



# **The RPSG**

**The Renal Patient Support Group**

**Nutrition and Renal Health**



## Nutrition in Kidney Diseases

- Introduction of kidney-friendly nutrition may help to protect kidneys from damage (Rysz et al. 2017).
- The adaptation of healthy diet might slow glomerular filtration rate (GFR) in early CKD stages (Stevens and Levin 2013).
- Patients with kidney disease should limit the intake of certain foods (Rysz et al.2017).



- Rysz J, Franczyk B, Cialkowska-Rysz A, Gluba-Brzozka A (2017) The Effect of Diet on the Survival of Patients with Chronic Kidney Disease. *Nutrients*, 9, 495: 1-18
- Stevens PE, Levin A (2013) Kidney Disease: Improving Global Outcomes 2012 and clinical practice guideline. *Ann. Intern. Med.*, 158, 825–830.

# Healthy Nutrition as Protection against the Incidence of CKD

## Introduction

Healthy nutrition patterns include can include Mediterranean diet, the Dietary Approach to Stop Hypertension (DASH) and vegetarian (Bach et al. 2019).

Healthy nutrition pattern typically involve:

- higher consumption of whole grains, fruits, vegetables, and healthy fats
- intake of fibre, vitamin C, and vitamin E and carotenoids,
- Lower consumption of saturated fats, salt, and processed foods,
- Lower nutrition acid load (Bach et al. 2019).

Healthy nutrition patterns may play a protective role in the primary prevention of CKD (Bach et al. 2019).

The study from 2019 investigated that adhering to a healthy nutrition pattern reduce odds of incident albuminuria (Bach et al. 2019).



- Bach KE, Kelly JT, Palmer SC, Khalesi S, Strippoli GFM, Campbell KL. Healthy Dietary Patterns and Incidence of CKD. CJASN 2019; 14: 1441-1449.



## Unhealthy Nutrition Patterns

- Include Western nutrition and high fat and meat (Bach et al. 2019)
- Diets high in refined starches, saturated fats, trans-fatty acids, and sodium (Bach et al. 2019)
- Lower in whole grains, fruit, vegetables, omega-3 fatty acids, and fibre (Bach et al. 2019)
- Can heighten inflammatory response (elevations in inflammatory markers are also used as a biomarkers to explore incidence of CKD) (Bach et al. 2019)



## Evidence-based Healthy Nutrition in CKD

- Nutrition pattern rich in whole grains, vegetables, fruit, legumes, and fish, and lower intake of red and processed meats, sodium, and sugar sweetened beverages was associated with reduced incidence of CKD and albuminuria (Bach et al. 2019).
- Mediterranean diet and glycaemic control have a positive association on weight loss, and cardiovascular risk factors (Bach et al. 2019).
- Plant-based and Mediterranean nutrition patterns were inversely associated with microalbuminuria (Bach et al. 2019).







## Evidence-based Healthy Nutrition in CKD

- Adherence to DASH has shown significant reductions in systolic and diastolic blood pressure (or ABP) and reduction in the incidence of cardiovascular disease, stroke, and heart failure (Bach et al. 2019).
- Adherence to a nutrition pattern rich in fruit and vegetables reduced the risk of doubling of serum creatinine, and ESRD (Bach et al. 2019).



# Salt Restriction in Kidney Diseases

- High intake dietary sodium is an important factor influencing blood pressure (Rysz et al. 2017).
- Salt-restricted nutrition can be associated with a reduction in proteinuria and glomerulosclerosis (Rysz et al. 2017).
- High sodium intake induces hyperfiltration which can cause renal damage (Rysz et al. 2017).



- Rysz J, Franczyk B, Cialkowska-Rysz A, Gluba-Brzozka A. The Effect of Diet on the Survival of Patients with Chronic Kidney Disease. *Nutrients* 2017; 9: 1-18.



## Plant-Based Diet

US Department of Health and Human Services, and the National Kidney Foundation recommend plant-based diets (Clegg and Hill Galant 2019).

### Plant-based nutrition is:

- lower in sulphur-containing amino acid
- high in fibre
- low in saturated fat
- contains sources of potassium, phosphorus, magnesium, and calcium
- have low levels of sodium (Clegg and Hill Galant 2019)

Health benefits can include preventing heart disease and hypertension and also delay progression of kidney disease (Clegg and Hill Galant 2019).



- Clegg DJ, Hill Galant KM. Plant-Based Diets in CKD. Clin J Am Soc Nephrol 2019; 14: 141-143.



## Health Benefits of Plant-Based Nutrition

Retrospective data from National Health and Nutrition Examination Survey shows that consumption of meat-based diets put patients in a higher risk of progression to ESRD (Clegg and Hill Galant 2019).

Also, the same data shows that a higher ratio of plant to total protein was associated with a lower risk of mortality (Clegg and Hill Galant 2019).

Plant-based diets are associated with a 12% lower risk of decline in eGFR compared with meat-based nutrition (Clegg and Hill Galant 2019).

Consumption of fruits and vegetables may be associated with greater benefits in kidney function (Clegg and Hill Galant 2019).

Vegan nutrition has been associated with delaying dialysis, in cohort study of patients with eGFR of 5-7 ml/min per 1.73 m<sup>2</sup> dialysis was delayed for about a year. The study informed patients were not at an increased risk of death or hospitalization (Clegg and Hill Galant 2019).



- Clegg DJ, Hill Galant KM. Plant-Based Diets in CKD. Clin J Am Soc Nephrol 2019; 14: 141-143.

## Plant-Based Nutrition

Phosphorus from plant sources is less well absorbed than the phosphorus from animal sources (Clegg and Hill Galant 2019).

Patients with CKD are recommended to reduce potassium intake to 2000 – 3000 mg/d (Clegg and Hill Galant 2019).

Patients with CKD are recommended to avoid high-potassium, plant-based foods, such as seeds, nuts, beans, and peas, as well as fruits and vegetables (Clegg and Hill Galant 2019).

Potassium derived from plants may promote intracellular potassium distribution (insulin stimulating) and promote faecal excretion of potassium due to natural fibres in plant-based nutrition (Clegg and Hill Galant 2019).

No studies have identified a difference in serum potassium levels in patients consuming plant-based versus meat-based potassium sources (St-Jules et al. 2016).



- Clegg DJ, Hill Galant KM. Plant-Based Diets in CKD. Clin J Am Soc Nephrol 2019; 14: 141-143.
- St-Jules DE, Goldfarb DS, Sevick MA. Nutrient on-equivalence: Does restricting high-potassium plant foods help to prevent hy-perkalemia in hemodialysis patients? J Ren Nutr 2016; 26: 282–287.



## High Protein Nutrition in CKD

Kidneys play crucial role in amino acid and protein metabolism including breakdown and excretion of protein metabolites (Ko et al. 2017).

- High protein nutrition may cause damage to kidney and may lead to accumulate of toxic protein metabolites (Ko et al. 2017).
- High protein nutrition is defined as >1.2 grams of protein per kilogram of body weight per day (g/kg/day) and induce significant alterations in renal function and kidney health (Ko et al. 2017).
- High protein nutrition modulates renal hemodynamic by increasing renal blood flow and elevating intraglomerular pressure leading to higher glomerular filtration rate (GFR) and it makes kidneys work harder (Ko et al. 2017).



- Ko GJ, Obi Y, Tortoricci A, Kalantar-Zadeh K. Dietary Protein Intake and Chronic Kidney Disease. *Curr Opin Clin Nutr Metab Care* 2017; 20: 77-85.



## High Protein Diet

- High protein nutrition is associated with glomerular hyperfiltration, and increase in urinary albumin excretion (Ko et al. 2017).
- The impact of protein consumption on the risk of ESRD may depend on the type of protein sources, specifically – red meat (Ko et al. 2017).
- Sulphur-containing amino acids induce higher acid load and end products from animal protein may exert detrimental effect on renal function (Ko et al. 2017).



- Ko GJ, Obi Y, Tortoricci A, Kalantar-Zadeh K. Dietary Protein Intake and Chronic Kidney Disease. *Curr Opin Clin Nutr Metab Care* 2017; 20: 77-85.



## Low Protein Diet (LPD)

- Low protein diet offers a variety of benefits in patients with renal insufficiency (Ko et al. 2017).
- Low protein nutrition reduces nitrogen waste products and decrease kidney workload by lowering intraglomerular pressure, which may protect the kidneys (Ko et al. 2017).
- Protein restriction has been demonstrated to lower proteinuria by 20-50% in patients with CKD (Ko et al. 2017).
- Low protein nutrition prevents uraemic symptoms and effectively delays the initiation of dialysis (Ko et al. 2017).



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## Challenges of Adherence to Low Protein Diet

- Successful adherence is hardly predictable and requires knowledge, attitude, and support (Ko et al. 2017).
- Good patient-physician communication, self-monitoring of protein intake, and periodic feedback by the dietitian improve recognition of the diet importance (Ko et al. 2017).
- LPD requires frequent periodic follow-up visits, e.g. every 3-4months, for monitoring nutritional intake and nutritional status and should be evaluated by nitrogen appearance in 24-hour urine collections (Ko et al. 2017).



- Ko GJ, Obi Y, Tortoricci A, Kalantar-Zadeh K. Dietary Protein Intake and Chronic Kidney Disease. *Curr Opin Clin Nutr Metab Care* 2017; 20: 77-85.



## Protein Intake in Dialysis Patients

- ❑ Guidelines recommends much higher protein intake (1.2 – 1.4 g/kg.IBW/day) in CKD stage 5 renal patients treated with dialysis than in pre-dialysis CKD patients (Ko et al. 2017).
- ❑ Low nutritional protein intake is also associated with higher morbidity, hospitalization and mortality in haemodialysis patients (Ko et al. 2017).
- ❑ Patients treated with dialysis should be approached to to adopt a more balanced nutritional regimen (Ko et al. 2017).





**Orzechowska, K**

Coventry University,  
England – United Kingdom

The Renal Patient Support Group (RPSG),  
England – United Kingdom

**Christine, H**

The Renal Patient Support Group (RPSG),  
England – United Kingdom

The Kidney Disease and Renal Support (KDARs) for Kids,  
England – United Kingdom