

BIBLIOGRAPHIC INFORMATION SYSTEM

Journal Full Title: [Journal of Biomedical Research & Environmental Sciences](#)

Journal NLM Abbreviation: J Biomed Res Environ Sci

Journal Website Link: <https://www.jelsciences.com>

Journal ISSN: 2766-2276

Category: Multidisciplinary

Subject Areas: [Medicine Group](#), [Biology Group](#), [General](#), [Environmental Sciences](#)

Topics Summation: 133

Issue Regularity: [Monthly](#)

Review Process: [Double Blind](#)

Time to Publication: 21 Days

Indexing catalog: [IndexCopernicus ICV 2022: 88.03](#) | [GoogleScholar](#) | [View more](#)

Publication fee catalog: [Visit here](#)

DOI: 10.37871 ([CrossRef](#))

Plagiarism detection software: [iThenticate](#)

Managing entity: USA

Language: English

Research work collecting capability: Worldwide

Organized by: [SciRes Literature LLC](#)

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**IndexCopernicus
ICV 2022:
83.03**

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PERSPECTIVE

Transforming Cardiac Care through Plant-Based Diets: A Breakthrough Experience from Bethsaida Hospital, Indonesia

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Abstract

Seven years ago, at Bethsaida Hospital in Indonesia, Professor Dasaad Mulijono pioneered the integration of a Plant-Based Diet (PBD) into routine cardiac care, a paradigm shift that has dramatically improved outcomes for patients with chronic and cardiovascular diseases. By synergizing conventional medical therapies with intensive nutritional education and sustainable lifestyle interventions, we have witnessed clinical recoveries that were once deemed improbable.

Patients have experienced remarkable reversals of hypertension, insulin-independent glycaemic control in diabetes, normalization of renal function, and substantial improvements in heart failure symptoms and ejection fraction. Atherosclerotic plaque regression is frequently observed in follow-up CT Coronary Angiography (CTCA) and coronary angiography. As a breakthrough achievement, our restenosis rates following Drug-Coated Balloon (DCB) therapy are remarkably low, around 2%, compared to the 10–20% typically reported in conventional centers. Sustained weight normalization is routinely achieved, and even complex conditions such as autoimmune disorders and early-stage malignancies have shown signs of stabilization or improvement under this holistic approach.

This article presents our real-world clinical outcomes, elucidates the underlying mechanisms driving these transformations, and addresses the prevailing scepticism within the medical community. We also explore the emerging role of Artificial Intelligence (AI) in tailoring nutritional interventions and enhancing patient engagement. Our intention is not to seek acclaim but to inspire broader adoption of this evidence-based, patient-centered model of care—one that is not only effective but also profoundly transformative.

Introduction

The global burden of chronic non-communicable diseases is rising, with cardiovascular diseases remaining the leading cause of death worldwide. While pharmacological management has improved outcomes, achieving long-term disease reversal and empowering patients remains challenging. At Bethsaida Hospital, we have adopted an integrative

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DOI: 10.37871/jbres2136

Submitted: 07 May 2025

Accepted: 13 June 2025

Published: 30 June 2025

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OPEN ACCESS

Keywords

- Plaque regression
- Mitigating restenosis
- Plant-based diet
- Lifestyle medicine
- Artificial intelligence
- Bethsaida hospital
- Patient education

VOLUME: 6 ISSUE: 6 - JUNE, 2025



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How to cite this article: Usman A. Transforming Cardiac Care through Plant-Based Diets: A Breakthrough Experience from Bethsaida Hospital, Indonesia. J Biomed Res Environ Sci. 2025 Jun 30; 6(6): 840-849. doi: 10.37871/jbres2136, Article ID: JBRES2136, Available at: <https://www.jelsciences.com/articles/jbres2136.pdf>

approach centred on PBD. Our experience suggests that chronic disease reversal is possible when lifestyle, particularly diet, is addressed with the same intensity as pharmacotherapy.



Clinical Outcomes at Bethsaida Cardiac Centre

We are pleased to share the remarkable outcomes achieved at the Cardiology Centre of Bethsaida Hospital in Tangerang, Indonesia, where we have implemented a PBD as part of our standard cardiac care for nearly seven years. This initiative represents the first in Indonesia—a pioneering effort to integrate evidence-based nutritional therapy into cardiovascular practice.

Despite the compelling clinical results, our work has remained mainly limited to date [1–15], due to several limiting factors. Internationally, research output from Indonesia is often overlooked, partly due to perceptions of lower research quality stemming from systemic limitations in funding and infrastructure. Locally, we have encountered considerable scepticism from medical peers, a challenge we intend to explore in a separate publication.

Nevertheless, the transformational impact of PBD on our patients' health has been undeniable. In the following sections, we present real-world testimonies and clinical data that highlight the profound benefits of this lifestyle intervention in reversing or stabilizing chronic diseases. We aim to contribute meaningful, experience-driven insight to the global discussion on nutrition and cardiovascular care, and to inspire broader adoption of this life-saving approach.

Patient Demographics and Baseline Clinical Characteristics

Over the past seven years, more than 3,000 patients have participated in the plant-based lifestyle

intervention program at Bethsaida Hospital's Cardiology Centre. The majority (approximately 68%) were male, aged between 45 and 83 (mean age 61 ± 9.4 years). Most patients presented with established cardiovascular disease, including chronic coronary syndrome (CCS) and a history of percutaneous coronary intervention (PCI). The most prevalent comorbidities included hypertension (82%), type 2 diabetes mellitus (33%), dyslipidaemia (98%), obesity (18%), with a mean body mass index (BMI) above 30 kg/m^2 and overweight (68%) with BMI between $25\text{--}29.9 \text{ kg/m}^2$. Additionally, 4% of patients had evidence of renal impairment ($\text{eGFR} < 60 \text{ mL/min/1.73 m}^2$) at baseline. Many were refractory to multiple pharmacological therapies or had failed to achieve adequate metabolic control with standard medical care.

The patient cohort represents a real-world Indonesian population, predominantly from urban and peri-urban regions, with a range of socioeconomic backgrounds, including middle to lower socioeconomic levels. All participants received structured, multidisciplinary support that encompassed nutritional counseling, peer group education, and AI-assisted engagement tools. Serial laboratory evaluations, coronary CT angiography, and echocardiography were routinely employed to monitor therapeutic progress.

Hypertension reversal without medications

Numerous patients have achieved normotensive readings without antihypertensive medications. By adopting a PBD rich in potassium, magnesium, and nitric oxide (NO)-boosting greens while avoiding sodium-laden animal products, blood pressure normalization was observed within weeks to months.

Diabetes management without insulin

Many Type 2 Diabetes Mellitus (T2DM) patients have successfully discontinued insulin while maintaining glycaemic control with minimal or no oral antidiabetic medications. Haemoglobin A1c (HbA1C) values have improved significantly, and patients report increased energy and enhanced quality of life.

Low-Density Lipoprotein Cholesterol (LDL) reduction without PCSK9 inhibitors

Patients receiving high-intensity statins and ezetimibe in conjunction with a PBD have experienced



profound reductions in LDL-C, eliminating the need for proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors. The diet's high fibre content and absence of saturated fats contribute significantly to lipid regulation.

Sustainable weight loss

Overweight and obese individuals who adopt the PBD consistently reach an ideal Body Mass Index (BMI) of 20–22 without calorie restriction. The high satiety index and nutrient density of plant foods encourage natural portion control.

Renal function restoration

Patients with mild to moderate Chronic Kidney Disease (CKD) have shown significant improvement or normalization of serum creatinine and Glomerular Filtration Rate (GFR), which prevents the need for dialysis and stabilizes kidney function.

Improved heart failure outcomes

In patients with Heart Failure with Reduced Ejection Fraction (HFrEF), we have observed a substantial improvement in symptoms and left ventricular ejection fraction when a PBD was incorporated alongside standard heart failure therapy.

Coronary Artery Disease (CAD) regression and exceptional restenosis rates

Our CAD patients often demonstrate angiographic regression of plaques, supported by lifestyle modification and optimal pharmacotherapy. Our DCB restenosis rate is just 2%, starkly contrasting with the 10–20% observed in other centres.

Other chronic inflammatory conditions

Patients with autoimmune diseases, psoriasis, and other chronic inflammatory conditions report symptom improvement and disease modulation under a plant-based regimen. Some patients with early-stage cancers have achieved disease stabilization or regression table 1.

Molecular and physiological mechanisms of disease improvement through a PBD

A growing body of scientific literature supports using a PBD as a powerful therapeutic approach for chronic diseases. Studies have consistently demonstrated its effectiveness in reversing

Table 1: Summary of Key Clinical Outcomes at Bethasaida Hospital.

Clinical Outcome	Observed Impact
Hypertension Reversal	Normotensive readings without medications
Diabetes Management without Insulin	Insulin discontinued; HbA1c improved
LDL Reduction without PCSK9 inhibitors	LDL < 55 mg/dL with statin + PBD
Sustainable Weight Loss	BMI normalized to 20-22
Renal Function Restoration	Improved eGFR and creatinine levels
Improved Heart Failure Outcomes	Improved LVEF and symptom relief
CAD Regression & Low Restenosis (2%)	Plaque regression; 2% restenosis
Chronic Inflammatory Disease Modulation	Symptom control and disease modulation
Early-stage Cancer Stabilization	Disease stabilization/regression in some cases

hypertension [16–20] and T2DM [21–28], often eliminating the need for long-term pharmacological intervention. A PBD has also been shown to significantly lower LDL cholesterol levels—sometimes to ultra-low targets—contributing to the prevention and regression of atherosclerosis [29–35].

In cardiometabolic health, a PBD supports sustainable weight loss and achieving an optimal BMI [36–45]. It has shown promise in reversing early to moderate stages of chronic kidney disease, improving renal function without additional medication burden [46–58]. Dietary intervention in patients with heart failure has been shown to improve cardiac function and alleviate symptoms [59–65].

Furthermore, emerging evidence supports the role of PBD in reducing atherosclerosis [66–76] and restenosis rates following DCB angioplasty [3]—a critical advancement in post-interventional care. Beyond cardiology, this dietary approach has also contributed to clinical improvement or stabilization in various chronic inflammatory conditions [77–79], including autoimmune disorders [80–85] and some early-stage cancers, where it may help prevent progression and keep the disease localized [86–91].

These findings underscore PBD's broad therapeutic potential and the urgent need to integrate it into mainstream medical practice as a foundational element of chronic disease management. This paper provides a brief overview of the mechanisms by which PBD exerts its benefits across the various conditions discussed.



A PBD improves hypertension by enhancing NO production, lowering sodium, and reducing inflammation. In diabetes, it improves insulin sensitivity, preserves beta-cell function, and supports gut microbiota. For lipid disorders, it lowers LDL through reduced absorption and increased clearance. In obesity, it promotes satiety and reduces inflammation. For CKD, it reduces intraglomerular pressure and renal toxins. Heart failure outcomes improve through reduced afterload and inflammation. CAD regression is driven by improved endothelial function and reduced smooth muscle proliferation. Chronic inflammatory diseases benefit from reduced cytokines and improved immune modulation. Cancer risk is mitigated by lower IGF-1 levels, inhibition of angiogenesis, and enhanced apoptosis.

Addressing the Reluctance in the Medical Community

Despite compelling clinical outcomes and a growing body of scientific literature supporting plant-based nutrition, many healthcare professionals remain hesitant to embrace this approach within standard medical practice. Several interrelated factors contribute to this reluctance [4,92-94].

Limited nutritional education

Medical training worldwide, including in Indonesia, allocates a minimal amount of time to nutrition education. As a result, most physicians graduate with little to no formal understanding of how dietary interventions can prevent, treat, or reverse chronic diseases. Without foundational knowledge, many feel unprepared to counsel patients on plant-based diets, let alone integrate them into treatment plans.

Perceived patient non-compliance

There is a widespread belief that patients will not adhere to a PBD, especially in cultures where meat, dairy, and processed foods are deeply ingrained in daily life and social rituals. This perception often leads to therapeutic nihilism, where clinicians pre-emptively dismiss the potential of lifestyle change without even attempting an intervention.

Time constraints and systemic pressures

The current structure of healthcare systems—particularly fee-for-service models—prioritizes quick consultations, pharmacologic solutions, and

procedural interventions. Time-intensive counselling on nutrition and lifestyle is often undervalued, inadequately reimbursed, or not reimbursed at all. This economic model disincentivizes preventive approaches that require sustained engagement.

Lack of familiarity with the evidence base

Although the evidence supporting plant-based nutrition is robust and expanding, it remains underrepresented in mainstream medical journals and conferences. Physicians who rely on traditional sources for continuing education may not be exposed to the most current research or dismiss nutrition-based studies as inferior to pharmaceutical trials due to differences in study design and funding.

Cultural bias and personal habits

Like their patients, physicians are influenced by cultural norms and personal habits. If a clinician does not personally follow a plant-based lifestyle, it may be psychologically or ethically challenging to recommend it to patients. Some may even feel that doing so would imply criticism of their lifestyle choices.

Influence of industry and institutional norms

The pharmaceutical, medical device, and food industries have a substantial influence on medical education, hospital policies, and clinical practice guidelines. This can create a subtle (or overt) bias against interventions threatening established revenue streams. Furthermore, hospitals often serve processed foods or animal products, reinforcing the perception that diet is a secondary concern.

Fear of legal or professional repercussions

In settings where PBDs are not yet standard of care, some physicians may fear legal risk or professional criticism if they recommend a diet perceived as “alternative” or “unconventional.” They may worry about liability should a patient’s condition not improve or complications arise, despite overwhelming evidence that a well-planned PBD is safe and effective.

Scepticism and the "Too Good to Be True" phenomenon

When physicians encounter stories of disease reversal through diet, whether hypertension, T2DM, or even coronary artery disease, the results can



seem too dramatic to be credible. There is a natural scepticism, especially among practitioners trained to rely on pharmacologic or interventional solutions. Some view lifestyle medicine as anecdotal or fringe, rather than a legitimate clinical discipline grounded in evidence.

Inertia and comfort with familiar protocols

Changing clinical practice requires new knowledge and the willingness to unlearn long-standing beliefs. For many, the comfort of familiar protocols—such as prescriptions, procedures, and clinical pathways—outweighs the perceived benefits of adopting a more proactive, nutrition-based approach. Shifting this mindset requires compelling data and strong leadership.

Emotional burnout and therapeutic fatigue

Paradoxically, some physicians experience emotional fatigue after years of treating lifestyle-related diseases with minimal long-term success. This burnout can lead to cynicism about the potential for change in themselves and their patients. Introducing a plant-based approach may feel like another idealistic solution doomed to fail for such clinicians.

We believe that data-driven results, compelling patient testimonials, extensive publications, and institutional leadership can begin to shift this mindset. As more centres demonstrate consistent, reproducible outcomes using plant-based interventions, scepticism will fade, replaced by curiosity and conviction. By addressing these barriers openly and systematically, we aim to foster a more patient-centered, preventive, and evidence-based model of care.

The Role of AI in PBD Nutrition Education

AI has played a crucial role in our program by supporting patients through:

- Personalized plant-based recipe generation
- Nutritional education tailored to individual health conditions
- Real-time Q&A support for diet-related inquiries

AI offers a powerful counterbalance in an era when social media platforms like YouTube and TikTok are saturated with influencers promoting unbalanced and often unhealthy animal-based dietary advice. Thanks

to advances in AI technology, patients now have access to accurate, personalized, and evidence-based nutrition education, bridging the knowledge gap and empowering patients and clinicians to make informed dietary decisions. We envision AI as an indispensable tool in the future of preventive and lifestyle medicine [95–97].

Conclusion

The clinical transformation observed at Bethsaida Hospital challenges the traditional paradigm that chronic cardiometabolic diseases are irreversible and destined for lifelong pharmacotherapy. Our experience reaffirms a growing body of scientific evidence that a well-structured PBD can manage and often reverse diseases once considered progressive. When implemented within a multidisciplinary framework alongside evidence-based medical therapy, nutrition becomes a powerful therapeutic tool capable of restoring physiological function across multiple organ systems.

Despite these outcomes, resistance within the medical community persists, often rooted in outdated education, perceived patient non-compliance, or systemic inertia. We contend that such reluctance must be addressed through scientific discourse, updated curricula, and practical implementation models. Moreover, the advent of AI presents a unique opportunity to democratize access to evidence-based nutrition education, personalize patient engagement, and scale interventions beyond institutional boundaries.

This paper is not a proclamation of singular success, but a call to the global medical community: to investigate, replicate, and refine this model of care. Chronic disease reversal through lifestyle medicine is not theoretical—it is happening. And it deserves its rightful place at the forefront of 21st-century healthcare.

Author Contributions

D.M; Conceptualization, writing, review, and editing.

Funding

This research received no external funding.

Institutional Review Board Statement

Not applicable.



Informed Consent Statement

Not applicable.

Data Availability Statement

Data are contained within the article.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Mulijono D, Hutapea AM, Lister INE, Sudaryo MK, Umniyati H. Plant-based diets and supplements in mitigating COVID-19: Part 1. The research report. *Journal of Community Medicine and Public Health Reports*. 2024;5(08). doi: [10.38207/JCMPHR/2024/MAY05080572/A](https://doi.org/10.38207/JCMPHR/2024/MAY05080572/A).
2. Mulijono D, Hutapea AM, Lister INE, Sudaryo MK, Umniyati H. Plant-based diet and supplements in mitigating COVID-19: Part 2. The Mechanism behind Successful Intervention. *Journal of Community Medicine and Public Health Reports*. 2024;5(08): doi: [10.38207/JCMPHR/2024/MAY05080264](https://doi.org/10.38207/JCMPHR/2024/MAY05080264).
3. Mulijono D, Hutapea AM, Lister INE, Sudaryo MK, and Umniyati H. Saving high-risk cardiac patients from covid-19 severity, hospitalization, and death with plant-based diets and dietary supplements. *Archives of Clinical and Biomedical Research*. 8 (2024): 245-252. Doi: 10.26502/acbr.50170406.
4. Mulijono D. Plant-Based Diets (PBDs): Challenges and solutions. *Online Journal of Cardiology Research & Reports*. 2024;7(5). doi: 10.33552/OJCRR.2024.07.000672.
5. Mulijono D, Hutapea AM, Lister INE, Sudaryo MK, Umniyati H. Mechanisms of plant-based diets reverse atherosclerosis. *Cardiology and Cardiovascular Medicine*. 2024;290-302. doi: 10.26502/fccm.92920390.
6. Mulijono D. Plant-based diet in regressing/stabilizing vulnerable plaques to achieve complete revascularization. *Archives of Clinical and Biomedical Research*. 2024;236-244. doi: 10.26502/acbr.50170405.
7. Mulijono D, Hutapea, AM, Lister INE, Sudaryo MK, Umniyati H. How a Plant-Based Diet (PBD) Reduces In-Stent Restenosis (ISR) and Stent Thrombosis (ST). *Cardiology: Open Access(COA)*. 2024;9 (1):01-15. doi: 10.33140/COA.09.01.05.
8. Mulijono D, Hutapea AM, Lister INE, Sudaryo MK, and Umniyati H. Plant-based diet to reverse/ regress vulnerable plaque: a case report and review. *Archives of Clinical and Medical Case Reports*. 2024;126-135. doi: 10.26502/acmcr.96550674.
9. Mulijono, D. Bethsaida hospital: pioneering plant-based diet and lifestyle medicine revolution in indonesia. *Archives of Epidemiology & Public Health Research(AEPHR)*. 2025;4(1):01-03. doi: 10.33140/AEPHR.04.01.02.
10. Mulijono D. The plant-based guru redefining cardiology and preventive medicine. *Online Journal of Cardiology Research & Reports*. 2025;8(1). doi: 10.33552/OJCRR.2025.08.000676.
11. Mulijono D. Healing with food or managing with injection? a new era in chronic disease care. *Journal of Biomedical Research & Environmental Sciences*. 2025;6(4):373-377. doi: 10.37871/jbres2092.
12. Mulijono D. How a plant-based diet and ultra-low ldl levels can reverse atherosclerosis and prevent restenosis: a breakthrough in heart health. *Journal of Biomedical Research & Environmental Sciences*. 2025;6(4):368-372. doi: 10.37871/jbres2091.
13. Mulijono, D. Reclaiming healing through nutrition: Resistance to plant-based diets and the biblical call to restoration. *Archives of Epidemiology & Public Health Research*. 2025;4(2):01-03. doi: 10.33140/AEPHR.04.02.01.
14. Mulijono D. The pitfalls of relying solely on guidelines for chronic coronary syndrome: A warning for cardiologists. *Cardiology and Cardiovascular Medicine*. 2025;97-99. doi: 10.26502/fccm.92920428.
15. Mulijono, D. What was meant for harm. a testimony of healing, faith, and medical revolution. *Archives of Epidemiology & Public Health Research(AEPHR)*. 2025;4(2):01-05. doi: 10.33140/AEPHR.
16. Alexander S, Ostfeld RJ, Allen K, Williams KA. A plant-based diet and hypertension. *J Geriatr Cardiol*. 2017 May;14(5):327-330. doi: 10.11909/j.issn.1671-5411.2017.05.014. PMID: 28630611; PMCID: PMC5466938.
17. Tomé-Carneiro J, Visioli F. Plant-Based Diets Reduce Blood Pressure: A Systematic Review of Recent Evidence. *Curr Hypertens Rep*. 2023 Jul;25(7):127-150. doi: 10.1007/s11906-023-01243-7. Epub 2023 May 13. PMID: 37178356; PMCID: PMC10224875.
18. Joshi S, Ettinger L, Liebman SE. Plant-Based Diets and Hypertension. *Am J Lifestyle Med*. 2019 Sep 24;14(4):397-405. doi: 10.1177/1559827619875411. PMID: 33281520; PMCID: PMC7692016.
19. Charles JA, Habibullah NK, Bautista S, Davis B, Joshi S, Hull SC. Planting the Seed for Blood Pressure Control: The Role of Plant-Based Nutrition in the Management of Hypertension. *Curr Cardiol Rep*. 2024 Mar;26(3):121-134. doi: 10.1007/s11886-023-02008-z. Epub 2024 Mar 25. PMID: 38526748; PMCID: PMC10990999.
20. Gibbs J, Gaskin E, Ji C, Miller MA, Cappuccio FP. The effect of plant-based dietary patterns on blood pressure: a systematic review and meta-analysis of controlled intervention trials. *J Hypertens*. 2021 Jan;39(1):23-37. doi: 10.1097/HJH.0000000000002604. PMID: 33275398.
21. McMacken M, Shah S. A plant-based diet for the prevention and treatment of type 2 diabetes. *J Geriatr Cardiol*. 2017 May;14(5):342-354. doi: 10.11909/j.issn.1671-5411.2017.05.009. PMID: 28630614; PMCID: PMC5466941.
22. Yang X, Li Y, Wang C, Mao Z, Chen Y, et al. Association of plant-based diet and type 2 diabetes mellitus in Chinese rural



- adults: The Henan Rural Cohort Study. *J Diabetes Investig.* 2021 Sep;12(9):1569-1576. doi: 10.1111/jdi.13522. Epub 2021 Mar 2. PMID: 33559976; PMCID: PMC8409831.
23. Pollakova D, Andreadi A, Pacifici F, Della-Morte D, Lauro D, Tubili C. The Impact of Vegan Diet in the Prevention and Treatment of Type 2 Diabetes: A Systematic Review. *Nutrients.* 2021 Jun 21;13(6):2123. doi: 10.3390/nu13062123. PMID: 34205679; PMCID: PMC8235036.
24. Jardine MA, Kahleova H, Levin SM, Ali Z, Trapp CB, Barnard ND. Perspective: Plant-Based Eating Pattern for Type 2 Diabetes Prevention and Treatment: Efficacy, Mechanisms, and Practical Considerations. *Adv Nutr.* 2021 Dec 1;12(6):2045-2055. doi: 10.1093/advances/nmab063. PMID: 34113961; PMCID: PMC8634508.
25. Ansari P, Khan JT, Chowdhury S, Reberio AD, Kumar S, et al. Plant-Based Diets and Phytochemicals in the Management of Diabetes Mellitus and Prevention of Its Complications: A Review. *Nutrients.* 2024 Oct 30;16(21):3709. doi: 10.3390/nu16213709. PMID: 39519546; PMCID: PMC11547802.
26. Barnard ND, Cohen J, Jenkins DJ, Turner-McGrievy G, Gloede L, Green A, Ferdowsian H. 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 May;89(5):1588S-1596S. doi: 10.3945/ajcn.2009.26736H. Epub 2009 Apr 1. PMID: 19339401; PMCID: PMC2677007.
27. Guest NS, Raj S, Landry MJ, Mangels AR, Pawlak R, et al. Vegetarian and Vegan Dietary Patterns to Treat Adult Type 2 Diabetes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Adv Nutr.* 2024 Oct;15(10):100294. doi: 10.1016/j.advnut.2024.100294. Epub 2024 Sep 30. Erratum in: *Adv Nutr.* 2025 Feb;16(2):100379. doi: 10.1016/j.advnut.2025.100379. PMID: 39415400; PMCID: PMC11540868.
28. Panigrahi G, Goodwin SM, Staffier KL, Karlsen M. Remission of Type 2 Diabetes After Treatment With a High-Fiber, Low-Fat, Plant-Predominant Diet Intervention: A Case Series. *Am J Lifestyle Med.* 2023 Jun 15;17(6):839-846. doi: 10.1177/15598276231181574. PMID: 38511112; PMCID: PMC10948923.
29. Polesel J, Di Maso M, Esposito G, Vitale S, Palumbo E, et al. DEDiCa Study Group. A Plant-Based Cholesterol-Lowering Diet Score Correlates with Serum LDL-Cholesterol Levels. *Nutrients.* 2024 Feb 8;16(4):495. doi: 10.3390/nu16040495. PMID: 38398819; PMCID: PMC10892311.
30. Koch CA, Kjeldsen EW, Frikke-Schmidt R. Vegetarian or vegan diets and blood lipids: a meta-analysis of randomized trials. *Eur Heart J.* 2023 Jul 21;44(28):2609-2622. doi: 10.1093/eurheartj/ehad211. PMID: 37226630; PMCID: PMC10361023.
31. Thomas MS, Calle M, Fernandez ML. Healthy plant-based diets improve dyslipidemias, insulin resistance, and inflammation in metabolic syndrome. A narrative review. *Adv Nutr.* 2023 Jan;14(1):44-54. doi: 10.1016/j.advnut.2022.10.002. Epub 2022 Dec 17. PMID: 36811593; PMCID: PMC10103000.
32. Koutentakis M, Surma S, Rogula S, Filipiak KJ, Gąsecka A. The Effect of a Vegan Diet on the Cardiovascular System. *J Cardiovasc Dev Dis.* 2023 Feb 22;10(3):94. doi: 10.3390/jcdd10030094. PMID: 36975858; PMCID: PMC10052889.
33. Wang T, Masedunskas A, Willett WC, Fontana L. Vegetarian and vegan diets: benefits and drawbacks. *Eur Heart J.* 2023 Sep 21;44(36):3423-3439. doi: 10.1093/eurheartj/ehad436. PMID: 37450568; PMCID: PMC10516628.
34. Diab A, Dastmalchi LN, Gulati M, Michos ED. A Heart-Healthy Diet for Cardiovascular Disease Prevention: Where Are We Now? *Vasc Health Risk Manag.* 2023 Apr 21;19:237-253. doi: 10.2147/VHRM.S379874. PMID: 37113563; PMCID: PMC10128075.
35. Trautwein EA, McKay S. The Role of Specific Components of a Plant-Based Diet in Management of Dyslipidemia and the Impact on Cardiovascular Risk. *Nutrients.* 2020 Sep 1;12(9):2671. doi: 10.3390/nu12092671. PMID: 32883047; PMCID: PMC7551487.
36. Najjar RS, Feresin RG. Plant-Based Diets in the Reduction of Body Fat: Physiological Effects and Biochemical Insights. *Nutrients.* 2019 Nov 8;11(11):2712. doi: 10.3390/nu11112712. PMID: 31717463; PMCID: PMC6893503.
37. Greger M. A Whole Food Plant-Based Diet Is Effective for Weight Loss: The Evidence. *Am J Lifestyle Med.* 2020 Apr 3;14(5):500-510. doi: 10.1177/1559827620912400. PMID: 32922235; PMCID: PMC7444011.
38. Ahmad SR. Plant-based diet for obesity treatment. *Front Nutr.* 2022 Sep 8;9:952553. doi: 10.3389/fnut.2022.952553. PMID: 36159462; PMCID: PMC9493195.
39. Remde A, DeTurk SN, Almardini A, Steiner L, Wojda T. Plant-predominant eating patterns - how effective are they for treating obesity and related cardiometabolic health outcomes? - a systematic review. *Nutr Rev.* 2022 Apr 8;80(5):1094-1104. doi: 10.1093/nutrit/nuab060. PMID: 34498070.
40. Bassin SR, Ferreira De Carvalho J, Gulati M. A Review of Plant-Based Diets for Obesity Management. *Endocr Pract.* 2024 Aug;30(8):779-789. doi: 10.1016/j.eprac.2024.04.020. Epub 2024 May 8. PMID: 38729570.
41. Jakše B, Jakše B, Pinter S, Pajek J, Fidler Mis N. Whole-Food Plant-Based Lifestyle Program and Decreased Obesity. *Am J Lifestyle Med.* 2020 Aug 28;16(3):260-270. doi: 10.1177/1559827620949205. PMID: 35706599; PMCID: PMC9189574.
42. Ivanova S, Delattre C, Karcheva-Bahchevanska D, Benbasat N, Nalbantova V, Ivanov K. Plant-Based Diet as a Strategy for Weight Control. *Foods.* 2021 Dec 8;10(12):3052. doi: 10.3390/foods10123052. PMID: 34945602; PMCID: PMC8701327.
43. Campbell EK, Fidahusain M, Campbell Li TM. Evaluation of an Eight-Week Whole-Food Plant-Based Lifestyle Modification Program. *Nutrients.* 2019 Sep 3;11(9):2068. doi: 10.3390/nu11092068. PMID: 31484341; PMCID: PMC6770132.
44. Bolori P, Setaysh L, Rasaei N, Jarrahi F, Yekaninejad MS, Mirzaei K. Adherence to a healthy plant diet may reduce inflammatory



- factors in obese and overweight women-a cross-sectional study. *Diabetes Metab Syndr*. 2019 Jul-Aug;13(4):2795-2802. doi: 10.1016/j.dsx.2019.07.019. Epub 2019 Jul 26. PMID: 31405709.
45. Chen Z, Schoufour JD, Rivadeneira F, Lamballais S, Ikram MA, Franco OH, Voortman T. Plant-based Diet and Adiposity Over Time in a Middle-aged and Elderly Population: The Rotterdam Study. *Epidemiology*. 2019 Mar;30(2):303-310. doi: 10.1097/EDE.0000000000000961. PMID: 30507650.
 46. Joshi S, McMacken M, Kalantar-Zadeh K. Plant-Based Diets for Kidney Disease: A Guide for Clinicians. *Am J Kidney Dis*. 2021 Feb;77(2):287-296. doi: 10.1053/j.ajkd.2020.10.003. Epub 2020 Oct 16. PMID: 33075387.
 47. Zarantonello D, Brunori G. The Role of Plant-Based Diets in Preventing and Mitigating Chronic Kidney Disease: More Light than Shadows. *J Clin Med*. 2023 Sep 22;12(19):6137. doi: 10.3390/jcm12196137. PMID: 37834781; PMCID: PMC10573653.
 48. Adair KE, Bowden RG. Ameliorating Chronic Kidney Disease Using a Whole Food Plant-Based Diet. *Nutrients*. 2020 Apr 6;12(4):1007. doi: 10.3390/nu12041007. PMID: 32268544; PMCID: PMC7230354.
 49. Torreggiani M, Fois A, Lippi F, Attini R, Longhitano E, et al. Plant-based diets for CKD patients: fascinating, trendy, but feasible? A green nephrology perspective. *Clin Kidney J*. 2022 Dec 9;16(4):647-661. doi: 10.1093/ckj/sfac267. PMID: 37007696; PMCID: PMC10061440.
 50. Kim H, Caulfield LE, Garcia-Larsen V, Steffen LM, Grams ME, Coresh J, Rebholz CM. Plant-Based Diets and Incident CKD and Kidney Function. *Clin J Am Soc Nephrol*. 2019 May 7;14(5):682-691. doi: 10.2215/CJN.12391018. Epub 2019 Apr 25. PMID: 31023928; PMCID: PMC6500948.
 51. Stanford J, Stefoska-Needham A, Lambert K, Batterham MJ, Charlton K. Association between plant-based diet quality and chronic kidney disease in Australian adults. *Public Health Nutr*. 2024 May 17;27(1):e142. doi: 10.1017/S1368980024001095. PMID: 38757167; PMCID: PMC11374545.
 52. Heo S, Han M, Ryu H, Kang E, Kim M, Ahn C, Yang SJ, Oh KH. Compliance with a Healthful Plant-Based Diet Is Associated with Kidney Function in Patients with Autosomal Dominant Polycystic Kidney Disease. *Nutrients*. 2024 Aug 17;16(16):2749. doi: 10.3390/nu16162749. PMID: 39203885; PMCID: PMC11356780.
 53. Świątek Ł, Jeske J, Miedziaszczyk M, Idasiak-Piechocka I. The impact of a vegetarian diet on chronic kidney disease (CKD) progression - a systematic review. *BMC Nephrol*. 2023 Jun 12;24(1):168. doi: 10.1186/s12882-023-03233-y. PMID: 37308813; PMCID: PMC10259031.
 54. Khan MA, Kassianos AJ, Hoy WE, Alam AK, Healy HG, Gobe GC. Promoting Plant-Based Therapies for Chronic Kidney Disease. *J Evid Based Integr Med*. 2022 Jan-Dec;27:2515690X221079688. doi: 10.1177/2515690X221079688. PMID: 35243916; PMCID: PMC8902019.
 55. Goraya N, Wesson DE. Plant-Based Diets across the Spectrum of Kidney Disease. *Clin J Am Soc Nephrol*. 2025 Mar 12. doi: 10.2215/CJN.0000000706. Epub ahead of print. PMID: 40072513.
 56. Cases A, Cigarrán-Guldrís S, Mas S, Gonzalez-Parra E. Vegetable-Based Diets for Chronic Kidney Disease? It Is Time to Reconsider. *Nutrients*. 2019 Jun 4;11(6):1263. doi: 10.3390/nu11061263. PMID: 31167346; PMCID: PMC6627351.
 57. Liebman SE, Baran A, Barnett TD, Campbell TM, Chen L, Friedman SM, Hasan S, Le TH, Monk RD, Sabescumar J, Wixom N, Zhang A, Campbell EK. The Effects of a Whole-Food Plant-Based Nutrition Education Program on Blood Pressure and Potassium in Chronic Kidney Disease: A Proof-of-Concept Study. *Nutrients*. 2025 Feb 24;17(5):779. doi: 10.3390/nu17050779. PMID: 40077649; PMCID: PMC11901990.
 58. Campbell TM, Liebman SE. Plant-based dietary approach to stage 3 chronic kidney disease with hyperphosphataemia. *BMJ Case Rep*. 2019 Dec 23;12(12):e232080. doi: 10.1136/bcr-2019-232080. PMID: 31874846; PMCID: PMC6936381.
 59. Kerley CP. A Review of Plant-based Diets to Prevent and Treat Heart Failure. *Card Fail Rev*. 2018 May;4(1):54-61. doi: 10.15420/cfr.2018.1:1. PMID: 29892479; PMCID: PMC5971679.
 60. Choi EY, Allen K, McDonnough M, Massera D, Ostfeld RJ. A plant-based diet and heart failure: case report and literature review. *J Geriatr Cardiol*. 2017 May;14(5):375-378. doi: 10.11909/j.issn.1671-5411.2017.05.003. PMID: 28630617; PMCID: PMC5466944.
 61. Allen KE, Gumber D, Ostfeld RJ. Heart Failure and a Plant-Based Diet. A Case-Report and Literature Review. *Front Nutr*. 2019 Jun 11;6:82. doi: 10.3389/fnut.2019.00082. PMID: 31245377; PMCID: PMC6579888.
 62. Alasmre FA, Alotaibi HA. Plant-Based Diet: A Potential Intervention for Heart Failure. *Cureus*. 2020 May 25;12(5):e8282. doi: 10.7759/cureus.8282. PMID: 32601558; PMCID: PMC7317137.
 63. Najjar RS, Montgomery BD. A defined, plant-based diet as a potential therapeutic approach in the treatment of heart failure: A clinical case series. *Complement Ther Med*. 2019 Aug;45:211-214. doi: 10.1016/j.ctim.2019.06.010. Epub 2019 Jun 29. PMID: 31331563.
 64. Najjar RS, Gewirtz AT. Plant-Based Diets: A Path to Ending CVD as We Know It? *Nutrients*. 2023 Aug 17;15(16):3608. doi: 10.3390/nu15163608. PMID: 37630797; PMCID: PMC10458614.
 65. Kahleova H, Levin S, Barnard ND. Vegetarian Dietary Patterns and Cardiovascular Disease. *Prog Cardiovasc Dis*. 2018 May-Jun;61(1):54-61. doi: 10.1016/j.pcad.2018.05.002. Epub 2018 May 22. PMID: 29800598.
 66. Esselstyn CB Jr, Gendy G, Doyle J, Golubic M, Roizen MF. A way to reverse CAD? *J Fam Pract*. 2014 Jul;63(7):356-364b. PMID: 25198208.
 67. Mehta P, Tawfeeq S, Padte S, Sunasra R, Desai H, et al. Plant-based diet and its effect on coronary artery disease: A narrative



- review. *World J Clin Cases*. 2023 Jul 16;11(20):4752-4762. doi: 10.12998/wjcc.v11.i20.4752. PMID: 37583985; PMCID: PMC10424050.
68. Sanchez A, Mejia A, Sanchez J, Runte E, Brown-Fraser S, Bivens RL. Diets with customary levels of fat from plant origin may reverse coronary artery disease. *Med Hypotheses*. 2019 Jan;122:103-105. doi: 10.1016/j.mehy.2018.10.027. Epub 2018 Oct 30. PMID: 30593389.
69. Massera D, Zaman T, Farren GE, Ostfeld RJ. A Whole-Food Plant-Based Diet Reversed Angina without Medications or Procedures. *Case Rep Cardiol*. 2015;2015:978906. doi: 10.1155/2015/978906. Epub 2015 Feb 10. PMID: 25755896; PMCID: PMC4338379.
70. Ornish D, Scherwitz LW, Billings JH, Brown SE, Gould KL, et al. Intensive lifestyle changes for reversal of coronary heart disease. *JAMA*. 1998 Dec 16;280(23):2001-7. doi: 10.1001/jama.280.23.2001. Erratum in: *JAMA* 1999 Apr 21;281(15):1380. PMID: 9863851.
71. Satija A, Bhupathiraju SN, Spiegelman D, Chiuve SE, Manson JE, Willett W, Rexrode KM, Rimm EB, Hu FB. Healthful and Unhealthful Plant-Based Diets and the Risk of Coronary Heart Disease in U.S. Adults. *J Am Coll Cardiol*. 2017 Jul 25;70(4):411-422. doi: 10.1016/j.jacc.2017.05.047. PMID: 28728684; PMCID: PMC5555375.
72. Pandey M, AlQassab O, Kanthajan T, Parikh A, Francis AJ, et al. Effectiveness of High-Fiber, Plant-Based Diets in Reducing Cardiovascular Risk Factors Among Middle-Aged and Older Adults: A Systematic Review. *Cureus*. 2024 Aug 24;16(8):e67660. doi: 10.7759/cureus.67660. PMID: 39314563; PMCID: PMC11419598.
73. Tusó P, Stoll SR, Li WW. A plant-based diet, atherogenesis, and coronary artery disease prevention. *Perm J*. 2015 Winter;19(1):62-7. doi: 10.7812/TPP/14-036. Epub 2014 Nov 24. PMID: 25431999; PMCID: PMC4315380.
74. Peña-Jorquera H, Cid-Jofré V, Landaeta-Díaz L, Petermann-Rocha F, Martorell M, et al. Plant-Based Nutrition: Exploring Health Benefits for Atherosclerosis, Chronic Diseases, and Metabolic Syndrome-A Comprehensive Review. *Nutrients*. 2023 Jul 21;15(14):3244. doi: 10.3390/nu15143244. PMID: 37513660; PMCID: PMC10386413.
75. Babalola F, Adesuyi A, David F, Kolajo BA, Urhi A, et al. A Comprehensive Review on the Effects of Vegetarian Diets on Coronary Heart Disease. *Cureus*. 2022 Oct 2;14(10):e29843. doi: 10.7759/cureus.29843. PMID: 36337779; PMCID: PMC9626375.
76. Sikand G, Severson T. Top 10 dietary strategies for atherosclerotic cardiovascular risk reduction. *Am J Prev Cardiol*. 2020 Nov 19;4:100106. doi: 10.1016/j.ajpc.2020.100106. Erratum in: *Am J Prev Cardiol*. 2021 Mar 22;6:100174. doi: 10.1016/j.ajpc.2021.100174. PMID: 34327475; PMCID: PMC8315554.
77. Watzl B. Anti-inflammatory effects of plant-based foods and of their constituents. *Int J Vitam Nutr Res*. 2008 Dec;78(6):293-8. doi: 10.1024/0300-9831.78.6.293. PMID: 19685439.
78. Menzel J, Jabakhanji A, Biemann R, Mai K, Abraham K, Weikert C. Systematic review and meta-analysis of the associations of vegan and vegetarian diets with inflammatory biomarkers. *Sci Rep*. 2020 Dec 10;10(1):21736. doi: 10.1038/s41598-020-78426-8. PMID: 33303765; PMCID: PMC7730154.
79. Min M, Tarmaster A, Bodemer A, Sivamani RK. The Influence of a Plant-Based Diet on Skin Health: Inflammatory Skin Diseases, Skin Healing, and Plant-Based Sources of Micro- and Macro-Nutrients. *Life (Basel)*. 2024 Nov 7;14(11):1439. doi: 10.3390/life14111439. PMID: 39598237; PMCID: PMC11595876.
80. Knippenberg A, Robinson GA, Wincup C, Ciurtin C, Jury EC, Kalea AZ. Plant-based dietary changes may improve symptoms in patients with systemic lupus erythematosus. *Lupus*. 2022 Jan;31(1):65-76. doi: 10.1177/09612033211063795. Epub 2022 Jan 3. PMID: 34978516; PMCID: PMC8793314.
81. Goldner B, Staffier KL. Case series: raw, whole, plant-based nutrition protocol rapidly reverses symptoms in three women with systemic lupus erythematosus and Sjögren's syndrome. *Front Nutr*. 2024 Feb 27;11:1208074. doi: 10.3389/fnut.2024.1208074. PMID: 38505266; PMCID: PMC10949923.
82. Alwarith J, Kahleova H, Rembert E, Yonas W, Dort S, et al. Nutrition Interventions in Rheumatoid Arthritis: The Potential Use of Plant-Based Diets. A Review. *Front Nutr*. 2019 Sep 10;6:141. doi: 10.3389/fnut.2019.00141. PMID: 31552259; PMCID: PMC6746966.
83. Mazzucca CB, Raineri D, Cappellano G, Chiocchetti A. How to Tackle the Relationship between Autoimmune Diseases and Diet: Well Begun Is Half-Done. *Nutrients*. 2021 Nov 5;13(11):3956. doi: 10.3390/nu13113956. PMID: 34836210; PMCID: PMC8620243.
84. Kim P, Arnold M, Gunti J. Five-Month Trial of Whole-Food Plant-Based Diet in a Patient With Coexisting Myasthenia Gravis and Lambert-Eaton Myasthenic Syndrome. *Am J Lifestyle Med*. 2021 Feb 16;15(3):230-237. doi: 10.1177/1559827621993748. PMID: 34025312; PMCID: PMC8120614.
85. Khalid W, Arshad MS, Ranjha MMAN, Róžańska MB, Irfan S, et al. Functional constituents of plant-based foods boost immunity against acute and chronic disorders. *Open Life Sci*. 2022 Sep 8;17(1):1075-1093. doi: 10.1515/biol-2022-0104. PMID: 36133422; PMCID: PMC9462539.
86. Hardt L, Mahamat-Saleh Y, Aune D, Schlesinger S. Plant-Based Diets and Cancer Prognosis: a Review of Recent Research. *Curr Nutr Rep*. 2022 Dec;11(4):695-716. doi: 10.1007/s13668-022-00440-1. Epub 2022 Sep 23. PMID: 36138327; PMCID: PMC9750928.
87. Cheng E, Ou FS, Gatten C, Ma C, Venook AP, Lenz HJ, O'Reilly EM, Campbell PT, Kuang C, Caan BJ, Blanke CD, Ng K, Meyerhardt JA. Plant-based diet and survival among patients with metastatic colorectal cancer. *J Natl Cancer Inst*. 2025 Jan 1;117(1):169-179. doi: 10.1093/jnci/djae213. PMID: 39212617; PMCID: PMC11717424.
88. Loeb S, Hua Q, Bauer SR, Kenfield SA, Morgans AK, et al. Plant-based diet associated with better quality of life in prostate



- cancer survivors. *Cancer*. 2024 May 1;130(9):1618-1628. doi: 10.1002/cncr.35172. Epub 2024 Feb 13. PMID: 38348508; PMCID: PMC11009061.
89. Madigan M, Karhu E. The role of plant-based nutrition in cancer prevention. *Journal of Unexplored Medical Data*. 2018;3:9. doi: 10.20517/2572-8180.2018.05.
90. Liu VN, Van Blarigan EL, Zhang L, Graff RE, Loeb S, Langlais CS, Cowan JE, Carroll PR, Chan JM, Kenfield SA. Plant-Based Diets and Disease Progression in Men With Prostate Cancer. *JAMA Netw Open*. 2024 May 1;7(5):e249053. doi: 10.1001/jamanetworkopen.2024.9053. PMID: 38691361; PMCID: PMC11063803.
91. Campbell TM, Campbell EK, Culakova E, Blanchard LM, Wixom N, et al. A whole-food, plant-based randomized controlled trial in metastatic breast cancer: weight, cardiometabolic, and hormonal outcomes. *Breast Cancer Res Treat*. 2024 Jun;205(2):257-266. doi: 10.1007/s10549-024-07266-1. Epub 2024 Mar 6. PMID: 38446316; PMCID: PMC11101531.
92. Alcorta A, Porta A, Tárrega A, Alvarez MD, Vaquero MP. Foods for Plant-Based Diets: Challenges and Innovations. *Foods*. 2021 Feb 1;10(2):293. doi: 10.3390/foods10020293. PMID: 33535684; PMCID: PMC7912826.
93. Storz MA. Is There a Lack of Support for Whole-Food, Plant-Based Diets in the Medical Community? *Perm J*. 2018;23:18-068. doi: 10.7812/TPP/18-068. PMID: 30589405; PMCID: PMC6307547.
94. Rickerby A, Green R. Barriers to Adopting a Plant-Based Diet in High-Income Countries: A Systematic Review. *Nutrients*. 2024 Mar 14;16(6):823. doi: 10.3390/nu16060823. PMID: 38542734; PMCID: PMC10975979.
95. Amiri M, Li J, Hasan W. Personalized Flexible Meal Planning for Individuals With Diet-Related Health Concerns: System Design and Feasibility Validation Study. *JMIR Form Res*. 2023 Aug 3;7:e46434. doi: 10.2196/46434. PMID: 37535413; PMCID: PMC10436119.
96. Starke AD, Dierkes J, Lied GA, Kasangu GAB, Trattner C. Supporting healthier food choices through AI-tailored advice: A research agenda. *PEC Innov*. 2025 Jan 10;6:100372. doi: 10.1016/j.pecinn.2025.100372. PMID: 39896056; PMCID: PMC11786099.
97. Sandri E, Cerdá Olmedo G, Piredda M, Werner LU, Dentamaro V. Explanatory AI Predicts the Diet Adopted Based on Nutritional and Lifestyle Habits in the Spanish Population. *Eur J Investig Health Psychol Educ*. 2025 Jan 24;15(2):11. doi: 10.3390/ejihpe15020011. PMID: 39997075; PMCID: PMC11854735.