Diet and Chronic Kidney Disease

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Prevalence of CKD

Key Facts	England
Observed prevalence of CKD (per cent)	4.1
Estimated prevalence of CKD (per cent)	6.1
Patients diagnosed with CKD whom the last blood pressure reading is 140/85 or less (per cent) (2014/15 QOF)	74.4
Number of people receiving RRT	52,953
Proportion of people receiving RRT with transplants	53.6

Stages of CKD

Classification of chronic kidney disease using GFR and ACR categories

GFR and ACR categories and risk of adverse outcomes			ACR categories (mg/mmol), description and range		
			<3 Normal to mildly increased	3–30 Moderately increased	>30 Severely increased
			A1	A2	A3
GFR categories (ml/min/1.73 m^2), description and range	≥90 Normal and high	G1	No CKD in the absence of markers of kidney damage		
	60–89 Mild reduction related to normal range for a young adult	G2			
	45–59 Mild–moderate reduction	G3a[1]			
	30–44 Moderate–severe reduction	G3b			
	15–29 Severe reduction	G4			
	<15 Kidney failure	G5			

Increasing risk

Increasing risk

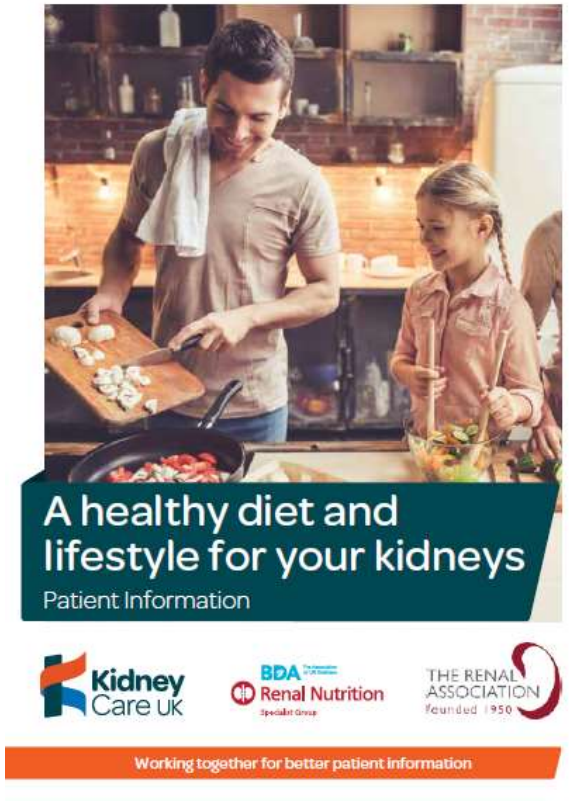
[1] Consider using eGFRcystatinC for people with CKD G3aA1 (see recommendations 1.1.14 and 1.1.15)

Abbreviations: ACR, albumin:creatinine ratio; CKD, chronic kidney disease; GFR, glomerular filtration rate

Adapted with permission from Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group (2013) KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney International (Suppl. 3): 1–150

Stages 1-3 dietary considerations

- Aim to control:
  - BP
  - DM
  - Obesity
  - Weight



Useful dietary info:
https://www.kidneycareuk.org/documents/178/Healthy_diet.pdf

No added Salt (NAS)

- Any stage of kidney disease.
- Aim for approx. 6g salt per day.
- Average UK salt intake= 8g per day
- A reduction in average salt intake from 8g to 6g per day is estimated to prevent over 8000 premature deaths each year and save the NHS over £570million annually.
- Can add little salt in cooking but not at table.
- Avoid salt substitutes e.g Lo Salt due to potassium content. (Ray et al 1999, Dorenboos et al 2003)
- Salt reduction diet sheet https://www.bhf.org.uk/informationsupport/publications/healthy-eating-and-drinking/taking-control-of-salt

Salt information sheet

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All salt is the same…

- Unless you are hiking up the Himalayas to collect it! (when the benefits of exercise may kick in!)

Salt and ethnic groups

BME groups tend to add salt ingredients during cooking, whereas Caucasian groups tend to get the salt via pre-prepared sources.

Common sources of salt

African
Maggi/Jumbo cubes
Monosodium glutamate ('white Maggi')
Salt

Caribbean
All purpose seasonings
Jerk seasonings
Salt

Asian
South Asian Pickles
Soy sauce
Salt

High levels of spice may mask the taste of salt, which means more is added.

How many salt sachets in one cube of……

Small Maggi Cube

Large Maggi Boullion Cube

Jumbo brand seasoning cube

2tblsp

1 tsp

Seasonings

- Without salt or very low in salt






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- Contains salt (try to reduce)

Salt sensitivity

- People of Black origin are more salt sensitive, so salt has more of a detrimental impact.

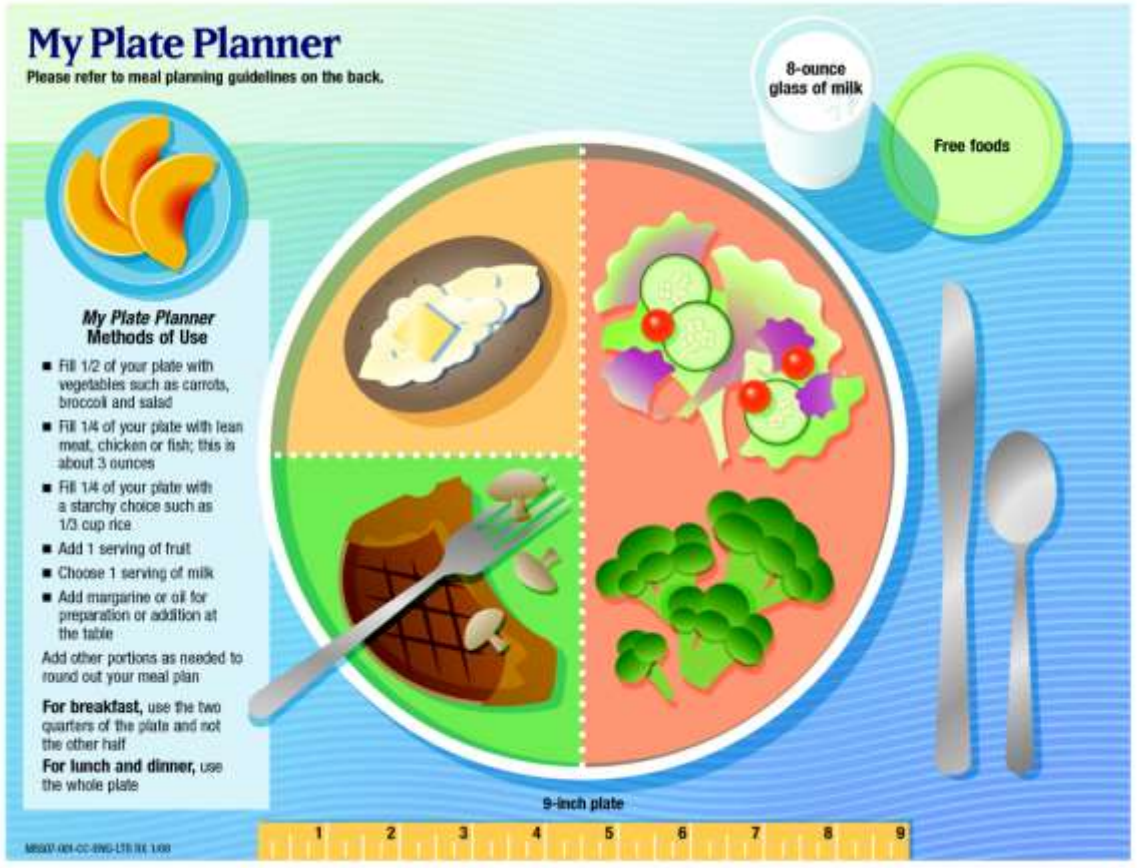
- Try to have only ¼ of a stock cube per person
- Reduce use of MSG e.g ‘White Maggi’, Ajinomoto

Benefits of reducing salt in CKD

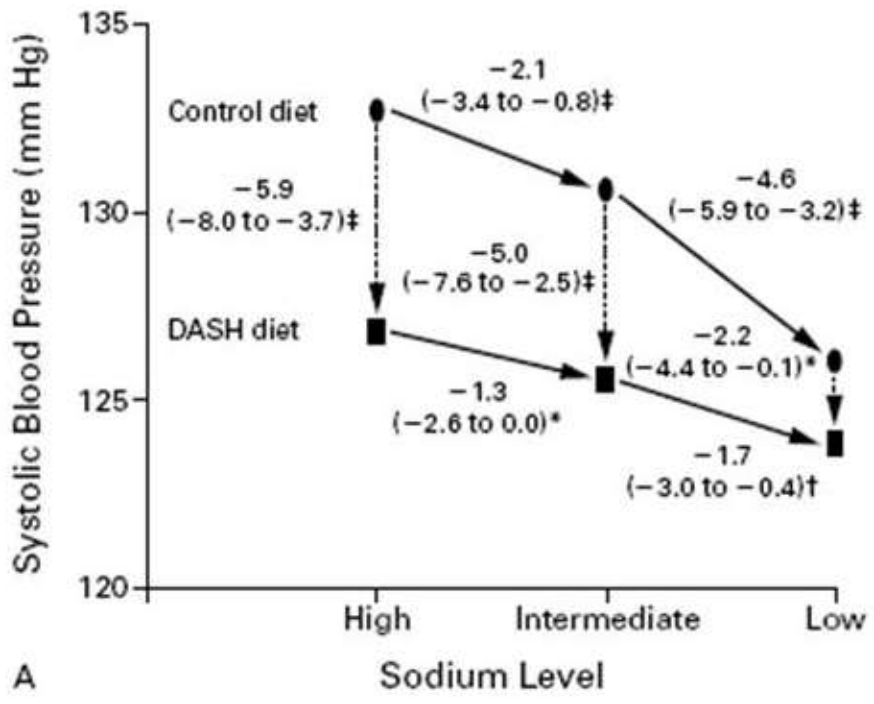
- Reduces BP
- Reduces thirst in those on a fluid restriction.

DASH diet reduces BP more than just a reduced salt diet

- DASH diet- diet high in fruit, veg, dairy and low in salt
- .

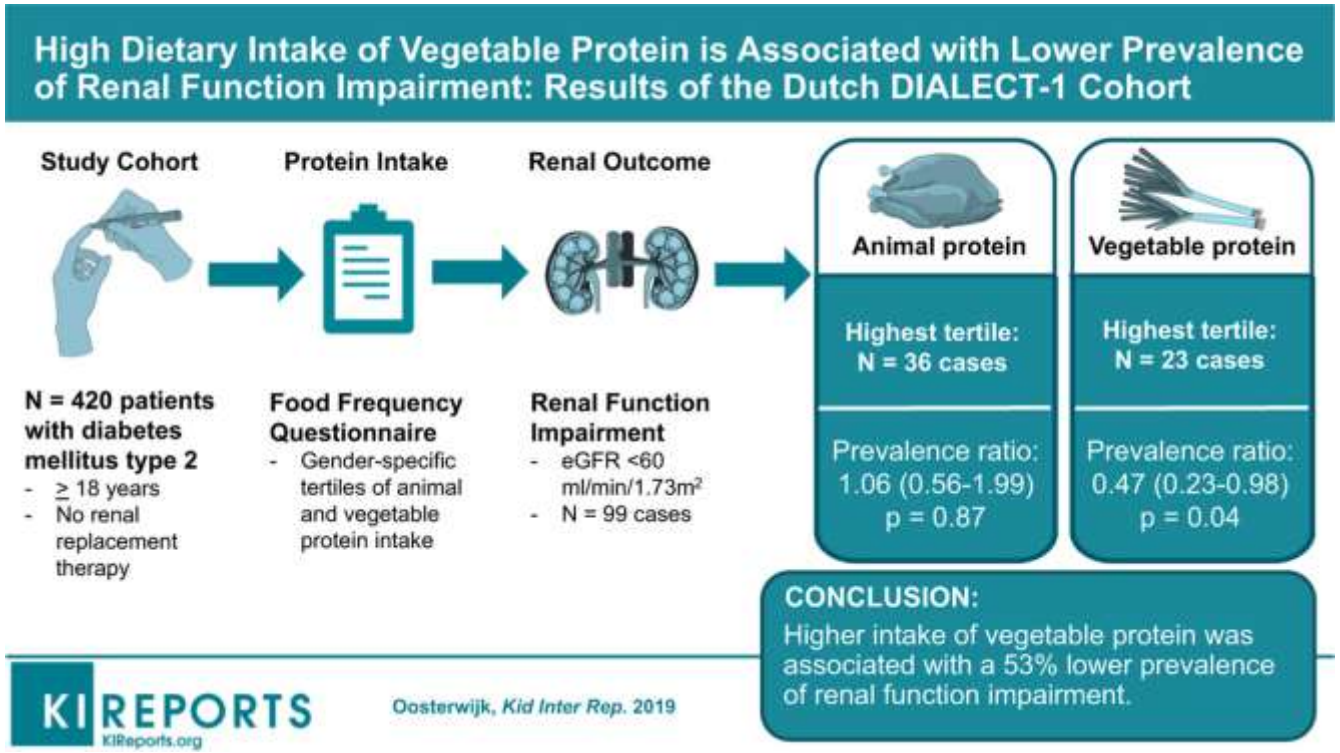


- Controlling for sodium the DASH diet has additional benefits on BP (Sacks et al 2001)



- N Engl J Med 2001; 344:3-10

Vegetable protein and prevalence of CKD



Useful meatless recipes: https://www.meatlessmonday.com/favorite-recipes/

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Why not restrict K+ early?

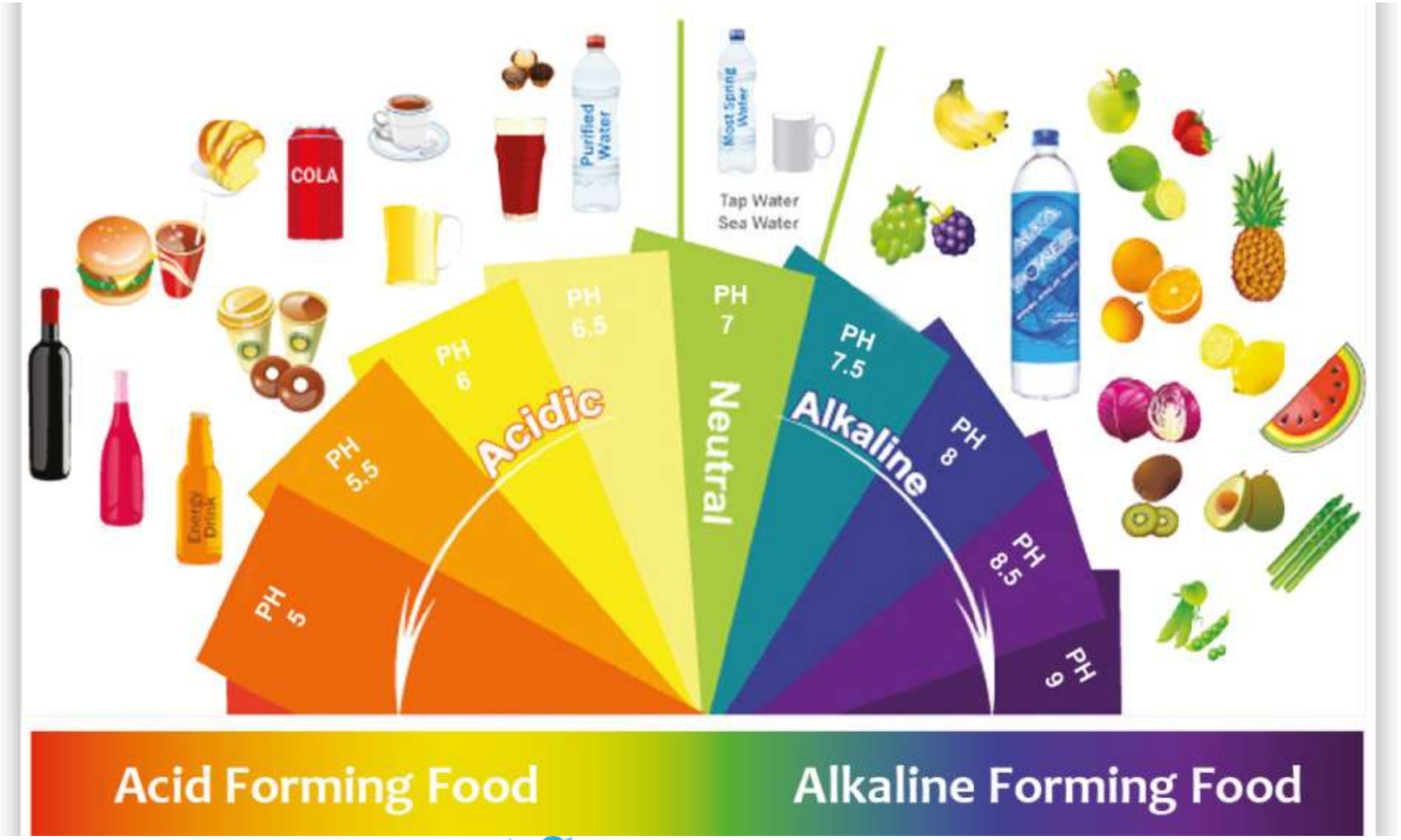
- Need to allow patients to have a good QoL.
- Some high potassium foods have other nutritional benefits to reduce risk of CKD worsening.

- Which foods that are high in K, may also have other health benefits?
- What are the health benefits?

Is potassium restriction important in early CKD?

- If potassium is not raised, no need to restrict. Most patients with eGFR>30 are unlikely to need any K restriction.
- Some of the food groups traditionally restricted in a low K diet can be beneficial.
- New KDIGO Nutrition guidelines due out in 2019 unlikely to suggest a specific restriction- only base on serum levels.

Need fruits/veg to help reduce diet acid load in CKD



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Dietary acid load (DAL) and progression

- Those with a high DAL had worse kidney function (Banerjee et al 2015 JASN **July 2015** vol. 26 no. 7 **1693-1700**)
- Fruits and vegetables are alkaline and can help neutralise the acid load (Goraya el al 2011 Kidney Int. 2012 Jan;81(1):86-93) from foods such as meat.
- Evidence that reducing dietary acid load can slow progression (Scialla et al 2013 AJCKD **March 2013**Volume 20, Issue 2, Pages 141–149
- **For this reason fruits and vegetables can be beneficial for kidneys**

Dietary Nitrates and BP reduction

- Dietary nitrates e.g. in 250ml beetroot juice reduced BP by 7.7/5.2mmHg (24hr ambulatory BP)
- 20% improvement in endothelial function
- Arterial stiffness reduced by 0.59 m/s
- (Kapil et al 2014 Hypertension. 2015 Feb;65(2):320-7)

- Potassium restriction is only needed for a small set of CKD patients.
  - Those who have demonstrated a high potassium level (k>5.2).These are likely to be mainly people with an eGFR less than 20.

Obesity and CKD

- Can cause CKD directly (FSGS related to obesity)
- Can also have an indirect effect due to raised BP or poor DM control.

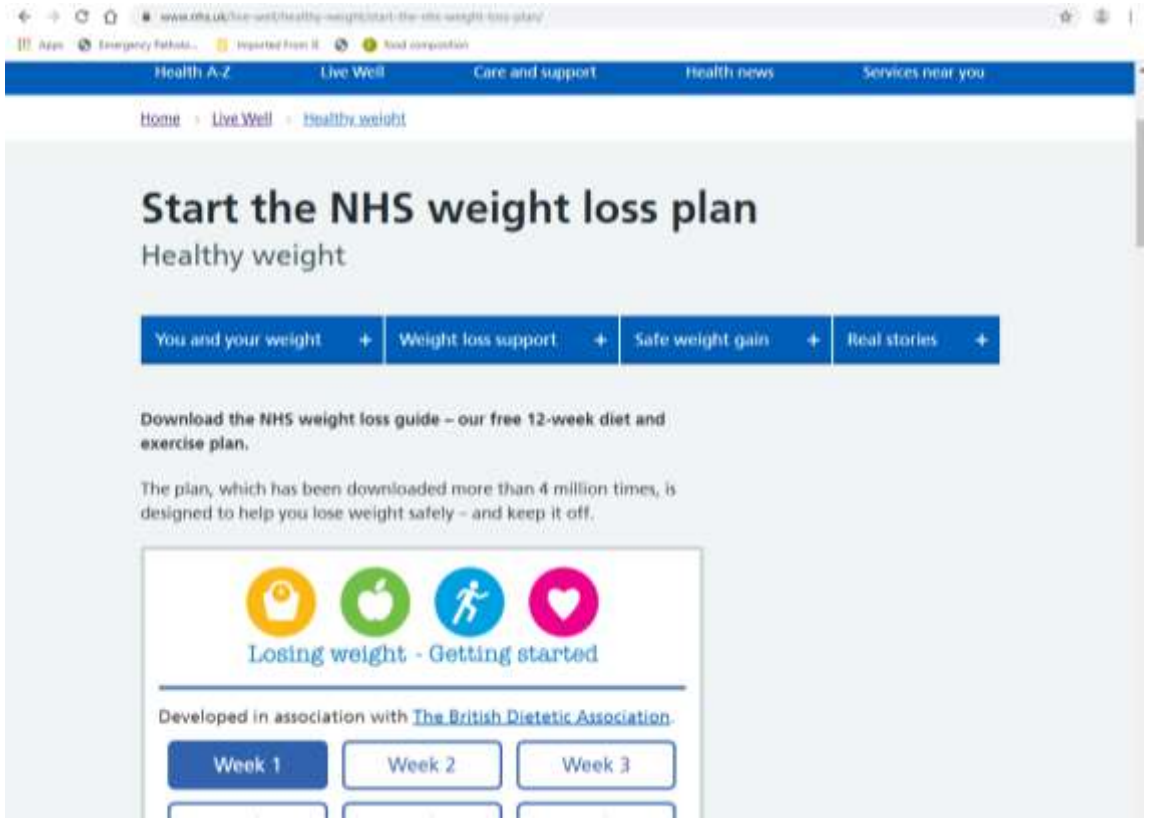
- Aim for BMI under 20-25 (in health, ideal= 18.5-25 but if they are end stage CKD, then may benefit from not being too low in wt in case they are unwell and lost wt).

Obesity

- Calorie reduction advice
- Increase activity.
- Consider Orlistat.

- If conventional diet and exercise measures isn’t working, then consider bariatric surgery.

NHS weight loss plan online- 12 week programme



https://www.nhs.uk/live-well/healthy-weight/start-the-nhs-weight-loss-plan/

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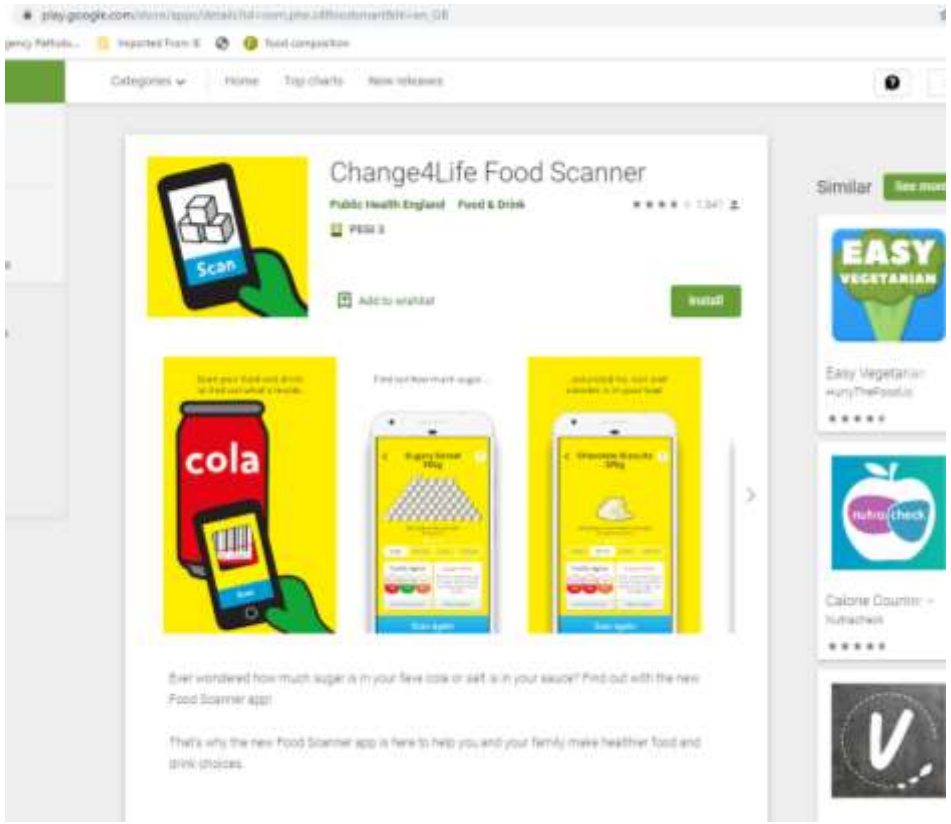
Change4Life app (Public Health England)



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Stage 4-5 CKD diet considerations

- Malnutrition risk higher due to uraemia causing poor appetite
- More likely to require a potassium modification (only if K is high- no need to otherwise restrict)
- Phosphate restriction

Renal Association guideline biochemistry values

	Standard range for non-renal patients	HD	PD
Potassium (mmols/l)	3.5-5.0	3.5-**6.0**	3.5-**5.5**
Phosphate (mmols/l)	0.7-1.4	0.7-**1.7**	0.7-**1.7**

Possible non-dietary causes of hyperkalaemia

- Drugs e.g. ACE inhibitors, Angiotensin Receptor Blockers
- Acidosis
- Constipation- bowel adapts in renal failure to remove more K
- Blood transfusion or GI bleed
- Underdialysis
- Insulin insufficiency
- Tumour Lysis Syndrome

Potassium restriction

- No need to ask all ‘renal’ pts to avoid bananas.
- Not usually needed until stage 4 but some stage 3 may need due to medication
- Look at overall trend.
- Pts want to know what they can eat!!! Let pts eat a ‘normal’ diet for as long as possible
- Most institution/meals on wheels meals are relatively low in potassium due to size of meal

Dietary potassium restriction

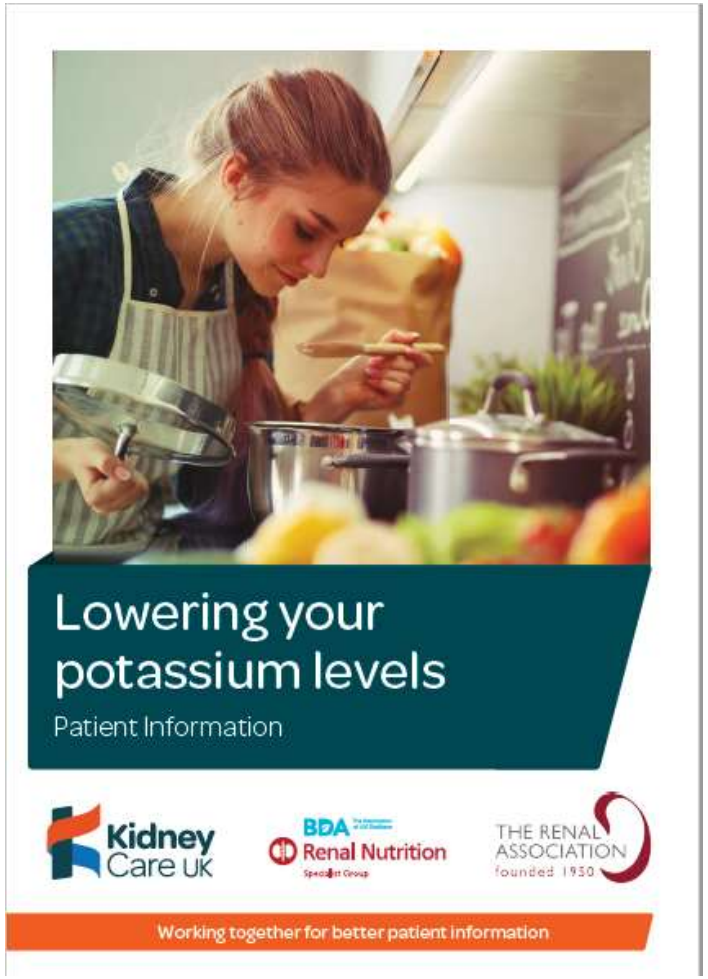
- Potassium is water soluble
  - reduced by boiling and then discarding the water

Can have 2 portions of fruit and 2 portions of veg per day usually. NEVER need to go lower than this.

Try to reduce the high calorie, low nutritive foods first, e.g. choc, crisps, nuts, juice before adjusting solid fruit and veg.

Food	Avoid	Choose
Drinks	Pure juice	Squash, Fizzy drinks
Sweet foods	Chocolate	Biscuits, cakes
Fruit	Dried fruit, bananas	Most other fresh fruit or tinned fruit
Veg	Steamed or fried veg	Boiled veg or parboil

BDA Renal Nutrition group and Kidney Care UK resources



- https://www.kidneycareuk.org/documents/260/Lowering_your_potassium_levels.pdf

1st line resources for BME low potassium diet due to be launched via Kidney Care UK soon

- Aimed at
- African and Caribbean
- Eastern European
- Far East
- South Asian
- Renal dietitians currently have acce to the 2nd line diet sheets

Table Three: Principles of the Diabetes Diet Compared with Principles of the Renal Diet

Diabetes principles	Considerations for the renal dialysis patient
Regular meals with complex carbohydrates	In addition to regular meals with complex carbohydrates, it is important to encourage a protein source with all 3 main meals
Fruit and vegetables encouraged	If blood potassium is raised (>5.5 mmol/l for PD patients and >6.0 mmol/l for HD patients), there is a need to keep fruit and vegetable intake to 4-5 portions per day
Inclusion of oily fish	The same can be advised for renal patients but need to avoid any edible bones that may be present in tinned fish due to its high phosphate content
High fibre foods encouraged	Phosphate naturally present in these foods is bound to phytate and hence its limited absorption makes it suitable to include in a renal diet
Pulses and legumes encouraged	Pulses and legumes can be a rich source of potassium, so meat intake (which also contains potassium) may need to be adjusted. Vegetarians would be allowed legumes/pulses without the need for other adjustments as they will not have meat as a potassium source
Encourage activity	Equally encouraged in the renal dialysis patient due to benefits to the cardiovascular system as well as overall wellbeing and quality of life. Cycling on HD and exercise classes held in hospitals for dialysis patients are becoming more common. For those able to partake in activity, the standard recommendation of 150 minutes exercise per week should be aimed for

If not on dialysis, then protein for 2 meals only

From: https://nutrition2me.com/wp-content/uploads/2012/05/images_free-view-articles_free-downloads_cn-nov-2013-diabetes-and-dialysis-article.pdf

Salt substitutes best avoided in CKD

- Avoid due to risk of hyperkalaemia.
- Best to reduce use of standard salt.
- Food manufacturers will start adding to foods, so some sources may be unavoidable

Scientists claim using potassium-based equivalents to sodium would have a positive impact on the British public

▲ Replacing salt with potassium chloride could reduce the risk of stroke and heart attack. Photograph: HERA FOOD/Alamy

Substantial amounts of salt could be removed from food after the government's scientific advisers recommended that replacing it with potassium-based equivalents instead would improve public health.

A committee of experts has urged ministers to ask food producers and supermarkets to look into how they can replace sodium with what is known as "potassium-based sodium replacers".

The scientific advisory committee on nutrition (SACN) has concluded that replacing between 15% and 25% of salt (sodium chloride) in food with potassium chloride would help reduce the risk of stroke and heart attack.

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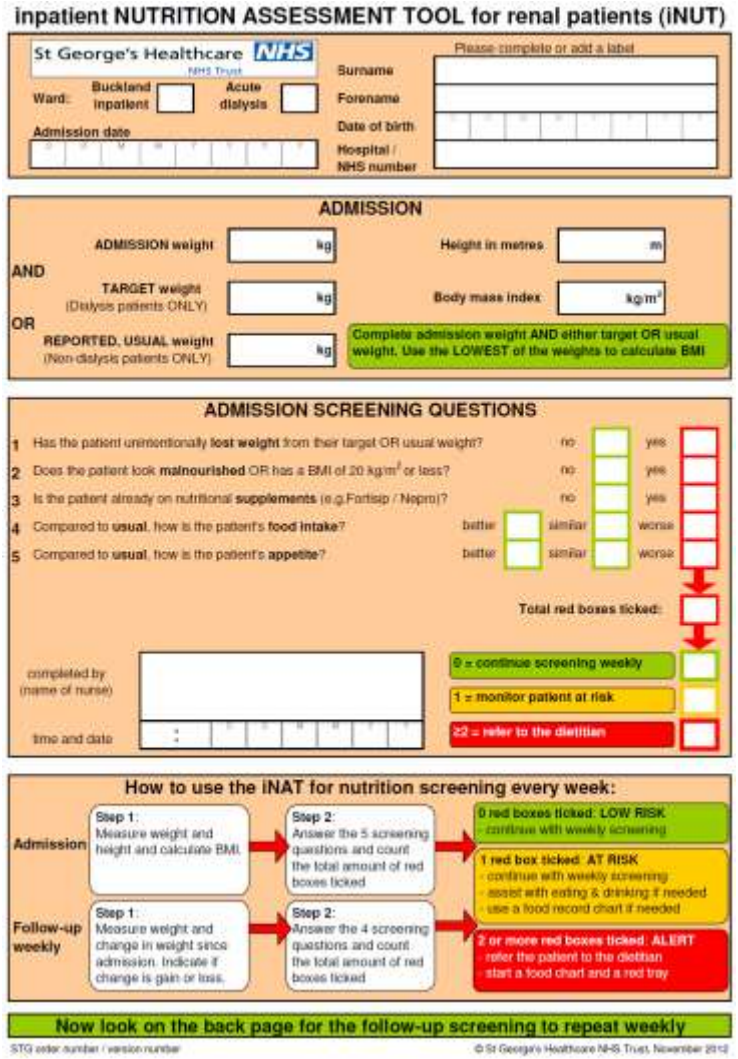
In the old days, these were lower in K than potato crisps… Now many contain added potassium chloride

Malnutrition

- Can be difficult to detect due to oedema.
- Popular nutritional screening tools e.g. MUST not suitable for those with significant oedema, as it relies on BMI and weight hx.

Some UK units use iNUT screening (developed by Helena Jackson Renal Dietitian at St George's Hospital, Tooting).



inpatient NUTRITION ASSESSMENT TOOL for renal patients (iNUT)

St George's Healthcare NHS
NHS Trust

Please complete or add a label

Ward: Buckland inpatient ☐ Acute dialysis ☐

Admission date

Surname
Forename
Date of birth
Hospital / NHS number

ADMISSION

ADMISSION weight kg
AND
TARGET weight (Dialysis patients ONLY) kg
OR
REPORTED, USUAL weight (Non-dialysis patients ONLY) kg

Height in metres m
Body mass index kg/m²

Complete admission weight AND either target OR usual weight. Use the LOWEST of the weights to calculate BMI

ADMISSION SCREENING QUESTIONS

1	Has the patient unintentionally **lost weight** from their target OR usual weight?			no ☐	yes ☐	
2	Does the patient look **malnourished** OR has a BMI of 20 kg/m² or less?			no ☐	yes ☐	
3	Is the patient already on nutritional **supplements** (e.g.Fortisip / Nepro)?			no ☐	yes ☐	
4	Compared to **usual**, how is the patient's **food intake**?	better ☐	similar ☐		worse ☐	
5	Compared to **usual**, how is the patient's **appetite**?	better ☐	similar ☐		worse ☐	

Total red boxes ticked: ☐

completed by (name of nurse)

time and date

0 = continue screening weekly ☐
1 = monitor patient at risk ☐
2/3 = refer to the dietitian ☐

How to use the iNAT for nutrition screening every week:

Admission	Step 1: Measure weight and height and calculate BMI	Step 2: Answer the 5 screening questions and count the total amount of red boxes ticked	0 red boxes ticked: LOW RISK - continue with weekly screening
			1 red box ticked: AT RISK - continue with weekly screening - assist with eating & drinking if needed - use a food record chart if needed
Follow-up weekly	Step 1: Measure weight and change in weight since admission. Indicate if change is gain or loss.	Step 2: Answer the 4 screening questions and count the total amount of red boxes ticked	2 or more red boxes ticked: ALERT refer the patient to the dietitian start a food chart and a red tray

Now look on the back page for the follow-up screening to repeat weekly

STG order number / version number

Pictures from Marinos Elia

Pictures from Marinos Elia


Pictures from Marinos Elia

Treating malnutrition

- Food fortification- snacks e.g yoghurts, custards if dialysis dependant and needing high protein. If CKD 4 and not yet on dialysis, need to consider overall protein intake and may need to consider lower protein snacks e.g. crackers, plain biscuits.

- Supplement drinks- type dependant on protein and electrolyte needs.
  - Pre-made supplement drinks (bottles) have less electrolytes in general e.g. Ensure, Fortisip, Aymes Complete, Nualtra Compact
  - Powdered supplements (sachets) higher in potassium/phosphate e.g. Enshake, Scandishake, Aymes Shake, Complan.

Phosphate

- Excess phosphate = vascular calcification, weakening of bones.
- Foods high in phosphate= all Colas, edible bones in tinned fish, processed meats e.g. sausages, luncheon meat, processed cheese.
- Protein containing foods generally contain some phosphate, so if dietary modification doesn't reduce level adequately, then consider phosphate binder medication.

Summary

- If has a good appetite and potassium is under 5.5mmols/l, aim for a healthy eating diet as you would in the general population.

  - Balance of fruit and veg
  - Include 1-2 portions of oily fish per week
  - Try to have some plant protein based days or meals.
  - 150mins per week of physical activity at least (if able)
  - If K is raised, reduced juice, coffee, choc, crisps in the first instance, as these foods are less nutritious. If this isn't enough, then review total fruit and veg intake.

  - If appetite is poor then may need to relax diet, to include a larger range of foods which may be more palatable.