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The impact of obesity on health and the treatment of obesity

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Abstract. Over the past 30 years, the global prevalence of obesity has risen significantly. The factors driving this epidemic are numerous but remain poorly understood, and there is an ongoing debate about prioritizing them. Despite efforts, public health initiatives to prevent obesity have largely been unsuccessful, leading to a growing burden of disease and disability. Obesity has distinct and quantifiable effects on both physical and mental health, reduces health-related quality of life, and results in significant direct and indirect costs. As the obesity epidemic continues to grow, it places a heavy burden on individuals, healthcare systems, and communities alike. Obesity is more than just a change in body shape; it is a chronic disease triggered by various biochemical factors that disrupt eating regulation and energy metabolism. The development of obesity is relatively complex, making its treatment challenging. However, obesity is preventable. Managing and reducing body weight effectively are crucial steps in maintaining and promoting overall health.

Keywords: obesity, treatment, review.

1. Introduction

As living standards continue to rise, an increasing number of people are experiencing obesity [1]. Obesity has become a common problem in various countries and populations around the world. The prevalence of obesity increased from 30.5% in 1999-2000 to 41.9% in 2017-March 2020. At the same time, the prevalence of severe obesity increased from 4.7% to 9.2% [2]. Obesity is not only a change in body shape, but also a chronic disease caused by a series of eating regulation and energy metabolism disorders caused by specific biochemical factors. The development of obesity is a complex process, and treating it can be challenging. However, obesity can be prevented. Effective control and improvement of physical fitness are key steps for individuals to maintain and enhance their health. Effective control and reduction of physical fitness are important measures for people to maintain and pursue health. Obesity is a condition characterized by an excessive buildup and abnormal distribution of fat in the body, resulting from an excess of energy intake over expenditure. It is a chronic metabolic disease with multiple causes, resulting from a combination of genetic and environmental factors. Obesity is mainly manifested in the increase of fat content in the body, the increase of the number of fat cells, the imbalance of body fat distribution and local fat precipitation. The main function of white adipocytes is to store fat, while the main function of brown fat is to generate heat. Compared to normal and lean individuals, obese patients have more white fat and less brown fat. Obese individuals have a low amount of brown adipose tissue, which leads to the failure of thermoregulation, causing excessive energy accumulation and subsequent conversion and aggregation. This article introduces the impact of obesity on health from the

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aspects of types of obesity, distinctions between different obesity diseases, risks and hazards, and treatment methods.

2. Classification of obesity

Simple obesity is the most common form of obesity, making up approximately 95% of cases. Individuals with simple obesity typically have an even distribution of body fat, without endocrine or metabolic disorders. A family history of obesity is often present.

Secondary obesity: Secondary obesity is a form of obesity resulting from endocrine or metabolic disorders, representing about 2% to 5% of all obesity cases. Obesity is just one of the important symptoms of this type of patient, and there are also various other clinical manifestations, mainly manifested in various diseases such as weight gain, hypothyroidism, pancreatic islet cell tumor, hypogonadism, polycystic ovary syndrome, and intracranial plate disease. During treatment, the main focus should be on treating the underlying disease, and weight loss methods such as exercise and dietary control should not be used.

Drug induced obesity: Some drugs not only effectively treat certain diseases, but also have the effect of causing obesity in patients. As long as the use of corticosteroids and phenothiazine drugs for treating mental illness is stopped, obesity can improve on its own. Unfortunately, some patients have become stubborn obese patients since then. Secondary obesity is caused by certain diseases as the primary disease, and their obesity is only one of the manifestations of the primary disease. By treating the primary disease, obesity can often be cured.

3. Assessment methods and standards for obesity

With the deepening of research on obesity, people's understanding is constantly improving. WHO and the Asia Pacific region have formulated the criteria for obesity respectively, and the obesity expert group specially organized by our country has proposed the diagnostic criteria for overweight and obesity suitable for countrymen.

Body Mass Index (BMI) is a measure used to assess an individual’s body weight in relation to their height. It is calculated by dividing a person’s weight (in kilograms) by the square of their height (in meters). BMI is a widely accepted global method for evaluating obesity levels, and the World Health Organization (WHO) uses it as a standard to define obesity. This index is closely related to total body fat and considers both weight and height, making it a simple and practical tool for identifying overweight and obesity. According to WHO standards, individuals of Asian descent with a BMI above 22.9 are classified as overweight.

Another straightforward method to assess obesity is by measuring waist circumference. Although not entirely precise, waist circumference is considered a reliable indicator of obesity-related health risks. Even individuals with a normal BMI may face increased health risks if they have a larger waist [3]. Typically, men gain fat around their abdomen, creating what is commonly known as a "beer belly". Before menopause, women typically accumulate fat around their hips and buttocks. However, after menopause, due to a drop in estrogen levels, many women start to store fat around their abdomen, similar to men. This increase in abdominal fat is associated with a higher risk of developing conditions such as type 2 diabetes, high cholesterol, elevated triglycerides, hypertension, coronary artery disease, hormone-related cancers like breast cancer, and sleep apnea.

WHR indicator WHR is an indicator for distinguishing types of fat distribution. Individuals with high WHR are considered central obesity, while those with low WHR are measured in a standing position with their feet separated by 25-30 centimeters to ensure even weight distribution. The measurement is taken at a key level between the lowest edge of the ribs and the upper edge of the hip bone during steady breathing. Hip circumference is measured at the widest point of the buttocks, aligning with the body’s natural contours. In 1998, WHO recommended that a waist circumference of 94 centimeters for males and 80 centimeters for females in Europe be the appropriate threshold values; The Asian population uses a male waist circumference of 90 centimeters and a female waist circumference of 80 centimeters as the

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threshold values. Asian males with WHR0.90 are classified as central obesity, while females with WHR0.80 are classified as central obesity

4. The hazards of obesity

Obesity can lead to the development and worsening of numerous health issues, significantly reducing quality of life and imposing substantial mental and financial burdens on both society and individuals. Beyond being a disease, obesity is closely linked to many chronic conditions. Obesity itself is not only a disease, but more importantly, it is closely related to many chronic diseases.

Obesity and type II diabetes. Obesity and type II diabetes are separate conditions, yet substantial evidence highlights their close connection. Obesity is a major contributing factor to the development of type II diabetes [4].

Obesity and cardiovascular disease. Before menopause, women typically accumulate fat around their hips and buttocks. However, after menopause, due to a drop in estrogen levels, many women start to store fat around their abdomen, similar to men. This increase in abdominal fat is associated with a higher risk of developing conditions such as type 2 diabetes, high cholesterol, elevated triglycerides, hypertension, coronary artery disease, hormone-related cancers like breast cancer, and sleep apnea.

Obesity and fatty liver. Obesity is strongly linked to fatty liver, with obese individuals being 4.6 times more likely to develop the condition than the general population. The risk is even higher for those with visceral fat obesity compared to those with subcutaneous fat obesity [5].

Obesity and malignant tumors. Obesity is associated with a higher risk of developing certain malignant tumors, including breast cancer, uterine cancer, colorectal cancer, gallbladder cancer, and prostate cancer. Additionally, obesity can lead to sexual dysfunction. Obesity is also linked to an increased incidence of gallstones and can impair the structure and function of the respiratory system, making obese individuals more susceptible to respiratory dysfunction. Research shows that the incidence rate of obstructive apnea syndrome will increase four times as the obesity level increases by one standard deviation. Obese patients are also prone to developing osteoarthritis[7]. Obesity and mortality rate. Obesity can lead to an increase in mortality rate. According to statistics from the United States, if the standard mortality rate is 100%, the mortality rate for those who are overweight by 25% is 128%, and for those who are overweight by 35% -40%, the mortality rate is 150% [6]. There is ample evidence to suggest that weight gain significantly increases mortality rates. The risk of death increases by 1.9 times in the population with a weight exceeding 40% of the average level[4]. Prevention of obesity. Once obesity occurs, treatment is difficult, so the focus is on prevention.1. General prevention Targeting the overall population, by improving dietary structure, promoting appropriate physical activity, and reducing smoking and alcohol consumption, lifestyle changes can ultimately reduce the incidence of obesity related diseases.2. Selective prevention Educate the high-risk population for obesity, make them aware of high-risk factors, and proactively reduce the impact of high-risk factors to prevent such populations from developing obesity.3. Targeted prevention is the main target of individuals who already have high-risk factors for obesity related diseases. The most crucial step in preventing obesity is maintaining a balanced and nutritious diet daily, along with adopting healthy lifestyle habits.

5. The treatment of obesity

The overall goal of treating obesity is to lose weight, maintain long-term weight loss, prevent further weight gain, and reduce various obesity related complications. The treatment principle for obesity emphasizes individual behavior as the main treatment approach, adhering to two basic treatment measures: diet and exercise therapy, supplemented by medication when necessary, and surgical therapy as a last resort.

Behavioral intervention experts, family members, and obese patients need to cooperate and develop food intake plans. To make obese individuals feel better even if they eat less, increase their sense of fullness, be more active without laziness, and have confidence to persist in cooperating with treatment.

A reasonable diet can only lead to weight loss when the number of calories consumed exceeds the intake, mainly by reducing body fat, preventing the accumulation of fat in the body, and removing

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excessive fat deposits. The dietary requirements for obese individuals are daily intake of 1g/kg/d protein, sufficient vitamins and other nutrients such as electrolytes, and can also be satisfied with melons and vegetables to satisfy hunger. High calorie foods such as fast food, convenience foods, and sweets should be avoided, but the calories should not be too low, otherwise adverse reactions such as physical weakness, depression, and hair loss may occur. For asymptomatic individuals with mild obesity, the total calorie intake should be determined based on their weight, age, activity level, and the growth and development needs of children and adolescents. 50% -60% of the total calories are carbohydrates, and 10% -20% should be oil. It is important to consume a variety of foods and not be picky about food. The main food should be a reasonable combination of course and fine grains, while the side dishes should be a combination of meat and vegetables. Eat fewer sweet foods, and not be fully satisfied with each meal. The recommended intake should be 70% -80% [7]. For those with overeating, it is recommended to eat small meals with light flavors to reduce their appetite. They should eat lower calorie and high-volume foods to feel full and maintain their weight or tend to decrease.

Physical exercise should be combined with diet and maintained for a long time, otherwise there may be phenomena such as difficulty in losing weight or rebounding after losing weight. Health monitoring should be conducted before exercise to eliminate diseases of the heart, brain, and kidneys, and to pay attention to the health of the foot joints and other parts. Exercise programs should be suitable for one's age group and in line with one's interests and hobbies. Persisting in exercise is one of the effective methods for treating obesity.

The ideal drug therapy is to reduce weight, improve abnormal body fat distribution, and address obesity related risk factors and complications. Drug therapy is only considered as a short-term supplement when diet and exercise prove ineffective. In summary, obesity is now recognized as one of the major diseases impacting human quality of life in the 21st century. Avoiding obesity is essential for maintaining a healthy life. By understanding the dangers of obesity, we can take it seriously and learn how to prevent it, control our weight through proper nutrition, and ultimately live healthier lives.

Exploratory treatment method: gastric resection. Gastric bypass and other weight loss surgeries, known as bariatric or metabolic surgeries, involve altering the digestive system to aid in weight loss[8]. These procedures are typically considered when diet and exercise have not been effective, or when significant health issues arise due to excess weight. Some bariatric surgeries limit the amount of food you can consume, while others reduce the body’s ability to absorb fat and calories, and some do both. Although bariatric surgery offers many benefits, it is a major procedure with potential risks and side effects. For long-term success, patients must adopt permanent healthy eating habits and maintain regular exercise.

6. Conclusion

As living standards continue to rise, an increasing number of people are affected by obesity. The factors contributing to this epidemic are numerous but not well understood, and there is an ongoing debate about which should be prioritized. Obesity has become a global public health issue, seriously affecting health. Addressing the causes of obesity by implementing comprehensive prevention and control strategies can help lower the incidence of obesity and enhance people’s quality of life. The primary goals of obesity treatment are to achieve weight loss, sustain long-term weight reduction, prevent further weight gain, and minimize obesity-related complications. Although the onset of obesity is complex and its treatment challenging, it is a preventable condition. Effective management and improvement of physical health are essential for individuals to maintain and pursue overall well-being. The world already have many treatment methods available to treat obesity, but they are still many shortcomings. Further research and experimentation are essential to discover more effective treatments for obesity, requiring collaborative global efforts to tackle this issue. Together, these efforts can improve people’s quality of life.

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