



The Burden of Adult Obesity: Exploring Health Consequences and Lifestyle-Based Intervention Approaches

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Abstract

Background: Obesity in adulthood has emerged as a major global public health concern and is strongly associated with the development of multiple chronic diseases. It is now widely recognized as a chronic, multifactorial condition influenced by genetic predisposition, metabolic imbalances, neuroendocrine regulation, and behavioural patterns such as dietary habits and physical inactivity. Beyond these individual determinants, socio-environmental influences including urbanization, availability of calorie-dense foods, reduced opportunities for physical activity, and socioeconomic disparities have further contributed to its widespread prevalence. Over the past few decades, the prevalence of adult obesity has risen sharply worldwide, affecting both developed and developing nations.

This review synthesizes current literature on the health consequences of adult obesity, emphasizing its strong associations with cardiovascular diseases, type 2 diabetes mellitus, metabolic syndrome, certain cancers, musculoskeletal disorders, reproductive complications, mental health problems, and premature mortality. In addition to its impact on physical health, obesity significantly impairs psychosocial well-being and quality of life, increasing the burden on healthcare systems. The aim of this article is to examine the effects of adult obesity on health and well-being and to discuss strategies for achieving and sustaining long-term weight management through lifestyle modification, diet, and policy-level approaches.

Method: This review is based on a comprehensive search of peer-reviewed articles, reports, and guidelines from databases such as PubMed, Google Scholar, and WHO resources. Relevant studies addressing adult obesity, its health impacts, and weight-management strategies were identified, reviewed, and synthesized to develop this paper.

Key words: Adult obesity, Chronic disease, Non-communicable diseases, Weight loss, Weight management strategies, Public health, Effect.

I. INTRODUCTION

Overweight refers to excessive fat accumulation, while obesity is a chronic and complex disease caused by excessive body fat that can harm health [1]. It is marked by elevated cholesterol and fatty acid levels, metabolic energy imbalance, and insulin resistance. The condition involves excessive accumulation of adipose tissue caused by both an increase in fat cell size (hypertrophy) and number (hyperplasia) [2]. According to the World Health Organization (WHO, 2016), nearly 2 billion adults worldwide are overweight, with over 600 million classified as obese. About 40% of adults were overweight and nearly 15% were obese in 2016, marking a threefold increase in global obesity rates since 1975. If this trend continues, by 2025, one-third of the world's adults may be overweight and over 1 billion obese [1]. Obesity is assessed using Body Mass Index (BMI), calculated by dividing weight (kg) by height squared (m²). A BMI of 30 or more indicates obesity, though it is only a screening tool as it does not precisely reflect body fat levels. Obesity also places a significant economic burden on healthcare systems [3].

With its rapidly increasing prevalence, complex causes, and severe impacts on both health and the economy, obesity has become a major global public health concern, strongly associated with serious conditions such as cardiovascular disease, diabetes, hypertension, and mental health problems etc [4]. Obesity is most commonly caused by a combination of excessive calorie intake, insufficient physical activity, and genetic predisposition [5]. Evidence suggests that some individuals gain weight despite eating very little due to a slower metabolic rate. The primary treatments for obesity include a balanced diet and regular physical exercise. When these methods are ineffective, anti-obesity medications may be used to suppress appetite or reduce fat absorption. In severe cases, surgical interventions or intragastric balloon procedures are performed to decrease stomach volume or shorten bowel length, resulting in early satiety and reduced nutrient absorption [6]. Even a modest 5% reduction in body weight can greatly improve overall health and reduce related risks [4].

II. METHODOLOGY

This review was conducted by systematically collecting and analysing published literature on adult obesity and its associated health consequences. A comprehensive search was carried out in databases such as PubMed, Google Scholar, ScienceDirect, and official reports from organizations including the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC). Keywords such as “adult obesity,” “chronic diseases,” “non-communicable diseases,” “Weight loss,” “weight management,” and “public health” were used to identify relevant studies. Articles published primarily between 2000 and 2025 were considered to ensure both historical perspective and current evidence. Studies that examined the prevalence, pathophysiology, health consequences, and treatment strategies of adult obesity were included, while irrelevant or duplicate papers were excluded. Findings were synthesized to highlight the association between obesity and various health conditions, alongside effective prevention and management approaches.

III. CLASSIFICATION

Obesity refers to the excessive accumulation of body fat beyond normal physiological levels. In young adults, body fat typically constitutes about 12–20% of total body weight in males and 20–30% in females. When body fat exceeds 25% in men and 33% in women, it is generally classified as obesity (Table 1).

Table 1. Body fat levels of men and women

	Body fat%		
	Normal	Overweight	Obese
Men	15-16	>22	>25
Women	18-32	>32	>35

With advancing age, fat mass tends to increase while lean body mass declines, resulting in a higher overall percentage of body fat even among individuals whose total body weight remains relatively stable [7]. In clinical practice, **Body Mass Index (BMI)** has become the most widely used and reliable method for assessing obesity, as it correlates well with total body fat, morbidity, and mortality, and is easy to calculate. A **BMI of 25 kg/m² or above** indicates an increased risk of obesity-related diseases such as type 2 diabetes, hypertension, and cardiovascular disorders. Health risks begin to rise from a BMI of **23 kg/m²** and escalate progressively with higher BMI levels — **overweight (25.0–29.9 kg/m²)**, **class I obesity (30.0–34.9 kg/m²)**, **class II obesity (35.0–39.9 kg/m²)**, and **class III or severe obesity (≥40 kg/m²)**. Alarminglly, more than **80 % of deaths** associated with obesity-related complications occur among individuals with a BMI of **30 kg/m² or higher** [1][8].

Table 2. proportion of disease prevalence attributable to obesity.

Disease	Prevalence (%)
Type 2 diabetes	61
Hypertension	17
Coronary heart disease	17
Gallbladder disease	30
Uterine cancer	34
Breast Cancer	11
Colon Cancer	11

The assessment and classification of obesity involve not only the Body Mass Index (BMI) but also waist circumference, biochemical markers of metabolic dysfunction, and clinical evidence of obesity-related disorders, providing a more comprehensive evaluation. Ethnic and demographic variations also influence classification; for example, Asian populations tend to develop cardiometabolic risks at lower BMI levels compared to Caucasians, leading to region-specific guidelines that define obesity as BMI ≥25 kg/m² in many Asian countries [9].

IV. ETIOLOGY OF OBESITY

The etiology of obesity is multifactorial, involving complex interactions between genetic, hormonal, behavioural, and environmental factors. Fig. 1. show the multifactorial causes of obesity.



Fig. 1. Main causes of obesity

Adults presenting with obesity should be carefully evaluated for potential underlying causes, including genetic or syndromic obesity, hypothyroidism, Cushing syndrome, polycystic ovarian syndrome (PCOS), hypogonadism, growth hormone deficiency, and hypothalamic obesity. Genetic forms are often characterized by early onset, dysmorphic features, hyperphagia, behavioural abnormalities, and a positive family history. In addition to these primary causes, several secondary and contributing factors play a significant role, such as medication use (psychiatric drugs, corticosteroids, insulin, β -blockers), inadequate sleep, crash dieting, smoking cessation, alcoholism, and psychological conditions including chronic stress, binge-eating disorder, and depression. Comprehensive assessment and management of these underlying and contributory factors are essential for effective, individualized treatment and may also mitigate the social stigma and psychological burden associated with obesity [10][11][12].

V. HEALTH CONSEQUENCES OF OBESITY

Obesity represents a major global health challenge with profound medical, psychological, and socioeconomic implications. It is a central risk factor for a wide range of chronic diseases and functional impairments. Excess adiposity adversely affects nearly every organ system, leading to a cascade of metabolic, hormonal, and cardiovascular complications. Among the most significant comorbidities are type 2 diabetes mellitus, hypertension, dyslipidemia, coronary artery disease, stroke, and metabolic syndrome, the latter being characterized by abdominal obesity, insulin resistance, impaired glucose tolerance, and abnormal lipid profiles. Hormonal and endocrine dysfunctions also play a critical role in obesity-related morbidity. Hypothyroidism slows metabolism, promoting fat accumulation, while Cushing's syndrome elevates cortisol and insulin levels, enhancing fat deposition and appetite. Polycystic ovarian syndrome (PCOS) similarly contributes to obesity through hyperinsulinemia and hormonal imbalance. Additionally, obstructive sleep apnea (OSA), resulting from fat deposition around the neck, leads to sleep disruption, hypoxia, and increased cortisol levels that further impede weight management. Excess fat deposition also contributes to obstructive sleep apnea, osteoarthritis, fatty liver disease, infertility, and certain cancers. In severe cases, congestive heart failure and renal dysfunction may cause fluid-related weight gain. Beyond physical health, obesity imposes profound psychological and social burdens, including low self-esteem, depression, and social stigmatization. Collectively, these complications highlight obesity as a multifactorial disorder requiring comprehensive, individualized management strategies to address both its biological and emotional dimensions [11][12][13]

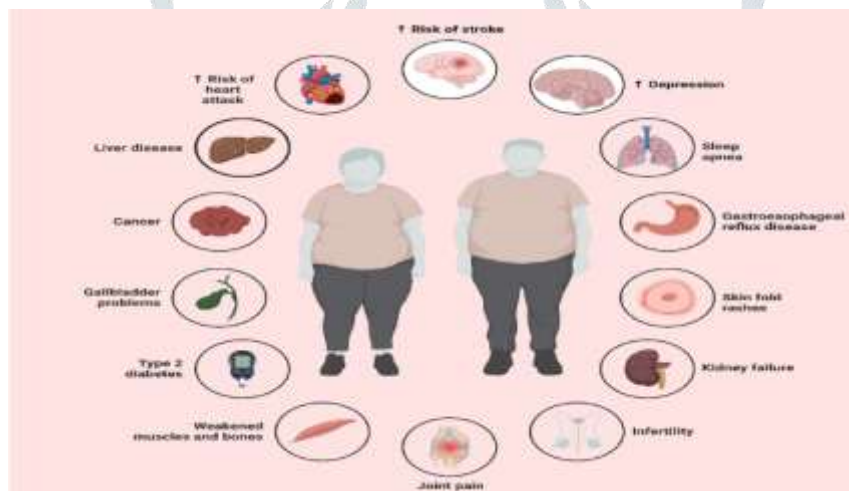


Fig. 2. Highlights the expensive impact of obesity on various organs.

- Cardiovascular Consequences of Obesity

Obesity has profound effects on cardiovascular health, with hypertension being one of the earliest and most common outcomes. Excess body weight increases blood volume and cardiac output, activating the renin–angiotensin–aldosterone system (RAAS) and the sympathetic nervous system, which elevate blood pressure and contribute to left ventricular hypertrophy and heart failure. Additionally, obesity promotes systemic inflammation and atherosclerosis, predisposing individuals to coronary artery disease (CAD)—particularly through abdominal or visceral fat accumulation, which greatly heightens cardiovascular risk. Obesity also increases the likelihood of both ischemic and hemorrhagic strokes, primarily due to hypertension, endothelial dysfunction, and a pro-inflammatory state. Collectively, these mechanisms establish obesity as a critical determinant of cardiovascular morbidity and mortality, emphasizing the need for early prevention and metabolic control [13][14][15][16][17].

- Type 2 diabetes mellitus Consequences of Obesity

Obesity is the most significant risk factor for the development and progression of type 2 diabetes mellitus (T2DM) across all age groups. Excess adiposity induces insulin resistance, hyperinsulinemia, and chronic low-grade inflammation, forming the core pathophysiological link between the two disorders. Individuals with T2DM often experience difficulty in weight reduction due to factors such as hyperinsulinemia, reduced glucosuria, use of obesogenic antidiabetic medications, and metabolic adaptations that conserve energy. Clinical evidence shows that moderate and sustained weight loss through a combination of dietary modification, physical activity, and behavioural therapy significantly improves glycemic control, enhances insulin sensitivity, and reduces medication dependency. Thus, targeting obesity remains a central strategy in both the prevention and management of T2DM, emphasizing the need for personalized, lifestyle-focused, and pharmacologic interventions that promote weight reduction [18][19][20].

- **Metabolic disorder Consequences of Obesity**

Obesity profoundly disrupts metabolic homeostasis and serves as a key determinant of multiple metabolic disorders. Excess adipose tissue, particularly visceral fat, induces chronic low-grade inflammation and hormonal dysregulation, leading to insulin resistance and impaired glucose utilization. These alterations increase susceptibility to type 2 diabetes, dyslipidemia, hypertension, and non-alcoholic fatty liver disease (NAFLD). Central obesity forms the core of metabolic syndrome, which is characterized by hyperglycemia, elevated triglycerides, reduced HDL cholesterol, and increased blood pressure—factors that collectively heighten cardiovascular risk. NAFLD, the hepatic component of metabolic syndrome, exacerbates insulin resistance and accelerates metabolic decline. Moreover, obesity is linked with secondary conditions such as gallstones, gout, sleep apnea, polycystic ovary syndrome (PCOS), and osteoarthritis. Evidence suggests that sustained weight reduction through dietary regulation and physical activity significantly improves metabolic parameters and mitigates the risk of obesity-associated complications [13][21][22][23].

- **Musculoskeletal Consequences of Obesity**

Obesity exerts significant adverse effects on the musculoskeletal system, contributing to disorders such as osteoarthritis, lower back pain, and gout. Excess body weight increases mechanical stress on weight-bearing joints like the knees and hips, accelerating cartilage degeneration and inflammation. Osteoarthritis is the most prevalent obesity-related joint disease, resulting from both biomechanical overload and obesity-induced low-grade systemic inflammation. Similarly, obesity alters spinal biomechanics, leading to intervertebral disc degeneration and chronic lower back pain. Gout, another common condition, arises due to elevated uric acid production and deposition of urate crystals in joints, a process aggravated by excess adiposity. The cumulative burden of these disorders significantly impairs mobility, quality of life, and increases healthcare costs. Evidence suggests that weight reduction and lifestyle modification not only relieve musculoskeletal symptoms but also slow disease progression, underscoring the importance of obesity management in maintaining musculoskeletal health [13][24][25].

- **Cancer Related Obesity**

Obesity has emerged as a significant risk factor for several types of cancer. Epidemiological studies reveal that for every 5 kg/m² increase in body mass index (BMI), cancer mortality rises by approximately 10%. The cancers most strongly associated with obesity include breast, endometrial, prostate, colon, and gallbladder cancers, many of which have hormonal bases. Adipose tissue functions as an active endocrine organ, where the enzyme aromatase converts adrenal androstenedione into estrone, increasing circulating estrogen levels that promote tumor growth in hormone-sensitive tissues. Additionally, obesity-related insulin resistance, chronic inflammation, and altered adipokine signalling further contribute to carcinogenesis. Evidence from bariatric surgery studies indicates that sustained weight loss reduces cancer incidence and mortality, particularly among women. Understanding these biological pathways reinforces the importance of obesity prevention and weight management in cancer risk reduction [13][26][27].

VI. MANAGEMENT AND PREVENTION STRATEGIES OF OBESITY

Effective management and prevention of obesity require a comprehensive, multidisciplinary approach that emphasizes lifestyle modification, dietary interventions, and behavioural strategies, along with public health measures to address societal risk factors.

- i. **Lifestyle Management**
 - a) **Physical Activity:** Regular physical activity is a cornerstone of both obesity prevention and treatment. Engaging in aerobic exercises such as brisk walking, cycling, or swimming helps increase energy expenditure, reduce visceral fat, and improve cardiovascular and metabolic health. Current guidelines from the Centers for Disease Control and Prevention (CDC) recommend that adults achieve at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity activity per week, coupled with muscle-strengthening exercises on two or more days weekly. Exercise also enhances insulin sensitivity, supports weight maintenance after weight loss, and improves mental well-being, reducing risks of depression and anxiety commonly observed in obese individuals.
 - b) **Behavioural Therapy:** Behavioural interventions play a pivotal role in achieving sustainable weight loss. Techniques such as self-monitoring of diet and physical activity, goal-setting, cognitive restructuring, stress management, and stimulus control have proven effective in supporting long-term weight management. Structured programs offering at least 12–14 counselling sessions over six months demonstrate significant improvements in weight reduction, cardiovascular risk factors, and adherence to healthy lifestyle behaviours.
- ii. **Dietary Interventions**
 - a) **Calorie Reduction:** Creating a negative energy balance by reducing caloric intake is fundamental to weight loss. Approaches include portion control, limiting consumption of energy-dense and processed foods, and increasing the intake of nutrient-rich, low-calorie foods such as fruits, vegetables, and whole grains. Even modest weight loss of 5–10% of body weight can improve metabolic parameters, blood glucose control, lipid profiles, and blood pressure.
 - b) **Balanced Diets:** Adopting dietary patterns that emphasize lean proteins, whole grains, healthy fats, and micronutrient-rich foods has proven beneficial. Evidence supports the use of the Mediterranean and Dietary Approaches to Stop Hypertension (DASH) diets for weight management and cardiovascular risk reduction. These diets reduce inflammation, improve insulin sensitivity, and promote satiety, thereby supporting adherence.
 - c) **Meal Planning:** Structured meal planning encourages consistent dietary habits, reduces impulsive eating, and ensures nutritional adequacy. Tools such as MyPlate or food diaries assist individuals in monitoring calorie intake, balancing macronutrients, and making informed food choices.
- iii. **Prevention Strategies**

- a) Early Intervention: Identifying at-risk individuals—such as those with overweight, family history of obesity, or sedentary lifestyles—and implementing early preventive measures can curb progression to obesity and its complications.
- b) Community and Policy Initiatives: Public health strategies promoting access to healthy foods, safe recreational spaces, and active commuting options create environments conducive to maintaining a healthy weight. School-based nutrition programs, workplace wellness initiatives, and urban planning policies targeting physical activity and dietary quality are integral to prevention.
- c) Education and Awareness: Increasing public knowledge about the health risks of obesity, benefits of physical activity, and the importance of balanced diets empowers individuals to adopt and maintain healthier behaviours. Awareness campaigns also help reduce social stigma associated with obesity, encouraging people to seek early intervention and treatment [28][29][30][31].

VII. SUMMARY

Adult obesity is a major global health crisis characterized by excessive fat accumulation that disrupts metabolic and physiological balance. It arises from a combination of sedentary lifestyles, high-calorie diets, genetic predisposition, and environmental influences. Obesity is a leading risk factor for numerous chronic diseases, including type 2 diabetes mellitus, hypertension, coronary artery disease, and stroke. It also contributes to metabolic syndrome, dyslipidemia, and non-alcoholic fatty liver disease, intensifying systemic inflammation. Musculoskeletal disorders such as osteoarthritis, gout, and lower back pain result from mechanical stress on weight-bearing joints, while hormonal and metabolic changes increase the risk of several cancers, notably breast, colorectal, and endometrial cancers. In addition to physical illness, obesity is linked to psychological distress, social stigma, and poor quality of life.

Prevention and management require comprehensive, evidence-based strategies. Lifestyle modification—including balanced nutrition, portion control, regular physical activity, and adequate sleep—is fundamental. A diet rich in fruits, vegetables, whole grains, and lean proteins, with reduced intake of saturated fats and refined sugars, supports weight maintenance. Behavioural counselling, community awareness, and public health policies promoting active living and healthy food environments are also essential. Early intervention and sustained lifestyle management remain key to reversing the obesity epidemic.

VIII. CONCLUSION

Obesity in adulthood represents a multifactorial and progressive disorder with profound metabolic, cardiovascular, musculoskeletal, and psychosocial consequences. Its escalating prevalence underscores the urgent need for integrated prevention and management strategies. Evidence suggests that sustained lifestyle interventions—comprising balanced nutrition, regular physical activity, and behavioural therapy—are the most effective means of mitigating obesity and its associated morbidities. Early identification of at-risk individuals, along with community-level public health initiatives, can further enhance prevention efforts. Addressing obesity as a chronic disease through comprehensive, evidence-based strategies is essential for improving population health and long-term quality of life.

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