



Kidney Failure: What to Expect

How does kidney failure affect a person's health?

Kidney failure can affect a person's health in several ways. Some people experience fatigue, some lose their appetite, and some have leg cramps. These problems are caused by waste products that build up in the blood, a condition known as uremia. Healthy kidneys remove waste products from the blood. When the kidneys stop working, uremia occurs.

The kidneys also make hormones and balance the minerals in the blood. When the kidneys stop working, most people develop conditions that affect the blood, bones, nerves, and skin. In addition to fatigue, loss of appetite, and leg cramps, some of the more common problems caused by kidney failure are itching, sleep problems, restless legs, weak bones, joint problems, and depression.

When is uremia likely to occur?

Uremia is likely to occur when a person reaches the final stages of chronic kidney disease (CKD). People with CKD often feel no symptoms until the kidneys are severely damaged. Usually when people develop symptoms, their kidney failure has progressed to the point where they must have regular blood-filtering treatments called dialysis or receive a kidney transplant to stay alive. Kidney failure treated by dialysis or transplant is called end-stage renal disease (ESRD). The

word “renal” refers to the kidneys. Even people who have dialysis treatments may experience some of the problems of uremia if they skip treatments or eat foods not recommended for people on dialysis.

Can uremia be avoided?

People with kidney failure can avoid most of the problems of uremia by having regular dialysis treatments and limiting foods that contain sodium, potassium, and phosphorus. People who have CKD should see a kidney specialist—called a nephrologist—regularly to track the progression of the disease so they can begin appropriate treatment before uremia occurs.

Even though health care providers can treat most of the complications of CKD and ESRD, people with these conditions should know what to expect when their kidneys fail.

What problems can occur during hemodialysis?

During the first few weeks of hemodialysis—a type of dialysis that uses a machine to circulate blood through a filter outside of the body—many people find that rapid changes in the body's water and mineral balance can cause problems. Muscle cramps and hypotension—a sudden drop in blood pressure—are two common side effects. Hypotension can make people feel weak, dizzy, or sick to their stomach.



U.S. Department of Health
and Human Services

NATIONAL INSTITUTES OF HEALTH

NIDDK | NATIONAL INSTITUTE OF
DIABETES AND DIGESTIVE
AND KIDNEY DISEASES

National Kidney and Urologic Diseases
Information Clearinghouse

Many people need a few months to adjust to hemodialysis. Side effects can often be treated quickly and easily, so people should always report problems to their health care provider and dialysis staff. Many side effects of hemodialysis treatments can be avoided by following a diet tailored for hemodialysis patients, limiting liquid intake, and taking medications as directed.

How does kidney failure affect the blood?

In addition to uremia, kidney failure can also cause anemia, a condition in which the red blood cells are fewer or smaller than normal, which means less oxygen is carried to the body's cells. Anemia can cause extreme fatigue and can worsen existing heart problems.

Anemia is common in people with CKD, as well as those on dialysis, because the damaged kidneys slow the production of the hormone erythropoietin (EPO), which helps the bone marrow make red blood cells. Less EPO means the body has fewer red blood cells, resulting in anemia. A synthetic form of EPO is commonly prescribed for people on dialysis.

How does kidney failure affect the heart and blood vessels?

People with kidney failure, particularly dialysis patients, have far higher rates of heart and blood vessel problems than people without kidney problems. Heart attacks are the leading cause of hospitalization and death among dialysis patients. Kidney failure also raises the risk of other cardiovascular problems such as blockage of blood to the heart and congestive heart failure. People who have kidney failure need to monitor their cardiovascular health, take all prescribed medications, and follow their health care provider's instructions for diet and exercise.

How does kidney failure affect the appetite?

People who have uremia often lose their appetite. Some people find that food tastes different. Some no longer like foods they once craved. In fact, many people feel sick to their stomach at the thought of eating. But getting enough protein and calories is important for staying healthy. People with kidney failure should talk with the renal dietitian at their dialysis clinic or transplant center to find foods that are appealing and provide needed nutrients.

How does kidney failure affect the skin?

Many people treated with hemodialysis complain of itchy skin, usually on the back, chest, head, or limbs. The itching is often worse during or just after dialysis treatment due to the waste products that are not removed from the blood during dialysis.

The problem can also be due to the damaged kidneys' inability to balance the levels of the minerals calcium and phosphorus in the blood. The resulting low levels of blood calcium trigger four pea-sized glands in the neck, called the parathyroid glands, to release parathyroid hormone, which draws calcium from the bones back into the blood. The high levels of parathyroid hormone can cause itching. Some people feel much better after having most of their four parathyroid glands removed. As long as one parathyroid gland remains, it can regulate the calcium and phosphorus balance in the blood.

Damaged kidneys cause phosphorus to build up in the blood, which can also cause itching. Often, medications called phosphate binders—such as calcium carbonate (Tums), calcium acetate (PhosLo), sevelamer hydrochloride (Renagel), or lanthanum carbonate (Fosrenol)—are prescribed with meals and snacks to bind phosphorus in the bowel, decreasing its absorption into the blood. The resulting lower blood phosphorus levels seem to ease the itching for some people. Reducing the dietary intake of phosphorus can also help.

Other people find relief after exposure to ultraviolet light. Ultraviolet light can be absorbed simply by spending time in sunlight or near a light box, a therapeutic device that uses several fluorescent lights. Still others improve with EPO shots. A few antihistamines, such as diphenhydramine (Benadryl) and hydroxyzine (Atarax, Vistaril), have been found to help. People should consult their health care provider before starting any therapy that includes over-the-counter medications.

A cure for itching that works for everyone has not been found. In some situations, a health care provider may refer people to a dermatologist, a doctor who treats people with skin problems.

How does kidney failure affect the bones?

Kidney failure weakens the bones due to a condition called chronic kidney disease-mineral and bone disorder. As discussed in the previous section, kidney failure can throw off the balance of calcium and phosphorus in the blood, causing the parathyroid glands to produce too much parathyroid hormone. The high level of parathyroid hormone draws calcium from the bones into the blood, leaving the bones without enough calcium. Chronic kidney disease-mineral and bone disorder describes the imbalance of calcium and phosphorus and how this imbalance weakens the bones. The condition affects 90 percent of dialysis patients, both children and adults, causing bones to become thin, weak, or malformed. Symptoms can be seen in growing children with kidney disease even before they start dialysis. Older patients and women who have gone through menopause are at greater risk for this disorder. Controlling parathyroid hormone levels prevents damage to bones. Usually, overactive parathyroid glands are controllable with an adjustment in dialysis treatment, medications, or changes in diet. In some cases, removal of most of the parathyroid glands may be useful. Reducing dietary intake of phosphorus can also help prevent bone disease.

How does kidney failure affect the joints?

Kidney failure can cause pain, stiffness, and fluid in the joints, the points where two or more bones come together. These symptoms result from amyloidosis, a condition in which an abnormal protein in the blood called amyloid is deposited in tissues and organs, including the joints and tendons—the tough bands of tissue that connect muscles to bones. Healthy kidneys filter amyloid protein out of the blood, but dialysis filters are not as efficient as the kidneys in removing amyloid. Dialysis-related amyloidosis is common in people who have been on dialysis for more than 5 years. No treatment to reverse amyloidosis has been found, although a successful kidney transplant may stop the disease from progressing. Health care providers can advise people on the best ways to relieve their pain.

How does kidney failure affect sleep?

People who have kidney failure often have insomnia—trouble getting to sleep and staying asleep. Insomnia and other sleep disorders can worsen a person's quality of life. People with kidney failure should discuss these problems with their health care provider.

Some people suffer from sleep apnea syndrome, which may be related to the effects of advanced kidney failure on breathing. Episodes of apnea are breaks in breathing during sleep. Over time, these sleep disturbances can lead to day-night reversal—insomnia at night, sleepiness during the day. This condition can cause headaches, depression, and fatigue. Some treatments may work with people who have sleep apnea, whether they have kidney failure or not. These treatments include losing weight, changing sleeping position, and wearing a mask connected to a small machine that gently pumps air continuously through a hose into the nostrils—nasal continuous positive airway pressure, commonly known as CPAP.

Many people on dialysis have trouble sleeping at night because of aching, uncomfortable, jittery, or restless legs. They may feel a strong impulse to kick or thrash their legs. Kicking may disturb a bed partner throughout the night. Theories about the causes of this syndrome include nerve damage and mineral imbalances.

Moderate exercise during the day may help, but exercising a few hours before bedtime can make restless legs worse. People with restless legs syndrome should reduce or avoid caffeine, alcohol, and tobacco. Some people also find relief through massages or warm baths. Health care providers may prescribe medications called benzodiazepines, often used to treat insomnia or anxiety, for relief of restless legs syndrome. Benzodiazepines include clonazepam (Klonopin), chlorthalidone (Thalidon), diazepam (Valium), and triazolam (Halcion). A newer and sometimes more effective medication therapy is levodopa (Sinemet), which is also used to treat Parkinson's disease.

How does kidney failure affect mental health?

Many people feel depressed when starting dialysis, or after several months of treatment. Adjusting to the effects of kidney failure and the time spent on dialysis can be difficult. People on dialysis also have less energy. They need to make changes in their work or home life, giving up some activities and responsibilities. Keeping to a schedule can be difficult when kidneys fail. Accepting this new situation can be hard. A mental health counselor or renal social worker can help people who are approaching total kidney failure and those starting dialysis. People who have kidney failure and depression should not keep their depression to themselves or assume they can handle their problems on their own. They should tell their health care provider because depression can often be treated with adjustments to the diet and dialysis dose, medications, and counseling. Scientists are also studying the use of cognitive behavioral therapy—a way of correcting harmful thought and behavior patterns—to treat depression in people with total kidney failure.

Eating, Diet, and Nutrition

For people who are on dialysis or approaching total kidney failure, adequate nutrition is important for maintaining energy, strength, healthy sleep patterns, bone health, heart health, and good mental health. A person's treatment will dictate the type of diet that should be followed:

- People on hemodialysis must watch how much fluid they drink and avoid eating foods with too much sodium, potassium, and phosphorus.
- In contrast, people on peritoneal dialysis—a type of dialysis that uses the lining of the abdomen, or belly, to filter the blood inside the body—may be able to eat more potassium-rich foods because peritoneal dialysis removes potassium from the body more efficiently than hemodialysis.
- Both hemodialysis and peritoneal dialysis can remove proteins from the body, so anyone on either form of dialysis should eat protein-rich foods such as meat, fish, and eggs.

All dialysis centers and transplant clinics have a renal dietitian who specializes in helping people with kidney failure. People who are on dialysis or have a kidney transplant should talk with their clinic's renal dietitian to develop a meal plan that will enhance the effectiveness of their treatment.

For more information about nutrition for people with advanced CKD or who are on dialysis, see *Nutrition for Advanced Chronic Kidney Disease in Adults* or *Eat Right to Feel Right on Hemodialysis* from the National Kidney and Urologic Diseases Information Clearinghouse at www.kidney.niddk.nih.gov.

Points to Remember

- Kidney failure can affect a person's health in several ways.
- When the kidneys stop working, waste products build up in the blood, a condition known as uremia.

- People with kidney failure can avoid most of the problems of uremia by having regular dialysis treatments and limiting foods that contain sodium, potassium, and phosphorus.
- Anemia is common in people with chronic kidney disease (CKD), as well as those on dialysis, because the damaged kidneys slow the production of the hormone erythropoietin (EPO), which helps the bone marrow make red blood cells.
- People with kidney failure, particularly dialysis patients, have far higher rates of heart and blood vessel problems than people without kidney problems.
- People who have uremia often lose their appetite.
- Many people treated with hemodialysis complain of itchy skin.
- Kidney failure weakens the bones due to a condition called chronic kidney disease-mineral and bone disorder.
- Kidney failure can cause pain, stiffness, and fluid in the joints. These symptoms result from amyloidosis, a condition in which an abnormal protein in the blood called amyloid is deposited in tissues and organs, including the joints and tendons.
- People on dialysis often have insomnia, sleep apnea syndrome, and restless legs syndrome.
- People who have kidney failure and depression should tell their health care provider because depression can often be treated with adjustments to the diet and dialysis dose, medications, counseling, and cognitive behavioral therapy.
- For people who are on dialysis or approaching total kidney failure, adequate nutrition is important for maintaining energy, strength, healthy sleep patterns, bone health, heart health, and good mental health.
- All dialysis centers and transplant clinics have a renal dietitian who specializes in helping people with kidney failure. People who are on dialysis or have a kidney transplant should talk with their clinic's renal dietitian to develop a meal plan that will enhance the effectiveness of their treatment.

Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) is devoted to improving the lives of people with kidney disease. Its Division of Kidney, Urologic, and Hematologic Diseases supports several kidney programs and studies. These focus on improving treatment for patients with kidney disease. The End-Stage Renal Disease Program promotes research for patients on dialysis or with a kidney transplant. The research is designed to reduce medical problems in kidney failure. These include bone, blood, nervous system, intestinal, heart, and endocrine problems. The program is also designed to improve the effectiveness of dialysis and transplantation. Current efforts focus on home dialysis options and alternative dialysis schedules. They include short daily sessions or long nightly sessions.

Participants in clinical trials can play a more active role in their own health care, gain access to new research treatments before they are widely available, and help others by contributing to medical research. For information about current studies, visit www.ClinicalTrials.gov.

For More Information

American Association of Kidney Patients

3505 East Frontage Road, Suite 315

Tampa, FL 33607

Phone: 1-800-749-2257

Fax: 813-636-8122

Email: info@aakp.org

Internet: www.aakp.org

American Kidney Fund

6110 Executive Boulevard, Suite 1010

Rockville, MD 20852

Phone: 1-800-638-8299

Fax: 301-881-0898

Email: helpline@kidneyfund.org

Internet: www.kidneyfund.org

National Kidney Foundation
30 East 33rd Street
New York, NY 10016
Phone: 1-800-622-9010 or
212-889-2210
Fax: 212-689-9261
Internet: www.kidney.org

Acknowledgments

Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts. This fact sheet was originally reviewed by Keith Norris, M.D., Charles R. Drew University of Medicine and Science, Los Angeles.

National Kidney Disease Education Program

3 Kidney Information Way
Bethesda, MD 20892
Phone: 1-866-4-KIDNEY
(1-866-454-3639)
TTY: 1-866-569-1162
Fax: 301-402-8182
Email: nkdep@info.niddk.nih.gov
Internet: www.nkdep.nih.gov

The National Kidney Disease Education Program (NKDEP) is an initiative of the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, U.S. Department of Health and Human Services. The NKDEP aims to raise awareness of the seriousness of kidney disease, the importance of testing those at high risk, and the availability of treatment to prevent or slow kidney disease.

You may also find additional information about this topic by visiting MedlinePlus at www.medlineplus.gov.

This publication may contain information about medications. When prepared, this publication included the most current information available. For updates or for questions about any medications, contact the U.S. Food and Drug Administration toll-free at 1-888-INFO-FDA (1-888-463-6332) or visit www.fda.gov. Consult your health care provider for more information.

National Kidney and Urologic Diseases Information Clearinghouse

3 Information Way
Bethesda, MD 20892-3580
Phone: 1-800-891-5390
TTY: 1-866-569-1162
Fax: 703-738-4929
Email: nkudic@info.niddk.nih.gov
Internet: www.kidney.niddk.nih.gov

The National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health of the U.S. Department of Health and Human Services. Established in 1987, the Clearinghouse provides information about diseases of the kidneys and urologic system to people with kidney and urologic disorders and to their families, health care professionals, and the public. The NKUDIC answers inquiries, develops and distributes publications, and works closely with professional and patient organizations and Government agencies to coordinate resources about kidney and urologic diseases.

This publication is not copyrighted. The Clearinghouse encourages users of this publication to duplicate and distribute as many copies as desired.

This publication is available at www.kidney.niddk.nih.gov.

The U.S. Government does not endorse or favor any specific commercial product or company. Trade, proprietary, or company names appearing in this document are used only because they are considered necessary in the context of the information provided. If a product is not mentioned, the omission does not mean or imply that the product is unsatisfactory.



U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
National Institutes of Health

NIH Publication No. 12-6059
December 2011

