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Dietary fiber intake amount affects the beneficial effects of dietary potassium on reduced prevalence of chronic kidney disease

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Objectives: High dietary potassium intake is known to be associated with decreased risk of cardiovascular disease. In this study, we aimed to study the factors associated with the beneficial health effects of potassium.

Methods: A total of 53,348 adult participants (aged over 18 years old) in NHANES 1999-2016 were enrolled in this study. Amount of dietary potassium intake was measured using dietary recall methods, and calibrated using residual adjustment. Chronic kidney disease was defined as glomerular filtration below 60 ml/min/1.73 m2 or urinary albumin-to-creatinine ratio above 30 mg/g. Effects of dietary potassium on hypertension and chronic kidney disease was tested by multivariate logistic regression, and effects on mortality was tested by multivariable Cox analysis. Multivariable analysis included covariates of age, gender, ethnicity, body mass index, diabetes mellitus, and hypertension. We stratified the effects of dietary potassium by the intake amount of dietary fiber.

Results: High dietary potassium intake was associated with reduced risk of hypertension (overall $p < 0.001$; HR of Q3 0.89 (0.83-0.96); HR of Q4 0.82 (0.77-0.88)). High dietary potassium intake was associated with reduced risk of chronic kidney disease (overall $p < 0.001$; HR of Q3 0.85 (0.78-0.92); HR of Q4 0.79 (0.72-0.85)). High dietary potassium intake was associated with reduced mortality risk (overall $p < 0.001$; HR of Q3 0.78 (0.72-0.85); HR of Q4 0.74 (0.68-0.81)). When the risk of chronic kidney disease was stratified by the dietary fiber intake, reduced risk of chronic kidney disease by high potassium intake disappeared ($p = 0.476$). However, higher intake of dietary fiber was still associated with reduced risk of chronic kidney disease (overall $p < 0.001$; HR of Q3 0.68 (0.57-0.81); HR of Q4 0.69 (0.57-0.83)).

Conclusions: Reduced risk of chronic kidney disease by high potassium intake is mostly dependent on high dietary fiber intake.