



PREVENTION OF OBESITY AMONG ADOLESCENTS: EVIDENCE-BASED STRATEGIES AND PUBLIC HEALTH INTERVENTIONS

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ABSTRACT

Adolescent obesity has become one of the most significant public health challenges worldwide. The increasing obesity among adolescents is associated with multiple physical, psychological, and social health consequences, including type 2 diabetes, cardiovascular diseases, metabolic disorders, depression, and reduced quality of life. Obesity during adolescence often persists into adulthood, increasing the risk of chronic diseases and premature mortality. The causes of adolescent obesity are multifactorial and include unhealthy dietary habits, physical inactivity, excessive screen time, inadequate sleep, genetic predisposition, and environmental influences. This review highlights the burden of adolescent obesity, its associated health risks, and evidence-based preventive measures. Effective prevention requires a comprehensive approach involving nutrition-focused interventions, regular physical activity, healthy behavioural practices, family support, school and community participation, and healthcare and policy-level initiatives. Early prevention strategies during adolescence can promote healthy growth, improve overall well-being, and reduce the long-term burden of obesity-related diseases.

Keywords: Adolescent obesity, obesity prevention, physical activity, nutrition, lifestyle modification, public health, health promotion, adolescents.

INTRODUCTION

Obesity among adolescents is a medical condition where teenagers aged between 10–19 years have excess body fat that have adverse effects on their health. However, obesity is more than just a number on a scale; it reflects a complex interplay of genetic, behavioural, environmental, and socioeconomic factors. During adolescence—a period of rapid physical, hormonal, and psychosocial development can disrupt normal growth patterns and metabolic function. Common factors include frequent consumption of energy-dense, nutrient-poor foods, sugar-sweetened beverages, insufficient physical activity, excessive screen time, inadequate sleep, and family or community environments that limit access to healthy options.

The condition has significant short- and long-term health problems. In the short term, adolescents with obesity has risk of insulin resistance, type 2 diabetes, hypertension, dyslipidaemia, non-alcoholic fatty liver disease, obstructive sleep apnoea, and orthopaedic problems.

Psychosocial consequences such as low self-esteem, depression, anxiety, and weight-related bullying are also prevalent. Long-term, adolescent obesity strongly predicts adult obesity and elevates lifetime risk for cardiovascular disease, certain cancers, and premature mortality. Because adolescence is a critical age for establishing lifelong habits, addressing obesity during these years through family-based lifestyle interventions, school and community support, and, when indicated, medical management is necessary for preventing complications and promoting healthy development.

Globally, obesity is the fifth leading risk factor for mortality. Prevalence rates of obesity among adolescents and children are increasing around the world, presenting a major public health problem. Adolescents living with overweight or obesity are at increased risk of living with overweight or obesity in adulthood. Childhood and adolescent overweight and obesity are risk factors for short- and long-term morbidity, including type 2 diabetes, hypertension, coronary heart disease, depression, social isolation, and premature mortality [Lister N. B., Baur L. A., Felix J. F., et al 2023].

Increasing awareness of the complexity of public health problems, including obesity, has led to growing interest in whole systems approaches (WSAs), defined as those that consider the multifactorial drivers of overweight and obesity, involve transformative co-ordinated action across a broad range of disciplines and stakeholders, operate across all levels of governance and throughout the life course. (Bagnall AM et al 2019)



Obesity and its associated comorbidities have emerged as a major health problem garnering interests from both public health agencies and mainstream media consumers. With increasing awareness on its impact on health, finances, and community at large, it has come to the forefront for scientific research and development of health plans. The need for better strategies and novel interventions to manage obesity is now being recognized by the entire health care system. Obesity and overweight is now the fifth leading global risk factor for mortality. Strategic investment is thus urgently needed to implement population-based childhood obesity prevention programmes which are effective and also culturally appropriate. Population-based prevention is crucial to stem this rising tide of childhood obesity which is fast reaching epidemic proportions. Obesity has its onset very early in life; therefore, children constitute a major group of this disease. (Pandita A et al 2016)

Once obesity is established, it is difficult for children and adolescents to return to normal weight. Indeed, obesity rarely resolves after adolescence, and further risks develop in adulthood, including infertility, cancer, cardiovascular diseases, and diseases of the liver and kidneys. Although population-level normal weight rather than overweight should be the ultimate goal, because obesity is associated with greater disease burden than overweight, it is important to pinpoint population groups that predominantly have overweight and those that predominantly have obesity (i.e., the majority of the population has transitioned from overweight to obesity [obesity transition]), as each of these health states signals the need for a different balance of public health and clinical responses. (Freedman DS, Mei Z, Srinivasan SR, Berenson GS, Dietz WH, 2007)

The prevalence of child and adolescent obesity has plateaued at high levels in most high-income countries and is increasing in many low-income and middle-income countries. Obesity arises when a mix of genetic and epigenetic factors, behavioural risk patterns and broader environmental and sociocultural influences affect the two body weight regulation systems: energy homeostasis, including leptin and gastrointestinal tract signals, operating predominantly at an unconscious level, and cognitive-emotional control that is regulated by higher brain centres, operating at a conscious level. Health-related quality of life is reduced in those with obesity. Comorbidities of obesity, including type 2 diabetes mellitus, fatty liver disease and depression, are more likely in adolescents and in those with severe obesity. Treatment incorporates a respectful, stigma-free and family-based approach involving multiple components, and addresses dietary, physical activity, sedentary and sleep behaviours. In adolescents in particular, adjunctive therapies can be valuable, such as more intensive dietary therapies, pharmacotherapy and bariatric surgery. (Lister NB et al, 2023)

Obesity could result from multidimensional biological, behavioural, and environmental causes, and unbalanced diet and sedentary habits appearing to be the main drivers. Since obesity is a disease in and of itself, managing it becomes more difficult when it coexists with other pathological illnesses including diabetes, cardiovascular disease, and psychological disorders. Furthermore, childhood overweight and obesity have been shown to persist into adulthood, and their related adverse outcomes include not only certain health conditions in childhood, but also a greater risk and earlier onset of chronic disorders in later life. Hence, there is a demand for routine surveillance of weight status in children and adolescents. (Sutaria S et al 2019)

Adolescence is a time of physical, cognitive, and social development. It is also a period of increasing autonomy, and as such, a period during which health behaviours may be more susceptible to change. Preventive interventions applied in this 'window of opportunity' may be more effective in promoting change to a healthy behaviour and thus in improving health throughout life.

The prevalence of overweight and obesity varies across countries, regions, and socio-economic groups. Data from OECD countries suggest a prevalence of self-reported overweight and obesity among 15 year olds that ranges from 10% to 31%. (Inchley J, Currie D, et al.2016)

Other survey data suggest generally higher obesity prevalence among boys than girls, younger than older adolescents, and in socially disadvantaged groups. Existing approaches for obesity prevention have not been effective at reaching these adolescents, and it is important to adopt universal public health approaches, including structural policy measures, with targeted interventions when necessary. (The Economist Intelligence Unit. Confronting obesity in Europe: taking action to change the default setting. London, UK; 2015)

A growing body of evidence indicates that obesity during childhood and adolescence is linked to adverse health outcomes across the lifespan, markedly increasing the risk of cardiovascular diseases (CVD), diabetes mellitus (DM), metabolic syndrome (MetS), obstructive sleep apnoea (OSA), musculoskeletal disorders (MSDs), and cancer [Kelsey MM, et al 2014]. Childhood and adolescent obesity also adversely impact the mental health of



young individuals [Quek YH, Tam WWS, Zhang MWB, et al. 2017]. With the rising prevalence and the associated disease and economic burdens, the prevention and management of obesity have become urgent priorities. Homes and schools are often targeted as key settings for interventions aimed at addressing childhood and adolescent obesity [Zhang K, Fan J, Xu X, et al 2025]. Previous studies have demonstrated that the involvement of parents significantly enhances the efficacy of weight management programs [Lee HJ, Lee SY, Park EC et al 2016; Leung AKC, Wong AHC, Hon KL. 2024]. Although family-based treatment (FBT) for obesity childhood and adolescents is commonly implemented, healthcare professionals still face challenges in effectively collaborating with parents as a unified team to manage obesity treatment. Many treatment programs initially lead to short-term weight loss, but the body weight and fat mass were often quickly regained once the therapy concludes [Leung AKC et al 2024]

Preventive measures for obesity Among Adolescents

Preventing obesity during adolescence targets the period when lifelong habits form and when excess weight strongly predicts adult obesity. Effective strategies are multi-level—individual, family, school, community, and policy.

1. **Nutrition-focused prevention:** Nutrition-focused prevention among adolescents targets dietary patterns to reduce obesity risk. Key measures include eliminating sugar-sweetened beverages and juices, decreasing highly processed foods and fast foods, and following patterns that emphasize plant-based foods, vegetables, fruits, whole grains, lean proteins, and high fiber while limiting saturated fat. Eating regular meals, avoiding frequent snacking, controlling portion sizes, and role-modelling healthy eating at home are also essential. Parents should avoid keeping calorie-dense, nutrient-poor foods at home and instead prepare meals together with teens. These strategies address energy imbalance and improve diet quality, which are core drivers of adolescent obesity (Expert Panel, 2026).
2. **Physical activity:** Physical activity is a cornerstone preventive measure against adolescent obesity by increasing energy expenditure, improving body composition, and enhancing metabolic health. Guidelines recommend at least 60 minutes of moderate-to-vigorous physical activity daily, plus vigorous and strengthening activities ≥ 3 days/week. Systematic reviews of school-based programs show significant reductions in body fat percentage, diastolic blood pressure, triglycerides, fasting glucose, and insulin resistance when interventions run ≥ 6 weeks, twice weekly or more. Effective strategies span individual, family, school, community, and healthcare levels: schools provide quality physical education, families support active lifestyles and limit screen time, and communities ensure safe facilities for play. Promoting sustained PA, especially MVPA, helps prevent excess weight gain and metabolically unhealthy obesity in teens. (Expert Panel on Obesity Management in Adolescents. (2025).
3. **Behavioural and lifestyle habits:** Behavioural and lifestyle habits are central to preventing obesity among adolescents by shaping daily routines that regulate energy balance. Key habits include consistent sleep schedules of 8–10 hours per night, limiting leisure screen time to ≤ 2 hours daily, and avoiding late wake-up times, since delayed morning wake-up and >9 hours of sleep are associated with obesity. Reducing sedentary behaviour is also critical: adolescents spending >3 hours/day in sedentary activities have higher obesity rates, while regular physical activity supports weight management. Establishing eating routines—such as regular breakfast, avoiding mindless snacking, and eating meals at home—reduces obesity risk. Behavioural strategies like goal setting, self-monitoring, and stimulus control, when delivered through multicomponent programs engaging families, further improve diet and activity habits and reduce BMI z-scores. (Yilmaz, S., Demir, A., & Kaya, M. (2024).
4. **Family and home environment:** Family and home environment shape adolescents' obesity risk through modelling, routines, and emotional climate. Key preventive factors include regular family meals, which lower obesity likelihood by fostering balanced eating and portion awareness; parental role-modelling of healthy dietary and activity habits; and a structured home that limits access to calorie-dense, nutrient-poor foods while ensuring fruits, vegetables, and water are available. Supportive communication, family cohesion, and low household chaos promote proactive health behaviours and reduce emotional eating. Parents influence adolescents by establishing sleep routines, reducing screen time, and creating safe spaces for physical activity at home. A family-centred approach that addresses diet, activity, sedentary behaviour, and sleep within an age-appropriate, autonomous framework is



essential for lasting behaviour change and weight management.(Van Hulst, A., Jayanetti, S., Sanson-Rosas, A. M., Harbec, M.-J., Kakinami, L., Barnett, T. A., & Henderson, M. (2023).

5. **School and community interventions:** School and community interventions create supportive environments that make healthy choices easier for adolescents, helping prevent obesity. Effective school strategies include integrating nutrition education into curricula, improving canteen offerings by removing soft drinks and promoting fruits/vegetables, and ensuring daily physical education with extracurricular sports. Community-level actions involve adding exercise facilities in parks, safe recreational spaces, and walkable neighbourhoods to increase physical activity access. Multicomponent programs that combine environmental changes—like school gardens and healthy food policies—with behavioural education show the strongest impact, reducing BMI and improving weight status. Community-based obesity prevention interventions also slow declines in health-related quality of life, particularly among younger students and those in low socioeconomic areas.(Moore, T. H. M., Tomlinson, E., Davies, A. L., Dawson, S., Breheny, K., Savović, J., ... Summerbell, C. D. (2022).
6. **Healthcare and policy level:** Healthcare and policy-level measures address obesity among adolescents through early detection, system-wide care, and regulatory environments. Primary care providers should conduct routine BMI-for-age and waist circumference screening, counsel on nutrition and physical activity, and identify at-risk adolescents for timely intervention. Management uses a family-centred, age-appropriate approach integrating dietary, activity, sleep, and behavioural support, with multidisciplinary teams including paediatricians, dietitians, and psychologists. At the policy level, governments can implement taxation on sugar-sweetened beverages and processed foods, subsidize fresh produce, regulate food marketing to children, and mandate front-of-pack labelling to guide choices. School policies should ensure adequate physical education, healthy school meals, and safe recreational spaces. WHO guidance emphasizes embedding obesity prevention and management as a central pillar of primary health care to achieve universal health coverage and reduce long-term noncommunicable disease burden. (World Health Organization. (2021).

CONCLUSION

Adolescent obesity is a growing global public health challenge with significant short-term and long-term health consequences. The condition results from a complex interaction of biological, behavioural, environmental, and social factors. Since obesity established during adolescence frequently persists into adulthood, early intervention is essential. Effective prevention requires a multidisciplinary and multi-sectoral approach that promotes healthy eating habits, regular physical activity, adequate sleep, reduced sedentary behaviour, and supportive family and school environments. Healthcare professionals, educators, communities, and policymakers must work collaboratively to create environments that facilitate healthy lifestyle choices. Strengthening preventive strategies during adolescence can surely reduce obesity-related morbidity and improve the health and well-being of future generations.

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