Plant-Based Diets in CKD: The Case *For*

Diet and CKD Controversies and Patient Perspectives

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KDSG Kidney Dietitian Week 2025

NHS Royal Devon University Healthcare NHS Foundation Trust

BDA The Association of UK Dietitians Kidney Dietitian Specialist Group

Kidney Kitchen

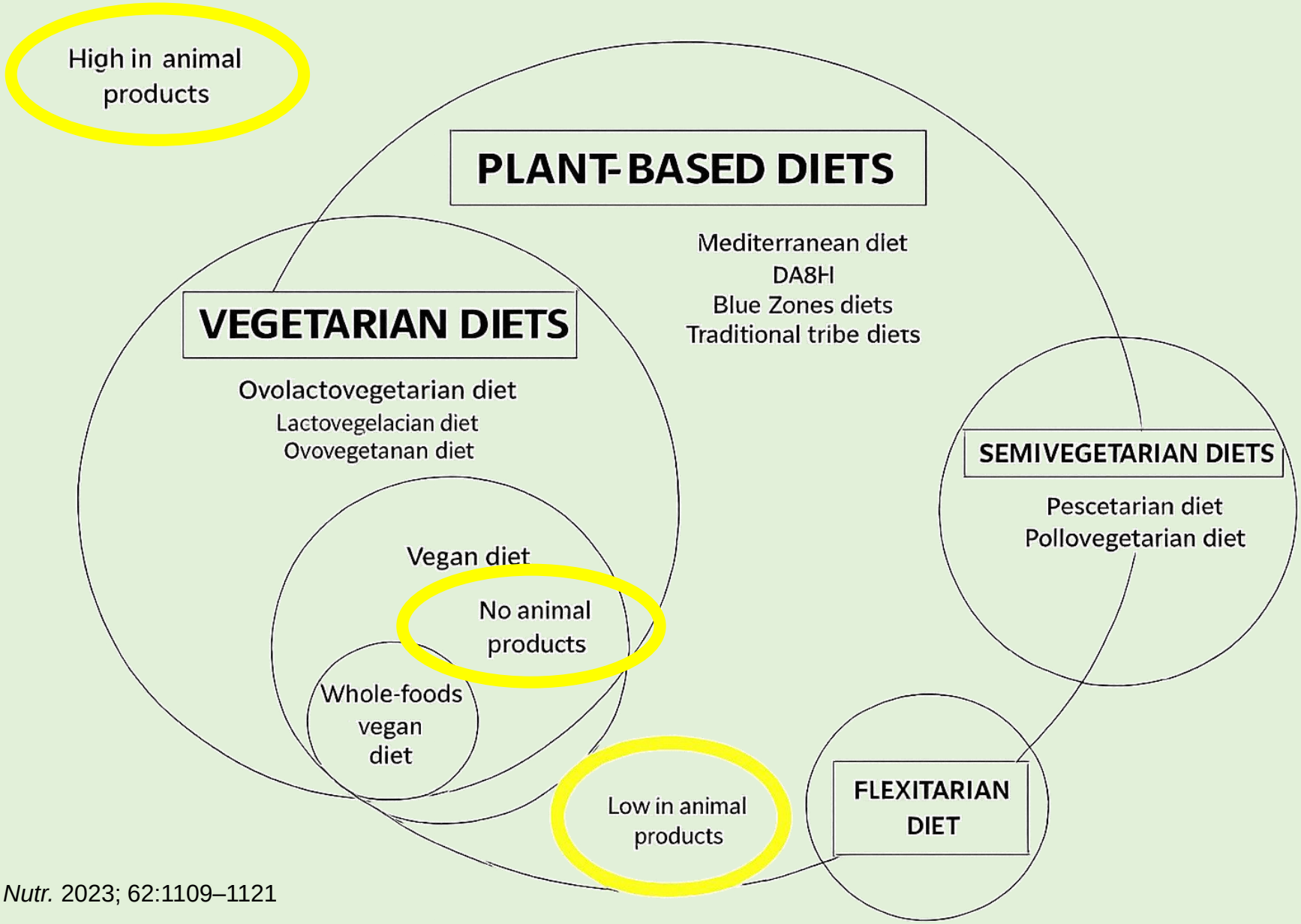
UKKA UK Kidney Association Sustainable Kidney Care

Plant-Based Diet Defined

- No formally accepted definition of a ‘plant-based diet’
- High in plant foods; vegetables, fruits, wholegrains, pulses, legumes, soy, nuts, seeds, herbs, and spices in their whole form
- Animal product content varies: ‘exclusively plant-based’ to diets with ‘small’ or ‘moderate’ amounts
- Minimal processed foods, especially those high in added fat, sugar and salt

Hargreaves *Eur. J. Nutr.* 2023; 62:1109–1121, **Kent** *Proc. Nutr. Soc*. 2022; 81(1), 62-74

Plant-Based Dietary Patterns



Hargreaves *Eur. J. Nutr.* 2023; 62:1109–1121

General Population: Plant-Based Diets associated with

- Cardiovascular disease
- Type 2 diabetes
- Obesity
- Certain cancers
- Lower carbon foot-print

Salehin *Int. J. Environ. Res. Public Health* 2023; *20*(4), 3337
Qian *JAMA Intern Med.* 2019;179(10):1335-1344
DeClercq *Curr. Nutr. Rep. 2022;* **11**, 354–369
Tran *Diabetes Metab. Syndr. Obes.* 2020; *13*, 3433–3448
Scarborough et al., *Clim Change.* 2014; 125(2): 179–192
Capodici et al., *PLoS One* 2024 ; 15;19(5)

🌿 Aligning with planetary-health diets

Eat Lancet 2

🥛 Not all-or-nothing: allows modest amounts of animal products.

🌍 Global adoption of a plant-rich ‘planetary health diet’ could prevent ≈ 40,000 premature deaths per day.

🌱 Could halve food-related greenhouse gas emissions by 2050.

Willett, W., et al. (2019).*The Lancet*

Plant-Based Diet and CKD: Systematic Review and Meta-analysis

Included 121,927 participants aged 18-74 years,
Followed for an average of 11.2 years

CKD Incidence:

- PBD associated with 26% lower risk of developing CKD
- Dose-dependent relationship: higher PBD intake linked to lower CKD risk

CKD Progression:

- Higher plant protein intake associated with slower eGFR decline

Unhealthy PBD may not offer renal protective effects compared to healthy PBD

Dang Z et al., *J Ren Nutr.* 2025; 11:S1051-2276(25)00027-5

Unhealthy PBD (uPDI) linked with ↑ mortality in CKD – quality matters…

NHANES cohort of ~4000 CKD adults (without CVD):

- Higher unhealthy PBD index (refined grains, SSBs, etc.) → higher all-cause mortality.
- Highlights importance of diet quality: healthy PBD ≠ ultra-processed ‘plant’ foods.

Healthy

Unhealthy

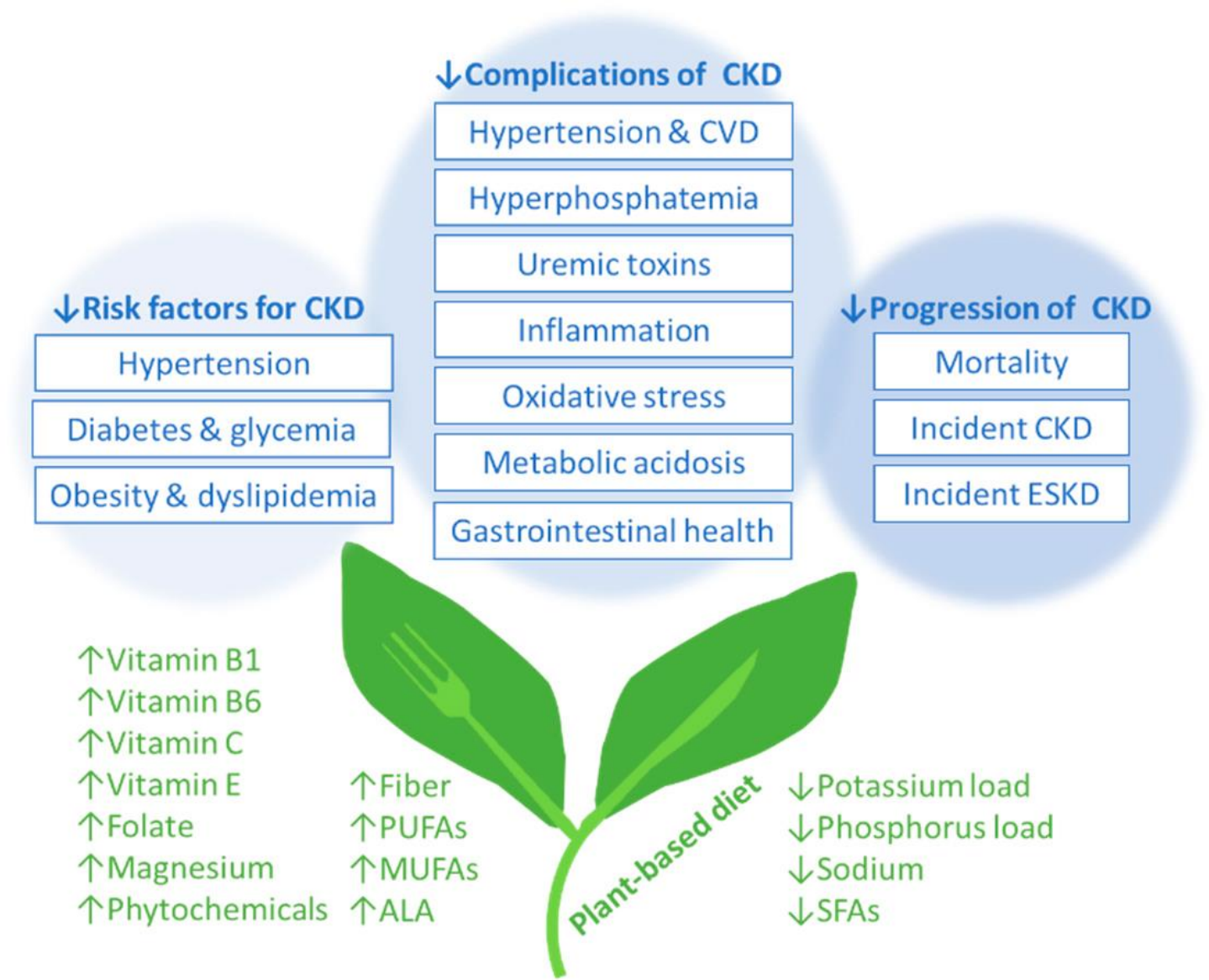
Li K et al., (2025) *NHANES* 18:5759-5770

2025 review: plant-based diets across the CKD spectrum

- Narrative review synthesising trials & cohorts across CKD prevention and management.
- Argues diet should be foundational alongside pharmacotherapy in CKD care.
- Summarises mechanisms: ↓ acidosis & inflammation; improved BP, weight, glycaemia; microbiome shifts.

Goraya N et al., (2025) *Clin J Am Soc Nephrol.* 20(8):1142-1149.

Plant-Based Diet Benefits in CKD



Narasaki et al., *Nutrients* 2024;16, 66

KDIGO Practice Point 3.3.1:

Adopt healthy and diverse diets with a higher consumption of;

plant-based foods compared to animal-based foods

and a *lower consumption of ultra-processed foods.*

KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney International Supplements, 14(2), S1–SXX.

Potential Advantages in Dialysis and Transplant

- ↓ Mortality & cardiovascular risk
- ↑ Transplant kidney function
- Supports weight & diabetes management
- ↓ Dietary acid load
- ↓ Absorbable phosphate
- Salt → better fluid control
- Fermentable fibre → ↓ toxins & inflammation
- ↑ PUFA → ↓ inflammation

Summary:

- Plant-based diets offer significant benefits

Concerns……..

- Micronutrient deficiencies (Se, I, B_{12})
- Protein adequacy in dialysis
- ?lower protein needs with ↓ inflammation
- Hyperkalaemia

Dupuis L et al., *Nephrology* 2021; 50(4-5):672-677, **Liebman S et al.,** *Nutrients* 2022; 19;14(6):1304, **Cyrino LG et al.,** *Kidney Int Rep* 2021; 27;6(7):1764-1774

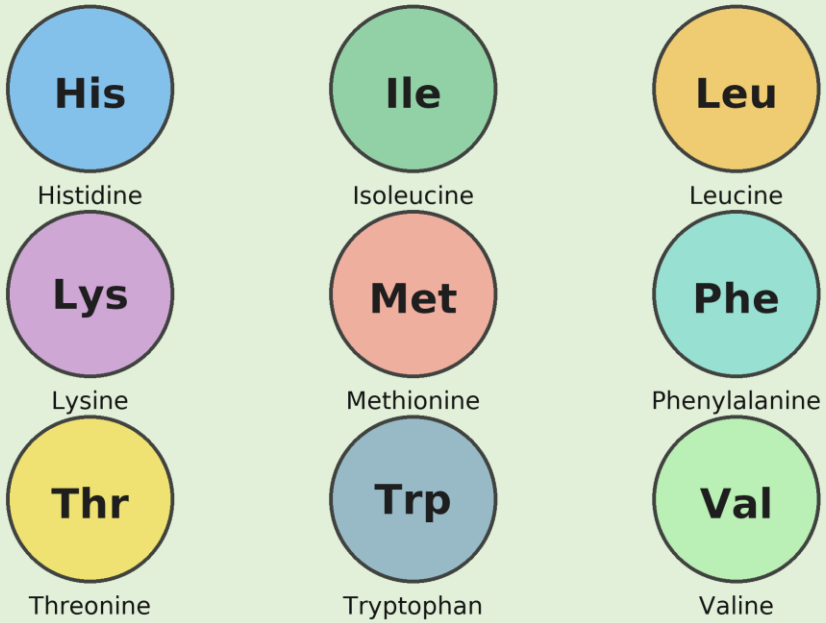
Nutrient deficiencies exist in all dietary patterns

Dietary Pattern	Risk of Inadequacy	Favourably High Intake
Vegans	EPA, DHA,	fibre, PUFA, ALA,
	vitamins B12, D,	vitamins B1, B6, C, E, folate,
	calcium, iodine, iron (in women), zinc	magnesium
Vegetarians	fibre, EPA, DHA,	PUFA, ALA,
	vitamins B12, D, E,	vitamin C, folate,
	calcium, iodine, iron (in women), zinc	magnesium
Meat-eaters	fibre, PUFA, ALA (in men),	protein,
	vitamins D, E, folate,	niacin, vitamin B12,
	calcium, magnesium	zinc

Narasaki Y et al., *Nutrients* 2024;*16*, 66**, Neufingerl et al**., *Nutrients.* 2021; 23;14(1):29

- **All** dietary patterns, not just plant-based, carry some risk of nutrient deficiencies
- With good planning, most diets, including plant-based ones, can provide all essential nutrients
- **Global dietetic organisations**: Well-planned plant-based diets are nutritionally adequate for all life stages.
- 'Plant-based diet'; this doesn't always mean *exclusively* plant-based. Many people are 'plant-forward' or 'plant-rich,' still including some animal foods – individual approach needed

Myth: Plant Proteins Are “Incomplete”



Myth Busting…..

2025 Survey: 75% of Registered Dietitians still believed plant proteins are incomplete.

The Reality:

- All plant foods contain all 9 essential amino acids - they just vary in proportion.
- As long as total protein needs are met and **variety** is consumed across the day, amino acid adequacy is achieved.
- No need for ‘protein combining’ at each meal.

Metoudi et al., *J Hum Nutr Diet* 2025; 38(1):e13386

Protein Adequacy

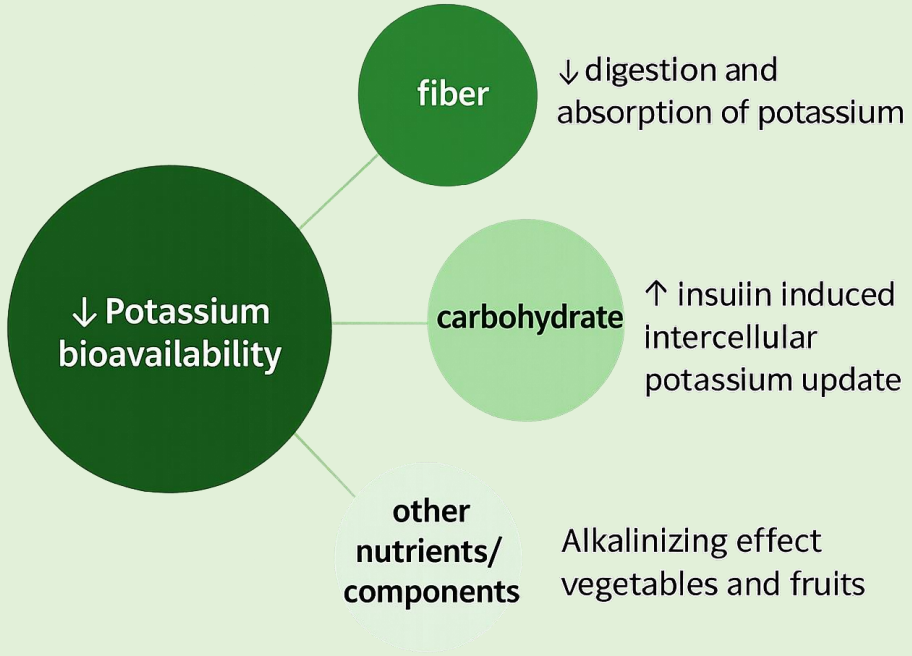
Protein content varies: *plant-based diets may provide less than animal-based diets*

- Plant-based diets aren’t inherently ‘low’ protein diets
- Exclusively plant-based diets can provide enough protein in the general population
- Flexible approach: ‘plant-rich’, not necessarily vegan or exclusively plant-based
- Lower protein needs may occur with ↓ inflammation

Narasaki Y et al., *Nutrients* 2024;*16*, 66 **Mariotti F et al**., *Nutrients* 2019;11(11):2661 **Kramer H, et al.** *CJASN*. 2019;14(10):1441-1449.

Hyperkalaemia

- Fibre limits K+ absorption from whole fruit and veg ~50–60%
- Additives are key contributors to post-meal K+
- 41 additives identified; 16 common in processed foods (breaded items, meats, drinks, ready meals, cereals, crisps)
- K+ management involves more than intake—insulin, carbs, alkalinity matter



Plant-based diets + potassium binders could support CKD care without added risk of hyperkalaemia

Braschi et al, Adv in *Kdney Disease and Health* 2023;30(6):487-495, **Cupisti et al**, *Nutrients* 2018; 25;10(3):261, **Martínez-Pineda et al**, *Nutrients* 2021; 12;13(10):3569, **Picard K.** *J Ren Nutr.* 2019; 29(4):350-353, **Sumida et al,** J Ren Nutr. 2023; 22:33(6 suppl):S6-12, **Kalantar-Zadeh et al**, *Nutrients* 2024; *16*, 66

Plant-Based Diets and Haemodialysis: Study Summary

Study: 150 HD patients,
3 monthly dietary assessments,
over 1 year

Outcomes:

- Lower protein intake in the plant-based group
- However, better malnutrition inflammation scores (MIS) with higher plant adherence
- No increase in serum K+ or hyperkalaemia risk with plant-based diets
- Energy intake consistent across all dietary groups

Implication:

- Plant-based diets may improve nutritional status without ↑ K+

González-Ortiz et al., *Nephrol Dial Transplant.* 2021; 29;36(4):681-688

Affordability of Whole-Food-Plant-Based Diets

Oxford University (2021):

- Vegan diets can reduce food costs by up to one-third.
- Based on legumes, grains, and vegetables—not plant-based alternative eg meat substitutes.

Office of Health Economics (2023):

- Plant-based diets could save the NHS ~£6.7 billion/year.
- NHS savings from lower incidence of chronic diet-related diseases.

Oxford University (2021). Sustainable eating is cheaper and healthier. www.ox.ac.uk
Office of Health Economics (2023). Vegan diets could save the NHS £6.7 billion/year. www.ohe.org

RCT (CJASN 2025): ≥30 plant foods/week

CKD 3–4

- Randomised crossover (n=25): High-diversity plant diet (≥30 plants/wk) vs low-diversity (≤15) for 6 weeks, separated by min 4 week washout period.
- ↓ potential renal acid load by ~47%; ↓ symptom burden (incl. constipation).
- Shifted microbiome toward beneficial metabolites; no electrolyte imbalances reported.

Stanford J, et al. (2025) *Clin J Am Soc Nephrol.* 20(5):619-631.

Dietitians' Perspectives on Plant-Based diets: Insights from Surveys

Benefits of Plant-Based Diets for CKD

- Addresses multiple clinical concerns (e g., glycemic control,

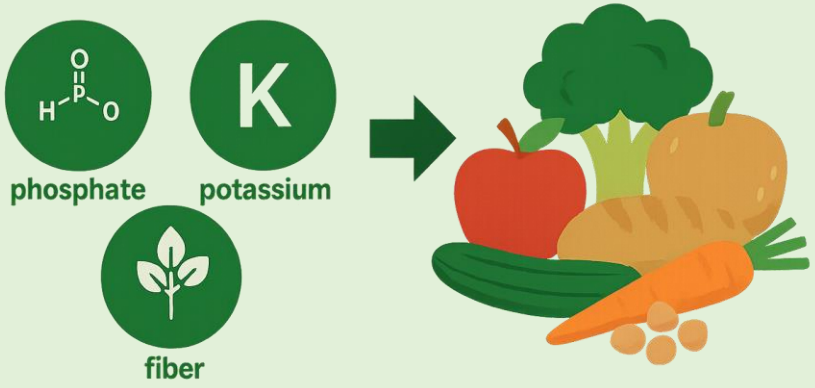
Glycemic control

Hypertension

Proteinuria

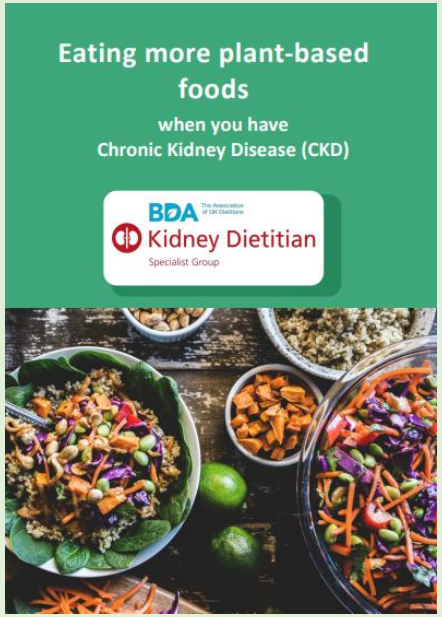
Obesity

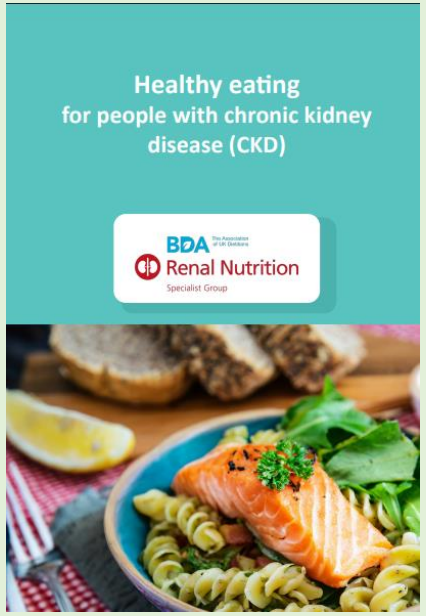
Shifts focus from nutrients such as phosphate, potassium, fibre to whole foods, reducing patient confusion.

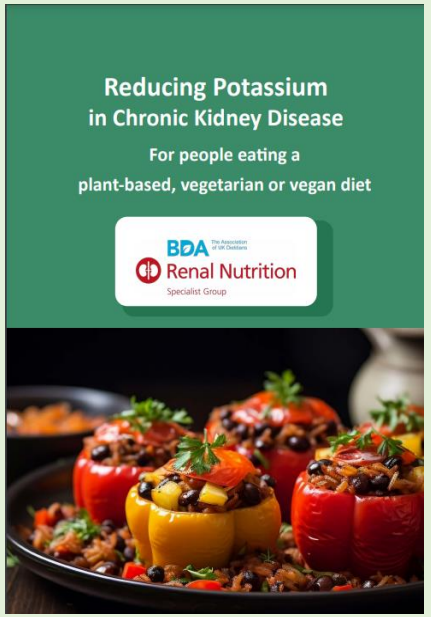


58%

Metoudi et al., *J Hum Nutr Diet* 2025; 38(1):e13386, **Stanford et al.**, *Nutrients* 2022;4;14(1):216







PLANT-BASED
Health Professionals UK

Patient Perspective

Correction: Handgrip measurement Kg not %

The ‘FOR’ Summary

- May reduce risk of developing CKD, and slow progression
- ↓ CVD, diabetes, inflammation, acidosis, phosphate, potassium
- ↑ Kidney transplant function
- ↑ Fibre intake → improved microbiome health, ↓ constipation
- May reduce protein requirements via ↓ inflammation
- Supports whole-body health through a whole-food approach
- May ↓medication burden, ↓ patient and healthcare costs
- ↑ Patient empowerment

Thank you for listening
With thanks to Sue Brewer, Cade Morant, and the Renal Dietitians at Southmead Hospital, Bristol