Can Dietary Patterns Modify Risk for CKD?

Emily A. Hu1,2 and Casey M. Rebholz1,2

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Dietary patterns, representing a combination of foods, nutrients, and beverages in a diet, are a more realistic representation of one’s overall dietary intake compared with individual nutrients or foods and they account for potential interaction between nutrients and food components (1). Healthy dietary patterns have accrued considerable interest as a primary prevention strategy for chronic disease. Although the literature has consistently shown healthy dietary patterns to be strongly associated with reduced risk of cardiovascular disease, type 2 diabetes, and mortality (2), less is known about dietary patterns and CKD. Of the substantial burden of CKD and ESKD, it is imperative to identify modifiable risk factors to prevent the incidence of CKD among the general population. Evidence from observational studies on the association between dietary patterns and CKD has been accumulating; however, the available data have not previously been summarized.

The study by Bach et al. (3) in this issue of CJASN is the first systematic review and meta-analysis of dietary patterns and incident CKD to date. Eligible studies included prospective and retrospective longitudinal cohort studies of participants without established CKD that reported an association between a healthy dietary pattern and incident CKD. Of the 18 total cohort studies that were eligible, 15 were included in the meta-analysis with a mean follow-up time of 10.4 years. Overall, the authors found that healthy dietary patterns were associated with a 30% lower odds of incident CKD (odds ratio [OR], 0.70; 95% confidence interval [95% CI], 0.59 to 0.99); 30% lower odds of eGFR decline, which was not statistically significant (OR, 0.70; 95% CI, 0.49 to 1.01); and 23% lower odds of albuminuria (OR, 0.77; 95% CI, 0.59 to 0.99). In general, the healthy dietary patterns encouraged higher consumption of whole grains, vegetables, fruits, legumes, nuts, fish, and lower consumption of red and processed meats, sodium, and sugar-sweetened beverages. In analyses of types of healthy dietary patterns, the authors found that the Mediterranean diet and dietary patterns reflective of dietary guidelines were inversely associated with CKD, but the Dietary Approaches to Stop Hypertension (DASH) score was not consistently associated with incident CKD.

Although the study has many notable strengths and the authors performed an extensive search of the literature, there are several questions that remain unanswered. It would be of interest to examine whether the associations between healthy dietary patterns and incident CKD were consistent across racial/ethnic groups. The authors conducted a subgroup analysis by country of origin and found a stronger association among populations outside of the United States (mostly from Iran) compared with studies conducted inside the United States. However, it is unknown whether the associations are different between white and black people, as there are important socioeconomic disparities in the United States related to access to healthy food and health care that disproportionately and negatively affect black people (4), which may result in a weaker association among this subgroup. On the basis of the small sample size of minority groups in the meta-analysis, there may not have been enough power to conduct a robust subgroup analysis by race or the individual studies may not have reported results separately by race. Future studies should examine the association among different racial and ethnic groups. Other questions that remain include explanations for differences in associations by specific dietary patterns and the role of beverages in dietary patterns.

In the meta-analysis by Bach et al. the dietary patterns that were most frequently studied included the Mediterranean diet, DASH diet, and patterns reflective of dietary guidelines. It should be acknowledged that the pooled estimate for the DASH dietary pattern was not statistically significantly associated with incident CKD, although the estimated measure of association was in the expected direction. Whether this is because of how the pattern was scored or the components that were included needs to be investigated further. Despite all being considered healthy diets, there are several differences in components and scoring criteria. For example, the Mediterranean diet awards points for moderate alcohol consumption, whereas alcohol is not included in the DASH score, and sugar-sweetened beverages are included in the DASH score but not the Mediterranean diet score. Although there are different variations of Mediterranean diet score, each component is usually scored 0 or 1, whereas the DASH score typically scores components 1–5 on the basis of quintile distribution. These patterns are both considered healthy diets because they reward points for fruits, vegetables, whole grains, nuts, legumes, and fish, and penalize red and processed meats.

Nonetheless, healthy dietary patterns overall were found to be inversely associated with incident CKD in the meta-analysis, demonstrating that there may be flexibility in which style of a healthy dietary pattern
one chooses to incorporate into a healthy lifestyle. As Bach et al. mentioned, it is unknown which dietary pattern is the best for prevention of CKD and other healthy dietary patterns should be explored. A recent article published by Kim et al. (5) found an inverse association between healthy plant-based diets and incident CKD in the Atherosclerosis Risk in Communities Study. This recent publication and the meta-analysis by Bach et al. suggest that there may be a variety of dietary patterns that could be consumed to reduce the risk of developing CKD.

Although a priori dietary scores have been widely used, they tend to be more focused on foods and nutrients than beverages. Some scores assess such beverages as alcohol, milk, or sugar-sweetened beverages, but many beverages that are often consumed on a daily basis and provide nutrients and calories are not included in the scores. For example, coffee, tea, and water are not captured by these a priori defined scores. Previous studies suggest that coffee and tea may play a role in kidney function (6,7). Furthermore, total energy intake from beverages and meeting daily fluid requirements are also important for health outcomes (8). Future studies should take into account beverages in addition to healthy foods and nutrients to prevent the onset of CKD. One method to incorporate beverages in dietary pattern analyses is by using a posteriori defined dietary scores using factor analysis to derive dietary patterns using correlations between food and beverage inputs (9).

On the basis of the results of the study by Bach et al., observational studies have consistently suggested that healthy dietary patterns are associated with reduced risk of incident CKD. In a previous meta-analysis by the same group of investigators in which they examined dietary patterns and CKD progression among individuals with CKD, healthy dietary patterns were associated with lower risk of mortality but not ESKD (10). Together, these two meta-analyses suggest that the timing of a healthy dietary intervention may be critical, as diet modification may be more effective in preventing CKD in a healthy population than preventing ESKD among individuals already diagnosed with CKD. To date, there have been no randomized, clinical trials of dietary pattern interventions and incident CKD. Randomized, clinical trials with sufficient follow-up time to ascertain meaningful kidney outcomes are necessary to determine whether a change in dietary patterns is causally related to favorable kidney health outcomes. Meanwhile, there may be sufficient observational evidence for clinicians to emphasize the importance of healthy dietary patterns to individuals who are healthy or who are at risk of developing CKD.

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