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Food Intake, Genetic Risk, and Risk of Incident Chronic Kidney Disease: A Longitudinal Analysis of the UK Biobank Data

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Objectives : Diets with high animal protein and low fruits and vegetables have been reported to lead the higher workload of kidney and dietary interventions are important to improve kidney function decline and prevent the development of other end-organ complications. However, little is known about the association between diet and the risk of chronic kidney diseases (CKD) related to genetic risk. Thus, this study aimed to evaluate the association between food intake and the risk of CKD varies with genetic risk using polygenic risk score (PRS).
Methods : Based on the data from UK Biobank, a total of 349,314 participants aged 40-69 years were included in 2006-2010. Food intake was measured using a food frequency questionnaire. The PRS for CKD was estimated using GWAS summary statistics of CKDGen overall European ancestry. The incidence of CKD was diagnosed by eGFR < 60ml/min/1.73m^2 or ICD-10 codes for CKD.
Results : Frequent intake of red/processed and total meat intake was significantly associated with an increased risk of CKD, whereas frequent intake of fruits was associated with a decreased risk of CKD. When stratified by PRS for CKD, the positive association between red meat intake and the risk of CKD remained significant only in the group with highest PRS [HR (95% CI) for ≥3 times/wk vs. <once/wk: 2.33 (1.30-4.17) and 1.43 (0.66-3.11) for high and low PRS groups, respectively, p for interaction=0.526]. Moreover, in the high PRS group, the participants who consumed vegetables 3 times/wk had a 37% decreased risk of CKD than those who than those who consumed less than 2 times/wk [HR (95% CI) 0.63 (0.44-0.90), p for interaction=0.378). There was a significant interaction between total fruit intake and incident CKD by PRS (p for interaction=0.027).
Conclusions : These findings indicate that genetic susceptibility may modify the association between diet and CKD risk.