

The Role of Nutrition in Non-Communicable Diseases: Literature Review

Jiaqi Ge^{1,*}

¹Stephen's Episcopal School, Austin, Texas, United States

*Corresponding author: Jiaqi.ge@sstx.org

Abstract:

Cardiovascular diseases, diabetes, obesity, and certain types of cancer, collectively referred to as NCDs, are a global concern and contribute to about 71% of the total global mortality. This paper focuses on examining nutrition in an attempt to understand how it influences these diseases since the consumption of certain foods is a modifiable risk factor. The results reveal that an increased concentration of fruits and vegetables, whole meal grains, and health-promoting fats can help reduce the vulnerability to NCDs, but a high diet of processed foods and sugar makes the problem worse. However, there is still a dearth of knowledge on the multifaceted processes regarding how particular diet patterns influence NCDs. This study synthesizes available literature on nutrition and NCDs concerning how dietary patterns and nutrient intakes influence the prevention and treatment of diseases. Conclusions are drawn from numerous investigations, stressing the positive effects of dietary modifications like Mediterranean and DASH diets on NCD risk and actual health status. This review contributes to the future development of nutrition and health as a quick reference for researchers about the specific effects of nutrition on health. However, some barriers have not yet been solved like the incidence of unhealthy dietary patterns. Subsequent research should closely examine factors that can be employed that would ensure the effective administration of both nutritional interventions as well as the formulation of improved public health policies that would ensure a change of habits and eating behaviors in a bid to reduce the effects of NCDs.

Keywords: Nutrition, Mediterranean diet, non-communicable disease, DASH diet, CVDs.

1. Introduction

Cardiovascular diseases (CVDs), diabetes, obesity, and specific kinds of cancers are non-communicable diseases that are responsible for various global health issues. Based on the World Health Organization (WHO), they cause much global disease burden. Non-communicable diseases (NCDs) are estimated to cause about 71% of the total deaths all over the world, with elevated rates of NCDs being associated with several aspects of life, and nutrition is among the most reversible risk factors [1]. Some studies have revealed a close relationship between eating patterns and nutritional quality and the risk and trend of NCDs. For instance, research shows that certain diets, such as those high in fruits, vegetables, whole grains, and other fats, are linked to decreased NCDs [2]. In contrast, diets high in processed foods and sugars increase the risk of developing these diseases.

The literature on nutrition and NCDs has progressed significantly over the past years with the areas of focus including dietary Patterns, whereby there has been a transition in focusing more on the effects of certain kinds of

diets as opposed to fixed nutrient values. This shift is particularly important as the approach presents a general concept of how food combinations affect people's health [3]. It is easier to get a combined impact of multiple foods that could either complement or negate each other's impact on human health.

Secondly, research in this field has been witnessed in nutritional interventions. Today, it is evident that nutrition-related interventions have elicited much interest, particularly concerning their role in the fight against chronic diseases. Much research has been conducted to establish the effects of certain dietary plans, which are most important, including the Mediterranean diet and the DASH diet. The basis of the Mediterranean diet is the intake of more fruits, vegetables, whole grains, healthy fats, and other such foods [4]. This diet can lower the risks of disease, metabolic disorders, and certain cancers.

Understanding the role of nutrition in NCDs is vital for several reasons. The first is public health impact, given that NCDs constitute a major portion of the global disease burden and a load on the healthcare systems. Therefore, addressing the nutrition issue will help minimize

healthcare expenses and enhance patients' quality of life [1]. Second is preventive health, where various crucial strategies for the prevention of diseases are centered on nutrition. Prevention of nutrient-related diseases involves healthy diets that help to reduce risk factors such as high BP, high cholesterol levels, and obesity [5]. Therefore, interventions by public health organizations should be aimed at promoting nutrition education and providing wholesome foods. This literature review will encompass the following key areas: an introduction to NCDs and their global impact, the relationship between nutrient intake and NCDs, dietary recommendations for preventing NCDs, and the role of macronutrients in the prevention and treatment of deficiencies. In addition, the content will include nutritional interventions and their effectiveness in clinical settings and directions for further research and public health interventions.

2. Organization of the Text

2.1 Type 2 Diabetes (T2D) and Dietary Patterns

2.1.1 Mediterranean diet

The Mediterranean is popular owing to its application in the avoidance of diabetes. This diet consists of consuming a large amount of whole inedible food less processed, such as fruits and vegetables, whole grains, beans, and nuts, and high monounsaturated fat from olive oil. A cross-sectional study concluded that adherence to MD significantly lowers the risk of a person developing T2DM [3]. The protective effect of the Mediterranean diet is linked to its relatively high fiber content, antioxidants, and healthy fat that actively improve the metabolic condition. Secondly, the glycemic index of the foods used in the preparation of the Mediterranean diet is low, which ensures that the human body does not accumulate high levels of glucose in the bloodstream and, therefore, has low tendencies to develop insulin resistance. Besides, a Mediterranean diet does not allow overeating, as it is partly based on the idea of portion control, and this factor is among the essential points of diabetes regulation.

2.1.2 DASH diet

Another plan believed to be efficient in preventing T2D is the Dietary Approaches to Stop Hypertension or the DASH diet. It is particularly designed to address issues related to raised hypertension rates. DASH users are supposed to personalize their diet to contain higher amounts of fruits, vegetables, whole grain products, lean meats, and low-fat dairy products while lowering sodium content. Improved glycemic management and a decrease in diabetes complications are made possible by following

the recommended DASH diet [6]. Therefore, a diet rich in nutrient-dense food provides micronutrients required for bodily maintenance. In addition, the DASH diet reduces sodium intake, thereby assisting in the control of blood pressure, which is very important for diabetic clients due to a higher risk of CVDs. Thus, it is established that the DASH diet is an effective tool in diabetes control and the enhancement of health among patients with the disease. Hence, the DASH diet increases the intake of the recommended nutrients for metabolism and the overall formation of a healthier lifestyle for clients with T2D.

2.1.3 Processed foods and sugar

The impact of processed foods and added sugar consumption on the development of T2D is a topic of interest in nutrition. The high intake of processed products is generally in processed carbohydrates, unhealthy fat, and sugar that are not good for the body [4]. Pointed out that people who consume foods containing processed elements and added sugars are at a higher risk of developing diabetes. These foods lead to high fluctuations in blood sugar levels, hence a high need for insulin with subsequent development of insulin resistance. Such patients lack fiber since processed foods do not fill one up like whole foods do. Thus, people end up consuming a lot of food and hence gain weight, a factor that leads to the development of diabetes. This problem is particularly worsened by the current diets characterized by high intakes of added sugars that compromise metabolic health. Thus, people should watch their consumption of processed foods and foods with added sugar and try to incorporate more foods that will not cause spikes in blood sugar.

2.2 Nutrition-specific Roles in the Management of NCD

Nutrient-specific roles are vital in the prevention and control of NCDs because some nutrients have been found to have an inverse effect on some of these diseases through one mechanism or the other. Dietary fiber, omega-3 fatty acids, vitamins, and several minerals are some of the nutrients that are involved in regulating certain physiological processes that affect disease susceptibility [7]. First, in regards to dietary fiber, the findings show a forward-thinking of high dietary fiber consumption, which can reduce the advent of type 2 diabetes and cardiovascular diseases. Fiber is also credited for controlling blood sugar levels since it reduces the rate at which glucose is absorbed in the bloodstream as well as enhances the efficiency of the hormone insulin. Secondly, in terms of Omega-3 Fatty Acids, this type of fat is part of fatty fish, flaxseeds, and walnuts, and it plays the role of reducing inflammation, which in turn reduces the potentiality of heart diseases. It is now

established that they are effective in lowering triglyceride concentration, improving endothelial function, and lowering blood pressure, thereby playing a role in Cardiovascular Disorders. Thirdly, in regards to vitamins and minerals, including vitamin D, magnesium, or potassium, which play vital roles in one's metabolic health. Notably, vitamin D has been associated with many non-communicable diseases, such as diabetes and hypertension, in individuals who lack this vitamin. It influences glucose metabolism and blood pressure. Besides sharing a role with calcium in muscle and nerve function, potassium is associated with blood pressure regulation.

2.3 Nutritional Intervention and Recommendations for Healthcare Practitioners

Nutritional interventions have emerged as an essential component in the prevention as well as management of NCDs. An analysis of the literature supports the view that the implementation of organized eating plans can bring about enhanced health for clients who are either susceptible to NCDs or living with diseases. Regarding clinical evidence, several types of research have proven the effectiveness of restricted diets like CVD and favorable Mediterranean and DASH diets. For example, based on the proportions of energy that are taken from the foods that are specified in the Mediterranean diet, patients with cardiovascular disease, diabetes, and metabolic syndrome have shown fewer events and better glycemic control [8]. Likewise, there have been investigations showing the effectiveness of the DASH diet in lowering blood pressure and reigning in lipid profiles among hypertensive patients. These diets do not allow processed foods and marginalize fruits, vegetables, whole grains, lean sources of proteins, and good fats that are beneficial to metabolic health.

In recommendations for practitioners, the issue of nutrition knowledge should become integrated into the everyday practice of healthcare practitioners due to its critical role in managing and preventing diseases related to nutrition. The survey findings suggest that practitioners should consider evaluating patients' dietary patterns and offering a diet that fully meets evidence-based recommendations. Furthermore, practitioners should involve patients in the process of cooking and meal preparation to increase the patient's awareness of nutrition and appropriate behavior during the cooking process. In addition, care coordination of providers involved in managing NCDs should include the engagement of a registered dietitian in formulating and implementing care plans for patients' nutrition [9]. It is outlined that through implementing Nutrition Support and nutrition-focused interventions into the clients' clinical practice, healthcare professionals can help such patients and contribute to decreasing the burden of NCDs.

2.4 Future Directions in Nutrition Research

The field of nutrition research is dynamically developing, and its findings have important policy implications for the sphere of public health while indicating directions for future studies. With the continuous increase in the global burden of NCDs, the need to fulfill research gaps that explain the relationship between feeding habits and health cannot be over-emphasized. First, in terms of emerging trends, a highly accessed area of research is the area of personalized nutrition which involves modifying the diet plan based on the genetic makeup, metabolism, and other variables of the consumer [10]. Thus, applying the framework developed in this study may offer the potential of improving dietary interventions, as well as health for those receiving such interventions, particularly people at risk of developing NCDs. Secondly, in regard to public health policy implications, the malnutrition status should be adopted by the authorities as an important aspect of the state's response measures against NCDs. This includes bottles on some of the policies, such as the provision of subsidies on healthy foods like fruits and a ban on advertisement of unhealthy foods, especially to children. Moreover, governments and public health institutions should target education programs to prevent aspects of diseases through nutrition improvements as well as promote healthier dietary patterns at the population level of analysis.

3. Conclusion

Overall, the highlight of nutrition as a contributing factor to non-communicable diseases, as discussed in this paper, is an indication of the significance of nutrition in combating NCDs. In this study, different ways through which dieting is associated with chances of getting diseases like cardiovascular diseases, diabetes, and obesity have been discussed to show the existence of a complex interconnection between the two. More specifically, this literature exemplified how following healthy diets, including the Mediterranean and the DASH diets, is very effective at lowering the rates of these diseases. Also, the review highlighted the thus of processed foods and high sugar intake on metabolic health and called for interventions. The findings of this article are worthy of analysis as it offers essential information regarding the possible prevention options for NCDs with the help of providing appropriate nutrition to the population. Hence, this paper provides a systematic review of the extant literature on how different coprophagy patterns impact health to inform future studies addressing specific issues of effective nutritional intercession.

However, it should be noted that this paper has some limitations. In its evaluation, conclusions, and recommen-

dations sections, it relies on established dietary patterns and their broad influences on the human body. Most of the available literature does not discuss in detail the biochemical processes that take place within the body or the long-term consequences that result from such changes in diet. Furthermore, the available literature fails to mention the social and economic aspects that shape individuals' feeding practices and their ability to obtain healthy foods essential for preventing NCDs. Therefore, a need for future studies to build upon these weaknesses and examine the moderating pathways by which nutrition influences NCDs and the influence of socio-economic factors on people's diet. Further, there is a lack of studies that evaluate the effectiveness of dietary portfolios on NCDs' outcomes over time. Therefore, future research should add to the literature surrounding nutrition as well as play a pivotal role in developing better ways of approaching disease prevention and control.

References

- [1] Budreviciute, A., Damiati, S., Sabir, D. K., et al. Management and prevention strategies for non-communicable diseases (NCDs) and their risk factors. *Frontiers in Public Health*, 2020, 8: 574111.
- [2] Cena, H., Calder, P. C. Defining a healthy diet: evidence for the role of contemporary dietary patterns in health and disease. *Nutrients*, 2020, 12(2): 334.
- [3] Guasch-Ferré, M., Willett, W. C. The Mediterranean diet and health: A comprehensive overview. *Journal of Internal Medicine*, 2021, 290(3): 549-566.
- [4] Inui, T., Hanley, B., Tee, E. S., et al. The role of micronutrients in aging Asia: what can be implemented with the existing insights. *Nutrients*, 2021, 13(7): 2222.
- [5] Kiani, A. K., Medori, M. C., Bonetti, G., et al. Modern vision of the Mediterranean diet. *Journal of Preventive Medicine and Hygiene*, 2022, 63(2 Suppl 3): E36.
- [6] Soltani, S., Arablou, T., Jayedi, A., Salehi-Abargouei, A. Adherence to the dietary approaches to stop hypertension (DASH) diet about all-cause and cause-specific mortality: a systematic review and dose-response meta-analysis of prospective cohort studies. *Nutrition Journal*, 2020, 19: 1-13.
- [7] Eggersdorfer, M., Berger, M. M., Calder, P. C., et al. Perspective: Role of micronutrients and omega-3 long-chain polyunsaturated fatty acids for immune outcomes of relevance to infections in older adults—A narrative review and call for action. *Advances in Nutrition*, 2022, 13(5): 1415-1430.
- [8] Castro-Barquero, S., Ruiz-León, A. M., Sierra-Pérez, M., et al. Dietary strategies for metabolic syndrome: a comprehensive review. *Nutrients*, 2020, 12(10): 2983.
- [9] Stephens, N. M. Referral rates and coverage for registered dietitian nutritionist services in a primary care setting. The Ohio State University, 2021.
- [10] Bush, C. L., Blumberg, J. B., El-Sohemy, A., et al. Toward the definition of personalized nutrition: a proposal by the American Nutrition Association. *Journal of the American College of Nutrition*, 2020, 39(1): 5-15.