

Watch Out if You Drink This While Working in Hot Weather

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✓ Fact Checked

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STORY AT-A-GLANCE

- › Research demonstrates the acute deleterious effects soda can have on your kidney function when used to quench your thirst during exertion on a hot day
- › Drinking soda causes dehydration and raises markers for kidney disease when consumed after performing manual labor or exercise in 95-degree F. weather
- › When you exert yourself in a hot environment, your body regulates blood pressure and conserves water by reducing blood flow to your kidneys. A sudden and steep drop in blood flow through your kidneys can cause acute kidney injury due to the fact that it reduces the amount of oxygen being delivered to your kidneys
- › Your diet has an overriding influence over the health of your kidneys, with sugar and excess protein topping the list of food components known to cause problems when consumed regularly
- › Poor kidney function is also associated with a number of other serious health problems, including Type 2 diabetes, high blood pressure and heart disease

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Your kidneys — two bean-shaped organs — are located just below your rib cage, one on either side of your spine. Positioned on top of each kidney are your adrenal glands. Each day, your kidneys filter up to 150 quarts of blood and flush out waste products through your urine.

One of the reasons why you need to drink enough water is to ensure healthy kidney function. In fact, chronic low-grade dehydration is one of the most common causes of kidney stones.

Poor kidney function is also associated with a number of other serious health problems, including Type 2 diabetes, hypertension (high blood pressure) and heart disease.

Common signs of kidney problems include:

- Frequent urination
- Problems urinating
- Pain or burning sensation during urination
- Chronic thirst

Good kidney function¹ is essential for maintaining homeostasis in your body, starting with the composition of your blood. For example, your kidneys are responsible for maintaining proper pH level and electrolyte balance (the ratios of sodium, potassium and phosphates). They also produce hormones that make red blood cells, and those that help regulate your blood pressure.

Drinking Soda While Exercising in the Heat Is a VERY Bad Idea

Your diet has an overriding influence over the health of your kidneys, with sugar and excess protein topping the list of food components known to cause problems when consumed regularly.

Most Americans consume three to five times more protein than they need, and two to four times (or more) fructose than is considered safe. These two dietary factors alone, and especially in combination, place significant stress on your kidneys and promote kidney disease and kidney stones.

Recent research demonstrates the acute deleterious effects soda can have on your kidney function when used to quench your thirst during exertion on a hot day. The study,² published in the American Journal of Physiology – Regulatory, Integrative and

Comparative Physiology, found soda caused dehydration and raised markers for kidney disease when consumed after performing manual labor in 95-degree F. weather. As reported by Science Daily:³

“The volunteers completed ... a 30-minute treadmill workout followed by three different five-minute lifting, dexterity and sledgehammer swinging activities. After 45 minutes of exercise, the volunteers rested for 15 minutes ... while drinking 16 ounces of either a high-fructose, caffeinated soft drink or water.

After the break, they repeated the cycle three more times for a total of four hours. Before leaving the laboratory, the volunteers were given more of their assigned beverage to drink before consuming any further fluids. The volume was either 1 liter or a volume equal to 115 percent of their body weight lost through sweating, if that amount was greater.”

Core body temperature, heart rate, blood pressure, body weight and markers of kidney injury were measured before exercise, immediately after and 24 hours later. Seven days later, the volunteers – which were an average age of 24 – underwent the same trial again, but switched groups, so those who received soda the first time now received water, and vice-versa.

When volunteers drank soda, 75% of them had elevated levels of creatinine in their blood, a marker for kidney injury. Only 8% of participants in the water trial had elevated creatinine. When drinking soda, volunteers also had:

- A lower glomerular filtration rate, another marker for kidney injury
- Higher uric acid levels
- Mild dehydration
- Higher levels of vasopressin, an antidiuretic hormone that raises blood pressure

As noted by the authors:

“The consumption of soft drinks during and following exercise in the heat does not rehydrate. Thus, consuming soft drinks as a rehydration beverage during

exercise in the heat may not be ideal⁴ ...

These findings indicate that consuming a soft drink during and following exercise in the heat induces AKI [acute kidney injury], likely via vasopressin mediated mechanisms.⁵"

How Exercise During Hot Weather Affects Your Kidneys

While soda, which is typically loaded with both high fructose corn syrup and caffeine, is harmful at any time, it may be particularly deleterious during hot weather.

The reason for this is because when you exert yourself in hot weather, your body regulates blood pressure and conserves water by reducing blood flow to your kidneys. A sudden and steep drop in blood flow through your kidneys can cause acute kidney injury due to the fact that it reduces the amount of oxygen being delivered to your kidneys.

Previous research has shown that exercising in hot temperatures raises biomarkers of acute kidney injury⁶ – even without the addition of soda – and that high-fructose beverages raise the risk of acute kidney injury when you're dehydrated.⁷ So, it makes sense that combining the two together – exertion in heat plus soda consumption – would impede healthy kidney function and raise your risk of acute kidney injury.

On a side note, analgesic drugs are also known to damage your kidneys when taken in excess, and/or over long periods of time. This includes aspirin, anti-inflammatory drugs, ibuprofen, naproxen and acetaminophen, especially when taken in combination with alcohol, even if the amount of alcohol is small.

Research^{8,9} shows combining alcohol with acetaminophen raises your risk of kidney damage by 123%, compared to taking either of them individually, so mixing soda, alcohol and an analgesic when working in your yard on a hot afternoon may be one of the most hazardous combinations conceivable.

What Is Acute Kidney Injury and What Causes It?

Acute kidney injury occurs when there's a sudden reduction in blood flow, resulting in renal failure. In fact, the two terms are synonymous. Severe dehydration, an accident, surgery and even cumulative overdose (or purposeful overdose) of acetaminophen, ibuprofen or naproxen could bring it on.

Chronic inflammation, such as what takes place in diabetics or heart disease patients, infections (such as sepsis), blockages or allergic reactions could also cause renal failure.

About half of acute kidney injury sufferers can be treated without permanent damage; the rest will likely require either a kidney transplant or dialysis, meaning that a machine filters your blood. Symptoms might include pain, weakness, lightheadedness, loss of appetite, nausea and vomiting, extreme thirst and decreased urination.

Dietary Keys to Protect Your Kidney Function

To protect your kidney function, keep the following basics in mind:

Restrict fructose to 25 grams per day (about 6 teaspoons) or less, especially if you're insulin/leptin resistant.

Restrict protein to just what your body needs — An ideal protein intake is likely around one-half gram of protein per pound (1 gram of protein per kilogram) of lean body mass, not total body weight. In this formula, you must first determine your lean body mass.

To do that, subtract your percent body fat from 100. For example, if you have 30% body fat, then you have 70% lean body mass. Then multiply that percentage (in this case, 0.7) by your current weight to get your lean body mass in pounds or kilos.

As an example, if you weigh 170 pounds: 0.7 multiplied by 170 equals 119 pounds of lean body mass. Using the "0.5 gram of protein" rule, you would need 59.5 or just under 60 grams of protein per day. If you have kidney disease, the American Kidney

Fund recommends restricting protein to certain amounts based on your current stage of chronic disease.¹⁰

Drink pure, clean water — Simply swapping out sweetened beverages like sodas and fruit juices for pure water can go a long way toward improving your kidney function and overall health. The best way to gauge your water needs is to observe the color of your urine (it should be light pale yellow) and the frequency of your bathroom visits (ideally, this is around 7 to 8 times per day).

Eat plenty of fresh, ideally organic, vegetables — One of the best things you can do for your kidneys is to eat three or four servings of vegetables and fruits daily. Your kidneys produce hormones regulating arterial and venous constriction, which affects your blood pressure. They also regulate your circulating blood volume. These two functions work together to maintain your blood pressure within normal limits.

High blood pressure is the second-leading cause of kidney failure.¹¹ Interestingly, research¹² shows simply increasing vegetable intake lowers systolic blood pressure in subjects with kidney disease more effectively than blood pressure medication.

Dr. Nimrit Goraya, study author and program director for nephrology at Baylor Scott & White Health in Temple, Texas, said that for people with kidney disease — or those wanting to prevent it — the importance of eating the right foods rather than settling for medications was "huge."

Adjust your potassium intake based on your kidney function — Your kidneys are responsible for maintaining the proper amount of potassium in your body. If they're not working well, your potassium level could actually become excessively elevated. So, it's important to consider your kidney function when assessing your potassium needs.

If your kidneys are working well, the recommended amount of potassium for adults is about 4,700 mg per day,¹³ which also needs to be balanced with sodium. As a general rule, your potassium to sodium ratio should be around 5-to-1. The easiest

way to achieve this ratio is to eat lots of fresh vegetables, ideally organically and locally grown to ensure optimal nutrient content.

This type of whole food diet will naturally provide much larger amounts of potassium in relation to sodium, whereas a processed food diet is virtually guaranteed to provide you with a lopsided ratio.

If you have kidney disease, you need to pay careful attention to your potassium level and dietary intake. Most who are being treated for kidney disease will monitor their potassium level by measuring it monthly, and potassium-restricted diets typically recommend keeping potassium intake to about 2,000 mg per day.

Kidney-Friendly Superfoods

Adding the following foods to your diet can also help promote optimal kidney function. ^{14,15,16,17}

Red bell peppers – Low in potassium, rich in vitamins A, B6, C, folic acid and fiber

Cabbage – Low in potassium, rich in vitamins C and K, fiber and phytochemicals that protect against free radical damage

Cauliflower – High in vitamin C, folate and fiber

Garlic – Antioxidant, anti-inflammatory and anticlotting properties

Onion – Low in potassium, rich in antioxidants, particularly quercetin, which has natural antihistamine properties

Apples – High in fiber, antioxidants, and anti-inflammatory compounds. Raw organic apple cider vinegar is helpful for the prevention of kidney stones

Berries¹⁸ – Including blueberries, raspberries and strawberries

Cherries – Rich in antioxidants and phytochemicals

Red and purple grapes – Rich in antioxidants; the skin is particularly rich in resveratrol

Watermelon – Rich in water, with diuretic properties, allowing you to produce more urine to flush out toxins

Lemon juice – Helps reduce kidney stone formation

Pumpkin seeds – Rich in antioxidants, vitamins and minerals, especially magnesium, which helps reduce the risk of kidney stones

Kale – Lower in potassium, good source of vitamins A and C

Sweet potatoes – Rich in beta-carotene, vitamins A and C and fiber; and a good source of B6 and potassium

Herbal Kidney Cleansers

A number of herbs also have kidney-cleansing properties, including the following:

Ginger – Purifies the blood and kidneys of toxins

Turmeric – Has antiseptic and anti-inflammatory properties that help prevent and treat kidney infections and inflammation

Dandelion – A natural diuretic that helps strengthen the kidneys and soothe urinary tract problems

Nettle – Natural diuretic that helps purify blood and treat urinary tract infection; also high in iron, making it beneficial for building blood. Avoid if you already have high iron

Marshmallow root – Natural diuretic that helps treat urinary tract infections, kidney stones and bladder infections

Juniper – Improves kidney function and helps treat urinary tract infections and kidney and bladder stones

Contraindication – Avoid juniper berry if you have a kidney infection or are pregnant. Also, don't take continuously for more than four weeks

Yarrow root – A natural diuretic with antiseptic and anti-inflammatory properties; helpful for urinary tract infections

Red clover – Diuretic that stimulates waste removal from the kidneys

Chanca piedra – Used in South America to break up kidney stones (its Spanish name actually means “stone breaker”)

Hydrangea root – Native American remedy for kidney stones

Uva ursi root – Helps treat urinary and bladder problems

Gravel root (Joe-Pye weed) – Indian remedy for urinary tract and kidney health

Goldenrod root – Native American remedy traditionally used to support urinary tract and kidney health

Sources and References

- ¹ Medical News Today February 4, 2016
- ^{2, 5} American Journal of Physiology – Regulatory, Integrative and Comparative Physiology January 2, 2019
- ^{3, 4} Science Daily January 17, 2019
- ⁶ Eur J Appl Physiol Occup Physiol. 1996;72(5-6):522-7
- ⁷ Am J Physiol Regul Integr Comp Physiol. 2016 Jul 1;311(1):R57-65
- ⁸ Medical News Today November 4, 2013

- ⁹ 141st annual American Public Health Association Meeting, Online Program
- ¹⁰ American Kidney Fund, Protein
- ¹¹ Kidney.org High Blood Pressure and Chronic Kidney Disease
- ¹² US News September 14, 2016
- ¹³ NIH.gov, Potassium Fact Sheet
- ¹⁴ Healthy and Natural World, Foods and Herbs to Cleanse Your Kidneys
- ¹⁵ Onegreenplanet.org
- ¹⁶ National Kidney Foundation, 7 Kidney-Friendly Superfoods
- ¹⁷ Natural Society June 23, 2015
- ¹⁸ LowOxalateInfo.com