



## Prevention of Childhood Obesity

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The World Health Organization has been working with its member states to reduce childhood obesity by implementing the "Global Strategy on Diet, Physical Activity, and Health" (1). The number of overweight and obese children worldwide has been estimated at over 155 and 45 million, respectively (2, 3). In other words, 1 out of every 8 children in the world has excess weight. The early consequences of obesity in children and adolescents are hyperlipidemia, insulin resistance, and hypertension in the pediatric age group (4). Furthermore, in recent years, an increasing number of complications, including type 2 diabetes, fatty liver, and orthopedic, respiratory, and sleep disorders have been reported (5, 6). This trend of increasing pediatric obesity is seen not only in developed countries, but also in developing countries (7). An alarming prevalence of childhood and adolescent obesity has been reported in Middle Eastern countries (8). For example, in Iran, the Tehran Lipid and Glucose Study (TLGS) and other investigations have reported a disturbing rise in the rate of excess weight in the pediatric age group (9, 10). In 9% of boys and 7% of girls, 2 or more non-communicable disease risk factors were seen, and the prevalence of hypertension, obesity, high cholesterol, elevated

► *Implication for health policy/practice/research/medical education:*

Emphasis on great complications of childhood obesity and global need for effective primary prevention.

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triglycerides, and low HDL was 12.7%, 5.2%, 5.1%, 5.0%, and 10.2%, respectively (11). The accumulation of risk factors is also rather prevalent, and 10% of adolescents fulfill the criteria for metabolic syndrome (12).

Overweight and obesity in childhood and adolescence increase the risk of coronary heart disease (CHD) in adulthood (13, 14), and the prevalence of CHD has been predicated to increase 5%-16% by 2035. Therefore, according to Ludwig's hypothesis, we have passed phase 1 (increased prevalence of pediatric obesity) and phase 2 (increased complications such as type 2 diabetes, fatty liver, etc.) of the obesity epidemic, and we are entering phase 3, which projects a rise in adult CHD in those suffering from excess weight and obesity during childhood (15). It has been predicted that this process may shorten life expectancy in the United States by 2-5 years by midcentury; equal to all cancers combined (16). Are people waiting to see phase 4 of Ludwig's hypothesis, an acceleration of obesity through transgenerational mechanisms in the late 21st century, including irreversible biologic changes in hormonal pathways, fat cells, and the brain that increase hunger and adversely affect metabolism, and affection of offspring through prenatal programming? All these thoughts point to the urgent need of a global effort for effective intervention (17). There is broad consensus that pediatric obesity can be prevented by correction of dietary and lifestyle habits and increased physical activity, which should begin from pregnancy and infancy onward (18). However, no comprehensive strategy to en-

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courage family members, in particular children, exists. There is no simple solution, and we have proposed that a country's programs must focus on primary prevention with structured programs for lifestyle modifications. Parents must take responsibility for their children's health by modifying their own lifestyle and ensuring healthy lifestyles for their children, encouraging more physical activity and less television and computer viewing. These family efforts should be accompanied by governmental and private sector initiations to provide high quality food in the market and to curtail the ever-increasing manufacture of fast and junk foods. Without serious and adequate interventions, a catastrophe looms ahead (19).

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