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REDUCING OBESITY RISK: PREVENTION STRATEGIES AND INFLUENCING FACTORS

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Abstract: Obesity, recognized as a chronic and relapsing disease, represents a significant public health issue with a prevalence that continues to rise. Worldwide, 16% of adults over the age of 18 are classified as obese, while 43% are considered overweight. The aim of this work is to highlight the urgent and comprehensive need to address this global challenge, which has profound implications for health systems and demands more effective political and economic decisions by governments. Additionally, it calls for improved communication with and motivation of patients, more effective treatment methods, and efforts to prevent stigmatization, all of which are crucial to ensuring successful treatment outcomes for obese individuals. The increasing prevalence of obesity-related conditions across all age groups necessitates the adoption of new public health measures and supportive actions. Treatment effectiveness and safety must be founded on an individualized approach, which requires consideration of the patient's unique characteristics—such as age, comorbidities, and personal preferences—alongside the properties of medications, particularly their weight-reduction efficacy and safety profile.

Keywords: obesity, overweight, Body Mass Index, prevalence, physical activity
Field: Medical Sciences and Health

1. INTRODUCTION

Obesity is a chronic, relapsing disease and a major risk factor for other non-communicable diseases, including cardiovascular diseases, diabetes, and certain types of cancer (Lim et al., 2024). The global trend of rising obesity rates is alarming, underscoring the vast medical, social, and economic burden it creates and highlighting the urgent need to mobilize all resources to combat this disease. Factors such as high consumption of energy-dense foods, trans fats, and saturated fats, along with increasingly sedentary lifestyles, have significantly contributed to the worldwide increase in obesity rates. People with lower incomes, both women and men, are more likely to be obese, which exacerbates health inequalities (OECD, 2023). The causes of obesity can be categorized as endogenous—such as genetic predisposition, epigenetics, family background, physiological conditions (e.g., pregnancy), and endocrine disorders—and exogenous, including environmental factors, occupation, lifestyle, caloric intake, hypothyroidism, hypercorticism, hypogonadism, acromegaly, as well as lifestyle elements like eating habits, reduced physical activity, smoking cessation, brain injuries, brain tumors, insomnia, depression, anxiety, psychosis, and more (National Guide to Good Clinical Practice, 2022). Rates of overweight and obesity continue to climb among adults and children alike. Between 1990 and 2022, the global prevalence of obesity among children and adolescents aged 5 to 19 quadrupled from 2% to 8%, while the rate among adults aged 18 and over rose from 7% to 16% (WHO, 2024).

In Hungary, obesity and its associated health and economic impacts have posed a substantial challenge in recent decades. Currently, 68% of the Hungarian population is classified as overweight or obese, the highest rate in Europe and the fifth highest globally, following Mexico, the USA, Costa Rica, and New Zealand. The increasing rate of childhood obesity is not only a concern in Hungary but also reflects a broader trend across Europe (Szilágyi et al., 2024).

In 2019, 40.5% of the Serbian population aged 15 and over had a normal weight, while more than half (57.1%) were either overweight or obese, with 36.3% classified as overweight and 20.8% as obese. A significantly higher percentage of obese individuals was recorded in Vojvodina (25.4%) and southern and eastern Serbia (23.1%), particularly among those aged 45 to 84, individuals with lower incomes (25.7%), and those residing in suburban areas (23.6%) (Statistical Office of the Republic of Serbia, 2021).

Bulgaria has made limited progress toward achieving its targets for nutrition-related non-communicable diseases (NCDs): 26.3% of women over 18 and 28.3% of adult men are living with obesity. The prevalence of obesity in Bulgaria is higher than the regional average of 25.3% for women and 24.9%

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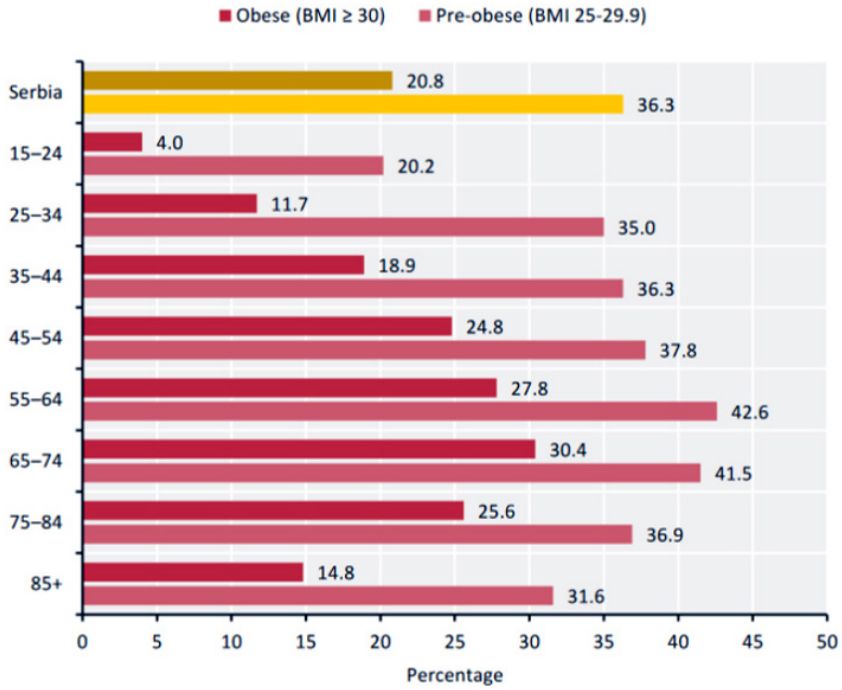
for men. Among children under five, 6.9% are obese, though indicators suggest that Bulgaria is on track to prevent further increases in this rate (The Global Nutrition Report, 2022a).

North Macedonia has also shown limited progress toward its goals for nutrition-related NCDs: 23.9% of women over 18 and 25.1% of adult men are living with obesity. The obesity rate among women is below the regional average, but for men, it is above. The prevalence of obesity in children under five is 11.2%, though North Macedonia is working to prevent this rate from rising (The Global Nutrition Report, 2022b).

Graph 1. Obese and pre-obese population by age groups



Source: Statistical Office of the Republic of Serbia, 2021.

Childhood obesity poses a lifelong health risk, contributing to the development of numerous diseases. Children with obesity often face social disadvantages, have lower self-esteem, and tend to be less successful academically. Alarming rates of overweight and obese children are recorded across Europe, with Croatia ranking high among Mediterranean European countries at seventh place, where one in three children is overweight or obese. The highest rates of childhood overweight and obesity are found in the Adriatic region, with 36.9% of children affected.

The continued increase in obesity prevalence is closely linked to dietary patterns. While there is only a weak correlation with changes in fat and carbohydrate intake, there is a strong association with the widespread consumption of ultra-processed foods (UPF), which are typically high in calories, salt, sugar, and fat but low in whole foods. Sugar intake, particularly from sugar-sweetened beverages (SSB), is especially significant, as these drinks lead to higher energy intake and weight gain due to their relatively low cost and the rising popularity of fast food establishments (Temple, 2022).

Petakov (2024) highlights obesity as a major risk factor for several types of cancer and notes its association with poorer treatment outcomes and higher mortality in malignant diseases. Observational studies indicate that weight reduction in humans, as well as caloric restriction in animal models, diminishes the cancer-promoting effects of obesity, especially in breast and prostate cancer.

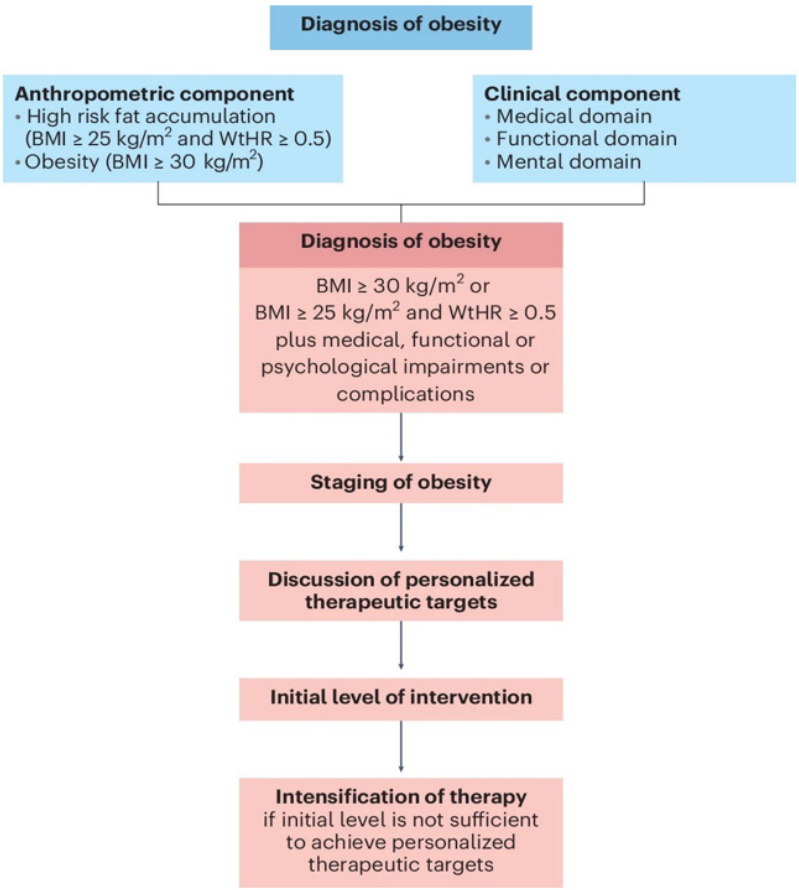
2. CLASSIFICATION OF OBESITY

Overweight and obesity are defined as abnormal or excessive fat accumulation that poses health risks. A body mass index (BMI) above 25 is classified as overweight, while a BMI above 30 is classified as obese (Nuttall, 2015; Flegal et al., 2019). In 2019, it was estimated that around 5 million deaths from non-communicable diseases (NCDs) were attributed to an elevated BMI (WHO, 2024). However, it is important to note that BMI has low sensitivity, with significant inter-individual variability in body fat percentage for

any given BMI value. This variability is partly due to factors like age, gender, and ethnicity: for example, Asians typically have a higher body fat percentage than whites at the same BMI. Solely relying on BMI to assess obesity prevalence could limit the effectiveness of future interventions for obesity prevention and control (Chooi et al., 2018).

Additional indices based on anthropometric measurements are still in use, such as waist circumference (WC), waist-to-height ratio (WtHR), and abdominal bioimpedance, along with equations for estimating visceral adipose tissue (VAT) (Itani El & Ghoch, 2024). The European Association for the Study of Obesity (EASO) has recommended a new framework for diagnosing and treating obesity in adults, proposing a WtHR ≥ 0.5 for individuals with a BMI between 25 kg/m² and 29.9 kg/m² as an indicator of high adiposity across all ethnic groups and both sexes. However, the WtHR cutoff of ≥ 0.5 has not been widely accepted, as its accuracy varies across different populations.

Figure 1. A new framework for the diagnosis, staging and management of obesity in adults



3. DIAGNOSIS AND TREATMENT OF OBESITY

Diagnosis of overweight and obesity is made by measuring a person's weight and height and calculating their body mass index (BMI): weight (kg)/height (m²). BMI acts as an indirect indicator of body fat, while additional measurements, like waist circumference, can help confirm a diagnosis of obesity. BMI categories used to define obesity vary by age and sex for infants, children, and adolescents.

APPROACHES/MEASURES WHICH HAVE BEEN UNDERTAKEN	EXPLANATIONS/REASONS
Improving communication and motivation	Motivation is essential for treatment adherence, and long-term willingness to change will be assessed using motivational interviewing.
Preventing stigmatization in healthcare	Stigmatization is common in healthcare and can lead to increased eating disorders, worsening obesity, and higher rates of depression, suicidal thoughts, and, in severe cases, suicide. Motivational interviewing can help reduce stigmatization.
Measuring waist circumference	Waist circumference is a strong indicator of visceral fat and a valuable predictor of cardiometabolic diseases. Monthly measurements are recommended to monitor visceral fat reduction and manage body weight changes.
Treatment of comorbidities	Comorbidities, particularly cardiometabolic diseases, must be prioritized in treatment to reduce mortality.
Engaging a multidisciplinary team	A multidisciplinary team, working collaboratively, is significantly more effective.
Monitoring body mass reduction	A 5-10% reduction in initial body weight over three to six months is sufficient to lower comorbidities.
Increasing physical activity	Physically active patients have lower overall mortality than sedentary patients with normal body mass. Regular physical activity also reduces the likelihood of regaining weight and minimizes fluctuations after weight loss.
Preventing body mass fluctuations	Following lean mass loss, focus should shift to maintaining the achieved weight reduction and preventing weight regain and fluctuation. Patients should be measured approximately every two weeks; if they gain 3-4 *kg* in a short time, they should consult their primary doctor for further treatment. .

Source: National Guide to Good Clinical Practice, 2022.

Obesity significantly increases the risk of developing non-communicable diseases. Evidence suggests that obesity, particularly in middle and later life, is a major risk factor for cognitive decline, both directly and indirectly, as related hypertension and type 2 diabetes accelerate vascular changes in the brain. Weight gain also poses a considerable challenge for individuals with any level of respiratory impairment, increasing the risk of sleep apnea due to factors like neck circumference and a tendency to obstruct breathing (Knežević & Jandrić-Kočić, 2023).

Laboratory diagnostics play an essential role for physicians in diagnosing obesity and monitoring therapy effects. Determining biochemical parameters is useful in preventing obesity and its related complications. Routinely available biochemical tests are commonly used to diagnose obesity and track the impact of treatment (Milinković et al., 2024).

In many cases, obesity diagnosis relies on BMI cutoffs, which may not account for the impact of adipose tissue distribution and function on disease severity. Therapeutic approaches are primarily based on anthropometric measurements rather than a thorough clinical assessment of the individual, as noted by Busetto et al. (2024).

Treatment involves various interventions, including dietary plans, structured physical activity, behavioral therapy, medication, and/or surgery (National guide for primary care physicians, 2004: 8).

The use of new anti-obesity drugs is on the rise in nearly all European countries. In two-thirds of these countries, however, anti-obesity medications are not covered by health insurance. Slovenia and Denmark are exceptions, reimbursing the costs for most anti-obesity drugs, while in the Netherlands, Setmelanotide is uniquely funded by the Health Insurance Fund (Stević et al., 2024).

In the Republic of Serbia, six drugs have been approved for long-term obesity treatment: orlistat, phentermine/topiramate, naltrexone/bupropion, liraglutide, semaglutide, and tirzepatide. Most of these drugs work by promoting satiety and reducing appetite. Semaglutide and tirzepatide have shown the highest efficacy in reducing body weight (>10%). While all obesity medications have demonstrated positive effects on cardiometabolic risk factors, only liraglutide and semaglutide have been proven to reduce the risk of major cardiovascular events (Sićović & Micov, 2024).

Curcic et al. (2024) examined the relationship between environmental pollutants and obesity, aiming

to provide insight into the complex factors driving the obesity epidemic. Anthropogenic activities such as industrialization, urbanization, agriculture, and transportation have significantly increased environmental pollution. Certain pollutants, termed "obesogens," are believed to disrupt lipid metabolism and thereby promote obesity. The most notable obesogens include bisphenol A (found in plastics, food packaging, and thermal receipt paper), phthalates (used in plastics, personal care products, and food packaging), toxic metals and pesticides (used in agriculture), as well as persistent organic pollutants and pharmaceutical waste.

4. LIFESTYLE CHANGES AND PHYSICAL ACTIVITY

Overweight, obesity, and their related diseases can largely be prevented and managed. By adopting preventive measures, individuals can lower their risk. These measures include the following (WHO, 2024):

- Promote healthy weight gain during pregnancy.
- Practice exclusive breastfeeding for the first six months and continue breastfeeding up to 24 months or longer.
- Encourage healthy behaviors in children related to nutrition, physical activity, limited sedentary time, and sufficient sleep.
- Limit screen time.
- Reduce the intake of sweetened beverages and high-calorie foods.
- Decrease total fat and sugar intake while increasing consumption of fruits and vegetables.
- Engage in regular physical activity.

In most OECD countries, obesity rates continue to rise, with 54% of adults classified as overweight and 18% as obese. While a healthy diet and regular physical activity are essential, only 15% of adults, on average, consume five or more servings of fruits and vegetables daily, and just 40% engage in at least 150 minutes of moderate-to-vigorous physical activity weekly (OECD, 2023).

Regular physical activity helps reduce visceral fat and lowers the risk of associated comorbidities. About 300 minutes per week of moderate-intensity activity, or 150 minutes of more intense exercise, is sufficient to mobilize visceral fat. This activity can be broken down into segments of at least 10 minutes to achieve a positive metabolic effect (National Guide to Good Clinical Practice, 2022).

Developing, adopting, and sustaining healthy lifestyle and eating habits begins in the family environment and continues in institutions where children spend much of their day outside parental supervision. Schools, in particular, should be prioritized as key settings for improving children's nutrition and fostering an environment that supports healthy eating (Dejanović et al., 2024).

5. CONCLUSION

Obesity is a complex, multifactorial, non-communicable disease with a global upward trend. It is closely linked to numerous health problems, increasing the risk of both morbidity and mortality. In this context, early detection and treatment are crucial for achieving favorable outcomes. Although obesity is classified as a chronic disease, there are still no well-defined guidelines that, as with other chronic diseases, align with clinical processes and expected results. Past efforts to reduce obesity prevalence have not met expectations, highlighting the need for a multidisciplinary approach. This approach would enable policymakers to develop more effective, proactive measures and interventions, particularly for children. In children, the consequences of being overweight or obese may not appear immediately but become evident later, when successful treatment is more challenging. Effective obesity treatment requires a broader approach than simply focusing on weight loss; it must prioritize identifying and mitigating risks while simultaneously addressing related diseases and complications.

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