Analysis of child obesity: Actual scenary, public policy, tratments and control

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ABSTRACT

Childhood obesity is a significant public health concern, presenting complex challenges with far-reaching consequences. The introduction of this analysis sets the stage by contextualizing the severity of childhood obesity, citing the World Health Organization's recognition of it as a critical 21st-century health issue. The condition adversely impacts children's physical and mental health to long-term complications that extend into adulthood. The analysis explores various dimensions of childhood obesity, including its prevalence, associated health risks, and the multifaceted factors contributing to its rise, such as genetic, environmental, and behavioral influences. The review identifies six key thematic impact in research on childhood obesity: obesity and overweight, risk of child obesity, causes of obesity, prevention strategies, and obesity data. The classification of childhood obesity, crucial for monitoring and intervention, is discussed, highlighting the use of body mass index (BMI) and measures to assess and categorize the condition. The importance of addressing childhood obesity is underscored, considering its on future societal health and the mental well-being of affected children. Public policies and health programs play a pivotal role in combating this issue, emphasizing the need for a comprehensive, multi-sectoral approach. The review also delves into various treatment and intervention strategies, ranging from lifestyle and dietary modifications to medical therapies, and stresses the importance of early detection and prevention. Global and regional prevalence trends are analyzed, revealing significant variations and underscoring the urgency of targeted interventions. The study concludes by advocating for sustained collaborative efforts among stakeholders, including policymakers, healthcare professionals, and communities, to effectively address and mitigate the childhood obesity epidemic.

Keywords: Childhood Obesity, Public Health, Prevention Strategies, Public Policy, Intervention.

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INTRODUCTION

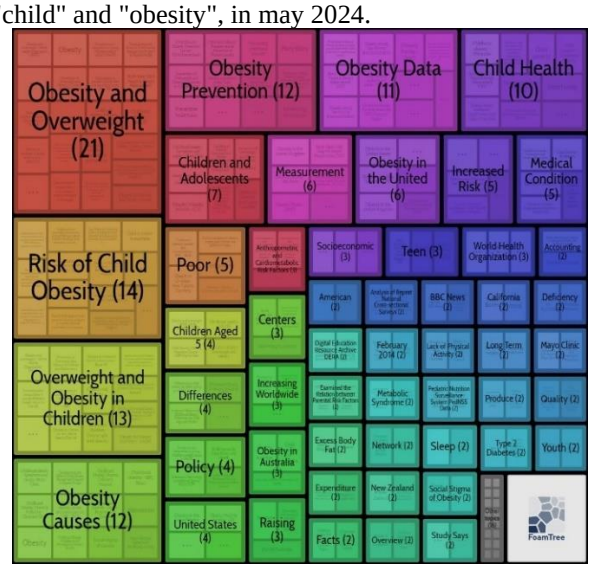
INTRODUCTION TO CHILDHOOD OBESITY

The introduction section of "Impacto da Obesidade Infantil: Consequências na Saúde Física e na Saúde Mental" serves to provide a contextualization of the problem of childhood obesity. According to the World Health Organization, childhood obesity is one of the most serious public health challenges of the 21st century. It has a significant impact on both the physical and mental health of children, as well as long-term consequences extending into adulthood. In this context, it is important to explore the causes, effects, and potential solutions to this pressing issue.

Overall, this introduction sets the stage for a thorough analysis of childhood obesity, encompassing its current status, policy framework, treatment options, and the broader societal and environmental implications. Through a comprehensive understanding of these issues, it is hoped that effective strategies can be developed to address this pressing public health issue and improve the well-being of children around the world (Wickramasinghe et al.2021; Pérez-Escamilla et al.2021).

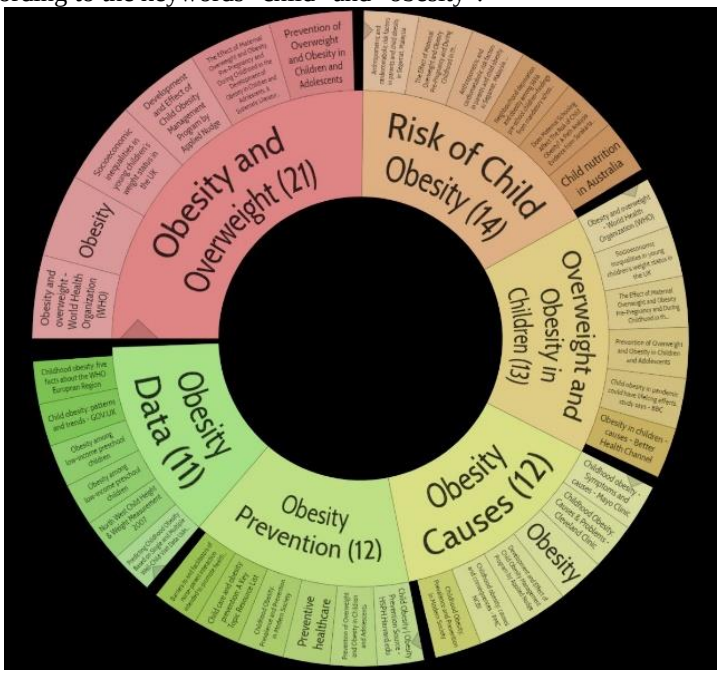
This chapter will also touch upon the existing public policies aimed at addressing childhood obesity, highlighting the importance of a comprehensive and multi-sectoral approach. In addition, it will outline the different treatment and intervention strategies that have been employed to combat childhood obesity, ranging from dietary and lifestyle modifications to medical and behavioral therapies. Finally, it will discuss the challenges and opportunities in the prevention and control of childhood obesity, emphasizing the need for collaborative efforts and sustained commitment from various stakeholders (Parnell et al.2022; Salvagno et al., 2023; Pavlik, 2023). In this sense, a literature survey was carried out, mainly on the PubMed platform and, according to what was recovered, in the last 5 years, the scientific articles published are based on a series of approaches, as can be seen in Figure 1.

Figure 1. Tree map that indicates the hierarchical distribution of scientific articles retrieved (117) on the PubMed platform, according descriptors "child" and "obesity", in may 2024.



Childhood obesity is a complex and multifaceted issue that has become a major public health concern in recent years. The introduction to childhood obesity in this work provides an overview of the current landscape, including the prevalence and trends of obesity among children, as well as the associated health risks and consequences. It also delves into the various factors contributing to childhood obesity, such as genetic, environmental, and behavioral influences. As a result of the literature survey, carried out on the PubMed platform, in the last years, six clusters or thematic areas of research around childhood obesity were grouped. Among them, there was greater attention to obesity and overweight (21 published articles), risk of child obesity (14 published articles) and the others including overweight and obesity in children (13 published articles), and obesity causes (12), obesity prevention (12) and obesity data (11) Figure 2.

Figure 2. Pie chart indicating clusters formation of scientific articles published and retrieved in a survey on the PubMed platform, in may 2024, according to the keywords "child" and "obesity".



DEFINITION AND CLASSIFICATION

Understanding the definition and classification of childhood obesity is fundamental for monitoring its prevalence, assessing health risks, and guiding intervention strategies. By identifying and categorizing children who are affected by obesity, healthcare professionals and policymakers can better target resources and interventions to address this critical public health issue (Breda et al., 2021; Spinelli et al., 2021; Tsoi et al., 2022).

Childhood obesity is generally defined as a medical condition characterized by an excessive accumulation of body fat that poses a risk to health. This excess adiposity can be assessed and classified using various measures, including body mass index (BMI) and waist circumference. The classification of childhood obesity takes into account age and gender-specific growth charts and

norms. Additionally, obesity can be further categorized into different levels of severity, such as overweight and obesity, based on specific BMI thresholds (Caprio et al., 2020; Kansra et al., 2021; Apperley et al., 2022).

Childhood obesity is a significant health issue that has gained widespread attention in recent years. In order to effectively address and combat this problem, it is crucial to have a clear understanding of what obesity in children entails. The definition and classification of childhood obesity are essential for identifying and categorizing the condition, which in turn informs the development of policies and treatment strategies (Dietz & Baur, 2022; Apperley et al., 2022; Deal et al., 2020).

IMPORTANCE OF THE THEME

Understanding the importance of this theme involves recognizing the impact it has on the future of society. In addition to the impacts on physical health, childhood obesity is also associated with mental health consequences, such as low self-esteem, social isolation, bullying and depression. Children with obesity often face discrimination and stigmatization, which can harm their psychosocial and emotional development. Therefore, addressing the problem of childhood obesity is crucial not only for children's health, but also for the well-being of society as a whole (Capistrano et al.2022; Garcia & Paiva, 2020).

Childhood obesity is a multifactorial problem, resulting from the interaction between several factors, including inadequate eating habits, lack of physical activity, genetic and environmental influences, as well as socioeconomic issues. Furthermore, obesity in childhood is associated with a series of health complications, such as type 2 diabetes, hypertension, orthopedic problems, respiratory and liver disorders, in addition to increasing the risk of developing cardiovascular diseases in adulthood (Batista & De, 2023; Pereira & Xavier, 2024).

Childhood obesity is a public health problem with significant repercussions on children's physical and mental health. In recent years, an alarming increase in the prevalence of obesity among children has been observed in many countries, including Brazil. This trend represents a growing concern due to the health risks that childhood obesity poses, as well as the long-term impacts on the quality of life of affected children. (Santos et al., 2023; Pires et al., 2024; Machado, 2021).

By shedding light on the significance of this topic, we can raise awareness, advocate for improved public health policies, and ultimately work towards creating a healthier environment for our children (McPhee et al., 2020; Faienza et al., 2020; Caprio et al., 2020).

The topic of childhood obesity is of utmost importance due to its alarming increase in recent years. This is a major public health issue that not only affects the physical health of children but also has long-term repercussions on their overall well-being. The rise in childhood obesity rates poses a

significant burden on healthcare systems and has serious economic implications. Furthermore, it is crucial to recognize that childhood obesity is not solely a medical issue, but a complex problem with social, environmental, and behavioral determinants (Mendoza-Muñoz et al., 2020; Nieto & Suhrcke, 2021; Browne et al., 2021).

EPIDEMIOLOGY OF CHILDHOOD OBESITY

The epidemiology of childhood obesity refers to the study of the distribution, determinants and consequences of this condition within the population (Drozdz et al., 2021; Deal et al., 2020).

Understanding the definition and epidemiology of childhood obesity is important for developing effective public health policies, treatment strategies, and prevention efforts. By analyzing the current landscape and trends in childhood obesity, we can gain valuable insights into the underlying causes, risk factors, and disparities that exist within different populations. This knowledge is essential for implementing targeted interventions and promoting early intervention initiatives to address the root causes of childhood obesity and mitigate its long-term effects on individuals and society as a whole (Dietz & Baur, 2022; Verduci et al.2022; Deal et al., 2020).

Epidemiological studies have shown that childhood obesity rates have more than tripled in the past four decades, resulting in approximately 38 million children under the age of five being classified as overweight or obese. The consequences of childhood obesity are severe, encompassing a range of physical and psychological health problems that can have lasting effects on a child's well-being. These include an increased risk of developing chronic conditions such as health problems associated with obesity, such as type 2 diabetes mellitus (T2DM), metabolic syndrome (MS) and non-alcoholic fatty liver disease (NAFLD), as well as the psychological impact of low self-esteem and social stigmatization (González-Álvarez et al., 2020; Sorić et al., 2020; Kranjac & Wagmiller, 2020; Kovalic et al., 2023).

Childhood obesity is a significant health issue characterized by an excessive accumulation of body fat that poses a risk to a child's health. The prevalence of childhood obesity has reached alarming levels globally, with both developed and developing countries experiencing a rise in the number of affected children. This trend is compounded by socioeconomic factors, making it a complex and multifaceted issue that requires attention and intervention (Biesma & Hanson, 2020; Klingelhöfer et al., 2021; González-Álvarez et al., 2020).

GLOBAL PREVALENCE

There is an increase in prevalence. The prevalence of childhood obesity has increased globally in 2000 years, with significant variations between regions and countries. (Hruby & Hu, 2015).

Childhood obesity is a public health problem of alarming proportions, transcending borders and consolidating itself as a true global epidemic. According to data from the World Health Organization (WHO), in 2022, 37 million children under the age of 5 were overweight; over 390 million children and adolescents aged 5–19 years were overweight, including 160 million who were living with obesity (WHO, 2024).

Regional differences

Current evidence also suggests that obesity rates have stabilized in children and adolescents in more economically advanced countries since 2000, which is possibly related to healthier eating habits and physical activity levels. On the other hand, there is a steady and uninterrupted increase in low-income nations, and the universal trend is an escalation of obesity rather than a slowdown, driven primarily by sharp increases in the prevalence of obesity in low-income populations (Koliaki et al., 2023). For example, the prevalence of obesity in children aged 5-19 is 41.8% in Mexico, 22.1% in Brazil, 22.0% in India and 19.3% in Argentina (Gupta et al., 2012).

Therefore, in the Brazilian scenario, the situation is no less worrying. It is estimated that 6.4 million Brazilian children between 5 and 9 years old are overweight and 3.1 million are obese, which represents 13.2% of this age group served by the Unified Health System (SUS). Trends show an increase in the prevalence of obesity in countries such as Brazil (from 4.1% to 13.9% between 1974 and 1997) and Thailand (12.2% to 15.6% between 1991 and 1993) (Gupta et al., 2012).

The prevalence of childhood obesity in Brazil is 12.2%, with 10.8% in girls and 12.3% in boys, and varies widely between states, emphasizing the need for urgent measures to prevent and treat obesity (Santos et al., 2023). The study reveals that childhood obesity in Brazil is a serious problem and requires urgent measures, with the aim of combating childhood obesity and ensuring the health and well-being of Brazilian children. They indicate that public education policies should be prioritized, focusing on: encouraging regular physical exercise; promote healthy eating for children; Implement educational programs on childhood obesity in schools.

RISK FACTORS, DETERMINANTS AND IMPACT OF CHILDHOOD OBESITY

Epidemiologically, the prevalence of childhood obesity varies across different regions and socio-economic strata, with higher rates observed in urban areas and among economically disadvantaged populations. Furthermore, disparities in obesity prevalence have also been identified among different racial and ethnic groups, emphasizing the complex interplay of genetic, environmental, and social factors in shaping this public health issue.

While the primary cause of childhood and adolescent obesity is an imbalance between caloric intake and physical activity, environmental factors are particularly significant in its development.

Beyond genetic and biological factors, socio-environmental influences, including family, school, community, and national policies, play a pivotal role. The complexity of the risk factors contributing to obesity in this population complicates treatment efforts. Numerous intervention trials targeting childhood and adolescent obesity have demonstrated limited effectiveness. Consequently, early detection and prevention are crucial in managing the global obesity epidemic. Given that the number of overweight children and adolescents exceeds that of those with obesity, a successful prevention strategy should focus on overweight youth, who are at a heightened risk of developing obesity (Lee & Yoon, 2018).

BIOLOGICAL AND GENETIC FACTORS

Genetic and biological factors play a significant role in the predisposition to obesity. History of parental obesity is an important determinant, with children of obese parents being at greater risk of developing obesity (Rohde et al., 2019). Non-genetic factors, such as eating behavior or physical activity, strongly modulate the individual risk of developing obesity. These factors may interact with the genetic predisposition to obesity through epigenetic mechanisms (Baygi et al., 2023).

SOCIOECONOMIC FACTORS

Socioeconomic status (SES) is also strongly associated with childhood obesity. In many developing countries, children from high-SES families are more likely to be obese due to greater access to high-calorie diets and sedentary lifestyles. In contrast, in developed countries, children from low-SES families are at greater risk due to economic and environmental barriers to maintaining a healthy lifestyle (Wang & Lim, 2012).

In India, Ramana et al. (2024) evaluated the socioeconomic relationship with childhood obesity. The authors observed that urban children had a higher prevalence of obesity (36%) than rural children (28%). In urban communities, children from lower socioeconomic status (SES) families had a 40% obesity rate compared to 32% in higher SES households. In rural communities, these rates were 36% (lowest SES) and 20% (highest SES).

PSYCHOLOGICAL ISSUES

Childhood obesity is linked to a range of problems, including psychological issues such as low self-esteem and depression. Understanding the multifaceted impact of childhood obesity is essential for developing effective interventions and strategies to address this problem. By contextualizing the problem in this way, we hope to underscore the urgency of addressing childhood obesity and the need for comprehensive, multidisciplinary approaches to tackle this complex issue (McPhee et al., 2020; Faienza et al.2020; Caprio et al., 2020).

PREVENTIVE APPROACHES AND INTERVENTIONS

In a systematic evaluation of the effectiveness of childhood obesity prevention programs, Yang et al. (2015) carried out a survey of studies conducted in high-income countries and implemented in various contexts. Searched MEDLINE®, Embase, PsycINFO, CINAHL®, ClinicalTrials.gov and the Cochrane Library from inception to April 22, 2013, targeting diet, physical activity or both, and carried out in children aged 2 to 18 years in high-risk countries. income. The authors retrieved 147 articles (139 intervention studies), of which 115 studies were primarily school-based, although other settings may have been involved. Most were carried out in the United States and in the last decade. The SOE (strength of evidence) was elevated for physical activity-only interventions delivered in schools with home-based involvement or for combined diet and physical activity interventions delivered in schools with home- and community-based components. The SOE was moderate for school-based interventions targeting diet or physical activity, combined school-based interventions with home-based or community-based components, or combined community-based interventions with a school-based component. The SOE was low for combined interventions in child care or home settings. Evidence was insufficient for other interventions. In conclusion, at least moderately strong evidence supports the effectiveness of school-based interventions to prevent childhood obesity.

Another meta-analysis study on the effect of childhood obesity prevention programs carried out by Yang et al. (2014). The authors used, as a basis, studies where diet and/or physical activity intervention(s) were implemented with ≥1 year of follow-up (or ≥6 months for school intervention studies) in children aged 2 to 18 years, and were excluded if they only targeted overweight/obese children or those with a pre-existing medical condition. Seventeen studies were finally included. It was observed that the majority of interventions (70%) showed similar significant effects or no effect on adiposity and lipid outcomes: 15% of interventions improved adiposity and lipid outcomes; 55% had no significant effects on either. Childhood obesity prevention programs had a significant and desirable effect on LDL-C and HDL-C. Two-thirds of interventions showed similar significant effects or no effect on adiposity and lipid outcomes. Assessment of lipid outcomes provides additional useful information about the benefits of the obesity prevention program.

For Reinehr (2013), lifestyle interventions are considered the therapy of choice in children with obesity. The effectiveness of lifestyle intervention for childhood obesity has been proven by several randomized controlled trials and meta-analyses. Even a stable weight in a growing child with obesity is associated with an improvement in cardiovascular risk factors and obesity comorbidities. In particular, children aged 5 to 12 and children who are overweight and not obese benefit from lifestyle interventions. However, in clinical practice, the degree of weight loss with lifestyle intervention is only moderate and the success rate 2 years after starting an intervention is low (<10%

with a decrease in BMI SD score < 0.25). However, the difficulty of an overweight or obese child in reducing their weight can be attributed not only to a lack of motivation, but also to genetic basis and/or adaptive changes in basal metabolic rate, hunger hormones and of satiety that occur with weight loss. We must accept that lifestyle interventions are only successful in a subset of children with obesity. Regardless, the techniques used and the training of therapists need to be improved. If lifestyle interventions do not result in weight loss in a child with obesity, drug treatment to reduce cardiovascular risk factors should be initiated, but is currently rarely undertaken.

PUBLIC POLICIES AND HEALTH PROGRAMS

According to Henriques et al. (2018), Brazilian government initiatives to combat childhood obesity include food and nutrition education, agroecological production systems, family agriculture, healthy environments, and regulatory measures, but face disputes between processed food and agribusiness interests.

According to the previously mentioned authors, the study they conducted analyzed initiatives to prevent and control childhood obesity, especially those promoting Adequate and Healthy Eating (PAAS), which have been part of the Brazilian federal government's policies for 15 years. All documents presenting PAAS initiatives in the areas of food and nutritional security, as well as in the areas of public health policy, were evaluated according to the following criteria: (1) the approach to PAAS initiatives; (2) the aspects of obesity they intend to affect and (3) potential disputes of interest. The main PAAS initiatives identified aim to encourage: food and nutritional education; agroecological production systems; family farming; food accessibility; healthy environments and regulatory measures. These initiatives change different aspects of childhood obesity and highlight different conceptions of the problem and affect different interests. We highlight the disputes between the interests of industrialized food and agribusiness corporations and the government and business sectors guided by the PAAS objectives. Measures aimed at regulating purchases and promoting unhealthy products to children are those that best express the interests involved.

Brazilian federal and local levels have diverse key actors shaping childhood obesity strategies, with the executive authority group playing a key role in policy and programming decisions (Buccini et al., 2022). These authors mapped and described the level of influence (i.e., power) of key actors at the federal and local levels to implement strategies to resolve this issue. Preliminary data shows a total of 188 key actors at the federal level (FED) and 68 key actors at the local level (LOC) shaping the agenda across four domains of influence: command (FED = 89; LOC = 44), financing (FED = 37; LOC = 24), technical capacity development support (DTC) (FED = 47; LOC = 28) and outreach (FED = 13; LOC = 15). The executive authority group has emerged as the most involved in driving childhood obesity policy and programming decisions at the federal and local levels. The

executive authority group was the most cited across all domains at the local level. In the field of financing at federal level, academia, civil society, the private sector and international organizations had a balanced presence with groups from the executive branch, while the main civil society actors were the most cited in the field of CDT. The dissemination network at the federal level focused on the private sector due to the workshop's time limit. In conclusion, they highlighted that the federal and local levels have different key actors and networks that shape strategies to prevent childhood obesity and care for children with obesity. While there is a more diverse group at the federal level across multiple domains of influence, the local level relies on the executive authority group to implement the agenda.

Policymakers seeking to reduce childhood obesity must prioritize investment in treatment and primary prevention. The authors estimate the cost-effectiveness of seven interventions high on the obesity policy agenda: an excise tax on sugary drinks; elimination of the tax subsidy for advertising unhealthy foods to children; calorie labeling on restaurant menus; nutritional standards for school meals; nutritional standards for all other foods and beverages sold in schools; better care and early education; and increased access to bariatric surgery in adolescentes (Gortmaker et al., 2018).

Gortmaker et al. (2018) indicate that Brazil has three main interventionist measures for childhood obesity. Excise tax, elimination of tax deduction, and nutrition standards for food and beverages sold in schools, are projected to save more in healthcare costs than they cost to implement, highlighting the importance of primary prevention. They carried out systematic reviews and a microsimulation model of national implementation of interventions during the period 2015-2025 to estimate their impact on the prevalence of obesity and their cost-effectiveness in reducing individuals' body mass index. In their modeling, the authors observed that three of the seven interventions – excise taxes, elimination of the tax deduction, and nutritional standards for foods and beverages sold in schools outside of mealtimes – saved more in health care costs than they cost to implement. Each of the three interventions prevented 129,000-576,000 cases of childhood obesity by 2025. Bariatric surgery in adolescents had a negligible impact on obesity prevalence. The results highlight the importance of primary prevention for policymakers aiming to reduce childhood obesity.

CHALLENGES AND BARRIERS IN CONTROLLING CHILDHOOD OBESITY

Childhood obesity prevention policies face barriers and facilitators, with structural factors being the most significant, and effective communication, healthy food programs, and low-cost resources being key (Taghizadeh et al., 2023).

The authors examined, through analysis, factors that influence the implementation of COP policies in a community approach, in the period from 2015 to 2022. As results, they presented the reluctance of parents to participate in COP (childhood obesity prevention policies) activities, the lack

of sufficient knowledge and the financial problems were the most reported barriers at the individual level. Furthermore, beliefs about the COP at the sociocultural level and limited funding and resources, time constraints of stakeholders at the implementation level, and lack of political support at the structural level were the most frequently communicated barriers. Furthermore, effective communication between stakeholders, parents and school staff at a socio-cultural level and flexibility of intervention, implementation of healthy eating programs in schools, appropriate and low-cost resources and availability of suitable facilities are the most frequently reported facilitators at the structural level. In conclusion, the authors indicate that individual, sociocultural and structural barriers and facilitators influence the implementation of COP policies. Most barriers and facilitators in this systematic review were related to the structural level.

Obesity management in Brazil's Unified Health System faces challenges, requiring permanent education, instructional materials, and support for health teams to effectively address these barriers (Lopes et al., 2020).

Lopes et al. (2020), carried out a web-based quantitative exploratory study, carried out in 2018 with healthcare professionals. They observed that for these professionals, the barriers were related to the work process and structural aspects and reinforce the need for training health teams. The authors of the study propose that permanent education activities be established, as well as the development of instructional materials applicable to the work routine of health professionals.

FUTURE PROSPECTS AND INNOVATIONS

A nutrition education project in Brazil, involving BMI monitoring, school gardens, and education, has been successful in promoting change in children's eating habits and reducing obesity. Segundo Nasser (2020), an innovative proposal was made, based on a nutritional education project developed by a Brazilian non-profit organization from 2016 to 2018. Focusing on health and nutrition, the project included interventions such as BMI monitoring, assessment of iron deficiency anemia in children, school gardens and education. This strategy has been developed in different areas of the country, with success in all scenarios, demonstrating that a bottom-up approach, with community involvement, is necessary to promote change. The program has managed to integrate the main activities into the schools' daily curriculum, with the adoption of healthier snacks for children. 76% of parents said that the school garden made their children eat more fruits and vegetables and 33% of children said they changed their eating habits after the program. The buy-in of local governments and communities demonstrates the effectiveness of the interventions. Private sector investments in social programs must ensure a more sustainable approach, so that behavioral change, which is fundamental to reducing risk factors associated with NCDs, can be promoted. This needs to be done with a comprehensive approach, with the support of local as well as national and

international stakeholders. Long-term change is possible with a grassroots approach that engages communities towards healthier lifestyles. A school or home garden can provide better nutritional choices.

Another approach, although ancient, has gained many followers is the use of herbal medicines and medicinal plants to control obesity and related diseases. Therapeutic lifestyle changes and maintenance of regular physical activity through parental initiative and social support interventions are the most important strategies in managing childhood obesity. Also, high-risk screening and effective health educational programs are urgently needed in developing countries (Gupta et al., 2012).

Natural anti-obesity agents, such as plants, show potential as a promising alternative to synthetic medications and surgical procedures, with potential for future research and development (Karri et al., 2019).

The use of medicinal plants to maintain normal weight and excellent health has long been researched. However, there is still a lack of sufficient empirical data to support the scientific notion of using herbal products for weight management. Obesity has traditionally been treated with herbal remedies from national and international sources, including Ayurveda (Traditional Indian System of Medicine). Medicinal herbs, such as Salvia plebian, Glycine max, Curcuma longa, Camellia sinensis, and Moringa citrifolia, show potential anti-obesity effects, with active phytochemical components like daidzein, ginsenosides (Ghai et al., 2023).

For Ghai et al. (2022), many synthetic anti-obesity drugs, such as orlistat, lorcaserin, phentermine, bupropion, and liraglutide, are now available on the market. However, these medications have side effects, including dry mouth and sleep disturbances, dizziness, blood pressure, elevated heart rate, constipation, and headache. Humans have a long and ancient history of dependence on traditional medicinal plants and their main bioactive antioxidant components, such as quercetin, anthocyanins and ellagic acid, for the treatment of such diseases and disorders. They emphasize that herbal approaches, containing bioactive compounds such as quercetin, anthocyanins and ellagic acid, show potential in the treatment of obesity without side effects.

FINAL CONSIDERATIONS

In conclusion, addressing childhood obesity requires a multifaceted and comprehensive approach that encompasses public health policies, community engagement, and individual behavioral changes. The rising prevalence of childhood obesity poses significant physical and mental health risks, extending into adulthood with chronic diseases and premature mortality. Effective interventions must consider the complex interplay of genetic, socio-environmental, and behavioral factors.

To mitigate this public health crisis, early identification and preventive strategies are paramount. School-based programs, community involvement, and supportive public policies have shown promise in promoting healthier lifestyles and reducing obesity rates. Additionally, the role of nutrition education and the incorporation of physical activities into daily routines are critical components in combating this issue.

Future efforts should focus on sustainable and inclusive approaches, ensuring that all stakeholders, including families, schools, healthcare professionals, and policymakers, work collaboratively. Innovations in treatment and prevention, coupled with robust policy frameworks, can create a healthier environment for children and adolescents, ultimately reducing the burden of obesity and improving their overall quality of life.

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