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## The Consequences Of Childhood Obesity

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### Abstract

Childhood obesity is considered one of the health problems that involves the entire family composition, since the child for a large part of his life reflects what is done at home, especially in the case of food. The general purpose of the work is to describe the consequences of obesity in children's lives. As for the specific objectives, they are: highlighting the main characteristics of childhood obesity; present information about the importance of nutritional education; evaluate the main consequences of childhood obesity. The methodology used was an exploratory bibliographic review, using the Lilacs, Pubmed and Virtual Health Library (VHL) databases. It was concluded that obesity in childhood and adolescence is associated with several cardiovascular changes, similar to those that a middle-aged adult may suffer, which predispose to the appearance of acute and chronic diseases not only in the childhood or adolescent phase, but also in the adulthood and old age, considerably increasing the number of disabilities and invalidity.

**Keywords:** Child obesity; Food; Nutritional Education.

### Introduction

Obesity is an epidemic trend that has expanded in its research processes and is considered a chronic disease that affects several aspects, whether social, genetic, psychological, physical, among others.

Obesity can present itself in different age groups, however, in childhood; it has an extremely negative impact and can last throughout life [1].

Childhood obesity is considered one of the health problems that involve the entire family composition, since the child for a large part of his life reflects what is done at home, especially in the case of food. It is necessary to monitor and raise awareness on the part of family members that the child's diet needs to be improved, as well as the implementation of a certain diet so that the child does not develop more serious complications or even certain complexes throughout their development [2].

Regarding these psychosocial aspects, there are factors that affect the learning process, harming school performance. Obesity affects the individual not only in their physical appearance, but also in terms of psychological support, bringing symptoms of anxiety, behavioral changes, internal and external conflicts, thus, the current condition tends to disrupt areas of life [3].

In his search, [4] highlights that, in the case of obesity in children, the risks and complications become stronger, mainly because they are in the development process. The author also considers that cardiac and psychological problems and some complications related to metabolism become stronger due to the age and organic composition of children. In recent years, studies and research have been carried out to prove how the physical and mental development of children is strongly impacted by obesity.

Linked to obesity, nutritional deficiencies also stand out as an important nutritional factor, which can lead to insufficient growth and development in children, increase their vulnerability to infections and cause delays in the maturation of the nervous system and the development of intelligence, which can be irreversible, depending on the intensity and duration of the deficiency [5].

Furthermore, children's food consumption is influenced by the family's socioeconomic conditions, such as parents' income and education, and by the mother's or guardian's knowledge and care in accessing, selecting and purchasing food [6].

It is important to highlight that excess weight in childhood predisposes to several health complications, such as: respiratory problems, diabetes mellitus, hypertension, dyslipidemia, increasing the risk of mortality in adulthood. Publication confirmed that overweight in urban areas tends to be more common than in rural areas, especially in the North, Northeast and Central-West regions. To a lesser extent, the geographic distribution of obesity is similar to that of overweight [5].

Based on the data, the present study highlights the following research problem: what are the consequences of childhood obesity? The general purpose of the work is to describe the consequences of obesity in children's lives. As for the specific objectives, they are: highlight the main characteristics of childhood obesity; present information about the importance of nutritional education; evaluate the main consequences of childhood obesity.

In this context and in order to justify the relevance of this study, it is assumed that childhood obesity affects aspects of physical, cognitive, social and emotional health, which in turn interfere with the child's

physical and psychological development. Another aspect that motivates us is having noticed in our preliminary studies for the development of this approach that there is a lot of lack of knowledge about this topic on the part of families, in addition to culturally the presence of unhealthy eating habits. In this line of reasoning, there is also the influence of media with high exposure, especially for children, to ultra-processed foods.

Therefore, it is important to reflect on the harm caused by childhood obesity, its causes and consequences. In addition to being an opportunity to present ways to prevent this pathology with the participation of the child and family. This is a bibliographical review of an exploratory nature. The research was carried out in the Lilacs, Pubmed, Virtual Health Library (BVS) databases, using the descriptors (DECS/MESH) "childhood obesity" and "impacts of childhood obesity", published between 2011 and 2022 in the Portuguese and English.

The inclusion criteria were: works that discussed childhood obesity, highlighting the impacts on children's routine. The exclusion criteria were: works that did not meet the proposed objective of the research; that did not adhere to the research area and that were unavailable at the time of collection and that, therefore, would not be relevant to this study. In total, 39 materials were selected. They were composed of: 16 books, 20 articles from scientific journals, a dissertation and two websites.

### **Prevalence and Definition of Childhood Obesity**

It is a topic that is attracting a lot of attention not only in Brazil, but throughout the world due to the growth in the rate of obese people, especially among young people, as obesity is not a phase but a chronic disease with irreversible behavior [7].

It is a disease that affects all age groups and can begin during the intrauterine period. Therefore, understanding genetic and epigenetic factors can contribute to understanding the pathophysiology and subsequent treatment of the disease. Studies are being carried out so that we can interfere with the child from the gestational stage [8].

Data from the WHO [9] indicate that young people are greatly affected by obesity or overweight, and this is partly due to bad lifestyle habits, as they express genetic characteristics earlier, becoming obese earlier. As this is a chronic disease associated with comorbidities, we will have an individual who is sick sooner and for longer.

Obesity in childhood can lead to many complications, as well as difficulties in self-acceptance and social discrimination, there are still factors that can lead to future illnesses [10].

It is essential to act quickly to combat obesity, especially in early childhood. In view of the context presented above and the frightening growth of obesity throughout the world, permanent work to control and prevent obesity is necessary, especially in childhood, so that this number will not grow even further and generate ever greater risks to the health of its carriers [11].

According to WHO data, in 2016, around 41 million children under the age of 5 were overweight or obese. Without effective treatment, they tend to remain overweight and obese for life. In addition to suffering physical and psychological consequences in childhood, they are also at risk of cardiovascular disease, diabetes and premature death [9].

The terms obesity and overweight are often used interchangeably, but they are not. Obesity is a metabolic disorder that leads to the accumulation of energy in the form of fat in the body in relation to the expected value for sex, height and age. Overweight denotes a higher body weight in relation to the expected value according to sex, height and age. In obese children, the definition of obesity is not always accurate, because an increase in fat-free mass is often observed in them as well [12].

The specific causes for the increased prevalence of childhood obesity are unclear and establishing causality is difficult, since longitudinal research in this area is limited. The heritability of body weight is high and genetic variation plays an important role in determining inter individual differences in susceptibility or resistance to the obesogenic environment [13].

### **Pathophysiology and Diagnostic Criteria**

Obesity is a chronic, multifactorial disease with genetic and epigenetic interaction. It is a broader concept that encompasses several factors such as genetic, endocrinological, physical and psychological problems, which must be treated incisively, as it is a chronic disease related to numerous causes, which are primary guidelines in all patients [14].

It can be conceptualized: as a condition of abnormal or excessive accumulation of fat in the body, leading to compromised health [7]. The degree of excess fat, its distribution and association with health consequences vary considerably among obese individuals. It is important to identify it, as people with this condition have an increased risk of morbidity and mortality. Currently, obesity is a priority for intervention, at the individual and community level, as a nutrition problem in public health [15].

Pediatric obesity is also a multifactorial condition resulting from genetic and non-genetic factors and the complex interactions between them. Genetics and social factors (socioeconomic status, race/ethnicity, media and marketing, and the physical environment) also influence energy consumption and expenditure. Obesity appears to be the result of a complex interaction between the environment and the body's predisposition to obesity based on genetics and epigenetic programming [16].

In terms of nutrition, the most notable are the consumption of foods rich in calories, irregular meal times and a diet with a predominance of "fast foods" that are not very nutritious. Thus, obesity is one of the nutritional diseases that has shown the greatest increase in prevalence, both in developed and developing countries [14].

There are factors that, added to this situation, can cause obesity in childhood, including genetic changes such as Trisomy 21 or Down syndrome, Turner syndrome, as well as other genetic diseases where the prevalence of overweight is relevant. Likewise, cases of children born to obese parents have an 80%

chance of being obese. Statistics that decline in the way that only the father or mother is obese, where the probability is 50% and when neither parent is obese it drops to 9% [15].

Another aspect to be highlighted is adipose cellularity, since in childhood its development can be decisive in the body composition patterns of an adult. [17] explain that adipose cellularity is the effect that occurs when the cells of overweight children reach, over time, the same size as the cells of adults and then increase their fat stores. The risk of a child becoming an obese adult increases markedly with age and the consequent persistence of obesity.

The most accurate criterion for diagnosing obesity is determining the percentage of fat that the body contains. To achieve this, various measurement techniques can be used to estimate body fat content, such as: anthropometry, air displacement plethysmography, double X-ray absorptiometry and impedance, among others. In clinical practice, the most used index for diagnosing obesity is the body mass index (BMI). BMI is measured by dividing body weight in kilograms by height in meters squared ( $\text{kg}/\text{m}^2$ ). BMI has a high correlation with adiposity and also correlates well with overweight at a population level. It is important to note that the calculated BMI value can sometimes be inaccurate because it does not quantify total body adiposity, does not distinguish between fat and muscle, or predict the distribution of body fat [18].

The main limitation of BMI is the lack of distinction between fat mass and fat-free mass. Furthermore, it was observed that many children who have a BMI within normal limits have fat mass values, determined by air displacement plethysmography (BOD-POD system), in obesity ranges [15].

## **Development and Outcomes Associated with Childhood Obesity**

Obesity is a pro-inflammatory state that increases the risk of several chronic diseases such as hypertension, dyslipidemia, diabetes, cardiovascular diseases, asthma, sleep apnea, osteoarthritis and several types of cancer in adults. With the increasing prevalence of pediatric obesity, doctors have begun to identify many of the same chronic diseases and risk factors that are seen in adults in pediatric age groups. Childhood obesity can adversely affect nearly every organ system and often has serious consequences, including hypertension, dyslipidemia, insulin resistance, prediabetes, type 2 diabetes mellitus (T2DM), fatty liver disease, and psychosocial complications [19].

It is also notable that body fat and the specific deposit where adipose tissue is stored (visceral vs. subcutaneous) may contribute to cardiometabolic health risks in children and adolescents. There are several studies indicating that visceral adipose tissue in particular is predictive of comorbidities such as insulin resistance, hypertension and fatty liver disease [20].

Obesity causes changes in other hormonal systems. The age of onset of puberty continues to decline, particularly in African Americans. This has been attributed, in part, to overnutrition and increased BMI values in this population. Excessive aromatization of androgens to estrogens by peripheral adipose tissue may promote gynecomastia in men. Obstructive sleep apnea is among the pulmonary complications of obesity and the hypercapnia associated with it can suppress hypothalamic gonadotropin-releasing hormone function and lead to delayed puberty [19].

Obese children are up to six times more likely than thin children to have obstructive sleep apnea. Obstructive sleep apnea syndrome is a sleep breathing disorder characterized by prolonged partial upper airway obstruction and/or intermittent complete obstruction (obstructive apnea) that disrupts normal ventilation during sleep and also distorts normal sleep patterns. Symptoms include habitual (nocturnal) snoring (often with intermittent pauses, snoring, or sighing), disturbed sleep, and daytime neurobehavioral problems. Daytime drowsiness may occur [18].

There are some risks and complications that can be associated with obesity. In some cases, it is mainly associated with health problems, with most children developing diseases related to the high consumption of foods without the necessary nutrients. High blood pressure, cholesterol problems, diabetes, among other health problems are directly related to obesity [21]. There are rare single gene defects in which obesity is the specific abnormality. Abnormalities in the leptin signaling pathway are one example. The appearance of marked obesity during early childhood raises the suspicion of genetic mutations in the leptin signaling pathway or abnormalities of the melanocortin-4 receptor. These are extremely rare conditions. The most common single gene defect causing pediatric obesity is melanocortin-4 receptor defects, which comprise 5%-6% of early-onset pediatric obesity [13].

In recent years, childhood obesity has been associated with the appearance of metabolic disorders (dyslipidemia, impaired glucose metabolism, diabetes, hypertension, among others) at younger ages [22]. According to [21], among the factors associated with diet that most contribute to the increase in rates of overweight and childhood obesity among Brazilians are eating outside the home, the increase in the supply of quick meals and the consumption of processed and industrialized foods.

A very common reason for poor nutrition on the part of both parents and children is mainly associated with a busy routine. There are many difficulties for people in eating efficiently or richly due to the routine they lead [23]. The number of overweight and obese people increases every day, resulting in important complications associated with this disease, in addition to premature old age and death. Obesity is a problem that requires attention from health systems, as currently one in four children is at risk of being overweight and obese.

The discouraging association between childhood obesity and poor school performance has been demonstrated across cultures. Although the poor academic performance of obese children was partially due to impaired working memory capacity, whether the working memory deficit for obese children was specific domain or general domain remains unclear.

The effects of obesity on children's psychosocial functioning are less clear. Although adverse effects of excess weight on self-esteem, general psychological distress, and quality of life have been observed in clinical samples of obese children, these findings have generally not been replicated in general population samples of children with comparable levels of obesity [22].

For [24], assessing the relationships between weight and academic performance, missing classes and perceptions of the school environment can be essential to obtain a sense of the adolescent's quality of life at school. These relationships can be of great interest to professionals who work in the school

environment and who are interested in improving students' health and quality of life. It can be observed that the academic performance of overweight children is lower than that of normal weight children; however, the reason(s) for this link between being overweight and academic performance remains unclear. Psychosocial factors, such as weight-based teasing, have been proposed to have a possible mediating role, although they remain largely unexplored.

Some studies show that obesity was associated with impairment in (gross) motor skills, after potential covariates were statistically controlled. Children with weaker motor skills may be less likely to participate in organized, recreational physical activities due to perceived stigma and/or lack of confidence, thereby increasing their risk of obesity [4].

School is a place where children spend a large part of their day, playing, eating, learning, interacting and practicing various physical activities. Therefore, it is assumed that the school, together with the family, has an important mission in integrated work to treat obesity and reduce these rates, which insist that they continue to rise. Within this institution, all disciplines must address and work on the topic of obesity, as this responsibility does not rest solely and exclusively with the Physical Education teacher [16]. Through interdisciplinarity, students learn in greater depth the importance of practicing physical exercise and understand the relationship between this practice and the occurrence of diseases, such as obesity.

Assessment of the overweight/obese child should include a comprehensive history and physical examination. Laboratory and radiological studies may also be obtained as indicated by history and examination. The assessment should also identify treatable causes and comorbidities [25]. It is recommended to consider certain screening tests for a general metabolic evaluation in all patients and to seek further evaluation if and when indicated by the specific case characteristics of the child being evaluated.

It is also important to emphasize that the assessment of BMI should not be restricted to the assessment of dietary patterns and physical activity. Environmental and social supports and barriers, opinions about the cause and effect of problems, and self-efficacy and readiness to change should be assessed. It is the clinician's responsibility to recognize the interactions between pediatric obesity and psychological complications and to engage patients and their caregivers accordingly [1].

The physical examination should assess the presence of comorbidities and underlying etiologies. Assessment of general appearance can help distinguish the etiology of obesity. This assessment should include inspection of characteristics that may suggest a genetic syndrome, assessment of affect, and assessment of fat distribution [25].

Excess fat in obesity resulting from binge eating, that is, exogenous obesity, is generally distributed in the trunk and periphery. In contrast, the centripetal distribution of body fat (concentrated in the interscapular area, face, neck, and trunk) is suggestive of Cushing's syndrome. Abdominal obesity (also called central, visceral, android, or male obesity) is associated with certain comorbidities and insulin resistance. Waist circumference measurement, together with BMI calculation, can help identify patients at risk for these comorbidities. Waist circumference standards are available for American children of various ethnic

groups. There are numerous publications on waist circumference measurements in children from various geographic regions that can be used in individual clinics [26].

### **Food Aspects for The Development of Obesity**

Infant feeding practices influence infant weight. Breastfeeding, especially exclusive breastfeeding, has been associated with a lower risk of being overweight. Introducing foods other than breast milk before four months of age has also been associated with increased childhood obesity [27]. Nutrition in early childhood is important because food preferences can be innate or learned through repeated environmental exposure to unhealthy foods: high in fat, sugar and energy dense [28]. On the other hand, high-energy snacks and snacks and increasing portion sizes have contributed to the rise in obesity.

Physical activity is an important component in regulating energy expenditure. Technological development (hours watching television, computers, video games) and the school environment have been associated with lower energy expenditure [29]. Hours watching television could not only reduce the child's physical activity time, but also high exposure to television commercials could induce the consumption of foods with high energy value.

In the dietary treatment of obesity in children and adolescents, it is necessary to note that the nutritional needs for their growth and development must be met, achieving a gradual change from adipose tissue to lean tissue, which is why diets should not be used. The main strategy for controlling obesity is prevention and early diagnosis. It can be prevented in childhood, although it is not known for sure whether this will prevent its presence in adolescence or adulthood. Therefore, it is very important to maintain exclusive breastfeeding for at least 4 months, as the breastfed child better controls the amount of his intake, as satiety does not only depend on the volume ingested, but also on the type and concentration of the food [30].

The satiety mechanisms in natural breastfeeding are largely associated with its fat content. Breastfed children perform more physical activity than those fed formula, work more, spend more time participating in breastfeeding and stay awake longer [29]. We should not force children to eat solid foods before 5 months of age, as this leads to obesity from the first year of life. At school age, there are other factors that we should avoid, such as the consumption of sweets rich in carbohydrates and a sedentary lifestyle.

To manage obesity, the pediatrician counts on the support of a specialist to discover the underlying causes and treat the different diseases that occurs as a consequence of this pathology. Attention must be paid to monitoring the child and the entire family group to achieve beneficial changes in both the short and long term. Nutritional therapy plays an important role in preventing and treating the disease. It is certainly a complex therapy in which pediatricians, nutritionists, psychologists, social communicators and professionals who work to modify dietary factors and lifestyles or other causal factors must intervene [28]. It is worth mentioning that in nutritional treatment, nutritional needs must be met to ensure the correct growth and development of the child, for which restrictive diets should not be used. In addition to diet, an exercise plan is necessary that allows the child to lose fat and maintain adequate medical monitoring.



At a pharmacological level, Rimonabant and Sibutramine were widely used in the treatment of obesity, however, they were withdrawn from the market due to their adverse effects. Orlistat is currently the only medication recommended for long-term treatment. Although not as effective in reducing body weight, it is safe in cardiovascular events and its positive effects in controlling diabetes [31].

However, Orlistat is only used in adolescents over 12 years of age, as at younger ages, an adequate diet, as well as a physical activity routine, are considered sufficient to prevent or treat childhood obesity. Furthermore, Orlistat is known to produce gastrointestinal-type adverse effects such as oily sweating, increased defecation, oily defecation, loose stools and fecal incontinence. These effects are directly related to the consumption of fats in the diet, that is, the lower the consumption of fats in the diet, the symptoms will decrease considerably [32].

The Westernization of lifestyle, that is, diets rich in saturated fats and carbohydrates, combined with the influence of electronic media, is the main cause of a sedentary lifestyle. Knowing the problem is the first step to solving it, however, the existing information on childhood obesity is not as extensive compared to that presented on the adult disease, which is why it is necessary for health professionals to develop strategies aimed at preventing obesity. disease in the early stages of life.

### **Consequences of Childhood Obesity**

In 2005, the WHO estimated that 1.6 billion adults (over 15 years old) were overweight and 400 million were obese, a number that in 2012 would reach 2.3 billion overweight and 700 million obese. This problem is particularly serious in childhood, the International Obesity Task Force (IOTF) estimated that 155 million children (1 to 10 years old) were overweight or obese and the WHO estimated 43 million (under 5 years old). In the United States, 9.6% of school-age children were obese in 2000 and this was estimated to increase to 15.2% in 2010. In recent years, childhood obesity has been associated with the appearance of metabolic disorders (dyslipidemia, impaired glucose metabolism, diabetes, hypertension, among others) at earlier ages (Lamounier, 2021). The American Diabetes Association reported that 85% of children diagnosed with type 2 diabetes are overweight or obese; Furthermore, 10% of obese children may suffer from glucose intolerance. In adolescents with obesity, 25% were found to have hypertension, 39% low HDL cholesterol levels and 46% high triglyceride levels (compared to 4, 18 and 17% in adolescents with adequate weight, respectively).

Likewise, it has been described that adolescents with oligomenorrhea and obesity are at increased risk of developing polycystic ovary syndrome. 77% of obese children in China had fatty liver and in the United States (US) almost all or all children with steatosis were obese (in a small group of children). Sleep apnea has been seen in up to 50% of obese children in the US. A twofold higher prevalence of asthma was also found in obese children in Germany, Israel and the USA. Another problem with being overweight is mechanical stress, making the child susceptible to orthopedic abnormalities and fractures [33].

It is estimated that 40% or more of children and 70% or more of adolescents with obesity will become obese adults, with a negative impact on the burden of health and disease [32]. Overweight and obese children and adolescents are at greater risk of developing chronic diseases (cardiovascular diseases,

certain types of cancer, diabetes and asthma) in adulthood, combined with high mortality from these health problems.

Acute and chronic diseases associated with excess weight not only affect an individual's quality of life, but also increase individual and social costs, health costs and low productivity [34]. It is estimated that obesity represents between 2 and 8% of health expenditures (although it is mentioned that the data is very conservative and could be higher). On the other hand, obesity also brings with it indirect costs due to the reduction in years lost due to disability, increased mortality before retirement, early retirement, disability pensions and reduced productivity due to absenteeism from work. Despite all the indirect consequences of obesity, these costs are believed to be even greater than medical costs.

Children with obesity have an impact on the entire economy that implies changes in several subsystems, for which many experts mention Metabolic Syndrome, which includes, in addition to obesity, hypercholesterolemia, hypertriglyceridemia, increased LDL cholesterol and VLDL cholesterol, decreased cholesterol HDL, hyperuricemia and increased insulin resistance [35]. Therefore, it is not a single disorder, on the contrary, it is accepted that it is a heterogeneous group of associated disorders that have a major impact on the morbidity and mortality of populations. Through high incidences of type 2 diabetes, high blood pressure, cerebrovascular diseases, cardiovascular diseases (Acute Myocardial Infarction), some types of cancer and obstructive sleep apnea, among others.

The majority of dysmorphic signs, dermatological changes and skeletal deformities found were those related to the development of obesity expressed in its morbid type. Among the dermatological changes, acanthosis nigricans and intertrigo lesions were observed most frequently. The most frequent skeletal deformities were valgus and flat feet in their different degrees [36]. According to [37], 6.50 to 9 kg more is enough to cause flat arches or inflammation of the growth plate in the heels, said Haycock, who also states that he used to see this foot pain in very active children and that now they suffer more and more. What is clear is that foot problems in obese children can cause a vicious circle, in which foot pain makes it difficult to give up a sedentary lifestyle, which in turn makes it difficult to lose weight.

Obesity is one of the risk factors linked to the increase in cardiovascular diseases in adults, along with hypertension, physical inactivity, smoking and hypercholesterolemia. The prevalence of obesity has been increasing in recent decades, considering it a global epidemic and the most prevalent non-communicable disease in the world. In relation to cardiovascular risk factors, it is important to measure waist circumference, as in children, as well as in adults, it is considered that abdominal, central or android obesity is more harmful from a cardiovascular point of view than hip, peripheral or gynoid obesity. Children with obesity and waist circumference above the 75th percentile have a higher risk of hypertension, cardiac hypertrophy and sudden death at an early age [34].

The capacity for fat storage and the alteration of endocrine function in obese children leads to an alteration in the pro-inflammatory behavior of tissues and the formation of adipokines, derivatives that play an important role in the production of cardiometabolic abnormalities [36]. The high prevalence of vitamin D deficiency in obese children is associated with reduced insulin sensitivity and a higher prevalence of type 2 diabetes mellitus in adulthood. Low levels of hydroxyvitamin D are associated with

left ventricular hypertrophy, vascular dysfunction and deficiencies in the renin-angiotensin-aldosterone activator system [37].

In a sample of 70 obese children (between 6 and 19 years old) and with atherosclerotic risk factors (hypertension, insulin resistance and dyslipidemia), it was found that 75% of the children had advanced vascular age, similar to that of a 45-year-old child. years. Assessment of carotid intima-media thickness is a clinical marker of atherosclerosis and, therefore, cardiovascular morbidity and mortality [38]. Obese children and adolescents have greater carotid intima-media thickness than children and adolescents with a healthy body mass index. According to [26], the term diabetes mellitus (DM) describes a metabolic disorder of multiple etiology, characterized by chronic hyperglycemia resulting from defects in insulin secretion and/or action, resulting in insulin resistance. High plasma glucose concentrations lead to the development of chronic degeneration associated with the failure of several organs, mainly eyes, kidneys, heart, nerves and blood vessels.

Another clinical condition that is very present in children or obese people is diabetes, which is one of the most worrying for family members, since if not treated correctly it can have profound impacts on the health and lives of children. Treatment should be carried out as quickly as possible, once symptoms are noticed or such a condition is detected. In general, treatment involves removing sweet foods or foods with a high concentration of sugar, these being the main components for a child or person to develop diabetes.

A point of fundamental importance for both diabetes and hypertension to be treated is related to medical monitoring, thus once again highlighting the role of parents and family members. Children or adolescents who are overweight should be taken to the doctor regularly, mainly with the aim of carrying out tests to check how they are doing and making a quick diagnosis of diseases associated with obesity possible.

## Conclusion

Obesity has become a global pandemic in recent years that affects populations of all age groups. This problem in childhood and adolescence becomes very important, as eating practices and physical activity at this age have an impact on the child's health status and, subsequently, on adult health and the country's economy. It is necessary to seek strategies that help prevent and reduce the problem and avoid the health and economic consequences for the individual, family, community and country. Obesity has increased alarmingly in developed and developing countries, it is the main problem of malnutrition in adults and it is a disease that has increased markedly in the child population. Some say that about 1/3 of all children are obese; this same incidence is described in adulthood, which suggests that obese children will be obese adults.

It can be seen throughout the content presented that the team of health professionals must carry out controlled studies on the different interventions that can be achieved at the level of prevention and promotion in order to modify habits and behaviors that lead to an increase in risk factors for cardiovascular diseases. Overweight prevention programs must be developed in preschool children, as once unhealthy habits and weight gain are established, it is very difficult to reverse them. These aspects

are important so that obesity does not directly impact the performance of individuals, as well as stabilizing the degree of obesity.

The scientific evidence consulted shows us that obesity in childhood and adolescence is associated with several cardiovascular changes, similar to those that a middle-aged adult may suffer, which predispose to the appearance of acute and chronic diseases not only in childhood or adolescence, but in adulthood and old age, considerably increasing the number of disabilities and invalidity.

## References

1. Cruz LM, Nunes CP. (2019) Fator emocional na obesidade e transtornos de imagem Emotional factor in obesity and image disorders. *Revista de Medicina de Família e Saúde Mental*. 1(20):125-34.
2. Braz JN. (2016) Obesidade Infantil: Contribuição da enfermagem na prevenção [Childhood Obesity: Nursing's contribution to prevention]. *Revista Humano Ser*. 1(1):1-12.
3. Sstero AM, CABRAL PC, SILVA GAP. (2015) Socioeconomic, cultural and demographic maternal factors associated with dietary patterns of infant. *Rev Paul de Pediatr*. 33(4):445-52.
4. Bar-OR O. (2003) A epidemia de obesidade juvenil: a atividade física é relevante? [The youth obesity epidemic: is physical activity relevant?] *Gatorade Sports Science Institute*. 16(2).
5. Miranda JMQ, Palmeira MV, Polito LFT, Brandao MRF, Bocalini DS, et al. (2015) Prevalência de sobrepeso e obesidade infantil em instituições de ensino: públicas vs. privadas [Prevalence of childhood overweight and obesity in educational institutions: public vs. private]. *Rev Bras de Med do Esporte* 21(2):104-7.
6. Schmidt AL, Strack MH, Conde SR. (2018) Relationship between food consumption, nutritional status and school performance. *J Human Growth Development*. 28(3):240-51.
7. <https://www.who.int/news/item/04-10-2017-who-releases-guidelines-to-address-overweight-and-obesity-in-children#:~:text=WHO%20recommends%20that%20all%20infants,to%20WHO%20child%20growth%20standards.>
8. Aragao SGA. (2017) Childhood obesity: review of literature. *Rev de Med da UFC*. 57(3):47-50
9. <https://www.even3.com.br/anais/pibidsul/23229-proesde-licenciatura--reflexoes-iniciais-sobre-o-programa-de-educacao-superior-para-o-desenvolvimento-regionallic/>
10. Sou CB. (2017) Prevalence of Hypertension in Children of Public School. *Int J Cardiovasc Sci*. 30(1):L42-51.
11. Faith MS, Horn LV, Appel LJ, Burke LE, S. Carson JA, et al. (2012) Evaluating parents and adult caregivers as "agents of change" for treating obese children: evidence for parent behavior change strategies and research gaps: a scientific statement from the American Heart Association. *Circulation*. 125(9):1186-07.
12. Jardim ED. (2014) Review of literature: the theme of obesity and nursing care in the face of the disease. 2014. Monograph (Specialization in Lines of Nursing Care – Chronic Noncommunicable Diseases)] - Department of Nursing, Universidade Federal de Santa Catarina, Florianópolis, 2014.
13. Passos DR, Gigante DP, Maciel FV, Matijasevich A. Eating behavior: comparison between non-overweight and overweight children in a school in the city of Pelotas, RS. *Rev Paul Pediatr*. 33(1):42-49.
14. Fronzyek LGM, BERNARDES LR, MODENA CM. (2017) Childhood obesity: understanding to better intervene. *Revista da Abordagem Gestáltica* 23(2):167-74.
15. Luft VC, Meyer F. (2004) Childhood obesity: how can we be effective?. *J Pediatr*. 80(3):173-82.
16. BANG SW, LEE SS. (2019) The factors affecting pregnancy outcomes in the second trimester pregnant women. *Nutrition Res Prac*. 3(2):134-40.
17. Paiva ACT, do Couto CC, de Lemos Masson AP, Silveira CA. (2018) Childhood Obesity: anthropometric, biochemical, dietary and lifestyle analyzes. *Revista Cuidarte*. 9(3):2387-99.

18. Dias JCR. (2018) Epidemiological aspects of obesity and its relationship with Diabetes mellitus]. *Revista Sociedade Brasileira de Alimentação e Nutrição*. 33(1):103-15.
19. James WPT. (2008) The epidemiology of obesity: the size of the problem. *J Int Med*. 263(4):336-52.
20. Carrel AL, Clark RR, Peterson SE, Nemeth BR, Sullivan J, *et al.* (2005) Improvement of fitness, body composition, and insulin sensitivity in overweight children in a school-based exercise program. *Arch Pediatr Adolesc Med*. 159(10):963-68.
21. Wang Y, LOBSTEIN T. (2006) Worldwide trends in childhood overweight and obesity. *Int J Pediatr Obes*. 1(1):11-25.
22. Matson KL, FALLON RM. (2012) Treatment of obesity in children and adolescents. *J Pediatr Pharmacol Ther*. 17(1):45-57.
23. Barbosa JHP, Oliveira S. (2019) *Revista de Nutrição*. 22(1):113-24.
24. French SA, Story M, Perry CL. (1995) Self-esteem and obesity in children and adolescents: a literature review. *Obes Res*. 3(5):479-90.
25. Rede Nacional Primeira Infancia. (2014) Obesity in early childhood. Fortaleza: RNPI.
26. Anjos LA. (2016) Obesity and health. Rio de Janeiro: Editora Fiocruz.
27. <https://www.gov.br/ans/pt-br/centrais-de-conteudo/final-obesidade-26-12-pdf>
28. Azevedo FR, Brito BC. (2012) Influence of nutritional variables and obesity on health and metabolism. *Rev Assoc Méd Bras*(1992). 58(6):714-23.
29. Cardoso A. (2019) Overview of obesity in children and adolescents]. Rio de Janeiro: Instituto Desiderata.
30. Helen P, Emerick L, Mourao N, Pereira D, Santos I, *et al.* (2017) Systemic arterial hypertension, blood pressure levels and associated factors in schoolchildren. *Revi Assoc Méd Bras*. 63(10):869-75.
31. Schmidt MI, DUNCAN BB, e Silva GA, Menezes AM, Monteiro CA, *et al.* (2012) Chronic non-communicable diseases in Brazil: priority for tackling and investigating. *Revista de Saúde Pública*. 46(Suppl 1):126-34.
32. Lamounier JA. (2021) Child nutrition, physical activity and the Coronavirus pandemic. *Rev Residên Pediátr*. 11(3):1-2.
33. Poulain JP. (2013) Sociology of obesity. São Paulo: Editora Senac.
34. Guedes DP. (2003) Body weight control: body composition, physical activity and nutrition. Rio de Janeiro: Shape.
35. Lopez FA. (2000) Exogenous obesity in childhood and adolescence. *J Pediatr*. 76(S2):305-10.