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Implementing the “Advancing American Kidney Health Initiative” by Leveraging Nutritional and Dietary Management of Kidney Patients

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Implementing the "Advancing American Kidney Health Initiative" by Leveraging Nutritional and Dietary Management of Kidney Patients

THIS MONTH'S EDITORIAL of the *Journal of Renal Nutrition* (JREN) is devoted to both the recent presidential Executive Order (EO) on kidney health initiatives and the articles published in this issue of *JREN*. On July 10, 2019, the US government took a series of actions to advance kidney care in the nation including a presidential EO entitled, "Advancing American Kidney Health Initiative."[1] The EO's intention is to prevent kidney failure through better diagnosis and treatment as well as better incentives for preventative kidney care. To achieve the goal of transforming chronic kidney disease (CKD) prevention and management and to better increase education and awareness to this end, 3 broad goals are proposed for delivering the new policies: (1) reducing the number of Americans developing end-stage renal disease (ESRD) by 25% by 2030 through improved efforts to prevent, detect, and slow the progression of kidney disease; (2) aim for 80% of new American ESRD patients receiving dialysis in the home or receiving a transplant by 2025; and (3) aim to double the number of kidneys available for transplant by 2030.

The Renal Nutrition community enthusiastically welcomes this timely EO and reminds the government and all stakeholders that in the midst of these positive developments, it is important to reiterate the critical role of nutritional and dietary interventions to achieve and enhance these goals in persons with or at risk for kidney disease. As discussed in our previous commentaries,[2-4] under the context of *secondary prevention* in persons with earlier signs of CKD including microalbuminuria or renal hyperfiltration, for both persons with native kidneys and kidney transplant recipients, eating low-sodium (<2.3 g/day) and low-protein (0.6-0.8 g/kg/day) foods should be the cornerstone of nonpharmacologic approaches. These measures can also result in slowing CKD progression and avoiding or delaying ESRD transition.[5] For the *tertiary prevention* of CKD, i.e., improving patient longevity and managing comorbidities in those with advanced CKD, nutritional interventions play a critical role and should be reinforced.[6,7]

Nutritional interventions are also important strategies for the *primary prevention* of kidney disease, given that obesity, diabetes, and hypertension, the 3 main risk factors of *de novo* CKD, are amenable to nutritional and dietary interventions.[8] Emerging data suggest that Americans eat increasingly more protein (1.3-1.4 g/kg/day) than the *Recommended Dietary Allowance* (0.8 g/kg/day)[9] and that this high protein intake, by virtue of causing increased intraglomerular pressure with resultant glomerular hyperfiltration, may affect kidney health over time across populations at risk for kidney disease.[4,10] Hence, a low-sodium with low-protein lifestyle should be the general recommendation in our plight for kidney health, and higher intake of plant-based foods with high fibers along with complex carbohydrates with resistant starch (see below) and monounsaturated and polyunsaturated fats should be encouraged.[3,11] Among persons at higher risk of CKD are the kidney transplant donors with a solitary kidney, in whom higher intake of sodium (>4 g/day) and protein (>1 g/kg/day) and higher body mass index (>30 kg/m^2) should be avoided in an effort to achieve the greatest kidney longevity and rejuvenation.[12]

Given that dietitians are the real-world executers of these goals, the President's EO should direct the *Center for Medicare and Medicaid Services* to launch innovative and effective payment models intended to incentivize providers to support these goals, including practicing dietitians. The overhaul is necessary for dietitian involvement to more effectively identify and treat at-risk populations earlier in CKD progression as well as those with moderate to advanced CKD and kidney transplanted patients. This model will be in sharp contrast to the current Center for Medicare and Medicaid Services payment system whereby the renal dietitians' focus of work is in the dialysis units, while patients at risk of CKD or those with early to advanced CKD have difficulty obtaining coverage for dietary counseling for kidney health. Of special importance are children and young adults, in whom the risk factors for CKD should be effectively identified and addressed by ensuring a healthy lifestyle and healthy diet. Also important is the role of educators to emphasize the important skill sets required for training dietitians in renal specialties and the provision of Medical Nutrition Therapy

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in varied settings outside the dialysis units.[13] A few years ago, JREN published the Standards of Practice and Standards of Professional Performance for dietitians in nephrology settings[14]; an update to these standards will be published in the near future in JREN.

In this issue of the *JREN*, Martin-del-Campo et al.[15] examined the association of obesity with kidney disease in 172 children and adolescents and found that renal hyperfiltration (defined as estimated glomerular filtration rate >170 mL/min/1.73 m^2) and microalbuminuria were present in children and adolescents with overweight and obesity, whereas those considered at normal weight exhibited no kidney alterations. Hence, better nutritional management of children to prevent or correct obesity may have an impact on overall kidney health across the population.

In another article of this *JREN* issue by Song et al.,[16] the associations of sociodemographic factors with food intake and markers of kidney disease were examined in 159 African Americans from the Baltimore, Maryland area with uncontrolled hypertension at high risk of kidney disease. Compared to the *Institute of Medicine*'s recommendations, the African Americans participating in this study had lower intakes of magnesium, fiber, and potassium but higher vitamin C intakes. Among female participants, sociodemographic factors associated with lower intake of the 4 nutrients were older age, obesity, lower health numeracy, and lesser educational attainment. Below-median intake of these micronutrients was associated with 2.9- to 3.6-fold higher likelihood of microalbuminuria, a key biomarker of kidney damage. The investigators concluded that African Americans with uncontrolled hypertension may have low intakes of important nutrients for kidney health that could result in higher CKD risk. They suggest that tailored dietary interventions for African Americans at high risk for CKD should be explored.[16]

In this issue of JREN, Yong et al[17] present the results of their randomized placebo-controlled trial in 73 nondiabetic patients with Stage 3-4 CKD to examine the effects of 4 g/day Omega-3 fatty acids supplementation on inflammatory markers including serum interleukin (IL)-12, IL-18, and C-reactive protein. After the dietary intervention, the magnitude of increase in serum IL-18 was significantly less in the treatment group compared to placebo, although there were no apparent effects on other markers of inflammation.

Although the 3 aforementioned studies by Martin-del-Campo et al.[15], Song et al.,[16] and Yong et al.[17] imply the potential impact of nutritional status including certain nutrient intakes on CKD risk and on disease progression, i.e., primary and secondary prevention of CKD, in the nested case-control study by Abbasi et al.,[18] also published in this issue of JREN, there was no significant association of total antioxidant capacity of the food or total dietary energy intake with prevalence of CKD in persons with type 2 diabetes. It is possible that dietary factors relevant to patients with diabetes and no CKD, such as higher dietary energy intake, are less relevant to patients with CKD and diabetes, and that dietary protein intake is a more relevant dietary target as shown recently, although the latter was not examined in this study.[18] Of note, a recent study by Malhotra et al.[19] showed that among African Americans with diabetes, a higher dietary protein intake was associated with a faster rate of CKD progression.

Eating "resistant starch" is among increasingly popular dietary approaches these days, and this may have potential utility for the management of diabetic kidney disease. Starches are long chains of carbohydrate moieties that are readily digested leading to higher glycemic burden, whereas resistant starch is much less digestible, and, hence, may improve glycemic status and have more favorable effects on gut microbiota similar to soluble fibers. Beans and lentils are rich in resistant starch, as are whole grains including barley and oats. In this issue of JREN, Meng et al.,[20] in a randomized, comparative, open-label trial, examined the effect of a low-protein flour with high-resistant starch in 75 adult patients with early type 2 diabetic nephropathy over 12 weeks. The 38 control subjects followed a low protein diet with a common staple, whereas the 37 intervention subjects received 50 g of high-resistant starch, low-protein flour instead of a common staple of equal quality at lunch and dinner each day. The latter intervention resulted in a significant reduction in fasting blood sugar, hemoglobin A1c, total cholesterol, triglycerides, and uric acid levels, while serum superoxide dismutase level increased, although IL-6 and tumor necrosis factor α concentrations did not change.[20] Despite the short-term (12-week) length of the study, the observed effects are promising and suggest that the effect of low-protein diet on secondary prevention of CKD can be further enhanced by adding resistant starch in lieu of mainstream carbohydrates.

Other articles in this issue of JREN include the following: Samaan et al.[21] conducted a randomized controlled study over 18 months in 80 patients with CKD Stages 3-4 and mild to moderate hypovitaminosis D (serum 25-OH-D level <30 but >15 ng/mL) with cholecalciferol and reported no change in vascular calcification progression. On the other hand, in another randomized controlled trial in 32 dialysis patients with hypovitaminosis D by de Carvalho et al.,[22] cholecalciferol supplementation did not exhibit detectable changes in IL-7 and B cell–activating factor levels or CD95 expression in B lymphocytes. Spatola et al.[23] compared subjective nutritional tools including the Subjective Global Assessment and Dialysis-Malnutrition Score with an objective malnutrition evaluation tool known as "Geriatric Nutritional Risk Index" in 71 elderly hemodialysis patients and found that Geriatric Nutritional Risk Index is a reliable nutritional tool predictive of Subjective Global Assessment and Dialysis-Malnutrition Score, pointing out a relationship between objective and subjective malnutrition indices in this patient

group. Kendrick et al.[24] examined real-world data of phosphorus management in 530 hemodialysis patients and found that switching from non-iron-based binders to sucroferric oxyhydroxide resulted in a 2-fold higher likelihood of achieving target phosphorus levels while halving daily pill burden of phosphorus binding therapy. The investigators also noted increases in serum phosphorus-attuned albumin and dietary protein intake suggesting improved nutritional status as a result of more effective phosphorus therapy that would allow less dietary restrictions.[24] Yeh et al.[25] compared the mortality predictability of iron indices in 1,346 hemodialysis patients with polycystic kidney disease (PKD) and 82,873 without PKD and found that the U-shaped curve of mortality against ferritin and iron saturation levels was not observed in patients with PKD, which was in contrast to those with PKD. They concluded that iron indices exhibit different associations with mortality when comparing hemodialysis patients with versus without PKD.[25] Finally, in a study to quantify how dialysis dietitians spend their time in the dialysis units, Hand et al.[26] reported that only 25% of dietitians' time was available for direct patient care, which is much less than that reported in previous studies and may not be sufficient to improve the nutritional status of dialysis patients.

In addition to the aforementioned original research papers, in this issue of JREN there is an exhaustive review of the literature by Anderson et al.[27] on the effectiveness of intradialytic parenteral nutrition (IDPN) in treating protein-energy wasting in hemodialysis patients. The authors have concluded that IDPN is a reasonable treatment option for patients who fail to respond to protein-energy wasting therapy or cannot receive recommended treatments, although they suggest that the broad usage of IDPN before recommended treatment options may not be warranted. As to what level of serum albumin (e.g., $<$3.5 vs. $<$3.0 g/dL, via bromocresol green method) and over which period of time (1 vs. 3 months or longer) and under which circumstances (exhausting oral nutritional supplement therapy or pharmacologic corrections first) are required as the clinical indicators to start IDPN, the jury is still out. We expect that a constructive discussion on the utility of IDPN to be continued on this and other topics, hoping that *JREN* can provide the most effective platform for such productive clinical debates and scientific discoveries.[2]

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