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Title

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Permalink

<https://escholarship.org/uc/item/5553f23h>

Journal

Journal of Renal Nutrition, 32(3)

ISSN

1051-2276

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Publication Date

2022-05-01

DOI

10.1053/j.jrn.2022.03.001

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Peer reviewed

Nutrition Therapy as a Critical Component for Protecting the Health of Living Donors



THE NATIONAL KIDNEY Foundation recently published a “Roadmap for Innovation to Advance Transplant Access and Outcomes”¹ providing several priority areas for focus to reach the goal. The first of these priorities is to “Expand opportunities for safe living donation and access to living donor kidney transplant,” within which is included “optimize donor risk assessment and long-term follow-up.” As a contribution to this priority, our feature article in this issue of the *Journal of Renal Nutrition* by Levea et al.² focuses on how best to support living donors nutritionally to ensure optimal long-term health.

Living donors are exceptional people who offer a kidney (or part of another organ) to someone they love or may not even know. According to the United Network for Organ Sharing, roughly 20% of organ transplants in the United States are from living donors, with the majority donating kidneys.³ The opportunity for becoming a living kidney donor is understandably restricted to people who are physically and mentally healthy adults. In a report by Min et al., 49.2% of the reasons for not donating included having already reduced kidney function, diabetes, hypertension, glomerulonephritis, and obesity.⁴

Whereas being overweight or obese are less common in living kidney donors than in the general population, Ibrahim et al. report that 24% of kidney donors still had a body mass index (BMI) > 30 kg/m² at the time of donation.⁵ Transplant centers vary both in what is an acceptable BMI criterion and in which, interventions are offered to people who want to be a kidney donor but need to lose weight to qualify. Factors that still need to be examined include the safety of fast weight loss for potential donors, particularly in situations when a longer time to donation can be risky for the recipient, and options for maintaining weight loss after donation.

While fewer than 1% of actual living kidney donors have been reported to develop end-stage kidney disease (ESKD) after kidney donation,^{6,7} they remain susceptible to the development of noncommunicable diseases common in the general population; namely, inactivity and unhealthy diets that lead to the development of overweight/obesity,

hypertension, and diabetes. In a study by Ibrahim et al., obese donors were 50% more likely to develop hypertension and exhibited twice the risk for developing diabetes than their nonobese donor counterparts over a 14-year period after donating a kidney.⁵ A recent report from Kim et al. demonstrated an increased risk for developing hypertension in living kidney donors who were obese compared to obese nonkidney donors.⁸ Wainwright et al. demonstrated that a higher body mass index was present in living donors who went on to develop ESKD.⁷ These data are compelling for considering plans to assist our living donors in preventing obesity, hypertension, and diabetes. As we continue to expand our focus to ensure the living donor's long-term health, we should also examine what types of nutrition education and therapy, including dietary adjustments, are optimal for protecting the solitary kidney for a lifetime.

This issue of the *Journal of Renal Nutrition* encompasses original works related to pediatric and adult patients with chronic kidney disease (CKD), patients requiring hemodialysis or peritoneal dialysis, and patients who have a kidney transplant. Harris et al.⁹ report on the prevalence of hypervitaminosis A related to formula feeding versus nonformula feeding in infants with CKD. They found an association between formula feeding and having a parathyroid hormone level below goal; they suggest monitoring vitamin A concentration in these children.

In adults with CKD, Arcidiacono et al.¹⁰ report on the association of serum irisin (a circulating myokine from muscle) concentration decreases with kidney function decline and is associated with markers of risk for cardiovascular events.⁹ Tariq et al.¹¹ and Asghari et al.¹² report on the association of dietary factors and incident CKD from large cohort studies. Metabolomic biomarkers of dietary acid load were examined by Tariq et al. from participants in the Atherosclerosis Risk in Communities study. They found that N-methylproline (a biomarker of citrus fruit) was inversely associated with incident CKD.¹¹ Relatedly, Asghari et al. examined dietary amino acid patterns of participants in a large prospective cohort study from Iran.¹² They observed that participants consuming dietary patterns with a high incidence of branched-chain, alcoholic, and aromatic amino acids (amino acids aligned with animal proteins) experienced an increased incidence of CKD over a 3-year follow-up period. They also observed a lower incidence of CKD in participants eating diets with more alkaline amino acids. Zhang et al.¹³ using data from the National Health and Nutrition Examination Survey, demonstrated that a low carbohydrate score was associated

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1051-2276/\$36.00
<https://doi.org/10.1053/j.jrn.2022.03.001>

with all-cause mortality over 24 years in participants with CKD compared to no CKD. With the popularity of low carbohydrate diets in the general population, this paper may provide support for cautioning against that approach in patients who have CKD.

Four reports related to patients requiring dialysis are included in this issue of the *Journal of Renal Nutrition*. Valente et al.¹⁴ describe a multicenter telehealth program approach for delivering nutrition intervention developed to aid in caring for patients on hemodialysis during the COVID-19 pandemic. Phone calls were made by dietitians to patients based on a clinical need (eg, presence of hyperkalemia, hyperphosphatemia, excessive intradialytic weight gain). The approach was successful as hyperkalemia, hyperphosphatemia, hypophosphatemia, and interdialytic weight gain improved significantly after the intervention. In a report by Koike et al.¹⁵ an estimation formula for dietary sodium intake was developed for patients on hemodialysis. Etemadi et al.¹⁶ conducted a randomized, double-blind, placebo-controlled trial to evaluate cholecalciferol supplementation (50,000 International Units weekly) on FGF23 and α -klotho in patients on hemodialysis with vitamin D concentration <30 ng/mL. Supplemented participants increased their vitamin D concentration; α -klotho was increased in the supplemented group, but no change was observed for FGF23 compared to placebo in this small study. In patients undergoing peritoneal dialysis, sarcopenia was assessed by Young Do et al.¹⁷ who validated the strength, assistance in walking, rising from a chair, climbing stairs, and falls (SARC-F) questionnaire against measures of hand-grip strength and appendicular muscle mass. Patients with a high SARC-F score had significantly lower handgrip strength, serum albumin, and were more likely to be women and of older age.

This issue of the *Journal of Renal Nutrition* also reports on three transplant studies. The first is a report of a clinical trial protocol that we are excited to watch its progress. Rice et al.¹⁸ outline a feasibility and acceptability study of medical nutrition therapy and physical rehabilitation for kidney transplant recipients that will be individualized to each participant based on the nutrition care process. Next is a report by Hajjar et al.¹⁹ regarding obesity management of kidney transplant recipients. They found a conservative approach worked for about one-fourth of the patients who needed to lose weight and that none of the patients with BMI >40 kg/m² were successful with this approach. We applaud the work of this team from Canada and encourage more research into methods for weight loss in kidney transplant recipients. Yildirim et al.²⁰ measured indices of frailty across transplant recipients, patients with nondialysis CKD, and healthy controls. They found that transplant recipients had higher markers of inflammation, lower muscle strength, and were more likely to have sarcopenia than age- and sex-matched healthy con-

trols. In most measures of frailty, the transplant recipients did not perform better than their nondialysis CKD matched controls.

In a research brief, Borin et al.²¹ compared milk and milk alternatives for ingredients important to kidney stones. Their report provides guidance on the selection of products to use in trials and guidance on products that may not be desirable for patients with CKD due to high sodium content and high oxalate concentration. The patient education piece in this issue²² is for guiding patients with CKD on the selection of snacks. The piece provides guidance for professionals on how to counsel patients on snacking and a helpful handout for patients to use.

We thank the nutrition community for their interest in publishing their important work in the *Journal of Renal Nutrition* and our readers for their interest in learning from these published works.

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