Plant-based diets in kidney disease: nephrology professional's perspective

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My Favorite Paper!

Annual Dialysis Conference, March 2023

Laura Quenneville, RD

Why this paper?

A few reasons…

1. **Personal**: "why aren't we recommending a plant-based diet if it is beneficial for our patients?"
2. **Professional** perspective: that's different!
3. **Strategic**: how (and why) to make a difference and help people change?

Introduction

- **Vegetarian diets:**
  - Vegan: only plant-based foods (PBF)
  - Lacto-Vegetarian: PBF + milk/dairy
  - Lacto-Ovo vegetarian: PBF + milk/dairy + eggs
  - Pesco-Vegererian: PBF + milk/dairy + eggs + fish
  - Semi-Vegeterian/Flexiterian: PBF, avoids red meat, may include fish/poultry

- **Goals in CKD:**
  - ↓ rate of progression of renal failure
  - ↓ Proteinuria
  - Minimize uremic toxins
  - Correct metabolic acidosis
  - Decrease secondary complications such as hypertension and cardiovascular diseases

General description

- Based on the fact that plant-based diet can delay progression of CKD and help manage complications/comorbidities.

Aim of this paper

This article was meant to:

1. Describe and understand how familiar are nephrology professionals with plant-based diet
2. Know their perception about the diet
3. See how likely they are to recommend a plant-based diet
4. Identify barriers to recommending a plant-based diet

Method employed

- Questionnaire: developed based on existing tools for diabetes, modified to better fit CKD population
- Questionnaire sent via e-mail and response collected online
- Nephrology professionals identified from NKF member directory
- Survey sent to 3901 e-mail addresses, resent twice in 2 weeks interval to maximize response rate
- Consent obtained at the start of the questionnaire
- Participant > 18 yo and at least 50% of their time working in nephrology
- Descriptive stats ran on all variable. Chi-square test + 2 samples t-tests used to compare differences between groups.

Results

- Of the 3901 e-mail sent → 664 responses were used for analysis
- 58.1% = dietitians, most working in dialysis (53.6%)
- Most participants had been in practice for over 10 years (49.1%)
- 87.7% = heard about plant-based diet for treatment of CKD

Results

Believed it could improve management of:

- CKD 86.7 %
- Acidosis 60%
- CVD 90.4%
- Hypertension 90.4%
- Diabetes 83.6%
- High cholesterol 89.6%
- Overweight/obesity 84.3%

Table 2. The Role of Plant-Based Diets in the Causes, Treatment, and Complications of Kidney Disease

	Role of Plant-Based Diet
Causes of Kidney Disease	
Hypertension	Well-established effect of rapid lowering in blood pressure with the consumption of plant-based foods
Type 2 diabetes mellitus	Combined effect of weight loss and improved insulin sensitivity with the consumption of plant-based foods
Obesity	Lower energy density and higher fiber content facilitates weight loss
Treatment of Kidney Disease	
Progression of disease	Plant-based diets tend to be lower in protein and tend to avoid protein excess, which may avoid hyperfiltration and temper the rate of GFR loss; treatment of complications (as listed below) may affect disease progression as well
Complications of Kidney Disease	
Metabolic acidosis	Plant-based foods have natural alkali
Hyperphosphatemia	Plant-based foods have lower bioavailability of phosphorus compared with animal-based and processed foods
Hypertension	Improved sodium to potassium ratio, weight loss
Cardiovascular disease	Plant-based diets may reduce the risk for several cardiovascular risk factors
Uremic toxins	Plant-based diets appear to generate fewer uremic toxins, which may be due to changes in the microbiome and fiber content

Abbreviation: GFR, glomerular filtration rate.

***Plant-based diet for kidney disease: a guide for clinicians**, Shivam Joshi, Michelle McMacken, Kamyar Kalantar-Zadeh, AJKD, February 2021

Who recommends a plant-based diet

- About half of participants **(55.5%)** are offering plant-based diet options to their patients

- Dietitians were more likely to offer than other specialties

Reasons for NOT recommending

- **“Low perceived acceptance” 50.8%**
- **“Not realistic for the patient” 44.9%**
- “Complexity of meal planning” 38.3%
- “electrolyte abnormalities” 22.9%

*Dietitians were **less likely** to identify the followings (compared to other specialties as a barrier)

- Lack of support
- Practice guidelines or inadequate scientific evidence
- Complexity of meal planning

Other common reasons: barriers

- Patients not interested in plant-based diet or behavior changes is not feasible
- Cost
- Concerns for adequate protein intake
- Need for practitioner education
- Need for more time and resources to educate patient
- Lack of nephrologist support

What could help patients change to a plant-based diet?

On a scale of 1 to 5

- Individual counselling session (1.37)
- Group education session (1.99)
- Example of a meal plan (2.18)
- Grocery store tour (2.46)
- Cooking class (2.50)

- Other: need for plant based handouts & recipes, monetary resources, family support, patient education and access to a dietitian.

Limitations & conclusion

- Most research is done with patients who are not on dialysis
  - Consistent with findings in this study, that more dietitians not working in dialysis recommends plant-based diet (74% vs 61%)
  - Common other reason: concerns of inadequate protein intake for dialysis patients in line with higher protein requirements for this population.*
- Conclusion:
  - Nephrology professionals are aware of the benefits of PBD to help delay progression of CKD
  - Increasing dietitian's referrals BEFORE starting dialysis to help support patients in their transition to a plant-based diet.
  - Work with patients to take small and realistic steps towards that change.

How can to convince our patients?

Plant-Based Diets for Kidney Disease: A Guide for Clinicians

Shivam Joshi, Michelle McMacken, and Kamyar Kalantar-Zadeh

"Singapore Chinese Health Study, which included 63,257 participants who were followed up for a median of 15.5 years. In that study, **red meat intake was strongly associated in a dose-dependent fashion with kidney failure"**

In a substitution analysis, **replacing 1 serving** of red meat per day with soy and legumes was associated with a **50% reduction in risk for kidney failure**

Animal vs plant food

- **Protective effect of plant-based foods:**

1. Presence of dietary fiber vs bioavailability K and Phos
2. Vitamins, minerals (such as potassium and magnesium)
3. Anti-oxidants (favorable microbiome)

- **Possible detrimental effect of animal-based foods**

1. Saturated fats
2. Sodium
3. Phosphorus
4. Dietary acid load (DAL)
5. Higher protein content(hyperfiltration)

Plant-based effects

- Metabolic Acidosis: increased DAL associated with increased acid retention leading to progression of CKD.
  - Plant-based food have natural dietary alkali (citrate/malate which can convert to bicarb)
  - A RCT (Goroya, 2014) of 108 pts CKD stage 3: 2-4 cups of fruits/veggies per day ≈ $NAHCO_3$ dose prescribed to lower DAL by 50%

- KDOQI nutrition guidelines:
  - "suggest that increased fruit and vegetable intake may decrease body weight, BP, and net acid production"

- Plant-based = more whole food
  - **Higher fiber, less sodium, less additives, ↓ bioavailability of phos and K**

What about vitamins and minerals?

- Close monitoring of CKD patients and dialysis population
  - Iodine & omega-3 could be monitored
  - B12 is not a component of plant foods except if fortified (like cereals/tofu)
  - Iron, calcium and vitamin D regularly checked for our population (peds)
  - Zinc sources: soy, legumes, grains, nuts and seeds
  - Water-soluble vitamin supplement should be prescribed re dialysis losses

- Additional supplements might be needed if serum levels are low.

Conclusion

- **Awareness of benefits** of plant-based diet is there **BUT** why only 56% of participants are recommending to patients and only 21% of them, regularly recommends?

- **Encouragements:** when compared with endocrinology similar survey, **more nephrology professionals are recommending** plant-based diet (56% vs 32%) and are more aware of the diet (88% vs 72%)

- **Refer to a dietitian, suggest small changes (one vege meal/week as a start!), educate staff and patients/families, create handouts and share!**

References

- **The essential guide for renal dietitians 4th edition,** 2020, Canadian Association of Nephrology Dietitians
- **Kidney Friendly Cooking,** 2015, Canadian Association of Nephrology Dietitians, Meatless Main Meals, page 167-184
- **Taking the Kale out of Hyperkalemia: PlantFoods and Serum Potassium in PatientsWith Kidney Disease,** Babich, Kalantar-Zadeh, Joshi, Journal of renal nutrition, November 2022
- **Nutritional adequacy of essential nutrients in low protein animal- and plant-based diets in the United States for chronic kidney disease patients,** Dina A, Tallman, PhD, RD, Ban-Hock Khor, PhD, Tilakavati Karupaiah, PhD, RnD, Pramod Khosla, PhD, Maria Chan, RD, Joel D. Kopple, MD, Journal of Renal Nutrition, November 2022
- **Acceptablility of Plant-Based Diets for people with chronic kidney disease: perspectives of renal dietitians,** Jordan Standford, Mikaela Zuck, Aniota Stefoska-Needham, Karen Charlton, Kelly Lambert, Nutrients, January 2022
- **Plant-based diet in kidney disease: nephrology professional's perspective**, Melanie V Betz, MS, RD, Kelly B. Nemec, MS, RDN, Anna L. Zisman, MD, Journal of renal nutrition, September 2022
- **Optimizing diet to slow ckd progression**, Pablo Molina, Eva Gavela, Belen Vizcaino, Emma Huarte, Juan Jesus Carrero, Frontiers in Medicine, June 2021
- **Plant-based diet for kidney disease: a guide for clinicians**, Shivam Joshi, Michelle McMacken, Kamyar Kalantar-Zadeh, AJKD, February 2021
- **Fruit and vegetable intake and mortality in adults undergoing maintenance hemodialysis**, Saglimbene, Wong, Ruospo and Al, CJASN, January 2019
- **Plant-based nutrition for healthcare professionals: implementing diet as a primary modality in the prevention and treatment of chronic disease**, Julieanna Hever, Raymond J Cronise, Journal of geriatric cardiology, May 2017
- **Renal, metabolic and hormonal responses to ingestion of animal and vegetable proteins**, Kontessis, Jones, Dodds, and al, International society of nephrology, February 1990

Websites and podcast

- Websites:
  - www.kidney.org/atoz/content/plant-based
  - www.nutritonfacts.org
  - www.pcrm.org
  - https://vegetariannutrition.net/
  - www.vndpg.org
- Recipes:
  - www.kineyucareuk.org
  - www.kidneycommunitykitchen.ca
  - www.thekidneydietitian.org (Melanie Betz, RD)
  - www.davita.com
  - www.plantbasekidney.com
- Podcast
  - Diary of a kidney warrior podcast: Episode 74 Plant based diet & dialysis
  - The Exam Room podcast: Is your diet helping or hurting your kidneys
  - Podcasts 360: Shivam Joshi, RD, on Plant-based diets to treat and prevent kidney disease

Comments or Questions?