ROLE OF PLANT-BASED DIETS (PBDS) IN MANAGING LIFESTYLE DISEASES: A PATHWAY TO SUSTAINABLE HEALTH

Ravi Kanji Chavda[1], Dr Aparna Jain[2]

[1]Research Scholar, Department of Business Studies, Dr. Shantilal K Somaiya School of Commerce and Business Studies

[2]Associate Professor, Department of Business Studies, Dr. Shantilal K Somaiya School of Commerce and Business Studies

Abstract

Purpose: This study examines the role of plant-based diets (PBDs) in managing lifestyle diseases by evaluating the effect of PBD adoption on key health outcomes and overall quality of life. The study aims to provide a structured understanding of how plant-based dietary practices contribute to sustainable health outcomes.

Design/Methodology/Approach: A quantitative research design was employed using Structural Equation Modeling (SEM) to analyze the relationships between adoption of a plant-based diet and multiple lifestyle-disease outcomes. Primary data were collected through a structured questionnaire, and both measurement and structural models were assessed to examine the strength and significance of direct relationships.

Findings: The results indicate that adoption of a plant-based diet has a positive and statistically significant effect on all examined outcomes, including blood pressure management, cholesterol and lipid profile improvement, glycemic control, weight and obesity management, and overall quality of life. Among these, weight and obesity management demonstrated the strongest effect, highlighting the effectiveness of plant-based dietary patterns in sustainable disease management.

Implications: The findings offer valuable insights for healthcare practitioners, nutrition professionals, and policymakers in designing evidence-based dietary strategies and public health interventions aimed at lifestyle-disease management and sustainable health promotion.

Originality: This study contributes to the literature by empirically validating multiple health outcomes of plant-based diet adoption within a single integrated analytical framework, providing a comprehensive perspective on PBDs as an effective lifestyle intervention.

Keywords: Plant-Based Diet, Quality of Life, Lifestyle diseases, Sustainable Health.

1. Introduction:

Type 2 diabetes (T2D), cardiovascular disease (CVD), and metabolic syndrome (MetS) are examples of lifestyle diseases that have evolved from being a later-life problem to a chronic condition that affects everyday activities, health care costs, and societal productivity. The current evidence in the world indicates that dietary and modifiable metabolic risk exposures remain focal determinants of disease burden, which is why food-based disease prevention and management strategies are also an urgent research topic (GBD 2021 Risk Factors Collaborators, 2024). However, even though it is commonly known that diet counts, the more practical question is a tighter one; what dietary habits are most protective, to whom and by what mechanisms they are converted into quantifiable changes in lifestyle-disease outcomes? "Plant-based diets (PBDs) - including the vegan and vegetarian trends, as well as flexitarian and plant forward diets - have become a major focus as a scalable lifestyle intervention." Instead, recent research is suggesting that with increased compliance with healthier vegetarian patterns, there is less cardiometabolic risk and better long-term outcomes, such as less incidence and progression to multimorbidity with cancer, CVD, and T2D (Cordova et al., 2025). There is also evidence that PBDs could contribute to risk reduction in T2D with beneficial relationships between healthier plant-based indices and almost-linear, negative relationships, whereas unhealthy

PBDs (e.g., refined, ultra-processed plant foods) may have a diluting or counterbalancing effect (Murciano et al., 2025). Equally, the recent studies note the possible usefulness of PBDs to MetS components, but the gaps in the clarity of the research and the necessity to clarify what quality of plant-based eating should be adopted more are also mentioned (Wisniewska et al., 2024). This aspect of quality is critical since plant-based is not necessarily associated with health promoting and policies or clinical guidelines that do not take this difference into account may lead to mixed outcomes. This study requires in-depth research because lifestyle-disease management is rarely a single-step relationship between "diet" and "health." Outcomes are shaped by interconnected behavioral, biological, and psychosocial mechanisms--such as adherence capability, food environment, health beliefs, metabolic traits, and mediators like lipid and glycemic markers. The traditional statistical methods are usually used to study isolated relationships, which may overlook indirect relationships, latent variables (e.g., perceived barriers, health motivation), and co-occurring pathways which interact. SEM will thus be appropriate in enhancing this field since it is able to estimate measurement models of complex constructs and test direct and indirect pathways with one integrated model (Miao et al., 2023). Through the application of SEM, the current study will not only address the question of whether a plant-based diet is effective in managing lifestyle-disease, but also how and why this occurs and consider the quality of the diet, and the interconnectedness of mechanisms involved between dietary practice and health outcomes.

The proposed research paper will analyze and theorize the use of PBDs in the management of lifestyle diseases. The main task is to form an inclusive conceptual approach that can encompass the variables of the multidimensional factors-diet quality, adherence to behavioral patterns, metabolic consequences and psychosocial factors-determining the effectiveness of plant-based dieting pattern in reduction of lifestyle diseases. Based on the empirical data and theoretical basis on nutrition science, communal health, health behavior, and lifestyle medication, the research aims to explain the mutual partnerships among plant-based dietary

intake, dietary quality, health consciousness, metabolic measures, and perceived health results. The suggested framework will be used to sustain the positioning of PBDs not only as dietary practices, but as systematic lifestyle changes to manage and prevent diseases.

Research Questions

RQ1: How does the adoption of a plant-based diet influence the management of lifestyle diseases?

RQ2: How does the adoption of a plant-based diet affect the quality of life of individuals with lifestyle diseases?

The current research provides a contribution to the current literature on the topic by outlining the interrelationship between dietary habits, behavioral determinants, and health-related consequences in the management of lifestyle-associated diseases. In contrast to previous researches that mostly deal with the direct relationship between diet and disease indicators, this research incorporates nutritional, behavioral, and outcome-related factors in one analysis framework. Adoption of plant-based diet has been conceptualized as a multidimensional construct, which is determined by individual-level behaviors as well as health perceptions. The results are likely to offer practical implications to healthcare practitioners, nutrition educators, and policy makers who may wish to find evidence-based approaches to enhance sustainable dietary interventions.

The article is divided into six parts. The initial part of it is the background, purpose, and scope of the study. The review of literature is presented in the second section and is based on the available knowledge on PBDs and lifestyle diseases. In the third section, there is an explanation of research methodology and SEM framework adopted in analysis. The fourth section provides the data analysis and interpretation along with empirical findings and structural associations between the variables. The first part is the discussion which links the findings of this research with the past and justifies the results of the data analysis. Finally, Conclusions, and future research directions are concluded with the final section dealing with the implications to health practice and policy.

2. Review of Literature

There is evidence indicating that plant-based eating habits tend to be linked with a "decreased blood pressure as compared to animal-based eating habits," summed up in recent systematic reviews (Tome-Carneiro & Visioli, 2023). Notably, it is the quality of "plant-based consumption, which is the healthier the plant-based diet, the less unfavorable BP. Conversely, PBDs rich in refined grains/sweetened products can be linked to an increase in the BP (Aljuraiban et al., 2020). Evidence of controlled-trial has shown that vegan dietary interventions could effectively lower LDL-C and total cholesterol in adults supporting the diet-responsive outcome of lipid improvement (Tow et al., 2025). Plant-based interventions also report a decrease in total cholesterol and LDL-C when compared to comparator diets in diabetes-focused dietary trials that have been synthesized in systematic work (Toumpanakis et al., 2018). These results support the prediction of lipid improvement as a dependent construct that is associated with the adoption of PBDs. In recent meta-analysis evidence of reduced HbA1c in adults with T2D by vegetarian dietary patterns is supported by evidence of randomized controlled trials synthesized, suggesting that there is indeed a significant change in glycemic control (Guest et al., 2024). There are also mechanistic and practice-oriented pieces of evidence, which prove that the "plant-based eating patterns are effective in the prevention and treatment of diabetes", and the report shows an improvement in the blood glucose levels and insulin-sensitivity pathways (Jardine et al., 2021). Plant-based diet interventions had been found to provide both quality-of-life and metabolic benefit involving adults with T2D (Toumpanakis et al., 2018). Nevertheless, the more recent synthesis of RCTs also reports that the effects of QoL are not always consistent across studies as they are affected by the design of intervention and the conditions of the comparators (Guest et al., 2024). A study of interventions involving PBDs finds that there are overall weight losses among studies used to justify the claim that plant-based interventions can attain weight-related results in a variety of study groups (Tran et al., 2020). Recent evidence on trials also indicates that whole-food, plant-based interventions have the potential to induce clinically relevant weight change and enhance cardiometabolic profiles among particular groups of patients (Campbell et al., 2024). The most common operationalisation of plant-based dietary patterns in the research is vegetarian/vegan or plant-forward diets, and they are operationalised as a behavioural construct, indicating the extent of adherence (Tran et al., 2020). Recent clinical and evidence synthesis studies suggest that plant-based patterns may be applied to lifestyle-disease settings since they have the potential to concurrently affect body weight, glycemic indicators, lipids, and cardiovascular risks pattern (Guest et al., 2024; Jardine et al., 2021).

Table No: 1 Summary of Literature on Plant-Based Diet and Lifestyle Disease Outcomes

Construct	Focus of Prior Studies	Key Findings	Representative Studies (2018–2025)
Adoption of Plant-Based Diet	Degree of adherence to plant-based or plant-forward dietary patterns	Higher adoption of PBDs is associated with favorable cardiometabolic outcomes and improved disease-related indicators	Tran et al. (2020); Jardine et al. (2021)
Blood Pressure Management	Effect of PBDs on systolic and diastolic blood pressure	Healthier plant-based dietary patterns are linked to lower blood pressure and reduced hypertension risk	Aljuraiban et al. (2020); Tomé-Carneiro & Visioli (2023)
Cholesterol & Lipid Profile Improvement	Changes in total cholesterol, LDL-C, and lipid ratios	Vegan and plant-based interventions consistently reduce LDL-C and total cholesterol levels	Toumpanakis et al. (2018); Tow et al. (2025)
Glycemic Control	Impact on HbA1c, fasting glucose, and insulin sensitivity	PBDs improve glycemic control among individuals with type 2 diabetes	Jardine et al. (2021); Guest et al. (2024)

| Overall Quality of Life | Perceived physical and psychological well-being among lifestyle-disease patients | Evidence suggests improvements in quality of life, though effects vary by intervention design | Toumpanakis et al. (2018); Guest et al. (2024) |
| Weight & Obesity Management | Body weight, BMI, and adiposity-related outcomes | Plant-based dietary interventions support weight reduction and obesity management | Tran et al. (2020); Campbell et al. (2024) |

3. Materials and Methods

The current research used quantitative research design to investigate the above through Structural Equation Modeling (SEM) technique to determine the role of adoption of plant-based diet in the management of the lifestyle diseases. The analysis of the respondents was based on a total sample of 235 respondents, who were members of Generation Z. This is a substantial sample size compared to the minimum acceptable level of 200 respondents to have sufficient statistical power in any SEM-based study hence rendering it strong and reliable. The six latent constructs included in the proposed research model and were measured using 27 observable indicators, which is suitable in identifying the medium effect size (0.30) with a statistical power of 0.90 at a 5 percent level of significance.

Non-random purposive sampling method was used to identify the respondents, who were appropriate in answering the research questions, especially those that had been sensitized on their diets and health issues relating to their lifestyles. There was the use of both primary and secondary sources of data in the research. Primary data were gathered using the structured questionnaire that would help to obtain the information concerning the adoption of the plant-based diet, as well as the health outcomes associated with its use, whereas the secondary data were utilized to help developing the construct and building the conceptualization of the model. The method of analysis was the use of "Partial Least Squares Structural Equation Modeling (PLS-SEM) with smartPLS software." It was selected because one needs it in prediction-based studies, the presence of numerous latent variables in a model, and non-normal data. The ethical considerations that were made during data collected adhered to the principles as described by Pirani (2024).

4. Data Analysis

Table No: 2 Reliability and validity

Construct	Cronbach's Alpha	Composite Reliability	Average variance Extracted
Adoption of Plant-Based Diet (APBD)	0.880	0.880	0.710
Blood Pressure Management (BPM)	0.887	0.887	0.612
Cholesterol & Lipid Profile Improvement (CLPI)	0.866	0.866	0.565
Glycemic Control (GC)	0.885	0.885	0.610
Overall Quality of Life (OQL)	0.831	0.831	0.552
Weight & Obesity Management (WOM)	0.895	0.895	0.632

The findings have shown that there is a high internal consistency reliability and acceptable convergent validity of all the constructs under investigation. The values of "Cronbach's Alpha and Composite Reliability of all the constructs are above the recommended standard of 0.70" which attests that the measurement items are reliable enough to reliably measure their respective constructs. Particularly, the reliability of Weight & Obesity Management (0.895) and Blood Pressure Management (0.887) is very high.

Moreover, the values of the "Average Variance Extracted (AVE) of all constructs exceed the acceptable minimum criterion of 0.50," which illustrates sufficient convergent validity. This implies that both constructs help to explain over half of the variance in the indicators. Adoption of Plant-Based Diet (0.710) has the highest AVE, which means the high construct validity, and the Overall Quality of Life (0.552) is at the acceptable level. Generally, these results indicate that measurement model is reliable and valid, hence it can be used to conduct further structural analysis of the model and test the hypothesis.

Table No: 3 Discriminant validity

Construct	APBD	BPM	CLPI	GC	OQL	WOM
Adoption of Plant-Based Diet	**0.842**					
Blood Pressure Management	0.677	**0.782**				
Cholesterol & Lipid Profile Improvement	0.718	0.705	**0.751**			
Glycemic Control	0.718	0.739	0.730	**0.781**		
Overall Quality of Life	0.694	0.666	0.732	0.660	**0.743**	
Weight & Obesity Management	0.721	0.716	0.743	0.706	0.727	**0.795**

The table presents "discriminant validity using the Fornell–Larcker criterion, where the diagonal values represent the square root of the Average Variance Extracted (AVE) for each construct, and the off-diagonal values represent the inter-construct correlations."

"For all constructs, the square root of AVE (diagonal values) is greater than the corresponding correlations with other constructs, satisfying the Fornell–Larcker criterion." For example, Adoption of Plant-Based Diet has a square root of AVE of 0.842, which exceeds its correlations with Blood Pressure Management (0.677), Cholesterol & Lipid Profile Improvement (0.718), and other constructs. Similarly, Weight & Obesity Management (√AVE = 0.795) shows higher diagonal values compared to its correlations with other constructs.

These findings show that every concept in the model is empirically unique and captures occurrences that other constructs do not. Hence, adequate discriminant validity is established for all constructs, confirming that the measurement model demonstrates good construct separation and is suitable for further structural equation modeling and hypothesis testing.
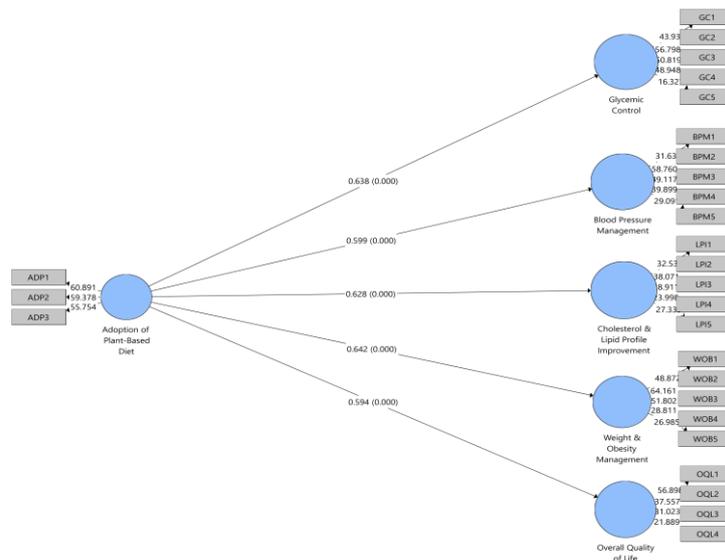
Figure No: 1 SEM model

Table No Hypothesis testing

Path	Beta Coefficient	T-Statistics	P-Value
Adoption of Plant-Based Diet → Blood Pressure Management	0.599	13.002	0.000
Adoption of Plant-Based Diet → Cholesterol & Lipid Profile Improvement	0.628	13.143	0.000
Adoption of Plant-Based Diet → Glycemic Control	0.638	16.158	0.000
Adoption of Plant-Based Diet → Overall Quality of Life	0.594	11.578	0.000
Adoption of Plant-Based Diet → Weight & Obesity Management	0.642	13.842	0.000

The result in hypothesis testing indicates that a positive and statistically significant effect of adoption of plant-based diet has a positive impact on all the health-related outcomes of the study under investigation. Plant-based diet is also effective in controlling blood pressure ($b = 0.599$, $t = 13.002$, $p < 0.001$), which means that it is effective in maintaining cardiovascular health. It has also a powerful positive effect on the improvement of the cholesterol and lipid profile ($b = 0.628$, $t = 13.143$, $p < 0.001$), which indicates its contribution to the minimization of the risks of health associated with lipids.

Moreover, the adoption of a vegan diet exhibits a substantial positive impact on glycemic control ($b = 0.638$, $t = 16.158$, $p < 0.001$), which highlights its relevance of the diet in the control of the level of glucose in blood. It is also significantly related to overall quality of life ($b = 0.594$, $t = 11.578$, $p < 0.001$), which points to the broader well-being gains other than clinical health indicators. Also, the biggest impact exists on the weight and obesity management ($b = 0.642$, $t = 13.842$, $p < 0.001$), which points at the efficiency of the vegetarian-based dietary patterns in weight management. In general, the hypotheses suggested are all validated, which proves that plant-based diet is a major modifiable factor in ensuring better health outcomes and the quality of life, in general.

5. Discussion

The results of the SEM analysis indicate clearly that the plant-based diet adoption has statistically significant and positive impact on all the outcomes of the lifestyle diseases that are investigated, which is highly consistent with data presented in empirical and synthesis-based studies. The high impact on blood pressure management is corroborated by other previous studies that have revealed that plant-based dietary patterns, especially the ones rich in whole grains, fruits, vegetables, and legumes, correlate with lower systolic and diastolic blood pressure levels caused by decreased intake of sodium, enhanced vascular functions, and increased intake of potassium and fiber (Aljuraiban et al., 2020; Tome-Carneiro and Visioli, 2023). Equally, the positive correlation between plant-based dietary adoption and cholesterol and lipid profile improvement is significant, which is indicative of the previous randomized controlled trials and meta-analyses that indicate significant changes LDL cholesterol and total cholesterol reduction of individuals on vegetarian or vegan diets (Tow et al., 2025; Toumpanakis et al., 2018). Previous studies also substantiate the importance of the overwhelming effect on glycemic control by indicating that vegetarian diets elevate insulin sensitivity and glycemic regulation due to greater intake of fibers, reduced intake of saturated fats, and a better body composition, especially in patients with type 2 diabetes (Guest et al., 2024; Jardine et al., 2021). In addition to the physiological results, the positive connection between the plant-based diet adoption and the general quality of life supports previous research stating that the perceived physical well-being, energy levels, and psychological health of those who follow the plant-based dietary interventions are improved. Nevertheless, earlier research documents inconsistency in compliance and intervention plan (Toumpanakis et al., 2018). Specifically, the effect size of weight and obesity management is the largest, which is consistent with systematic reviews that found that PBDs are effective in reducing weight and promoting weight management in the long run due to their lower energy content and increased satiety (Tran et al., 2020; Campbell et al., 2024).

6. Conclusion

The results of the current examination confirm that the practicality of a plant-based diet is crucial and beneficial in the thermostat of life forms diseases as the SEM outcomes show. The adoption of a plant-based diet was reported to have great benefits in blood pressure regulation, cholesterol, and lipid, glycemic, weight and obesity control, and improvement of the general quality of life. The robustness and steadiness of every structural pathway demonstrate that PBDs are an efficient and holistic lifestyle intervention and not a separate diet. PBDs are a promising and effective solution in the increasing burden of lifestyle-related diseases as they can positively impact a series of health outcomes at the same time.

Healthcare managers and nutrition service providers can think about the implementation of formal plant-based diet interventions into intervention plans as part of the routine lifestyle-disease management to enhance patient outcomes and adherence. These findings can also be used by wellness and corporate health managers to develop evidence-based dietary programs that will enhance preventive healthcare and well-being among employees. The evidence of the study can be used by policy makers to enforce dietary guidelines and policies related to health promotion by promoting plant-based eating patterns to help prevent chronic diseases. The results also contribute to the idea that the education about plant-based nutrition should be included in the national health campaigns and interventions at the community level. PBDs should be promoted as it will help to improve the health outcomes of the population empowering these individuals to make more healthy and sustainable food choices. Extended adoption by society can also mitigate the incurred healthcare costs due to lifestyle illnesses as well as create more awareness about managing lifestyle diseases by nutrition.

References:

1. Aljuraiban, G., Chan, Q., Gibson, R., Stamler, J., Daviglus, M. L., Dyer, A. R., Miura, K., Wu, Y., Ueshima, H., Zhao, L., Van Horn, L., Elliott, P., Oude Griep, L. M., & INTERMAP Research Group (2020). Association between plant-based diets and blood pressure in the INTERMAP study. BMJ nutrition, prevention & health, 3(2), 133–142. https://doi.org/10.1136/bmjnph-2020-000077

2. Campbell, T. M., Campbell, E. K., Culakova, E., Blanchard, L. M., Wixom, N., Guido, J. J., Fetten, J., Huston, A., Shayne, M., Janelsins, M. C., Mustian, K. M., Moore, R. G., & Peppone, L. J. (2024). A whole-food, plant-based randomized controlled trial in metastatic breast cancer: weight, cardiometabolic, and hormonal outcomes. Breast cancer research and treatment, 205(2), 257–266. https://doi.org/10.1007/s10549-024-07266-1

3. Córdova, R., Kim, J., Thompson, A. S., Noh, H., Shah, S., Dahm, C. C., Jensen, C. F., Mellemkjær, L., Tjønneland, A., Katzke, V., Le Cornet, C., El-Khoury, C., Schulze, M. B., Masala, G., Agnoli, C., Simeon, V., Tumino, R., Ricceri, F., Verschuren, W. M. M., van der Schouw, Y. T., … Freisling, H. (2025). Plant-based dietary patterns and age-specific risk of multimorbidity of cancer and cardiometabolic diseases: a prospective analysis. The lancet. Healthy longevity, 6(8), 100742. https://doi.org/10.1016/j.lanhl.2025.100742

4. GBD 2021 Risk Factors Collaborators (2024). Global burden and strength of evidence for 88 risk factors in 204 countries and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021. The Lancet, 403(10440), 2162-2203. https://doi.org/10.1016/S0140-6736(24)00933-4

5. Guest, N. S., Raj, S., Landry, M. J., Mangels, A. R., Pawlak, R., Senkus, K. E., Handu, D., & Rozga, M. (2024). Vegetarian and Vegan Dietary Patterns to Treat Adult Type 2 Diabetes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Advances in Nutrition, 15(10), 100294. https://doi.org/10.1016/j.advnut.2024.100294

6. Jardine, M. A., Kahleova, H., Levin, S. M., Ali, Z., Trapp, C. B., & Barnard, N. D. (2021). Perspective: Plant-Based Eating Pattern for Type 2 Diabetes Prevention and Treatment: Efficacy, Mechanisms, and Practical Considerations. Advances in Nutrition, 12(6), 2045-2055. https://doi.org/10.1093/advances/nmab063

7. Lee, H., Lee, J. E., & Kang, M. (2025). Association of plant-based diet indices with all-cause and cause-specific mortality among Korean adults in the KNHANES. Scientific Reports, 15, 41007. https://doi.org/10.1038/s41598-025-24698-x

8. Miao, R., Yu, R., Zhou, H., Liu, L., Peng, T., & Wang, J. (2023). Novel use of structural equation modelling to examine diet and metabolic traits associated with microvascular endothelial dysfunction in middle-aged Chinese

males: a cross-sectional study. BMJ open, 13(9), e073357. https://doi.org/10.1136/bmjopen-2023-073357

9. Murciano, A., Malavolti, M., Fairweather-Tait, S., Paduano, S., Vinceti, M., & Filippini, T. (2025). Plant-based diets and risk of type 2 diabetes: Systematic review and dose–response meta-analysis. The British Journal of Nutrition, 134(4), 277. https://doi.org/10.1017/S0007114525104157

10. Pirani, S. (2024). Navigating Research Ethics: Strategies for preventing and Addressing Research Misconduct, International Journal of Multidisciplinary Research & Reviews, Vol 03, No. 02, PP.96-104.

11. Tomé-Carneiro, J., & Visioli, F. (2023). Plant-based diets reduce blood pressure: A systematic review of recent evidence. Current Hypertension Reports, 25, 127–150. https://doi.org/10.1007/s11906-023-01243-7

12. Toumpanakis, A., Turnbull, T., & Alba-Barba, I. (2018). Effectiveness of plant-based diets in promoting well-being in the management of type 2 diabetes: a systematic review. BMJ open

diabetes research & care, 6(1), e000534. https://doi.org/10.1136/bmjdrc-2018-000534

13. Tow, W., Looi, A. D., Nithusharini, V., Lakshmipathy, K., Palanisamy, U. D., & Sundralingam, U. (2025). The green plate effect: Systematic review and meta-analyses of vegan diets and metabolic health in adults-findings from randomized controlled trials. Trends in Food Science & Technology, 164, 105227. https://doi.org/10.1016/j.tifs.2025.105227

14. Tran, E., Dale, H. F., Jensen, C., & Lied, G. A. (2020). Effects of Plant-Based Diets on Weight Status: A Systematic Review. Diabetes, metabolic syndrome and obesity : targets and therapy, 13, 3433–3448. https://doi.org/10.2147/DMSO.S272802

15. Wiśniewska, K., Okręglicka, K. M., Nitsch-Osuch, A., & Oczkowski, M. (2024). Plant-Based Diets and Metabolic Syndrome Components: The Questions That Still Need to Be Answered-A Narrative Review. Nutrients, 16(1), 165. https://doi.org/10.3390/nu16010165