

***Corresponding author**

*Muhammad Akram, Department of Eastern Medicine, Government College University Faisalabad, Pakistan.

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The Impact of Nutrition on Chronic Diseases

Muhammad Akram¹, David Pérez-Jorge², Momina Iftikhar¹, Sarvananda L³, Francisco Garcia-Sierra⁴, Riyadh S Al-Malki⁵, Fethi Ahmet Ozdemir⁶, Gawel Sołowski⁶, Najmiatul Fitria⁷, Marcos Altable⁸, Adonis Sfera⁹, Simone Brogi¹⁰, Ho Soonmin¹¹, Zaryab Fatima¹², El Hadji Seydou Mbaye¹³, Isah Suleiman Yahaya¹⁴, Yahaya Usman¹⁵

¹Department of Eastern Medicine, Government College University Faisalabad-Pakistan .

²DISAE Research Group. University of La Laguna. Spain.

³Molecular Nutritional and Biochemistry Laboratory, University of Peradeniya, Sri Lanka .

⁴Department of Cell Biology, Center of Research and Advanced Studies of the National Polytechnical Institute, Mexico City, Mexico.

⁵Department of Pharmacology and Toxicology, Faculty of Pharmacy, Umm Al Qura University, Makkah, Saudi Arabia.

⁶Department of Molecular Biology and Genetics, Faculty of Science and Art, Bingol University, Bingol, 1200, Türkiye.

⁷Department of Pharmacology and Clinical Pharmacy, Universitas Andalas, Indonesia.

⁸Department of Neurology, Neuroceuta, (Virgen de Africa Clinic), Spain.

⁹Department of Psychiatry, Patton State Hospital, USA.

¹⁰Department of Pharmacy, University of Pisa, Via Bonanno, 6, I-56126 Pisa, Italy.

¹¹Faculty of Health and Life Sciences, INTI International University, 71800, Putra Nilai, Negeri Sembilan, Malaysia.

¹²Department of Sociology & Criminology, University of Sargodha, Sargodha.

¹³7BCNet International Working Group, IARC/WHO, Dakar –Senegal.

¹⁴Department of Medical Laboratory Science, Faculty of Allied Health Sciences, Bayero University, Kano, Nigeria.

¹⁵Federal College of Forest Resources Management Maiduguri Borno State Nigeria.

Abstract

Chronic diseases, such as diabetes, cancer and cardiovascular diseases, place a heavy burden on the world's healthcare and health systems. Recent studies have shown how important nutrition is in controlling and preventing chronic diseases. This overview summarizes the most recent research on the effects of specific nutrients and dietary patterns on the course of chronic diseases. Maintaining health and reducing the risk of disease requires eating a sufficient, well-balanced diet. Diets rich in healthy grains, fruits, vegetables, and lean meats have been consistently linked to a lower incidence of chronic diseases. For example, consuming plenty of fiber has been associated with a lower risk of type 2 diabetes and cardiovascular disease, and omega-3 fatty acids, found in flax seeds and fish, have been shown to reduce inflammation and improve heart health. On the other hand, diets high in added sugars, processed foods, and saturated fats are linked to a higher risk of developing chronic diseases. Too much of these foods can lead to obesity, insulin resistance and high cholesterol, all of which are major risk factors for diabetes and cardiovascular disease. Recent studies have also highlighted the importance of personalized nutrition, which considers each person's unique genetic, metabolic and lifestyle factors. More

than broad dietary guidelines, individualized nutritional interventions can improve disease prevention and treatment. In summary, diet has a significant impact on the onset and evolution of chronic diseases. Improving dietary habits is a key component of public health interventions that can have a major impact on disease prevalence and overall health outcomes. To improve dietary counseling and therapies, future studies should conduct more research into the intricate relationships between genetics, diet, and chronic diseases.

Introduction

Chronic diseases, such as diabetes, cancer and cardiovascular diseases, represent a serious threat to global health and are a leading cause of morbidity and mortality rates. These chronic diseases are caused by a confluence of hereditary, environmental and lifestyle variables. They develop gradually. Nutrition is one of these vital elements for the management and prevention of chronic diseases. The importance of nutritional practices as basic determinants of health is increasingly recognized. Numerous studies have examined the connection between nutrition and chronic diseases, and results show that dietary decisions can have a significant influence on the development and risk of these disorders. For example, diets rich in fruits, vegetables, whole grains, and lean proteins are linked to lower risks of type 2 diabetes, cardiovascular disease, and several types of cancer (Sofi et al., 2010; Mozaffarian et al., 2011). On the other hand, diets high in added sugars, processed foods, and saturated fats have been associated with an increased risk of developing certain chronic diseases (Katz et al., 2014). One strategy that has shown promise for the treatment of chronic diseases is a personalized diet. This approach involves customizing dietary guidelines based on personal traits such as metabolic profiles, genetic predispositions, and lifestyle choices. By taking into account individual differences in nutrient metabolism and disease risk, personalized nutrition seeks to maximize health outcomes by providing more targeted and efficient dietary interventions (Ordovas et al., 2018; Zeevi et al., 2015). Heart disease, hypertension, and stroke are examples of cardiovascular diseases that are affected by dietary variables. Diets high in cholesterol, salt, and saturated and trans fats are known to exacerbate cardiovascular disorders; On the other hand, diets rich in fiber, omega-3 fatty acids and unsaturated fats are good for the heart (Mozaffarian et al., 2011). Dietary practices are closely associated with diabetes, especially type 2 diabetes. High blood sugar levels and insulin resistance may be due to excessive consumption of processed carbohydrates and little fiber. In contrast, diets rich in whole grains, fiber, and healthy fats help reduce the incidence of diabetes and improve glycemic control (American Diabetes Association, 2021; Ebbesson et al., 2011). Diet also has an impact on cancer risk. Dietary fiber

and nutrients with antioxidant qualities, such as vitamins C and E, have been shown to have preventive effects against specific types of cancer. On the other hand, a higher risk of cancer has been linked to a high intake of red and processed meats (World Cancer Research Fund, 2018; Bouvard et al., 2015). Creating successful preventive and treatment plans requires understanding how nutrition affects chronic diseases. Dietary changes can improve overall health and reduce risk factors related to these diseases. One route toward more effective and personalized treatment of chronic diseases is the incorporation of personalized nutrition techniques into clinical practice, which can improve patient outcomes and quality of life.

Dietary patterns: Are the general patterns of eating and nutrient intake over a long period of time that have a substantial impact on long-term health effects. Numerous dietary approaches, including plant-based, low-carbohydrate, and Mediterranean diets, have been investigated for their potential impact on chronic diseases. For example, studies have repeatedly linked lower risks of cardiovascular disease and some types of cancer to the Mediterranean diet, rich in fruits, vegetables, whole grains, nuts, and olive oil (Sofi et al., 2010). On the other hand, diets rich in processed foods, trans fats and refined sugars are associated with an increased risk of developing chronic diseases (Mozaffarian et al., 2011). Healthy weight, improved metabolic function, and decreased inflammation are important aspects of disease prevention that can be achieved by emphasizing whole, nutrient-dense foods (Liu et al., 2015).

Personalized Nutrition: A new method called "Personalized Nutrition" adjusts food suggestions for each person based on their unique characteristics. This method creates personalized eating regimens taking into account lifestyle factors, metabolic reactions, genetic predispositions, and current health concerns. For example, people with particular genetic variations might respond differently to dietary modifications or metabolize nutrients differently (Zeevi et al., 2015). Unlike conventional guidelines, personalized nutrition seeks to optimize dietary interventions to improve individual health outcomes, which may result in more successful chronic disease management or disease prevention (Ordovas et al., 2018).

Chronic diseases that are long-term disorders greatly influenced by food include diabetes, cancer, and cardiovascular disease.

Diabetes: Dietary practices are directly associated with diabetes, especially type 2 diabetes. Insulin resistance and increased blood sugar levels can be caused by diets high in refined carbohydrates and deficient in fiber (Nielsen et al., 2011). On the other hand, diets rich in vegetables, lean

meats, whole grains, and healthy fats can reduce the risk of diabetes and improve blood glucose control (Ebbesson et al., 2011). It has been shown that nutritional therapies, such as low-carbohydrate or Mediterranean diets, can help control blood sugar levels and prevent diabetes-related problems (Patterson et al., 2021).

Cancer: The risk and course of cancer can be influenced by nutritional variables. Antioxidant stress and inflammation are linked to cancer development, and diets rich in antioxidants, vitamins, and minerals may protect against these effects (World Cancer Research Fund/American Institute for Cancer Research, 2018). For example, a reduced risk of colorectal cancer is associated with a high intake of fruits, vegetables, and fiber (Aune et al., 2011). On the other hand, consuming a lot of red and processed meat increases the chances of developing several malignant diseases (Bouvard et al., 2015).

Cardiovascular diseases: These include diseases influenced by diet, including heart disease and stroke. According to Smith et al. (2020), diets high in cholesterol, trans fats, and saturated fats can cause plaque buildup in the arteries, increasing the risk of cardiovascular events. On the other hand, diets rich in fiber, omega-3 fatty acids, and unsaturated fats are good for heart health (Mozaffarian et al., 2011). Reducing the risk of heart disease requires adopting dietary patterns that support healthy blood pressure, cholesterol, and overall cardiovascular function (Kris-Etherton et al., 2021).

Dietary fibre and whole grains in the prevention of cardiovascular disease: systematic review and dose-response meta-analysis of prospective studies. *The Journal of the American College of Cardiology*, 57(3), 289-299.

Dietary patterns include the general food selection and consumption habits of an individual or population over time. The types and amounts of foods eaten fall among these patterns and together affect health outcomes. Typical dietary habits that have been investigated in relation to chronic diseases include:

The Mediterranean diet is characterized by a moderate intake of fish and poultry and a high intake of fruits, vegetables, whole grains, nuts and olive oil. This diet has been associated with lower risks of diabetes, cancer, and cardiovascular disease (Sofi et al., 2010).

Plant-based diet: Minimizes or eliminates animal products and emphasizes fruits, vegetables, legumes, nuts and seeds. Research indicates that eating a plant-based diet can reduce your chances of developing long-term conditions such as diabetes and heart disease (Melina et al., 2017).

Low-carbohydrate diet: This diet emphasizes consuming more fat and protein while consuming fewer carbohydrates. According to Stern et al. (2004), this pattern has been shown to help control blood glucose levels in diabetics and may facilitate weight loss.

Western diet: typically high in red and processed meats, refined carbohydrates, and saturated fats. According to Katz et al. (2014), this pattern is related to increased risks of obesity, type 2 diabetes, and cardiovascular disease.

Genetic variability: People differ in their genetic makeup, which can have an impact on how they metabolize nutrients and react to dietary modifications. For example, a person's reaction to dietary lipids can be influenced by genetic variations in genes related to fat metabolism (Corella et al., 2018).

Metabolic profiling: Personalizing dietary recommendations can be helpful by measuring metabolic markers such as insulin sensitivity, cholesterol, and blood glucose levels. For example, low-carbohydrate diets may be advantageous for people with high levels of insulin resistance (Belfort et al., 2005).

Lifestyle factors: Stress, sleep patterns, and physical activity levels are taken into account in personalized nutrition. These elements can affect the effectiveness of dietary interventions as well as nutritional requirements (Liu et al., 2020).

Conclusion

To prevent and treat chronic diseases such as cancer, diabetes and cardiovascular diseases, proper nutrition is essential. Research continually shows that eating a diet rich in fruits, vegetables, whole grains, and healthy fats reduces the chance of developing chronic diseases. On the other hand, diets high in added sugars, processed foods, and saturated fats are linked to an increased risk of disease. Personalized nutrition offers promising options for more effective disease prevention and control by adjusting dietary recommendations based on individual genetic and metabolic profiles. Optimization of dietary patterns and individualized nutrition techniques can be combined to improve overall health and well-being and decrease the effects of chronic diseases.

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