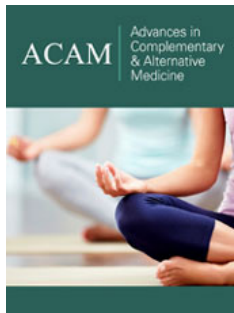


The Relationship Between Nutrition and Obesity, Diabetes, Cardiovascular Disease, and Non-Alcoholic Fatty Liver Disease

ISSN: 2637-7802



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Abstract

The Centers for Disease Control and Prevention state that 60% of adults in the US have at least one chronic disease, with 40% having two or more. Chronic diseases are among the primary causes of mortality worldwide. Diet plays a significant role in the onset of these diseases, including obesity, cardiovascular disease, hypertension, stroke, type 2 diabetes, metabolic syndrome, and fatty liver. Additionally, nutrition plays a crucial role in managing and preventing them. Furthermore, nutrition has a major effect on our gut health. Controlling calorie intake, increasing fiber intake, having physical activity, choosing healthy fat, and other solutions that are mentioned in the text are important for our health.

Keywords: Nutrition; Obesity; Diabetes; Cardiovascular diseases; Fatty liver disease; Gut

Introduction

The Centers for Disease Control and Prevention report that sixty percent of adults in the United States possess at least one chronic disease, while approximately forty percent have two or more chronic diseases [1]. Chronic diseases, defined as problems persisting for one or more years that require continuous medical process such as cardiovascular diseases and diabetes mellitus. These illnesses are among the primary causes of mortality worldwide, constituting 70% of all deaths globally [2-4]. Diet, frequently seen as a lifestyle determinant, plays a significant role in the onset of various chronic diseases, including obesity, cardiovascular disease, hypertension, type 2 diabetes, metabolic syndrome, certain malignancies, and maybe some neurological disorders. Furthermore, a singular medical disease frequently exacerbates the emergence of additional medical conditions, exemplified by the role of obesity or excess body weight/fat as a risk factor for diseases such as type 2 diabetes, hypertension, metabolic syndrome, and some cancers, among others [5]. This document presents the impact of nutrition on some specific areas, including diabetes, obesity, non-alcoholic fatty liver disease, cardiovascular disease, gut health.

Diabetes

Adequate nutrition is essential for managing and preventing diabetes. Effective management of blood glucose levels and mitigation of cardiovascular risk factors are crucial objectives of medical nutrition therapy [6]. Consuming a well-balanced diet that is abundant in dietary fibers and polyphenols can successfully regulate the metabolism of lipids and carbohydrates, enhance the sensitivity to insulin, and reduce inflammation and oxidative stress

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Submission:  September 23, 2024

Published:  October 15, 2024

Volume 8 - Issue 3

How to cite this article: Nima Jahaniboushehri*, Fatemeh Ahang, Hamed Hashemitangestani and Parichehr Edalat. The Relationship Between Nutrition and Obesity, Diabetes, Cardiovascular Disease, and Non-Alcoholic Fatty Liver Disease. *Adv Complement Alt Med.* 8(3). ACAM. 000686. 2024.
DOI: [10.31031/ACAM.2024.08.000686](https://doi.org/10.31031/ACAM.2024.08.000686)

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[7]. Specific dietary strategies, such as low-carbohydrate, low-fat, and high-protein diets, have demonstrated promise in effectively controlling diabetes [8]. Emerging research indicates that altering dietary guidelines to accommodate individual patient preferences may enhance compliance [9]. Consistent physical activity and the maintenance of a desirable body weight are essential for the prevention and control of diabetes [8]. A balanced and nutritious diet is not only advantageous for people with diabetes, but it also beneficial for their families and communities [9]. Nutrition-based therapy continues to be a fundamental component of the holistic approach to diabetes care.

Obesity

Obesity is a major worldwide health problem characterized by extensive causes and effects [10]. Particularly during childhood, nutritional determinants are of paramount importance in the development of obesity [11]. Previous studies have discovered genetic variations that affect both body weight and nutritional consumption, indicating possible interactions between genes and diet in the predisposition to obesity [12]. Factors that protect against obesity include consistent engagement in physical exercise, consumption of high levels of dietary fiber, provision of supportive family and school environments for children, and the practice of nursing [13]. In contrast, risk factors encompass sedentary lifestyles, excessive intake of energy-dense foods, and sugar-sweetened drinks [13]. The obesity epidemic can be effectively tackled by implementing comprehensive measures, including regulating food supply, minimizing the promotion of unhealthy foods to children, encouraging physical activity, and establishing community-wide programs [13]. Furthermore, the notion of personalized nutrition has arisen, which combines genetics and conventional nutrition research to create customized dietary interventions for the prevention and treatment of obesity [12].

Fatty Liver

The development and treatment of Non-Alcoholic Fatty Liver Disease (NAFLD) are significantly influenced by nutrition. Excessive caloric intake, particularly high in saturated fats, trans-fats, and simple sugars, can result in elevated levels of lipids in the liver and the advancement of Non-Alcoholic Fatty Liver Disease (NAFLD) [14,15]. In contrast, the Mediterranean diet, which is defined by the extensive intake of olive oil, omega-3 fatty acids, vegetables, fruits, and whole grains, has demonstrated advantageous outcomes for individuals with Non-Alcoholic Fatty Liver Disease (NAFLD) [14,16]. Effective care of Non-Alcoholic Fatty Liver Disease (NAFLD) involves moderate weight loss, decreased consumption of high glycemic index carbohydrates, and increased physical exercise [15,17]. Furthermore, the inclusion of monounsaturated fats, plant-based proteins, and dietary fibers, together with the restriction of red and processed meats, might effectively mitigate and manage Non-Alcoholic Fatty Liver Disease (NAFLD) [16,17].

Cardiovascular Disease

Cardiovascular Disease (CVD) is a prominent contributor to mortality worldwide, significantly affected by dietary habits [18-

21]. In the prevention and treatment of Cardiovascular Disease (CVD), nutrition is of paramount importance since it influences both the buildup of vascular plaque and the rates of aging [18]. Dietary interventions can regulate chronic inflammation and oxidative stress, which are important contributors to the development of cardiovascular disease [19]. Distinct dietary constituents affect the risk of Cardiovascular Disease (CVD): trans and saturated fats raise the risk, whereas polyunsaturated fats provide protection; sodium raises blood pressure, while potassium reduces the risk of hypertension and stroke [20]. Research has shown that systematic consumption of fruits and vegetables, along with the adoption of special diets like DASH and Mediterranean diets, can provide cardioprotective benefits [20]. The implementation of evidence-based nutritional interventions at both the individual and population levels have the potential to greatly decrease the occurrence of Cardiovascular Disease (CVD) and the related expenses to public health [20,21].

Gut Health

The gut microbiota is essential for human health, affecting metabolism, immunity, and several illnesses [22]. Nutrition significantly impacts the composition of gut microbiota, thereby affecting various physiological processes [23]. Dietary fiber serves as a crucial substrate for gut microbiota, generating advantageous short-chain fatty acids, but high-protein diets may result in detrimental by-products [23]. Probiotics and prebiotics may help reduce gut microbial dysbiosis, which is linked to digestive, behavioral, and metabolic issues [24]. The mutually beneficial relationship between micronutrients and gut microbiota is becoming a significant field of research [25]. Responses to food and microbiota composition differ among individuals, underscoring the necessity for personalized strategies in nutrition and gut health research [23]. Subsequent research should concentrate on defining a "healthy" gut microbiome and investigating the long-term health effects of dietary treatments on both the host and microbiota [24].

Conclusion

In conclusion, nutrition plays a key role in onset, managing, and preventing chronic diseases such as obesity, diabetes, cardiovascular diseases, and fatty liver. Additionally, nutrition has a major effect on our gut health. Controlling calorie intake, increasing fiber intake, having physical activity, choosing healthy fat, and other solutions that are mentioned in the text are important for our health.

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