



The renal diabetes diet challenges and choices

Amita Godse

Specialist Renal dietitian

Freeman hospital, Newcastle upon Tyne NHS Trust

Dietitian for Kidney Kitchen- Kidney Care UK

Challenges in Renal-Diabetes Nutrition care: Two perspectives

Patient
perspective

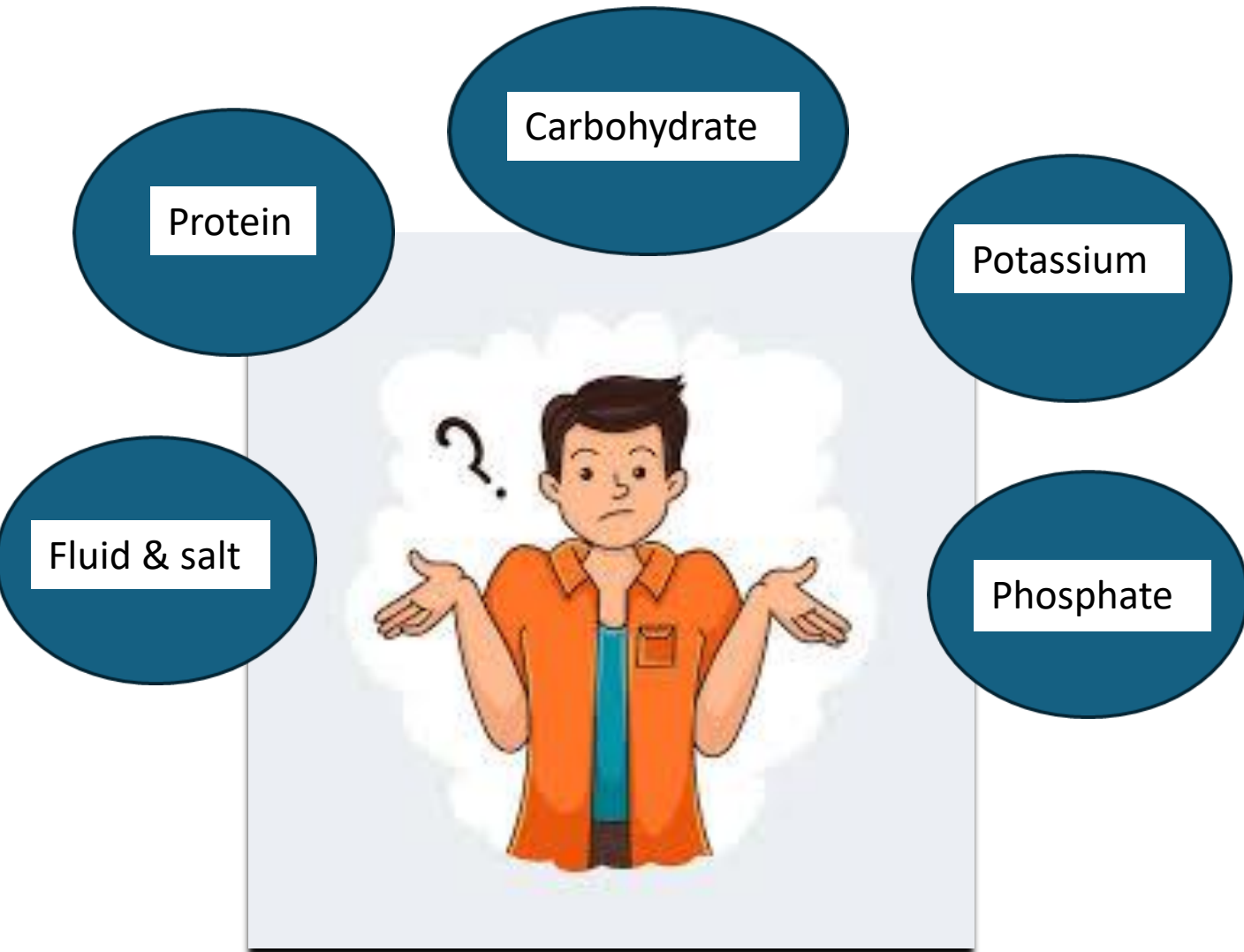
Dietitian
perspective

Patient perspective

The burden of managing diet for two chronic conditions

- Food is not just nutrition. It is taste, pleasure, nourishment, emotion, memories, bonding, joy and a necessity.

How to get the balance right?



“I don’t know what to eat anymore?”

“Its hard to keep track of everything.”

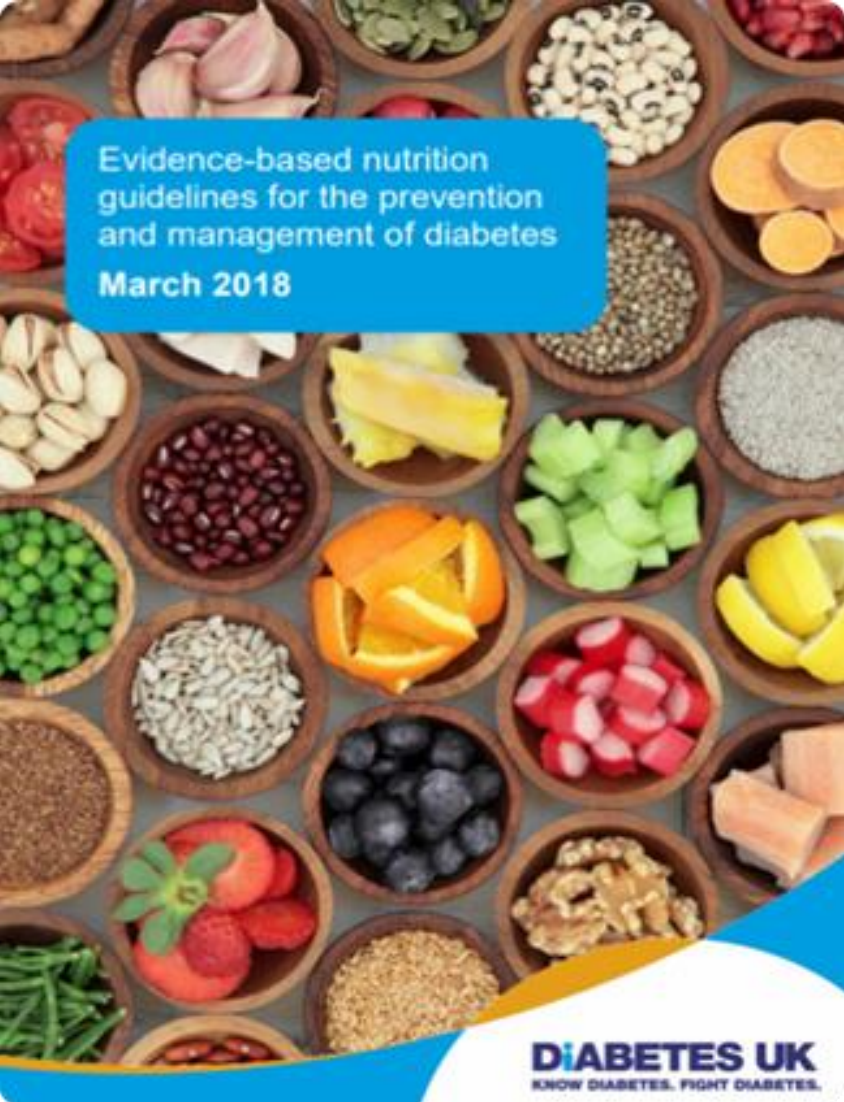
“Diet is so restrictive.”

“I can't enjoy food the way I used to.”

“I feel stressed about what to eat.”

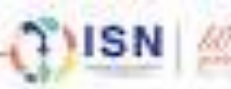
Why this confusion?

Evidence-based nutrition guidelines for the prevention and management of diabetes
March 2018



DIABETES UK
KNOW DIABETES. FIGHT DIABETES.

Official Journal of the International Society of Nephrology



SUPPLEMENT TO
kidney
INTERNATIONAL



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JBDS-IP Joint British
Diabetes Societies
for International Practice

Management of adults
with diabetes on dialysis

March 2023



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UKKA
UK Kidney Association

What do the latest renal & diabetes dietary guidelines suggest?

Are patients still following the old renal dietary advice?

Diabetes diet advice	Historical renal diet advice	New renal diet advice
Eat plenty of vegetables and salads	Limit vegetables and salad to reduce K	Encourages at least 5 portions of low potassium fruit and vegetables /day.
Lentils and pulses encouraged	Limit lentils and pulses for K and PO4 content	Tinned lentils/pulses after draining the water. Plant based diets encouraged.
Vegetables can be cooked using any cooking method	Boil or double boil vegetables to reduce K	Double boiling not advised. Boil vegetables where appropriate
Whole grains encouraged	Limit whole grains for K and PO4	Encouraged to have wholegrains

Patient education is the key to help align potassium and phosphate management with a healthy diet for diabetes

Potassium

Traditionally, many fruits and vegetables, pulses and wholegrains have been restricted to control serum K⁺.

However, we now know:



Plants are natural source of fibre, a nondigestible, nonabsorbable carbohydrate polymer that increases stool quantity, facilitating colonic elimination of potassium and protecting against hyperkalemia.



Plant cell walls are difficult to digest thus decreasing the bioavailability of potassium. Potassium bioavailability of whole fruits and vegetables may be as low as 50% to 60%.



Plants provide a natural alkali, which may facilitate the transfer of potassium to the intracellular compartment, especially in metabolic acidosis.



Complex carbohydrates found in fruits and vegetables increase the insulin-mediated cellular uptake of potassium.

1. Naismith DJ et al, An investigation into the bioaccessibility of potassium in unprocessed fruits and vegetables. Int J Food Sci Nutr. 2008;59:438-450.

2. Gema Souto B.S.,1 Cristóbal Donapetry, M.D.,2 Jesús Calvino, M.D.,2 and Maria M. Adeva, M.D., Ph.D, Metabolic Acidosis-Induced Insulin Resistance and Cardiovascular Risk. Metabolic syndrome and related disorders Volume 9, Number 4, 2011.

Watch out for the hidden culprit... Food additives

Salt substitutes

Potassium chloride has a salty taste, so often used to replace up to 25% of salt in processed foods

Potassium additives

- Preservative
- Stabiliser, emulsifier, thickener
- Flavour enhancer



Potassium absorption from different foods

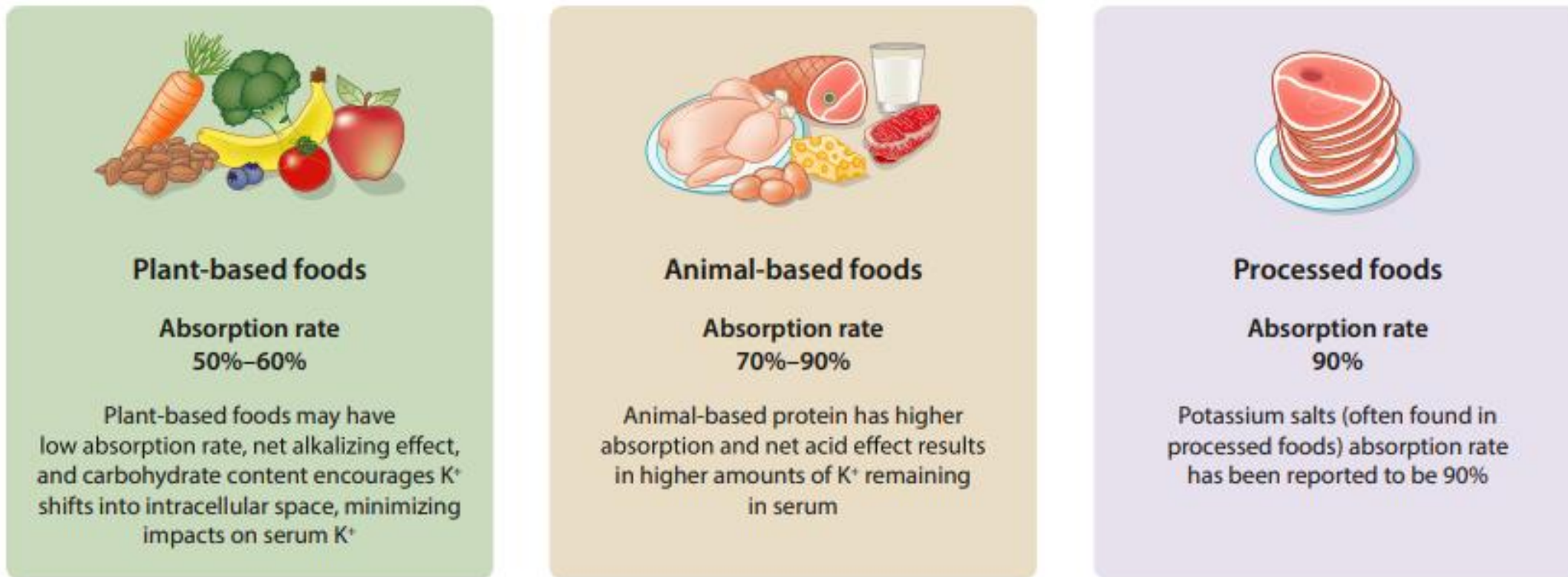


Figure 33 | Potassium absorption rates of plant-based, animal-based, and processed foods. Data from Picard K, Griffiths M, Mager DR, Richard C. Handouts for low-potassium diets disproportionately restrict fruits and vegetables. *J Ren Nutr.* 2021;31:210–214.⁵⁹²

Individual guidance required

Stepwise approach



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graph TD; A[Stepwise approach] --> B[Step 1: First exclude all non-dietary factors.]; B --> C[Step 2: Initially focusing on processed foods, snacks, sugary drinks, smoothies, fruit juices, milky coffees, and foods containing K+ additives.]; C --> D[Step 3: Encourage low K+ wholegrain carbohydrates options (pasta, rice, noodles, bread etc) and less potatoes and other starchy root vegetables.]; D --> E[Step 4: Aim for at least '5-a-day' by promoting low K+ fruit, vegetables and appropriate cooking methods.];
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Step 1: First exclude all non-dietary factors.

Step 2: Initially focusing on processed foods, snacks, sugary drinks, smoothies, fruit juices, milky coffees, and foods containing K+ additives.

Step 3: Encourage low K+ wholegrain carbohydrates options (pasta, rice, noodles, bread etc) and less potatoes and other starchy root vegetables.

Step 4: Aim for at least '5-a-day' by promoting low K+ fruit, vegetables and appropriate cooking methods.

What about phosphate?



Common Phosphorus Additives

Dicalcium phosphate
Disodium phosphate
Monosodium phosphate
Phosphoric acid
Sodium hexameta-phosphate
Sodium tripolyphosphate
Tetrasodium pyrophosphate
Trisodium phosphate

Pulses,
wholegrains,
nuts

Dairy foods

Meat, fish,
eggs

Phosphate
additives

20-50%

40-70%

90-100%

- Calvo et al., Assessing the health impact of phosphorus in the food supply: issues and considerations. *Adv Nutr* 2014;5:104-13.
- Calvo et al The Regulatory Aspects of Phosphorus Intake: Dietary Guidelines and Labeling. In: Uribarri J, Calvo MS, eds. *Dietary Phosphorus: Health, Nutrition, and Regulatory Aspects*. Boca Raton, Florida: CRC Press; 2018:249-66.
- St-Jules et al, Examining the proportion of dietary phosphorus from plants, animals and food additives excreted in urine. *J Ren Nutr*. 2017 27 2):78-83

Phosphate additives commonly found in processed foods....

- Dark fizzy drinks, chocolate and malt drinks
- Processed meat, poultry, fish and plant-based meat alternatives.
- Processed dairy, eg spreadable and sliced processed cheese, evaporated milk, dried milk products, and non-organic dairy alternatives.
- Processed potato products eg. waffles, croquettes.
- Dried powdered food eg sauces, dessert mixes, soups, instant pasta or noodles
- Baked goods



Individual guidance required

Foods containing phosphate additives which have low nutrient value should be targeted prior to other high phosphate foods e.g. wholegrain products and foods with high biological value protein¹

Limit processed foods.
Encourage cooking from scratch where possible.

When choosing commercial foods & drinks, **aim for those without phosphate additive.**

Protein is essential but will contain phosphate.

Beans, pulses, lentils can be encouraged, with lean sources of fish, poultry and eggs.

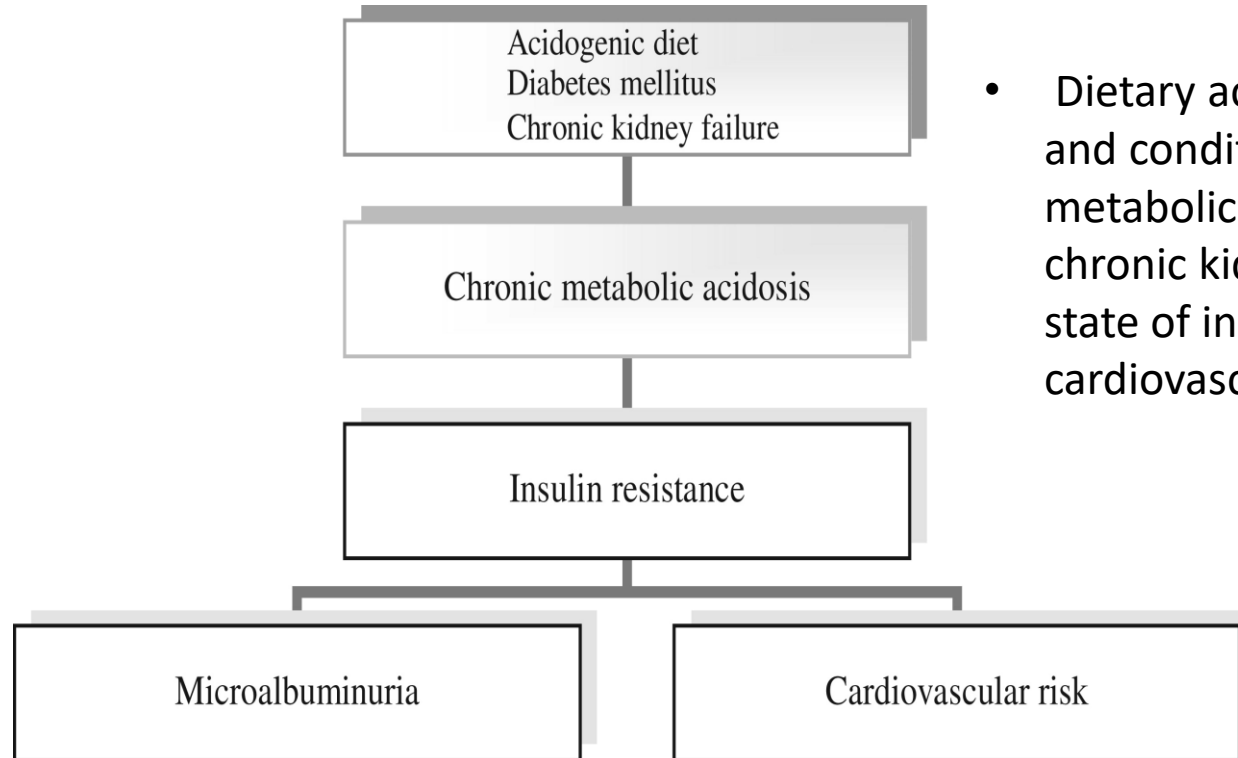
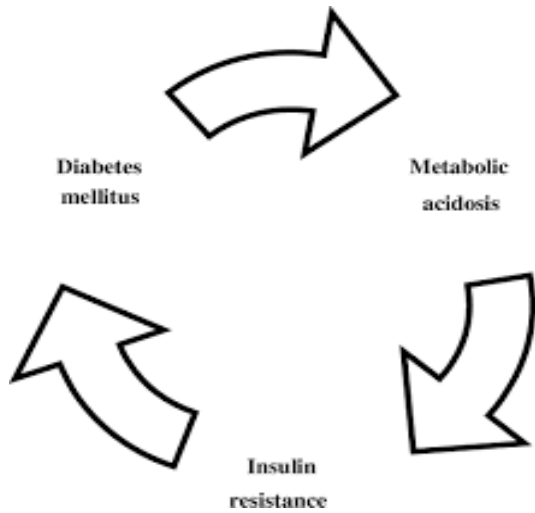
Moderate dairy intake and less red or processed meat.

Encourage wholegrains over refined carbohydrate to lower glycaemic index and Po_4 absorption

Reference:

1. JBDS-IP, Management of adults with diabetes on haemodialysis, August 2022

Metabolic acidosis and diet



- Dietary acid load due to the modern acidogenic diet and conditions typically featuring a chronic state of metabolic acidosis, such as diabetes mellitus and chronic kidney failure, are associated with a chronic state of insulin resistance which in turn increases cardiovascular risk and produces microalbuminuria.¹

1. Metabolic Acidosis-Induced Insulin Resistance and Cardiovascular Risk, MeGema Souto, B.S.,¹ Cristóbal Donapetry, M.D.,² Jesús Calvino, M.D.,² and Maria M. Adeva, M.D., Ph.D, Metabolic syndrome and related disorders Volume 9, Number 4, 2011

Low acid diet

- Modern day diets are deficient in fruits & vegetables
- Excessive consumption of animal products contributes to acid load
- **Fruits & Vegetables: Alkalinizing Effect**
 - Contain metabolizable anions like citrate, malate.
 - Metabolism of these anions consumes hydrogen ions, producing an alkalinizing effect.
 - Rich in glutamate, an amino acid which is alkalinizing
- **Animal Products : Acidogenic**
 - Contain non-metabolizable anions like phosphate & chloride
 - Produce acid load through oxidation of sulfur-containing amino acids (methionine, homocysteine, cysteine)

Metabolic acidosis & Plant-based diet



The review article by Caroline Passey highlights that reducing High Biological Value (HBV) protein to 50% of total protein intake in Acute Kidney Disease (AKD) patients, along with increasing fruits and vegetables, led to slower CKD progression and occasional improvements in renal function. This effect is primarily attributed to the reduction in dietary acid load, as plant-based foods produce alkali, counteracting the acid produced by animal proteins¹.

Patients with diabetes are,

- Restricted to carbohydrate and fat intake.
- High animal protein intake which may exacerbate acid load and affect kidney health

My observation of dietary habits in Typical North-East Patient Population:

- Meat-heavy diet, limited consumption of vegetables, legumes, pulses.
- Commonly eaten vegetables: peas, carrots, sweetcorn.
- Many patients report eating vegetables only on Sundays.

Barriers to Vegetable Intake:

- Poor dietary habits
- Lack of culinary knowledge

Recommendations:

- Education on preparation methods and ways to make vegetables more enjoyable could improve intake.

1. A review article -Reducing the Dietary Acid Load: How a More Alkaline Diet Benefits Patients With Chronic Kidney Disease- Caroline Passey BSc, Rd, PhD Journal of Renal Nutrition, Vol 27, No 3 (May), 2017: pp 151-160



Summary.... Its not that different after all!

Diabetes and renal dietary guidelines align in many ways and falls in line with healthy eating advice

- Encourage vegetable and fruit intake. If hyperkalemic, consider non-dietary causes and K⁺ additives, before replacing high K⁺ fruit & vegetables with low K⁺ alternatives. Still give the 5-a-day message.
- Encourage wholegrain over refined carbohydrates to lower glycemic index and phosphate absorption.
- Encourage adequate protein intake from pulses, and minimally processed fish, poultry, meat and eggs. With less red meat and processed meat.
- Moderate dairy intake
- Limit commercial foods & drinks, and where possible choose those without phosphorus and potassium additives

Options

- Educating all health care professionals involved in care of DKD patients about the changed renal dietary advice.
- Patient education incorporating latest evidence-based diet advice.
- Regular dietetic follow ups – one session is never enough, couple of changes at a time for better compliance.
- Teaching what to prioritise. No blanket rules- diet advice needs to be individualised or else it can be overwhelming. Not all DKD patients need low K and low PO4 diet.

- **Resources**

- Kidney Kitchen – www.kidneykitchen.org
- BDA –Kidney Dietitians Specialist Group (KDSG) resources for low K, low PO4- ask your dietitians
- BDA- KDSG multicultural low potassium diet resources- ask your dietitian
- Kidney care UK website- <https://kidneycareuk.org/get-support/free-resources/patient-information-booklets/order-resources/>
- BDA – diabetes patient education resources
- Diabetes UK- patient education resources
- Kidney Beam website for exercise guidance www.kidneybeam.com



Challenges from dietitian perspective

- **Renal dietitians and Diabetes dietitians working in separate specialities**
 - Fragmented care model: leading to siloed care rather than an integrated approach.
 - Issues with funding a dual post.

- A snapshot survey looked at UK dietetic practice for management of patients with co-existent diabetes mellitus (DM) and end stage renal disease (ESRD)- Oonagh Gooding 2019

Key findings:

- 65 questionnaires completed by renal dietitians.
- 92% of hospitals lack dietitians in joint up care.
- 86% of dietitians support the need for renal-diabetes specialist dietitian post.
- Lack of confidence among renal dietitians in complex diabetes areas- like insulin pumps.

Benefits of dual specialties in dietetics

- **Early Stage of CKD (1-4)**

- Seen by Diabetes specialist dietitians

- Requires skills & knowledge to appropriately advise on salt, protein, potassium & phosphate restrictions.

- **Later Stage of CKD (4-5)**

- Seen by Renal specialist dietitians

- Requires skills & knowledge in managing glycaemic control during renal replacement therapy / on insulin pumps/ using CGMs

- **Advanced clinical skills**

- Expertise in managing artificial feeding & glycaemic control especially when patient is acutely ill.

- Supplementary prescribing – Po₄ binder, alfacalcidol, cinacalcet and Insulin/ OHA dose adjustments

- **Consistent and Comprehensive care**

- Appropriate highly specialised dietary advice that complements co-morbidities.

- Dietetics Ambassador to both diabetes & renal.

- ‘2 dietitians’ for the price of 1!- Dual expertise for optimal care

Options: Becoming Diabetes and Renal specialist Dietitian

	Diabetes dietitian	Renal dietitian
Competency	<p>BDA Diabetes Specialist Group 2021 Post-registration Professional Development Framework</p> <ul style="list-style-type: none"> - Entry Level - Enhanced Level - Advanced Level - Consultant Level <p><u>BDA Professional Development Framework - British Dietetic Association (BDA)</u></p>	<ul style="list-style-type: none"> - Journal of renal nutrition-2021 - Competent Level - Proficient Level - Expert Level <p>https://www.jrnjournal.org/action/showPdf?pii=S1051-2276%2820%2930288-0</p>
Formal Training	<p>Warwick University – Postgrad certificate (6mo), Postgrad Diploma (12 mo), MSc (24 mo)</p> <p>DAFNE qualification</p> <p>BDA- Diabetes specialist Group course</p>	<p>BDA & University of Surrey – Renal nutrition post registration clinical update course</p> <p>BDA- Kidney dietitian specialist Group course</p>
Other Resources	<ul style="list-style-type: none"> - Diabetes UK - CDEP (Cambridge Diabetes Education Program) - ABCD & DTN - Conference 	<ul style="list-style-type: none"> -Kidney Care UK - NKF (National Kidney Federation) - UK Kidney Association -PEN (Practice-based Evidence in Nutrition) - KDOQI - KDIGO - Conferences

Case study

Background:

48yr old Female

Single left kidney (congenital)

Started on Haemodialysis in 2020

T2 DM 2013- on insulin (Humulin M3)

Unsuitable for kidney transplant due to BMI > 35

Hypertension

Referred in July 2022 for Weight management (Pt keen to lose weight to be eligible for renal transplant).

Was previously advised on low phosphate and low potassium diet.

July 2022

K (mmol/l)	PO4 (mmol/l)	CCa (mmol/l)	PTH (mmol/l)	HBA1c (mmol/mol)	Insulin TDD (units)	Dry weight (Kg)	BMI (Kg/m ²)
4.0	1.94	2.5	26	58	182	122	49.5

On Humulin M3– 140units- 42units

Not on PO4 binders , Vit D or Ca supplements

Patient was advised to maintain food record, insulin and blood glucose diary.

Overall diet:

Breakfast- Rice Krispies 1 big bowl/ cornflakes/ 2 Toasts with butter

+ 1 sandwich on HD days

Lunch- 1 big Pasty/ bacon bun/ sausage sandwich/ Pork rolls

Dinner- sandwich/ chicken with 2-3 boiled potatoes and some veg/ bowl of pasta/ rice and meat curry

Snacks- 3-4 biscuits/day, occasional crisps

Drinks- 3-4 cups of tea/day

Sometimes dark fizzy pops

Issues:

- Diet high in fat, carbohydrates, low in protein and low on fruit and veg
- PO4 climbing
- Average blood glucose- 6-11mmols in morning and 12-18mmol in the evening
- C/O feeling bloated all the time
- Limited mobility

Aim:

1. To reduce weight whilst improving serum phosphate and maintaining serum potassium level.
2. To improve blood glucose control and reduce insulin dose requirement.

Intervention:

Patient was reviewed from July 2022 - Feb 2025

- Initially once every month for the first 6 months
- Thereafter once every two months till March 2024
- Six monthly between March 2024-Feb 2025

Gradual dietary and lifestyle changes introduced at every review with personalised goal setting.

1. Reduce processed foods- bacon/ sausage/ fizzy drinks
2. Reduce carbohydrate portions – education around healthy carbohydrates and portions
3. Increase protein intake – lean meats, low fat high protein yoghurt
4. Increase vegetable and fruit intake- ideas for cooking vegetables discussed, resources suggested
5. Gradually increase physical activity- step counting introduced

Success and challenges

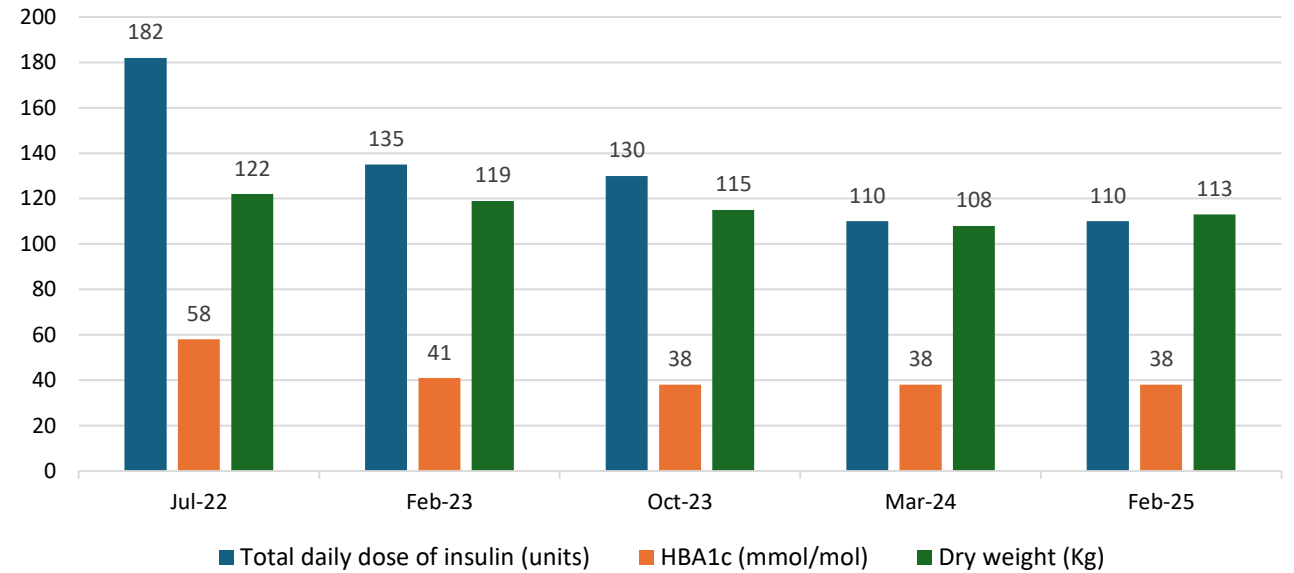
- **Success:**

- Weight stated to drop
- Insulin dose reduced
- Serum potassium remained stable
- GI symptoms improved

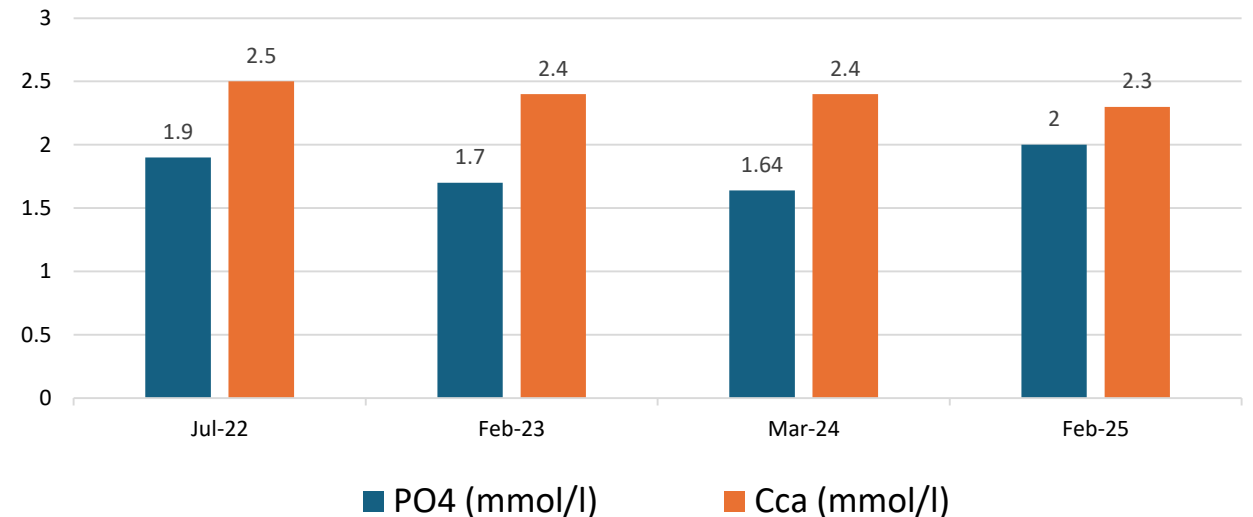
- **Challenges :**

- Dry weight needed constant adjustment on dialysis
- Increased protein intake resulted in raised phosphate- constant adjustments of PO4 binder dose
- Issues with hypos - liaising with diabetes team

Changes in weight, Insulin dose & HBA1c



Changes in serum phosphate and calcium



Biochemistry , HBA1c & weight change from July 22 to Feb 25

Date	K (mmol/l)	PO4 (mmol/l)	CCa (mmol/l)	PTH (mmol/l)	HBA1c (mmol/mol)	TDD insulin (units)	Dry weight (kg)	BMI ((Kg/m ²)
July 22	4.0	1.9	2.5	26	58	182	122	49.5
Feb 23	3.8	1.7	2.4	30	41	135	119	48.3
March 24	3.6	1.64	2.4	72	38	110	108	43.9
Feb 25	3.9	2.0	2.3	79	38	110	113	45.9

Observation and learning:

- Managing diabetes, weight control, and renal-specific dietary requirements demands significant time, attention and expertise.
- Regular follow-ups are critical for patient motivation and health management. A long gap in care may lead to:
 - **Loss of motivation**
 - **Weight gain**
 - **Non-compliance with phosphate binders**
 - **Uncontrolled blood glucose**

The case demonstrates benefits of dual speciality in dietetics to help manage renal-diabetes diet at the same time highlights the need to establish a service that helps facilitate working in this role.

THANK YOU!

