Diet and Nutrition Can Play a Pivotal Role in Improving Outcomes among Minorities and Reducing Health Disparities

Improving dietary habits and ensuring access to healthy foods are important to reducing health disparities and improving outcomes among lower-income individuals and minorities, at-risk populations for developing kidney disease in the United States. This was the conclusion of two new studies presented at Kidney Week 2012 that demonstrated 1) increased intake of fruit and vegetables can ameliorate metabolic acidosis, and 2) an unhealthy diet lacking nutrients that indicate adherence to a DASH (Dietary Approaches to Stop Hypertension) diet—which is high in whole grains and fruits and vegetables—among individuals living in poverty can adversely impact their chances for developing CKD, some of whom already have an increased odds for disease progression. Both studies offer evidence that diet and nutrition present targets for reducing health disparities in individuals facing an increased risk for kidney disease.

Previous research into the effects of diet on CKD focused on limiting protein intake, most notably in the Modification of Diet in Renal Disease (MDRD) study, said Frank C. Brosius III, MD, of the University of Michigan Health System, who was not involved in either of the studies. The MDRD study, however, found no significant difference in outcomes based on diet, and despite interest in how nutrients and antioxidants impact kidney disease, "there have been no conclusive studies stating that dietary intervention leads to a statistically significant improvement in outcomes," he said.

"This is why studies like these are exciting, because improving diet can be a low-cost high-safety intervention," Brosius said. "The focus of this research is great, because if dietary changes can be shown to have an impact on progression of disease, particularly in those groups who are at highest risk for kidney disease, you can get the biggest bang for your buck."

Dietary habits of individuals living in poverty

Research has demonstrated that lower socioeconomic status is connected with reduced kidney function and an increased risk for progression to ESRD. To determine if dietary habits were contributing to this increased risk for CKD, Deidra Crews, MD, FASN, of the Johns Hopkins University School of Medicine, and her colleagues studied a large urban population to determine if adherence to a DASH-style diet was linked with reduced prevalence of kidney disease among those living in poverty.

Crews used the Healthy Aging in Neighborhoods of Diversity Across the Lifespan (HANDLS) cohort, an intramural study of the National Institute on Aging that focuses on the influence of socioeconomic status and race on health outcomes. A total of 2058 participants from diverse backgrounds in Baltimore were included, 42 percent of whom were classified as living in poverty. The poverty group had a significantly higher number of black and uninsured individuals and tobacco users compared with the non-poverty group. Although participants were not instructed in the DASH diet, their report, via 24-hour dietary recall of intake of foods containing the macro- and micronutrients considered in DASH adherence scoring were used to assess their dietary habits. Kidney disease was defined by reduced eGFR and/or elevated urinary albumin–creatinine ratio.

The majority in both poverty and non-poverty groups in the HANDLS cohort were found to be non-adherent to a DASH-style diet (only 4.5 percent and 6.1 percent, respectively, were adherent). Despite this, those in the poverty group fared significantly worse in levels of nutrients (cholesterol, fiber, magnesium, calcium, and potassium) and had a significantly higher rate of CKD compared with the non-poverty group (5.6 percent versus 3.8 percent).

When the entire cohort was stratified across tertiles of DASH adherence (lowest, middle, and highest) prevalence of CKD remained higher in the low and middle adherence tiers of the poverty group, while there was no statistically significant difference across the tiers in the non-poverty group. Logistic regression revealed similar findings, even after inclusion of sociodemographic, hypertension, diabetes, and tobacco use variables.

Given these results, could specific factors lead to increased risk for individuals in the poverty group? Crews said the reasons behind this relationship were unclear.

"The specific nutrient profiles could be the main drivers, as could additives in the foods of the poverty group (which we did not directly assess)," Crews said. "It is also possible that dietary habits do not play as much of a role in CKD risk for higher income individuals because their risk is largely mitigated by access to health care, access to recreation, and less psychological stress. On the converse, dietary habits may play a big role in risk of CKD for poor individuals because they have so many risk 'amplifiers' (poor access to health care, limited access to recreation, significant stress, or discrimination), and thus when dietary habits are favorable, CKD risk might be lessened even in the setting of poverty."

Brosius noted that although "it is a complex study, the results are consistent with the fact that the DASH diet tends to be more expensive, and the poverty group is more likely to be living in 'food deserts' where there is less access to DASH-style diets. However, those people in poverty groups who do adhere to DASH-style diets have a significantly reduced risk of CKD." He added that a follow-up study would need to control for more than presence or absence of diabetes and hypertension, "but also how well these are being controlled. But in these groups, a DASH diet might be an effective preventative intervention."

Crews is planning a tailored interventional study in a similar population, aimed at educating the participants on how to follow a DASH-style diet even with limited finances and limited access to healthy foods.

"As more evidence is revealed regarding the detrimental and costly effects of limited access to healthy foods we will see changes in policies on zoning and more incentives for full-service grocery stores opening in what are now food deserts," Crews said. "I consider ours, and other studies of its kind, a call to action for members of the kidney community to get involved in public policy."

Fruits and vegetables can mitigate metabolic acidosis

Metabolic acidosis can commonly affect individuals with CKD and is associated with higher levels of angiotensin II, a pathway that powerfully promotes hypertension, a decline in renal function, and irreversible fibrosis of kidney tissue. This condition is exacerbated by a diet rich in fat and animal proteins, which generate a higher acid load than impaired kidneys can handle. Current clinical guidelines indicate alkali therapy for severe (<22 mM $PTCO_2$) but not for milder (22–24 mM $PTCO_2$) cases. To determine if patients with stage 3 CKD and less severe metabolic acidosis could also benefit from therapy, Nimrit Goraya, MD, of the Texas A&M College of Medicine and her co-workers investigated if adding fruits and vegetables (which generate a net alkaline load) or oral doses of sodium bicarbonate could reduce the decline in kidney function.

Building on their previous research, they performed a prospective trial with

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