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# Engaging Nutrition and Diet for Primary, Secondary, and Tertiary Prevention of Kidney Disease: The World Kidney Day 2020



THE CONCEPT OF the World Kidney Day (WKD) was developed in 2006 by the *International Federation of Kidney Foundations* and the *International Society of Nephrology*. The WKD is a global campaign initiative aimed at improving education and raising awareness of the importance of kidney health and to help reduce frequency and impact of kidney disease and its associated health problems worldwide. Each year, on the second Thursday of March, and also during the entire month of March, the WKD is acknowledged and celebrated throughout the world with many diverse events and innovative activities including public health screenings, marathon runs, professional and educational meetings, festive events, and more, supported by the *International Federation of Kidney Foundations*, *International Society of Nephrology*, and kidney patient groups. The 2020 theme of the WKD is “Kidney health for everyone everywhere—from prevention to detection and equitable access to care.”<sup>1</sup> It highlights the importance of prevention of chronic kidney disease (CKD) across various strategies and available therapies to prevent CKD before its onset (primary prevention), during early disease stages (secondary prevention), and for effective management of established disease to prevent kidney failure (tertiary prevention).<sup>2</sup>

This year’s WKD theme of prevention coincides—and nicely dovetails—with the U.S. president’s executive order of July 2019 under the “Advancing American Kidney Health Initiative.”<sup>3</sup> The theme highlights measures to enforce kidney health, that is, primary prevention, and to prevent or to slow progression of CKD toward kidney failure, that is, secondary and tertiary prevention, respectively. As it has recently been highlighted, the core components of effective strategies to achieve these preventive goals are by leveraging nutritional and dietary management of persons at risk of kidney disease and those with pre-existing CKD.<sup>3</sup> *The Journal of Renal Nutrition* (JREN) takes pride in its recent contributions to the important discussions and publications to reinvigorate the use of

low-protein diets with emphasis on more plant-based sources along with novel nutritional and dietary interventions that can slow CKD progression or prevent kidney failure.<sup>4,5</sup> We believe that both traditional and novel nutritional and dietary interventions are quintessential complementary parts to any pharmacologic strategies for prevention of CKD and that efficacy of such medications as angiotensin-pathway modulators can be enhanced or handicapped if important lifestyle and modifications, in particular dietary interventions, are pursued or ignored, respectively.<sup>6,7</sup>

A relevant study to the topic of primary CKD prevention is by Mirmiran et al<sup>8</sup> in this issue of JREN. The investigators used a validated food-frequency questionnaire to examine the association of different meat intake and substitution of meat with risk of incident CKD in a cohort of 4,881 community indwelling participants from one of the largest middle-eastern metropolitan cities, who were free of CKD at baseline. The multivariate-adjusted incidence of new CKD in the highest quartile of red meat and processed meat intake was 73% and 99% higher than the lowest quartile of meat intake, respectively. The investigators also found that replacing a serving of total red meat and processed meat with low-fat dairy, nuts, whole grains, and legumes was associated with a decreased risk of incident CKD.<sup>8</sup> These data highlight the important role of plant-based diet in primary prevention of CKD and the potential deleterious role of meat ingestion on burden of incident CKD in the emerging economies of the world.

In line of the examining novel dietary initiatives for secondary and tertiary prevention of CKD, in this issue of JREN, Li and Xu have presented a meta-analysis of randomized controlled trials examining the efficacy and safety of *Jinshuibao* in combination with angiotensin-pathway modulators for management of diabetic kidney disease (DKD).<sup>9</sup> *Jinshuibao* is a fermentation product of *Ophiocordyceps sinensis*, also known as cordyceps, which is a fungus that grows out of the body of certain insects and other arthropods in the Tibetan Plateau of China, Nepal, and India and which has been traditionally consumed in these nations to prevent or cure DKD.

Li and Xu examined 51 randomized trials with 3,955 participants and found that compared with the controls, *Jinshuibao* combined with angiotensin-pathway

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modulators led to 4.9-fold increase in the overall response rate in patients with DKD.<sup>9</sup> Reduced proteinuria, lowered serum creatinine and urea nitrogen concentrations, and lessened blood pressure were also observed, along with improvement in glycemic indices.<sup>9</sup> Whether Jinshuibao is an effective dietary supplement for prevention of kidney failure in DKD or other types of CKD deserves studies with even higher levels of scientific rigor and transparency. In another meta-analysis of 10 randomized controlled trials in this issue of *JREN* by Chen et al,<sup>10</sup> the effect of supplemented antioxidant vitamins E and C was examined on CKD progression prevention in 445 participants with diabetes and microalbuminuria. The investigator reported favorable effects of antioxidant vitamins on lowering serum creatinine level and systolic blood pressure value, whereas there was no significant effect on albuminuria, diastolic blood pressure, glycemic control, or lipid metabolism.<sup>10</sup>

This issue of *JREN* highlights several additional important studies: Martin-Alemañy et al<sup>11</sup> present the results of a parallel-controlled clinical trial that examined the effect of oral nutritional supplementation with and without exercise on nutritional status and physical function in hemodialysis patients in Mexico and report that the combination of exercise with nutritional supplement had larger effects on physical function than supplement alone. In a 6-month prospective interventional study by Li et al<sup>12</sup> in China, a short-term intradialytic administration of an inexpensive protein-rich meal comprising 200 mL milk combined with two egg whites resulted in a significant increase in serum albumin concentration in hypoalbuminemic dialysis patients. In a historical cohort study from Japan by Hishida et al,<sup>13</sup> extended-hour hemodialysis treatment without dietary restrictions was associated with prevention of weight loss, especially in women and nondiabetic patients as well as those older than 65 years. Given that an unintentional weight loss in patients with CKD is associated with worse survival,<sup>14</sup> these data may have important clinical implications and strengthen the case for enforcing intradialytic nutrition including meals and supplements during hemodialysis.<sup>15</sup>

Hung et al<sup>16</sup> suggested that lower bioelectrical impedance analysis calculated phase angle exhibit survival predictability in 760 incident peritoneal dialysis patients in China. Adanan et al<sup>17</sup> examined physical and nutritional changes during prolonged intermittent fasting from sunrise to sunset in 87 Ramadan-observing hemodialysis patients in Malaysia in a 12-week, multicenter, prospective study and report temporary changes in nutritional status parameters that appear to pose nondetrimental nutritional risk in these patients. Lambert et al<sup>18</sup> examined practice patterns of the intradialytic parenteral nutrition in Australian hemodialysis patients and discuss potential approaches to resolve identified barriers to intradialytic parenteral nutri-

tion use including training to support staff, protocols with defined responsibilities, and access to experienced clinicians. Byham-Gray et al<sup>19</sup> examined a CKD patient-centered model for protein-energy wasting by integrating the patient's voice into research prioritization for more effective symptom management using panels of eight patient and twelve clinician stakeholders in the United States and report that the most important outcomes selected by stakeholders were living longer, staying out of the hospital, and being able to do more. Prest et al<sup>20</sup> studied the Nutrition-Specific Quality of Life questionnaire in 27 American hemodialysis patients and found no significant association of the score of this questionnaire with age, dialysis vintage, albumin, or normalized protein catabolic rate. Messenger et al<sup>21</sup> examined how registered dietitians in Canada perceived the value of Subjective Global Assessment (SGA) to assess protein-energy wasting in patients with CKD using a sequential exploratory mixed-method approach including two focus groups with 6 and 8 participants and a national survey and described the limitations to the clinical use of the SGA tool in the context of the dietitians' time, confidence, ability to interpret the SGA tool, and how SGA is used by administration. Because the investigators suggested that an alternative validated version of the conventional SGA or screening tool may be appropriate,<sup>21</sup> the malnutrition-inflammation score can be considered to that end.<sup>22</sup>

Given that kidney disease development and progression is associated with gastrointestinal dysfunction and alterations in gut microbiota, this issue of the *JREN* presents a succinct commentary by Nelson et al<sup>23</sup> including a brief discussion on constipation, which is common in many patients with CKD and which may be caused by low fiber intake and low fluid consumption that is often imposed to patients with CKD under the context of dietary restrictions. Both constipation and uremia may contribute to dysbiosis because of bacterial overgrowth in the gastrointestinal tract leading to the increased uremic toxin generations that may accelerate CKD progression, while probiotic supplementation may affect microbiome with salutary effect on CKD progression.<sup>23</sup> Whether microbiome modulation will evolve into effective nutritional strategies for primary, secondary, or tertiary prevention of CKD remains to be seen in future studies.<sup>24,25</sup>

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