

An overview on childhood obesity

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ABSTRACT

Introduction: Childhood obesity is a modern epidemic situation and is the most frequent eating disorder. The importance of childhood obesity has driven many researchers to investigate and study its etiology, consequences, and interventions for managing it.

Purpose: To review the factors which contribute to the development of childhood obesity, its consequences, and the interventions for managing the problem.

Results: It follows from the review that childhood obesity is associated with the presence of genetic, behavioral, and environmental factors, while its consequences are connected with cardiovascular,

gastrointestinal, and respiratory diseases. Certain psychosocial and endocrine disorders are also observed. Management of the problem can be achieved with targeted interventions in the context of the family, school and community environment.

Conclusions: Childhood obesity is directly connected with the adoption of a sedentary lifestyle, a change in healthy eating habits, and reduced physical activity. Apart from the serious risks it causes to children, this problem considerably affects the cost of healthcare and social security systems.

Key words: calorie imbalance, childhood obesity, interventions, physical activity

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INTRODUCTION

In recent years, childhood obesity has acquired an epidemic character worldwide and constitutes one of the most serious risks to public health. Meanwhile, the concern and interest shown by all those who are interested in child health and well-being, i.e., parents, health professionals, and scientists, increases [1, 2].

The prevalence of childhood obesity has increased dramatically, and researchers classify it as the primary problem of childhood both in developed and in developing countries [3]. World health organization has declared obesity as one of the most neglected diseases of significant public health importance. The 2002 World Health Report lists overweight as the fifth most serious risk factor for both developed countries and low mortality developing countries [4]. In the USA, during the last two decades, the prevalence of overweight in children and adolescents almost doubled (from 15.4 % to 25.6%) but tripled in Canada (from 11% of boys and 13% of girls in 1981 to 33% and 27% respectively in 1996)[5]. Globally, in 2010 the number of overweight and obese children under the age of five was estimated to be over 42 million. Close to 35 million of these was living in developing countries [6]. In Greece, its prevalence is particularly high, and in the past three decades, it presents a steady upward course [7]. According to the results of a recent study among 4800 Greek children, 41.2% of them were obese and overweight. In particular, 29.9 % of the boys and 29.2% of the girls were overweight while the percentage of obese boys and girls was 12.9% and 10.6% respectively [7].

Obesity is defined as a condition described by a pathologically increased fatty deposition in the human body, to such a degree that it constitutes a risk to human health [8]. The disorder which is responsible for obesity is the undesirable positive energy balance and increased body weight. Apart from the increased body weight, the excessive amount of body fat entails multiple psychosomatic and social consequences [8].

Often, the terms “obese” and “overweight” are confused: although they are used alternatively, they have different meanings. An overweight child is a child whose weight is higher than normal considering their age and height while an obese child is a child characterized by excess body fat [9, 10].

Factors contributing to the development of childhood obesity include the excessive consumption of unhealthy food and

inappropriate diet (reduced intake of vegetables, increased meat consumption), lack of physical exercise, emotional and behavioural problems of children and parents, television watching time, and long periods of time spent dealing with computers and video games, mass media, unawareness of the children, mothers working outside the house, demographic characteristics, and genetic factors, which have been found to be the main causes of increased childhood obesity [11 - 13].

Obesity in childhood is a predisposing factor for the development of obesity in adulthood [14]. In addition, it contributes to the development of metabolic syndrome, cardiovascular diseases and hypertension, occurrence of diabetes mellitus, respiratory, orthopedic, and psychological problems (including stress, low self-esteem, social isolation, depression, and victims of verbal and physical abuse) [10, 15 - 17].

This paper examines the factors which contribute to the development of childhood obesity, its consequences, and potential interventions for managing the problem.

FACTORS CONTRIBUTING TO THE OCCURRENCE OF CHILDHOOD OBESITY

Childhood obesity is due to the imbalance between calorie intake and burning. The factors which are involved in the occurrence of this problem are genetic, behavioral and environmental [18].

The effect of genetic factors on an increase in weight is widely recognized in the scientific community. In 1997, the first gene mutation, which referred to the gene that encodes leptin, was detected. Leptin is a hormone produced in the adipocytes (fat cells), whose volume is directly related to its secretion, under normal conditions [19]. In 1999, the discovery of ghrelin, a hormone which is produced by the endocrine cells of the stomach and is considered to be a powerful appetite stimulant, was also important. The results of a number of studies have shown that ghrelin is highly correlated with the occurrence of obesity [20]. It seems that certain mutations identified in the melanocortin-4 receptor (MC4R) gene are possibly associated with the occurrence of childhood obesity; there is an imperative need, however, for further research [21].

However, there are some rarely occurring genetic syndromes, which are also responsible for the occurrence of obesity, e.g.,

Down syndrome, Prader-Willi syndrome, Bardet – Biedl syndrome, and Cohen and Alström syndromes [22]. In these syndromes, polymorphisms in various genes controlling appetite and metabolism predispose individuals to obesity. Are characterized by hyperphagia and food preoccupations which lead to rapid weight gain in those affected [22]. Modern studies suggest that genetic factors do not seem to play the leading role in the epidemic [23].

It is impossible to determine that certain behavior is the “cause” of obesity, since there is an interaction among factors contributing to obesity. However, certain types of behaviors may result in energy imbalance and, consequently, in obesity.

Increased energy intake: Certain eating habits and consumption of foods rich in calories may possibly lead to excessive energy intake in children and adolescents. Large food portions, consumption of snacks and fast food, excessive consumption of sugar-sweetened soft drinks, all contribute to the increased energy intake of children and adolescents [24 - 26].

Reduced physical activity: Physical activity plays an important role in the overall development of children [27]. Studies have proven that boys exercise more than girls and the overall physical activity reduces with age in children [28]. Therefore, it is evident that energy intake results in obesity unless there is a balance with the corresponding energy expenditure. Increase in physical activity may contribute to an increase in energy expenditure and, by extension, to the prevention of obesity [29]. Nowadays, physical activity among overweight children is reduced, while there is an increase in sedentary activities [30].

Sedentary lifestyle: A manifestation of such behaviour is TV watching time, which is positively related to both the consumption of snacks and fast food and the consumption of increased quantities of food [31]. Children spend more and more time watching TV, playing video games, or in front of their PCs. Thus, a vicious circle begins, where the combination of sedentary lifestyle, reduced physical activity, and consumption of unhealthy foods results in obesity. In addition, TV commercials of soft drinks, sweets, and fast food, play an important role in the formation of an incorrect eating culture [32, 33].

The eating habits of children and their level of physical activity may be affected by their families and parents. Modern lifestyle, lack of free time, and excessive working hours, all considerably affect the diets of families and children, therefore, foods containing a large

amount of calories and having low nutritional values are chosen. Choices of foods made by children at school mainly focus on snacks and fast food, or sweets [34].

The parents’ eating habits and lifestyle constitute an imitation factor for their children. Studies in children of obese parents have shown that parameters including absence of breakfast, reduced physical activity, and selection of inappropriate diets by parents have also affected their children [35, 36].

EFFECTS OF CHILDHOOD OBESITY

As a chronic pediatric disorder, childhood obesity affects various systems of the human organism.

These effects are mostly associated with the cardiovascular system (hypertension, dyslipidemia), the respiratory system (obstructing sleep apnea, asthma), and the gastrointestinal tract, and also with problems related to skeletal development [37 - 39]. In addition, they are associated with diseases of the immune system and psychological problems (depression, low self-esteem) [37, 39, 40].

The occurrence of health conditions, including type II diabetes, hypercholesterolemia and hypertension, which were considered to be diseases of adulthood, is more and more frequent in children, with an increase in the prevalence of obesity [41, 42].

With regard to the effects of childhood obesity on adulthood, it has been observed that obese children may possibly remain obese in adulthood, with all the accompanying risks [39, 43].

In addition, the occurrence of obesity in childhood is connected with increased morbidity and mortality rates in adulthood, regardless of the weight of the adult person [44].

INTERVENTIONS FOR MANAGING CHILDHOOD OBESITY

Family and dynamics developed inside a family play an important role in the development of obesity. A number of studies report that parents are models to imitate for their children, even negative models, in terms of obesity [35, 36]. Thus, any interventions should aim at providing information for parents about nutrition-related issues, their rights and responsibilities for protecting their children from this epidemic. In addition, it is to be underlined that the sophisticated form of obesity constitutes a kind of negligence or child abuse and parents play an important part in the formation of critical thinking and decision-making by their children in nutrition-

related issues. An attempt made to adopt healthy eating habits, an increase in physical exercise (e.g., walking, use of stairs) and a healthy lifestyle, in general, must be the objectives of any interventions in the family [45 - 47].

Children spend a large part of their time at school; therefore, school plays a leading role in their lives. With regard to nutrition, school must encourage healthy eating habits, use of vegetables, fruits, fresh juices, and water. School cafeterias must provide products contributing to this direction. Increased physical exercise through programmes extending the time spent for physical activities must be a priority. Encouragement of walking, active movement, use of stairs, and avoidance of elevators, can all be of great assistance. Participation in games and dance groups are also constructive intervention measures [48, 49].

Community is the environment where the child lives, moves and reacts. It is also connected with other factors, including socioeconomic status, nationality, race, and geographical position [50].

Cooperation between the community and parents is necessary for the implementation of any interventions and organization of events on healthy diet and the importance of physical exercise [50]. Programmes aiming at making the neighbourhoods safer and more accessible to children constitute a primary need. Establishment of children's play lands, cycle paths, municipal gyms, and dancing and exercise rooms are basic prerequisites for the success of any community-based intervention for managing obesity. Informative advertising programmes through the mass media may improve awareness of all parents and children [51].

CONCLUSIONS

Obesity and overweight are considered to be two of the most important health risks of children and adolescents worldwide. This spreading is connected with an increase in sedentary lifestyle, reduced physical activity, change in eating habits (junk food) and by a general lifestyle change. This lead to significant physical (diabetes mellitus, high blood pressure, heart disease, sleep problems), psychological (lack of confidence and self-esteem, depression) and social impacts. The seriousness of these specific problems requires appropriate therapeutic interventions but mainly focus in prevention.

Conflicts of interest: none declared.

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