United European Gastroenterology Journal

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NEWS ARTICLE OPEN ACCESS

The Growing Burden of Obesity: Addressing a Global Public Health Challenge

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Received: 17 December 2024 | **Revised:** 27 January 2025 | **Accepted:** 28 January 2025

Keywords: modifiable risk factors | NCDs | noncommunicable diseases | obesity | overweight | prevention strategies

1 | Epidemiology

The growing burden of obesity in Europe represents a significant public health concern that jeopardizes social and economic advancement globally.

Stopping the obesity epidemic is one of the 2025 Global Nutrition Targets (for children under 5) and one of the Targets for Noncommunicable Diseases (NCDs) reduction for adolescents and adults. Obesity has significant impacts on well-being and quality of life and is a major risk factor in many other NCDs, including diabetes, cardiovascular disease and cancer [1].

The prevalence of overweight and obesity (defined as body mass index in adults of $\geq$ 25 kg/m^2) is anticipated to rise from 38% (approximately 2.6 billion people) in 2020 up to 50% (around 4 billion people) by 2035, excluding children (< 5 years old) [2]. Besides, overweight and obesity are estimated to cost the global economy over US$4 trillion of potential income in 2035, nearly 3% of the current global gross domestic product (GDP), which includes both the healthcare costs of treating obesity and its consequences and the impact of high body mass index (BMI) on economic productivity [2].

Overweight and obesity are also common problems for children and adolescents. Specifically in the World Health Organization (WHO) European region, alarming rates are found in the 5–9 years age group, where one in eight children (11.6%) live with obesity and almost one in three (29.5%) are overweight (including obesity); these values decrease to 7.1% and 24.9%, respectively, in the 10–19-year - old age group [3].

Globally, the rise in obesity rates has been observed in all countries, with the highest increases in lower-income countries [2]. At the European level, the highest prevalence was found in the Mediterranean and eastern European countries [3]. The COVID-19 pandemic worsened the obesity epidemic, specifically in pediatric age groups, exacerbating dietary and sedentary behaviors [2].

If an inaction scenario persists, none of the countries in the EU region member States are on track to reach the target of halting the rise in obesity by 2025.

In the context of gastroenterology, the obesity epidemic places a heavy burden specifically on gastrointestinal (GI) healthcare providers. There is a need to raise awareness of overweight and

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obesity in gastroenterology. The problem of obesity often goes unnoticed in routine clinical practice, while it may significantly affect the clinical course of the disease and treatment outcomes of various GI diseases [4, 5].

1.1 | Modifiable Risk Factors

Although there are genetic, epigenetic and metabolic mechanisms that influence obesity propensity, environmental factors are of great relevance to preventing or reducing it [6].

Prevention of obesity starts even before birth and during prenatal life. Maternal factors such as body mass index at the time of conception and diet and lifestyle during pregnancy, influence "early metabolic programming" that may affect modulation of obesity risk in the newborn. Breastfeeding may reduce overweight and obesity risk by 13% [7]. Complementary feeding guidelines should be adopted particularly during the first 2 years of life as these modulate long-term risk [8].

Individual feeding patterns with a well-balanced diet, avoidance of high caloric ingestion and regular physical activity should be promoted from a young age throughout adulthood. Public educational initiatives to promote healthy eating habits within families may provide an appropriate environment to reduce obesity risk [9].

Implementation of balanced diets in school canteens is important to promote healthy eating patterns.

Beyond pediatric age, behavioral factors and habits like smoking or alcohol ingestion also favor increased weight gain. Anxiety and stress may be triggers that encourage these habits.

As many of these factors depend on collective influence, public policies that promote the progressive reduction of salt, sugar and saturated fat consumption can induce an adaptation to healthier practices. In some countries, official regulations and agreements with industry have promoted a staggered reduction of these components in bakery, soups, or processed foods [10].

2 | Consequences of Obesity

2.1 | Diabetes, Cardiovascular Diseases, Hypertension, Cancer

Obesity is a complex disease that reduces life expectancy and is strongly linked to cardiovascular and respiratory diseases, diabetes and cancer. A linear correlation between BMI and blood pressure and the non-HDL to HDL cholesterol ratio has been observed [11]. Higher BMI is associated with increased mortality from ischemic heart disease, stroke, diabetes, kidney disease and liver disease. There is a weaker association with cancer mortality, including liver, kidney, breast, endometrial, prostate, and colorectal cancers.

2.2 | Other Associated Gastrointestinal Diseases

Obesity has far-reaching consequences for GI health, significantly increasing the risk of various GI diseases such as gastroesophageal reflux disease (GERD), Barrett's esophagus, esophageal cancer, colon polyp and cancer, gallstones and pancreatic cancer [12]: GERD is more prevalent in individuals with obesity, and chronic reflux can lead to cellular changes, increasing the risk of Barrett's esophagus and esophageal cancer [13–15]. Obesity is also linked to the development of gallstones, as excess body weight influences cholesterol metabolism, promoting stone formation [16]. A prospective study also indicated that adiposity is a risk factor for incident IBD, mediated by unhealthy metabolism, especially inflammation [17]. Since patients with chronic GI diseases often suffer from obesity either due to coincidence or related pathophysiology, treatment of GI patients should be adjusted to their obesity status in some of the diseases, as detailed in the Joint European Society for Clinical Nutrition and Metabolism/United European Gastroenterology guideline [18].

2.3 | Steatosis of the Liver

A concerning consequence of obesity is its strong association with Metabolic Associated Steatotic Liver Disease (MASLD), which is characterized by the accumulation of fat in hepatocytes. With an increasing worldwide prevalence, rising from 25.3% in 1990–2006 to 38.0% in 2016–2019, MASLD is a primary cause of chronic liver disease [19]. MASLD can progress to a more severe form characterized by inflammation, known as metabolic-associated steatohepatitis (MASH), which can lead to fibrosis, cirrhosis, and hepatocellular carcinoma [20].

As obesity rates continue to rise, the burden of associated diseases is expected to increase. Addressing obesity is crucial to alleviate these serious health consequences and improve overall, GI and liver health.

3 | Prevention

3.1 | Social and Environmental Risk Factors, and Stigma

Socioeconomic barriers affecting children's and adult's food habits are a key public health concern. A cross-sectional study based on data from 123,487 children aged 6–9 years in 24 countries in the WHO European region indicated an inverse relationship between the prevalence of childhood overweight/obesity and parental education in high-income countries and unhealthy food habits are associated with lower socioeconomic status [21]. The results are of relevance when addressing strategies, policy actions, and interventions targeting social inequalities in children's diets [22]. Low socioeconomic status and food insecurity are related to the consumption of lower-quality diets, partially because nutritious diets are associated with higher diet costs. Ultra-processed foods (UPF) and drinks are

usually cheaper than unprocessed or minimally processed foods (e.g., fruits and vegetables, nuts, fish, and olive oil) [23] and they tend to be high in energy, salt, sugars (mainly fructose or high-fructose corn syrup), and fat (in particular saturated fat), with low nutritional value [24, 25]. Furthermore, UPFs are usually very easy to use, durable, and hyper-palatable [26]. These characteristics, among other things, have led to a significant increase in UPF consumption [27–29], accounting for over 50% of the mean energy intake in the United Kingdom (UK) [30] and the United States (USA) [31]. The association between the dietary share of UPF and the risk of various diet-related NCDs was broadly investigated [25, 32]. A systematic review, meta-analyses and several prospective cohort studies have shown that the vast majority of observational studies found a positive association between UPF consumption and overweight, obesity, weight gain, and abdominal obesity [33–43], with a dose-response association. Importantly, a strong association was also demonstrated between UPF consumption and the risk of type 2 diabetes (T2D) [33, 44, 45].

People with obesity commonly face social stigma. They are often subject to discrimination in the workplace as well as in educational and healthcare settings, leading to physical and psychological harm and lower adherence to receiving adequate care. Therefore, a Joint international consensus statement for ending the stigma of obesity was published to inform healthcare professionals, policymakers, and the public about this issue. They state that academic institutions, professional organizations, media, public health authorities, and governments should encourage education about weight stigma and refrain from using stereotypical language, images, and narratives that unfairly and inaccurately depict individuals with overweight and obesity as lazy, gluttonous, and lacking willpower or self-discipline [46]. Weight bias and stigma are also emphasized in the Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents with Obesity [47].

3.2 | Physical Activity

In addition to the need to improve nutritional behavior, physical activity and exercise training play central roles in the prevention and treatment of several obesity-related chronic diseases. Regular physical activity has important effects on adipose tissue morphology and function with increased lipolysis, mitochondrial activity and free fatty acid mobilization. This makes more metabolic substrates available for increased energy demand and reduces obesity-induced systemic inflammation in crucial organs such as the liver [48].

Several forms of regular physical exercise have been shown to be beneficial for reducing weight, particularly the visceral fat that exerts most obesity-related detrimental effects. These physical activities include aerobic exercise (e.g. walking, running, cycling) and high-intensity interval training (repeated short-to-long bouts of high-intensity exercise interspersed with recovery periods) [49]. Increasing levels of environmental pollution, however, especially in larger municipal areas, together with global warming, might pose increasing barriers to widespread outdoor physical activities [50].

3.3 | Harmonizing the Use of (Easy-To-Access and Affordable) Diagnostic Tests

Early detection and quantification of hepatic steatosis are essential for accurate diagnosis and effective management of obese people [51]. From a public health policy perspective, ultrasound (US) represents the ideal diagnostic test due to its availability and affordability. Biochemical tests, such as serum markers or liver enzyme measurements, can also help to identify hepatic steatosis earlier and complement imaging techniques. A preliminary, first-level US examination with hand-held scanners, performed by primary care physicians, offers a simple and reliable method to discriminate between a normal and a steatotic liver [52]. Second-level examinations, that is, multiparametric US or MRI to quantify fat infiltration (liver fat fraction), may be reserved for selected patient populations [51].

4 | Key Messages

- Effective prevention strategies should include a multicomponent approach (addressing health behavior and diet, family and community habits, educational institutions, and societal standards) according to the income levels of the countries.
- The greatest preventive benefits occur in the early years of life, with marked risk reduction through improved infant and young child feeding.
- Health promotion campaigns should target all populations including disadvantaged people and groups.
- To actively support and empower families, pediatricians and their organizations should advocate for social policies that safeguard children's health.
- All public health and clinical activities should be sensitive to weight stigma and refrain from using stereotypical language.
- Public policies to correct excess ingestion of unhealthy foods (fat, salt, sugar) should be implemented in order to modify social habits of consumption.

In conclusion, pediatricians, gastroenterologists, hepatologists, nutritionists, and surgeons, alongside other healthcare professionals, play a pivotal role in combating the obesity pandemic. Through greater engagement in prevention, treatment, and obesity's wider impacts, they can significantly help reduce its prevalence. Strengthening these efforts and addressing modifiable risk factors through collaborative, well-supported public health policies can lead to lasting improvements in the lives of children and adults affected by obesity, ultimately building a healthier future for all.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Research data are not shared.

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