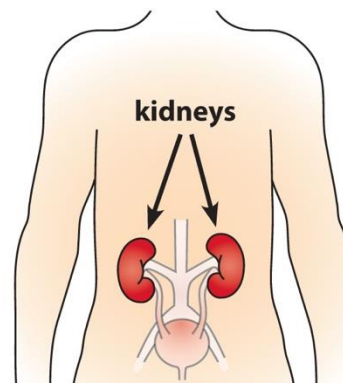


Chronic Kidney Disease

Overview

Chronic Kidney Disease (CKD) is a syndrome of progressive, irreversible loss of kidney function. Kidneys are key to maintain good health as they regulate fluid and electrolyte balance, blood pressure, and aid in removing waste products, like toxins and drugs, from the body. CKD occurs when a disease or condition, such as high blood pressure or diabetes, impairs kidney function. With the progressive loss of kidney function, fluids, electrolytes and waste products can build up in your body and cause severe complications such as cardiovascular disease, malnutrition, and bone and mineral disorders. The primary goal of treatment is to slow the progression of kidney damage in order to avoid the development of End Stage Renal Disease (ESRD), which is fatal in the absence of dialysis or a kidney transplant.

A major aspect of both the prevention and management of CKD is your diet. Poor eating habits, smoking, and obesity have been associated with increased risk for kidney disease. Nutrition therapy that supports healthy kidney function not only aids in maintaining good nutritional status, it can also slow the progression of kidney damage and treat associated complications.



Causes

The primary causes of CKD are poorly controlled diabetes and high blood pressure. Other causes include:

- Glomerulonephritis
- Polycystic kidney disease
- Lupus
- Frequent urinary infections
- Prolonged obstruction of the urinary tract

Symptoms

- Nausea, vomiting
- Loss of appetite
- Fatigue, weakness
- A metallic taste in the mouth or ammonia breath
- Disturbed sleep
- Swelling of feet and ankles
- Dry, itchy skin
- Muscle cramping
- High blood pressure (Hypertension)
- Increased need to urinate, especially at night

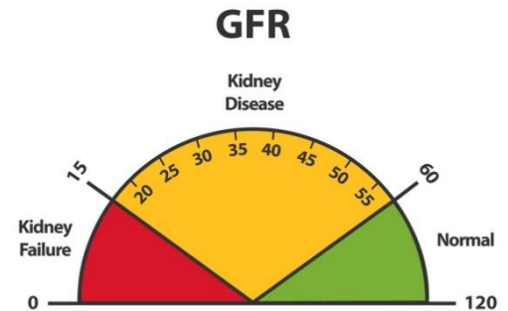
It is important to note that the signs and symptoms of CKD are highly individualized. For some, signs and symptoms may not appear until advanced stages of kidney damage have occurred.

Nutrition and CKD

The nutrition therapy for patients with CKD correlates with the level of kidney dysfunction. There are five stages of kidney disease that are categorized according to your glomerular filtration rate (GFR). The GFR measures how much blood the kidneys filter per minute (mL/min).

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As GFR declines, so does your kidney function. Nutrition interventions must be individualized based on the severity of disease progression and overall health status of the patient. Many patients may remain in the initial stages for months to years. Individuals with stage 1 or 2 CKD may only require vitamin D supplementation at first. However, when CKD progresses to stage 5, more extensive treatment and a strict renal diet must be implemented. With kidney disease it is very important to routinely consult your health care provider on the right diet for you depending on the degree of kidney disease.



Sodium

One of the kidneys' many functions is to filter sodium out of the body so it can be excreted in the urine. When the kidneys become damaged their ability to excrete waste is diminished resulting in a buildup of sodium. Without treatment, high levels of sodium can eventually lead to fluid retention and high blood pressure. Eating a diet that is low in sodium will not only aid in slowing the progression of CKD, it is also instrumental in lowering blood pressure and reducing the risk of cardiovascular disease.

Low Sodium Foods to Include:

- **Meats:** Fresh or frozen un-breaded meats; Eggs
- **Vegetables:** Fresh or frozen vegetables; Canned vegetables with no added salt
- **Starches:** English muffins; Bagels; Plain pasta; Noodles; Rice; Cooked hot cereals; Unsalted crackers
- **Fats:** Vegetable oils (e.g. canola, olive); Unsalted butter
- **Seasonings:** Fresh garlic or garlic powder (not garlic salt); Fresh onion or onion powder (not onion salt); Black pepper; Lemon juice; Vinegar

High Sodium Foods to Avoid:

- **Meats:** Processed deli meats (pepperoni, bologna, salami, pastrami, ham, turkey, corned beef); Sausage; Hot dogs; Breaded meats (chicken nuggets, fish sticks); Canned meats (*Spam*); Smoked or cured meats (salt pork, bacon); Lox and herring
- **Diary:** Buttermilk; Processed cheese spreads (*Cheez Wiz*, *Easy Cheese*); Processed cheese (*Velveeta*, American cheese, nacho cheese); Pimento cheese
- **Vegetables:** Regular canned vegetables and vegetable juices; Pickles; Relish; Olives; Pepperoni; Sauerkraut
- **Starches:** Biscuits; Prepared mixes (pancakes, muffins, cornbread); Seasoned rice, noodle, or potato mixes (*Rice-a-Roni*, macaroni and cheese); Coating mixes (seasoned bread crumbs, *Shake'n' Bake*); Snack foods (potato chips, corn chips, pretzels, pork rinds, crackers, tortilla chips, popcorn, sunflower seeds)
- **Fats:** Bacon; Salt pork; Commercial salad dressings
- **Seasonings:** Table salt; Seasoning seasonings (garlic salt, onion salt, celery salt); Meat tenderizer; Bouillon cubes; Flavor enhancers; Condiments (BBQ sauce, steak sauce, soy sauce, teriyaki sauce, oyster sauce, ketchup)
- **Processed Foods:** Canned soups; Frozen prepared foods; Fast foods

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Protein

Protein intake is very important in order to help maintain muscle and organ health. However, when your body digests protein foods, waste products are produced that are excreted by the healthy kidney. As with sodium, when the kidneys become damaged these waste products build up and can lead to a condition called Uremia. Uremia symptoms are common, especially in advanced stages of CKD. Limiting the amount of high protein foods in your diet may help alleviate symptoms of uremia such as nausea, vomiting, weight loss, and fatigue.

It is important to note that not all proteins are equal. Protein from animal sources differ from plant proteins in that they contain all the amino acids your body needs to function effectively. Plant proteins are an equally beneficial protein source; however, they lack one or more of the essential amino acids, meaning you must eat a wide variety of foods to meet your needs. While animal protein foods are high quality sources, they also contain phosphorous and have been associated with increased mortality in individuals with advanced stages of CKD. Eating a balanced amount of both animal and plant proteins is the best way to get all the nutrients you need. Please consult your registered dietitian on the amount and type of protein that is right for you.

Animal Protein Sources Include: Meat; Poultry; Seafood; Dairy; Eggs

Plant Protein Sources Include: Beans; Lentils; Nuts and nut spreads (e.g. almond butter, peanut butter); Soy products (e.g. soy milk, tofu)

Potassium

Potassium is a mineral that is found in a wide variety of plant and animal foods. It is required for normal cell function, muscle contraction, and maintaining a healthy heartbeat. Under normal conditions, the kidney excretes 80-90% of the potassium consumed daily, however, in advanced CKD the kidney can no longer perform this function and the potassium begins to build up. Increased potassium levels, also known as hyperkalemia, can result in severe cardiovascular complications and even death.

The potassium restriction in CKD varies depending on the degree of kidney function. In advanced CKD, it is highly important that patients work with their health care provider to monitor their potassium levels. If they begin to rise, a diet that avoids potassium containing foods can prevent associated complications from occurring. For a detailed description of potassium containing foods please refer to the **End Stage Renal Disease Fact Sheet**.

Phosphorus

Phosphorous is a mineral found in your bones and is a major component in maintaining strong and healthy bone structure. In advanced stages of CKD, the kidneys are no longer able to excrete phosphorous from the body and blood levels begin to rise. Increased circulating phosphorous causes calcium to be pulled out of your bones, making them weak and brittle. In addition to developing bone disease, high levels of phosphorous and calcium in the blood can result in calcification of blood vessels, lungs, eyes, and the heart.

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Please consult your healthcare provider in order to monitor your blood phosphorous levels. If they begin to increase, you may need to control the amount of phosphorous in your diet. Phosphorous is found in protein rich foods such as meat, poultry, fish, nuts, beans and dairy products. It is also commonly added to processed foods, fast foods, and ready to eat foods as a preservative. For a detailed description of phosphorous containing foods please refer to **the End Stage Renal Disease Fact Sheet**.

Iron

In addition to regulating body fluids and waste excretion, the kidneys produce erythropoietin (EPO), a hormone involved in red blood cell production. In CKD, the impairment of EPO production frequently results in iron deficiency and anemia. Iron rich foods should be encouraged in order to decrease the risk of anemia. Sources of iron include lean cuts of red meat, poultry, fish, beans, lentils, tofu, and dark leafy greens. Speak to your registered dietitian whether an iron supplement should be taken.

Tips for Increasing Iron Absorption

- Cook with a cast iron skillet
- Consume vitamin C rich foods (e.g. citrus fruits, dark leafy greens, or raw broccoli) with meals
- Avoid drinking coffee and tea during and after meals

Tips for Reading Food Labels

1. Check for sodium on the Nutrition Facts Label. A Daily Value (DV) of 20% or higher means the food is high in sodium. A DV of 5% or less means it's low in sodium.
2. Common terms associated with sodium to look for on food labels:
 - **Sodium Free:** Less than 5 mg of sodium per serving.
 - **Very Low Sodium:** 35 mg or less of sodium per serving.
 - **Low Sodium:** 140 mg or less of sodium per serving.
 - **Reduced Sodium:** At least 25% less sodium than the original product.
 - **No Added Salt/ Unsalted:** No salt was added during processing, not necessarily sodium free.
3. Look for words that contain PHOS on the ingredient list. Many packaged foods contain phosphorous.
4. Look for potassium on the ingredient list. Potassium chloride can be used as a salt substitute in packaged foods like canned soups and tomato products.

Nutrition and Lifestyle Guidelines

- Frequently consult your healthcare provider to monitor the progression of CKD.
- Choose and prepare foods that are low in salt in order to help control your blood pressure.
- Cook at home when possible. Prepared or packaged foods contain high amounts of sodium and phosphorous and restaurants often use sodium for flavoring.
- Use spices, herbs for seasoning instead of salt. Check with your registered dietitian about using salt substitutes as they may contain potassium.
- Buy lower sodium versions of foods at the supermarket when possible.
- Drain and rinse canned vegetables, fruits, beans, meats, and fish with water before eating to reduce the sodium content.

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- Consult your registered dietitian on the amount and type of protein that is right for you.
- If you have high potassium levels, choose vegetables and fruits that are low in potassium.
- Peel and soak fruits and vegetables that are high in potassium in water for several hours to remove excess potassium. Drain and rinse before cooking.
- Animal protein foods are high in phosphorous and may need to be limited in advanced stages of CKD if you have high phosphorous levels.
- Be familiar with foods that have a low phosphorous content.
- Consult your registered dietitian to discuss an appropriate vitamin supplementation to support your overall health. Multivitamins may not be recommended as some can contain vitamin and mineral contents that are not suitable for patients with CKD.

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