



Vegan Diet and Multiple Health Outcomes: A Review and Meta-analysis

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A recent development in social protest literature involves cultural activism centered largely on the subject of veganism; its health benefits and responses to diseases that already exist among us. This article brings you the data relating health benefits with the entire plant-based diet, based on numerous studies done around and about this subject, taking into account the health-related, social, and ethical aspects.

Aim: Vegan Diet and Multiple Health Outcomes: A Review and Meta-Analysis

Conclusion: Plant-based nutrition is something so simple, yet so profound and so inexpensive that one can 'make health a habit' and thus, can absolutely reverse most of our modern day killers.

Keywords: Vegan; diet; health; disease; plant-based.

1. INTRODUCTION

'A vegan eats a plant-based diet free of all animal ingredients, including milk, meat, and honey,' according to the Vegan Society. The majority of vegans avoid wearing leather, fur, or silk (Vegan society, 2005) [1]. For the first 90% of our hominoid life, our bodies derived mostly from animals. Our entire physiology is thought to have developed in the form of consuming plants, which is just what evolution meant. Since you are addressing the disease's root cause, a vegan diet might be more efficient. We discuss how food plays a key role in avoiding, arresting, and reversing each of the world's top 15 killer diseases. However, there has only ever been one diet that has been shown to cure heart disease, type 2 diabetes, and hypertension. Many of our feared illnesses was shown to be slightly lower for those consuming more plant-based foods, which is morality from all causes together [2].

In observational cohort trials, vegetarians were shown to have a significantly lower rate of ischemic heart disease occurrence and/or mortality. (RR 0.75;95% CI ,0.68 to 0.82) and incidence of total cancer (RR 0.92; 95% CI, 0.37 to 0.98) [3].

Cholesterol, or animal fat, is the cause of heart disease. Vegans have lower BMI, overall cholesterol, LDL cholesterol, and glucose levels, according to a meta-analysis of cross-sectional research. Vegans are 24% less likely than non-vegans to have clogged arteries due to saturated fats and cholesterol [4]. As a result, not only did their cholesterol levels improve, but their blood pressure and extra body weight have decreased, and their arteries reopened [5]. High total trans and saturated fats, on the other hand, will both suppress the desaturase enzyme, causing more health problems. According to a comprehensive meta-analysis, a vegan diet conferred a substantial reduction in the rate of overall cancer incidence (-15 percent) [6]. In a survey on prostate cancer that included a large number of patients, the control group had to undergo surgery, while the vegan group did not have to undergo surgery over the year-long study. Since, when they tracked their blood tests, Prostate Specific Antigen (PSA) levels revealed that cancer was not progressing; in particular, PSA levels fell by around 4% over the span of a year. As a result, the diet is beneficial for cancer prevention and longevity [7]

The lack of highly bioavailable haem-iron in vegetarian diets, as well as the inhibiting effect of certain components present in plant-derived foods on non-haem iron supply, has been seen in cross-sectional studies and narrative reviews. Apart from the fact that adult vegans are more likely than non-vegetarian controls to have slightly lower serum ferritin levels (-29.71 microgram/litres, 95 percent CI [-39.69, -19.73], p0.01). However, high Fe stores put people at risk for noncommunicable diseases like type 2 diabetes. Recommended not only to vegans but also non-vegetarians should regularly control their iron status and thus, improve their diet regarding the content and bioavailability of iron by consuming more plant-based food [8].

In India, undernutrition is steadily decreasing as the country's diet shifts to a higher weight, lower carbohydrate diet, with a heavy consumption of dairy and added sugar. The onset of diabetes seems to be on the rise now. Diabetes may be managed, regulated, and cured with a vegan diet rich in low-protein, low-fat, low-sugar, and low-refined carbohydrate, as well as cardio activity and minimal tension. Pig serum was previously the main ingredient in insulin before physicians found that it aggravated foot neuropathy and ocular problems. Human insulin is now used to synthesize all insulin [9].

In the case of osteoporosis, animal protein adds to the problem since maintaining a neutral pH balance in blood and tissues is often prioritized over maintaining calcium phosphate in bones. Bones can survive without calcium for years, but blood and tissue can't because they require phosphorous to even out the acidity. As the body gets acidic from animal protein, it removes calcium phosphate from bones and replaces it with alkaline mineral phosphate to maintain a healthy pH level in the blood and tissues. Since calcium is excreted from the feces, epidemiological data shows that individuals who consume the least amount of animal protein have the lowest incidence of osteoporosis and bone fractures [9].

HbA1c increased by 0.4 absolute percent point in the traditional diet category, which is fantastic, but it fell three times as much in the vegan group, by 1.2 absolute percent point, which is like real heat crate pharmaceutical except it was food. In this case, a vegan diet was extremely successful. They were also in better shape at the end of the follow-up cycle than they were at the start.

Permanent weight loss necessitates long-term nutritional modifications [10].

1.1 Low-fat Diets Supplements

Low-fat diets focused on fruits and vegetables, whole grains, and legumes; empowerment by knowledge; and no substantial difference in the control group, while the plant-based intervention group lost a total of 19 pounds by the end of the three-month trial, even without any portion limits. They were still down about 27 pounds at the six-month mark, but things got better as they were more physically, psychologically, and emotionally capable. Plant cells, on the other hand, have fibrous cell walls that serve as an indigestible physical shield, trapping more calories. Animal cells are encased in readily digestible membranes, allowing enzymes in our intestine to easily unleash calories. Processed plant food has had its molecular integrity broken, its cell walls cracked open, and it is calorie-free for consumption; but, if you are eating structurally intact plant food, chew it thoroughly. You'll always consume calories, but they'll be totally encased in fiber, which will blunt the glycemic effect, provide nourishment to your pleasant flora, and trigger the ileal split, which will reduce your appetite [11].

In the long term, various diets that result in a low-carbohydrate diet have been linked to a substantially higher risk of all-cause mortality. Even if you consume more organic plant foods, adding meats at least once a week can not only double or triple the risk of diabetes, stroke, heart disease, and weight gain, but it can also be linked to a 3.6-year reduction in life expectancy [12]. Low carbohydrate diets have been found to affect coronary function and exacerbate heart disease; however, a whole plant-based diet has been shown to reverse this [13].

While veganism has been shown to be beneficial to our overall health, it does present some challenges in terms of designing a nutritious diet, such as energy and protein sufficiency, vitamin B12 and vitamin D adequacy, minerals such as Fe, Zn, Ca, I, and the lack of long chain n-3 fatty acids EPA (eicosapentaenoic acid), which can be found in plant sources such as walnuts, flax seeds, chia seeds, and hemp seeds. However, it is the assertion of this essay that a nutritive vegan diet can be conveniently planned with just study and careful consultation to achieve the diet satisfactorily by strategic control of food

accessible to us by plants and adequate supplementation [14].

1.2 Protein Deficiency

Protein deficiency of vegan diets is often debated, but all amino acids may be obtained in plants, with examples like alfalfa sprouts, almonds, bananas, bean sprouts, broccoli, cabbages, coconuts, and the list goes on. Fruits have about 5% protein, which is the same level of protein as human babies get from their mothers' breast milk [15].

Because of the importance of adequate protein consumption, which is debated in the plant-based diet, mixing protein is one of the ways to meet the body's protein requirement, namely, mixing rice protein (available from brown rice) with pea protein while avoiding soy protein due to its high calorie content. It varies greatly from person to person, and for many vegans, it often depends on what they are converting from [16,17].

Vegetarian diets have been shown to have lower fat content, especially saturated fats, and higher dietary fiber content [18]. Fiber and minerals are abundant in fruits and vegetables. Testing should be performed on a weekly trial basis for transitioning into a full-time vegan, such that it strongly emphasizes whether or not gastrointestinal problems are being detected, and whether or not the lifestyle should be continued in moderation or heavy metals would accumulate. As a result, there will not be a complete cut-off from anything when transitioning to veganism. This would easily preclude even the most unlikely case from occurring [19].

1. Intolerance to foods
2. IBS (irritable bowel syndrome) and
3. IBD (inflammatory bowel disease) are the two most controversial topics within vegans (inflammatory bowel disease).

1.3 Wheat Gluten Deficiency

With the exception of wheat gluten deficiency, which causes celiac disease in some gluten-intolerant individuals, the aforementioned information suggests that fruits and vegetables, nuts and seeds, grains, and legumes are unlikely to cause disease.

Lactose allergy is now very normal, with 75 percent of humans missing the enzyme lactase

in the jejunum of their small intestine, which allows them to absorb lactose properly. As a result, certain dairy products cause cramping, bloating, and sometimes diarrhea.

In terms of the climate and energy used in plant vs. animal-based food foods, quarter pound beef uses 122 liters of non-green water (freshwater), which is more than corn, which uses 90 liters, and bread, which uses 55 liters (Mekonnen, Hoekstra, Hydrology and earth system sciences, 2011). Animal health is critical ethically when eating food, but it doesn't necessarily have to be animal vs. plant-based diets, as many ethnographic interviews surfacing all over the internet today suggest. Instead, it could be within the plant kingdom, for example, some people consume a no-starch diet to help with joint pain, usually with spine issues such as enclosing spondylitis –a condition in which you can have narrowing in your joint space of your spine, which can be exacerbated by a type of bacteria in your colon that feeds on starch. Now, resistant starch (starch that makes it to the large intestine after escaping digestion in the small intestine) is obtained by heating/cooking starch and then cooling it (food leftover in refrigerator). So, it goes from being able to digest almost all starch to not being able to digest even 20% of it, and that undigested starch goes to your gut, where it provides excellent fuel for bacteria. If it fuels certain bacteria called klebsiella, which can overgrow and be implicated in this auto-immune condition that causes spinal pain, it can overgrow and be implicated in this auto-immune condition [20].

Dietary risk factors were blamed for 11 million deaths and 255 million disability-adjusted life-years (DALYs) in 2017. 21 Many people believe that our death manner is preprogrammed into our genes, but science indicates that with the majority of the leading causes of death, our genes account for just 10-20% of the chance at most.

According to a slew of research papers, most beef, dairy, and egg eaters would develop cancer, osteoporosis, and diabetes, with more than half of them experiencing a non-genetically caused heart attack or stroke [22].

Long-term vegan diet use treats/cure heart disease, prostate, colon, breast, ovarian, non-lymphoma, Hodgkin's and pancreatic cancers, as well as kidney disease, diabetes, osteoporosis, high blood pressure, obesity, asthma, and

impotence, as shown by a 2016 study published in the Journal of American Medical Association, which found that substituting plant protein for animal protein is associated with lower mortality [23-26].

2. CONCLUSION

Various studies have suggested that vegetarian and vegan diets have positive impacts on health outcomes. Many qualitative reviews, as well as inverse variance random effects meta-analysis, were performed to pool available different evidence related to veganism, showing more of the good side and major—animal welfare being protected, our wellbeing being disease-free, and the earth's atmosphere being conserved—all for the betterment of the future. Plant-based diet is so basic, and so powerful and affordable, that it is possible to "make wellness a habit" and thereby completely reverse much of today's killers.

CONSENT

It's not applicable.

ETHICAL APPROVAL

It's not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Gracie DaSilva, Juliette Hecquet, Katherine King. Exploring veganism through serious leisure and liquid modernity. *Annals of Leisure Research*. 2020;23(5):627-644.
2. Lisa M. Haider, Lukas Schwingshackl, Georg Hoffmann & Cem Ekmekcioglu. The effect of vegetarian diets on iron status in adults: A systematic review and meta-analysis. *Critical Reviews in Food Science and Nutrition*. 2018;58(8):1359-1374.
3. Monica Dinu, Rosanna Abbate, Gian Franco Gensini, Alessandro Casini & Francesco Sofi. Vegetarian, vegan diets and multiple health outcomes: A systematic review with meta-analysis of observational studies. *Critical Reviews in*

- Food Science and Nutrition. 2017;57(17):3640-3649.
4. Buran, T., Sanem Gökçe Merve Kılınc, & Elmas Kasap. Prevalence of Extraintestinal Manifestations of Ulcerative Colitis Patients in Turkey: Community-Based Monocentric Observational Study. *Clinical Medicine and Medical Research*. 2020;1(2):39-46. Available: <https://doi.org/10.52845/CMMR/2020v1i2a8>
 5. Rogerson D. Vegan diets: practical advice for athletes and exercisers. *J Int Soc Sports Nutr*. 2017;14:36. DOI: 10.1186/s12970-017-0192-9. PMID: 28924423; PMCID: PMC5598028.
 6. Marsh K, Zeuschner C, Saunders A. Health Implications of a Vegetarian Diet: A Review. *American Journal of Lifestyle Medicine*. 2012;6(3):250-267.
 7. Ahmad Jabria, Ashish Kumar et al. Meta-analysis of effect of vegetarian diet on ischemic heart disease and all-cause mortality. *American Journal of Preventive Cardiology*. 2021;7:1-7
 8. Daniel V, Daniel K. Diabetic neuropathy: new perspectives on early diagnosis and treatments. *Journal of Current Diabetes Reports*. 2020;1(1):12-14. Available: <https://doi.org/10.52845/JCDR/2020v1i1a3>
 9. Hermsdorff, H.H.M., Zulet, M.Á., Puchau, B. et al. Fruit and vegetable consumption and proinflammatory gene expression from peripheral blood mononuclear cells in young adults: a translational study. *Nutr Metab (Lond)*, 2010;7(42):1-11.
 10. Neal D Barnard 1, Joshua Cohen, David J, Jenkins A, et al. A low-fat vegan diet and a conventional diabetes diet in the treatment of type 2 diabetes: a randomized, controlled, 74-wk clinical trial. *Am J Clin Nutr*. 2009;89(5):1588S-1596S
 11. Esselstyn CB Jr, Gendy G, Doyle J, Golubic M, Roizen MF. A way to reverse CAD? *J Fam Pract*. 2014;63(7):356-364b. PMID: 25198208.
 12. Ornish D, Weidner G, Fair WR, Marlin R et al. Intensive lifestyle changes may affect the progression of prostate cancer. *J Urol*. 2005;174(3):1065-9. Discussion 1069-70.
 13. Wright N, Wilson L, Smith M, Duncan B, McHugh P. The BROAD study: A randomised controlled trial using a whole food plant-based diet in the community for obesity, ischaemic heart disease or diabetes. *Nutr Diabetes*. 2017;7(3):e256.
 14. Daniel V, Daniel K. Perception of Nurses' Work in Psychiatric Clinic. *Clinical Medicine Insights*. 2020;1(1):27-33. Available: <https://doi.org/10.52845/CMI/2020v1i1a5>
 15. Shamima Akter, Tetsuya Mizoue, Akiko Nanri, Atsushi Goto, et al. Low carbohydrate diet and all cause and cause-specific mortality. *Clinical Nutrition* 2020;40(2021):2016-2024.
 16. Schwingshackl L, Hoffmann G. Low-carbohydrate diets impair flow-mediated dilatation: Evidence from a systematic review and meta-analysis. *British Journal of Nutrition*. 2013;110(5):969-970.
 17. Barry M. Popkin, Susan Horton, Soowon Kim, Ajay Mahal, Jin Shuigao. Trends in Diet, Nutritional Status, and Diet-related Noncommunicable Diseases in China and India: the Economic Costs of the Nutrition Transition, *Nutrition Reviews*. 2001;59(12):379-390,
 18. Esselstyn CB. A plant-based diet and coronary artery disease: a mandate for effective therapy. *J Geriatr Cardiol*. 2017;14(5):317-320. DOI: 10.11909/j.issn.1671-5411.2017.05.004.
 19. Willett WC. Balancing life-style and genomics research for disease prevention. *Science*. 2002;296(5568):695-8.
 20. Daniel V, Daniel K. Exercises training program: It's Effect on Muscle strength and Activity of daily living among elderly people. *Nursing and Midwifery*. 2020;1(01):19-23. Available: <https://doi.org/10.52845/NM/2020v1i1a5>
 21. Morgan E. Levine, Jorge A. Suarez, Sebastian Brandhorst, Priya Balasubramanian, Chia-Wei Cheng, Federica Madia et al. Low Protein Intake Is Associated with a Major Reduction in IGF-1, Cancer, and Overall Mortality in the 65 and Younger but Not Older Population. *cell metabolism*. 2014;19(4):407-417.
 22. Marsh AG, Sanchez TV, Chaffee FL, Mayor GH, Mickelsen O. Bone mineral mass in adult lacto-ovo-vegetarian and omnivorous males. *Am J Clin Nutr*. 1983;37(3):453-6.
 23. Marsh AG, Sanchez TV, Midkelsen O, Keiser J, Mayor G. Cortical bone density of adult lacto-ovo-vegetarian and omnivorous

- women. J Am Diet Assoc. 1980;76(2):148-51.
24. Aro A, Antoine JM, Pizzoferrato L, Reykdal O, van Poppele G. Trans Fatty Acids in Dairy and Meat Products from 14 European Countries: The TRANSFAIR Study. Journal of Food Composition and Analysis. 1998;11(2):150-160.
25. Tuso P, Stoll SR, Li WW. A plant-based diet, atherogenesis, and coronary artery disease prevention. Perm J. 2015;19(1):62-67. DOI: 10.7812/TPP/14-036.
26. Sheenam Suri, Vikas Kumar, Rasane Prasad, Beenu Tanwar, et al. Considerations for development of lactose-free food. Journal of Nutrition & Intermediary Metabolism. 2019;15:27-34.

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