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Longitudinal association between the healthful plant-based diet index and insulin sensitivity in Australian adults: the Childhood Determinants of Adult Health study

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A plant-based eating pattern has advantages for both human and planetary health.(1) Such an eating pattern broadly promotes minimally processed plant foods while moderating, but not necessarily excluding, animal-sourced foods. Adherence to a healthful plant-based eating pattern (determined using a dietary index) is associated with a lower risk of developing type 2 diabetes.(2) However, the association with its preceding state, diminishing insulin sensitivity, is less well established,(3) particularly in younger populations with repeat dietary assessments. Our aim was to examine the longitudinal relationship between a healthful plant-based eating pattern and insulin sensitivity in young to middle-aged Australian adults. We identified 667 participants (50.2% female) free of chronic disease at baseline from the Childhood Determinants of Adult Health (CDAH) study, an ongoing population-based cohort in Australia. Using qualitative food frequency questionnaire data, the healthful plant-based diet index (hPDI) scored adherence to a plant-based eating pattern. Plant foods considered "healthful" were scored positively (e.g., fruit, vegetables, whole grains) while all remaining foods were scored reversely (e.g., refined grains, sugar-sweetened beverages, poultry/red meat). Updated homeostatic model assessment (HOMA2) estimated insulin sensitivity (%) from fasting insulin and glucose concentrations. We used linear mixed-effects regression to analyse data from two time points: CDAH-1 (2004–2006, aged 26–36 years) and CDAH-3 (2017–2019, aged 36–49 years). hPDI scores were modelled as between- and within-person effects (i.e., a participant's overall mean and their deviation from said mean at each time point, respectively). The median follow-up duration was 13 years. A 10-unit hPDI score increase was associated with higher log-transformed HOMA2 insulin sensitivity, with discernible between-person ($\beta = 0.11$, CI [0.05, 0.17], $p < .001$) and within-person effects ($\beta = 0.10$, CI [0.05, 0.16], $p < .001$). Thus, a higher average hPDI score across follow-up and a higher-than-average hPDI score at any time point were positively—and independently—associated with higher insulin sensitivity. This finding was largely independent of adherence to the 2013 Australian dietary guidelines and robust to sensitivity analyses (e.g., inverse probability weighting to mitigate loss to follow-up). Further adjustment for adiposity (body mass index or waist circumference) attenuated between- and within-person effects by approximately 46–75%. In conclusion, we found a positive association between a healthful plant-based eating pattern and insulin sensitivity in young to middle-aged Australian adults, a finding that complements and expands upon prior research.(3) This may have beneficial implications for type 2 diabetes prevention later in life. Our findings reinforce the importance of prioritising certain plant foods (such as fruit, vegetables, whole grains, legumes, and nuts/seeds) for health promotion.

References

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