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Chronic Kidney Disease

CKD: Executive Summary of Recommendations (2010)

Executive Summary of Recommendations

Below are the major recommendations and ratings for the Academy of Nutrition and Dietetics Chronic Kidney Disease (CKD) Evidence-Based Nutrition Practice Guideline. More detail (including the evidence analysis supporting these recommendations) is available on this website to Academy members and EAL subscribers by clicking **Major Recommendations** from the menu bar on the left.

To see a description of the Academy Recommendation Rating Scheme (Strong, Fair, Weak, Consensus, Insufficient Evidence), and an explanation of the type of Recommendation (Imperative, Conditional), [click here](#).

The CKD Recommendations are listed below. *[Note: If you mouse-over underlined acronyms and terms, a definition will pop up.]*

- [Screening and Referral](#)

CKD: Medical Nutrition Therapy

Medical nutrition therapy (MNT) provided by a registered dietitian (RD) is recommended for individuals with chronic kidney disease (CKD, Stages One to Five including post-kidney transplant). MNT prevents and treats protein-energy malnutrition and mineral and electrolyte disorders and minimizes the impact of other comorbidities on the progression of kidney disease (e.g., diabetes, obesity, hypertension and disorders of lipid metabolism). Studies regarding effectiveness of MNT report significant improvements in anthropometric and biochemical measurements sustained for at least one year.

Strong Imperative

CKD: Initiation of Medical Nutrition Therapy

Referral for MNT per federal or state guidelines, should be initiated at diagnosis of CKD, in order to maintain adequate nutritional status, prevent disease progression and delay renal replacement therapy (RRT). MNT should be initiated at least 12 months prior to the anticipation of RRT (dialysis or transplant).

Strong Imperative

CKD: Frequency of Medical Nutrition Therapy

Depending on the care setting and the initiation of MNT, the RD should monitor the nutritional status of individuals with CKD every one to three months and more frequently if there is inadequate nutrient intake, protein-energy malnutrition, mineral and electrolyte disorders or the presence of an illness that may worsen nutritional status, as these are predictive of increased mortality risk. Research related to the time requirements for MNT provided by an RD indicate that approximately two hours per month for up to one year may be required to provide an effective intervention for adults with CKD.

Strong Conditional

- [Nutrition Assessment](#)

CKD: Initial Assessment of Food/Nutrition-Related History

The registered dietitian (RD) should assess the food- and nutrition-related history of adults with chronic kidney disease (CKD, including post kidney transplant), including but not limited to the following:

- Food and nutrient intake [e.g., diet history, diet experience and intake of macronutrients (and micronutrients, such as energy, protein, sodium, potassium, calcium, phosphorus, and others), as appropriate]
- Medication (prescription and over-the-counter), dietary supplements (vitamin, minerals, protein, etc.), herbal or botanical supplement use
- Knowledge, beliefs or attitudes (e.g., readiness to change nutrition and lifestyle behaviors)
- Behavior
- Factors affecting access to food and food and nutrition-related supplies (e.g., safe food and meal availability).

Assessment of the above factors is needed to effectively determine nutrition diagnoses and plan the nutrition interventions. Inability to achieve optimal nutrient intake may contribute to poor outcomes.

Consensus Imperative

CKD: Reassessment of Food/Nutrition-Related History

On subsequent visits, the RD should reassess the food- or nutrition-related history of adults with CKD (including post kidney transplant), related to changes in other assessment parameters (laboratory and anthropometric changes), including but not limited to the following:

- Food and nutrient intake, targeted to changes in biochemical parameters
- Medication, dietary supplements, herbal or botanical supplement use
- Knowledge, beliefs or attitudes
- Behavior
- Factors affecting access to food and food and nutrition-related supplies.

Assessment of the above factors is needed to explain changes in the other assessment parameters and plan additional nutrition interventions. Inability to achieve optimal nutrient intake may contribute to poor outcomes.

Consensus Imperative

CKD: Use Clinical Judgment in Assessing Body Weight

Due to the absence of standard reference norms in the chronic kidney disease population ([CKD](#), including post kidney transplant), the registered dietitian (RD) should use clinical judgment to determine which data to include in estimations of body weight:

- Actual measured weight
- History of weight changes (both long-term and recent)
- Serial weight measurements, monitored longitudinally
- Adjustments for suspected impact of edema, ascites and polycystic organs.

Body weight estimates are used for calculation of nutritional needs, such as protein and energy requirements. Body weight can be difficult to determine because as kidney function declines, the ability to regulate fluid balance may be

compromised and multiple factors must be considered.

Consensus Imperative

CKD: Use Published Weight Norms with Caution

The RD may use other published weight norms in the anthropometric assessment of individuals with CKD (including post kidney transplant), but each norm has significant drawbacks and must be used with caution:

- Ideal body weight (**IBW**) is the body weight associated with the lowest mortality for a given height, age, sex and frame size and is based on the Metropolitan Life Insurance Height and Weight Tables. *[Caution: Not generalizable to the CKD population and data-gathering methods were not standardized.]*
- **Hamwi** Method determines the optimal body weight. *[Caution: A quick and easy method for determining optimal body weight, but has no scientific data to support its use.]*
- Standard Body Weight, NHANES II (**SBW** as per **KDOQI** Nutrition Practice Guidelines) describes the median body weight of average Americans from 1976 to 1980 for height, age, sex and frame size. *[Caution: Although data is validated and standardized and uses a large database of ethnically-diverse groups, data is provided only on what individuals weigh, not what they should weigh in order to reduce morbidity and mortality.]*
- Body Mass Index (**BMI**) often defines generalized obesity and CKD research, specific to dialysis patients, has identified that patients at higher BMIs have a lower mortality risk. *[Caution: The researchers may not have statistically adjusted for all confounders related to comorbid conditions occurring in CKD on dialysis (diabetes, malignancy, etc) and it is unclear how it may relate to CKD patients not on dialysis.]*
- Adjusted Body Weight (**ABW**) is based on the theory that 25% of the excess body weight (adipose tissue) in obese patients is metabolically active tissue. **KDOQI** supports the concept of subtracting 25% for obese patients and adding 25% for underweight patients. *[Caution: This has not been validated for use in CKD and may either overestimate or underestimate energy and protein requirements.]*

Body weight estimates are used for calculation of nutritional needs, such as protein and energy requirements. Body weight can be difficult to determine because as kidney function declines, the ability to regulate fluid balance may be compromised and multiple factors must be considered.

Consensus Conditional

CKD: Assessment of Body Composition

The RD should assess the body composition of individuals with CKD (including post kidney transplant). Studies suggest that CKD patients exhibit altered body composition, as compared to healthy individuals.

Fair Imperative

CKD: Methodologies for Body Composition Assessment

When assessing the body composition of individuals with CKD (including post kidney transplant), the RD may use any valid measurement methodology, such as anthropometrics (including waist circumference and body mass index) and body compartment estimates. Currently, there is no reference standard for assessing body composition in CKD patients and studies do not show that any one test is superior to another in assessing body composition among CKD patients.

Fair Imperative

CKD: Assess Biochemical Parameters

The registered dietitian (**RD**) should assess various biochemical parameters in adults with chronic kidney disease (**CKD**, including post-kidney transplant), related to:

- Glycemic control
- Protein-energy malnutrition
- Inflammation
- Kidney function
- Mineral and bone disorders
- Anemia
- Dyslipidemia
- Electrolyte disorders
- Others as appropriate.

For list of biochemical parameters, [click here](#). Assessment of the above factors is needed to effectively determine the nutrition diagnoses and nutrition prescription in adults with CKD and post-kidney transplant.

Consensus Imperative

CKD: Assess CKD-Mineral and Bone Disorders

The registered dietitian (RD) should assess measurements of mineral and bone disorders (MBD) in adults with chronic kidney disease (CKD, including post kidney transplant) for prevention and treatment. Adults with CKD have altered mineral-bone metabolism and increased risk of vascular disease.

Consensus Imperative

CKD: Assessment of Medical/Health History

When implementing medical nutrition therapy (MNT), the registered dietitian (RD) should assess the medical and health history of individuals with chronic kidney disease (CKD, including post kidney transplant) for the presence of other disease states and conditions, such as diabetes, hypertension, obesity and disorders of lipid metabolism. Adults with CKD, including post kidney transplant, have a higher prevalence of comorbidities, which are risk factors for the progression of kidney disease.

Strong Imperative

• Nutrition Intervention

CKD: Protein Intake for eGFR <50ml per minute per /1.73m²

For adults with chronic kidney disease (**CKD**) without diabetes, not on dialysis, with an eGFR below 50 ml per minute per 1.73 m², the registered dietitian (**RD**) should recommend or prescribe a protein-controlled diet providing 0.6g-0.8g dietary protein per kg of body weight per day. Clinical judgment should be used when recommending lower protein intakes, considering the client's level of motivation, willingness to participate in frequent follow-up and risk for protein-energy malnutrition. Research reports that protein-restricted diets (0.7g dietary protein per kg of body weight per day, ensuring adequate caloric intake) can slow GFR decline and maintain stable nutrition status in adult non-diabetic patients with CKD.

Strong Conditional

CKD: Very-Low-Protein Intake for eGFR <20ml per minute per 1.73m²

In international settings where keto acid analogs are available, a very-low protein-controlled diet may be considered. For adults with CKD without diabetes, not on dialysis, with an eGFR below 20ml per minute per 1.73 m², a very-low protein-controlled diet providing 0.3g to 0.5g dietary protein per kg of body weight per day with addition of keto acid analogs to meet protein requirements may be recommended. International studies report that additional keto acid

analogs and vitamin or mineral supplementation are needed to maintain adequate nutrition status for patients with CKD who consume a very-low-protein controlled diet (0.3g to 0.5g per kg per day).

**Strong
Conditional**

CKD: Protein Intake for Diabetic Nephropathy

For adults with diabetic nephropathy, the RD should recommend or prescribe a protein-controlled diet providing 0.8g to 0.9g of protein per kg of body weight per day. Providing dietary protein at a level of 0.7g per kg of body weight per day may result in hypoalbuminemia. Research reports that protein-restricted diets improved microalbuminuria.

**Fair
Conditional**

CKD: Protein Intake for Kidney Transplant

For adult kidney transplant recipients (after surgical recovery, with an adequately functioning allograft), the RD should recommend 0.8g to 1.0g per kg of body weight per day for protein intake, addressing specific issues as needed. Adequate, but not excessive, protein intake supports allograft survival and minimizes impact on comorbid conditions.

**Consensus
Conditional**

CKD: Energy Intake

For adults with chronic kidney disease (CKD, including post kidney transplant after surgical recovery), the registered dietitian (RD) should recommend or prescribe an energy intake between 23 kcal to 35kcal per kg of body weight per day, based on the following factors:

- Weight status and goals
- Age and gender
- Level of physical activity
- Metabolic stressors.

Research reports that energy intakes between 23kcal to 35kcal per kg body weight per day are adequate to prevent signs of malnutrition.

**Fair
Imperative**

CKD: Phosphorus

For adults with chronic kidney disease (CKD Stages Three to Five), the registered dietitian (RD) should recommend or prescribe a low-phosphorus diet providing 800mg to 1,000mg per day or 10mg to 12mg phosphorus per gram of protein. CKD patients have a predisposition for mineral and bone disorders. Phosphorus control is the cornerstone for the treatment and prevention of secondary hyperparathyroidism, renal bone disease and soft tissue calcification.

**Strong
Conditional**

CKD: Adjust Phosphate Binders

For adults with CKD (Stages Three to Five), the dose and timing of phosphate binders should be individually adjusted to the phosphate content of meals and snacks to achieve desired serum phosphorus levels. Serum phosphorus levels are difficult to control with dietary restrictions alone.

**Strong
Conditional**

CKD: Phosphorus Management for Kidney Transplant

For adult kidney transplant recipients exhibiting hypophosphatemia, the registered dietitian (RD) should recommend or prescribe a high-phosphorus intake (diet or supplements) to replete serum phosphorus as needed. Hypophosphatemia is common post kidney transplant.

**Consensus
Conditional**

CKD: Calcium

For adults with chronic kidney disease (CKD Stages Three to Five, including post kidney transplant), the registered dietitian (RD) should recommend a total elemental calcium intake (including dietary calcium, calcium supplementation and calcium-based phosphate binders) not exceeding 2,000mg per day. CKD patients have a predisposition for mineral and bone disorders. Serum calcium concentration is the most important factor regulating parathyroid hormone (PTH) secretion affecting bone integrity and soft tissue calcification.

**Consensus
Conditional**

CKD: Vitamin D Supplementation

In adults with chronic kidney disease (CKD, including post kidney transplant), the registered dietitian (RD) should recommend vitamin D supplementation to maintain adequate levels of vitamin D if the serum level of 25-hydroxyvitamin D is less than 30 ng per ml (75 nmol per L). CKD patients have a predisposition for mineral and bone disorders, as well as other conditions that may be affected by insufficient vitamin D. Sufficient vitamin D should be recommended to maintain adequate levels of serum vitamin D.

**Consensus
Conditional**

CKD: Iron Supplementation

In adults with chronic kidney disease (CKD, including post kidney transplant), the registered dietitian (RD) should recommend oral or IV iron administration if serum ferritin is below 100ng per ml and TSAT is below 20%. CKD patients have a predisposition for anemia. Sufficient iron should be recommended to maintain adequate levels of serum iron to support erythropoiesis.

**Consensus
Conditional**

CKD: Vitamin B12 and Folic Acid for Anemia

In adults with CKD (including post kidney transplant), the RD should recommend vitamin B₁₂ and folic acid supplementation if the MCV is over 100ng per ml and serum levels of these nutrients are below normal values. CKD patients have a predisposition for anemia and all potential causes should be investigated.

**Consensus
Conditional**

CKD: Vitamin C for Treatment of Anemia

If the use of vitamin C supplementation is proposed as a method to improve iron absorption for adults with CKD (including post kidney transplant) who are anemic, the RD should recommend the DRI for vitamin C. There is insufficient evidence to recommend the use of vitamin C supplementation above the DRI in the management of anemia in patients with CKD, due to risk of hyperoxalosis.

**Consensus
Conditional**

CKD: L-Carnitine for Treatment of Anemia

For adults with CKD (including post kidney transplant) who are anemic, the RD should *not* recommend L-carnitine supplementation. There is insufficient evidence to recommend the use of L-carnitine in the management of anemia in adults with CKD including post kidney transplant.

**Consensus
Conditional****CKD: Management of Hyperglycemia in Diabetes and CKD**

For adults with diabetes and chronic kidney disease (CKD, including post kidney transplant), the registered dietitian (RD) should implement medical nutrition therapy (MNT) for diabetes care to manage hyperglycemia to achieve a target A1C of approximately 7%. Intensive treatment of hyperglycemia, while avoiding hypoglycemia, prevents diabetic kidney disease (DKD) and may slow progression of established kidney disease.

**Strong
Conditional****CKD: Multi-Faceted Approach to Intervention in Diabetes and CKD**

For adults with diabetes and chronic kidney disease (CKD, including post kidney transplant), the registered dietitian (RD) should implement Medical Nutrition Therapy (MNT) using a multi-faceted approach, including education and counseling in healthy behaviors, treatment to reduce risk factors and self-management strategies. Multiple risk factors are managed concurrently in adults with diabetes and CKD and the incremental effects of treating each of these risk factors results in substantial clinical benefits.

**Consensus
Conditional****CKD: Multi-Faceted Approach to Intervention in Dyslipidemias and CKD**

For adults with dyslipidemia and chronic kidney disease (CKD, including post kidney transplant), the registered dietitian (RD) should implement medical nutrition therapy (MNT), using a multi-faceted approach, including education and counseling in therapeutic lifestyle changes (TLC), treatment to reduce risk factors and self-management strategies. Multiple risk factors are managed concurrently in adults with dyslipidemia and CKD and the incremental effects of treating each of these risk factors results in substantial clinical benefits.

**Fair
Conditional****CKD: Education on Self-Management Behaviors**

For individuals with chronic kidney disease (CKD, including post kidney transplant), the registered dietitian (RD) should provide education and counseling regarding self-management behaviors. Therapy must take into consideration the patient's perception of the health-care provider's advice and prescriptions, factors that may influence self-management behaviors and the likelihood that the patient will adhere to recommendations.

**Fair
Imperative****CKD: Control Sodium Intake in CKD**

For adults with chronic kidney disease (CKD) including post-kidney transplant, the Registered Dietitian (RD) should recommend/prescribe a sodium intake of less than 2.4g (Stages One to Five), with adjustments based on the following:

- Blood pressure
- Medications
- Kidney function
- Hydration status
- Acidosis
- Glycemic control
- Catabolism
- Gastrointestinal issues, including vomiting, diarrhea and constipation.

Dietary and other therapeutic lifestyle modifications are recommended as part of a comprehensive strategy to reduce cardiovascular disease risk in adults with CKD.

**Fair
Imperative****CKD: Fish Oil/Omega-3 Fatty Acids**

If the use of fish oil or omega-3 fatty acid supplementation is proposed as a method to improve renal function, the registered dietitian (RD) should advise on the conflicting evidence regarding effectiveness of this strategy. Research reports that renal outcomes were inconsistent among patients with IgA nephropathy who received fish oil supplementation. There is insufficient evidence to support fish oil therapy to improve renal function and patient or graft survival for kidney transplant patients. However, evidence does support a benefit of fish oil supplementation in reducing oxidative stress and improving lipid profile in adults with chronic kidney disease (CKD, including post kidney transplant).

**Fair
Conditional****CKD: Physical Activity**

If not contraindicated, the registered dietitian (RD) should encourage adults with chronic kidney disease (CKD, including post kidney transplant), to increase frequency or duration of physical activity as tolerated. Studies report that physical activity may minimize the catabolic effects of protein restriction and improve quality of life.

**Fair
Conditional****CKD: Coordination of Care**

For adults with chronic kidney disease (CKD, including post kidney transplant), the Registered Dietitian (RD) should implement Medical Nutrition Therapy (MNT) and coordinate care with an interdisciplinary team, through:

- Requesting appropriate data (biochemical and other)
- Communicating with referring provider
- Indicating specific areas of concern or needed reinforcement.

This approach is necessary to effectively integrate MNT into overall management for patients with CKD.

**Consensus
Imperative****CKD: Multivitamin Supplementation**

In adults with chronic kidney disease (CKD , including post- kidney transplant), with no known nutrient deficiency (biochemical or physical) and who may be at higher nutritional risk due to poor dietary intake and decreasing GFR , the registered dietitian (RD) should recommend or prescribe a multivitamin preparation. Sufficient vitamin supplementation should be recommended to maintain indices of adequate nutritional status.

**Consensus
Conditional****CKD: Control Potassium Intake in CKD**

For adults with chronic kidney disease (CKD), including post kidney transplant who exhibit hyperkalemia, the registered dietitian (RD) should recommend or prescribe a potassium intake of less than 2.4g (Stages Three to Five), with

adjustments based on the following:

- Serum potassium level
- Blood pressure
- Medications
- Kidney function
- Hydration status
- Acidosis
- Glycemic control
- Catabolism
- Gastrointestinal (GI) issues, including vomiting, diarrhea, constipation and GI bleed.

Dietary and other therapeutic lifestyle modifications are recommended as part of a comprehensive strategy to reduce cardiovascular disease risk in adults with CKD. The degree of hypokalemia or hyperkalemia can have a direct effect on cardiac function, with potential for cardiac arrhythmia and sudden death.

Fair

Conditional

• **Nutrition Monitoring and Evaluation**

CKD: Monitor and Evaluate Biochemical Parameters

The registered dietitian (RD) should monitor and evaluate various biochemical parameters in adults with chronic kidney disease (CKD, including post-kidney transplant), related to:

- Glycemic control
- Protein-energy malnutrition
- Inflammation
- Kidney function
- Mineral and bone disorders
- Anemia
- Dyslipidemia
- Electrolyte disorders
- Others as appropriate.

For list of biochemical parameters, [click here](#). Monitoring and evaluation of the above factors is needed to determine the effectiveness of Medical Nutrition Therapy (MNT) in adults with CKD and post kidney transplant.

Consensus

Imperative

CKD: Monitor and Evaluate Adherence to Nutrition and Lifestyle Recommendations

The registered dietitian (RD) should monitor the following in adults with chronic kidney disease (CKD, including post kidney transplant):

- Food and nutrient intake (e.g., diet history, diet experience and intake of macronutrients and micronutrients, such as energy, protein, sodium, potassium, calcium, phosphorus and others, as appropriate)
- Medication (prescription and over-the-counter), dietary supplements (vitamin, minerals, protein, etc.), herbal or botanical supplement use
- Knowledge, beliefs or attitudes (e.g., readiness to change nutrition and lifestyle behaviors)
- Behavior
- Factors affecting access to food and food- and nutrition-related supplies (e.g., safe food and meal availability).

Monitoring and evaluation of the above factors is needed to determine the effectiveness of Medical Nutrition Therapy (MNT) in adults with CKD and post kidney transplant.

Consensus

Imperative