

Overweight and Obesity among Adolescents: A Review

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ABSTRACT

Childhood obesity and overweight have become a global public health crisis. It is defined as excessive accumulation of body fats that can impact health. It is a complex condition with multiple causes such as genetic, sociodemographic, socioeconomic, psychosocial, substance abuse, physical inactivity, sedentary lifestyle, and dietary habits are all factors. These factors interact independently with each other leading to overweight and obesity. Overweight and obesity are known to be associated with a number of chronic conditions such as type 2 diabetes, hypertension and coronary artery disease, sleep disorder, asthma, infertility and cancers.

Keywords: Overweight, obesity, adolescents

INTRODUCTION

The origins of obesity can be traced back to our prehistoric ancestors 30,000 years. Survival of the fittest demanded that those who conserved energy most efficiently would survive the inevitable fast and famine that would follow periods of abundance. Natural selection, on the other hand, has turned against humanity. The scarcity of food led to the perception that being overweight was a good thing and desirable, and it was also prized as an indication of good health, wealth and prosperity [1-2]. The ancient Greeks first reported the risks of obesity and its link to diseases. Hippocrates recognized that obesity resulted in infertility and premature death [3]. It was during the latter half of the nineteenth century that overweight/obesity began to be stigmatised for aesthetic reasons [1]. The burden of obesity is rising in all regions of the world, including the poorest of low and middle income countries (LMICs), and the food environment has been a primary driver of the rise in obesity worldwide over the past 50 years [4]. In many countries, there has been a striking increase in the rate of overweight and obesity in children during the past several decades [5], and since 1975, this burden of obesity has almost tripled.

Childhood obesity and overweight

Childhood obesity and overweight have become a global public health crisis. It is defined as excessive accumulation of body fats that can impact health. BMI is the measure used to determine overweight and obesity. According to International Obesity Task Force, BMI values at 25kg/m² to 29.9kg/m² for a given age and sex defines overweight, while BMI values at 30kg/m² to 34.9kg/m² for a given age and sex defines obesity in adolescents [6]. It is a complex condition with multiple causes such as genetic, sociodemographic, socioeconomic, psychosocial, substance abuse, physical inactivity, sedentary lifestyle, and dietary habits are all factors. These factors interact independently with each other leading to overweight and obesity. Overweight and obesity are known to be associated with a number of

chronic condition such as type 2 diabetes, hypertension and coronary artery disease, sleep disorder, asthma, infertility and cancers [7-12].

Prevalence of overweight and obesity among adolescents

Prevalence of overweight and obesity varies considerably across continents [13], and is highest in urban compared to rural settings. Another school-based study on the magnitude and factors associated with overweight and obesity among adolescents in a semi-rural area in Tanzania reported an overall prevalence of overweight and obesity of 9.2%, with more girls being overweight and obese than boys. In Kenya, Rapando *et al.* [14] found the prevalence of overweight and obesity to be 17.8 % (16.96% in males and 20.59% in females) among secondary school students.

Factors associated with overweight and obesity

Sociodemographic factors

According to Omigbodun *et al.* [15], rural adolescents are less likely to be overweight or obese compared to the urban counterparts. A study on child obesity and fitness levels among Kenyan and Canadian children from urban and rural environments found that no rural children were overweight or obese, however, 6.8% of urban boys and 16.7% of girls were overweight or obese respectively [16]. In Zimbabwe, 13.8% urban children were found to be having overweight or obesity, whereas in rural setting, the prevalence was 2.3% (Kambondo & Sartorius, 2018). In a cross-sectional study involving students in four secondary schools in Nigeria, 11.59% and 1.45% of students in private schools were overweight and obese respectively, compared to 5.71% and 0.95% for those in public schools [18]. Overweight and obesity are variably related to gender. Through a systematic review of the prevalence of overweight and obesity in adolescents, Bibiloni, Pons, & Tur (2013) found that male adolescents are more likely to be obese compared to their female counterparts. In Ethiopia, the frequency of overweight was higher in female (16.5%) than male (12.3%) children, but males (8.6%) were more obese than females (3.8%) (Desalew, Mandesh, & Semahegn, 2017). Similarly, Omigbodun *et al.* [15] in Nigeria reported that female adolescents were more likely to have higher risk of overweight/obesity compared to their male counterparts. However, Choudhary and colleagues [19] found no significant gender difference in the prevalence of overweight and obesity among school-going adolescents aged 10 to 18 years in India.

Psychosocial factors

Not having close friends and being a victim of bullying are significantly associated with overweight and obesity among adolescents. In seven Asian nations, Pengpid and Peltzer [20] also found that having no close friends was significantly associated with overweight/obesity among school-going adolescents aged 13-15 years. Inversely, Pengpid and Peltzer [21] found that having close friends and peer support was associated with overweight and obesity in Oceania's six pacific island countries

Socio-economic factors

Overweight and obesity have been known to be common among families with high socioeconomic status. In a Ghanaian cross-sectional survey, Adom *et al.* [22] found that high socioeconomic status households had 2.58 times higher odds of being overweight or obese compared to those living in low socio-economic status households.

Dietary factors

Frequent consumption of fruit and vegetables is associated with lower levels of overweight and obesity. The WHO [23] recommends at least 400 g (5 portions) of fruits and vegetables a day. Less than 10% of total energy intake from free sugars which is equivalent to 50 g (or around 12 level teaspoons) for a person of healthy body weight consuming approximately 2000 calories per day, but ideally less than 5% of total energy intake for additional health benefits. However, several factors have resulted in increased caloric consumption, such as increasing use of sugar-sweetened beverages, sweet snacks, processed foods containing excess fat, large portion sizes, and high glycemic foods. Consumption of processed food has been purported to contribute to the increasing prevalence of obesity [24-34]. Croezen *et al.* [25] found that skipping breakfast, alcohol consumption and physical inactivity were associated with overweight in second and fourth grade adolescents.

Physical inactivity and sedentary lifestyle

Changes in economic and sociodemographic status associated with urbanization have favored a shift in lifestyle behaviors towards less physical activity, and increased sedentary habits. Lack of regularly walking to school and not regularly taking part in sporting activities is associated with obesity among adolescents [26-37]. Compared with non-obese adolescents, obese males and females are significantly less physically active [27-40]. A study involving 906 adolescents aged 14 to 19 years selected from Kuwaiti schools found a prevalence of overweight and obesity of 50.5% in boys and 46.5% in girls. Among boys, moderate and vigorous activities were found to be significantly negatively associated with overweight and obesity ($p < 0.05$), whereas in girls, only those with not less than moderate activities were negatively associated with overweight and obesity [28]. Sedentary behavior encompasses activities involving low levels of energy expenditure, primarily sitting time in various contexts. Sedentary activities during leisure time are the focus of preventive strategies because they are part of many young people's daily routines (for example, classes at school, studying). Sedentary lifestyle such as television (TV) viewing, video games, and computer and internet use are associated with overweight and obesity [29-45].

Genetic and medical factors

Childhood obesity has its basis in genetic susceptibilities influenced by a permissive environment which starts in utero and extends through childhood and adolescence [30-45]. Although polygenetic obesity is by far the most commonly observed, several single gene defects and syndromes associated with obesity have been identified. There is also increasing evidence for the role of epigenetic factors in the development of obesity.

Hyperglycemia in relation to overweight and obesity

Childhood obesity affects virtually every organ system, and is thus associated with a wide spectrum of adverse consequences, including many outcomes that are likened to those seen in adults [31]. In Nigeria, a study involving adolescents 10 to 19 years-olds found that 28.7% and 0.6% had fasting blood glucose (FBG) in pre-diabetic and diabetic range respectively, and fasting blood glucose had linear relationship with BMI percentile [32]. A case report on type 2 diabetes in a Nigerian adolescent, diagnostic and management challenges in a resource poor setting, indicated that adolescents especially girls with obesity and positive family history of type 2 diabetes are at high risk of having type 2 diabetes [33]. Severe obesity significantly increases the risk for incidence of type 2 diabetes in early adulthood in both sexes (Twig et al., 2020). As compared with men who had never been overweight, men who had been overweight till puberty had a higher risk of type 2 diabetes [34-45].

CONCLUSION

There is a high prevalence of overweight and obesity among adolescents. Female sex, urban residence, family history of overweight and obesity, below moderate to vigorous physical activities, receiving pocket money from parents/guardians and unhealthy diet are associated with overweight and obesity. Overweight and obese adolescents are at risk of having hyperglycemia that can lead to type 2 diabetes in the future.

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