Dose-response relationships of seven dietary patterns with incident type 2 diabetes: Findings from the UK Biobank study

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Several approaches for assessing the healthiness of dietary patterns have been developed and links with disease risk have been investigated. However, associations with diabetes risk are under-explored. This study investigated the associations of seven dietary patterns with incident type 2 diabetes (T2D) in the UK Biobank study.

This study included 136,354 participants from the UK Biobank cohort. Participants who had type 1 diabetes or T2D and those with undiagnosed diabetes (HbA1c ≥48 mmol/mol) at baseline were excluded. Incident T2D was derived from linkage to hospital records in UK Biobank. Dietary intake was evaluated via 24-hour recall and seven dietary pattern scores were derived: Mediterranean Diet Adherence (MEDAS-14), Recommended Food Score (RFS), Healthy Diet Indicator (HDI), Mediterranean Diet Score (MDS), Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND), Diet Inflammatory Index (E-DII) and Ultra Processed Food score (UPF). Scores were categorised into quartiles. The most unhealthy quartile for each dietary score was used as a reference group. Cox regression was performed to investigate associations between T2D incidence and each of the seven dietary scores. Analysis was adjusted for sociodemographics (age, sex, ethnicity), lifestyle (smoking status, total sedentary time, sleep duration time, total physical activity), adiposity (BMI) and multimorbidity.

After a median follow-up of 11.6 (IQR: 11.0; 12.4) years, 3,093 participants developed T2D. The strongest association was found for the MEDAS-14 score; individuals in the highest quartile (higher adherence to the Mediterranean diet) had a 35% lower risk of T2D (HR 0.65 [95% CI 0.57; 0.74]) compared with the lowest quartile. The risk of T2D was 25% lower for RFS (HR 0.75 [95% CI 0.67; 0.84]), 20% lower for MDS (HR 0.80 [95% CI 0.69; 0.94]) and 18% lower for MIND (HR 0.82 [95% CI 0.73; 0.91]) when the most healthy compared to the least healthy. The risk of T2D was 14% lower for individuals in the lowest quartile of E-DII (anti-inflammatory diet) (HR 0.86 [95% CI 0.78; 0.95]) versus in the highest quartile, but this association was attenuated after adjusting for BMI. Individuals in the lowest quartile for UPF intake had a 13% lower risk of T2D (HR 0.87 [95% CI 0.78; 0.96]) compared to those in the highest quartile. Participants in the highest quartile for HDI had a 19% lower risk of T2D (HR 0.81 [95% CI 0.74; 0.90]) compared with those in the lowest quartile, but this association disappeared after adjusting for lifestyle and BMI.

For all seven dietary patterns, adherence to a healthier diet was associated with a lower risk of T2D. The associations were independent of sociodemographics, lifestyle and adiposity levels for most dietary patterns. The magnitude of the associations differed between dietary patterns with greater Mediterranean Diet adherence showing the biggest effect in reducing the risk of T2D.