HSC Public Health Agency
Research and Development

Evidence Brief

Food-Based Biomarkers, Diet Quality, And Cardiometabolic Health

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Why did we start? (The need for the research and/or why the work was commissioned)	Improving population dietary intake could prevent one fifth of global deaths, with cardiovascular disease (CVD) identified as the leading contributor to diet-related deaths. The potential of personalised nutrition (PN) has been investigated given the apparent inadequacy of current population-based dietary guidelines and has shown promise, but it is not yet clear how best to personalise dietary advice. The aim of the Personalising Advice to Improve Diet Quality (PAD-Q) trial was to evaluate the efficacy of personalised dietary advice informed by dietary assessment only in improving diet quality and other cardiometabolic outcomes in a population at risk of CVD compared with standard dietary advice.
What did we do? (Methods)	The Personalising Advice to Improve Diet Quality (PAD-Q) trial was a single-blind randomised controlled parallel group 6-month dietary intervention. It investigated the effect of personalised dietary advice informed by baseline diet quality (assessed by Prime Diet Quality Score (PDQS) and dietary biomarkers) (PAD-Q intervention arm), compared with non-personalised dietary advice (comparator arm), on diet quality and cardiometabolic outcomes in participants at risk of CVD on the island of Ireland. Participants at risk of CVD were recruited from Queen's University Belfast, Northern Ireland, and University College Dublin, Republic of Ireland. The primary outcome was diet quality assessed via Prime Diet Quality Score (PDQS); secondary outcomes included anthropometry, blood pressure, lipid profile (mmol/L), glycated haemoglobin (HbA1c) (mmol/mol), fasting glucose (mmol/L) and physical activity.
What answer did we get? (Findings)	The PAD-Q intervention did not produce a significant change in diet quality between Month 0 and 3 (difference in mean change between groups -0.12 (95% CI: -1.85, 1.61); P: 0.89), Month 0 and 6 (difference in mean change between groups 1.22 (95% CI: -0.51, 2.95); P: 0.16) and Month 0 and 12 (difference in mean change between groups 1.57 (95% CI: -0.16, 3.30); P: 0.07) or the majority of the secondary cardiometabolic outcomes in participants randomised to the personalised intervention group compared with non-personalised comparator group. Change in outcomes across timepoints were investigated in the whole PAD-Q sample with improvements seen in diet quality, BMI (kg/m^2), waist circumference and hip circumference (cm). A significant increase in HbA1c (mmol/mol) was also observed in whole group.
What should be done now? (Practice/Policy Implications and/or Recommendations)	The PAD-Q personalised intervention, informed by diet assessment only (PDQS and dietary biomarkers), did not produce an additional benefit in relation to diet quality or cardiometabolic outcomes compared with non-personalised generic dietary advice. Although personalised diet has shown promise when compared with 'one-size-fits-all-approaches', it is not yet clear how best to personalise dietary advice for various population groups, including those at risk of cardiovascular disease. Further research is warranted to elucidate whether varying degrees of personalisation are more effective than others in varying populations. Research into personalised nutrition must continue to consider practicalities such as scalability and sustainability of such interventions to maximise potential public health impact.