Nutritional benefits of the Planetary Health Diet on cardiometabolic risk biomarkers among adolescents: evidence from the Spanish SI! Program

Murcia-Lesmes David, MSc[1,2]; Laveriano-Santos Emily P, PhD[3,4]; Estruch Ramón, PhD, MD[2,4,5]; Tresserra-Rimbau Anna, PhD † [1,2,4]; Corrado Marina, PhD[1,2,4] Lamuela-Raventós Rosa M, PhD[1,2*]; Castro-Barquero Sara, PhD [2,4,5*]

[1] Polyphenol Research Group. Departament de Nutrició, Ciències de l'Alimentació i Gastronomía, Facultat de Farmàcia i Ciències de l'Alimentació, Barcelona, Spain
[2] Institut de Nutrició i Seguretat Alimentària (INSA-UB), Universitat de Barcelona, Barcelona, Spain
[3] Global Health Institute (ISGlobal), Barcelona, Spain
[4] Centro de Investigación Biomédica en Red de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Instituto de Salud Carlos III, Madrid, Spain
[5] Department of Internal Medicine, Institut d'Investigacions Biomèdiques August Pi Sunyer (IDIBAPS), Hospital Clinic, University of Barcelona, Barcelona, Spain
† In loving memory

Background

As the impact of early adoption of a sustainable plant-based diet on cardiometabolic biomarkers remains unexplored, we assessed whether they are associated with the Planetary Health Diet Index (PHDI) in adolescents.

Objectives

We examine the association between the Planetary Health Diet Index (PHDI) and cardiometabolic risk biomarkers in a prospective 4-year study in Spanish adolescents.

Methods

This prospective study was conducted within the SI! Program for Secondary Schools trial (SI! Program) in 886 Spanish adolescents (12 years ± 0.4; 49·1% female) who were followed during 4-years. The PHDI scores were derived from validated food frequency questionnaires. Multivariable-adjusted Cox proportional-hazards models (HR) were used to analyze the association between the PHDI and the risk of new-onset high blood pressure, obesity, and elevated plasma cardiometabolic biomarkers. Additionally, mixed models assessed longitudinal changes in cardiometabolic parameters.

Results

High adherence to the PHDI $_{(Q4\ vs.\ Q1)}$ was associated with a reduced risk of high blood pressure by 81% (HR: 0.19 [95% CI: 0.11, 0.34]), plasma glucose by 47% (HR: 0.53 [95% CI: 0.48, 0.58]), triglycerides (TG) by 96% (HR: 0.04 [95% CI: 0.02, 0.07]), and total cholesterol by 51% (HR: 0.49 [95% CI: 0.34, 0.69]) in Cox models. Additionally, an inverse association was observed between PHDI $_{(Q4\ vs.\ Q1)}$ and blood glucose (-5.23 mg/dL [95% CI: -10.35, -0.10]), TG (-3.26 mg/dL [95% CI: -4.38, -2.14]), and body mass index (BMI) z-score (-0.02 [95% CI: -0.03, 0.00]) in mixed models.

Conclusions

The study shows that higher adherence to the PHDI improves cardiometabolic biomarkers in adolescents, due to the consumption of nutritious components in this diet. Practical implications of these results include incorporating PHDI recommendations into school meals, and education campaigns targeting adolescents and their families to promote the dual benefits of this diet for health and sustainability.

Keywords: Plant-based diet, sustainable, cardiovascular risk, observational study, adolescent health

Summary of the CV: PhD candidate David Murcia-Lesmes studies the relation between plant-based diets and cardiovascular risk factors in adolescents and older populations at high cardiovascular risk. By using nutritional epidemiology, he assesses diet and lifestyle and their role in the prevention of cardiometabolic diseases. He has experience in clinical nutrition and research on foods for health, specifically conducting cohort studies about a sustainable diet, tomatoes, and their associations with cardiometabolic risk factors. Currently, he is under the supervision of Prof. Rosa M. Lamuela-Raventós and PhD. Sara Castro-Barquero at the University of Barcelona in the Polyphenols Research Group.