



Year VI, v.1 2026 | Submission: 01/17/2026 | Accepted: 01/19/2026 | Publication: 01/21/2026

**The role of health and nutritional education strategies in preventing childhood obesity in Brazil: An integrative review.**

*The role of health and nutritional education strategies in preventing childhood obesity in Brazil: An integrative review*

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### Summary

**Introduction:** Childhood obesity is one of the main public health challenges, influenced by the increased consumption of ultra-processed foods and changes in the lifestyle habits of Brazilian children. Recent evidence suggests that food and nutrition education (FNE) actions, associated with the involvement of family, school, and health services, can contribute to the prevention of childhood overweight. **Objective:** To analyze how health and nutrition education strategies can act in the prevention of childhood obesity in children aged 2 to 10 years (incomplete) in Brazil. **Methodology:** This is an integrative, qualitative, and descriptive review, conducted between 2021 and 2025 in the SciELO, PubMed, and Virtual Health Library databases, using descriptors in Portuguese and English such as "childhood obesity," "nutrition education," "health strategies," and "ultra-processed foods." Primary articles, available in full, that investigated interventions or perceptions about preventive practices in the preschool and school phases were included. **Results and discussion:** The studies included in this review showed that intersectoral strategies involving schools, families, and Primary Health Care (PHC) are fundamental to promoting healthy habits and reducing the prevalence of childhood obesity. Educational interventions based on the Dietary Guidelines showed a positive impact on eating habits, while qualitative studies highlighted the importance of the family environment and domestic routines. School programs that integrate nutritional education, sports practice, and sociocultural values showed greater effectiveness. In Primary Care, recognition of the importance of prevention was observed, but with structural limitations and institutional support. **Conclusion:** The prevention of childhood obesity requires continuous, culturally and socially contextualized actions that articulate schools, families, and health services. Structured educational programs, combined with the strengthening of Primary Care and family involvement, have greater potential to consolidate healthy habits and reduce the risk of childhood overweight.

The need for long-term studies and integrated interventions that consider the emotional, cultural, and environmental factors of children's nutrition is highlighted.

**Keywords:** ultra-processed foods; food and nutrition education; health strategies; childhood obesity; prevention.

### Abstract

**Introduction:** Childhood obesity is one of the main public health challenges, influenced by the increased consumption of ultra-processed foods and changes in the lifestyle of Brazilian children. Recent evidence indicates that food and nutrition education (FNE) actions, combined with the involvement of families, schools, and health services, can contribute to preventing overweight during childhood. **Objective:** To analyze how health and nutritional education strategies can contribute to the prevention of childhood obesity in children aged 2 to under 10 years in Brazil. **Methodology:** This is an integrative review, qualitative and descriptive in nature, conducted between 2021 and 2025 in the SciELO, PubMed, and Virtual Health Library databases. Descriptors in Portuguese and English were used, such as "childhood obesity," "nutrition education," "health strategies," and "ultra-processed foods." Primary articles available in full and investigating interventions or perceptions related to preventive practices in preschool and school-aged children were included. **Results and discussion:** The studies included in this review showed that intersectional strategies involving schools, families, and Primary Health Care (PHC) are essential to promote healthy habits and reduce the prevalence of childhood obesity. Educational interventions based on the Brazilian Dietary Guidelines demonstrated a positive impact on eating habits, while qualitative studies highlighted the importance



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of the family environment and household routines. School programs integrating nutrition education, physical activity, and sociocultural values showed greater effectiveness. In Primary Health Care, recognition of the importance of prevention was evident, although structural and institutional support limitations were reported. Conclusion: The prevention of childhood obesity requires continuous, culturally and socially contextualized actions that connect schools, families, and health services.

Structured educational programs, combined with strengthened Primary Health Care and family engagement, have greater potential to consolidate healthy habits and reduce the risk of overweight in childhood. The need for long-term studies and integrated interventions that consider emotional, cultural, and environmental factors related to children's eating behaviors is emphasized.

**Keywords:** ultra-processed foods; food and nutrition education; health strategies; childhood obesity; prevention.

## Introduction

Childhood obesity is recognized as one of the major public health challenges. contemporary, showing continuous growth in different regions and age groups. According to According to the World Health Organization (WHO, 2023), more than 39 million children under the age of five For years, people around the world have lived with excess weight. In Brazil, the National Study of Nutrition and The National Survey on Child Nutrition (ENANI-2019) demonstrates that the high consumption of ultra-processed foods and Low consumption of *fresh, unprocessed* foods has contributed significantly to the increase in Prevalence of childhood obesity (ENANI, 2021). The Pan American Health Organization (PAHO, 2023) reinforces that the current food environment, marked by the wide availability of The consumption of processed foods and sedentary lifestyles intensifies this scenario and demands action. systematic prevention.

The World Health Organization (WHO) recognizes that childhood is composed of different stages of development, each with specific health needs, Behavior and nutrition. The preschool phase includes children from 0 to 5 years old (preschoolers). a period marked by rapid growth, consolidation of eating habits and greater Vulnerability to external influences (WHO, 2007). The school-age phase encompasses children from 6 to 10 years old. (school age), a phase in which greater autonomy occurs in the choice of food, intensification of socialization and increased exposure to the school environment and food marketing (WHO, 2007). A The distinction between these phases is fundamental to understanding how health promotion strategies work. Nutrition education and other related topics can play a specific role in preventing childhood obesity.

The diagnosis of childhood overweight and obesity involves specific criteria. internationally recognized. In Brazil, both for preschoolers (0 to 5 years) and for For schoolchildren (6 to 10 years old), nutritional status assessment follows the WHO growth charts, officially adopted by the Ministry of Health. The Body Mass Index for Age (BMI/A) Overweight is classified when the z-score is greater than +1 and obesity when it exceeds +2 standard deviations. Standard for sex and age (WHO, 2007; Brazil, 2020). For data interpretation. For anthropometric measurements, it is recommended to use the standardized cut-off points defined by the System of

Food and Nutritional Surveillance (SISVAN), presented in Figure 1, which visually organizes

It provides diagnostic categories and guides nutritional classification.

**Figure 1** - Classification of children's nutritional status according to BMI/I

**IMC-para-idade:**

VALORES CRÍTICOS		DIAGNÓSTICO NUTRICIONAL
< Percentil 0,1	< Escore-z -3	Magreza acentuada
≥ Percentil 0,1 e < Percentil 3	≥ Escore-z -3 e < Escore-z -2	Magreza
≥ Percentil 3 e ≤ Percentil 85	≥ Escore-z -2 e ≤ Escore-z +1	Eutrofia
> Percentil 85 e ≤ Percentil 97	≥ Escore-z +1 e ≤ Escore-z +2	Sobrepeso
> Percentil 97 e ≤ Percentil 99,9	≥ Escore-z +2 e ≤ Escore-z +3	Obesidade
> Percentil 99,9	> Escore-z +3	Obesidade grave

**Source:** Ministry of Health. SISVAN – Food and Nutritional Surveillance System. WHO growth curves (2006/2007).

From a physiological and nutritional point of view, excessive food consumption Ultra-processed foods, rich in simple sugars, fats, sodium, and additives, negatively affect the... Children's metabolism. These products have high energy density and low quality. nutritional, promoting a positive energy balance, insulin resistance, and inflammation. subclinical and, consequently, accelerated weight gain (GATTO-MORENO *et al.*, 2021; PAHO, 2023). Such early exposure increases the risk of developing future chronic diseases. Non-communicable diseases (NCDs), such as type 2 diabetes, hypertension, and dyslipidemia (WHO, 2023).

The evolution of childhood obesity in Brazil also reflects sociocultural transformations. Important. Food advertising targeted at children, the presence of products Ultra-processed foods in homes, increased screen time, reduced physical activity, and... Increased consumption of food outside the home contributes to changes in dietary patterns. families (PAHO, 2023; BAGGIO *et al.*, 2021). In the school environment, the provision of food Processed foods and sugary drinks, coupled with a lack of stricter regulations, reinforce inadequate dietary practices (FERREIRA; SILVA; ASSUNÇÃO, 2023).

The school environment is configured as a strategic space to promote health and education. dietary habits. Gato-Moreno *et al.* (2021) demonstrate that nutritional education actions Early interventions contribute significantly to the development of more informed food choices. appropriate. Additionally, Zuccotti *et al.* (2025) show that educational campaigns Integrated, grounded in the values of Olympism, they increase children's engagement and



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They reinforce protective behaviors related to diet and physical activity.

Within the healthcare services sector, Primary Care plays an essential role in surveillance. nutritional, in continuous monitoring and in coordination with schools and families. However, as As pointed out by Gooley *et al.* (2024), family doctors, nurses, and managers report limitations. structural and operational factors that hinder the implementation of broader preventive strategies, reinforcing the need for intersectoral policies and greater investment in educational initiatives. continued. In addition, gaps persist in the regulation of the supply of ultra-processed foods, in monitoring of advertising aimed at children and ensuring equitable access to health promotion initiatives (PAHO, 2023).

The impacts of childhood obesity go beyond the biological dimension, reaching other spheres. social and economic. Overweight children have a higher risk of stigmatization, low self-esteem and impairment of school performance (BAGGIO *et al.*, 2021). At the level As the population grows, the increased prevalence of obesity leads to higher public health costs. increased demand for treatments for chronic non-communicable diseases (NCDs) and a reduction in future productivity, posing a significant economic challenge for health systems (PAHO, 2023; Zuccotti *et al.*, 2025).

Given this complex scenario, marked by the interaction between biological factors, Considering behavioral, cultural, and environmental factors, it becomes essential to understand how different strategies... Health and nutritional education can contribute to reducing the prevalence of childhood obesity. Thus, the objective of this study is to analyze how health and nutritional education strategies... can contribute to the prevention of childhood obesity in children aged 2 to 10 years (not yet 10 years old) in Brazil, considering the growing consumption of ultra-processed foods in the country.

## Methodology

This study is an integrative literature review of a qualitative nature and descriptive study, which aimed to analyze how health and nutritional education strategies They can contribute to the prevention of childhood obesity in preschool children (2 to 5 years old) and school-aged children (6 to 10 years old), considering the increase in food consumption. Ultra-processed foods in Brazil. This methodology allows for the gathering and synthesis of results from different... Research already published allows for a broad and up-to-date understanding of the topic.

The review was conducted based on the following guiding question: How do the strategies of Health and nutritional education can contribute to the prevention of childhood obesity in children in preschool and school age, considering the increasing consumption of ultra-processed foods in Brazil? This question was defined based on the observation of the progressive increase in the rates of Overweight and obesity in Brazilian children, especially as a result of changes in



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Dietary habits and the high consumption of processed foods.

The searches for the studies were carried out in the SciELO (Scientific Electronic Journal of Economics) database. Library Online), PubMed (US National Library of Medicine) and Virtual Health Library, selected for bringing together scientific productions of national and international relevance in the area of health and nutrition. Standardized vocabulary descriptors were used to conduct the searches. DeCS (Descriptors in Health Sciences) and MeSH (Medical Subject Headings), combined by Boolean operators AND and OR, in order to refine the results and cover the main concepts related to the topic. The terms used were: “obesidade infantil” OR “childhood obesity”; “nutrition education” OR “nutrition education”; “health strategies” OR “health strategies”; “prevention” OR “pre-vention”; “ultra-processed foods” OR “ultra-processed foods”;

The inclusion criteria defined were: primary articles published between 2021 and 2025. available in full and freely accessible, written in Portuguese or English, that included children from 2 to 10 years old (not yet 10 years old), and that they discuss health or nutritional education strategies aimed at to the prevention of childhood obesity.

Studies addressing family participation in were also considered. prevention of childhood obesity, provided they described how health education actions, Food and nutrition education (FNE) or community interventions could support families in Adoption of healthier habits. Therefore, research that presented evidence was included. about the role of the family environment in shaping children's eating behaviors and in Adherence to preventive practices.

Similarly, studies that did not specifically address the topic were included. The role of the nutritionist was discussed, as well as the work of multidisciplinary teams in the context of prevention. of childhood obesity. Thus, those who described the participation of were considered eligible. health, education, and social assistance professionals, provided they emphasized the role of education in health, intersectoral actions, or integrated practices as strategies to promote healthy habits. Proper nutrition and preventing childhood obesity. These criteria allowed for the expansion of understanding the different forms of intervention that contribute to addressing Childhood obesity in various contexts.

Excluded were: duplicate studies in the databases, works without peer review, and articles. focused exclusively on clinical or pharmacological treatment, monographs, reviews, editorials, opinions and those that did not directly address the central theme. The five-year time frame. (2021–2025) was adopted to ensure the updating of evidence, considering the recent context. increased consumption of ultra-processed foods and the strengthening of public policies on Promoting healthy eating in Brazil.

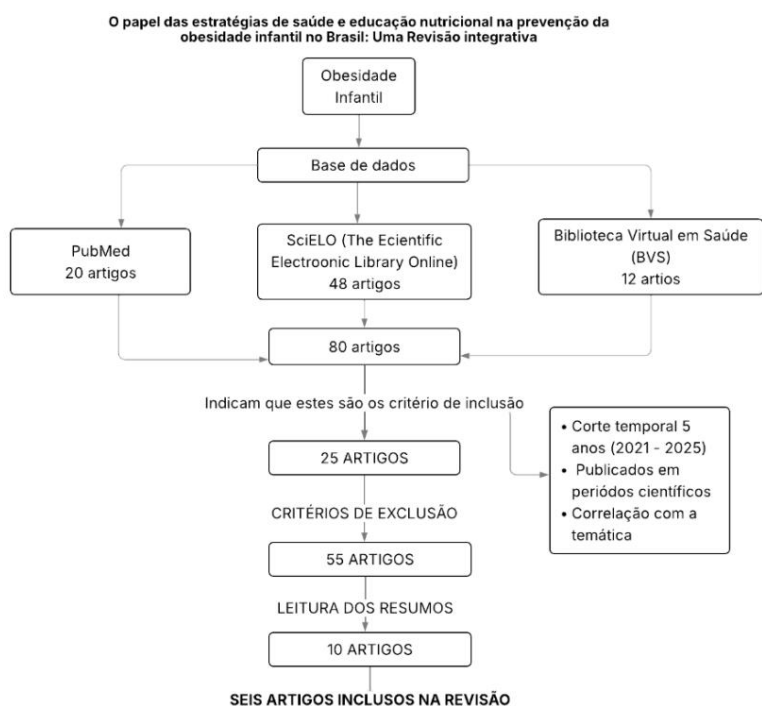
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After applying the descriptors and filters to the databases, 13 duplicate articles were found. excluded, leaving 80 studies. Next, the titles and abstracts were read, at which point that articles that did not meet the thematic and methodological criteria were removed, resulting in 55 publications for preliminary analysis. Subsequently, exclusion criteria were applied, Excluding studies that dealt only with clinical or pharmacological interventions, those that They addressed other age groups and those that did not have a direct relationship with the proposed theme. After In this phase, 25 articles remained for full reading.

During the detailed reading, 19 studies were excluded for not fully meeting the criteria. established methodological criteria or because they do not present results focused on the preschool phase. and school. Thus, 6 articles were considered suitable to compose the final sample of the review.

These six studies were analyzed critically and descriptively, considering objectives, methodology, sample, and main conclusions are organized into a summary table. The process of The selection was structured according to the PRISMA model (Preferred Reporting Items for Systematics). Reviews and Meta-Analyses), as represented in the flowchart below, which summarizes the main steps and filters applied in the article screening process.

Figure 2 – Flowchart of the process for identifying, selecting, and including articles according to the PRISMA model.



Source: developed by the authors, 2025.

Table 1, described below, compiles the results relating to the six articles. selected for this integrative review, according to the criteria established in the process. Methodological. The summary includes the main information from each study, authors, year of Publication, title, type of study, objectives, and main results, enabling an analysis.

**Table 1.** Summary of articles analyzed for review.

Articles	Author, Design, Objectives, publication, study location	Methodology	Year of study and type of study	of	Key findings	
1	Lawrence, AEP et al., 2025; Macaé (RJ), Brazil.	Study of panel, moments (2012-2014 and 2017-2019), N1 = 1,028; N2 = 1,005 preschool children.	2	To assess the nutritional status of preschool children in the public school system of Macaé. Rio de Janeiro, in two moments. separated by about five years, in the context of the oil crisis and the implementation of educational actions based on the Dietary Guidelines for the Brazilian Population.	The children were selected from 5 urban, non-probabilistic (~15% of students in the city's early childhood education network). Anthropometric indicators: height-for-age and body mass index-for-age, with Z-score calculations according to World Health Organization (WHO) growth charts.	Educational activities, such as those implemented in Macaé, promote awareness among participants and support healthier food choices.
2	Baggio, MA et al., 2021; Brazil (Paraná)	Qualitative research study N = 39 (13 children, 12 family members, 7 primary health care professionals and 7 education professionals, all in linked to the Health in School Program)		Understanding the perceptions of children, family members, and health and education professionals regarding childhood obesity.	Data collection through semi-structured interviews.	The study revealed that childhood obesity is perceived as a growing problem, associated with inadequate eating habits and sedentary lifestyles. It highlighted the need for integrated actions between health and education, including families, focusing on nutritional education, promoting physical activity, and strengthening public policies for the prevention of childhood obesity.
3	Gató-Moreno, M. et al., 2021; Province of Malaga, Spain.	Randomized clinical trial N = 261 (IG=122; CG=139).		To determine the impact of an educational nutritional intervention aimed at parents of preschool-aged children on the BMI z-score (zBMI) of children and the prevalence excess weight/obesity over a 2-year period.	Sample: 3-4 year old children in public schools in the province of Málaga. Intervention: six 2-hour sessions in the first year + a 3-hour follow-up session in the second year. Measurements of weight, height, zBMI calculation, prevalence of overweight/obesity.	In the intervention group (IG), there was a significant decrease in zBMI (e.g., from 0.23 $\bar{y}$ 0.10 in the first year; p=0.002). In the control group, there was an increase in the prevalence of overweight/obesity from 20.1% (p=0.027), while in the IG there were no significant changes.
4	Zuccotti, G. et al.,	Report of initiative/ intervention		Presenting and evaluating a model	The initiative consisted of two	The combination of sport, Olympic values and education is

	2025; Lombardia & Venice, Italy	Large-scale school intervention; N = 350 schools.	Integrated components of educational phase (1 year) + sports phase (final school environment). 95 (27.1%) schools formally adopted this strategy for preventing childhood obesity.	involving 2,100 classes and 51,066 students.  8,658 people participated in the sporting phase. Strong school community engagement.	Presented as a scalable and culturally powerful strategy for preventing pediatric obesity. Study to evaluate weight/BMI.
5	Verga, S. MP; Mazza, VA; Teodoro, FC <i>et al.</i> (2022)  Brazil	Qualitative study N= 26	Understanding the influence of family on the formation of children's eating habits.	Semi-structured interviews with content analysis.	Family involvement and changes in parenting habits are essential in preventing obesity.  It reinforces the importance of family involvement in tackling childhood obesity.
6	Gooley <i>et al.</i> , 2024; Australia	Qualitative study; N = 15 (9 general practitioners, 4 nurses and 2 of (clinic managers)	To explore the perceptions and experiences of primary care professionals regarding the prevention of childhood obesity in general clinical practice.	Semi-structured interviews; thematic analysis based on the ecological model of health.	It was identified that, although professionals recognize the importance of promoting healthy habits and monitoring children's growth, there is little institutional structure and support for preventive actions. The need to overcome implementation gaps and promote changes outside the clinic that support healthy behaviors was highlighted.

Source: developed by the authors, 2025

## Results and discussion

The studies analyzed show that health and nutritional education strategies Measures aimed at preventing childhood obesity are essential to promoting healthy eating habits. healthy and reduce the incidence of the disease among preschool and school-aged children. In a way In general, it is observed that intersectoral actions between schools, families, and basic health units have They have proven to be more effective, especially when they involve food and nutrition education from the start. early childhood (Lourenço *et al.*, 2025; Baggio *et al.*, 2021; Gato-Moreno *et al.*, 2021).

The study conducted by Lourenço *et al.* (2025), which evaluated the nutritional status of pre-Schoolchildren in the public school system of Macaé (RJ) through anthropometric data collected in schools Municipal studies identified a high prevalence of overweight among the children evaluated. The authors They indicate that children's nutritional status is directly related to the school environment and to The quality of the meals offered is highlighted, emphasizing the importance of nutritional monitoring. systematic in educational institutions. The study reinforces the importance of the school environment as



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Strategic scenario for the prevention of childhood obesity. Evidence that continuous monitoring and Effective school feeding policies directly impact the formation of habits and the risk of Excessive weight gain.

In a complementary way, the qualitative study by Baggio *et al.* (2021), carried out with children, families, and health and education professionals, sought to understand perceptions about the Childhood obesity in the community context. The authors identified that, although it exists Despite recognizing the importance of healthy eating habits, families face challenges. difficulties in maintaining proper practices due to work routine and environmental influences The study highlights that strategies based on schooling and the lack of continuity in educational actions are problematic. in food and nutrition education (FNE), with an emphasis on active listening and family involvement, They are essential for lasting changes in children's behavior.

The research by Gato-Moreno *et al.* (2021), which evaluated educational interventions aimed at Promoting healthy habits in children has shown that structured education programs... Nutritional approaches, using accessible language and involving the family, are effective for developing Food autonomy and preventing excess weight. The study showed that continuous interventions They promote not only children's knowledge, but also their ability to make choices. more balanced.

The findings of Zuccotti *et al.* (2025) broaden this perspective by demonstrating that strategies Focusing exclusively on sports practice is not enough to combat obesity. childhood. The study highlights the need to integrate health education, encouragement of physical activity and actions that consider social, emotional, and cultural factors associated with eating behavior. childhood. Therefore, preventive programs must be multidimensional and sensitive to realities. of children and their families.

Within the scope of Primary Health Care, the qualitative study by Gooley *et al.* (2024), The study, conducted with family doctors, nurses, and managers, investigated perceptions and challenges. related to the prevention of childhood obesity in clinical practice. The professionals reported to recognize the importance of monitoring growth and promoting behaviors They were healthy, but pointed to structural limitations, lack of time, and absence of organizational support. as barriers. The study highlights the need for more robust public policies and greater support. institutional framework for the effective implementation of preventive actions.

The study by Verga *et al.* (2022), developed from reports of families seeking Changing your eating habits demonstrates that the home environment exerts a strong influence. regarding children's eating behavior. The authors highlight that interventions that include Parents and caregivers, especially mothers, are more effective in adopting healthy eating practices. healthy individuals within the family unit.



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Taken together, the results of the studies demonstrate that obesity prevention...

Early childhood education requires coordinated action between school, family, and health services. The literature converges on this point. the need for ongoing educational programs, robust public policies, and institutional support.

in Primary Care and intersectoral interventions that consider the sociocultural contexts of children and their families (Baggio *et al.*, 2021; Gooley *et al.*, 2024). When implemented in a way When coordinated, these strategies promote healthier environments and the formation of healthy habits.

Proper nutrition from childhood.

Taken together, the results of the articles included in this review demonstrate that the

Health and nutritional education strategies represent the central axis for the prevention of Childhood obesity in Brazil, directly linked to the different contexts in which...

The child is included. Studies that have assessed the nutritional status of children in public schools (LOURENÇO *et al.*, 2025; FERREIRA; SILVA; ASSUNÇÃO, 2023) show that the environment

The school environment exerts a decisive influence on dietary patterns and on the prevalence of overeating. weight, reinforcing the need for structured nutritional surveillance actions and an adequate supply of meals.

Research that explored perceptions of children, families, and professionals (BAGGIO *et al.*, 2021; VERGA *et al.*, 2022) highlight that adherence to healthy eating habits depends directly from family support, communication between health services, and continuity of actions. Educational activities in the home environment. Structured nutritional education interventions (GATO-MORENO *et al.*, 2021) and expanded programs that consider sociocultural and emotional aspects. and behavioral (ZUCCOTTI *et al.*, 2025) demonstrate a positive impact on eating autonomy of children and in reducing risky behaviors, showing that isolated actions, such as only Encouraging physical activity is not enough.

Furthermore, studies conducted within the scope of Primary Care (GOOEY *et al.*, 2024)

They emphasize that healthcare professionals recognize the importance of prevention, but face barriers. institutional factors, such as lack of time, training, and organizational support, indicate that policies More robust and structured public policies are essential to ensure the effectiveness of actions.

Additionally, national and international technical documents (BRAZIL, 2020; ENANI, (2021; WHO, 2007; WHO, 2023; PAHO, 2023) provide guidelines and evidence on surveillance. nutritional information, consumption trends, and factors associated with child growth, enriching the Understanding the determinants of obesity.

Thus, all studies converge in demonstrating that the prevention of childhood obesity

It requires an intersectoral, continuous, and culturally contextualized approach, linking school, family, health services and public policies to promote healthy food environments and to encourage the formation of positive habits from childhood.



## Conclusion

This integrative review demonstrated that the prevention of childhood obesity in the pre-pregnancy phase... School and school requires a broad, continuous approach built jointly between school, Family and health services. Evidence suggests that the school environment plays a central role. in the development of eating habits, and what actions of Food and Nutrition Education (FNE), When structured, accessible, and applied repeatedly over time, they contribute to... Expanding knowledge and promoting more balanced food choices among children.

The analysis of the studies allowed us to conclude that the prevention of childhood obesity, both in the early stages... Preschool and school education depend on continuous and integrated actions between school, family, and services. health. Evidence shows that the school environment exerts a significant influence on development. of eating habits, especially when it includes structured education programs. nutritional guidelines that are applied consistently and appropriately to the context of children.

It was also observed that family involvement is crucial for the consolidation of Healthy habits in the home environment. Routines, emotional bonds, and socioeconomic conditions. They directly interfere with eating behavior, and the active participation of caregivers is crucial. It enhances the effects of educational actions initiated in schools or health services.

In Primary Care, it was found that professionals recognize the importance of their role. preventive measures, however, still face limitations related to time, service organization, and... Institutional support. More integrated care models centered on the needs of children. They demonstrate greater potential for promoting adequate monitoring and effective interventions.

Despite the progress, significant gaps remain in the literature, such as the scarcity of long-term studies and the need for in-depth analysis of specific strategies aimed at Preschool and school-aged children. Future research should prioritize intersectoral interventions. that consider cultural, emotional, and social aspects of eating behavior, in addition to using more sensitive assessment tools to measure the impact of actions over time.

Understanding and strengthening these strategies is fundamental to promoting a healthier development and establishing dietary practices that are maintained throughout life. life, contributing to the prevention of obesity and to the improvement of the health of future generations.

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