity"
2. Is a qualitative methodology appropriate?	Yes "To understand the social phenomena, it is appropriate"	Yes "To know the human experiences qualitative method is appropriate"	Yes "To understand the social phenomena, it is appropriate"	Yes "To explore different factors, it is appropriate"	Yes To know the human experiences qualitative method is appropriate	Yes "To understand the social phenomena, it is appropriate"	Yes To know about different types of interventions, it is appropriate.
3. Was the research design appropriate to address the aims of the research?	Yes Expert interviews were a part of the study design, which made it appropriate for examining complicated policy issues from several angles.	Yes The observational study design was suitable for exploring associations between diet and PA with childhood obesity	Yes The qualitative method and cross-sectional approach were suitable for examining the connection between children's obesity and lifestyle choices.	Yes the parent and child interviews used in the research design were appropriate for gathering in-depth insights on the eating patterns of the family.	Yes Focus groups and interviews were incorporated into the study design to enable the researchers to get in-depth information on the opinions of parents and kids on school-based treatments.	Yes Through focus groups and interviews with community members, the study approach enabled a thorough investigation of environmental and cultural issues.	Yes Parents participated in semi-structured interviews as part of the study methodology, which is appropriate for thoroughly examining subjective experiences.

<p>4. Was the recruitment strategy appropriate to the aims of the research?</p>	<p>Yes In order to guarantee that the data gathered was pertinent to the study's objectives, the recruiting approach specifically targeted experts in the field, such as legislators and public health specialists.</p>	<p>Yes "Survey was conducted in school to know the actual rate of childhood obesity which is appropriate"</p>	<p>Yes "It is a cross sectional study"</p>	<p>Yes 'To better understand the perceptions of the pupil focus group discussion was appropriate"</p>	<p>Yes 'To better understand the perceptions of the pupil focus group discussion was appropriate"</p>	<p>Yes 'To better understand the perceptions of the pupil focus group discussion was appropriate".</p>	<p>Yes "Interview held with parents; it is appropriate"</p>
<p>5. Was the data collected in a way that addressed the research issue?</p>	<p>Yes Interviews were used to gather data, which is a suitable technique to investigate the opinions of experts on matters pertaining to policy.</p>	<p>Yes The method the data was gathered made it possible for the researchers to evaluate how the intervention affected dietary and physical activity changes.</p>	<p>Yes Accurate analysis of the study questions was made possible by the use of approved techniques to gather data on obesity and lifestyle behaviours.</p>	<p>Yes a thorough investigation of eating habits and attitudes within families was made possible by the data gathered through interviews.</p>	<p>Yes Focus groups and interviews were effective techniques of gathering data because they allowed participants' perspectives and experiences to be captured.</p>	<p>Yes Focus groups and interviews were useful data gathering techniques for examining the environmental factors that contribute to childhood obesity.</p>	<p>Yes The researchers were able to acquire comprehensive data on parents' perspectives and experiences with managing childhood obesity using semi-structured interviews.</p>

<p>6.Has the relationship between researcher and participants been adequately considered?</p>	<p>Yes The relationship between the researcher and the participants was probably taken into account to make sure that experts felt comfortable expressing their opinions on potentially delicate policy matters.</p>	<p>Yes The connection between the researcher and the participant was probably taken into account in the study to guarantee proper data collection, however no particulars are given.</p>	<p>It's possible that the participant-researcher interaction was more formal and organised. Although the researcher-participant interactions are not discussed in length in the study, it is implied by the design that such issues were taken into account.</p>	<p>In order to collect useful data, given the study's emphasis on family relations, researchers would have required to encourage participants' openness and trust.</p>	<p>Given that children were engaged, the interaction between the researchers and participants was taken into consideration. Establishing trust and providing a secure space for children to voice their opinions were critical to the study's accomplishment.</p>	<p>The researchers have taken into account the necessity of cultural awareness and competency when working with members of these groups.</p>	<p>Given the delicate nature of the subject, the researcher's and participants' connection was probably taken into consideration. Achieving open communication and building trust were essential to obtaining truthful insights.</p>
<p>7. Have ethical issues been taken into consideration</p>	<p>Yes, because the study included professional perspectives on policy subjects, ethical concerns including informed consent and confidentiality have been handled.</p>	<p>Yes Ethics have been taken into account, especially with relation to informed consent and participant privacy protection.</p>	<p>The study complied with ethical standards suitable for a global research endeavour, encompassing the acquisition of informed permission from both parents and children, maintaining participant anonymity, and ensuring</p>	<p>It's probable that ethical considerations were made, especially when it came to getting permission from parents and kids, maintaining anonymity, and managing potentially delicate conversations regarding</p>	<p>It is probable that ethical considerations took precedence, such as getting informed agreement from parents and kids and maintaining anonymity. When using minors in research, ethical guidelines must be strictly followed.</p>	<p>It's likely that ethical issues were stressed, especially in relation to working with minority ethnic communities. Informed permission must be obtained, and cultural customs and norms must be respected.</p>	<p>It is probable that ethical considerations were taken into account because qualitative research usually calls for cautious treatment of participant confidentiality and informed permission, especially when touching</p>

			the welfare of participants.	eating habits.			on delicate subjects like childhood obesity.
8. Was the data analysis sufficiently rigorous?	Yes A suitable method for qualitative data was thematic analysis. There are distinct themes that emerge from the interviews, suggesting that the analysis was carried out with rigour.	Yes The study's analysis of the dietary and physical activity changes most certainly included robust statistical techniques.	indicated analysing lifestyle choices and how they relate to obesity statistically. Strong statistical rigour is evident from the stated thorough data analysis methodologies.	The application of theme analysis, a popular technique in qualitative research, allowed for the identification of patterns in the data.	Themes arose from participant interviews throughout the qualitative approaches of data processing.	Finding contextual factors influencing childhood obesity within a particular cultural group was one of the tasks of the data analysis.	The researchers' use of thematic analysis to pinpoint important themes suggests that the data analysis was thorough. To increase confidence in the breadth and rigour of the study.
9. Is there a clear statement of findings?	Yes With thorough statistical data and explanations, the findings are presented in an understandable manner.	Yes The influence of the intervention on childhood obesity is clearly presented in the research.	Yes The study's conclusions about the relationships between various lifestyle choices and childhood obesity are rather evident.	Yes The study's conclusions are presented in an understandable manner, outlining how parents and kids feel about dining out and how that affects eating patterns.	Yes The study's conclusions are presented in an understandable manner, outlining how parents and kids feel about school-based initiatives to combat obesity.	Yes The study's conclusions are presented in an understandable manner, emphasizing elements that South Asian populations face in relation to childhood obesity.	Yes Yes, the results are presented in an understandable manner, emphasizing improvement and concentrating on parents' experiences with primary care obesity.

<p>10.How valuable is the research?</p>	<p>Yes, The research has significance because it adds to policy discussion and public health initiatives by offering insights into the possible efficacy of HFSS food marketing practices in combating obesity.</p>	<p>Yes, the research is significant because it shows how community-based treatments may effectively address childhood obesity in underprivileged communities, and this information can guide future public health initiatives.</p>	<p>The study is important because it advances our knowledge of the ways in which different lifestyle choices lead to childhood obesity and lays the groundwork for treatments meant to encourage youngsters to adopt better habits.</p>	<p>The study is important because it sheds light on the rising popularity of dining out and how it affects the nutritional status of families. Strategies for public health that encourage healthy eating habits can be informed by these findings.</p>	<p>The study is significant because it sheds light on how those who are directly impacted by school-based obesity control initiatives see them. This can help in the future when designing solutions that are more acceptable and successful.</p>	<p>The study is important because it clarifies the particular contextual variables that affect childhood obesity in South Asian populations, which can help develop public health initiatives and interventions that are culturally relevant.</p>	<p>The study is important because it sheds light on the viewpoints of parents, which may help primary care providers create more efficient plans for managing paediatric obesity.</p>
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TABLE 3 (source – self created)

DATA EXTRACTION TABLE –

Table 4 – (source – self created)

Author	Bijlani et al., (2024)
Study design	Community-wide pilot intervention
Research Aim/Purpose	Assess the impact of a community-wide intervention on diet and physical activity in tackling childhood obesity.
Sample Size	Inner-London community (exact number not specified)
Methodology	Mixed-methods approach including community engagement, dietary assessments, and physical activity tracking
Data analysis	Statistical analysis comparing pre- and post-intervention data
Findings	Modest improvements were observed in dietary habits and physical activity, but sustained efforts were needed for long-term change.

Author	Pallan et al., (2012)
Study design	Qualitative study
Research Aim/Purpose	Investigate contextual influences on childhood obesity in UK South Asian communities.
Sample Size	South Asian children from two UK communities
Methodology	Focus groups and interviews with children and parents, focusing on cultural and environmental factors influencing obesity
Data analysis	Qualitative analysis to explore the role of culture, family dynamics, and environment in obesity development
Findings	Cultural factors, including dietary traditions and social norms, played a significant role in shaping obesity risk among South Asian children.

Author	McGuffin et al., (2015)
Study design	Qualitative study
Research Aim/Purpose	Explore parent and child perspectives on family out-of-home eating behaviors.
Sample Size	32 families from Northern Ireland
Methodology	In-depth interviews with parents and children to explore family eating patterns and influences on out-of-home eating
Data analysis	Thematic analysis to identify common themes and differences in perspectives
Findings	Both parents and children cited convenience as a key factor for eating out, but parents were more concerned about health impacts than children.

Author	Wilkie et al., (2016)
Study design	Cross-sectional study
Research Aim/Purpose	Examine associations between multiple lifestyle behaviors and overweight/obesity among children aged 9–11 years.
Sample Size	6,354 children from the UK
Methodology	Questionnaires assessing physical activity, diet, screen time, and sleep, alongside anthropometric measurements
Data analysis	Multivariate regression analysis to assess associations between lifestyle behaviors and weight status
Findings	Sedentary behaviors and poor dietary habits were strongly associated with higher BMI, while physical activity showed a protective effect.

Author	Clarke et al., (2015)
Study design	Qualitative study
Research Aim/Purpose	Investigate parent and child perceptions of school-based obesity prevention programs in England.
Sample Size	52 parents and children
Methodology	Focus groups conducted separately for parents and children in schools implementing obesity prevention programs
Data analysis	Thematic analysis to identify perceptions and themes among parents and children
Findings	Both parents and children expressed positive views on school-based obesity prevention, though concerns were raised about long-term sustainability and impact.

Author	Turner et al., (2012)
Study design	Qualitative study
Research Aim/Purpose	Explore parents' views and experiences of childhood obesity management in primary care.
Sample Size	15 parents of obese children
Methodology	Semi-structured interviews with parents conducted in primary care settings
Data analysis	Thematic analysis to identify key themes in parental experiences and attitudes
Findings	Parents expressed dissatisfaction with the support offered in primary care and desired more tailored, empathetic, and practical advice.

Author	Hilton et al., (2023)
Study design	Qualitative study
Research Aim/Purpose	Explore expert views on policies regulating high fat, salt, and sugar (HFSS) food marketing in the UK.
Sample Size	20 experts in public health and policy
Methodology	Semi-structured interviews with public health and policy experts on HFSS food marketing regulation
Data analysis	Thematic analysis to identify policy preferences and perceived barriers
Findings	Experts supported stricter regulations on HFSS food marketing, though challenges included industry resistance and enforcement issues.

TABLE 4 (source – self created)

DATA EVALUATION OF RELEVANT STUDIES –

TABLE 5

Author	Research aim/ Purpose	Literature review	Sample size	Ethical considerations	Methodology	Results	Discussion
Bijlani et al., (2024)	Clearly defined	Comprehensive	identified	considered	Clearly defined	Clearly stated	Clearly presented
Hilton et al., (2023)	Clearly mentioned	Clearly stated	Clearly stated	considered	Clearly defined	Clearly stated	Clearly stated
Turner et al., (2012)	Clearly stated	Comprehensive	identified	considered	Clearly defined	Clearly stated	Clearly presented
Clarke et al., (2015)	Clearly presented	Clearly mentioned	mentioned	considered	Clearly defined	Clearly stated	Clearly stated
Wilkie et al., (2016)	Clearly defined	Comprehensive	identified	considered	Clearly defined	Clearly stated	Clearly stated
McGuffin et al., (2015)	Clearly defined	Comprehensive	Clearly stated	considered	Clearly defined	Clearly stated	Clearly stated
Pallan et al., (2012)	Clearly Represented	Comprehensive	Clearly defined	considered	Clearly defined	Clearly stated	Clearly presented

TABLE 5 (source – self created)