Acta Scientific NUTRITIONAL HEALTH (ISSN:2582-1423)

Volume 7 Issue 7 July 2023

Review Article

The Burden of Obesity Pandemic Among Adolescents and Young Adults-Its Prevention and Management

Emmanuel Zimba, Monique Mukanyandwi and Sophonie Ndahayo*

Associate Professor of Public Health, Zambia

***Corresponding Author:** Sophonie Ndahayo, Associate Professor of Public Health, Zambia.

DOI: 10.31080/ASNH.2023.07.1268

Received: May 30, 2023

Published: June 25, 2023

Abstract

Non-communicable diseases (NCDs) are a global burden and a great challenge to public health and social economic development worldwide. NCDs are responsible for 38 million of 57 million annual deaths, with 85% of the deaths occurring in low and middle income countries (LMICs). The population of LMICs is mainly of young people. Addressing non-communicable diseases (NCDs) is a global priority in sustainable development goals, especially for adolescents (1). In a bid to contribute to the world health organisation's objective number four: to promote research for NCD prevention and control, this review discusses the prevalence of NCDs among adolescents and young adults and recommends cost-effective lifestyle interventions that any willing person can adopt and contribute to prevention and control of NCDs pandemic.

Keywords: Non-Communicable Diseases; Adolescents; Young Adults; Prevention

Introduction

The obesity pandemic around the world affects not only adults, but also children. About 80% of the time, obesity in childhood is carried into adulthood in a phenomenon known as "tracking". By 2030, some epidemiologists suggest that 20% of the world's population will be obese [5,15]. Obesity is associated with premature mortality and is a serious public health threat that accounts for a large proportion of the worldwide non-communicable disease burden, including type two diabetes, cardiovascular disease, hypertension and certain cancers. Its implications regarding both physical and economic health remain threatening [7].

The top four killers among NCDs with the highest number of deaths are cardiovascular diseases (17.9 million deaths annually), cancers (9 million), respiratory diseases (3.9 million), and diabetes (1.6 million) [6].

Obesity in young adults and adolescents (aged 2-18 years) has become a serious health issue worldwide, particularly in Asian countries. It is linked to adult obesity, with 80% of obese adolescents remaining obese in adulthood. Childhood obesity affects physical and mental health aspects, such as type 2 diabetes, cardiovascular disease, chronic kidney disease, and cancer. Additionally, obesity increases the risk of cardiovascular diseases and mortality in adulthood.

The prevalence of childhood and adolescent obesity has increased significantly over the past 40 years, with the prevalence reaching 23.8% for boys and 22.6% for girls in 2013. In 2015, 107.7 million young adults were considered obese worldwide. The prevalence of childhood obesity is higher in countries with higher socioeconomic level than those in lower socioeconomic level countries. Non-parental caregivers were also associated with an increase in childhood obesity. Countries that are experiencing rapid development showed marked increases in childhood obesity, such as China, which increased by 28 times from 1985 to 2000.

Below is a conceptual framework on non-communicable diseases among adolescents-adopted from [6].

Obesity risk-factors

The main risk-factors of non-communicable diseases (NCDs) can be classified into categories of self-management, genetic factors, environmental factors, factors of medical conditions, and socio-demographic factors. The main focus is on the elements of self-management and to reach a consensus about the influence of

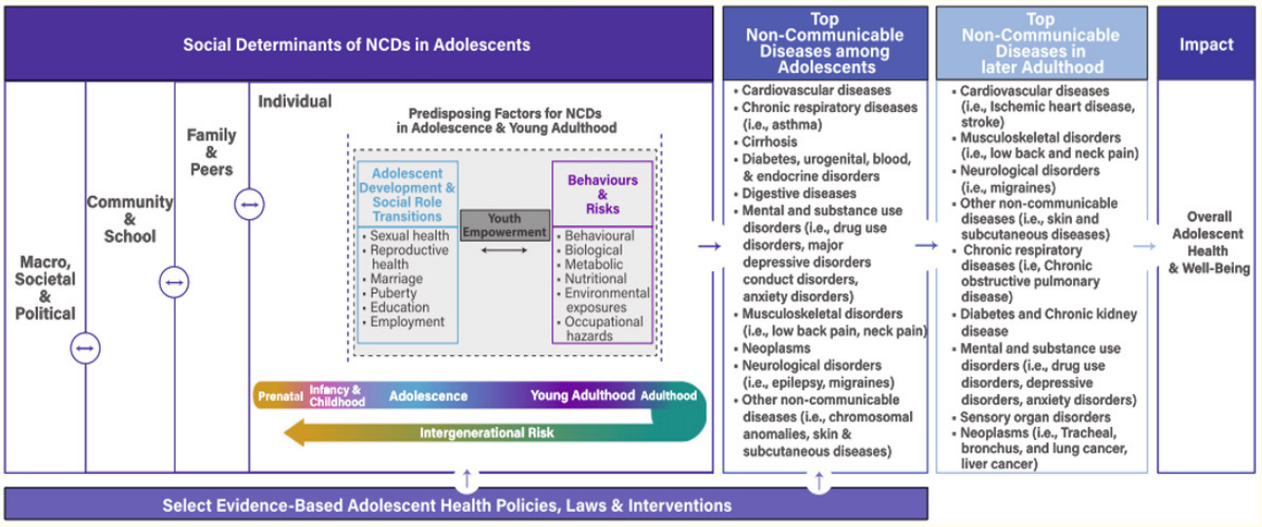

Figure 1: Conceptual frameworks on NCD's among adolescents.

food on risk management and actions toward prevention of non-communicable diseases at all stages of life [6].

For the sake of this review, we will highlight some of risk-factors as follows.

Genetic as a risk-factor

Genetic factors may not be the sole cause of childhood obesity, but they may play an important role in its development. Mutations in the melanocortin 4 receptor gene (MC4R) and SNPs on the fat mass and obesity-associated gene (FTO) are linked to obesity. According to the American Centre for Diseases Control and prevention (CDC), obesity is the result of chronic imbalance in a person who consistently takes in more calories from food and drink that are needed to power their body's metabolic and physical functions. Obesogenic environment, which offers ready access to high-calorie foods but limits opportunities for physical activities have been mentioned in this condition.

Rarely, obesity occurs in families according to a clear inheritance pattern caused by changes in a single gene. Changes in MC4R that diminish its function are found in a small fraction: less or equal to 50% of obese people in various ethnic groups. Therefore, public health efforts to prevent obesity should focus on strategies that promote healthy eating and encourage physical activity. This can be achieved through increasing the availability of healthy food and beverage choices in schools and other public service settings [19].

However, [15] argue that factors influencing epigenetic changes vis a vis obesity include: maternal nutrition (both maternal over and under-nutrition); maternal exposure to toxins like organochlorides, polycyclic aromatic hydrocarbons, arsenic [which can cause gestational diabetes mellitus and thus fetal metabolic syndrome]; and cigarette smoking, which can cause epigenetic modifications; maternal diabetes; younger maternal age; low pre-pregnancy weight; nutritional disturbances in the postnatal environments and early childhood nutrition; altered gut microbial flora with antibiotic use in the first year of life and even in adulthood; paternal over-nutrition, pre-diabetes, and low protein diets; and a high intake of sugary beverages, fried foods, high saturated fats, sleep disturbances, and a sedentary lifestyle in adulthood.

Behavioral factors

Several lifestyle factors have been implicated as correlates or determinants of childhood obesity, such as physical inactivity, excessive sedentary behaviour, and short sleep duration [10]. Diet has been studied extensively as a cause for obesity, with increased consumption of fast food and sugar-sweetened beverages linked to an increased prevalence of childhood obesity. Eating patterns, such as number, regularity, and duration of meals, are also considered as obesity-related eating behavior. A recent study found that habitual eating in the absence of hunger was significantly associated with obesity. Lack of physical activity and increased sedentary time are also risk factors for obesity.

Television watching is more closely related to adiposity than vigorous physical activity. Sedentary time and shortened sleep duration are also associated with obesity.

According to [16], a number of behavioural risk-factors have been postulated, including diets with high energy density, high consumption of sugar-sweetened beverages, large portion sizes, eating patterns, and high levels of sedentary behaviour and low level of physical activity.

Recently, [2] found that male gender, consumption of more sugary beverages, smoking, and sleeping for fewer hours were all independent predictors of obesity among university students.

Psychological

Concerning psychological effects, [14] said that many adolescents suffer from common mental disorders such as stress, which affects health through psychosocial process, eating behaviour, food choices and physical activity. They concluded that stress can lead to developing obesity among adolescents. This implies that stress due to biological changes can influence body weight and lead to obesity among adolescents. Developing healthy food choices among adolescents can help prevent obesity and other complications in adulthood.

The above findings correlate with the review of [12] who found that of the 14 studies, nine [9] reported a significant relationship between the psychiatric disorder under investigation and obesity.

Compared to adults, young adults are more vulnerable to psychological and emotional stress. Unresolved stress has an impact on eating habits and frequently results in increased food volume, accelerated eating, irregular meal times, and fast food and snack. As a result, these unhealthy coping mechanisms lead to excessive weight gain. Environmental factors, such as psychological stress, have been shown to have a significant impact on the development of childhood obesity in several studies. In a previous study, we also found that young adults with obesity tended to eat more impulsively and under stress than those without obesity. This finding raises the possibility that eating patterns that are motivated by psychological factors pose significant risks for obesity. Despite the lack of a clear causal link, prior research suggested that depression, Young adults with obesity frequently displayed anxiety and low self-esteem. Another significant psychological factor for obesity, particularly in girls, is body dissatisfaction. In girls, there was a linear correlation between body dissatisfaction and rising body mass index (BMI), whereas in boys, there was a U-shaped correlation.

Environmental

Environmental factors and lifestyle preferences may play a major role in the increasing prevalence of childhood obesity worldwide. Family environment, school, and community all play a role in influencing young adults' food intake and physical activity. Commercial advertising and marketing trends are focused on high glycemic foods, sugar-sweetened beverages, snacks, fast food containing excess fat, and large portion sizes. In the US and Britain, young adults are exposed to about 10 food commercials per hour of television time. Television advertising in the Middle East is mainly composed of soft drinks, snacks, confectionery, and fast food.

This can affect young adults' immediate food choices and long-lasting taste preferences. Opportunities for youth to be physically active have decreased, and television and computer use is associated with prolonged sedentary time and decreased physical activity. Sociocultural factors also affect the development of obesity, such as using food as a reward and a social ritual. Extracurricular study time is associated with more frequent fast food and/or soda consumption.

Biological

One of the most researched biomarkers of obesity is adipokines. Leptin, adiponectin, visfatin, resistin, and adipocyte fatty acid binding protein were among the adipokines previously linked to childhood obesity. According to a recent study, adolescents' elevated BMI and insulin resistance were related to the production of lipopolysaccharide binding protein in relation to microbial translocation. The triglyceride-to-HDL cholesterol (TG/HDL-C) ratio among lipid profiles demonstrated an association with elevated BMI and cardio- metabolic risk factors. The TG/HDL-C ratio has also been shown to be a reliable indicator of diabetes and insulin resistance. In a prior study, we discovered a correlation between the triglycerides/glucose index (TyG index, calculated as triglyceride [mg/dL] fasting glucose [mg/dL] 0.5) and elevated BMI and insulin resistance.

The summary of risk-factors is given in the table below.

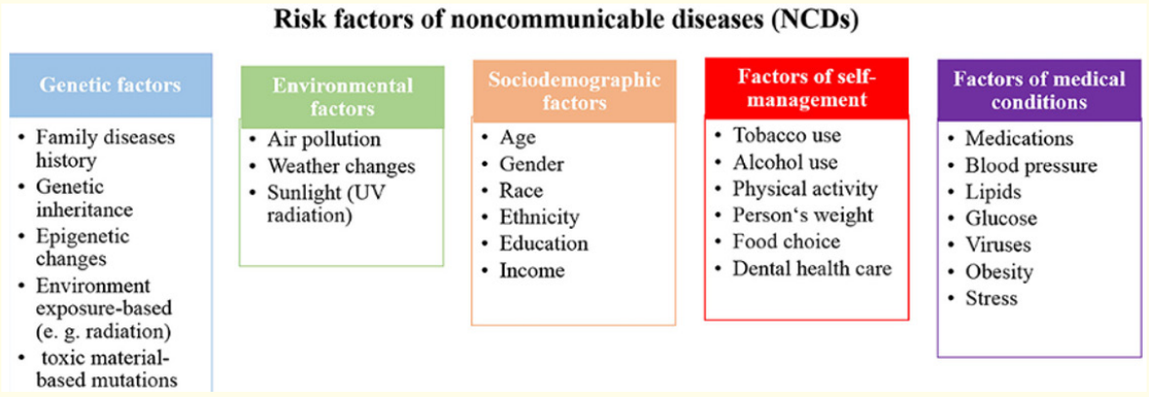

Figure 2: Proposed prevention management of NCDs - adopted from Budreviciute., *et al.* 2020.

Prevention and management

Nutrition interventions are essential in managing the risk of NCDs. The same researchers foresaw that the best prevention management strategy will include individual (lifestyle management), societal (awareness management), national (health policy decisions), and global (health strategy) elements, with target actions, such as multi-sectoral partnership, knowledge and information management, and innovations [6]. The most effective strategy is the one that leads to changes in lifestyle with respect to diet, physical activities, cessation of smoking, and the control of metabolic disorders [6].

Childhood and adolescent obesity is a complex issue that requires a comprehensive approach including school life, home activities, environmental and cultural practices, and supportive parents and teachers [11].

In America, preventive services task force reported that effective interventions are multifaceted and include information about eating, exercise, stimulus control, goal setting, and problem solving. Long-term weight reduction and/or maintenance of reduced weight is difficult to achieve, and young adults are more susceptible to environmental factors. To reduce the intake of unhealthy foods, some parts of US and Canada have applied a small tax on these items, and in Australia and New Zealand, the national heart foundation run "Pick and Tick" symbol program. European countries have imposed regulations on television advertising to young adults. Prevention is vital to successful obesity control, and overweight young adults at high risk should be targeted to prevent childhood obesity. Previous studies have found that targeting overweight young adults may be more effective than treating obese young adults. Childhood weight management strategies should begin at the earliest possible age.

It is well documented that healthy lifestyles play an important role for primordial and primary prevention of non-communicable diseases. Regarding dietary intake, lower eating of fruits, vegetables and fibres, as well as higher consumption of fatty and salty foods (fast foods, junk food), and carbonated soft drinks are of most usual habits correlated with increased risk of NCDs [11].

The prevention and management is summarised in the table below

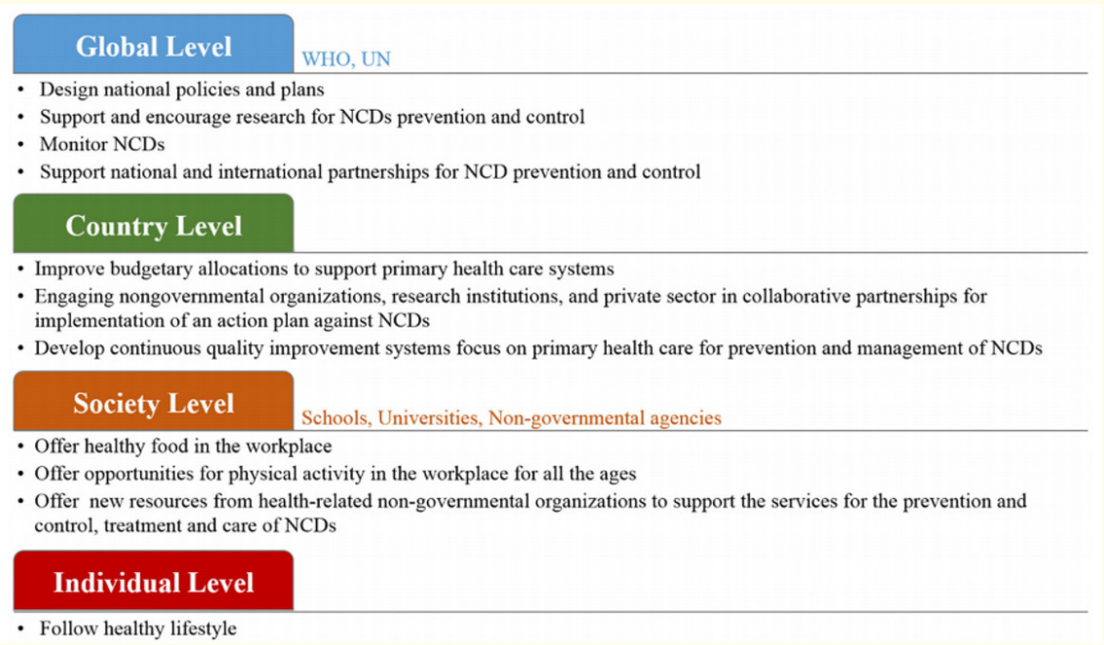

Figure 3: Proposed prevention management of NCDs - adopted from Budreviciute 2020.

Conclusions

Adolescent obesity has emerged as a major health problem in developed and developing countries. This condition is implicated in many chronic diseases and can lead to increased mortality and premature death. As childhood and adolescent obesity tracks adulthood obesity, its prevention could reduce adult obesity-related complications. Most interventions for childhood and adolescent obesity have used either family or school-based programs. However, no single intervention can halt the rise of the growing obesity epidemic. Addressing childhood and or adolescent obesity also requires consideration of environmental factors and critical developmental periods when behavioral responses are formed. In

addition, young adults at high risk for developing obesity should be identified and managed early to prevent obesity for sustainable living and development. Comprehensive and intensive interventions can change the current high burden of non-communicable diseases. Although further studies are needed to support the effectiveness and feasibility of widespread implementation of interventions, efforts to prevent and respond to childhood and adolescent obesity should be sustained. The most critical dimension of the prevention strategy is lifestyle management at the individual level and with a focus on actions, such as increase awareness of risk-factors management [9,18].

Bibliography

1. Akseer N., *et al*. "Non-communicable diseases among adolescents: current status, determinants, interventions and policies". *BMC Public Health* 20 (2020): 1908.

2. Alsulami S., *et al*. "Obesity and its association with gender, smoking, consumption of sugary drinks, and hours of sleep among King Abdulaziz University Students in Saudi Arabia". *Diabetes Metabolic Syndrom Obesity* 1.16 (2023): 925-934.

3. Baker JL., *et al*. "Childhood body-mass index and the risk of coronary heart disease in adulthood". *New England Journal of Medicine* 357.23 (2007): 2329-2337.

4. Boyer BP., *et al*. "Childhood body mass index trajectories predicting cardiovascular risk in adolescence". *Journal of Adolescent Health* 56.6 (2015): 599-605.

5. United States of America Centres of for disease control and prevention clinical growth charts (2017).

6. Budreviciute A., *et al*. "*Frontiers of Public Health* 8 (2020).

7. Franks PW., *et al*. "Childhood obesity, Other cardiovascular risk factors, and premature death". *New England Journal of Medicine* 362.6 (2010): 485-493.

8. Global Burden of Disease (GBD). Obesity collaborators. "Health effects of overweight and obesity in 195 countries over 25 years". *New England Journal of Medicine* 377 (2017): 13-17.

9. International Diabetes Federation. IDF Diabetes Atlas. 7th Edition. Brussels: International Diabetes Federation (2015).

10. Katzmarzyk PT., *et al*. "Relationship between lifestyle behaviours and obesity in children ages 9-11: results from a 12 country study". *Obesity* 23.8 (2015): 1696-1702.

11. Kelishadi R. "Life-cycle approach for prevention of non-communicable diseases". *Advances in Experimental Medicine and Biology* 1121 (2019): 1-6.

12. Kokka I., *et al*. "Psychiatric disorders and obesity in childhood and adolescence – a systematic review of cross-sectional studies". *Children* 10 (2023): 285.

13. Ogden CL., *et al*. "Prevalence of childhood and adult obesity in the United States, 2011-2012". *JAMA* 311.8 (2014): 806-814.

14. Tajik E., *et al*. "Contributing factors of obesity among stressed adolescents". *Electron Physician* 6.1 (2014): 771-778.

15. Tirthani E., *et al*. "Genetics and Obesity". StatPearls Publishing, Treasure Island (2023).

16. Rennie KL., *et al*. "Behavioural determinants of obesity". *Best Practices Research Clinical Endocrinology Metabolism* 19.3 (2005): 343-358.

17. Venn AJ., *et al*. "Overweight and obesity from childhood to adulthood: a follow-up of participants in the 1985 Australian Schools Health and Fitness Survey". *The Medical Journal of Australia* 186.9 (2007): 458-460.

18. World Health Organisation (WHO). "Global Action Plan for the prevention and control of NCDs 2013-2020 (2013).

19. www. cdc.gov/genomics/resource