# Reduced kidney function linked to increased risk of dementia

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Chronic kidney disease is when a person's kidneys progressively lose their ability to filter waste from the blood and eliminate fluids. Now a new study has found that people with reduced kidney function may have an increased risk of developing dementia. The study is published in the May 5, 2021, online issue of *Neurology*.

Chronic kidney disease affects approximately 15% of adults in the United States and it is more common as people age. However, since many people don't experience symptoms until later stages, it is estimated that 90% of people with chronic kidney disease don't know they have it.

"Even a mild reduction in kidney function has been linked to an increased risk of cardiovascular disease and infections, and there is growing evidence of a relationship between the kidneys and the brain," said study author Hong Xu, M.D., Ph.D., of Karolinska Institute in Stockholm, Sweden. "Just like with chronic kidney disease, the risk of dementia increases as people age. With no effective treatments to slow or prevent dementia, it is important to identify possible modifiable risk factors. If we could prevent or delay some cases of dementia by preventing or treating kidney disease, that could have important public health benefits. Our study shows that reduced kidney function is linked to the development of dementia, however it does not prove that it is a cause."

For the study, researchers used a database to identify nearly 330,000 people 65 years and older who received health care in the city of Stockholm and were followed for an average of five years. None of the participants had dementia or had undergone kidney transplants or dialysis at the start of the study. Over the course of the study 18,983 people, or 6% of participants, were diagnosed with dementia.

Creatinine is a waste product from muscles that is removed from the blood by the kidneys and released into the urine. Using blood tests of plasma creatinine, researchers estimated the glomerular filtration rate for each participant, a measure of how well the blood is filtered by the kidneys and that is commonly used to approximate kidney function. An estimated filtration rate of 90 milliliters (mL) per minute or higher is considered normal in most healthy people.

Using this measure, researchers then determined the rates of dementia in people with different levels of kidney function. They used person-years to calculate the difference. Person-years take into account both the number of people in the study and the amount of time each person spends in the study.

Researchers found as kidney function decreased, the rate of dementia increased. In people with a normal kidney filtration rate of 90 to 104 mL per minute, there were seven cases of dementia per 1,000 person-years. In people with severe kidney disease, or a filtration rate of less than 30 mL per minute, there were 30 cases of dementia per 1,000 person-years.

After adjusting for other factors that could affect dementia risk like smoking, alcohol use, hypertension and diabetes, researchers determined that people with filtration rates of 30 to 59 mL per minute, which indicates moderate chronic kidney disease, had a 71% higher risk of developing dementia compared to those with normal kidney function, and people with filtration rates of less than 30 mL per minute had a 162% higher risk.

Researchers also examined data on 205,622 participants who had multiple blood tests over one year. They used those tests to estimate the speed of kidney function decline. They found that a steeper decline in a person's filtration rates during this time frame was also associated with a higher risk of a dementia diagnosis later on.

According to researchers, 10% of the dementia cases could be attributed to a filtration rate of 60 mL per minute or less, which is a higher proportion of dementia cases than those attributed to other dementia risk factors like cardiovascular disease and diabetes.

"Our study identifies chronic kidney disease as a possible risk factor for dementia, however while it shows an association, it does not prove that it is a cause," said Xu. "More research is needed to determine the exact reasons for the association. Still, our findings raise awareness of the link between these two conditions and may help health professionals develop and implement strategies to screen for kidney disease and monitor kidney function in people at risk of dementia. Identifying and treating cases sooner may reduce the risk of dementia."

A limitation of the study was that dementia was identified by clinical diagnoses. Access to participants' medical records may have helped to identify more cases.

**More information:** "Kidney function, kidney function decline and the risk of dementia in older adults: A registry-based study," *Neurology* (2021). DOI: 10.1212/WNL.0000000000012113

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