

Plant-Based Diets and Cardiovascular Disease

Chonoor Mohammadi¹ and Ebrahim Alinia-Ahandani^{2*}

¹Department of Biochemistry, Payame Noor University, Iran

²Department of Biology, University of Soran Kurdistan, Iraq

ISSN: 2578-0204



***Corresponding author:** Ebrahim Alinia-Ahandani, Department of Biochemistry, Payame Noor University, Tehran, P.O.BOX 19395-3697, Iran.

Submission:  September 25, 2019

Published:  January 24, 2020

Volume 3 - Issue 2

How to cite this article: Chonoor M, Ebrahim A-A. Plant-Based Diets and Cardiovascular Disease. Open J Cardiol Heart Dis.3(2). OJCHD.000559.2020. DOI: [10.31031/OJCHD.2020.03.000559](https://doi.org/10.31031/OJCHD.2020.03.000559).

Copyright@ Ebrahim Alinia-Ahandani, This article is distributed under the terms of the Creative Commons Attribution 4.0 International License, which permits unrestricted use and redistribution provided that the original author and source are credited.

Abstracts

Several herbs and supplements may help in fighting atherosclerosis, the underlying cause of most heart disease which will be started in various ranges. There be a role for supplementation with folic acid, vitamin B12, and vitamin B6 to decrease homocysteine levels in stroke prevention with complementary role of vitamin K, E or C that recent data with vitamin D and cardiovascular diseases (CVD) provides new opportunities for further research. we concentrate on some herbs for which there is some evidence, if not final proof, supporting their value in the prevention or treatment of CVD like Hawthorn (*Crataegus* species), Garlic (*Allium sativum*), Danshen (*Salvia miltiorrhiza*), Lingzhi (*Ganoderma lucidum*), Ginkgo (*Ginkgo biloba*), Foxglove (*Digitalis species*), Ginseng (*Panax species*) and so on. At the end of this paper, concentration was on suggestions for using these sources to prevent secondary progress levels of heart disorders.

Introduction

Cardiovascular disease, also known as heart disease, or coronary artery disease (CAD), is the number one killer in the United States. Diet and lifestyle play an important role in preventing and reversing heart disease, and certain herbs and supplements can help lower your risk for heart disease and treat heart conditions you've already been diagnosed with. Several herbs and supplements may help in fighting atherosclerosis, the underlying cause of most heart disease. Atherosclerosis causes plaque to build up in your arteries, blocking the flow of oxygen-rich blood to your heart and other organs. It can cause a heart attack and even death. Atherosclerosis is common in the developed world, but virtually unknown outside of it, due to the different diets and lifestyles of people in the developing world. Xinyu et al. found that there is overwhelming evidence that oxidative stress is associated with the pathogenesis of Coronary Heart Disease (CHD).

Traditional Chinese medicine or TCM therapy has unique advantages in CHD. In recent years, Chinese medicine has made great progress in the treatment of CHD, which can effectively ameliorate the symptoms of patients and improve the quality of life of patients. Compared with Western medicine, it has significant therapeutic effects, few side effects, and no obvious drug dependence. The treatment of this disease by TCM has a broad prospect, and it is worthy of further promotion and development [1]. Diets consisting of predominantly plant foods and that are lower in animal foods were associated with a lower risk of incident cardiovascular disease, cardiovascular disease mortality, and all-cause mortality in a general population. Dietary patterns that are relatively higher in plant foods and relatively lower in animal foods may confer benefits for cardiovascular health. Considering the adverse outcomes associated with refined carbohydrate consumption, future research should continue to explore if the quality of plant foods (either healthy plant foods or less healthy plant foods) within the framework of plant-based diets is associated with cardiovascular disease and all-cause mortality in a general population [2,3].

Essential Micronutrients and Cardiovascular Disease

The use of supplements of essential micronutrients (EMNs) in orthodox medical practice remains controversial, although adequate amounts of these substances are known to be necessary for the maintenance of health. Although it has long been proved that vitamin D,

ascorbic acid, and vitamin B₁₂ are the key to treating rickets, scurvy, and pernicious anemia, respectively, it is less accepted that subclinical deficiency states exist for these and other essential substances that may escape recognition in chronic illness, including CVDs. The estimated average requirement (EAR) to prevent deficiency states for common EMNs have been formulated and modified over the years. Recommendations from the United Kingdom Department of Health guidelines according to age and sex are given in Table 1 [4]. Despite the extensive literature suggesting the benefits of antioxidant vitamins in observational studies, the results of interventional studies have largely been disappointing.

There may still be a role for supplementation with folic acid,

vitamin B₁₂, and vitamin B₆ to decrease homocysteine levels in stroke prevention, and recent data with vitamin D and Cardiovascular Diseases (CVD) provides new opportunities for further research. Niacin clearly has beneficial effects on plasma lipids when given in pharmacological doses, and although n-3 PUFAs are suggested to have various benefits, their exact role in prevention and treatment of CVD still needs to be defined more clearly. Flavonoids such as resveratrol and flavanol-rich cocoa and chocolate appear to have beneficial effects that may be through specific mechanisms rather than a general antioxidant activity, and these merit further investigations. Other herbal medicines also have ingredients with specific pharmacologic effects that influence CVD [4].

Table 1: Vitamin and nutraceutical supplements that have been used for prevention or treatment of CVD.

Nutraceutical	Estimated Average Requirement (Adults)	Doses Used in Clinical Studies
Vitamin E	Men: >4mg/day; women >3mg/day ^e	100-600mg/day
Vitamin C	25mg/day	250-500mg/day
Thiamin	0.8-1.0mg/day ^f	
Vitamin B ₁₂	1.25µg/day	
Vitamin D	10µg/day after 65 years ^b	
Vitamin K	1µg/kg/day ^c	
Folic acid	150µg/day	
Pyridoxine (vitamin B ₆)	Men: 1.4mg/day; women: 1.2mg/day ^e	
Niacin (nicotinic acid)	Men: 16mg/day; women: 12mg/day ^f	1000-2000mg single dose
Carotenoids	-d	β-Carotene 20-50mg/day
Flavonoids	-d	200-1000mg/day
Alcohol		
Magnesium	Men: 250mg/day; women: 200mg/day	800-1000mg/day
Zinc	Men: 7.3mg/day; women: 5.5mg/day	No study
Manganese	1.4mg/day ^a	
Selenium	Men: 75µg/day; women: 60µg/day	
Chromium	25µg/day ^a	200µg/day
Molybdenum	50-40µg/day	No study
Calcium	525mg/day	
Coenzyme Q10	-d	300 mg/day
L-carnitine	-d	2g/day
Omega-3 fatty acids	-d	EPA 1500mg/day

Herbal Medicines and Cardiovascular Disease

A wide variety of plant extracts have been used in traditional medicine over the centuries and some, such as digoxin, have been adopted in conventional medicine. In this section, we concentrate on those plants and herbs for which there is some evidence, if not

final proof, supporting their value in the prevention or treatment of CVD. More detailed reviews can be found elsewhere in the literature [5,6]. Overall, many of the herbal medicines discussed here do appear to have pharmacological effects in vitro and in animal studies, which may influence CVD (Table 2). However, the evidence

from properly conducted clinical trials is generally insufficient to draw definitive conclusions. The problems with standardization of herbal preparations and performance of properly controlled clinical

trials to acceptable international standards need to be addressed before the true clinical value of these herbs can be defined.

Table 2: Potential applications for therapy in cardiovascular conditions of some common herbal medicines.

Herb	Possible Cardiovascular Indications
Hawthorn (<i>Crataegus species</i>)	Heart failure, angina, hyperlipidemia
Garlic (<i>Allium sativum</i>)	Hypertension, hyperlipidemia, antithrombotic
Danshen (<i>Salvia Miltiorrhiza</i>)	Angina, ischemic stroke, hyperlipidemia, antithrombotic
Lingzhi (<i>Ganoderma lucidum</i>)	Hyperlipidemia, hypertension, diabetes
Ginkgo (<i>Ginkgo Biloba</i>)	Cerebral insufficiency, peripheral vascular disease, antithrombotic
Foxglove (<i>Digitalis species</i>)	Heart failure, atrial fibrillation
Ginseng (<i>Panax species</i>)	Angina, hypertension, diabetes

Other Herbal Medicines

Many other herbal materials have been used for treating cardiovascular conditions. They have not been studied to the same extent as the ones listed here, although some did show demonstrable effects. For hyperlipidemia, the herbal extract from the resin of the Commiphora mukul or mukul myrrh tree, known as guggul, is widely used in Asia based on Indian Ayurvedic medicine. The presumed bioactive compounds, guggulsterone, are suggested to antagonize the Farnesoid X Receptor (FXR) involved in controlling cholesterol metabolism [7]. A short-term safety and efficacy study of a standardized guggul extract (guggulipid, containing 2.5% guggulsterone) in healthy adults with hyperlipidemia showed no improvement of serum lipids, and there was a dermatologic hypersensitivity reaction in some patients [8].

More promising effects were seen in rats with diabetes induced by a high-fat diet [9]. Extracts of Chinese red yeast rice (*Monascus purpureus*) contain several active ingredients, including lovastatin, which can lower LDL cholesterol [10-12]. These preparations appear to be safe in moderate doses, but they may not be standardized well and are likely to have the same side effects and drug interactions as lovastatin when taken in large amounts. As suggested with ginkgo, extracts of rosemary may have benefits in attenuating cognitive decline from cerebral insufficiency, but this remains unproved [13]. Extracts of rosemary (*Rosmarinus officinalis*) do appear to have antiproliferative, antioxidant, and anti-inflammatory properties in various cell line studies [14].

The component tetrandrine isolated from *Stephania tetrandra* has antihypertensive and antiarrhythmic effects that have been demonstrated in experimental hypertensive animals and in hypertensive patients [15]. These effects come to action mainly through a calcium antagonistic effect, but other pharmacological mechanisms may also be involved. *Rauwolfia* preparations and veratrum alkaloids are mainly of historical interest in hypertension treatment [16]. Extracts of horse chestnut (*Aesculus hippocastanum*) have been used in the treatment of chronic venous insufficiency, and they were found to be safe and well tolerated, with some beneficial effects in one study [17]. Extracts from Butcher's broom rhizome (*Ruscus aculeatus*) have also been widely used for the treatment of chronic venous insufficiency with some favorable reports [18].

Conclusion

The cardinal importance of a well-balanced diet that includes adequate fruit and vegetables has been rediscovered after some years of oversight during the era of great pharmaceutical and therapeutic advances. In times of plenty, it is important to control calorie intake and lower the consumption of animal fats and alcohol in association with taking adequate regular physical exercise and mental recreation for the maintenance of good health. A worldwide chronic disease epidemic of obesity, diabetes, and consequent CVDs is replacing the diminished burden of infectious diseases. It is evident that there is a place for the use of EMNs where these are deficient, but their value in treating established CVDs is unproved in most instances. Herbal remedies, although they have a long history of use in traditional medicine and show promising biological actions, remain clinically unproved and are as yet often insufficiently standardized to be recommended as therapy. This situation is likely to change with further research. The evidence to support the use of these alternative therapies from clinical trials is not yet secure, but custom and practice make it likely that they will continue to be used for the prevention or treatment of CVDs, among other indications [4].

References

1. Yang X, Tianmai He, Songjie Han, Xiaoyu Zhang, Yang Sun, et al. (2019) The role of traditional Chinese medicine in the regulation of oxidative stress in treating coronary heart disease. *Oxidative Medicine and Cellular Longevity*.
2. Hu EA, Pan A, Malik V, Sun Q (2012) White rice consumption and risk of type 2 diabetes: Meta-analysis and systematic review. *BMJ* 344: e1454.
3. Malik VS, Li Y, Pan A, De Koning L, Schernhammer E, et al. (2019) Long-term consumption of sugar-sweetened and artificially sweetened beverages and risk of mortality in US adults. *Circulation* 139(18): 2113-2125.
4. Benzie IF, Wachtel GS (2011) Herbal medicine: Biomolecular and clinical aspects.
5. Mashour NH, GI Lin, WH Frishman (1998) Herbal medicine for the treatment of cardiovascular disease: Clinical considerations. *Archives of Internal Medicine* 158(20): 2225-2234.
6. Frishman WH, Beravol P, Carosella C (2009) Alternative and complementary medicine for preventing and treating cardiovascular disease. *Dis Mon* 55(3): 121-192.

7. Deng R (2007) Therapeutic effects of guggul and its constituent guggulsterone: Cardiovascular benefits. *Cardiovascular Drug Reviews* 25(4): 375-390.
8. Szapary PO, Wolfe ML, Bloedon LT, Cucchiara AJ, DerMarderosian AH, et al. (2003) Guggulipid for the treatment of hypercholesterolemia: A randomized controlled trial. *JAMA* 290(6): 765-772.
9. Sharma B, Salunke R, Srivastava S, Majumder C, Roy P, et al. (2009) Effects of guggulsterone isolated from *Commiphora mukul* in high fat diet induced diabetic rats. *Food and Chemical Toxicology* 47(10): 2631-2639.
10. Lin CC, Li TC, Lai MM (2005) Efficacy and safety of *Monascus purpureus* Went rice in subjects with hyperlipidemia. *European Journal of Endocrinology Eur J Endocrinol* 153(5): 679-686.
11. Huang CF, Li TC, Lin CC, Liu CS, Shih HC, et al. (2007) Efficacy of *Monascus purpureus* Went rice on lowering lipid ratios in hypercholesterolemic patients. *Eur J Cardiovasc Prev Rehabil* 14(3): 438-440.
12. Gheith O, Hussein Sheasha, Mohamed A, Zaki S, Mohamed Sobh, et al. (2009) Efficacy and safety of *Monascus purpureus* Went rice in children and young adults with secondary hyperlipidemia: A preliminary report. *European Journal of Internal Medicine* 20(3): e57-e61.
13. Kennedy DO, Scholey AB (2006) The psychopharmacology of European herbs with cognition-enhancing properties. *Curr Pharm Des* 12(35): 4613-4623.
14. Cheung S, Tai J (2007) Anti-proliferative and antioxidant properties of rosemary *Rosmarinus officinalis*. *Oncology Reports* 17(6): 1525-1531.
15. Qian JQ (2002) Cardiovascular pharmacological effects of bisbenzylisoquinoline alkaloid derivatives. *Acta Pharmacol Sin* 23(12): 1086-1092.
16. Moser M (1986) Historical perspective on the management of hypertension. *J Clin Hypertens (Greenwich)* 8(Suppl 2): 15-20.
17. Dickson S, Gallagher J, McIntyre L, Suter A, Tan J, et al. (2004) An open study to assess the safety and efficacy of *Aesculus hippocastanum* tablets (*Aesculaforce*® 50mg) in the treatment of chronic venous insufficiency. *J Herb Pharmacother* 4(2): 19-32.
18. Vanscheidt W, Jost V, Wolna P, Lücker PW, Müller A, et al. (2002) Efficacy and safety of a Butcher's broom preparation (*Ruscus aculeatus* L. extract) compared to placebo in patients suffering from chronic venous insufficiency. *Arzneimittelforschung* 52(4): 243-250.

For possible submissions Click below:

[Submit Article](#)