

The World Kidney Recipes: Teaming up to Empower Patients, Care-Partners, Dietitians, and Chefs With Culinary Creativity and Multicultural Diversity in Renal Nutrition and Dietetics

IN A PARADIGM-SHIFTING effort to empower renal nutrition communities with infinite kidney advocacy possibilities across cultures and boundaries throughout the world, the *International Federation of Kidney Foundation–World Kidney Alliance* (IFKF-WKA) and the *International Society of Renal Nutrition and Metabolism* (ISRNM) have teamed up and embarked on the World Kidney Recipes project. The main goal is to galvanize patients and their care partners to work with gastronomic experts and dietetic professionals, including chefs and dietitians, to inspire creativity in culinary medicine and medical nutrition therapy in kidney care.^{1,2} Additionally, advancing the concept of the World Kidney Recipes is expected to enforce multicultural diversity in renal nutrition and kidney dietetics so that these efforts can evolve into appealing experiences for all persons and providers engaged in care for patients with chronic kidney disease (CKD) in any stage and severity.^{3,4}

Activities under the World Kidney Recipes can entail three separate but interconnected components: (1) Engage kidney healthcare professionals and kidney advocacy organizations, including kidney foundations and nephrology societies in the art and science of culinary medicine, so that barriers and gaps along with opportunities for partnership and collaboration can be identified, in an effort to become better familiarized with and appreciate the field of applied renal nutrition in support for patients with kidney disease under real-world scenarios.⁵ (2) Encourage kidney patients and their family members to overcome the constraints of the often imposed dietary restrictions by embracing diversity in multicultural recipes and joy in cooking and choice of food, aligned with the 2021 World Kidney Day's theme of "living well with kidney disease,"⁶ and (3) Enforce patients' and care partners' education, engagement and empower-

ment in adhering to and embracing healthy diet and lifestyle modification as an important component of kidney preserving therapy.⁷

The healthcare professionals to be engaged in the World Kidney Recipes include nephrologists, non-nephrology physicians, nurses, dietitians, and other allied health professionals, as well as professional organizations, patient groups, renal support networks, and kidney foundations all throughout the world. Gastronomy affiliates and food industry experts along with chefs and other culinary enthusiasts are encouraged to take part. The goal is to be engaged in not only the conceptual theory of the potential role of diet and nutrition in kidney health, but also in day-to-day practice of culinary medicine "Food as medicine" as an important nonpharmacologic intervention to preserve kidney function and to prolong life.⁸ This is consistent with secondary and tertiary prevention of kidney disease,^{9,10} including by means of low salt, low protein (0.6 to <0.8 g/kg/day), and plant dominant (>50% of the source of protein from plant sources) diets such as the PLADO diet,¹¹⁻¹³ including for patients with diabetic kidney disease and also promoting high fiber intake.¹⁴ Similarly important is modifying primordial risk factors such as hypertension, diabetes, obesity, and hyperlipidemia that may modify the risk of developing incident CKD in the context of primary prevention.^{9,10} Additionally, in people with kidney failure who receive dialysis therapy, the World Kidney Recipes can offer a host of enjoyable diets consistent with higher protein (1-1.2 g/kg/day) and low phosphorus (<800 mg/day) diets.¹⁵ Kidney transplant recipients, too, are expected to benefit immensely from the World Kidney Recipes with more appealing meal plans so that their transplanted kidneys can function longer by means of supportive dietary interventions if possible.¹⁶⁻²⁰ A collection of vetted and classified recipes and meal plans for different stages of CKD and from around the world will be identified and reconstructed. The recipes should be not only in support of kidney and patient longevity but also appetizing, tasty, appealing, interesting, simple and easy to prepare, suitable for home cooking and a family meal. This will bring the joy back in eating for a patient with kidney disease.⁶

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Culturally diverse kidney-friendly recipes from around the world will be presented by inviting contributions from identified and emerging sources and experts, including from the members of the IFKF-WKA and ISRNM. A standard template for presenting and posting the World Kidney Recipes will be advanced. Patient groups, as well as chefs and dietitians, will be engaged with reconfiguring and optimizing the recipes for different stages of CKD. These efforts will be managed under the World Kidney Recipes' *Joint Steering Committee*, consisting of appointed members from both organizations IFKF-WKA and ISRNM. The deliberations will be available online for all beneficiaries, including those who prefer to engage via telemedicine and telenutrition,²¹ given ongoing COVID-19 pandemic waves and related restrictions.²² We hope that the World Kidney Recipes project can effectively elevate food literacy,²³ raise awareness of the importance of kidney nutrition in renal disease management, and reinforce precision medicine and precision nutrition in kidney care.^{24,25} The World Kidney Recipes will also be aligned with the July 2019 US Presidential Executive Order's restructuring of the end-stage renal disease (ESRD) program by preemptively involving patients and dietitians in earlier phases of CKD care rather than dialysis preparation.²⁶

In this issue of the Journal, Boslooper-Meulenbelt et al.²³ examined the role of food literacy in adherence to a Mediterranean-style diet in 148 kidney transplant recipients. They assessed dietary intake using food frequency questionnaires to calculate the Mediterranean Diet Score, while sodium intake was based on the 24-hour urinary sodium excretion measurements. Although statistically not significant, patients with higher food literacy tended to have a lower sodium intake than those with lower food literacy. Overall higher levels of food literacy were associated with better adherence to a Mediterranean-style diet in this group of patients. Food literacy that can facilitate healthy diet habits is expected to be reinforced by the World Kidney Recipes, and future studies are needed to determine if such interventions to improve interest and enthusiasm about food literacy will contribute to healthier diets, more kidney-friendly recipes, and better long-term outcomes in persons with kidney disease.

In another study of this issue of JREN, Limirio et al.²⁷ studied the association between dietary intake, assessed by two 24-hour dietary recalls using the 5-step multiple-pass method, and serum uric acid levels in 113 kidney transplant recipients. They found that patients who ingested more vegetable protein and caffeine exhibited a lower likelihood of hyperuricemia. In linear regression, animal protein intake was positively associated, while vegetable protein (g/kg) intake was inversely associated with serum uric acid. Hence, plant-based protein and caffeine intakes may help lower uric acid levels in these patients.

This important preliminary finding can be further examined using future World Kidney Recipes-based meal plans that are plant-focused.

Given the importance of estimating 24-hour dietary sodium intake accurately but more conveniently, Hu et al.²⁸ examined approaches to estimate 24-hour urinary sodium excretion from spot urine samples in 5,235 persons with CKD stages 1–4, whose spot and 24-hour urinary samples were collected over 4 years. The investigators advanced a predictive equation, the "CKDSALT" equation, for estimating salt intake in CKD patients, comparing it with three other preexisting equations, i.e., Kawasaki, INTERSALT, and Tanaka equations.²⁸ The Bland-Altman plots indicated that the CKDSALT equation had the lowest bias with limits of agreement and the best performance in any subgroup analysis. They concluded that the spot urine method by CKDSALT equation might be a promising approach in patients with a wide spectrum of CKD. Whether this and other salt-intake estimating approaches can help refine the World Kidney Recipes remain to be seen in future studies.

Given the importance of adherence to diet and dietary modification as a critical component of CKD care, Lee et al.²⁹ conducted a prospective interventional study to investigate the effect of intensive individualized nutritional counseling in 59 patients with CKD stages 3 and 4. The intensive group received three monthly sessions of individualized intensive nutrition counseling, while the control group underwent a single session. Analyzing data of the 42 participants who completed the study, the most common nutritional problem observed was the excessive intake of sodium in 97% of participants, followed by a higher intake of potassium (79%), protein (52%), and phosphorus (31%). Dietary protein, sodium, and energy intake decreased, while body mass index declined, and renal function improved significantly in the intensive group. These investigators concluded that their intensive individualized nutrition counseling intervention resulted in better adherence to dietary recommendations, including low sodium and low-protein intake and improvement in kidney function in this group of CKD patients.²⁹ Whether the World Kidney Recipes can enhance the provision of better meal plans and dietary diversity that would lead to better adherence rates can be the focus of future studies.

Dekkers et al.³⁰ examined the effect of glycemic control on renal triglyceride content using Proton Spectroscopy in patients with type 2 diabetes, given that ectopic lipid accumulation in the kidney, known as "fatty kidney," can be a risk factor for diabetic kidney disease. Patients with type 2 diabetes were randomized to liraglutide versus placebo added to the standard of care for 26 weeks and found that the intervention resulted in lower renal triglyceride content. The investigators stated that larger clinical studies

are needed to assess whether these changes reflect a true effect of glycemic control on the fatty kidney. Similar studies can be conducted in the future to examine whether future meal plans developed under the World Kidney Recipes can have similar favorable effects on renal triglyceride content.

In another study by the Know-CKD Study Group from South Korea, Ryu et al.³¹ reported that both rapid weight gain and weight loss are associated with a high risk of adverse outcomes in CKD, particularly in patients with more advanced CKD Stages 3b, 4, and 5. In this longitudinal multicenter prospective cohort study of 2,022 patients with CKD, the percent weight change per year was modeled over a median of 4.4 years, and there was a U-shaped correlation between the degree of longitudinal weight change and ESRD and composite of cardiovascular disease and death. The World Kidney Recipes should strive to identify and highlight meals plans that will prevent unintentional weight loss.

In another World Kidney Recipes relevant study by Saka et al.,³² 299 patients with Stage 5 CKD not yet on dialysis were followed for a median period of 36 months, and those with a lower serum zinc level, particularly those receiving proton pump inhibitors, were found to be at higher risk of infection-related hospitalizations. Zinc, which exists more abundantly in such nutrients as legumes, nuts, seeds, whole grains, and dairy products, may play an important role in immune function, and indeed zinc-rich diets have been suggested for the prevention and management of COVID-19 infection.^{22,33,34} These data are aligned with another recent study by Tavares et al.,³⁵ in that reduced zinc levels in nondialysis CKD patients appeared to be associated with lower perception of bitter, sour, and salty tastes, given the important role of the taste sensation to enjoy food in persons with CKD within the context of living well with kidney disease.⁶ Also, in this issue of JREN, Liu et al.³⁶ report that higher levels of blood copper and lower levels of blood zinc and selenium were independently associated with higher nutritional risk in patients on maintenance hemodialysis based on data from 118 patients with a median dialysis vintage of 34 months. Additionally, in this issue of the Journal, Zhou et al.³⁷ report that a lower plasma 25-hydroxy-vitamin D3 level was associated with higher risk of proteinuria in patients with hypertension, especially in those without diabetes mellitus, based on data from a large study known as the China Stroke Primary Prevention Trial that included 1,655 patients with hypertension but without proteinuria and with an eGFR >60 mL/min/1.73 m² at baseline. Hence, the World Kidney Recipes-based meal plans should ensure an optimal supply of vitamin D, as well as other vitamins and trace elements.

In the randomized controlled trial by Ramos-Acevedo et al.,³⁸ intradialytic hypotension events did not increase with the oral nutritional supplement during 1,082 hemodi-

alysis sessions that were closely observed. Hence, eating during hemodialysis that has been cautiously recommended by the ISRNM as an important patient-centered strategy,³⁹ appears to be a safe anabolic nutritional strategy for the prevention of protein-energy wasting. More studies with larger samples sizes are required to confirm these findings. The World Kidney Recipes can advance a special group of meals particularly suitable for eating during dialysis therapy sessions.

Other articles in this issue of JREN include a study by Aoun et al.,⁴⁰ who found that although headache occurs in more than a third of patients during their chronic hemodialysis sessions, caffeine intake or lack thereof does not impact headache occurrence in these patients. Given that caffeinated drinks are used in some dialysis clinics to increase blood pressure in hypotensive patients undergoing hemodialysis therapy, these data may have important clinical implications. In a study by Kittiskulnam et al.,⁴¹ who examined 555 patients with ESRD undergoing peritoneal dialysis, while the presence of protein-energy wasting was not a better predictor of all-cause mortality than either the altered serum albumin or low muscle mass criteria, the Malnutrition-Inflammation Score performed well as an independent predictor of death and suggested to be a better tool for assessment of protein-energy wasting status in this patient population. In the study by Di Bonito et al.,⁴² a borderline or mildly reduced estimated glomerular filtration rate (eGFR >60 and <90 mL/min/1.73 m²) was associated with an altered cardiometabolic risk profile in 3,118 children (5–14 years) with overweight and obesity compared to 286 healthy normal-weight youth. In this study, the eGFR calculation using the bedside Schwartz equation resulted in a lower prevalence of mildly reduced renal function compared to the Full-Age Spectrum equation eGFR equation.⁴²

In a letter to editors in this issue of the Journal, Visser et al.⁴³ questioned the accuracy of a recent meta-analysis by Morris et al.⁴⁴ that had concluded that dietary potassium restriction was associated with a 0.22 mEq/L decrease in serum potassium and 40% lower mortality hazard, but not with the progression of CKD; and Visser et al.⁴³ suggested that the relationship between dietary and serum potassium was overestimated in this meta-analysis. In response, Morris et al.⁴⁵ stated that high-quality evidence is still needed relating to the ongoing debate on the association of dietary potassium and outcome measures in patients with CKD, including ESRD, who are often on low-potassium diet regimens. Potassium-rich foods might provide many health benefits even to people who have declining renal function.⁴⁶ The barrier to obtaining these health benefits has long been the concerns in adopting a potassium-restricted diet to prevent hyperkalemia. The World Kidney Recipes provide an invaluable opportunity to improve, refine, and reclassify the so-called “kidney

friendly” meals and meal plans, and to end decade long confusion as to what to eat and enjoy, as opposed to what not to eat, while some careful restrictions may still be considered. The World Kidney Recipes platform will also innovatively emphasize the important skillset provided by trained dietitians and other healthcare providers in CKD patient care both within and outside the dialysis arena. Averting and delaying dialysis by patient-centered, multicultural, and flexible dietary recipes will also result in major cost benefits to virtually all healthcare systems and will lead to greater health-related quality of life and patient’s and care partner’s satisfaction and will allow us to team up to implement the important goal of living well with kidney disease.⁶ In the context of the so-called “kidney friendly” meals that have abundantly been proposed by others, the World Kidney Recipes can adopt an “old wine, new bottle” approach, while the project will inspire innovation, diversity, inclusion, partnership, and teamwork.

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