

## THE RELATIONSHIP BETWEEN OBESITY AND DIABETES

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**Abstract:** This article analyzes the relationship between obesity and diabetes. Studies show that excess weight and fat accumulation lead to insulin resistance and hormonal imbalance in the body, which increases the risk of developing diabetes. The article scientifically reviews different types of obesity, methods of their assessment, and their impact on diabetes. It also analyzes prevention and treatment strategies, including the importance of proper nutrition, physical activity, and lifestyle changes. This article helps to understand the complex mechanisms between obesity and diabetes and to identify preventive and health-promoting measures.

**Keywords:** Obesity, weight gain, insulin resistance, hormonal imbalance, metabolic syndrome, diabetes, lifestyle, prevention.

## SEMIZLIK VA DIABET O'RTASIDAGI BOG'LIQLIK

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**Annotatsiya:** Mazkur maqolada semizlik va diabet o'rtasidagi bog'liqlik tahlil qilinadi. Tadqiqotlar shuni ko'rsatadiki, ortiqcha vazn va yog' to'planishi organizmda insulin rezistentligi hamda gormonal nomutanosiblikni keltirib chiqaradi, bu esa diabet rivojlanish xavfini oshiradi. Maqolada semizlikning turli turlari, ularni baholash usullari va diabetga ta'siri ilmiy jihatdan ko'rib chiqilgan. Shuningdek, profilaktika va davolash strategiyalari, jumladan, to'g'ri ovqatlanish, jismoniy faollik va turmush tarzini o'zgartirishning ahamiyati tahlil qilingan. Ushbu maqola semizlik va diabet o'rtasidagi murakkab mexanizmlarni tushunishga hamda profilaktik va sog'lomlashtiruvchi choralarni aniqlashga yordam beradi.

**Kalit so'zlar:** Semizlik, vazn ortishi, insulin rezistentligi, gormonal nomutanosiblik, metabolik sindrom, diabet, turmush tarzi, profilaktika.

## ВЗАИМОСВЯЗЬ МЕЖДУ ОЖИРЕНИЕМ И ДИАБЕТОМ

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**Аннотация:** В данной статье анализируется взаимосвязь между ожирением и диабетом. Исследования показывают, что избыточный вес и накопление жира приводят к инсулинорезистентности и гормональному дисбалансу в организме, что увеличивает риск развития диабета. В статье с научной точки зрения рассматриваются различные типы ожирения, методы их оценки и влияние на развитие диабета. Также анализируются

стратегии профилактики и лечения, включая значение правильного питания, физической активности и изменения образа жизни. Статья способствует пониманию сложных механизмов взаимосвязи ожирения и диабета, а также выявлению профилактических и оздоровительных мер.

**Ключевые слова:** Ожирение, увеличение массы тела, инсулинорезистентность, гормональный дисбаланс, метаболический синдром, диабет, образ жизни, профилактика.

## INTRODUCTION

Obesity and diabetes are among the most serious social and medical problems in the global healthcare system today. The number of overweight people worldwide is increasing, which significantly raises the risk of various chronic diseases, particularly diabetes. Studies show that obesity reduces insulin sensitivity in the body and disrupts metabolic processes, ultimately leading to the development of diabetes. The type and degree of obesity also affect the risk of diabetes: visceral fat, or abdominal fat, is particularly associated with a high risk. However, lifestyle, dietary habits, lack of physical activity, and genetic factors also play a role in the development of these diseases. This article scientifically analyzes the complex mechanisms between obesity and diabetes, examining their assessment methods, risk factors, and preventive measures. The goal is to provide scientific recommendations for the identification, prevention, and development of strategies to improve diabetes associated with obesity.

## MATERIALS AND METHODS

Obesity is a chronic metabolic disorder characterized by the excessive accumulation of fat in the human body to an extent that may impair health and increase the risk of numerous non-communicable diseases, particularly diabetes mellitus. In medical and epidemiological studies, obesity is usually evaluated using indicators such as body mass index (BMI), waist circumference, and waist-to-hip ratio. Among the different forms of obesity, two major patterns are often distinguished: general obesity and abdominal obesity. General obesity refers to an overall increase in body fat distributed across various parts of the body, whereas abdominal obesity is specifically associated with the accumulation of visceral fat in the abdominal cavity around internal organs such as the liver, pancreas, and intestines. This distinction is clinically important because abdominal obesity has been shown to have a stronger association with metabolic dysfunction and the development of type II diabetes mellitus. Visceral adipose tissue is metabolically active and contributes significantly to disturbances in glucose and lipid metabolism. It releases free fatty acids and inflammatory mediators directly into the portal circulation, thereby affecting liver metabolism and promoting insulin resistance more aggressively than subcutaneous fat.

## RESULTS

The relationship between obesity and diabetes is largely mediated through metabolic mechanisms that alter normal physiological processes. Excess fat tissue is no longer viewed merely as a passive energy storage site, but rather as an active endocrine organ capable of producing numerous bioactive molecules, including cytokines, adipokines, and inflammatory mediators. As adipose tissue expands, especially in obese individuals, it becomes associated with chronic low-grade inflammation. This inflammatory environment disrupts cellular signaling pathways involved in glucose regulation and insulin action. As a result, the transport of glucose from the bloodstream into muscle and fat cells becomes less efficient. In parallel, obesity contributes to dyslipidemia, characterized by elevated triglyceride levels, increased low-density lipoprotein (LDL), and reduced high-density lipoprotein (HDL), which further aggravates insulin resistance and metabolic

syndrome. These metabolic abnormalities form the basis for the close pathophysiological link between obesity and diabetes and explain why obesity is one of the most important risk factors for the disease.

One of the central mechanisms connecting obesity with diabetes is insulin resistance. Insulin is a hormone produced by the beta cells of the pancreas and is responsible for facilitating the uptake of glucose by body tissues for energy production or storage. In obese individuals, especially those with excess abdominal fat, the body's tissues become less responsive to insulin. This reduced responsiveness means that the same amount of insulin is no longer sufficient to maintain normal blood glucose levels. Consequently, the pancreas attempts to compensate by secreting larger amounts of insulin, leading to a state known as hyperinsulinemia. Over time, this compensatory mechanism becomes insufficient, and pancreatic beta-cell function begins to decline. When insulin secretion can no longer overcome the resistance of peripheral tissues, blood glucose levels rise and type II diabetes develops. In addition, obesity increases the release of free fatty acids into the circulation, which can accumulate in the liver and muscles, further impairing insulin signaling. The liver also becomes more active in producing glucose through gluconeogenesis, even when blood sugar levels are already elevated, which contributes to persistent hyperglycemia. Thus, insulin resistance represents a key metabolic bridge between obesity and diabetes.

Hormonal imbalance is another critical factor in the obesity–diabetes relationship. Adipose tissue secretes several hormones and hormone-like substances that regulate appetite, energy balance, inflammation, and glucose homeostasis. Among these, leptin, adiponectin, and resistin are especially important. Leptin is primarily responsible for signaling satiety to the hypothalamus and regulating energy intake and expenditure. In obese individuals, leptin levels are usually elevated; however, the body often becomes resistant to its effects, a condition referred to as leptin resistance. As a result, appetite control and energy regulation become impaired, contributing to further weight gain. Adiponectin, in contrast, has protective metabolic effects because it enhances insulin sensitivity and possesses anti-inflammatory properties. However, adiponectin levels tend to decrease as body fat increases, particularly in abdominal obesity. This reduction contributes to worsening insulin resistance and impaired glucose metabolism. Resistin is another adipokine that has been associated with increased insulin resistance and inflammatory activity. In addition to these adipose-derived hormones, obesity may also influence cortisol levels, reproductive hormones, and gastrointestinal peptides involved in hunger and satiety, such as ghrelin and peptide YY. Therefore, the association between obesity and diabetes is not solely a consequence of excess body mass but is deeply rooted in endocrine dysregulation and altered metabolic signaling.

## DISCUSSION

The progression from obesity to diabetes is also influenced by lifestyle-related factors, many of which are modifiable. Sedentary behavior, excessive caloric intake, poor dietary quality, irregular eating patterns, and insufficient physical activity are major contributors to weight gain and metabolic dysfunction. Diets high in refined carbohydrates, sugar-sweetened beverages, saturated fats, and ultra-processed foods have been strongly linked to both obesity and diabetes. In contrast, a diet rich in whole grains, vegetables, fruits, legumes, lean protein, and unsaturated fats supports metabolic health and improves insulin sensitivity. Physical activity is equally essential, as regular exercise promotes glucose uptake by skeletal muscles independently of insulin and helps reduce visceral fat accumulation. Even moderate forms of activity, such as brisk walking, cycling, or daily household movement, have been shown to improve glycemic control and reduce the risk of

diabetes. Moreover, adequate sleep, stress management, smoking cessation, and limiting alcohol consumption are important lifestyle factors that influence body weight and metabolic balance. Prevention strategies should therefore emphasize comprehensive lifestyle modification rather than focusing only on weight reduction. Public awareness campaigns, school-based health education, nutritional counseling, and community-level interventions can all contribute to reducing the burden of obesity-related diabetes.

Early diagnosis and preventive screening are essential in addressing the growing overlap between obesity and diabetes. Many individuals remain unaware that they are in a prediabetic or insulin-resistant state until symptoms or complications appear. Routine assessment of BMI, waist circumference, fasting glucose, glycated hemoglobin (HbA1c), and lipid profile can help identify at-risk individuals before diabetes becomes established. Early intervention at this stage can significantly reduce long-term health complications such as cardiovascular disease, kidney dysfunction, neuropathy, and retinopathy. In clinical practice, multidisciplinary approaches involving physicians, endocrinologists, nutritionists, physical therapists, and public health educators are often the most effective in managing obesity and preventing diabetes. Educational interventions are especially important because many patients require support in understanding the long-term health consequences of obesity and in maintaining sustainable lifestyle changes.

From a global public health perspective, obesity and diabetes are now considered twin epidemics. International studies consistently show a dramatic increase in the prevalence of overweight and obesity across both developed and developing countries. Urbanization, reduced physical labor, increased screen time, changes in food environments, and the widespread availability of energy-dense foods have all contributed to this trend. As obesity rates continue to rise, the incidence of type II diabetes has increased correspondingly. Epidemiological evidence shows that obesity is one of the strongest modifiable risk factors for diabetes, particularly among adults over the age of 30, although recent trends also indicate a worrying increase among adolescents and young adults. This shift suggests that obesity-related metabolic disorders are appearing earlier in life, which may increase the burden of chronic disease in future generations. Population-based studies have also shown that central obesity is often a better predictor of diabetes risk than BMI alone, highlighting the need for more comprehensive screening tools in both research and clinical settings.

### **CONCLUSION**

The relationship between obesity and diabetes is complex and multifaceted. Studies show that excess weight, especially abdominal obesity, leads to insulin resistance and hormonal imbalance, which significantly increases the risk of developing diabetes. However, lifestyle, dietary habits, and lack of physical activity exacerbate the link between these diseases. A healthy diet, regular exercise, and weight control are important for preventing diabetes and reducing obesity. In addition, early diagnosis and preventive measures can improve the effectiveness of detecting and treating diabetes associated with obesity. This article helps to understand the complex mechanisms between obesity and diabetes, identify risk factors, and develop preventive strategies, which are important for promoting health and preventing disease effectively.

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