

AN INTEGRATIVE HEALTH APPROACH TO CHRONIC KIDNEY DISEASE

July 2021





*This report has been developed with the generous support,
and on behalf of, the Samueli Foundation.*

LETTER FROM WAYNE JONAS, MD

When I was recently asked to speak at a support organization for those with chronic kidney disease, I decided to develop a short one-pager on the topic. However, upon digging into the literature, I quickly realized that the science was so strong that a larger guide was needed to cover the topic properly. This is good news because it means that if you are living with chronic kidney disease, there are a number of effective approaches that you can take to improve your quality of life and prevent your condition from getting worse.

In my over 40 years as a primary care doctor, I have seen that an integrative approach to most conditions optimizes a person's ability to heal. This is also true of chronic kidney disease. It is a condition that affects all areas of a person's life and is highly sensitive to changes in lifestyle. This makes it an ideal condition for whole-person or integrative health care.

When I talk about an integrative health approach, I am referring to a style of care that combines the best that science and self-care has to offer. This includes evidence-based conventional medical care, complementary medicine, and lifestyle changes to optimize healing.

If you are one of the 37 million people in the United Statesⁱ with chronic kidney disease, read on to explore how an integrative health approach can help. Before you make any changes, talk to your doctor and health care team to see what is best for your specific case.



In health,
Dr. Wayne Jonas

WHAT IS CHRONIC KIDNEY DISEASE?

A diagnosis of chronic kidney disease (CKD) is an indication that the kidneys are damaged and are unable to filter the blood effectively. Kidneys are a vital organ and are responsible for:

- Filtering waste and excess water from the blood, which, in turn, makes urine.
- Balancing salt and minerals in the blood to keep your body working properly.
- Making hormones to regulate blood pressure.
- Making red blood cells.
- Keeping bones strong and healthy.

As the kidneys are not a regenerative organ, most kidney damage cannot be reversed, and kidney function usually decreases over time. Kidneys are responsible for filtration, and as the disease progresses, waste will build up in the body. In its early stages, CKD does not have any symptoms and can go undetected until it has advanced. You can also have some kidney damage and continue to be healthy because our kidneys naturally have a greater capacity than is needed to filter our blood. CKD can eventually lead to end-stage renal disease (ESRD), where the kidneys can no longer function on their own and dialysis or a kidney transplant will be necessary. Some patients may chose [conservative care](#) over dialysis once they have been diagnosed with ESRD, but this usually does not prolong life like dialysis can.

Fast Facts

- CKD is more common than publicly acknowledged, with approximately 15% of U.S. adults, or 37 million people, estimated to have CKD.ⁱⁱ
- It is estimated that 90% of adults who are living with CKD do not know they have it.ⁱⁱⁱ
- Kidney disease is a leading cause of death in the United States.^{vii}
- The leading cause of CKD is diabetes: It is estimated that 1 in 3 adults with diabetes will get CKD.^{iv}
- CKD kills more people each year than breast or prostate cancer.ⁱⁱ
- CKD has no symptoms in early stages and can go undetected until it is very advanced.ⁱⁱ
- CKD patients can reduce their risk of death by 68% if they don't smoke, are physically active, eat a healthy diet, and have a body mass index between 20 and 25 kg/m².^v

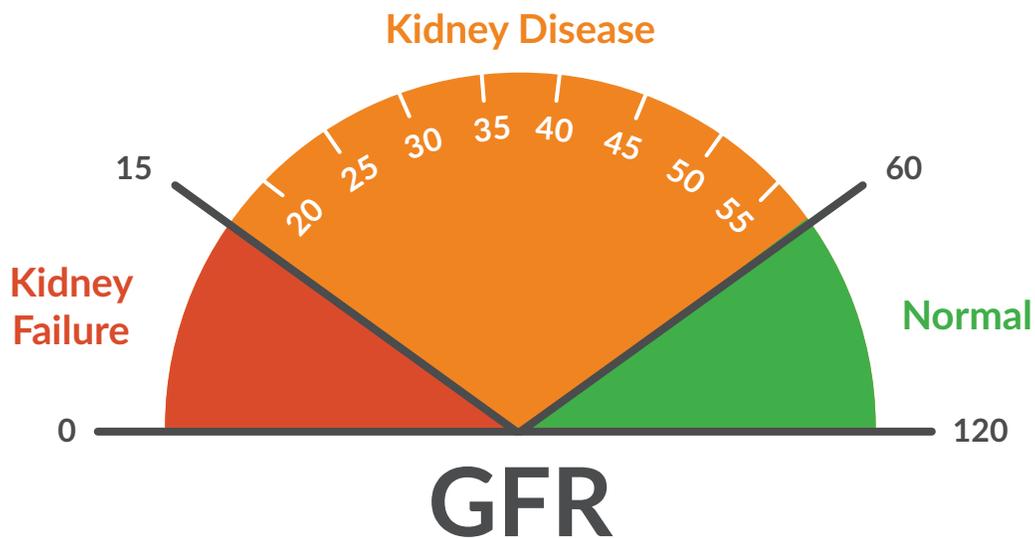
More facts on CKD can be found [here](#).

HOW IS CHRONIC KIDNEY DISEASE DIAGNOSED?

If your doctor suspects you have CKD, or if you are in a high-risk group for developing CKD, your doctor may request the following:^{vi}

- **Blood Test** – A blood test called the estimated glomerular filtration rate (eGFR) will be used to look at how well your kidneys are filtering waste from your blood. Some doctors may also order a serum creatinine test to estimate how well the kidneys are filtering waste out of the blood. If the eGFR is below 60, you may have CKD. If you are diagnosed with CKD, the eGFR will also help your doctor determine the CKD stage.
- **Urine Test** – The urine test will look at the amount of albumin (a protein) and other abnormalities in your urine. When kidneys are damaged, albumin can pass into the urine. Additionally, analyzing the abnormalities in your urine may help your doctor understand the cause of your CKD.

It is possible that your doctor may also request imaging or a kidney biopsy.



WHAT ARE THE STAGES OF CHRONIC KIDNEY DISEASE?

There are five stages of CKD. Some patients will be able to slow the progression of their kidney damage and will never reach end-stage renal disease (ESRD)¹, and some patient's kidneys will progress quickly into ESRD. People at risk for quick progression and who should be closely monitored are:

- Diabetes patients (especially those with high levels of albumin in their urine).
- Patients with high blood pressure (HBP).
- Patients with increasing albumin in their urine.
- Patients with decreasing eGFR.

STAGE	DESCRIPTION ^{vii}	GFR, mL/min/ 1.73 m ²
1	Kidney damage with normal or increased GFR	≥90
2	Kidney damage with mildly decreased GFR	60–89
3	Moderately decreased GFR	30–59
4	Severely decreased GFR	15–29
5	End-stage renal disease	<15 or dialysis

GFR = glomerular filtration rate; mL/min/1.73 m² = milliliters per minute for 1.73 meters squared

ESRD^{viii}

ESRD is the final stage of CKD wherein the kidneys can no longer function on their own. It is usually fatal if the patient does not receive dialysis or a kidney transplant within a few weeks. There are a wide variety of symptoms associated with ESRD including:

- Decreased urination or an inability to urinate
- Fatigue
- Shortness of breath
- Metallic taste in mouth/ammonia breath
- Drowsiness
- Weight loss
- Feeling cold
- Dizziness and trouble concentrating
- Nausea
- Headache
- Dry and/or itchy skin
- Skin or nail changes
- Easy bruising
- Bone pain

Once diagnosed with end-stage renal disease (ESDR), people need to receive dialysis regularly or a kidney transplant.

1 EDSR can also referred to as end-stage renal failure or end-stage kidney disease (ESKD).

WHO ARE THE AT RISK GROUPS?

Certain diseases and chronic conditions can put people at risk for developing CKD. If you have been diagnosed with any of the following chronic conditions, your kidney functioning should be monitored:

- **Diabetes** is the leading cause of CKD and 1 in 3 people with CKD have diabetes. People with diabetes have high blood glucose levels, which can cause damage to blood vessels in the kidney over time. People should be tested every year if they have Type 2 diabetes or have had Type 1 diabetes for more than five years.
- **HBP** (hypertension) is the second leading cause of CKD with 1 in 5 adults with HBP having CKD. HBP causes damage to the kidney's blood vessels over time.
- **Heart Disease** patients are more likely to develop CKD, and CKD patients are more likely to develop heart disease. If you have been diagnosed with one, there is an increased risk of developing the other because both CKD and heart disease have similar causes, such as HBP, diabetes, and high cholesterol.

People with a family history of CKD are at a greater risk for CKD and should also be tested and monitored.

Hispanics, Native Americans, and African Americans also are at a higher risk of developing CKD, diabetes, and high blood pressure. Scientists are also studying these groups to better understand if there are additional factors for their increased CKD risk.

If you have been diagnosed with CKD, there are ways to prevent and slow further kidney damage. Disease progression is based on a combination of factors dependent on the individual. [The National Institutes of Health recommends](#) the following strategies for living with CKD:^x

Control Your Blood Pressure

This is the most important step you can take to prevent further kidney damage. Your blood pressure should be kept below 140/90 mm Hg. Some steps you can take to manage your blood pressure include:

- Instituting a heart-healthy and low-sodium diet.
- Quitting smoking.
- Being active.
- Getting enough sleep.
- Taking medications as prescribed.

If You Have Diabetes, Meet Your Blood Glucose Levels

Check your blood-glucose levels regularly to make sure they are within a normal range. This can reduce long-term kidney damage caused by poorly managed blood-glucose levels, which will increase kidney damage over time.

Work Closely with Your Health Care Team to Monitor Kidney Function

Because kidney disease tends to get worse over time, it is important to track kidney function and disease progression. To slow disease progression, your goals should be to maintain your eGFR and either maintain or lower your urine albumin. Your physician will also monitor your blood pressure and, if you have diabetes, your A1C. It is recommended you bring [this document](#) to your appointments to keep track of your test results.

When you prepare to meet with your health care provider(s), keep track of questions to ask about your disease and how your lifestyle choices could be impacting your CKD progression.

Who is part of your health care team is up to you, but it is possible to include a number of different health care providers to support you in living with CKD, including your primary health care provider, a registered dietitian, nurse, diabetes educator, social worker, psychologist, and/or nephrologist.

Take Medicines as Prescribed

It is very important that you take your medications as prescribed by your health care providers. Although there isn't medication specifically for CKD, taking your medications appropriately can significantly slow the progression of CKD and kidney failure. Medications your doctors may prescribe include:

- **Blood pressure medications** – You may be prescribed blood pressure medications even if you do not have HBP because they can slow CKD progression by changing the rate of blood flow to the kidneys. However, blood pressure medications should be monitored closely by your physician because, as the disease progresses and kidney functioning decreases, blood pressure medication can damage the kidneys. The most common forms of blood pressure medication prescribed for CKD include:
 - » Angiotensin-converting enzyme inhibitors (e.g., ramipril, enalapril and lisinopril).
 - » Angiotensin receptor blockers.
- **Cholesterol medications** – You are at a higher risk developing cardiovascular disease or having a heart attack or stroke if you have CKD. Because of this, you may be prescribed statins to reduce your likelihood of developing cardiovascular disease.
- **Diuretics** – It is possible that your kidneys may have a hard time removing fluids from the blood, causing your tissues to retain water and can cause your ankles, hands, and feet to swell. In addition to reducing your salt intake, you may be prescribed a diuretic for this or for your blood pressure.
- **Medications to address anemia^x** – As kidney functioning declines, your red blood cell count (iron) may also decrease. Your kidneys are responsible for releasing a hormone called erythropoietin (EPO), which signals to the bone marrow to make more red blood cells. However, damaged kidneys may not be able to produce enough EPO. As a result, the bone marrow does not produce enough red blood cells. The two main treatments for reduced EPO production are:
 - » A subcutaneous injection of a synthetic form of EPO called erythropoietin-stimulating agent.
 - » Iron pills or an iron injection.

It is possible that your doctor may also recommend you take vitamin B12 or folic acid supplements. In rare instances, if your anemia is considered severe, your doctor may recommend you receive a blood transfusion.

The dosage of your medications will change over time as your disease progresses. It is important to follow the instructions given to you by your health care provider because your kidneys may eventually have troubling filtering certain medications, causing an unsafe buildup in your system.

Pay Attention to Over-the-Counter (OTC) Medications

Please consult your physician and/or pharmacist before taking any OTC medications or supplements. Specifically, nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and naproxen can damage your kidneys and lead to acute kidney injury. NSAIDs are sold under many different names, and you should always check with your physician and/or pharmacist before taking OTC medications to treat pain.

If you do plan on purchasing and taking OTC medications, here are some tips to avoid complications:

- Keep a running list of all of the medications you take (this includes prescription and OTC medications, as well as supplements) in your wallet and bring this list to all of your health care visits and the pharmacy.
- Check for any harmful interactions or warnings on medication labels.
- Always ask your pharmacist how the medication may affect your kidneys or if there are interactions with the current medications you are taking.
- Fill all of your prescriptions and purchase all OTC medications at the same pharmacy.

Develop a Meal Plan with a Dietician

Food and drink play an important role in kidney health and can also help you lower your blood pressure, maintain a healthy hemoglobin A1C, and delay or even prevent problems caused by CKD. A dietician can help you develop meal plans that are healthy and help you meet the goals set by your physician, such as decreasing your sodium intake to reduce or maintain a healthy blood pressure. Additionally, as CKD worsens, there are dietary changes your dietician will likely recommend, such as eating foods with less phosphorus and potassium.

To learn more about ways you can use food and nutrition to support your CKD, [see here](#).

Introduce Physical Activity Into your Routine

Physical activity for 30 minutes a day can help you maintain a healthy weight, reduce your stress, and achieve your blood glucose and pressure goals. Before you begin regular physical activity, it is recommended you first speak with your health care provider.

Maintain or Strive Toward a Healthy Weight

Being overweight can make your kidneys work harder and may speed up disease progression. Monitoring what you eat with the help of a dietician and exercising regularly can help you reach your weight-loss goals and/or maintain a healthy weight to slow CKD progression.

Sleep 7-8 Hours a Night

Getting adequate and restful sleep is important for physical and mental health and can help you maintain healthy weight, blood pressure, and glucose levels.

Don't Smoke

Smoking can increase CKD disease progression and cause damage to the kidneys. Additionally, smoking is associated with increased blood pressure and a greater likelihood of heart disease and/or stroke, which complicate and make it harder to effectively treat CKD.

Cope with your Stress and Depression in Healthy Ways

Long-term stress is associated with increased blood pressure, blood glucose, and depression. Mind-body methods such as meditation and mindfulness, maintaining regular physical activity, and getting an adequate amount of sleep can all help with stress reduction.

Depression can make it harder to engage in self-care and other activities that can help slow kidney disease progression. Seeking the help of a trained therapist can also help you manage your stress and/or depression.

WHAT ARE LIFESTYLE APPROACHES TO KIDNEY DISEASE?

As recommended by the National Institutes of Health, there are many lifestyle approaches that can slow disease progression and make it easier to live with CKD. The three key lifestyle approaches for managing CKD before it progresses to ESRD are diet, exercise, and stress reduction.

FOOD & DIET

Your diet plays a crucial role in CKD disease progression. For all stages of CKD, it is recommended that patients:

1. **Reduce sodium intake** – It is important to choose and prepare foods that are low in sodium, and it is recommended you consume less than 2,300 milligrams of sodium each day. On average, Americans consume more than 3,400 milligrams of sodium a day.
2. **Eat the right amount and the right types of protein** – Kidneys remove the waste produced when your body uses protein. It is important not to eat more than the amount of protein the body needs to keep the kidneys from working too hard. This means it is important to eat small amounts of animal- and plant-based proteins.
3. **Eat heart healthy foods** – It is important to eat foods that are heart healthy to keep fat and calcium from building up in the heart, kidneys, and blood vessels. Learn more about a heart healthy diet [here](#).
4. **Limit your alcohol consumption** – Drinking too much alcohol can cause serious health problems and can damage your kidneys, liver, heart, and brain. It is recommended that men do not drink more than two drinks a day and women no more than one. Consult your health care providers to understand how much alcohol you can safely consume.

As your disease progresses, it is recommended you also:

5. **Consume foods with less phosphorus** – As your disease progresses, your kidneys are less able to filter phosphorus from your blood. When phosphorus builds up in your blood, it pulls calcium from your bones, causing your bones to become thin and weak and increasing their chances of breaking. Your doctor may discuss taking a phosphorus binder, which is a medication you can take when you eat that can bind the phosphorus so it does not end up in your blood stream.
6. **Consume foods with the right amount of potassium** – It is important to consume enough potassium in your diet to support the proper functioning of your nerves and muscles, but too much or too little potassium in your blood can be problematic. When your kidneys are damaged, too much potassium can build up in your blood, causing heart damage. Certain foods and drinks you consume can help lower your potassium levels. Please note that certain salt substitutes and supplements may contain high levels of potassium, so always check the label and consult with your physician. It is also possible that certain prescription medications your physician prescribes may increase your potassium levels. These medications should be tracked over time and adjusted as needed.

To learn more about what to and not to eat for your CKD, please visit:

- [Eating Right for Chronic Kidney Disease](#)
- [National Kidney Foundation – Nutrition in CKD](#)

WHAT ARE LIFESTYLE APPROACHES TO KIDNEY DISEASE?

Before starting a new diet, seek the advice of a registered dietician/nutritionist. It is important to continue to see a dietician because the nutrients and types of foods and drinks you should consume will change as your disease progresses. To learn more about seeking the advice of a registered dietician, please see this [pocket guide on Nutritional Counseling](#).

Additional information and tips on how to manage specific nutrients mentioned above can also be found here:

- [Sodium](#)
- [Phosphorus](#)
- [Potassium](#)
- [Protein](#)

Evidence

Adherence to a western diet, which is characterized by low fruit and vegetable intake and a high intake in animal fat, red meat, ultra-processed foods, and sweets/desserts, is correlated with decreased kidney function and can speed up disease progression in patients with CKD. Studies have also found a Western diet is associated with rapid kidney decline in older adults.^{xi}

A Cochrane systematic review of 17 studies (1,639 participants) looking at the impact of different dietary changes on health outcomes and well-being/quality of life in people with CKD (including those on dialysis) found that the impact of these dietary changes on mortality, cardiovascular events, and ESKD is uncertain because these measures were rarely reported on in the included studies. However, this review did find evidence that dietary interventions may increase health-related quality of life, eGFR, and serum albumin, and lower blood pressure and serum cholesterol levels.^{xii}

MEDITERRANEAN DIET

The Mediterranean diet is a set of guidelines shaped and inspired by the traditional eating patterns of regions surrounding the Mediterranean and encourages the consumption of lean proteins in small portions, fruits and vegetables, legumes, whole grains and healthy fats (specifically those high in monounsaturated fats and polyunsaturated omega-3 rich fatty acids). Below are summaries of some of the research on the impact of a Mediterranean diet on kidney disease.

Research

A prospective longitudinal study of older adults in New York City found that a Mediterranean diet was positively associated with increased kidney function. Researchers tracked their kidney and cardiovascular function and related outcomes over time and found that dietary patterns similar to the Mediterranean diet were associated positively with kidney function. Specifically, participants with a MeDi (Mediterranean diet questionnaire) score at or above the median (≥ 5), had an approximate 50% decreased odds of developing incident eGFR <60 ml/min per 1.73 m².^{xiii}

WHAT ARE LIFESTYLE APPROACHES TO KIDNEY DISEASE?

In another prospective longitudinal study, the dietary patterns and kidney function of 1,212 adults, aged 30 to 71 years were tracked for six years. The researchers found that there was an inverse relationship between CKD incident risk and adherence to a Mediterranean diet (as assessed by the Mediterranean diet score).^{xiv}

A randomized control trial of 40 ESRD patients with dyslipidemia, hypertriglyceridemia, and/or hypercholesterolemia were randomized to group nutritional counseling based on the Mediterranean Diet or care as usual. This study found that the nutritional counseling intervention helped improve cardiovascular health by increasing the nutritional value of food consumed, which reduced dyslipidemia and protected against lipid peroxidation and inflammation. These improved outcomes allowed the participant to enter into dialysis with better cardiovascular health.^{xv}

To learn more about this dietary approach, please see [here](#).

DIETARY APPROACHES TO STOP HYPERTENSION (DASH) DIET

The Dietary Approaches to Stop Hypertension (DASH) Diet is designed to prevent and lower HBP. The DASH diet recommends foods high in certain nutrients (potassium, calcium, protein, and fiber), including vegetables, fruits, whole grains, fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils. The diet limits salt, saturated fat, and sugar.

Research

In a prospective before-and-after feeding pilot study of 11 adults with moderate CKD (stage 3), participants completed one week of a reduced sodium diet followed by two weeks of the DASH diet. This study reported the reduced-sodium DASH dietary pattern did not cause acute metabolic events in adults with moderate CKD and that it may improve nocturnal blood pressure. The authors concluded that more research was needed to better understand the long-term impact of the DASH diet.^{xvi}

The blood pressure and diet of 3,135 Black Americans participating in the Jackson Heart Study was monitored over a four-year span (2000-2004). Although the group overall had low DASH scores, better DASH scores among the participants with CKD was associated with lower blood pressure.^{xvii}

A longitudinal prospective cohort study following 3,121 adult females for 21 years found that participants who followed a Western diet significantly increased their chances of rapid decrease in kidney functioning and microalbuminuria than people who had eating patterns more closely aligned with the DASH diet.^{vii}

WHAT ARE LIFESTYLE APPROACHES TO KIDNEY DISEASE?

LOW- OR VERY LOW-PROTEIN DIET

The most commonly recommended diet for people with CKD is a low-protein diet. Given the stress that digesting protein can cause to the kidneys, which, in turn, can increase disease progression, limiting protein sources can slow disease progression during the early stages of the disease and can prolong time till dialysis. The latest review is described below.

Evidence

A Cochrane systematic review including 17 studies (2,996 participants) looking at the impact of low protein diets for non-diabetic adults with CKD (including those on dialysis) found that adhering to a very low-protein diet likely reduces the number of people who progress to CKD stages 4 or 5 (ESRD).^{xviii} Another systematic review and meta-analysis including nine studies (506 participants) looking at the impact of a low-protein diet for patients with diabetic CKD found that there is a strong relationship between a dietary protein intake of <0.8 g/kg of protein and the slowing of GFR decline as well as decreased proteinuria.^{xix}

However, this is not the case for ESKD. Current research indicates that low-protein diets may make little difference on the number of people who progress to ESKD. Low- or very low-protein diets probably do not influence death in these patients. The data is limited on the effects that very low- and low-protein diets have on mortality and whether adhering to one of these diets has an impact on quality of life. This review recommends more research on the impacts on quality of life and additional adverse effects of low-protein diets before recommending their widespread use.^{xx}

EXERCISE

[The National Kidney Foundation](#) recommends that people with CKD exercise 30-60 minutes a day most days of the week because exercise has been linked to improved outcomes and can slow kidney disease progression. Exercise can help you:^{xxi}

- Maintain a healthy weight.
- Control your blood pressure, glucose, and cholesterol levels.
- Prevent heart and disease and diabetes.
- Decrease disease-associated stress and anxiety.

WHAT ARE LIFESTYLE APPROACHES TO KIDNEY DISEASE?

Proper Exercise

If you are new to exercise and have not previously engaged in regular physical activity, it is recommended by The National Kidney Foundation to start with 10-15 minutes a day and gradually work up to 30-60 minutes. But exercise needs to be done properly. Improper exercise can produce:

- Fatigue.
- Pain and soreness.
- Injuries.
- Developing exercise obsession.
- Headaches.

Evidence

A randomized control trial of 150 non-diabetic adult patients with hypertension and CKD stages 2-4 were randomized to 16 weeks of aerobic and resistance training or usual care. The study found significant increase in functional capacity [2' Step Test 33.9 (17.7-50.0); 30" Stand Test 2.3 (0.9-3.7)] and a decrease in high-sensitivity C-reactive protein [-6.7(-11.7 to -1.8) mg/L] and fasting blood glucose [-11.3(-20.0 to -1.8) mg/dL] in the exercise group compared with control group. This RCT suggests that in patients with early stages of CKD, aerobic exercise may reduce inflammation and insulin resistance.^{xxii}

A systematic review and meta-analysis of 31 randomized control trials (including 1,305 participants) on the impact of aerobic exercise on patients with CKD found that adult CKD patients benefit from aerobic exercise training by increasing cardiorespiratory function, HDL-C level, and improvement in health quality of life.^{xxiii}

A systematic review and meta-analysis of 13 randomized control trials (including 421 participants) on the impact of aerobic exercise on patients with CKD (not receiving dialysis) found that exercise therapy may be beneficial for CKD patients (not on dialysis) by reducing BMI, systolic blood pressure, diastolic blood pressure, and increasing GFR. Additionally, this meta-analysis also found that short-term exercise interventions can decrease triglyceride levels.^{xxiv}

MANAGING STRESS & PSYCHOLOGICAL DISTRESS

It is important to find healthy ways to manage and cope with stress to offset the challenges of living with CKD. Long-term stress can also lead to increased blood pressure, which can decrease kidney function, increase likelihood of developing depression, and lead to unhealthy coping strategies that can make it harder to manage CKD. A recent study found that mild to moderate levels of psychological distress were associated with smoking and low physical activity in participants with CKD. Additionally, in comparison with participants CKD reporting no unhealthy behaviors, participants with 2-3 unhealthy behaviors were almost five times more likely to report severe psychological distress.^{xxv}

WHAT ARE LIFESTYLE APPROACHES TO KIDNEY DISEASE?

Managing stress and anxiety can become increasingly challenging once a patient has progressed to ESRD and is receiving dialysis regularly; it is estimated that up to 50% of people with ESRD undergoing hemodialysis suffer from anxiety and depression, which results in decreased quality of life.^{xxvi} Learn about evidence-based ways of effectively managing stress, including meditation, the use of a therapist, and mind-body interventions below.

Mindfulness Meditation

Meditation is a practice that involves consciously exerting control over breathing and attending nonjudgmentally to the present moment. It produces multiple physiological and chemical effects such as decreased heart rate, blood pressure, and cortisol (stress hormone) levels. Meditation is widely considered a safe way of addressing physical and mental symptoms; side effects are rare.

Side Effects/Safety Concerns

- Although rare, there have been reports that engaging in breathwork has worsened symptoms of patients with psychiatric problems, such as anxiety. If you are attending a breathwork class, please make sure to alert your instructor of any condition you may have.
- Excessive, rapid breathing can drop carbon dioxide levels and change the pH of the blood, causing tingling, muscle cramps, light-headedness and, on rare occasions, seizures. If you are susceptible to seizures, consult your doctor before engaging in any type of meditation that includes intensive breathwork.

Evidence

A randomized, crossover study of 15 African American males with hypertension and CKD received at different times either a 14-minute educational video on blood pressure (the control) or 14 minutes of mindfulness meditation (MM). A subset of participants also received a controlled-breathing (CB) intervention. Compared to the control condition, MM significantly reduced systolic blood pressure (BP), diastolic BP, mean arterial pressure, respiratory rate (RR), and heart rate (HR), as well as a significantly greater reduction in muscle sympathetic nerve activity (MSNA). Participants who received the CB intervention alone (without the MM) did not experience significant decreases in BP, HR, RR, or MSNA. MM had significant effects on hemodynamics or sympathetic activity over CB alone and the educational control.^{xxvii}

A pilot feasibility study of 40 participants with ESRD receiving hemodialysis randomized participants either to a health education program or a health-education program plus eight sessions of Mindfulness Based Stress Reduction (MBSR). Participants who received MBSR had significant reductions in both anxiety ($p=.0001$) and depression ($p=.0001$) over the eight-week period.^{xxviii}

BEHAVIORAL THERAPEUTIC INTERVENTIONS

Seeking the counsel of a trained psychotherapist and incorporating stress-reduction methods is a key step to addressing the challenges associated with CKD. Psychotherapists can help you incorporate coping strategies and new ways to approach living with CKD.

Side Effects/Safety Concerns

Psychotherapy, when delivered by a well-trained certified therapist, is widely considered a safe way of addressing the added stress that managing your CKD can cause. Note that any form of therapy can unearth uncomfortable emotions and may cause you to experience increased levels of psychological discomfort.

Evidence

A Cochrane systematic review including 33 studies (2,056 participants) looking at the impact of psychosocial interventions for preventing and treating depression in people with CKD found that, in addition to exercise and relaxation techniques, Cognitive Behavioral Therapy (CBT) reduced depressive symptoms and also increased health-related quality of life.^{xxix}

A pilot study of participants with ESRD undergoing hemodialysis looking at 12-week group CBT with mindfulness found that following the 12-week intervention, participants had significant improvements in anxiety, perceived stress, quality of life, and depression. Additionally, serum creatinine levels significantly improved after the 12 weeks CBT mindfulness intervention.^{xxx}

Other Interventions

A systematic review including 32 randomized control trials looking at the use and application of mind-body interventions to address psychological and physical symptoms faced by people with CKD (including people undergoing hemodialysis) found that the most studied interventions were music therapy (=11), relaxation therapy (=9), and spiritual therapy (=6). For anxiety reduction, music and spiritual therapies were the most effective, and for depression, spiritual therapies were the most effective in addressing depression-related symptoms. To address pain, this review found that music and yoga therapies were shown to be the most effective.^{xxxi}

Studies looking at the use of complementary and integrative medicine practices have found anywhere from 23.2%^{xxxii} to 54.9%^{xxxiii} of patients with CKD using integrative medicine approaches, with the percent increasing in the last few years. As integrative medicine is designed to address the whole person and CKD onset and progression is heavily influenced by lifestyle factors, there are integrative medicine approaches that can help with addressing symptoms and possibly slowing CKD disease progression. Additionally, once a patient has reached ESRD and is undergoing hemodialysis, integrative approaches can help address symptoms such as pain, stress, and anxiety.

Please note, before engaging in any of the approaches below, it is important to inform and discuss with your health care team how to best integrate these approaches into your CKD-management plan.

ACUPUNCTURE

Acupuncture is a practice in which a trained specialist called an acupuncturist stimulates specific points on the skin called acupoints, usually with a thin needle. Stimulating acupoints increases the release of chemicals like endorphins (naturally-produced pain reducers) in the body and brain. These chemicals may directly impact how a person experiences pain.

Potential Side Effects:

- Slight bleeding and bruising at the acupoint site.
- Fainting.
- Convulsions (rare).
- Pain or soreness at the acupoint site (which may enhance its effectiveness).

However, professionally delivered acupuncture produces only mild and transient side effects in most people. Be sure you find a properly trained and licensed acupuncturist. See my [“Pocket Guide”](#) to help you identify a qualified provider.

Evidence

A randomized control trial of 53 patients with CKD randomized to acupuncture or sham acupuncture once a week for 12 weeks found that the participants in the acupuncture group had significantly reduced creatinine levels and significantly increased eGFR levels.^{xxxiv}

A systematic review and meta-analysis of 17 randomized control trials (including 1,414 participants) on the impact of acupuncture on non-dialysis CKD patients found that acupuncture can reduce blood urea nitrogen and creatine levels as well as increase creatine clearance and hemoglobin levels. However, the authors caution that the evidence is not sufficient to make treatment recommendations due to the high risk of bias in the included trials. Higher-quality research is needed.^{xxxv}

A prospective observational study of the use of acupuncture for symptom management of CKD patients undergoing hemodialysis reported that after seven weeks of the intervention, acupuncture significantly reduced the patients' primary symptoms ($p < 0.0001$) as well as effects of kidney disease, burden of kidney disease, physical limitations, emotional well-being, and energy/fatigue.^{xxxvi}

YOGA

Numerous studies attest to the benefits of yoga, a centuries-old mind-body practice, on a wide range of health-related conditions—particularly stress, mental health (including depression), and pain management.

Side Effects

Although very rare, certain types of stroke as well as pain from nerve damage have been reported from people practicing extreme yoga. Muscle injury can also occur if not properly done. Minor side effects include:

- Dizziness.
- Fatigue.
- Weakness.
- Nausea.
- Heat exhaustion.

Evidence

In a six-month controlled study of 54 participants with CKD undergoing regular hemodialysis, 28 participants received care as usual and 26 participants received care as usual plus a yoga intervention (specifically focused on asanas for the kidney) for six months; participants were instructed to practice the prescribed yoga intervention at least five times a week for 40-60 minutes. Participants in the yoga group had a statistically significant decrease in blood pressure and significant improvements in physical and psychological quality of life. Additionally, although the difference was not statistically significant, participants in the yoga group had less need for hemodialysis when compared to control group.^{xxxvii}

A systematic review of two randomized control trials (including 68 patients) looking at the effect of yoga on physical and psychological outcomes in CKD patients on chronic hemodialysis found that the yoga interventions significantly improved quality of life, pain, fatigue, sleep disturbance, and physical function.^{xxxviii}

MOVING MEDITATIONS

Moving meditations (practices such as tai chi and qigong) build balance, coordination, strength, and functional capacity and combine the use of slow and deliberate movements with meditation and breathing practice.

Side Effects

These practices are widely considered safe ways of addressing physical and mental symptoms; side effects are rare. Minor side effects include aches, pains, and soreness. If you are pregnant, have chronic back problems, or a hernia, please speak with your physician prior to beginning moving meditations.

Evidence

A randomized control trial of 21 participants with CKD and cardiovascular disease looked at the impact of a 12-week (30 minutes, 2-3 times a week) tai chi intervention. Participants in the intervention group had improved eGFR, left ventricular ejection fraction, and high-density lipoprotein levels, and decreased serum creatinine levels, heart rate, systolic blood pressure, diastolic blood pressure, and total cholesterol, triglyceride and low-density lipoprotein levels.^{xxxix}

A study including 46 participants with EDSR randomized participants to receive care as usual or care as usual plus a once a week one-hour tai chi intervention for 12 weeks. Participants in the tai chi program had statistically significant improvements in quality of life and physical functioning.^{xl}

ENERGY HEALING

Energy healing includes a number of different therapeutic interventions where a therapist helps to harness or manipulate a patient's subtle energy in order to help restore the body's balance and improve the body's ability to heal. These "subtle energy" therapeutic interventions have been described and used for thousands of years by systems such as traditional Chinese medicine and traditional Indian medicine, and by religious and faith healers through approaches like laying on of hands.

Side Effects

These practices are widely considered safe when delivered by a well-trained certified energy practitioner, provided it is not used as a substitute for a proven treatment.

Potential Side Effects

- Increased thirst.
- Restlessness.
- Anxiety.
- Fever.
- Mental spaciness.

Evidence

A pilot study looking at 15 patients receiving Reiki for 20 minutes, twice a week for four weeks during hemodialysis found that participants experienced a significant reduction in pain and anxiety.^{xii}

A pilot study of six participants undergoing regular peritoneal dialysis received 10 sessions of healing touch for 30-45 minutes. In these six participants there were improvements in fatigue (decreased by 46%) and pain (decreased by 68%) and reductions in stress and anxiety (decreased by 49%) and depression (decreased by 84%).^{xiii}

VITAMINS & SUPPLEMENTS

Understanding which supplements to take and not to take when having a diagnosis of CKD is crucial for maintaining health and preventing further damage to your kidneys. As your disease progresses, your physician and health care team may recommend adding vitamins and supplements to your treatment plan. Adding vitamins and supplements to your routine can help ensure your body maintains a healthy level of important nutrients. These are crucial for proper functioning because you may have to limit the consumption of certain foods that would normally provide you with the nutrients your body needs. However, some supplements can cause kidney damage and increase disease progression, so it is imperative that you always speak with your health care team about the supplements you take and have them monitor your eGFR and other important indicators. Many supplements can be given in pill form; others may be injected directly into your body by your physician.

Vitamins

- B Complex
 - Vitamin B6, B12 and folic acid – these three vitamins work together and can help prevent anemia.
 - Thiamine, riboflavin, pantothenic acid, and niacin – these are additional B vitamins that help produce energy used by the body to function properly.
- Iron – Can help to treat or prevent anemia.
- Vitamin C – This vitamin can keep your tissues healthy, help with wound healing, and can prevent infections. Levels of vitamin C need to be closely monitored because high dosages can increase excretion of oxalate (a possible toxin) into the kidneys.
- Vitamin D – Assists with maintaining healthy bones.
- Calcium – Also assists with maintaining healthy bones. Calcium levels in the blood should be closely monitored because too much can be harmful.

ARE THERE INTEGRATIVE HEALTH APPROACHES TO HELP MANAGE CKD?

Vitamins to Avoid

There are certain vitamins that should be avoided because they can build up in the body, speed up disease progression, and be harmful to your health. These include vitamins A, E, and K. These should only be used if directed and closely monitored by your physician.

Additional Supplements

Although not part of the standard practice guidelines, there are other supplements with some research supporting their use. Again, before adding any supplements or vitamins to your diet, it is important to speak with your health care providers.

- **Omega 3** – There is some evidence to suggest that omega-3 supplements may delay the progression in CKD, reduce the risk of ESRD, and reduce cardiovascular mortality in hemodialysis patients.^{xliii xliiv}
- **Curcumin** – There is limited evidence supporting the use of curcumin in patients with CKD, but is an anti-inflammatory that is speculated to help with CKD symptoms, and some doctors do recommend their patients take it.^{xlv} However, curcumin supplements can contain large amounts of potassium, which may be harmful to CKD especially in later stages of the disease.

Supplements to Avoid

The National Kidney Foundation recommends that people with CKD and ESRD do not take herbal remedies or OTC nutritional supplements. It is particularly important to avoid the following:

- **St. John's Wort (SJW)** – If you are taking immunosuppressants after a kidney transplant, SJW can significantly interfere with the way the immunosuppressants are metabolized and may cause your body to reject the new organ.
- **Supplements that contain a lot of potassium.**
- **Star Fruit** (both supplements containing it and the fruit itself) – can be fatal for patients with CKD because it contains a neurotoxin that the kidney may not be able to filter out of the bloodstream.^{xlvi}
- **Stimulants** – Avoid supplements that contain stimulants, which may raise your blood pressure and further damage your kidney over time.
- **Supplements that contain aristolochic acid** as this can potentially cause nephrotoxicity (toxicity of the kidneys).

To learn more about supplements to avoid, visit the [National Kidney Disease Foundation's Herbal Supplements and Kidney Disease web page](#).

IN SUMMARY

Conventional approaches to treating CKD involve closely monitoring your kidney functioning with your physician and a team of health care providers to help you understand your disease and develop new routines that will keep your disease from progressing. This includes maintaining a CKD-appropriate diet, exercising regularly, and engaging in self-care activities that will help reduce stress. It is crucial that after receiving a diagnosis of CKD you closely follow the advice and instructions of your health care providers; with proper care and attention, your disease may never progress into ESRD, and you may never need dialysis.

Integrative approaches can help manage symptoms of CKD, reduce the stress of dialysis, and slow disease progression.

It is important to always keep your health care team informed of the approaches you are interested in integrating into your CKD treatment as certain approaches may not be appropriate for you and certain supplements can cause damage to the kidneys.

- i *Kidney Disease Statistics for the United States*. (2016, December). National Institutes of Diabetes and Digestive and Kidney Diseases. Retrieved February 18, 2021, <https://www.niddk.nih.gov/health-information/health-statistics/kidney-disease>.
- ii *Chronic Kidney Disease in the United States, 2021*. (2021, March 4). Chronic Kidney Disease Initiative, Retrieved April 23, 2021, <https://www.cdc.gov/kidneydisease/publications-resources/ckd-national-facts.html>.
- iii *Kidney Disease: The Basics*. (2021). National Kidney Foundation, Retrieved <https://www.kidney.org/news/newsroom/fsindex>.
- iv *Diabetic Kidney Disease*. (2017, February). National Institutes of Diabetes and Digestive and Kidney Diseases. Retrieved February 18, 2021, <https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/diabetic-kidney-disease>
- v *Lifestyle Modifications Improve CKD Patient Outcomes*. (2015, March 16). National Kidney Foundation. Retrieved April 12, 2021, <https://www.kidney.org/news/lifestyle-modifications-improve-ckd-patient-outcomes>.
- vi *Chronic Kidney Disease Tests & Diagnosis*. (2016, October 1). National Institutes of Diabetes and Digestive and Kidney Diseases. Retrieved March 1, 2021, <https://www.niddk.nih.gov/health-information/kidney-disease/chronic-kidney-disease-ckd/tests-diagnosis>
- vii Thomas, R., Kanso, A., & Sedor, J. R. (2008). Chronic kidney disease and its complications. *Primary care*, 35(2), 329–vii. <https://doi-org.liboff.ohsu.edu/10.1016/j.pop.2008.01.008>
- viii End Stage Renal Disease (ESRD). (Unknown). John Hopkins Medicine- Health. Retrieved March 1, 2021, <https://www.hopkinsmedicine.org/health/conditions-and-diseases/end-stage-renal-failure>.
- ix *Managing Chronic Kidney Disease*. (2016, October 1). National Institutes of Diabetes and Digestive and Kidney Diseases. Retrieved March 1, 2021, <https://www.niddk.nih.gov/health-information/kidney-disease/chronic-kidney-disease-ckd/managing>
- x Anemia of Chronic Kidney Disease. (2020, December 17). Michigan Medicine, University of Michigan. Retrieved March 1, 2021, <https://www.uofmhealth.org/health-library/abr9104>.
- xi Lin, J., Fung, T. T., Hu, F. B., & Curhan, G. C. (2011). Association of dietary patterns with albuminuria and kidney function decline in older white women: a subgroup analysis from the Nurses' Health Study. *American Journal Of Kidney Diseases : The Official Journal of the National Kidney Foundation*, 57(2), 245–254. <https://doi-org.liboff.ohsu.edu/10.1053/j.ajkd.2010.09.027>
- xii Palmer, S. C., Maggo, J. K., Campbell, K. L., Craig, J. C., Johnson, D. W., Sutanto, B., Ruospo, M., Tong, A., & Strippoli, G. F. (2017). Dietary interventions for adults with chronic kidney disease. *The Cochrane database of systematic reviews*, 4(4), CD011998. <https://doi-org.liboff.ohsu.edu/10.1002/14651858.CD011998.pub2>
- xiii Khatri, M., Moon, Y. P., Scarmeas, N., Gu, Y., Gardener, H., Cheung, K., Wright, C. B., Sacco, R. L., Nickolas, T. L., & Elkind, M. S. (2014). The association between a Mediterranean-style diet and kidney function in the Northern Manhattan Study cohort. *Clinical Journal of the American Society of Nephrology: CJASN*, 9(11), 1868–1875. <https://doi.org/10.2215/CJN.01080114>
- xiv Asghari, G., Farhadnejad, H., Mirmiran, P., Dizavi, A., Yuzbashian, E., & Azizi, F. (2017). Adherence to the Mediterranean diet is associated with reduced risk of incident chronic kidney diseases among Tehranian adults. *Hypertension research: Official Journal of the Japanese Society of Hypertension*, 40(1), 96–102. <https://doi-org.liboff.ohsu.edu/10.1038/hr.2016.98>
- xv Mekki, K., Bouzidi-bekada, N., Kaddous, A., & Bouchenak, M. (2010). Mediterranean diet improves dyslipidemia and biomarkers in chronic renal failure patients. *Food & function*, 1(1), 110–115. <https://doi-org.liboff.ohsu.edu/10.1039/c0fo00032a>
- xvi Tyson, C.C, Lin, P., Corsino, L., Batch, B.C., Allen, J., Sapp, S., Barnhart, H., Nwankwo, C., Burroughs, J., Svetkey, L.P. (2016). Short-term effects of the DASH diet in adults with moderate chronic kidney disease: a pilot feeding study. *Clinical Kidney Journal*, 9(4), pp. 592–598. <https://doi-org.liboff.ohsu.edu/10.1093/ckj/sfw046>
- xvii Tyson, C. C., Davenport, C. A., Lin, P. H., Scialla, J. J., Hall, R., Diamantidis, C. J., Lunyera, J., Bhavsar, N., Rebholz, C. M., Pendergast, J., Boulware, L. E., & Svetkey, L. P. (2019). DASH Diet and Blood Pressure Among Black Americans With and Without CKD: The Jackson Heart Study. *American Journal of Hypertension*, 32(10), 975–982. <https://doi-org.liboff.ohsu.edu/10.1093/ajh/hpz090>
- xviii Hahn, D., Hodson, E. M., & Fouque, D. (2018). Low protein diets for non-diabetic adults with chronic kidney disease. *The Cochrane Database of Systematic Reviews*, 10(10), CD001892. <https://doi-org.liboff.ohsu.edu/10.1002/14651858.CD001892.pub4>
- xix Li, Q., Wen, F., Wang, Y., Li, S., Lin, S., Qi, C., Chen, Z., Qiu, X., Zhang, Y., Zhang, S., Tao, Y., Feng, Z., Li, Z., Li, R., Ye, Z., Liang, X., Liu, S., Xie, J., & Wang, W. (2021). Diabetic Kidney Disease Benefits from Intensive Low-Protein Diet: Updated Systematic Review and Meta-analysis. *Diabetes Therapy: Research, Treatment And Education Of Diabetes And Related Disorders*, 12(1), 21–36. <https://doi-org.liboff.ohsu.edu/10.1007/s13300-020-00952-5>

ENDNOTES

- xx Hahn, D., Hodson, E. M., & Fouque, D. (2020). Low protein diets for non-diabetic adults with chronic kidney disease. *The Cochrane Database of Systematic Reviews*, 10, CD001892. <https://doi-org.liboff.ohsu.edu/10.1002/14651858.CD001892.pub5>
- xxi *Exercise: What You Should Know*. (2014, March). National Kidney Foundation. Retrieved April 12, 2021, <https://www.kidney.org/atoz/content/exercisewyska>.
- xxii Barcellos, F. C., Del Vecchio, F. B., Reges, A., Mielke, G., Santos, I. S., Umpierre, D., Bohlke, M., & Hallal, P. C. (2018). Exercise in patients with hypertension and chronic kidney disease: a randomized controlled trial. *Journal of Human Hypertension*, 32(6), 397–407. <https://doi-org.liboff.ohsu.edu/10.1038/s41371-018-0055-0>
- xxiii Pei, G., Tang, Y., Tan, L., Tan, J., Ge, L., & Qin, W. (2019). Aerobic exercise in adults with chronic kidney disease (CKD): a meta-analysis. *International Urology and Nephrology*, 51(10), 1787–1795. <https://doi-org.liboff.ohsu.edu/10.1007/s11255-019-02234-x>
- xxiv Zhang, L., Wang, Y., Xiong, L., Luo, Y., Huang, Z., & Yi, B. (2019). Exercise therapy improves eGFR, and reduces blood pressure and BMI in non-dialysis CKD patients: evidence from a meta-analysis. *BMC nephrology*, 20(1), 398. <https://doi-org.liboff.ohsu.edu/10.1186/s12882-019-1586-5>
- xxv Choi, N. G., Sullivan, J. E., DiNitto, D. M., & Kunik, M. E. (2019). Associations between psychological distress and health-related behaviors among adults with chronic kidney disease. *Preventive Medicine*, 126, 105749. <https://doi-org.liboff.ohsu.edu/10.1016/j.ypmed.2019.06.007>
- xxvi Cukor, D., Coplan, J., Brown, C., Friedman, S., Cromwell-Smith, A., Peterson, R. A., & Kimmel, P. L. (2007). Depression and anxiety in urban hemodialysis patients. *Clinical Journal of the American Society of Nephrology : CJASN*, 2(3), 484–490. <https://doi-org.liboff.ohsu.edu/10.2215/CJN.00040107>
- xxvii Park, J., Lyles, R. H., & Bauer-Wu, S. (2014). Mindfulness meditation lowers muscle sympathetic nerve activity and blood pressure in African-American males with chronic kidney disease. *American journal of physiology. Regulatory, integrative and comparative physiology*, 307(1), R93–R101. <https://doi-org.liboff.ohsu.edu/10.1152/ajpregu.00558.2013>
- xxviii Haghshenas, M., Assarian, F., Omid, A., Razaghof, M., Rahimi, H. (2019). Efficacy of Mindfulness-based Stress Reduction in Hemodialysis Patients with Anxiety and Depression: a randomized, double-blind, parallel-group trial. *Electronic Physician*, 11(1), 7370–7377. <http://dx.doi.org/10.19082/7370>
- xxix Natale, P., Palmer, S. C., Ruospo, M., Saglimbene, V. M., Rabindranath, K. S., & Strippioli, G. F. (2019). Psychosocial interventions for preventing and treating depression in dialysis patients. *The Cochrane Database of Systematic Reviews*, 12(12), CD004542. <https://doi-org.liboff.ohsu.edu/10.1002/14651858.CD004542.pub3>
- xxx Sohn, B. K., Oh, Y. K., Choi, J. S., Song, J., Lim, A., Lee, J. P., An, J. N., Choi, H. J., Hwang, J. Y., Jung, H. Y., Lee, J. Y., & Lim, C. S. (2018). Effectiveness of group cognitive behavioral therapy with mindfulness in end-stage renal disease hemodialysis patients. *Kidney Research and Clinical Practice*, 37(1), 77–84. <https://doi-org.liboff.ohsu.edu/10.23876/j.krcp.2018.37.1.77>
- xxxi Chu, F., Yeom, C. T., Low, L. L., Tay, W. Y., Foo, W., & Seng, J. (2020). The role of Mind-Body Interventions in Pre-dialysis Chronic Kidney disease and Dialysis patients - A Systematic Review of literature. *Complementary Therapies in Medicine*, 102652. Advance online publication. <https://doi-org.liboff.ohsu.edu/10.1016/j.ctim.2020.102652>
- xxxii AlAnizy, L., AlMatham, K., Al Basheer, A., & AlFayyad, I. (2020). Complementary and Alternative Medicine Practice Among Saudi Patients with Chronic Kidney Disease: A Cross-Sectional Study. *International Journal Of Nephrology and Renovascular Disease*, 13, 11–18. <https://doi-org.liboff.ohsu.edu/10.2147/IJNRD.S240705>
- xxxiii Arjuna Rao, A. S., Phaneendra, D., Pavani, C., Soundararajan, P., Rani, N. V., Thennarasu, P., & Kannan, G. (2016). Usage of complementary and alternative medicine among patients with chronic kidney disease on maintenance hemodialysis. *Journal of Pharmacy & Bioallied Sciences*, 8(1), 52–57. <https://doi-org.liboff.ohsu.edu/10.4103/0975-7406.171692>
- xxxiv Yu, J. S., Ho, C. H., Wang, H. Y., Chen, Y. H., & Hsieh, C. L. (2017). Acupuncture on Renal Function in Patients with Chronic Kidney Disease: A Single-Blinded, Randomized, Preliminary Controlled Study. *Journal Of Alternative And Complementary Medicine (New York, N.Y.)*, 23(8), 624–631. <https://doi-org.liboff.ohsu.edu/10.1089/acm.2016.0119>
- xxxv Yang, T., Zhao, J., Guo, Q., Wang, Y., & Si, G. (2020). Acupoint injection treatment for non-dialysis dependent chronic kidney disease: A meta-analysis of randomized controlled trials. *Medicine*, 99(51), e23306. <https://doi-org.liboff.ohsu.edu/10.1097/MD.00000000000023306>
- xxxvi Kim, K. H., Kim, T. H., Kang, J. W., Sul, J. U., Lee, M. S., Kim, J. I., Shin, M. S., Jung, S. Y., Kim, A. R., Kang, K. W., & Choi, S. M. (2011). Acupuncture for symptom management in hemodialysis patients: a prospective, observational pilot study. *Journal Of Alternative and Complementary Medicine (New York, N.Y.)*, 17(8), 741–748. <https://doi-org.liboff.ohsu.edu/10.1089/acm.2010.0206>

- xxxvii Pandey, R. K., Arya, T. V., Kumar, A., & Yadav, A. (2017). Effects of 6 months yoga program on renal functions and quality of life in patients suffering from chronic kidney disease. *International Journal of Yoga*, 10(1), 3–8. <https://doi-org.liboff.ohsu.edu/10.4103/0973-6131.186158>
- xxxviii KaurickKlein Z. (2019). Effect of yoga on physical and psychological outcomes in patients on chronic hemodialysis. *Complementary Therapies in Clinical Practice*, 34, 41–45. <https://doi-org.liboff.ohsu.edu/10.1016/j.ctcp.2018.11.004>
- xxxix Shi, Z. M., Wen, H. P., Liu, F. R., & Yao, C. X. (2014). The effects of tai chi on the renal and cardiac functions of patients with chronic kidney and cardiovascular diseases. *Journal of Physical Therapy Science*, 26(11), 1733–1736. <https://doi-org.liboff.ohsu.edu/10.1589/jpts.26.1733>
- xl Chang, J. H., Koo, M., Wu, S. W., & Chen, C. Y. (2017). Effects of a 12-week program of Tai Chi exercise on the kidney disease quality of life and physical functioning of patients with end-stage renal disease on hemodialysis. *Complementary Therapies in Medicine*, 30, 79–83. <https://doi-org.liboff.ohsu.edu/10.1016/j.ctim.2016.12.002>
- xli Zins, S., Hooke, M. C., & Gross, C. R. (2019). Reiki for Pain During Hemodialysis: A Feasibility and Instrument Evaluation Study. *Journal Of Holistic Nursing: Official Journal of The American Holistic Nurses' Association*, 37(2), 148–162. <https://doi-org.liboff.ohsu.edu/10.1177/0898010118797195>
- xlii Hendricks, K., & Wallace, K. F. (2017). Pilot Study: Improving Patient Outcomes with Healing Touch. *Advances in peritoneal dialysis. Conference on Peritoneal Dialysis*, 33(2017), 65–67.
- xliii Hu, J., Liu, Z., & Zhang, H. (2017). Omega-3 fatty acid supplementation as an adjunctive therapy in the treatment of chronic kidney disease: a meta-analysis. *Clinics (Sao Paulo, Brazil)*, 72(1), 58–64. [https://doi-org/10.6061/clinics/2017\(01\)10](https://doi-org/10.6061/clinics/2017(01)10)
- xliv Saglimbene, V. M., Wong, G., van Zwieten, A., Palmer, S. C., Ruospo, M., Natale, P., Campbell, K., Teixeira-Pinto, A., Craig, J. C., & Strippoli, G. (2020). Effects of omega-3 polyunsaturated fatty acid intake in patients with chronic kidney disease: Systematic review and meta-analysis of randomized controlled trials. *Clinical Nutrition (Edinburgh, Scotland)*, 39(2), 358–368. <https://doi-org.liboff.ohsu.edu/10.1016/j.cnu.2019.02.041>
- xlv Ghosh, S. S., Gehr, T. W., & Ghosh, S. (2014). Curcumin and chronic kidney disease (CKD): major mode of action through stimulating endogenous intestinal alkaline phosphatase. *Molecules (Basel, Switzerland)*, 19(12), 20139–20156. <https://doi-org.liboff.ohsu.edu/10.3390/molecules191220139>
- xlvi *Why You Should Avoid Eating Starfruit.* (2021). National Kidney Foundation. Retrieved June 17, 2021, <https://www.kidney.org/atoz/content/why-you-should-avoid-eating-starfruit>

ABOUT THE AUTHOR – DR. WAYNE JONAS

Dr. Jonas is a practicing family physician, an expert in integrative health and health care delivery, and a widely published scientific investigator. Dr. Jonas is the executive director of Samuelli Integrative Health Programs, an effort supported by Henry and Susan Samuelli to increase awareness and access to integrative health. Additionally, Dr. Jonas is a retired lieutenant colonel in the Medical Corps of the United States Army. From 2001-2016, he was president and chief executive officer of Samuelli Institute, a nonprofit medical research organization supporting the scientific investigation of healing processes in the areas of stress, pain, and resilience.

Dr. Jonas was the director of the Office of Alternative Medicine at the National Institutes of Health (NIH) from 1995-1999, and prior to that served as the director of the Medical Research Fellowship at the Walter Reed Army Institute of Research. He is a fellow of the American Academy of Family Physicians.

His research has appeared in peer-reviewed journals, such as the *Journal of the American Medical Association*, *Nature Medicine*, *Journal of Family Practice*, *Annals of Internal Medicine*, and *The Lancet*. Dr. Jonas received the 2015 Pioneer Award from the Integrative Healthcare Symposium, the 2007 America's Top Family Doctors Award, the 2003 Pioneer Award from the American Holistic Medical Association, the 2002 Physician Recognition Award of the American Medical Association, and the 2002 Meritorious Activity Prize from the International Society of Life Information Science in Chiba, Japan.

To access more information on integrative health, including tools and resources for patients and providers, visit DrWayneJonas.com

DrWayneJonas.com

 [@DrWayneJonas](https://twitter.com/DrWayneJonas)



This report has been developed with the generous support, and on behalf of, the Samueli Foundation.

