Outcome Models and Care Pathways for Renal Dietetics
Renal Nutrition Group Outcomes Working Group


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BDA RNG: Clinical Outcomes Model for Oral Nutrition Support in Pre-Dialysis and Dialysis Patients

**Outcome (end point)**

To achieve and maintain a measurable improvement in nutritional status using one or more of the following nutritional markers:

- 3 or 7 point SGA scale
- Dry Weight
- Body Mass Index (BMI)
- % weight change in 3 or 6 months
- Mid arm muscle circumference (MAMC)
- Tricep skinfold (TSF)
- Handgrip strength

Note: These are the most common markers used in assessment of renal patients. However this list is not exhaustive and other methods to assess nutritional status can be used.

**Timeframe**

To achieve and maintain a measurable improvement in nutritional status using within _______ months (or following initial dietetic assessment/advice and ___ dietetic reviews).

*Refer to the appropriate care pathway for guidance.

**Rationale for Outcome**

**Current recommendations for energy intake:**
CKD 4-5 (not on dialysis): 30-35 kcals/kg ideal body weight/d\(^1\)
Haemodialysis: 30-40 kcals/kg ideal body weight/d\(^2\)
Peritoneal Dialysis: 30-35 kcals/kg/d in non-obese (taking into account energy derived from peritoneal glucose absorption)\(^1,2\)

**Current recommendations for protein intake:**
CKD 4-5 (not on dialysis): 0.75g/kg ideal body weight/d\(^1\)
Haemodialysis: Minimum 1.1g/kg ideal body weight/d\(^4\)
Peritoneal Dialysis: Minimum 1.0-1.2g/kg ideal body weight/d\(^4\)

Protein-energy wasting is a strong predictor for increased morbidity and mortality and decreased quality of life in patients undergoing maintenance dialysis\(^5-14\). It is also recognised that patients nearing end stage renal failure may be at risk of deteriorating nutritional status as energy intake may spontaneously reduce with reducing glomerular filtration rate and increasing uraemic symptoms\(^15\). Furthermore a poorer nutritional status prior to starting dialysis increases risk of mortality\(^16\).

Nutrition support including the use of oral nutritional supplements, enteral tube feeding and intra-dialytic parenteral nutrition has been shown to improve anthropometric markers, biochemical markers and dietary intake in patients with chronic kidney disease\(^17-20\). This in turn may improve long-term clinical outcomes.

Best practice guidance on the use of nutrition support in chronic kidney disease with a step-by-step pathway has been produced by the Renal Nutrition Group of the British Dietetic Association\(^21\).
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<td>To improve or maintain level of physical function e.g. handgrip, ADLs</td>
<td>G5</td>
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<td>Able to state benefits of dietary advice</td>
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Environmental, behavioural and social

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**Intervention and Plan**

The Renal Dietitian will provide a specific intervention and plan that is individual to the patient and will help them to achieve the goals jointly agreed on.

This should include a plan for follow-up if required.

**Guidelines and References**

**Guidelines:**


**References:**


### Outcome (end point)

To achieve and maintain target serum phosphate level within nationally agreed target ranges whilst ensuring an adequate dietary protein intake.

### Timeframe

To achieve and maintain target serum phosphate level (and an adequate dietary protein intake) within ____ months (or following initial dietetic assessment and advice and ____ dietetic reviews.)

*Refer to the appropriate care pathway for guidance.*

### Rationale for Outcome

High serum phosphate levels in patients with CKD are associated with hyperparathyroidism, mineral and bone disorder, increased vascular calcification, cardiovascular events and increased mortality.

Low serum phosphate levels and low dietary protein intakes in patients with CKD are associated with increased mortality and protein energy wasting.

NICE recommends that the initial management of hyperphosphatemia should be provided by a specialist renal Dietitian, who should give individualised information and advice on dietary phosphate management. It is important to ensure that the patient maintains an adequate protein intake when reducing their dietary phosphate intake. The patient should receive support and guidance to increase their dietary knowledge on foods high in phosphate and foods that contain phosphate additives. Appropriate food choices, together with the use of appropriate medication for phosphate control where necessary, should lead to lower incidence of hyperparathyroidism, CKD MBD and CVD.

An adequate dietary protein intake whilst achieving a serum phosphate level within an acceptable range should reduce the risk of mortality and morbidity in patients with CKD.

### Current recommended target range for serum phosphate:

- CKD 3b-5 (not on dialysis) 0.9-1.5 mmol/l
- CKD 5D 1.1-1.7 mmol/l (measured before a “short gap” dialysis session in HD)

### Current recommended target range for dietary protein intake:

- CKD 4-5 (not on dialysis): 0.75g/kg ideal body weight/d
- Haemodialysis: Minimum 1.1g/kg ideal body weight/d
- Peritoneal Dialysis: Minimum 1.0-1.2g/kg ideal body weight/d
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<td>Biochemistry</td>
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<td>Clinical/Physical</td>
<td>To reduce frequency of (diet related) symptoms e.g itching</td>
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<td>Patient reported level of symptoms: itching or red eyes</td>
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<td>Dietary Intake</td>
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<td>To increase or maintain adherence with agreed dietary change(s)</td>
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<td></td>
<td>To achieve agreed dietary change(s)</td>
<td>G14</td>
<td>Confidence scaling 0-10</td>
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<tr>
<td></td>
<td>To increase or maintain adherence with prescribed product(s)</td>
<td>G16</td>
<td>Patient reported taking correct dose of binders etc at correct time</td>
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<tr>
<td>Patient Experience</td>
<td>Patient’s chosen goal or Client’s identified goal</td>
<td>G17</td>
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Plan

The Renal Dietitian will provide specific intervention that is individual to the patient and will help them to achieve the outcome jointly agreed.

This should include a plan for follow up if required.

References

Current Relevant Guidelines


4. NICE Management of Hyperphosphataemia Costing Report (March 2013)


References: Phosphate and Mortality Outcomes


17. Panichi,V et al. Impact of calcium, phosphate, PTH abnormalities and management on mortality in haemodialysis: Results from the RISCAVID study. *Journal of Nephrology*. 2010; 23(05), pp 556-562


**BDA RNG: Clinical Outcomes Model for management of Serum Potassium in Pre-dialysis and Dialysis Patients**

**Outcome (end point)**

To achieve and maintain target serum potassium levels within nationally agreed target ranges.

**Timeframe**

To achieve and maintain target serum potassium levels within ____ months (or following initial dietetic assessment and advice and ____ dietetic reviews).

*Refer to the appropriate care pathway for guidance.*

**Rationale for Outcome**

There is a significant risk for cardiac arrhythmias during both hypo- and hyperkalaemia. ³⁻⁵

Both pre-dialysis hypokalaemia ⁶ and hyperkalaemia ⁶,⁷ have been shown to have associations with higher mortality in maintenance haemodialysis patients.

Pre-dialysis hyperkalaemia is associated with higher all-cause and cardiovascular mortality in patients who are on maintenance haemodialysis.⁸ Hyperkalaemia may contribute to 2-5% of deaths among end stage renal failure patients and accounts for up to 24% of emergency haemodialysis sessions in these patients. ⁹⁻¹¹

**Current recommended target range for serum potassium:**

- **CKD 3b-5** (not on dialysis): None available therefore use hospital/trust recommendations or best practice.

- **CKD 5D** Haemodialysis: 3.5-6.0 mmols/l¹ (measured before a “short gap” dialysis session on HD)¹. Peritoneal Dialysis: 3.5-5.5 mmols/l.²
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<td>Biochemistry</td>
<td>To achieve serum potassium within target range</td>
<td>G6</td>
<td>Serum potassium level</td>
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</table>
| Clinical/Physical                | To reduce frequency of (diet related) symptoms eg itching, dry mouth, bowel function | G4   | Patient reported symptoms eg muscle cramps/ weakness  
Clinical reports of diastolic dysfunction etc. |
| Dietary Intake                   | To meet estimated energy and/or protein requirements                  | G1   | Patient reported oral intake  
Examples:  
Diet history  
Food Frequency Questionnaire |
To achieve recommended dietary potassium intake | G3 | Assessment of dietary protein intake and potassium intake |
| Environmental, behavioural and social Knowledge | To increase knowledge and understanding of benefits of dietary advice  
To increase knowledge and understanding of how to make dietary change(s)  
To increase or maintain adherence with agreed dietary change(s)  
To achieve agreed dietary change(s) | G12  | Knowledge questionnaire e.g. state 3 foods (ETDNA) |
| Environmental, behavioural and social Motivation | Patient’s chosen goal or Client’s identified goal | G13  | Patient reported motivation / change in behavior  
Importance scaling 0-10  
Confidence scaling 0-10 |
| Patient Experience               | Patient’s chosen goal or Client’s identified goal                    | G17  | Patient’s own choice goal  
PROMS tools eg Outcome STARs |
**Intervention and Plan**

The Renal Dietitian will provide specific intervention that is individual to the patient and will help them to achieve the outcome jointly agreed.

This should include a plan for follow up if required.

**References**

**References: Potassium and Mortality Outcomes**


Dietetic Care Pathway for Management of Undernutrition in Patients with Chronic Kidney Disease

1. Refer to the Dietitian for nutrition support
   - Initial dietetic assessment: Identify nutritional diagnosis and barriers
     - Barriers identified
       - Goals and timeframe agreed with patient
       - Intervention and plan implemented
     - Outcome achieved

2. Dietetic review(s): Monitor and review progress
   - Outcome maintained

3. Evaluation at end of episode of care
   - Discharge

4. Liaise with medical team and/or other members of the MDT regarding non-dietary causes identified from dietetic assessment
   - Medical team to re-refer if necessary

   - Non-dietary causes eliminated
   - Not appropriate for oral nutrition support

   - Discuss non-modifiable barriers with the patient and MDT
     - Outcome not achieved
     - Outcome not maintained
Dietetic Care Pathway for Management of Phosphate in Patients with Chronic Kidney Disease

1. Refer to the dietitian for phosphate management
   - Non dietary causes eliminated

2. Initial assessment – dietary and non dietary causes investigated
   - Dietary cause identified
     - Overall clinical outcome, goals, timeframe and intervention plan agreed with patient

3. Intervention/Planned review
   - Goals not achieved
     - Discuss with the patient and MDT about their barriers
   - Goals and outcome achieved
     - Intervention/Planned review
     - Goals and outcome not maintained
     - Discharge, end of intervention

4. Liaise with medical team re non dietary causes identified from clinical assessment
   - Medical team to re-refer if needed

5. Follow up discussed with patient and MDT to re-refer
Dietetic Care Pathway for Management of Potassium in Patients with Chronic Kidney Disease

1. Refer to the dietitian for potassium management
   - Non dietary causes eliminated

2. Initial assessment - dietary and non dietary causes investigated
   - Dietary cause identified
   - Overall clinical outcome, goals, timeframe and intervention/plan agreed with patient
   - Goals not achieved
   - Goals achieved
   - Intervention/Planned review
   - Discharge, end of intervention

3. Liaise with medical team re non dietary causes identified from clinical assessment
   - Medical team to re-refer if needed

4. Discuss with the patient and MDT about their barriers.

5. Follow up discussed with patient and MDT to re-refer