


Abstract

The Separate and Combined Associations of Physical Activity and Diet Quality and Their Changes over Time with Mortality: Findings from the EPIC-Norfolk Prospective Cohort Study [†]

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Abstract: Background and Objectives: Both physical activity and diet quality are associated with longevity, but less is known about their combined associations, especially in consideration of their changes over time. We aimed to examine the separate and combined associations of physical activity and adherence to a Mediterranean-type diet and their changes over time with mortality outcomes. Methods: The participants included 9349 adults aged 40 to 79 years old from the European Prospective Investigation into Cancer in Norfolk (EPIC-Norfolk) cohort, with repeated questionnaire-based measurements of physical activity and diet from 1993 to 2004. From the questionnaire responses, we derived physical activity energy expenditure (PAEE) and adherence to the Mediterranean Diet Score (MDS) and calculated their average within-person changes (Δ PAEE and Δ MDS, respectively). A multivariable-adjusted Cox regression was fitted to examine associations between PAEE and MDS at baseline, Δ PAEE, and Δ MDS and their combination with all-cause mortality, cardiovascular disease mortality, and cancer mortality up to March 2022. Results: For over 149,681 person-years of follow-up, there were 3534 deaths in the cohort. In the models mutually adjusted for potential time varying and static cofounders, for each 1-SD difference in baseline PAEE (4.64 kJ/kg/day), Δ PAEE (0.65 kJ/kg/day per year), baseline MDS (1.30 points), and Δ MDS (0.32 points per year), the hazard ratios (95% CI) for all-cause mortality were 0.90 (0.86 to 0.94), 0.89 (0.85 to 0.93), 0.95 (0.91 to 0.99), and 0.93 (0.90 to 0.97), respectively. Similar results were observed for cardiovascular disease mortality and cancer mortality. Among participants recording low PAEE (<5 kJ/kg/day) and low MDS (<8.5 points) at baseline, all-cause mortality was lower by 40% (18% to 56%) for those who improved both behaviours over time (recording high PAEE and high MDS), compared to those who remained to be low for both behaviours. During the follow-up, 461 potential deaths were prevented by adherence to high diet quality and high physical activity levels over the repeated assessments. Discussion: these findings suggest that improvements in physical activity levels and diet quality over time could lower mortality in middle-aged adults, and public health benefits could be realised by encouraging active living and healthy eating throughout adulthood.

Keywords: Mediterranean Diet; physical activity; mortality



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that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted. All authors have read and agreed to the published version of the manuscript.

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Informed Consent Statement: All participants gave written informed consent before enrolment in the study.

Data Availability Statement: The data cannot be made openly available because of ethical and legal considerations. Non-identifiable data can be made available to bona-fide researchers on submission of a reasonable request to datasharing@mrc-epid.cam.ac.uk. The principles and processes for accessing and sharing data are outlined in the MRC Epidemiology Unit Data Access & Data Sharing Policy.

Conflicts of Interest: The authors declare no conflict of interest.

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