

Childhood Obesity : A Review of Literatures

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ABSTRACT

Obesity is a multifarious disorder involving developmental, behavioral, biological, environmental, and hereditary components; it is a major medical health issue. The greatest predominant cause of childhood obesity is a discrepancy in energy balance. The physicians have commonly depended on changes in food consumption with exercise since there is no single treatment choice for obesity treatment . The prevention of childhood obesity is considered as the enduring, cost-effective solution to the problem of obesity, effective methods for it still indescribable. In summary, this study will overview the implications, and treatment options available for childhood obesity.

Keywords : Children , Obesity , Prevention , Treatment .

السمنة عند الأطفال ، مقال مراجعة

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الخلاصة

السمنة اضطراب متعدد الأنواع يشمل مكونات نمائية ، وسلوكية ، وبيولوجية ، وبيئية و وراثية. إنها قضية صحية طبية كبيرة. أكبر سبب سائد لسمنة الأطفال هو الاختلاف في توازن الطاقة. اعتمد الأطباء بشكل عام على الحمية الغذائية والعلاج بالتمارين الرياضية نظراً لعدم وجود خيار علاجي واحد لعلاج السمنة. تعتبر الوقاية من السمنة لدى الأطفال بمثابة الحل الدائم والفعال من حيث التكلفة لمشكلة السمنة الطرق الفعالة لعلاج السمنة عند الأطفال مازالت محل خلاف. باختصار ، سوف تستعرض هذه الدراسة الآثار وخيارات العلاج المتاحة لسمنة الأطفال

الكلمات المفتاحية : الأطفال ، السمنة ، الوقاية ، العلاج .

INTRODUCTION

Obesity is a difficult problem that can affect children of all age groups.¹⁻³ It results by multifaceted interactions between many factors rather than by a single one.⁴ Childhood obesity can be categorized as either non syndromic or syndromic. Prader-Willi syndrome, Bardet-Biedl syndrome, and Alström syndrome are examples of syndromic obesity. Non-syndromic obesity can be divided into two types: monogenic obesity, which is rare, and polygenic obesity, which is far more frequent. Many common and rare genetic variations have been proven to contribute to obesity heredity, while the molecular processes underlying the majority of these variants are unknown.⁵ The gut microbiota, as well as intrauterine impacts, have lately developed as contributors to the obesity pandemic.^{6,7} Other variables, such as formula rather than breast feeding, and if protein introduced into a baby's food intake early, have been linked to weight increase that can last a lifetime.⁷⁻⁹ The developmental risk of early puberty in children will be increased by obesity^{10,11}, also sleep disorders, menstrual irregularities in adolescent girls^{12,13}. Multiple hormones (adipokines) are secreted by adipose tissue and play a vital role in metabolic control and physiological balance. Leptin and adiponectin, two major adipokines, are known to influence a variety of metabolic processes, including body weight management and energy expenditure. Obesity-related hyperleptinemia and hypoadiponectinemia are also linked to metabolic issues like type 2 DM, and CVS disease.¹⁴ Adolescent obesity has been linked to high risk of malignancy like Hodgkin's lymphomas, leukemias, colorectal cancer, breast cancer, and other cancers in adulthood, according to new researches.¹⁵

Obese children may also have psychological problems for example sadness, nervousness, low self-confidence and abnormal eating behavior^{16,17}. In the general population, the link between hypovitaminosis D and obesity has been extensively researched. In 2015, a meta-analysis found a link between vitamin D deficiency and obesity.¹⁸ There is no clarity on why obese people have decreased vitamin D levels. The fundamental hypothesis would be that fat-soluble vitamin D is absorbed by adipose tissue.¹⁹

Consequently, treatments for obesity have mostly directed toward on individual behavioral alterations for example higher daily exercises or change quality of diet by decreasing extra calorie consumption.^{20,21} These measures, however, have had very restricted results. The promotion of healthy food choices are additional behavioral and dietary guidelines.²²

However, the pharmacological and/or surgical treatments will continue as essential choice for individuals with morbid obesity¹. The present review article outlines the existing knowledge of the mechanisms that contribute to obesity, the psychosocial and physiological impacts of obesity on children, and measures that may help to prevent future comorbid problems.

Body mass index (BMI) is a dependable manner that evaluate obesity. It is calculated by formula of body weight and height in children more than 2 years of age^{23,24}. While other methods exist but they are costly and not readily accessible.² In the healthy pediatric population, BMI gives a decent measure of body fat, and researches have demonstrated that BMI associates with body fat and health concerns in the future²³. Z-scores are used for description of child BMI. The World Health Organization (WHO) recommended body mass index Z-score points of > 1, > 2, and > 3 as risk of overweight, overweight and obesity, respectively. However, rounded percentiles of the 85th %, 97th %, and 99.9th % are used commonly.²⁴⁻²⁷ BMI is doesn't directly measure body fat²⁸.

Pathophysiology of Obesity

Obesity has a complicated pathophysiology that is caused by a mix of individual and social variables. Individual eating practices and weight gain are influenced by physiological elements in the context of one's own hereditary hazard.¹

The well-known risk factor for adult obesity is high BMI at age less than five years and it is associated metabolic syndrome and comorbidities for the next years of life.²⁹⁻³¹ In children, the BMI drops to a minimum before growing again in maturity, a condition known as adult obesity.²⁹

Clinical Comorbidities

Overweight could affect progression of growth and puberty in children¹¹. Obesity in children may induce prepubescent linear growth acceleration in both boys and girls.³² For the usual time of pubertal onset, adequate nourishment is required. Due to changed hormonal factors, excessive weight gain might trigger early puberty.¹¹ The association between primary pubertal changes and obesity is well-established in females; however, there is no evidence in boys.³³

Obesity is considered as a risk factor for obstructive sleep apnea (OSA) in children^{13,34}. When compared to adolescents and adults, children with OSA have less negative repercussions in terms of cardiac stress and metabolic syndrome.^{35,36}

The maximum serious and common morbidities linked with sleep apnea in children are aberrant behaviors and neurocognitive impairment.¹³

Also obesity is related to liver abnormalities e.g. non-alcoholic fatty liver disease which is the greatest vital factor of hepatic disease in children³⁷⁻⁴⁰. This condition is closely related to metabolic syndrome⁴¹. Obese child is furthermore at hazard for slipped capital femoral epiphysis. Lifestyle of sedentary behaviors may have a negative effect on the structure and function of the brain, but the cause is still not clear⁴²⁻⁴⁴.

Prevention and Treatment

The preventive methods for obesity along the early childhood are very important to be recognized and provided⁴⁵⁻⁴⁷. During discussion of a patient's body weight, the health care practitioners has been shown to promote impaired desire for weight reduction which cause avoidance of preventive treatment.⁴⁸ Families education about healthy food habits and avoidance of harmful eating behaviors, with encouraging movement, and sedentary activities limitation like screen time are all examples of anticipatory counseling. Many aspects of our culture, especially the family, impact children's lifestyle choices.^{3,49} As a result, rather of addressing obesity as an individual problem, it is critical to approach the issue through the lens of the family unit.⁴⁷

There is limited effect of drugs in the management of child obesity. FDA approved Orlistat as a drug for body weight reduction in 12 to 18-year-olds⁵⁰. Also, Metformin, may decrease body weight, but it still not approved by FDA. Qsymia (combination of phentermine and topiramate) is now approved by FDA to decrease weight in obese peoples > 18 years.⁵¹

Hydrogel technology (High viscosity polysaccharides and fibers that absorb water in the stomach) is another treatment option which was approved to be effective for weight reduction in patients with metabolic syndrome.⁵²

The importance of probiotics in the fight against obesity has recently been recognized. Probiotics have been found to modify the gut microbiota, resulting in improved nutritional digestion and absorption. The use of probiotics for children might be a viable option.^{53,54} Vitamin E may also have a role for dealing with the comorbidities like hyperlipidemia, diabetes, nonalcoholic steatohepatitis and cardiovascular risk, has been recently described^{55,56}. It contains tocopherols which have antioxidants properties that protects the body from oxidation damage^{57,58}.

The supplementation of Vitamin E in adequate dose is a correct approach to aid in the obesity prevention and treatment in adult patients ,but it's

not approved for pediatric use yet . However, some clinical studies have revealed inconsistent results with supplement of Vitamin E⁵⁷.

GLP-1 agonist is a new anti-obesity agent that will likely serve as a promising anti-obesity treatment. Liraglutide is the only GLP-1 to be approved by the FDA in 2020 for use in children aged 12–17 years . New trials for pediatric obesity, including semaglutide, are under underway.⁵⁸

Bariatric Surgery

Since the early 2000s, bariatric surgery has grown in favor as a treatment for extreme obesity.⁵⁹⁻⁶² Bariatric surgery for these patients must be considered when they have accomplished their linear growth⁶³⁻⁶⁶. Now, gastric banding is not recommended by an FDA for children below 18 years of age. A study showed that it can improve BMI and severity of comorbidities. Although numerous repeated surgeries is not considered as a suitable option for obese children⁶⁷.

CONCLUSION

Childhood obesity is not an issue that can be treated by dealing with a single factor. Social ,biological, and environmental factors, such as the availability of high-density food alternatives, impact youth eating behaviors. The physical activity is an alternative for children.

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