

Letter to the Editor

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Heart Health on the Plate: How do plant-based diets and air quality impact heart failure risk?

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To the Editor:

We have meticulously reviewed the article by Zhu *et al.*⁽¹⁾ published in *The British Journal of Nutrition*. This study investigates the synergistic relationship between the Healthful Plant-Based Dietary Index and exposure to Particulate Matter (PM_{2.5}) in the context of heart failure. The findings suggest that adherence to a healthful plant-based diet may reduce the risk of heart failure, particularly among populations exposed to lower levels of PM_{2.5}. However, several methodological aspects merit further discussion. These aspects are crucial for a comprehensive evaluation of the research findings and for ensuring the robustness of its conclusions. Key areas of concern include

First, the study's omission of data linking BMI to heart failure risk significantly limits its findings, as both low and high BMI can indicate varying risk levels for heart health. High BMI is associated with obesity, which increases the likelihood of developing conditions such as hypertension and diabetes that contribute to heart failure. Conversely, low BMI may signal malnutrition or other health issues that also predispose individuals to cardiovascular problems. By including BMI in the analysis, researchers could better examine how plant-based dietary patterns interact with body weight to influence heart failure risk, leading to a deeper understanding of dietary impacts on diverse populations. This comprehensive approach would enhance the relevance and inform more effective public health strategies and dietary recommendations aimed at preventing heart failure.

Second, the exclusion of vegetable oil from the analysis of the seventeen food groups within the Healthful Plant-Based Dietary Index (HPBDI) is significant because fats, particularly from plant sources, play a crucial role in overall dietary patterns and health outcomes. Vegetable oils provide essential fatty acids and can impact health in various ways depending on their type, influencing cardiovascular health and metabolic conditions. This omission could lead to skewed findings regarding dietary quality, as it disregards an important source of healthy fats that interacts with other food groups. Furthermore, referencing previous research by Satija *et al.* suggests that including vegetable oil in this analysis could strengthen conclusions about the impacts of a healthful plant-based diet by aligning with or challenging existing evidence on the benefits and risks associated with dietary fats, thus offering a more comprehensive understanding of optimal dietary practices.

Third, the research employs a 24-hour food recall method instead of a Food Frequency Questionnaire (FFQ) or a comprehensive diet history. The 24-hour food recall may limit the ability to accurately capture long-term dietary and behavioural patterns among the participants aged 40–69 years from England, Scotland and Wales, as sourced from the UK Biobank. Utilising an FFQ or a diet history approach could provide a more nuanced understanding of dietary habits over time, enriching the analysis of healthful plant-based dietary patterns.

There is also an equity dimension to this issue. Many urban and low-income communities face both limited access to fresh, plant-based foods and higher exposure to air pollution – a double burden that widens health disparities. Promoting plant-based diets without addressing environmental justice and air quality issues risks leaving the most vulnerable populations behind.

In this context, improving air quality is not just an environmental or industrial concern – it is a public health priority that directly intersects with nutrition, agriculture and food security. Clean air ensures that plant-based diets can fulfill their full potential: not just as a personal health choice, but as part of a broader ecosystem of sustainable, safe and equitable living.

In conclusion, while the study provides a crucial foundation for understanding the relationships between HPBDI, reduced heart failure risk and air quality, addressing the aforementioned points could strengthen the findings and implications of the research. A healthful plant-based dietary pattern offers myriad benefits for heart health, potentially reducing

the risk of heart failure through various biological and lifestyle mechanisms. However, it is essential to ensure that such diets still adhere to recommended dietary intake levels for essential nutrients while addressing environmental issues such as air pollution. As individuals and healthcare professionals increasingly recognise the value of plant-based diets, further research should continue to explore the specific components and practices that contribute to optimal heart health, guiding public health recommendations and dietary strategies aimed at preventing heart diseases while caring for the environment.

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Ethical Considerations. Not applicable.

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