

# The Relationship between Plant-Based Diets (Vegetarian/Vegan) and Central Obesity: A Literature Review



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## KEY WORDS

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## ABSTRACT

Obesity, particularly central obesity, has become a major global health concern due to its strong association with metabolic disorders such as cardiovascular diseases and type 2 diabetes. This study aims to examine the relationship between plant-based diets (vegetarian and vegan) and central obesity by conducting a qualitative literature review using the library research method. The research analyzes various scientific articles, systematic reviews, and meta-analyses published in reputable international journals. The findings indicate that plant-based diets are generally associated with lower body mass index (BMI), reduced visceral fat accumulation, and improved metabolic health. Several mechanisms contribute to this relationship, including higher fiber intake, lower energy density, and improved gut microbiota composition. Additionally, plant-based diets are rich in phytonutrients and antioxidants that promote fat metabolism and reduce inflammation, factors that are closely associated to central obesity. However, some studies highlight potential risks of plantbased diet such as inadequate nutrients intake particularly protein, vitamin B12, iron, and omega-3 fatty acids. A well-planned or well-balanced plantbased diet can provide all essential nutrients and nutritionally adequate. The overall evidence suggests that adopting a plant-based diet can be an effective strategy for managing and preventing central obesity. Future research should focus on long-term randomized controlled trials to strengthen the causal relationship and explore potential confounding factors. This study contributes to the growing body of evidence supporting plant-based nutrition as a sustainable and health-promoting dietary approach for obesity prevention and management.

## 1. INTRODUCTION

Obesity, particularly central obesity, has become a significant public health challenge worldwide due to its strong association with metabolic disorders, including cardiovascular diseases and type 2 diabetes (Erlich et al., 2024). Central obesity, characterized by excessive fat accumulation in the abdominal region, is a major risk factor for insulin resistance, dyslipidemia, and hypertension (Bakhshimoghaddam et al.,

2024). Dietary habits play a crucial role in managing obesity, with plant-based diets (PBDs), including vegetarian and vegan diets, gaining increasing attention due to their potential benefits in weight management and metabolic health (Di Napoli et al., 2024). Studies suggest that PBDs, which are rich in dietary fiber, polyphenols, and antioxidants, can contribute to lower body fat levels and improved metabolic profiles (Venturi, 2025). Despite these promising findings, the extent of the relationship between



PBDs and central obesity remains a topic of debate due to variations in dietary adherence and lifestyle factors.

Although multiple studies have highlighted the potential of plant-based diets in obesity management, existing literature presents inconsistencies regarding their impact on central obesity. Some research suggests that individuals following a PBD exhibit lower visceral fat accumulation and improved metabolic markers (Monge, 2024), while others emphasize the need for further investigation into the long-term sustainability and efficacy of PBDs in preventing central obesity (Mohammadi-Nasrabadi & Rashidimehr, 2024). Furthermore, limited research has explored the mechanisms by which plant-based nutrition influences fat distribution, particularly in different population groups and dietary patterns.

Given the rising prevalence of obesity-related metabolic disorders and the increasing interest in sustainable dietary interventions, understanding the impact of PBDs on central obesity is of critical importance. This study aims to provide a comprehensive review of current evidence to bridge the research gap and offer practical recommendations for dietary interventions in obesity management (Siqueira Júnior et al., 2024). Additionally, the findings of this review can contribute to public health policies promoting healthier eating habits as part of obesity prevention strategies.

Recent systematic reviews and meta-analyses indicate that plant-based diets may lower the risk of obesity by promoting satiety, reducing energy intake, and improving gut microbiota composition (Gil-Lespinaud, 2024). Erlich et al. (2024) found that a higher intake of plant-based foods was associated with lower visceral fat

accumulation and better cardiometabolic health. However, some studies caution that poorly planned PBDs may lead to nutrient deficiencies, which could influence body composition and metabolic health (Pires Fernandes, 2024). The variability in research findings underscores the need for a more detailed literature review focusing on central obesity.

This study provides a unique contribution by synthesizing recent evidence on the relationship between PBDs and central obesity while identifying gaps in current research. Unlike previous studies that focus primarily on general obesity, this review specifically examines central obesity, an aspect less frequently discussed in PBD research (Di Napoli et al., 2024). Additionally, this study considers different plant-based dietary patterns, including whole-food plant-based diets and processed vegetarian diets, to assess their impact on visceral fat distribution.

The primary objective of this study is to evaluate the relationship between plant-based diets and central obesity through a qualitative literature review. This study holds significant implications for both scientific and public health communities. By providing a comprehensive synthesis of existing research, it offers insights into the potential role of PBDs in managing central obesity. The findings may be useful for healthcare professionals in recommending dietary interventions and for policymakers in designing nutritional guidelines aimed at reducing obesity prevalence (Bakhshimoghaddam et al., 2024). Moreover, individuals seeking sustainable weight management strategies can benefit from understanding the impact of plant-based nutrition on metabolic health.



## 2. METHOD

This study employs a qualitative research approach through a literature review (library research) to examine the relationship between plant-based diets (vegetarian/vegan) and central obesity. The qualitative method is chosen to provide an in-depth understanding of existing knowledge and patterns based on prior research findings (Azzahroh, 2024). This approach allows for a critical synthesis of existing scientific literature, helping to identify trends, contradictions, and gaps in knowledge regarding the topic (Shaltout, 2025).

The data used in this study are secondary data collected from reputable academic sources, including peer-reviewed journal articles, systematic reviews, and meta-analyses published between 2019 and 2025. The primary sources include databases such as Google Scholar, PubMed, ScienceDirect, and Springer, ensuring credibility and relevance to the study objectives (Md Jamri, 2024). Selection criteria for the literature include studies that focus on the impact of plant-based diets on obesity, particularly central obesity, and related metabolic health outcomes (Trompeter et al., 2024). Articles discussing dietary interventions, mechanisms of action, and population-based studies on plant-based diets are also included (Hossain et al., 2024).

The data collection process involves a systematic literature search using relevant keywords such as "plant-based diet and central obesity," "vegetarian diet and visceral fat," "vegan diet and obesity," and "dietary interventions for metabolic health." Boolean operators (AND, OR) are applied to refine search results. Furthermore,

studies are filtered based on inclusion and exclusion criteria to ensure high-quality and relevant data (Esmaeilpour et al., 2024). Studies that do not specifically address the connection between plant-based diets and central obesity, or those conducted before 2019, are excluded to maintain the study's relevance to recent advancements (Kula et al., 2024).

The collected data are analyzed using a content analysis approach, where findings from different studies are categorized based on thematic similarities and key emerging patterns (Rahman et al., 2025). The analysis involves identifying the primary mechanisms through which plant-based diets influence central obesity, such as fiber intake, gut microbiota modulation, and caloric density (Taha et al., 2025). Studies are compared based on methodological rigor, sample size, and findings to derive meaningful conclusions. This method allows for a structured synthesis of evidence, highlighting consistent trends and discrepancies across different research studies (Mäder et al., 2025). Additionally, a critical appraisal framework is applied to assess the reliability and validity of included studies, ensuring that the conclusions drawn are based on strong scientific evidence (Greaves-Peters, 2024).

Through this qualitative approach, the study aims to provide a comprehensive overview of the impact of plant-based diets on central obesity and contribute to future research directions in the field of nutritional science and obesity prevention.

## 3. RESULT AND DISCUSSION

The table below presents 10 selected articles from the last five years (2019–2025) retrieved from Google Scholar, focusing on the



relationship between plant-based diets (vegetarian/vegan) and central obesity. These articles were selected based on their relevance,

methodological rigor, and contribution to understanding the effects of plant-based nutrition on obesity management.

Table 1 Literature Review

No.	Study	Methodology	Key Findings
1	Almneni et al. (2024)	Systematic Review & Meta-analysis	Plant-based diets reduce BMI and visceral fat accumulation.
2	Venturi (2025)	Literature Review	Polyphenols in plant-based foods improve metabolic health and prevent abdominal obesity.
3	Dowlati (2024)	Literature Review	Phytonutrients play a key role in obesity prevention and weight management.
4	Bakhshimoghaddam et al. (2024)	Systematic Review	Plant-based diets help mitigate metabolic syndrome, reducing waist circumference.
5	Siqueira Júnior et al. (2024)	Systematic Review	DASH and Mediterranean diets (plant-based components) help in obesity control.
6	Di Napoli et al. (2024)	Review Article	Abdominal obesity is significantly lower in individuals adhering to a plant-based diet.
7	Monge (2024)	Literature Review	Plant-based protein sources are beneficial for obesity prevention.
8	Fernandes (2024)	Experimental Study	Functional plant-based foods contribute to lower fat storage and improved metabolism.
9	Mohammadi-Nasrabadi & Rashidimehr (2024)	Comparative Analysis	Plant-based fats reduce central obesity risk.
10	Blanco Mejia et al. (2024)	Systematic Review	Soy-based alternatives help in weight management and metabolic improvements.

The findings from the literature review suggest a strong association between plant-based diets and reduced central obesity. Multiple studies indicate that vegetarian and vegan diets contribute to lower BMI and reduced visceral fat accumulation, primarily due to higher fiber intake, lower energy density, and improved gut microbiota (Almneni et al., 2024). High dietary fiber in plant-based foods enhances satiety, reducing total energy intake and subsequently lowering central obesity risk.

Bioactive compounds in plant-based diets, including polyphenols and phytonutrients, play a crucial role in obesity management. Studies highlight that plant-based foods with

antioxidants and anti-inflammatory properties help regulate fat metabolism and reduce inflammation, which is a key factor in abdominal fat deposition (Venturi, 2025). This suggests that plant-based diets may offer metabolic advantages beyond just calorie restriction.

Another critical finding is the effectiveness of plant-based dietary patterns such as the DASH and Mediterranean diets. These diets incorporate significant amounts of fruits, vegetables, whole grains, legumes, and healthy fats, which contribute to lower waist circumference and better metabolic outcomes (Siqueira Júnior et al., 2024). These results



align with prior research suggesting that diversity and balance in plant-based nutrition. Some studies also discuss specific plant-based food components, such as soy-based alternatives and plant-derived fats, which have been linked to lower central obesity risk. Soy products, in particular, improve lipid profiles and glucose metabolism, making them beneficial for individuals at risk of metabolic syndrome (Blanco Mejia et al., 2024). Moreover, plant-based fats from nuts and seeds provide healthier lipid profiles compared to animal-based fats (Mohammadi-Nasrabadi & Rashidimehr, 2024).

Despite the benefits, there are concerns regarding nutritional adequacy in plant-based diets. Some studies highlight that poorly planned vegetarian and vegan diets may lead to deficiencies in essential nutrients like protein, vitamin B12, and iron, potentially affecting body composition and metabolism (Monge, 2024). This underscores the importance of nutritionally balanced plant-based diets to maximize their benefits while avoiding deficiencies.

In conclusion, the literature suggests that a well-balanced plant-based diet is a promising dietary strategy for preventing and managing central obesity. The positive effects of fiber, polyphenols, and healthy fats provide compelling evidence for the adoption of plant-based nutrition as a sustainable approach to obesity management. However, future research should focus on long-term clinical trials to further validate these findings and optimize dietary recommendations for different populations.

The increasing prevalence of central obesity is a major global health concern, particularly as it is closely linked to metabolic disorders such as type 2

diabetes, cardiovascular disease, and hypertension (Almneni et al., 2024). The findings from this study suggest that plant-based diets (vegetarian and vegan) offer significant benefits in reducing central obesity by promoting weight management and metabolic health. The primary mechanisms identified include higher fiber intake, lower energy density, improved gut microbiota composition, and anti-inflammatory effects of plant-based foods (Venturi, 2025). These findings align with contemporary nutritional theories, such as the Set-Point Theory and the Gut Microbiota Hypothesis, which suggest that dietary composition significantly influences long-term weight regulation and fat distribution.

#### Current Phenomenon: The Rise of Plant-Based Diets and Obesity Epidemic

In recent years, there has been a surge in the adoption of plant-based diets, driven by ethical, environmental, and health-related reasons. This shift coincides with rising concerns about obesity rates, particularly central obesity, which has reached alarming levels worldwide. According to recent WHO reports, over 650 million adults are obese, and the prevalence of obesity-related diseases has increased sharply over the past two decades. Central obesity, characterized by excess visceral fat, is particularly dangerous as it is more closely associated with chronic inflammation and metabolic dysfunction (Bakhshimoghaddam et al., 2024). Given this context, the findings of this review are highly relevant, as they provide scientific evidence supporting plant-based diets as an effective strategy for obesity prevention.

#### Theoretical bases: Energy Balance and Gut Microbiota Theories

The Energy Balance Theory, which states that



weight gain occurs when caloric intake exceeds energy expenditure, has traditionally been used to explain obesity (Di Napoli et al., 2024). However, this theory does not fully account for how different food types impact metabolism, satiety, and fat storage. Plant-based diets tend to have lower energy density, meaning that individuals can consume larger volumes of food with fewer calories, thus reducing overall caloric intake while promoting satiety. Additionally, the high fiber content in plant-based diets slows digestion and modulates appetite hormones, further supporting weight management.

Another important theoretical framework is the Gut Microbiota Hypothesis, which suggests that the composition of gut bacteria influences body weight and fat distribution. Studies indicate that a fiber-rich plant-based diet promotes a healthier gut microbiome, leading to better metabolic function and reduced inflammation (Siqueira Júnior et al., 2024). This aligns with findings from this review, which suggest that individuals on plant-based diets exhibit lower levels of visceral fat and improved metabolic markers compared to those consuming high-fat, animal-based diets.

#### Dietary Patterns and Their Role in Obesity Management

Several well-established dietary patterns incorporate plant-based components and have been linked to improved obesity outcomes. For instance, the Mediterranean Diet and the DASH Diet emphasize high consumption of fruits, vegetables, whole grains, legumes, and healthy fats, all of which are characteristic of a plant-based diet. These dietary patterns have been scientifically validated for reducing obesity and improving metabolic health (Mohammadi-Nasrabadi & Rashidimehr, 2024). Similarly, the Blue Zone Diets, which focus on natural, plant-

heavy nutrition, are associated with longer lifespans and lower obesity rates. This suggests that plant-based eating patterns, when properly structured, can be sustainable for long-term weight management.

#### Challenges and Controversies in Implementing Plant-Based Diets

Despite the benefits, challenges remain in the adoption of plant-based diets for obesity prevention. Some concerns include potential nutrient deficiencies, particularly in protein, vitamin B12, iron, and omega-3 fatty acids, which are more commonly found in animal-based products (Monge, 2024). On the other hand, the Academy of Nutrition and Dietetics stated that appropriately planned vegetarian, including vegan, diets are healthful, nutritionally adequate, and may provide health benefits for the prevention and treatment of certain diseases. These diets are appropriate for all stages of the life cycle, including pregnancy, lactation, infancy, childhood, adolescence, older adulthood, and for athletes (Vesanto Melina et al., 2016). Protein-rich foods, such as traditional legumes, nuts and seeds, are sufficient to achieve full protein adequacy in adults consuming vegetarian/vegan diets, while the question of any amino acid deficiency has been substantially overstated (Mariotti & Gardner, 2019).

Additionally, not all plant-based diets are necessarily healthy—highly processed vegetarian and vegan foods can still contribute to weight gain and metabolic disorders if they are high in refined carbohydrates, unhealthy fats, and additives. Therefore, it is crucial to emphasize whole, nutrient-dense plant foods rather than processed plant-based alternatives.

Another issue is diet adherence. Many



individuals find it challenging to fully transition to a plant-based diet due to cultural food preferences, lack of accessibility to fresh plant-based ingredients, or perceived taste differences. Public health initiatives should focus on education and policy changes that support increased availability of affordable plant-based options, particularly in lower-income communities where obesity rates are often higher.

#### Future Implications and Research Directions

The findings of this review highlight the potential of plant-based diets as a strategy for obesity management, but long-term studies and randomized clinical trials are needed to further establish causality. Future research should focus on:

1. Longitudinal studies assessing the sustained effects of plant-based diets on central obesity.
2. Comparative studies between different types of plant-based diets (vegan, vegetarian, flexitarian) and their impact on visceral fat reduction.
3. Examination of genetic and lifestyle factors that influence individual responses to plant-based diets.
4. Intervention studies to improve adherence to plant-based diets and mitigate potential nutrient deficiencies.

#### 4. CONCLUSION

This literature review provides strong evidence that plant-based diets (vegetarian and vegan) are associated with a lower risk of central obesity, primarily due to their high fiber content, lower energy density, improved gut microbiota composition, and anti-inflammatory properties. The findings indicate that individuals following plant-based dietary

patterns tend to have lower BMI, reduced visceral fat accumulation, and improved metabolic health markers, which are crucial for preventing obesity-related diseases such as type 2 diabetes and cardiovascular disorders. The research aligns with established theories, including the Energy Balance Theory and the Gut Microbiota Hypothesis, reinforcing the idea that nutrient composition and dietary quality play a vital role in body weight regulation and fat distribution.

Despite the positive impact of plant-based diets on obesity prevention, challenges such as nutritional deficiencies, adherence issues, and the prevalence of processed plant-based foods must be addressed. While a well-balanced plant-based diet can provide all essential nutrients, improper dietary planning may lead to deficiencies in protein, vitamin B12, iron, and omega-3 fatty acids, potentially affecting overall health. Additionally, the increasing availability of highly processed vegetarian and vegan foods highlights the need for education and awareness on the importance of consuming whole, nutrient-dense plant-based foods. Public health initiatives should emphasize affordable access to fresh plant-based foods and the development of effective dietary guidelines to maximize the benefits of plant-based nutrition in obesity prevention.

Future research should focus on longitudinal studies and randomized controlled trials to establish a causal relationship between plant-based diets and central obesity. Comparative studies should be conducted to examine the differences in effectiveness between vegan, vegetarian, and flexitarian diets in reducing visceral fat accumulation. Additionally, research should investigate the impact of genetic and lifestyle factors on individual



responses to plant-based nutrition to develop more personalized dietary recommendations. Lastly, intervention studies aimed at improving adherence to plant-based diets, particularly in diverse socio-economic populations, should be conducted to enhance the practical application of plant-based nutrition in obesity prevention strategies. By addressing these gaps, future research can further solidify the role of plant-based diets in global public health efforts to combat obesity and metabolic disorders.

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