

The Effect of Dietary Choices, Junk Food Consumption, and Physical Activity on Obesity: A Literature Review

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ABSTRACT

Obesity is a global health concern associated with significant morbidity, mortality, and healthcare costs. Defined by the World Health Organization (WHO) as a condition where body mass index (BMI) exceeds 30 kg/m², obesity results from an imbalance between energy intake and expenditure, influenced profoundly by dietary habits and physical activity levels. This literature review examines the intricate relationships between nutrition, junk food consumption, physical activity, and obesity. Nutrition plays a critical role in obesity prevention and management. Diets rich in fruits, vegetables, whole grains, lean proteins, and healthy fats support metabolic health and weight regulation. In contrast, the consumption of energy-dense, nutrient-poor junk food contributes to excessive calorie intake and weight gain. The pervasive availability and marketing of junk food exacerbate dietary challenges, emphasizing the need for interventions promoting healthier eating habits. Physical activity is pivotal in energy balance and obesity prevention. Sedentary lifestyles, increasingly prevalent, heighten obesity risks. Regular physical activity not only expends calories but also improves metabolic function and cardiovascular health. The WHO recommends specific guidelines for physical activity to mitigate obesity risks. This review synthesizes current research findings and expert insights to elucidate how dietary choices, junk food consumption, and physical activity levels collectively influence obesity. Understanding these interactions is crucial for developing effective strategies and policies to combat obesity and enhance public health outcomes globally.

Keywords: obesity; public health; junk food; non-communicable diseases; physical activity.

INTRODUCTION

Obesity remains a significant public health challenge worldwide, characterized by excessive body fat accumulation that poses a risk to health. The prevalence of obesity has risen dramatically over the past few decades, with substantial implications for both individual health outcomes and healthcare systems globally (WHO, 2022). Defined by the World Health Organization (WHO) as a condition where body mass index (BMI) exceeds 30 kg/m², obesity not only increases the risk of chronic diseases such as cardiovascular disorders, diabetes mellitus type 2, and certain cancers but also diminishes overall quality of life (WHO, 2022; WHO, 2020).

Nutrition plays a pivotal role in the development and management of obesity. The dietary choices individuals make directly influence their energy balance and body weight regulation. Diets high in energy-dense, nutrient-poor foods, commonly referred to as junk food, contribute significantly to the obesity epidemic (Agrawal, 2019). Junk food, characterized by its high levels of refined sugars, unhealthy fats, and low nutritional value, not only fails to provide essential nutrients but also promotes excessive calorie intake, leading to weight gain and metabolic disturbances (Agrawal, 2019).

The term "junk food" encompasses a wide range of highly processed food products that are convenient and palatable but lacking in essential vitamins, minerals, and dietary fiber. These foods are often marketed aggressively and are readily available, contributing to their widespread consumption (Agrawal, 2019). Studies indicate that frequent consumption of junk food is associated with increased risk of obesity and related comorbidities, underscoring the need for dietary interventions that promote healthier eating habits (Agrawal, 2019).

In contrast, a balanced diet that includes adequate amounts of fruits, vegetables, whole grains, lean proteins, and healthy fats is essential for maintaining optimal health and preventing obesity (Roig et al., 2019). Such a diet not only provides essential nutrients but also supports metabolic health, regulates appetite, and helps in achieving and maintaining a healthy body weight (Roig et al., 2019). Physical activity is another crucial determinant of energy balance and body weight management. Sedentary lifestyles characterized by low levels of physical activity have become increasingly common in modern society, contributing to the rise in obesity rates (WHO, 2020). Regular physical activity not only helps expend excess calories but also improves cardiovascular health, enhances metabolic function, and supports overall well-being (WHO, 2020). The WHO recommends adults engage in at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity aerobic activity per week, along with muscle-strengthening activities on two or more days a week (WHO, 2020).

The interplay between nutrition, junk food consumption, physical activity, and obesity is multifactorial. While poor dietary habits and sedentary behaviors are primary contributors to obesity, socioeconomic factors, environmental influences, and genetic predisposition also play significant roles (WHO, 2022). Addressing obesity requires a comprehensive approach that encompasses individual behavior change, community-wide interventions, and policy measures aimed at promoting healthier lifestyles (WHO, 2022). This literature review aims to explore the current understanding of nutrition, the impact of junk food consumption, the role of physical activity, and their collective influence on obesity. By synthesizing evidence from recent studies and expert perspectives, this review seeks to elucidate the pathways through which dietary factors and physical activity levels contribute to obesity development and management. Understanding these dynamics is essential for developing effective strategies and interventions to combat the obesity epidemic and improve public health outcomes.

REVIEW CONTENT

1. Obesity

1.1 Definition of Obesity

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health (World Health Organization, 2020). Obesity can

occur when, over a period of time, more calories are consumed through food than are used to support the body's energy needs, with the excess energy stored as triglycerides in body tissues (Aulianisaa, 2023). Adolescent weight is a good predictor for assessing the risk of obesity or detrimental diseases in the future. Individuals who are overweight at present are 20 times more likely to become obese compared to when they were children. Regardless of the importance of an individual's weight status during childhood or adolescence, it is important to educate that being overweight can lead to the development of diseases in the future (Aulianisaa, 2023).

1.2 Causes of Obesity

Fundamentally, obesity occurs due to an imbalance between higher calorie intake and lower calorie expenditure, leading the body to store the excess calories as fat. Excessive fat accumulation results in obesity. Several factors contributing to obesity include:

- *Genetic Factors*

The first genetic factor contributing to obesity is age. Obesity is a result of excess body fat due to an imbalance between calorie consumption and energy expenditure, often leading to health problems. As age increases, the metabolic rate slows down. Every 10 years after the age of 25, cellular metabolism decreases by 4%, and for women, when entering menopause, the metabolic rate begins to decline, thus requiring fewer calories to maintain body weight (Siwi et al., 2021). Parental fatness plays a significant genetic role in childhood obesity. Genetic factors are related to weight gain, BMI, waist circumference, and physical activity. If either parent is overweight, the likelihood of their child being overweight is 40-50%. If both parents are obese, the likelihood of their child being obese is 70-80%. Genetic factors greatly influence weight gain. Data from various genetic studies indicate several alleles that predispose obesity. Additionally, there is an interaction between genetic factors and excessive solid food intake and reduced physical activity. Recent genetic studies have identified gene mutations underlying obesity. There are many genes in humans believed to affect body weight and adiposity (Roig et al., 2019).

- *Environmental Factors*

Physical activity is often done only as a trend rather than a lifestyle. The lack of physical activity among modern society contributes to the risk of obesity. At first glance, there may appear to be a trend of increased sports activity in big cities. However, not all people who go to fitness clubs or exercise do so seriously. Many millennials join fitness clubs for social media or content purposes (Siwi et al., 2021). In terms of families passing down eating habits and lifestyles, families share the same food and physical activity habits, thus the relationship between genes and the environment is mutually supportive. It is quite natural for children to adopt their parents' habits. A child with overweight parents who regularly consume high-calorie foods and are inactive is likely to inherit similar habits, becoming overweight as well (Roig et al., 2019).

• Hormonal Factors

Body mass index is directly related to thyroid volume and the occurrence of thyroid nodules. This relationship appears to correlate positively with the degree of insulin resistance (Ylli et al., 2022). Leptin hormone (from the Greek word "leptos," meaning "thin") is a peptide hormone consisting of 167 amino acids, encoded by the *ob* (obesity) gene, and secreted by white adipocytes. Once released into circulation, leptin crosses the blood-brain barrier and binds to presynaptic GABAergic neurons. Leptin levels decrease during fasting, low-calorie diets, and uncontrolled type 1 diabetes. In these situations, reduced leptin levels stimulate hunger while reducing energy expenditure and causing other physiological adaptations that restore fat stores, and consequently leptin levels, to normal (Roig et al., 2019).

1.3 Risk of Obesity

Metabolic syndrome is a collection of metabolic risk factors directly associated with the occurrence of atherosclerotic cardiovascular disease. These risk factors include atherogenic dyslipidemia, elevated blood pressure, increased plasma glucose levels, prothrombotic state, and proinflammation. Obesity is a major component in the development of metabolic syndrome. Obesity, accompanied by increased fat metabolism, leads to increased production of Reactive Oxygen Species (ROS) both in circulation and in adipose tissue cells. Increased ROS within adipose cells can disturb the balance of oxidative reduction reactions (redox), leading to decreased antioxidant enzymes in circulation. This condition is known as oxidative stress. Increased oxidative stress causes dysregulation of adipose tissue and initiates the pathophysiology of metabolic syndrome, hypertension, and atherosclerosis (Kusumaningnastiti, 2019).

1.4 Prevention

Autonomous support related to motivation for weight loss is crucial. With motivation, individuals receive support starting from those closest to them. Motivation is a successful weight loss intervention showing reductions in body mass index (BMI) for those with high BMI (Gettens et al., 2018). Consuming large portions of food also increases the risk of obesity. Consuming meals in smaller portions is recommended as a weight control strategy. Unconsciously, consuming large portions of food can happen to some people. Getting used to eat smaller portions is a real challenge because many environments expose us to tempting food. Therefore, weight management recommends measuring food and eating smaller portions than usual (Roig et al., 2019).

2. Lifestyle

Lifestyle and behaviors that do not support healthy and nutritious food consumption cause individuals to lack control over their food intake. Lifestyle influences an individual's or group's eating habits and has specific impacts, especially related to nutrition. Low levels of physical activity and high energy intake, especially (high calories, sugar,

carbohydrates, and fats), create an energy imbalance in the body, resulting in fat accumulation and obesity (Indra, 2022).

2.1 Junk Food

Junk food is food that has poor nutritional value. Junk food refers to fast food that contains high calories but low nutrition. Because it lacks good nutrition, junk food is not beneficial to the body when consumed. Junk food typically contains high calories, sugar, salt, and fats (Agrawal, 2019). According to WHO, there are ten types of food classified as junk food including fried food, canned food, pickled food, food from fatty meats and offal, processed meat products, processed cheese products, instant noodles, grilled/baked food, sweetened desserts, and dry snacks. Eating excessively large portions can also provide many calories compared to what is recommended for normal daily consumption. Fast food tends to be low in fiber but high in sugar, causing rapid increases in blood sugar levels (Boylan, 2019).

2.2 Physical Activity

The World Health Organization (WHO) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. Working, playing, traveling, and recreational activities that involve skeletal muscle movement, including completing household chores and exercising, constitute physical activity. Lifestyle changes, including increased physical activity, healthy diet, and a positive attitude, have been recommended for managing obesity. Physical activities such as exercise can reduce BMI and waist circumference for obese individuals. In addition to weight loss, it also improves the quality of life. For obese individuals who are physically inactive, increasing physical activity may initially be challenging due to their previous sedentary lifestyle habits. However, this approach has been proven effective in increasing physical activity levels among obese individuals for weight management, as it is safe and supervised (Telles et al., 2018).

3. Balanced Nutrition

Dietary patterns include the amount, type, meal schedule, and processing of food ingredients. Using the T-model eating plate, the number of vegetables should be twice that of carbohydrate sources (rice, noodles, bread, pasta, cassava), and the amount of protein sources should be equivalent to that of carbohydrate sources. Vegetables and fruits should at least match the amount of carbohydrates plus protein (Roig et al., 2019).

3.1 Caloric Requirements

Calories measure the amount of energy in food. When eating and drinking, we provide calories (energy) to the body, which uses them as fuel for activities. The amount of activity performed determines the number of calories (energy) needed. The calorie content in food is measured in 'kcal' (kilocalories). Calories are crucial for everyone's survival, serving as the primary support for the body in performing various activities (Ajidarma, 2019).

3.2 Carbohydrate Requirements

Carbohydrates are the main source of energy for bodily activities, so their intake should constitute 50-60% of the total daily energy requirement. The daily carbohydrate requirement varies widely between countries based on different considerations. For health maintenance, the WHO/FAO recommends carbohydrates comprise between 55% to 75% of the total energy intake from various foods, preferably complex carbohydrates with about 10% from simple carbohydrates (Supariasa, 2016).

3.3 Fat Requirements

Fat is a nutrient that is insoluble in water. However, it is digested into a reserve energy source after muscles have depleted much of their glycogen. Fat is stored around organs and in large amounts beneath the skin. The energy requirement from fat is +20-30% of the total daily calories, with unsaturated fatty acids having a greater proportion than saturated fatty acids, ideally in a ratio of more than one. In junk food, saturated fatty acid composition is greater than unsaturated fatty acids. The adult requirement for fat is 19-25 years old (Pratiwi, 2020).

3.4 Protein Requirements

Proteins or essential amino acids function primarily as catalysts, carriers, movers, regulators, genetic expression, neurotransmitters, structural strengtheners, immunostimulants, and growth (WHO, 2007). Animal protein sources include meat, eggs, milk, fish, seafood, and their processed products. Plant-based protein sources include beans, legumes, and processed products such as tempeh, tofu, and soy milk. Generally, animal protein quality is better than plant protein.

3.5 Vitamin and Mineral Requirements

• Vitamins

Vitamins are essential nutrients needed in very small amounts but are crucial and must always be available in food because the body cannot produce them. Based on solubility, vitamins are divided into water-soluble vitamins (B1, B2, B3, B6, B12, pantothenic acid, folic acid, biotin, and vitamin C) and fat-soluble vitamins (vitamin A, D, E, K) (Aridan, 2021).

• Minerals

Minerals essential for bone growth and maintenance include calcium, magnesium, phosphorus, and fluoride. Food sources containing calcium include dairy products, cheese, yogurt, salmon, and sardines, especially with bones, and green leafy vegetables such as broccoli. Other minerals needed for school-age children include sodium, potassium, chlorine, iron, zinc, iodine, selenium, manganese, copper, chromium, and molybdenum (Aridan, 2021).

3.6 Fiber Requirements

Fiber is also essential for the body, especially to facilitate the process of defecation. Water-soluble dietary fiber found in fruits, nuts, and cereals functions to slow the absorption of glucose, cholesterol, and bile salts in the small intestine, thereby reducing blood sugar and cholesterol levels. Insoluble dietary fiber from vegetables and fruits

helps facilitate bowel movements. The fiber requirement for adults is 25-30 grams per day, sufficient to maintain digestive tract health and balance blood sugar and cholesterol levels (Pratiwi, 2020).

CONCLUSION

In conclusion, this paper explored the relationship between obesity, junk food consumption, physical activity, and nutrition. It has highlighted the detrimental effects of unhealthy dietary habits and sedentary lifestyles on global health, emphasizing the urgent need for comprehensive strategies to promote healthy eating and active living. By aligning with Sustainable Development Goals (SDGs), particularly those related to health and well-being, policymakers and stakeholders can implement targeted interventions aimed at reducing obesity rates and improving population health outcomes worldwide. Moving forward, addressing these issues requires collaborative efforts across sectors to create environments that support healthy choices and lifestyles. Continued research and advocacy are crucial to mitigate the impact of obesity-related complications and foster sustainable health improvements for future generations.

Acknowledgements

The authors would like to thank all the supervisors for enabling the successful implementation of this study.

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