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Plant-based diets and their effect on cardiometabolic risk factors: A meta-analysis.

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Introduction

Cardiometabolic diseases including Cardiovascular Disease (CVD), Type 2 Diabetes Mellitus (T2DM), hypertension, and dyslipidemia remain leading causes of mortality worldwide. As diet plays a central role in modulating these conditions, researchers and clinicians alike have increasingly turned attention to Plant-Based Diets (PBDs) as a potential preventive and therapeutic strategy.A plant-based diet emphasizes the consumption of vegetables, fruits, legumes, whole grains, nuts, and seeds, while minimizing or eliminating animal-derived products. The rise of vegetarian, vegan, and flexitarian eating patterns over the last two decades has prompted a substantial body of research into their health outcomes.This meta-analysis aims to synthesize current evidence on the effect of plant-based diets on cardiometabolic risk factors, including Body Mass Index (BMI), blood pressure, lipid profiles, glycemic control, and inflammatory Aprkers [1].

A systematic search of PubMed, Scopus, and Web of Science databases was conducted for Randomized Controlled Trials (RCTs) and observational studies published between 2000 and 2024. The inclusion criteria were. Adult participants (≥18 years).Intervention involving a plant-based diet (vegan, vegetarian, or semi-vegetarian).Comparison to omnivorous or standard diet. Outcome reporting on at least one cardiometabolic risk factor.A total of 42 studies (including 26 RCTs) involving over 12,000 participants were included in the final analysis. Statistical pooling was done using a random-effects model, and heterogeneity was assessed using the I^2 statistic [2].

Participants on plant-based diets had a mean reduction in BMI of 1.45 kg/m² compared to omnivorous controls ($p < 0.01$).Average weight loss over 12 weeks was approximately 3.4 kg in intervention groups.Systolic blood pressure dropped by 4.7 mmHg and diastolic by 2.6 mmHg (both statistically significant).These reductions were more pronounced in hypertensive and prehypertensive individuals.Total cholesterol levels decreased by 12.5 mg/dL and LDL cholesterol by 9.8 mg/dL.HDL showed a modest reduction (−2.2 mg/dL), which is common with low saturated fat intake.Triglycerides were slightly reduced in some studies but showed inconsistent results across trials [3].

Hemoglobin A1c (HbA1c) dropped by 0.4% in type 2 diabetes patients on plant-based diets.Fasting glucose improved by 8.2 mg/dL, particularly in studies with whole-food, low-GI plant foods.C-Reactive Protein (CRP), an inflammation bioAprker, was significantly reduced (−0.8 mg/L) in high-quality RCTs.Improvements were more substantial in those with metabolic syndrome or elevated baseline inflammation.The findings strongly support the beneficial impact of plant-based diets on several key cardiometabolic risk factors. Weight loss and blood pressure reductions are consistent with prior studies and likely result from increased fiber intake, lower energy density, and improved gut microbiota diversity [4].

Reductions in LDL cholesterol can be attributed to the low saturated fat content and high intake of phytosterols and soluble fiber, which inhibit cholesterol absorption. Meanwhile, improved glycemic control appears to be linked to the high intake of whole grains, legumes, and antioxidant-

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rich foods, which enhance insulin sensitivity.Some limitations of the included studies include. Variability in the type and strictness of plant-based diets (e.g., vegan vs. flexitarian).Short intervention durations (<6 months in many trials).Adherence challenges and self-reported dietary intake.Nonetheless, the overall consistency of findings across diverse populations and study designs adds to the credibility of the evidence [5].

Conclusion

This meta-analysis demonstrates that plant-based diets offer measurable improvements in cardiometabolic health, including lower BMI, reduced blood pressure, improved lipid profiles, and better glycemic control. The magnitude of benefit is clinically meaningful, especially when adopted as part of a long-term lifestyle change.Plant-based diets should be considered a viable, evidence-based approach for the prevention and management of cardiometabolic diseases. Future long-term trials are needed to explore sustainability, adherence, and the impact on hard endpoints like myocardial infarction and mortality.

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