

Opinion



Vegetarian Diet for Cardiovascular Disease Risk Reduction: Cons

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ABSTRACT

Numerous studies have reported that adopting a plant-based diet can significantly reduce the risk of cardiovascular diseases (CVDs). Not only does a vegetarian diet help mitigate the risk of these diseases, but it also contributes to enhancing environmental sustainability. However, it is not necessary to universally recommend a vegetarian diet as a preventive measure against CVDs. More research is needed to determine whether completely excluding animal products is necessary, or if adhering to a predominantly plant-based diet is sufficient. In this opinion paper, the potential adverse health effects of a vegetarian diet and the barriers associated with adopting it will be discussed, in order to provide a rationale for the disadvantages of using a vegetarian diet for CVD risk reduction.

Keywords: Vegetarian diet; Cardiovascular diseases; Vitamin B12; Risk; Dietary guidelines

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death worldwide, with the number of CVD-related deaths rising from 12.1 million in 1990 to 18.6 million in 2019.¹ In Korea, CVD is the second leading cause of death, responsible for 121.5 deaths per 100,000 individuals in 2021, according to the Korean Statistical Information Service.² In the United States alone, CVD claims over 800,000 lives each year.³ Dietary habit is an important component that attributes to the burden of CVD. Key dietary factors include low consumption of whole grains, fruits, nuts and seeds, vegetables, seafood, and omega-3 fatty acids, as well as high sodium intake, all of which are major contributors to CVD deaths.⁴ The health benefits of plant-based diets in preventing CVD and other chronic diseases, such as diabetes and cancer, have been well-documented. Moreover, plant-based diets are considered more environmentally healthy due to their reduced demand for natural resources and lower greenhouse gas emissions.⁵ However, a vegetarian diet can be unhealthy if it is not properly planned. This opinion article presents an argument against vegetarianism as a strategy for reducing CVD risk.

VEGETARIAN DIET AND CVD RISK

A vegetarian diet has been linked to a reduced risk of CVD. Dinu et al.⁶ investigated the association between a vegetarian diet and CVD mortality by analyzing 86 cross-sectional and 10 prospective cohort studies. They reported that vegetarians had significantly lower body mass index (BMI), total cholesterol, and low-density lipoprotein cholesterol levels than omnivores. A vegetarian diet was found to decrease the risk of incidence and mortality from ischemic heart disease by 25%. However, there was no significant difference in the incidence and/or mortality from total cardiovascular and cerebrovascular diseases between vegetarians and non-vegetarians. A systematic review and meta-analysis of data from 13 prospective cohort studies showed that vegetarians had a 15% reduction in the relative risk of CVD and a 21% reduction in the relative risk of ischemic heart disease compared to non-vegetarians, but not stroke.⁷ The favorable impact of a vegetarian diet on CVD risk can be attributed to several factors, including its ability to lower blood lipid levels, reduce glucose levels, protect against oxidative stress and inflammation, and alter the gut microbiome.⁸ Conversely, Kaiser et al.⁹ concluded that there was no significant evidence of an association between a vegan diet and the risk of a primary CVD event based on a systematic review of 7 out of 5,729 identified studies. Among these studies, 3 involved a total of at least 7,380 vegans within 73,426 individuals, and none reported evidence of an increased or decreased risk of CVD for vegans. While one study suggested a higher risk of ischemic stroke, another study indicated lower carotid artery intima-media thickness among vegans.

ADVERSE HEALTH EFFECTS OF A VEGETARIAN DIET

It should not be assumed that a vegetarian diet is always healthy. If not properly managed, a vegetarian diet can potentially be unhealthy due to its potential to be high in refined carbohydrates, high-fructose corn syrup, sodium, artificial sweeteners, and hydrogenated fats. This could lead to an increased risk of CVD morbidity and mortality.⁸ Furthermore, there are several nutritional and health concerns that individuals following vegetarian diets need to consider. Research suggests that some vegetarians, especially those following more restrictive diets, may benefit from consulting a dietitian and should be encouraged to maintain a balanced diet. Vegans, in particular, are at risk of deficiencies in several vitamins and minerals, including vitamin B12, riboflavin, iron, zinc, and calcium.⁷ The NuEva study, which compared nutrient intake and nutritional status among omnivores, flexitarians, ovo-lacto vegetarians, and vegans, found particularly insufficient dietary intake of selenium, zinc, potassium, iron (in women), calcium, vitamin B12, n-3 polyunsaturated fatty acids, and vitamin D with vegetarian and vegan diets.¹⁰

Vitamin B12 is the nutrient most significantly impacted by vegetarianism. In vegetarian men, the serum concentration of vitamin B12 (122 pmol/L) was found to be less than 50% of the average concentration observed in omnivores (282 pmol/L). Notably, vitamin B12 deficiency was identified in 52% of the 232 vegans studied, while only one out of 226 omnivores exhibited a deficiency of vitamin B12 (<118 pmol/L).¹¹ Vegans, who entirely exclude animal-derived foods from their diet, showed a significantly higher prevalence of vitamin B12 deficiency than other vegetarians.¹² A case study involving a female vegetarian patient presenting with delirium indicated vitamin B12 deficiency as a likely cause, and a significant improvement in cognitive function was achieved through vitamin B12 treatment.¹³ Vitamin B12 deficiency is highly prevalent among patients with diabetes and can exacerbate diabetic neuropathy.¹⁴

Therefore, vegetarians with diabetes may be at an increased risk of vitamin B12 deficiency. This necessitates regular monitoring of vitamin B12 status and the implementation of effective supplementation strategies, particularly for vegetarians with diabetes.

In addition to potential nutrient deficiencies, vegetarianism has been linked to several health concerns. For instance, a maternal vegan diet has been associated with an increased risk of giving birth to small-for-gestational-age newborns and lower birth weight.¹⁵ A British cohort study involving both vegetarians and non-vegetarians found that vegetarians had a moderately increased risk of developing symptomatic gallstone disease, even after adjusting for factors such as BMI and other risk factors.¹⁶ A vegetarian diet can also lead to higher oxalate excretion, which may increase the risk of calcium oxalate stone formation in individuals prone to urolithiasis. A significant increase in oxalate excretion was observed in healthy men who followed an ovo-lacto-vegetarian diet, compared to those who consumed western-type and normal mixed diets. The authors of this study suggested that a vegetarian diet, without adequate calcium intake, might not be recommended for patients with calcium oxalate stones.¹⁷

A VEGETARIAN DIET IS NOT THE ONLY ANSWER FOR CVD PREVENTION

Psychological barriers can hinder dietary changes, and for many, adopting a vegetarian diet may not be the preferred choice. An Australian survey revealed that the main perceived obstacles to adopting a vegetarian diet were the enjoyment of eating meat and a reluctance to change established eating habits.¹⁸ Consequently, there could be a greater interest in plant-based diets that include some meat, rather than a strictly vegan diet. In line with this idea, a more effective strategy for preventing and managing CVD might be to suggest a plant-based diet that allows for manageable adjustments for non-vegetarians, rather than enforcing a vegetarian diet. O'Keefe et al.¹⁹ argued that a plant-forward, omnivorous, whole-foods diet is a more logical choice and is more compatible with human biology. This is because completely eliminating animal-derived foods from the diet often leads to adverse health consequences. For example, prolonged strict veganism can increase the risks of bone fractures, sarcopenia, anemia, and depression.¹⁹

Dietary guidelines for numerous chronic diseases, including CVD and diabetes, recommend individualized medical nutrition therapy rather than a specific dietary pattern. Dietary guidance to improve cardiovascular health from the American Heart Association (AHA) emphasizes the importance of achieving and maintaining a healthy body weight, consuming a diet rich in vegetables and fruits, choosing whole-grain foods, selecting healthy protein sources, and using liquid plant oils. It also advises minimizing the intake of ultra-processed foods, foods and beverages with added sugars, foods high in sodium, and alcoholic beverages.²⁰ This heart-healthy dietary pattern aligns with the principles of a plant-based diet. However, the AHA also emphasizes the regular intake of fish and seafood, as well as low-fat or fat-free dairy products, as healthy protein sources. The n-3 polyunsaturated fatty acids found in fish and seafood, along with the substitution effect of replacing other animal proteins with fish and seafood, appear to contribute to a lower CVD risk. Low-fat dairy is a component of the Dietary Approaches to Stop Hypertension, and a dietary pattern that includes low-fat dairy has been reported to be associated with a lower risk of CVD.²⁰ Therefore, incorporating healthy protein sources such as fish, seafood, and low-fat dairy

could be a more beneficial option than a vegan diet for reducing CVD risk. Consuming these healthy protein sources could provide additional benefits by supplying nutrients such as n-3 polyunsaturated fatty acids, vitamin D, and calcium, which are often deficient in a vegan diet.

In a study comparing the effects of an 8-week vegan diet and an AHA-recommended diet on participants with coronary artery diseases, no significant differences were found in weight loss, glycemic control markers, and lipid profiles between the 2 diet groups. Consequently, the authors concluded that the vegan diet does not offer any notable additional benefits compared to the AHA-recommended diet.²¹ Similarly, a 2-year intervention study comparing the effects of a vegan diet and a low-fat omnivorous diet on overweight or obese African American adults found no significant differences in weight loss, changes in blood lipids, or changes in blood pressure between the 2 groups.²²

Adopting a vegetarian diet can present challenges due to the limited options available when eating out. Furthermore, the diet may lack variety due to fewer food choices. For some individuals, consuming excessive amounts of soy-based products could potentially lead to health issues.

CONCLUSION

The advantages, disadvantages, and potential barriers of vegetarian diets, along with the mechanisms that may explain them, are summarized in **Table 1**. The viewpoint of cons for consuming a vegetarian diet as a strategy for CVD prevention are based on its practicality and feasibility. For those who choose to follow a vegetarian diet, their decision should be respected. However, it is crucial for them to understand the potential for nutritional deficiencies. They should receive appropriate nutrition education to prevent nutrient deficiencies and maintain a well-planned, healthy vegetarian lifestyle. For those who do

Table 1. Benefits and drawbacks of a vegetarian diet

Health effects	Possible causes	Reference
Benefits		
Reduction of CVD and IHD risks		Dybvik et al. ⁷ (2023)
Lowering effect of		Wang et al. ⁸ (2023)
Body weight	Low energy density of the diet	
Blood cholesterol	Low saturated fat and high fiber intake	
Blood glucose	High fiber intake	
Protection against oxidative stress and inflammation	High intake of vitamin C, vitamin E, beta-carotene, and phytochemicals	Wang et al. ⁸ (2023)
Modulation of the gut microbiome	High intake of fiber	Wang et al. ⁸ (2023)
Drawbacks or barriers		
Health risks of		O'Keefe et al. ¹⁹ (2022)
Depression	n-3 polyunsaturated fatty acids and zinc deficiencies	
Hair loss	Protein, zinc, and iron deficiencies	
Dermatitis	Zinc and protein deficiencies	
Anemia	Iron and vitamin B12 deficiencies	
Sarcopenia	Inadequate high-quality protein	
Osteoporosis	Vitamin D and calcium deficiencies	
Insufficient intake of n-3 polyunsaturated fatty acids, zinc, calcium, vitamin B12, and vitamin D	Low content in vegetarian diet	Dawczynski et al. ¹⁰ (2022)
Risk of low birth weight	Less weight gain during pregnancy	Avnon et al. ¹⁵ (2021)
Risk of gallstone formation		McConnell et al. ¹⁶ (2017)
Deficiency of vitamin B12	Suboptimal intake of vitamin B12	Gilsing et al. ¹¹ (2010)
Risk of calcium oxalate stone formation	Increased oxalate excretion	Siener and Hesse ¹⁷ (2002)

CVD, cardiovascular disease; IHD, ischemic heart disease.

not follow a vegetarian diet, it is not necessary to insist on vegetarianism for the prevention of CVD. While the health benefits of plant-based diets on CVD have been consistently documented, the superiority of a vegan diet over other plant-based diets has not been definitively established. Rather than requiring a complete shift to vegetarianism, incorporating more plant-based foods into the diet—ones that are acceptable to non-vegetarians—and making gradual changes towards heart-healthy eating habits would be a more sustainable and less demanding strategy for CVD prevention among the broader population.

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