

Challenges of Childhood Obesity Interventions in the United Kingdom and Lessons for Public Health Practitioners in the Global South: A Scoping Review

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ABSTRACT

Childhood obesity is a major health challenge around the world and has been linked to several health and non-health risks. Although significant efforts are in place in the United Kingdom (UK) to reduce the burden of the disease, these efforts suffer fundamental shortcomings that potentially undermine their effectiveness. Drawing upon this understanding, this study examines the existing intervention challenges to childhood obesity interventions in the UK, with the goal of informing improved programmatic solutions in the global south (Africa, the Caribbean and Latin America, Asia excluding Japan, Israel, and South Korea, with Oceania without New Zealand and Australia). A search of five popular health databases was carried out yielding 19 research articles. The study article period is between 2013 and 2023. A scoping review methodology was implemented on the selected reports following a critical appraisal. Children between the ages of 3 to 11 years were considered. Findings suggest that intervention implementers focus mainly on executing school-based programs but fail to involve stakeholders from the wider society which consistently leads to failure. This review also found body mass index to be a popular measure for weight gain or loss. Nevertheless, this measure has been consistently criticized in literature, thus subjecting the accuracy of the results of interventions to serious criticism. Overall, for intervention implementers in developing countries to carry out successful interventions, lessons around perceived standardized but possibly inaccurate procedures and measures must be carefully considered.

Keywords: Childhood, Obesity, Intervention, Health challenges, Childhood obesity, Intervention failure in Childhood Obesity, Intervention failure in the UK, Lessons for the Global South.

INTRODUCTION

Of the many countries of the world where the health of children is prioritized, the United Kingdom (UK) is

perhaps one of the most popular. Given a range of health policies aimed at ensuring that children aged 0-5 years enjoy the best of health in their childhood years and eventually grow to become healthy adults. This is one of the ultimate goals of the Government of the United Kingdom as the country moves to actualize Sustainable Development Goals (SDG) 3 alongside its 13 targets. Even though the UK is making significant efforts across all fronts concerning the health of children, it is obvious that the country has consistently struggled to control and manage childhood obesity, a leading disease amongst children in the UK and in many developed countries [1]. Whilst [2] offer compelling evidence suggesting that low socio-economic level is the ultimate cause of obesity, some scholars have identified obesity as the disease of the rich in poorer climes [3]. Nevertheless, the situation is completely different in wealthy nations where the burden of obesity is more pronounced amongst the poor.

The World Health Organization (WHO) has noted increased global rates of obese children since the mid-1970s [4]. This is the exact case in the UK. WHO notes that, globally, more than 30 million children were categorized as obese in 2020 [4]. According to the National Health Service (NHS) report in 2020, at least 1 out of every 5 children is obese, signifying a 2% increase in the obesity rate of children in reception classes, a similar situation is found with children in higher classes [5]. Whilst weight gain in children would not have ordinarily caused any problems, the fact that obesity has been linked to many diseases is worrisome. To name a few, childhood obesity has been researched to be the primary cause of metabolic challenges as well as sleeping problems [6], [7]. Some scholars have also posited the challenges faced by obese children when the need arises to engage in physical activities. Furthermore, [8] maintained that lengthy periods of obesity in childhood may translate into obesity as an adult, increasing the chances of a person suffering from a range of respiratory problems, diabetes, and high blood pressure [9]. Aside from the health implications, obesity has also been found to affect the academic performance of children [10].

One way in which researchers in the global north in general, particularly those in the UK, continue to stay ahead of the obesity scourge is the practice of implementing interventions. This has led to an increased understanding of the disease and its manifestation in children. Amongst the new developments, [11] explained that there is a need for implementers to duly consider the health status as well as the socio-demographic situation of a child as these factors are known to promote the disease. This is why the practice of socio-cultural interventions some of which are implemented in UK schools has become popular. There is also a wide range of other interventions such as breakfast in class among others.

Rationale

The many known implications of childhood obesity in the UK have resulted in significant scholarship about the disease which are presented in the form of interventions designed either to eradicate, control, or manage the disease in the UK. Whilst this is the case in the UK, contrasting evidence from developing countries shows little or no efforts to manage childhood obesity. This presents a learning gap for public health practitioners and policy-makers in developing countries. Premised on this situation, there is an urgent need to examine the challenges faced in childhood obesity intervention implementation across the UK and the lessons that developing countries can learn from them.

Research Aim and Objectives

This study examines the shortfalls of childhood obesity interventions as implemented across the UK, and lessons that public health personnel in developing nations can learn. To achieve this goal, the research will make efforts to answer the following questions:

- What are the common childhood obesity interventions in the UK?
- What are the main challenges of childhood obesity interventions in the UK?
- What critical lessons can public health practitioners in developing countries learn from the challenges

of childhood obesity interventions in the UK?

LITERATURE REVIEW

Childhood obesity according to several authors [12], [13], [14], [15] is a major public health issue worldwide, with serious psychological, physical, and social consequences. [16] mentioned that childhood obesity rates in the United Kingdom have been gradually rising, necessitating several intervention initiatives to combat this growing epidemic. Nonetheless, these interventions encounter numerous hurdles, and the lessons acquired are critical for developing countries dealing with similar problems. Within this literature review session of the paper, the researchers delve into the complexities of childhood obesity interventions in the United Kingdom, assess their effectiveness, and draw parallels with the situation in developing nations.

Prevalence and Impact of Childhood Obesity in the United Kingdom

Childhood obesity in the United Kingdom has reached alarming proportions, with various research and reports showing its rising prevalence [16]. Based on statistics from the National Health Service (NHS) Digital, the National Child Measurement Programme (NCMP) indicated that in the 2018/2019 school year, 20.2% of children in Reception (aged 4-5) and 34.3% of children in Year 6 (aged 10-11) were overweight or obese [17]. This pattern has grown significantly during the last several decades. For example, obesity rates among sixth graders increased from 18.7% in 2006/2007 to 20.2% in 2018/2019. The issue is considerably more concerning in some areas along with specific demographics [18]. According to NCMP data, childhood obesity is prevalent in poor communities. For instance, in 2018/2019, 26.9% of children in the poorest districts were obese, whereas 11.4% were in the least impoverished regions [17]. This gap demonstrates the importance of socioeconomic factors in juvenile obesity rates.

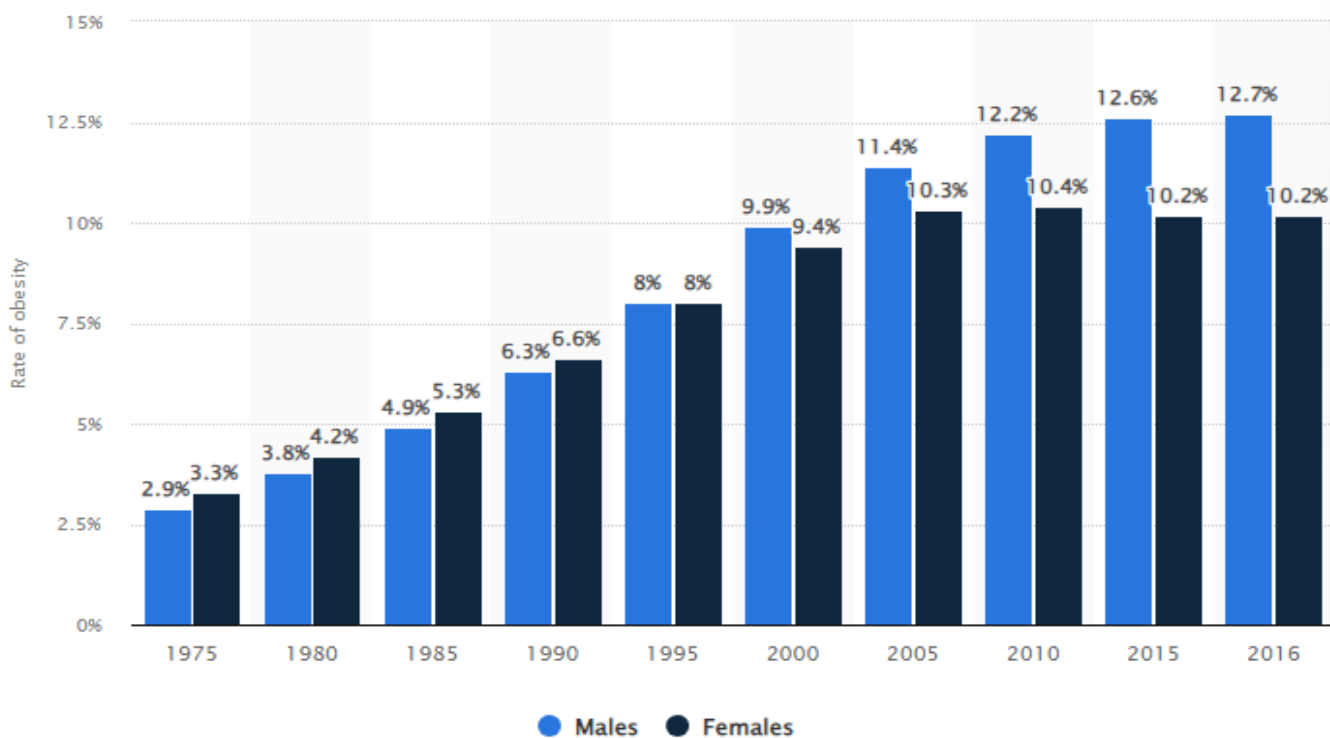


Figure 1: Childhood obesity rate in the UK between 1975 and 2016 [19].

Figure 1 shows the statistics of the prevalence of childhood obesity in the United Kingdom (UK) between 1975 and 2016, broken down by gender. At the start of this time succession, female children in the UK were

more inclined to be obese than male children. This changed in 1995, as rates of obesity among both female and male children in the UK hit 8%. In 2010, as depicted in Figure 1, 12.7% of male children reported being obese, compared to 10.2% of female children. It is additionally interesting to note that the rate of obesity among female youngsters has declined from an alarming rate of 10.4% in 2010 [19]. Childhood obesity has a wide range of consequences, including physical health, psychological well-being, and socioeconomic outcomes.

Physical Health Consequences of Childhood Obesity

Childhood obesity, according to [20], is linked to a variety of unfavourable physical health outcomes that can persist into older age. According to many academic health-related research [21], [22], [23], one of the most evident and concerning consequences is a higher likelihood of acquiring type 2 diabetes. [24] stated that obese youngsters are more likely to develop insulin resistance, an antecedent to diabetes that may result in long-term health issues if not managed effectively. According to a study published by [25], obese youngsters are approximately four times more likely to be diagnosed with type 2 diabetes than their non-obese classmates. [26] also observed that childhood obesity exerts an enormous effect on the cardiovascular health of the victim or the child in question. Obese children tend to be more prone to conditions like dyslipidemia (to develop high levels of cholesterol and triglycerides), high blood pressure, and atherosclerosis (artery stiffness). These factors lead to the early start of cardiovascular disease. According to research, obese children as early as five years old can develop atherosclerosis, which dramatically raises the risk of coronary artery disease and stroke later as adults [27].

Obese children are also prone to respiratory difficulties. Obstructive sleep apnea (OSA), defined as constant episodes of obstructed breathing during sleep, is common in obese children owing to extra fat around the neck clogging airways. This syndrome impairs sleep quality and can cause daytime weariness, poor academic performance, and behavioural problems [28]. Musculoskeletal disorders are another complication, as excess weight strains bones and joints. This can result in Blount's disease (a growth problem of the shin bone), flat feet, and an increased risk of fractures. These difficulties can induce chronic pain and restrict physical activity, continuing the obesity cycle [29]. Obesity has also been associated with gastrointestinal concerns like non-alcoholic fatty liver disease (NAFLD), which causes fat to build up in the liver, eventually resulting in liver damage and cirrhosis over time. According to multiple studies [26], [30], [31], NAFLD has grown more common in obese youngsters and is associated with major metabolic issues.

Economic Burden of Childhood Obesity

Childhood obesity has significant economic consequences, including both immediate and subsequent healthcare costs, like costs incurred due to loss of productivity as a result of low performance and costs incurred as a result of social care bills or subsidies. As reported by [32], the Government of the United Kingdom spends a significant amount of its revenue on tackling obesity-related health conditions. For instance, the treatment of cardiovascular disease, type 2 diabetes, and orthopaedic issues in children and adolescents living with obesity demands significant state medical resources (funding and equipment). As published by [33] the National Health Service incurs a direct cost of over £5.1 billion annually while treating obesity-related disorders. Also, the Indirect costs incurred may raise a financial burden. Obesity among children typically leads to lowered performance in school and a greater absence rate resulting from health issues, which might influence future job prospects and labour productivity. Based on to report by [34], children's absenteeism owing to obesity-related issues and lower productivity make the UK economy lose over £28 billion each year. Also, the cumulative economic effect continues until adulthood. As observed by [32], children with obesity are more likely to develop into obese adults, which will increase the probability of chronic conditions requiring continual medical treatment and perpetuating the downward spiral of financial strain on the UK healthcare system.

Psychological and Emotional Impact of Childhood Obesity

As observed by [35], childhood obesity is not only a physical health issue; the author mentioned that it additionally comes with significant emotional and psychological consequences. Children suffering from Obesity as noted by [36] may face considerable social discrimination and stigma, which can lead to a variety of emotional and psychological issues. Low self-esteem is one of the most prevalent concerns or issues. [37] mentioned that children who are overweight/obese frequently get bullied and taunted by their peers, lowering their self-confidence and sense of self-worth. A study by [38] revealed that obese or overweight children are considerably more likely to be ridiculed/bullied than their normal-weight classmates, regardless of colour, gender, or socioeconomic status. When obese kids are bullied, they usually experience emotions of remorse, isolation, and helplessness.

Several authors [37], [39], [40], [41], also observed that children with the health condition of obesity are also more inclined to develop anxiety and depressive disorders. They tend to experience a Long-term strain from battling obesity and its social repercussions and it may further result in worsening these health conditions. According to a study by [38], obese youngsters are more likely to experience symptoms of depression and anxiety-related conditions than their non-obese classmates [42]. This is owing to the constant negative criticism they receive from their social setting, which often leads to experiencing feelings of hopelessness and inadequacy.

In addition, as posited by [37], children with obesity condition have a higher risk of developing eating disorders. [43] explained that they are pressured to lose weight so as to meet societal standards and as such, they tend to over do too much which might cause some youngsters to engage in harmful weight-control routines, like excessive dieting or bingeing. These behaviours might compound their physical and mental health problems, resulting in a tough-to-break cycle. Also, [36] mentions that Obesity may damage relationships within the family or family dynamics. Parents may feel guilty or frustrated about their child's illness, resulting in strained relationships. More importantly, the child's mental distress could have a bearing on the entire family's attitude and functioning, resulting in a tense and worrisome family setting.

Ethnic Disparities Associated with Childhood Obesity

As reported by [44], the rate of obesity in children varies greatly by ethnicity, with certain ethnic groups having higher rates than others. According to data from the National Child Measurement Programme, obesity rates amongst Asian and Black children in the United Kingdom are significantly higher than those among White children. According to a poll, the obesity rate among Year 6 children in 2018/2019 was highest in the Black and Asian communities (27.8% and 25.9%, respectively), compared to 16.7% in the White population [45]. These distinctions or variations are attributed to an intricate link of cultural, social, and ecological variables. for instance, Ethnic food habits often have a part, as traditional foods may contain more fats and calories. In addition, socioeconomic variables such as lower educational attainment and income in specific ethnic communities may limit their ability to purchase nutritious meals and afford recreational facilities, which causes higher obesity rates.

Also, some ethnic minorities usually reside in urban centres with barely any open spaces and a high concentration of fast-food outlets, which may increase their risk of being overweight and raising obese children. [46] mentioned that language barriers and an absence of culturally appropriate health education hinder efficient discussion on healthy lifestyles and obesity prevention.

Socioeconomic Disparities Associated with Childhood Obesity

The overall rate of children with obesity varies greatly based on the socioeconomic status (SES) of the

parents or caregivers, resulting in youngsters from families with lower earnings getting more susceptible. The variation is caused by several causes, like less availability of nutritious meals, fewer opportunities for aerobic activity, and greater susceptibility to bad food marketing. Lower-income families according to [45], generally are residents in “food deserts area”. Food-deserted areas are characterized by locations with little or no access to inexpensive, nutritional meals [48]. On the contrary, these municipalities are bombarded with convenience stores and eateries that provide highly dense-calorie foods with little or no nutritional value. This scenario poses a challenge for caregivers to provide healthy nourishment to their wards [39]. As a result, as noted by [49], communities with low-income earnings may often lack safe recreational spaces like parks and sports facilities, which restrict the opportunities for children to engage in physical activity for their optimal growth and physical development. Educational institutions within these areas could additionally have less funding for physical and health education programs, which further limits children’s ability to engage in routine physical activity [50]. Financial constraints of the parents as noted by [51] may also encourage households to prefer less costly, more energy-dense diets over expensive vegetable and fruit consumption. The strain of financial uncertainty according to psychologists has the tendency to lead victims to eating disorders as well as reduced attention to healthy lifestyle choices.

UK Government Intervention Strategies for children suffering from Obesity

The United Kingdom adopted several government and policy steps to combat the growing prevalence of childhood obesity. In 2016, the government announced the Childhood Obesity Plan, with the goal of halving childhood obesity rates by 2030 [52]. This comprehensive plan comprises numerous initiatives aimed at both the food environment and lifestyle behaviours. Among the important measures is the Soft Drinks Industry Levy, formerly known as the sugar tax. Introduced in 2018, this levy imposes a tax on sugary soft drinks, incentivizing manufacturers to reformulate their goods to contain less sugar. Early reviews indicate that this strategy has reduced the sugar level of numerous beverages [51].

Also, the UK government is implementing voluntary modification measures to urge food firms and vendors to reduce salt, sugar, and fat content in their manufactured products [54]. Further to that, stricter regulations were placed on the marketing and promotion of junk food/unhealthy food towards youngsters so as to reduce children’s consumption of low-nutrient and high-dense-calorie food products through media. Educational institutions also play a pivotal role in the fight against obesity in children in the UK due to that they offer a structured environment that promotes proper nutrition and physical activity. The UK government also mandated better school meals and increased support through funding for physical education in preschool to guarantee children receive appropriate dietary guidance and exercise during school hours. Part of the government effort is the Daily Mile program, which was initiated to encourage young people to jog or run for 15 minutes every single day, so as to show excellent results in increasing physical activity levels. [55]. Dietary awareness and proper school food guidelines as posited by [56] are also critical components of the aforementioned interventions. Change4Life along with other community-centred initiatives leverage public education campaigns, outreaches and neighbourhood support networks to encourage healthier living [31].

What are the Challenges in Implementing Childhood Obesity Interventions in UK?

Implementing interventions for addressing childhood obesity in the United Kingdom hit several hurdles, the majority of which can be linked and others complex. The key problem as observed by [57] is hostility from the food and beverage businesses. Notwithstanding the government’s efforts to enact regulations such as the Soft Drinks Industry Levy, food and beverage corporations have expressed strong opposition, stating the proposed intervention will have a severe impact on their businesses [58], [59], [60]. Such opposition according to [61] may stymie policy implementation and as such result in policy insignificant, reducing their effectiveness.

Another bottleneck experienced by the intervention is socioeconomic inequality within the UK communities, which exacerbates obesity rates in low-income households. As observed by [62], some of these families often live in areas with little or limited access to nutritional foods and recreational dispensary alternatives. Notwithstanding government intervention programs to encourage healthier diets and more physical activity, families and caregivers within these neighbourhoods face structural barriers to adopting and sustaining healthier lives for their wards. Also, cultural variances and discrepancies in health literacy across ethnic groups make it difficult to implement a one-size-fits-all intervention strategy by the UK government. According to [62], effective communication along with culturally appropriate strategies are essential but often insufficient during policy implementation. Educational institutions offer a critical platform for preventing obesity among children, nonetheless, these institutions also face particular challenges. According to [63], financial limitations and competing academic interests could hinder the rollout of comprehensive student health campaigns. Also, guaranteeing that educational regulations result in long-term behavioural changes beyond school hours needs regular engagements with parents/caregivers and the general public. Lastly, there is also the issue regarding the sustainability and continuity of the intervention program. Short-term financial cycles and political transitions, according to [62], may undermine the long-term sustainability of health projects by the government. As such, sustained dedication and sufficient financing are essential for preserving the momentum of obesity interventions and attaining long-term success.

What are the Backwardness of Interventions in Developing Countries?

Intervention programs to mitigate childhood obesity in underdeveloped nations regularly face significant hurdles, resulting in poor results and effectiveness. According to [65], the primary major bottleneck is a scarcity of resources. A lot of developing nations like Nigeria lack proper healthcare facilities and financing, which results in restricting their ability to implement complete childhood obesity prevention initiatives. As posited by [66], owing to this limited financing, the government prioritized emergency healthcare above prevention treatments, which put long-term childhood obesity management in the non-essential healthcare priority policy.

Childhood obesity and nutritious eating habits are also overlooked by the general population owing to high illiteracy levels. As such, [67] observed that many developing nations suffer a double burden of malnutrition, with undernutrition and obesity coexisting. The result undermines public health messages and policy desired outcomes. The efforts of the government to promote healthy eating habits and physical activity are usually overlooked by more visible and pressing national issues such as hunger (food inflation and insurgency) and infectious diseases. Also, the socioeconomic factors exacerbate the challenge of implementing these interventions. Poverty and food shortages are major economic problems in developing nations, which often lead to families eating cheaper, calorie-dense meals based on the economic realities [68]. These eating preferences are aggravated by a dearth of leisure opportunities and safe places to exercise, which leads to childhood obesity.

Political unrest and governance issues, according to [69], may hinder the development and execution of effective public health interventions. Developing nations are faced with inconsistent policy enforcement, corruption, and a lack of political will all work to hinder the success of obesity control measures. Moreover, medical facilities in these developed nations are usually fragmented, with limited synergy across various industry segments and institutions, which is essential for a comprehensive approach to childhood obesity prevention interventions [70].

Additionally, cultural attitudes and customary eating behaviours may cause significant complications in terms of childhood obesity intervention. Some cultures in developed countries, especially Africa believe that a higher body weight is a sign of affluence and healthy living, which potentially leads to opposition to

obesity control programmes.

RESEARCH DESIGN AND METHODOLOGY

To achieve the study objective in order to determine the efficacy of existing interventions for the prevention, control, and management of childhood obesity in the United Kingdom, it becomes necessary to conduct a thorough literature review to fully understand the situations requiring certain kinds of intervention, their rate of success and/or failure rates, the reason or reasons for inefficiency (if perceived to have failed), and methods of transforming the situation around where necessary. As such, the current research undertakes a scoping review of the available literature. Scoping reviews are effective when the purpose of the study is to map the range of literature on a certain research topic. This provides an overview of academic activities in that area, highlighting areas that have yet to get considerable research for planning further research [71]. Scoping reviews are particularly effective for examining new research information when other more extensive assessments do not provide an accurate representation of potential questions. [72] emphasized that this is attainable by providing findings from research execution, along with the various sorts of evidence that shape policy and practice. In one of the first studies to attempt to establish a baseline framework for undertaking scoping reviews, [73] proposed a few factors that may justify such reviews. [74] fine-tuned these parameters, pointing out that there were no explicit guidelines for executing scoping reviews at the time. Nonetheless, in 2015, the Joannes Briggs Institute published an easy recommendation for authors [75]. [76] interpret this recommendation and declare that a scoping review may be appropriate in the scenarios that follow: i. Identifying existing research evidence in a niche, ii. Clarifying fundamental definitions and concepts, iii. Examining research methods to identify knowledge gaps, iv. Scoring literature for a more detailed review. The current study falls under points (i) and (iv) above, hence a scoping review was chosen, which involves a structured database search using predetermined criteria.

Search Design

The scoping review approach for this research was carried out using five search engines (MEDLINE, Cochrane Library, CINAHL, PubMed and Web of Science), the five of which are well-known for their wide coverage of public and child health-related subjects. According to [77], while choosing databases for searches in evidence-based investigations, researchers must consider indexing and abstracting concerns. This enables the selection of the most appropriate database for optimal time management. A search of each of the listed databases yields a variety of scientific articles on public and child health, particularly in the areas of disease identification description and action for preventing, controlling, or alleviating them. To guarantee that research follows a distinctive framework for answering the research questions as indicated by [78], a SPICE structure (see Table 1) is utilized to organize essential parts of the investigation, which was previously chosen to frame the research questions.

Table 1. The research SPICE structure

SPICE	
Setting	United Kingdom
Population	Overweight and Obese children, their parents, and any other individuals participating in programs to prevent, control, and manage the disease
Interest	Childhood obesity
Comparison	Effective vs. ineffective interventions for childhood obesity
Evaluation	Measures to Determine the Effectiveness of Interventions against Childhood Obesity in the UK

After selecting the databases for this research, [79] stated that the following stage in a scoping review is to establish a set of search criteria. These criteria, also known as inclusion and exclusion requirements, guarantee that the search takes a specific form so that the articles chosen can be traced and tracked to some standardised criterion and that they are indeed relevant to the purpose of the research with regard to interest and study focus. Table 2 explains the criteria used to find and choose literature for this research.

Table 2. Requirement for the selection or rejection of articles

Aspect	Criteria	
	Inclusion	Exclusion
Year	Publications released between January 2014 and April 2024.	Articles published before 2014 and after April 2024.
Location	The United Kingdom only (comprising Scotland, England, Northern Ireland, and Wales)	All the nations in the globe that are not part of the United Kingdom
Interest	Childhood obesity and conditions leading to it (e.g., overweight)	All other childhood diseases apart from obesity; obesity in adults
Language	English	Spanish, Dutch, Deutsche, and all other languages apart from English
Focus	Interventions to prevent, manage, and control childhood obesity; success/failure rates of the interventions; causes of ineffectiveness of the interventions; and ways to improve on the interventions for childhood obesity	Causes and effects of obesity
Type of article	Peer-reviewed documents only	All other publication types that do not undergo the peer-review procedure (i.e. year reports, books and their sections, white papers blog posts etc.)
Article reputation	Literature is published in trustworthy journals where academic rigour is usually applied.	Articles published in perceived predatory journals
Nature of literature	Only empirical literature	Review and narrative studies

Strategy for Executing Literature Search

To conduct a literature search in each of the specified databases, a few terms identified as keywords, taken from the study’s title and based on the study objectives, were employed. According to [78], the words to employ as search terms (keywords) in a scoping review task must be solely determined by the research objectives/questions, such that papers resulting from the search contain data relevant to the ongoing investigation. The current research’s search criteria include CHILDHOOD, OBESITY, EFFECTIVENESS, INTERVENTION, and UNITED KINGDOM. In addition to selecting search phrases, researchers can obtain reliable search feedback from database searches by looking for words that are synonymous or have a meaning similar to the search terms. As such, words like CHILDREN OR YOUNG PERSON (which is synonymous with childhood), OVERWEIGHT (which is closest in describing obesity), PROFESSIONAL HELP (which is used to substitute intervention) and EFFICACY or SUCCESS (which is synonymous with effectiveness), were all accepted. Aside from using synonymous phrases, using Boolean

terms (AND, OR, and NOT), truncation, and MeSH (Medical Subject Heading) terminology. Boolean phrases allow the researcher to widen potential input from database searches or filter them down to the most relevant items. The Aggregate search strings are as follows:

- “Overweight OR Obesity AND Young Persons OR Children” NOT “Older people OR Adults”
- “Overweight OR Obesity AND Young Persons OR Children” NOT “Older people OR Adults AND United Kingdom”
- “Effectiveness OR Efficacy OR Success” AND “Professional help OR Intervention” AND “Overweight OR Obesity” AND “Children OR Young People” NOT “Older people OR Adults” AND United Kingdom
- “Professional help OR Intervention” AND “Overweight OR Obesity” AND “Young Persons OR Children” NOT “Older people OR Adults” AND United Kingdom

With regards to wildcard search, the following strings were applied

- Child* AND Obese* AND Interven*
- Obese* AND Child* AND Interven*
- Interven* AND Child* AND Obese*
- Effect* AND Child* AND Obese* AND Interven*

The search for papers for this research matched the inclusion and exclusion criteria outlined in Table 2. The Cochrane Library database was the first to be searched, providing input on 38 publications. The MEDLINE database contained 43 articles, followed by CINAHL with 31, Web of Science with 28 articles, and PubMed with 36. 176 papers were obtained from all five databases. The papers in question were saved using the Zotero platform a bibliography management application.

Articles Screening

After completing the paper search and archiving, the researchers began scanning and screening. The first database search in a systematic or scope review generally yields a large number of irrelevant items that must be carefully but thoroughly screened. As a result, the 176 objects underwent a comprehensive scanning and screening process. This was done again following the predetermined guidelines for inclusion and exclusion. First, after searching five databases, several overlaps were discovered (i.e., certain publications were counted twice). This is primarily due to the ability to extract an article from two or more databases. As such, the first scanning process consisted of removing duplicates or triplicates, leaving only one copy. This approach resulted in the removal of 58 papers from the 176, retaining 118 reports that advanced to the first round of screening.

The first screening stage required thoroughly reviewing the papers stored in Zotero to look for paper abstracts and titles that did not correspond with this research's aims. Another 43 papers were excluded. For instance, some studies mentioned interventions that were not particular regarding child obesity but rather addressed adult obesity or other medical conditions. Other studies that addressed the causes and effects of obesity did not match the inclusion requirements. In general, only 75 papers advanced to the next stage of screening. In the following phase, the researchers concentrated on removing papers whose publication year did not fit the inclusion requirements. As such, every paper published before 2014 (8 articles) was eliminated, resulting in only 67 publications. Of the 67 papers, 11 possessed all the elements required for a thorough review. Still, it focused on obesity in developing nations or high-income nations other than England, Scotland, Wales, and Northern Ireland, comprising the United Kingdom. Another 10 items were either white papers, books, book sections, or year reports, which are often not peer-reviewed. As a result, 21 papers were eliminated simultaneously based on their location and nature, retaining 46 reports. Among the 46 papers that eventually made it to the final screening phases, 9 publications were identified to have been

published in Afrikaans or Korean, 8 were narrative or systematic reviews, and another 10 were published in predatory journals. Figure 2 depicts the methods for scanning and screening (resulting in a final 19 publications) adopting the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

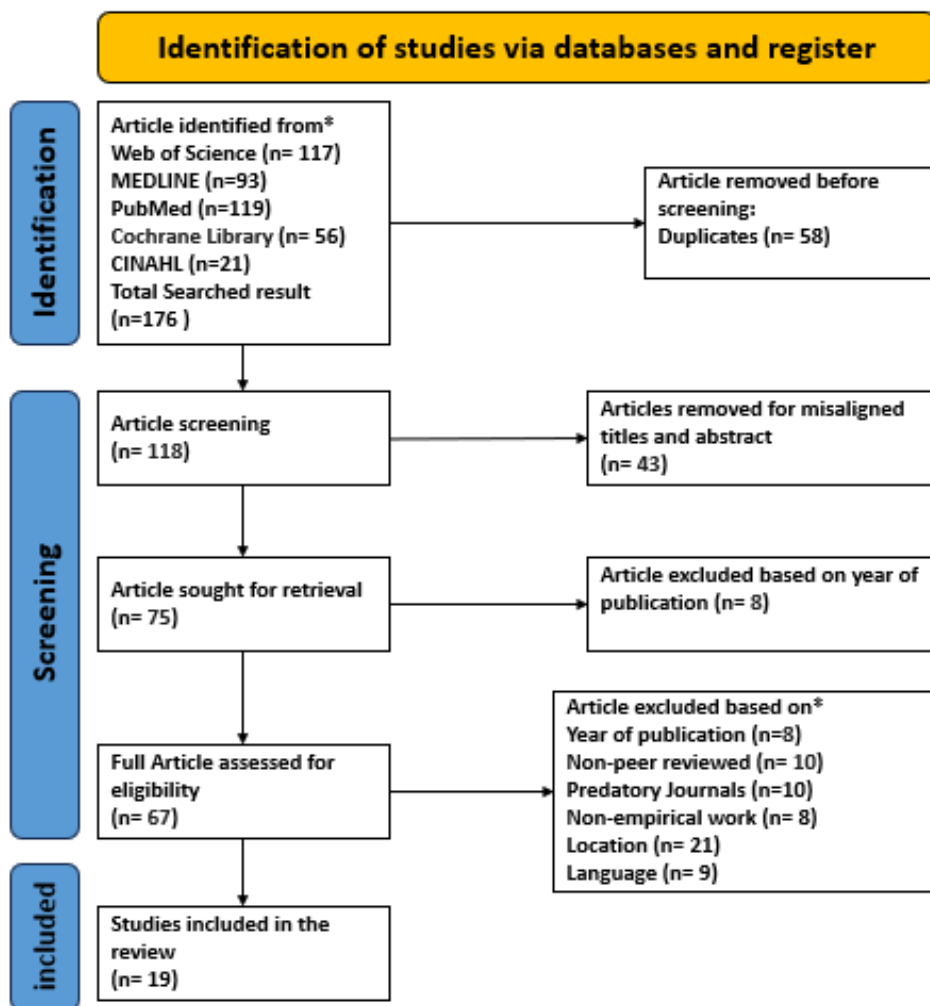


Figure 2. PRISMA flowchart for article screening

RESULTS

Data extraction (see Table 3) from the selected studies reveals approximately five interventions used to manage or control childhood obesity in different parts of the UK (see Appendix 1 for more information on the selected papers). These interventions either take place in the child’s school, at home [80], within the community [81], in places of worship [82], or are nationally directed [83], so that the naming convention follows where they are implemented. For example, school-based are carried out in the school, family or home-based are implemented at home, etc. Interventions are generally implemented

Table 3. Data extraction from searched articles

Author	Intervention type	Location	Research method	Sample	Measure	Intervention tool
[84]	School-based	About a dozen districts in Lancashire	RCT	Mother and child only	BMI	Healthy Heroes

[81]	Community-based	Golborne area of Greater Manchester, England	Qualitative	Child, mother, and any school-based Stakeholder	Height and weight	Go-Golborne
[83]	National	England	Quantitative	Child and any young adults within the home or wider community	BMI	National Institute of Health and Care Excellence guidelines
[85]	School-based	Southwest, England	Qualitative	Child only	BMI	Healthy Lifestyles Programme (HeLP)
[86]	School-based	Southwest, England	RCT	Child only	BMI	Healthy Lifestyles Programme (HeLP)
[87]	School-based	West Midlands	RCT	Child only	BMI	WAVES
[88]	School-based	Southwest, England	RCT	Child only	BMI	The Active for Life Year 5
[89]	School-based	Birmingham	RCT	Child only	BMI	The Birmingham Healthy Eating and Active Lifestyle for Children Study
[90]	Community-based	London	Quantitative	Child only	Physical activities and diet	The Diet and Active Living (DEAL) exploratory phase of obesity intervention
[91]	National	Birmingham	Qualitative	Child, mother, and any school-based Stakeholder	Physical activities	Analysis Grid for Environments Linked to Obesity (ANGELO) framework
[82]	Family/home-based	Bradford and Birmingham	Qualitative	Children, mothers, fathers, and other stakeholders (e.g., religious leaders)	Physical activities and diet	—
[92]	Family/home-based	Southwest, England	RCT	Child only	BMI	Healthy Lifestyles Programme (HeLP)
[93]	Community-based	Bradford	Mixed-method	Mother and child only	BMI	Healthy and Active Parenting Programme for Early Years (HAPPY) (Intervention Mapping)
[94]	School-based	Southwest, England	RCT	Child only	Physical activities	The Active for Life Year 5

[95]	Family/home-based	Scotland	Mixed-method	Child only	BMI	Healthy Habits, Happy Homes Scotland (4H-S)
[96]	School-based	Scotland	RCT	Child only with a professional	BMI	ToyBox-Scotland
[97]	Family/home-based	Northeastern and Southwestern parts of England	Qualitative	Child, mother, and any school-based Stakeholder, and a professional	Not applicable	—
[98]	School-based	The northwestern part of England	Qualitative	Not specified	Not applicable	Mind, Exercise, Nutrition...Do It! (MEND) 7-13 programme
[99]	Family/home-based	The northwestern part of England	Mixed-method	Both parents and child	Dietary behavioral changes	Getting Our Active Lifestyles Started (GOALS)

RCT-Randomized Controlled Trials, BMI-Body Mass Index

using tools or frameworks. For example, Healthy Heroes, Go-Golborne (with RE-AIM framework), Guideline of the National Institute of Health and Care Excellence (NICE), Healthy Lifestyles Programme (HeLP), WAVES, The Active for Life Year 5 (AFLY5), ToyBox-Scotland, Mind, Exercise, Nutrition...Do It! (MEND) 7-13 program, Getting Our Active Lifestyles Started (GOALS) etc. Of all the frameworks adopted within childhood obesity interventions, the Healthy Lifestyles Programme is the UK's most prominently used. Furthermore, the frameworks adopt procedures that ensure that implementers can link intervention outcomes to the procedures adopted. For instance, HeLP is typically implemented in UK schools and uses behavioral change [85]. By implication, implementation would typically encourage teachers who are crucial stakeholders on the program, to train children on how to make healthier choices with regards to meals. This means that the focal person is the child, and the implementers try all they can to wield some influence on him/her through instilling of discipline on meal choices capable of combating obesity as well as encouraging parents to act as role models [87]. Overall, behavioral change in this instance would imply that the child gives preferences to physical activities

A popular step amongst childhood obesity intervention implementers is the involvement of other individuals to ensure the success of the programs. For example, in interventions based in schools, at least one parent and one teacher are usually present. The same can be said of interventions implemented at home where the mother of the obese child or any other close relative is present, as well as community and religious leaders for programs carried out within the immediate community or at worship centers respectively. Findings also reveal that programs carried out in the school as well as those around the home are the most popular and contribute about 80% of the reported interventions. This is justifiable mainly because the average child typically tends to spend more time at these places and, hence, learns the first eating habits from parents and/or teachers (in cases where meals are served in school)

Concerning the challenges of childhood obesity interventions in the UK, a major finding is the use of body mass index (BMI) as a yardstick to determine normal weight and overweight/obesity. At least 12 of the selected articles focused on this idea. Hence, BMI before and after the intervention was the basis to conclude the success or failure of the program. According to [100], BMI refers to a person's weight-height ratio in anthropometric terms per. Square metre. Nevertheless, this measure of a person's weight has been the subject of significant research backlash, as some authors have argued that the BMI calculation does not

fully consider fat to muscle mass. As another noteworthy challenge, context is a fundamental factor that determines whether a program will lead to success or failure. This is so because while some interventions performed well in some settings [92] e.g., South-west England, these successes could not be replicated in others [80], e.g., Devon and Plymouth. One way to explain this challenge is to think around the overarching influence of context in the public health sphere [101], so that a childhood obesity intervention that performed well in a community A, may be flawed in another community, B. Apart from the issue of context potentially influencing an intervention, as slight differences in their ages may also influence outcomes. Nevertheless, the research by [92] as well as that of [80] adopted similar children age group of 9-10 years.

Apart from the variation in some intervention outcomes in separate locations, some intervention tools have consistently failed regardless of the setting. For example, [88] report that the Active for Life Year-5 did not change the obesity status of children participants with regards to leading them to take up physical activities, shun sedentary lifestyles, or develop the habit of eating fruits and vegetables. The study by [94] found the same results just less than five years later. A major surprise is that even though the studies were two years apart, the location did not change and remained southwest England, and the participants' ages also were the same (8-9 years old) baseline and (9-10 years old) end line. A potential reason is that behavior change did not occur over the period, as 2 years may be quite short for any drastic behavior change to happen. As in the case of the Active for Life Year-5 framework, the WAVES framework as adopted by [87] also did not produce any significant changes amongst school children when combined with home-based interventions across more than 50 schools. An intervention implemented in West Midlands, the study adopted children between 5-6 years of age but no improvement in diet nor physical activities was recorded at the end of the intervention.

DISCUSSION

Themes found from study review

The results section has focused extensively on what the different selected studies contribute to the current one. Albeit, this section goes a step further to discuss in clear terms, the thematic areas found. As listed below, the themes perceived from the articles are:

- Childhood obesity interventions are complex and may not always produce positive results
- School-based childhood obesity interventions are not the only solutions
- BMI may be unreliable in childhood obesity interventions

The complexity of interventions for controlling and managing childhood obesity

The findings from the reviewed literature domiciled in the UK show how complex childhood obesity interventions are. Specifically, it details the fact that a one-size-fits-all approach may never yield the desired results. The reason for this is the uniqueness of communities and family make-up which are fundamental aspects of context (differences in culture and religion). A notable finding that clarifies this assertion is the failure of HeLP in one setting and its success in another. Even though Plymouth where the intervention by [80] was implemented and failed is located in southwest England, there may also have been a part of the study by [80] where the intervention succeeded. This is rightly so because [80] did not specify the part of the southwest of England where the research was carried out. Apart from focusing on the child, [80] involved parents in their intervention procedure. This may have led to a positive outcome given that [89] maintained how important it is for implementers of school-based interventions not to ignore components of the broader society when the need arises to get better outcomes. There is a chance that culture may also play a role in shaping the differences in results in both areas where the interventions were implemented.

The complexity of childhood obesity interventions is further deepened in that regardless of whether

stakeholders all combine through a wholesome approach, this does not directly guarantee that the success of the intervention is certain. The reason for this is that successful childhood obesity interventions are nuanced and hinge on many different considerations that ultimately impact results. One critical factor is the length of time for which the intervention is implemented and whether the implementers considered a follow-up on the children after the initial phase. Overall, when a childhood obesity intervention is too short, gathering sufficient evidence may be far-fetched. Similarly, when it takes too long a time, the attrition rate may be high.

School-based childhood obesity interventions are not the only solutions

There seems to be an excessive focus on schools as a perceived best setting for childhood obesity interventions in the UK. Whilst this is understandable given the time the child spends at school; it does not necessarily mean that successful interventions cannot happen in other places as noticed across some of the reviewed articles. The massive focus on schools is linkable to the existence of a school feeding program which makes it easy to implement interventions. Nevertheless, we found that there is an increasing rate of failed school-based interventions [88], [89], [94], [80]. Surprisingly, whilst there were several other interventions domiciled at home and in the community, there was never a mention of failed interventions in any of these settings. This is why some authors have suggested the need to involve individuals from the wider society through the wholesome method.

The unreliable nature of body mass index

A popular finding across the literature reviewed is the adoption of body mass index as the standard for determining normal weight or obesity. Unfortunately, many researchers have criticized this approach and have suggested other techniques with high level of accuracy. These new methods such as waist-to-hip ratio and waist circumference are likely to better ascertain whether a child is truly losing weight in an intervention. According to the study by [102], body mass index does not consider the body-fat/muscle comparison which is fundamental in obesity calculation. The authors further noted that when used for obesity measurement, a person who exercises daily and trains the muscles may likely be tagged as fat. In addition, [103] reports that body mass index was never designed as a measure for health or any other health-related purpose. Adolphe Quetelet who came up with the idea of body mass index was mainly keen to understand certain physical characteristics of an average individual, hence took a sample of many Belgians. The scholar therefore failed to consider persons of different ethnicities whose stature and make-up may differ significantly from the Belgians [103]. Overall, [104] suggest that body mass index does not duly consider the spread of body fat around the human body. Based on some of the identified flaws of body mass index which was adopted as the primary source of childhood obesity measurement across the reviewed studies, the accuracy of these studies can be contested, given that some researchers have tagged the use of body mass index as unethical within public health discourse [105].

Lessons for public health practitioners in developing climes

There is much to learn for public health practitioners in developing countries seeking to implement CHO-I. As revealed by this study, there is a need for a critical appraisal of certain facts that may turn out incorrect. One such is using dietary changes in school feeding programs to combat childhood obesity. Even though this may be a good idea, this study has shown that such planning must involve the parents and where necessary community representatives. This is mainly because while the child's meals are well-planned in the school, without the parents in the picture, there is a chance that the child may be served unhealthy meals at home. Aside from focusing largely on the school, this study perceives religious, community, and home-based interventions as superior to the school-based ones. While this assertion is yet to be established, it is noteworthy to emphasize that none of the interventions carried out in religious settings, communities or at home reported failure. Given that a large percentage of persons in many developing countries (e.g., Nigeria)

prioritize religion [106], religious leaders could be pivotal in raising awareness of the dangers associated with childhood obesity as well as participate actively in interventions.

Regarding the standardization of CHO measurement and the adoption of tools to do so, this study has revealed the shortcomings associated with the use of body mass index in the UK. As a result, proponents of CHO interventions in developing countries may look to adopt other more accurate measures. This helps to increase the accuracy level of CHO-I programs, thereby positively influencing intervention outcomes. Lastly, [107] explained that undermining the importance of context in public health interventions may be detrimental to primary healthcare programs designed to strengthen health systems. Hence, in the planning of CHO-I programs, implementers must fully understand and preempt the possibilities of significant changes in response and outcome across different communities.

CONCLUSIONS

Within the framework of global and public health discourse, child health remains a priority given the vulnerability of children to many known diseases which leads to increasing morbidity and mortality statistics. This study which evaluates interventions of CHO in the UK with the intent to draw up lessons for practitioners in resource-scarce nations has revealed that adhering to certain existing practices and standards without taking into cognizance their associated shortcomings may affect intervention outcomes. Nevertheless, in circumstances where the goal is to strengthen health systems, several lessons abound with regard to practices around interventions in general, and CHO-I in particular. Future researchers may concentrate on developing and evaluating culturally adapted interventions that tackle the unique environmental and socioeconomic circumstances of different demographics. Investigating the efficacy of multisectoral methods that include communities, schools, and policymakers is critical. Also, longitudinal research studies are required to understand the long-term implications of early-life obesity treatments. Furthermore, further studies can look into the function of technology, like mobile health apps and telemedicine, in encouraging healthy behaviours. Finally, studying the genetic and epigenetic components contributing to obesity may offer insights into individualised preventive and treatment techniques.

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APPENDIX 1

AIN	Author (year): Title	Journal	Coverage Area in the UK	Research Aim	Findings
I	Hodgkinson et al. (2019): An educational intervention to prevent overweight in pre-school years: a cluster randomised trial with a focus on disadvantaged families	BMC Public Health	12 district authorities of Lancashire	To assess whether the effectiveness of an educational intervention in early years settings can prevent obesity and overweight among pre-school kids.	The study make use of five pairs early years centres, one dropped out, and the remaining four pairs were analyzed. There are two groups, the intervention group and the control groups. In the control groups, there are 34 families and in the intervention group there 47 families. There is a decrease in the BMI z-score of children between the ages of 2 and 4 years that are in the intervention group. However, in the same period, the control group BMI z-score tend to increase.
II	Gadsby et al. (2020): Impact of a community-based pilot intervention to tackle childhood obesity: a 'whole-system approach' case study	BMC Public Health	Golborne, England	To examine and evaluate the Go-Golborne pilot programme. To contribute to understanding the community-based approaches to preventing obesity.	The events organized by Go-Golborne were attended by more than 3360 kids locally, and all the primary schools that are within the area participated in the event. There is a steady rate of children that have healthy weights. Schools, neighborhoods and schools begin to promote healthy habits. There were positive changes in behavior amongst some children. However, based on the quantitative data there was not significant changes.

<p>III</p>	<p>Russell et al. (2023): Estimating the effects of preventive and weight-management interventions on the prevalence of childhood obesity in England: a modelling study</p>	<p>The LANCET Public Health</p>	<p>England</p>	<p>To gauge the potential contributions of different systematic approaches in delivering evidence-based treatment and preventive interventions targeted at reducing level of obesity in England, especially among children and young adults.</p>	<p>18,080 children and young adults were examined in the study, at the start of the study, a total of 11.2% kids between the ages of 2 -18 that participated in the study were found to be obese.</p> <p>When examined; using a universal preventive intervention, obesity among children might reduce by 0.9%. In primary care settings obesity might amongst children and adults might reduce by 0.2%. Communities and lifestyle program might reduce obesity by 1%.</p> <p>The use of certain medicines might reduce obesity by 0.2%. Surgery might reduce obesity by 0.4%. The research further examined two types of care; stage managed care and stepped care, where they finds out that stage managed care might reduce obesity by 1.3%, and stepped care might reduce obesity by 2.4%.</p>
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IV	Lloyd et al. (2018): Effectiveness of the Healthy Lifestyles Programme (HeLP) to prevent obesity in UK primary-school children: a cluster randomised controlled trial	The LANCET Child & Adolescent Health	Southwest, England	To determine how effective are schoolbased intervention program in preventing excessive weight gain in kids that are within ages of 9-10 over a 24-month period.	1324 children from 32 schools participated in the study. The schools were in two groups. The HeLP intervention group consist of 16 schools with 676 children and the control group contain 16 schools with 648 children. Out of all the children that are in the two groups 1244 have their BMI data available throughout the period. At the start of the study the average BMI SDS is 0.32 in the intervention group and in the control group, the average BMI is 0.18. After 24 months, these values changed to 0.35 and 0.22 respectively.
V	Wyatt et al. (2013): The Healthy Lifestyles Programme (HeLP), a novel school-based intervention to prevent obesity in school children: study protocol for a randomised controlled trial	Trials	Southwest, England	To examine the cost effectiveness and efficacy if Healthy Lifestyles Programme (HeLP) in reduce obesity and overweight among children.	The result of the trial will provide evidence on the cost-effectiveness of HeLP in mitigating obesity among children.
VI	Adab et al. (2018): Effectiveness of a childhood obesity prevention programme delivered through schools, targeting 6- and 7-year-olds: cluster randomised controlled trial (WAVES study)	BMJ	West Midlands	To examine the how effective family and school based healthy lifestyle programme (WAVES intervention) in comparison with usual practice, in mitigating childhood obesity.	The research found out that after 18 months the average BMI z score in the intervention group were slightly lower than the control group. Between the two group, there were no significant difference in the BMI z score in 30 months.

<p>VII</p>	<p>Kipping et al. (2014): Effect of intervention aimed at increasing physical activity, reducing sedentary behaviour, and increasing fruit and vegetable consumption in children: Active for Life Year 5 (AFLY5) school-based cluster randomized controlled trial</p>	<p>BMJ</p>	<p>Southwest, England</p>	<p>To carry out investigation on the effectiveness of a school based intervention to reduce sedentary behavior and increase the consumption of vegetables and fruits amongst children.</p>	<p>Data were collected on 2221 children in 60 schools on how many fruits and vegetables they consume and how long they spend sitting. Children who in a special program called AFLY5 were compared with those who are not in the program. The research concluded that, the program did not make much difference in areas such as time spent sitting and the number of veggies and fruits they consume. However, the research finds out that kids that are in the AFLY5 program spent less time watching screens on weekends and they drank few energy drinks.</p>
<p>VIII</p>	<p>Adab et al. (2014): Preventing childhood obesity, phase II feasibility study focusing on South Asians: BEACHeS</p>	<p>BMJ Open</p>	<p>Birmingham</p>	<p>To examine the acceptability of a cultural intervention to mitigating obesity in South Asian children.</p>	<p>The research finds out that, some of the cultural intervention program like hosting workshops to improve cooking skills, adding more physical activity in the school and taking people to leisure facilities were acceptable. However, others that are accepted cannot be implemented practically. Thus, it is less likely for student that participated in the program to be obese.</p>
<p>IX</p>	<p>Maynard et al. (2017): Exploring childhood obesity prevention among diverse ethnic groups in schools and places of worship: Recruitment, acceptability and feasibility of data collection and intervention components</p>	<p>Preventive Medicine Reports</p>	<p>London</p>	<p>To carry out a detailed examination of the process of obesity intervention among children from minority ethnic group in London.</p>	<p>The dietary assessment reveals deficiencies in data for foods in minority ethnic group. Due to the cultural relevance and community reach of places worship, they provide opportunities for an effective intervention.</p>

<p>X</p>	<p>Pallan et al. (2013): Development of a childhood obesity prevention programme with a focus on UK South Asian communities</p>	<p>Preventive Medicine</p>	<p>Birmingham</p>	<p>To develop an obesity prevention intervention program targeted at UK South Asian primary schools children</p>	<p>The use of ANGELO framework provide a holistic approach in the development of intervention program.</p>
<p>XI</p>	<p>Dogra et al. (2021): Delivering a childhood obesity prevention intervention using Islamic religious settings in the UK: What is most important to the stakeholders?</p>	<p>Preventive Medicine Reports</p>	<p>Bradford and Birmingham</p>	<p>The research aims to determine what is most essential to stakeholders when delivering a pediatric obesity prevention intervention in Islamic religious contexts in the UK.</p>	<p>The study found that participants highlighted key intervention components, such as Prophet Muhammad (PBUH) being a role model for a healthy lifestyle, physical activity, healthy food, and organizational behavior change within the IRS. Participants suggested promoting a balanced diet and physical exercise through Islamic narratives could boost delivery rates. Staff demonstrated willingness to lead physical exercise sessions for both boys and girls.</p>
<p>XII</p>	<p>Lloyd et al. (2017): The impact of active stakeholder involvement on recruitment, retention and engagement of schools, children and their families in the cluster randomised controlled trial of the Healthy Lifestyles Programme (HeLP): a school-based intervention to prevent obesity</p>	<p>Trials</p>	<p>Southwest, England</p>	<p>The study aims to examine how active stakeholder involvement affects the recruitment, retention, and engagement of schools, children, and families in the cluster randomized controlled trial of the Healthy Lifestyles Programme (HeLP), a school-based obesity prevention intervention.</p>	<p>Anthropometric and behavioral measurements were taken by 99%, 96%, and 94% of children at baseline, 18 and 24 months, respectively. There was no difference in follow-up between intervention and control groups at every point. The program was attended by all children, with 92% of children and 77% of parents from various socioeconomic backgrounds actively engaging with HeLP.</p>

<p>XIII</p>	<p>Taylor et al. (2013): Using intervention mapping to develop a culturally appropriate intervention to prevent childhood obesity: the HAPPY (Healthy and Active Parenting Programme for Early Years) study</p>	<p>International Journal of Behavioral Nutrition and Physical Activity</p>	<p>Bradford</p>	<p>The HAPPY (Healthy and Active Parenting Programme for Early Years) study aims to use intervention mapping to create culturally appropriate interventions to reduce childhood obesity.</p>	<p>HAPPY (Healthy and Active Parenting Programme for Early Years) is designed for overweight and obese pregnant women (BMI > 25). It consists of 122.5-hour sessions (6 antenatal from 24 weeks and 6 postnatal up to 9 months) that cover mother's physical activity and diet, infant diet, breast or bottle feeding, parental feeding practices, and infant physical activity.</p>
<p>XIV</p>	<p>Lawlor et al. (2016): The Active for Life Year 5 (AFLY5) school-based cluster randomised controlled trial: effect on potential mediators</p>	<p>BMC Public Health</p>	<p>Southwest, England</p>	<p>The research goal is to improve children's self-efficacy, awareness of healthy choices, and parental support for healthy food and physical activity.</p>	<p>The intervention group had higher levels of three potential mediators when compared to the control group: fruit and vegetable self-efficacy (2.2 units, 95% CI: 0.7 to 3.8), child-reported maternal limitation of sedentary behavior (0.5, 0.1 to 0.8), and knowledge (0.5, 0.2, 0.7) on a scale of 0 to 9. The intervention's effect on lowering weekend sedentary behavior was explained by mother limitations and children's understanding, accounting for 23%. The intervention did not affect the other mediators.</p>
<p>XV</p>	<p>Gillespie et al. (2020): Healthy Habits, Happy Homes Scotland (4HS) feasibility study: Translation of a home-based early childhood obesity prevention intervention evaluated using RE-AIM framework</p>	<p>Public Health in Practice</p>	<p>Scotland</p>	<p>The Healthy Habits, Happy Homes Scotland (4HS) feasibility study aims to translate a home-based early childhood obesity prevention intervention and evaluate it using the RE-AIM framework.</p>	<p>Positive impact with families was facilitated by inclusive recruitment approaches and effective communication channels (Reach). Out of 126 inquiries, 26 families (21%) were successfully recruited. Positive relationships with local parents and community workers were crucial to the study process during 9 meetings (Effectiveness). In</p>

					<p>Scotland, 61.5% of families resided in the most impoverished statistical zone, with 23% being single-parent families. Therefore, it is crucial to examine local contextual elements such as adoption and suitable materials. 4HS was a practical and effective solution that adhered closely to MI (implementation).</p>
XVI	<p>Malden et al. (2019): A feasibility cluster randomised controlled trial of a preschool obesity prevention intervention: ToyBox-Scotland</p>	<p>Pilot and Feasibility Studies</p>	<p>Scotland</p>	<p>This study aimed to assess the viability of a cluster randomized controlled trial for the Toy Box-Scotland preschool obesity prevention intervention.</p>	<p>The preschool aspect of the intervention was executed with high fidelity (64%), however the home aspect was done with low fidelity (41%). The recruitment rate was 10% at the cluster level and 18% at the individual level (42/233 children with an average age of 4.4 years and 17 girls). The attrition rate was 14%, and compliance rates fluctuated significantly depending on the final result. The highest compliance rate was for BMI (86%), whilst 19% of the sample provided valid accelerometer data for baseline and follow-up, and 23% responded to the parental questionnaire. At follow-up, both the intervention and control groups experienced minor increases in BMI z-scores (0.02 and 0.06, respectively). At the follow-up, both groups showed small decreases in physical activity and increases in inactive time.</p>

<p>XVII</p>	<p>Lucas et al. (2014): What works in practice: user and provider perspectives on the acceptability, affordability, implementation, and impact of a family-based intervention for child overweight and obesity delivered at scale</p>	<p>BMC Public Health</p>	<p>London, Northeast and Southwest of England</p>	<p>The qualitative study examined the acceptability and implementation of a family-based intervention for child overweight and obesity, which was administered on a large scale.</p>	<p>Participation was sometimes hindered by practical issues including transportation, work schedules, and competing family obligations. Delivery partners' efforts to attract, retain, and motivate families resulted in greater uptake but also increased costs. Parents and providers value delivery professionals. Some providers made changes to accommodate local social and cultural concerns. Both providers and parents expressed concern about the impact of an obesogenic environment on long-term health outcomes.</p>
<p>XVIII</p>	<p>Turner et al. (2016): Addressing childhood obesity at school entry: Qualitative experiences of school health professionals</p>	<p>Journal of Child Health Care</p>	<p>Northwest of England</p>	<p>The research aim is School health professionals' perspectives on addressing childhood obesity at school admission.</p>	<p>A theme analysis found agreement among school nurses, service managers, and child health practitioners. School health professionals play a crucial role in managing childhood obesity, but their efforts are hindered by limited capacity, challenges in engaging parents, unclear protocols, and insufficient training on the topic. To address juvenile obesity, school health policymakers should prioritize nurse training, commit resources, and establish clear channels for consistent care.</p>
<p>XIX</p>	<p>Watson et al. (2015): Service evaluation of the GOALS family-based childhood obesity treatment intervention during the first 3 years of implementation</p>	<p>BMJ Open</p>	<p>Northwest of England</p>	<p>The purpose of this study is to assess the effectiveness of the GOALS (Getting Our Active Lifestyles Started) family-based intervention for children obesity during its first three years of</p>	<p>Child BMI z-score decreased by 0.07 from baseline to post-intervention ($p < 0.001$) and remained stable at 12 months ($p < 0.05$). Parent/carer BMI and child self-perceptions were unchanged, however, there was a significant improvement in perceived social</p>

				implementation. Allocate funding for nurse training and development, and establish defined channels to ensure consistent treatment.	acceptance from baseline to post- intervention ($p < 0.05$). Parents/caregivers reported good changes in family physical activity and food habits after completing GOALS.
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