

The Known and Unknown Factors Involved in Chronic Kidney Disease

Narrator: Have you ever used an air filter or a water filter in your home? If you have, you know that filters can help improve the quality of the air you breathe or the water you drink by removing unwanted particles or contaminants. But did you know that your body has a built-in filtration system, too?

Your kidneys filter all the blood in your body every 30 minutes, removing toxins and waste products, and helping to keep you healthy. Your kidneys also make important hormones that help control your blood pressure, make red blood cells, and keep your bones strong!

When the kidneys are diseased or damaged, they can't properly filter blood. This can lead to health problems such as heart disease, stroke, anemia, or increased occurrence of infections.

We caught up with Dr. Madeleine Scammell, associate professor of environmental health at Boston University's School of Public Health to learn more about kidney disease and some of the environmental factors that contribute to a unique form of the disease, called chronic kidney disease of uncertain origin or CKDu, that researchers are still working to understand.

According to Scammell, there are several common risk factors for kidney disease that we need to know about before we learn more about CKDu.

Scammell: The primary cause of chronic kidney disease in the general population is diabetes. So diabetes affects the body's ability to process sugar, and over time that excess sugar in the blood damages the cells in the kidneys, whose job it is to filter the blood. So the damaged cells leads to decreased kidney function. Age is also a risk factor for kidney disease, and then genetics can play a role as well.

Narrator: Another common risk factor for kidney disease is high blood pressure, also called hypertension. But according to Dr. Scammell, there has been a significant increase in chronic kidney diseases that cannot be explained by these traditional risk factors, known as CKDu. Increasingly, attention is being focused on the environmental factors that may be involved, such as exposure to potentially harmful chemicals. While researchers are still working to understand the cause of this unique epidemic, Scammell says that this form of the disease tends to occur earlier in life and to occur in specific agricultural regions like Sri Lanka, El Salvador, and Nicaragua.

Scammell: The people who seem to be most affected by CKDu are generally younger than we would expect. The Global Burden of Disease country profile for El Salvador says that chronic kidney disease is the second-leading cause of all deaths, having increased 44% from 2005 to 2016, and it's a leading cause of death among all younger men in both El Salvador and Nicaragua. So we know it's not caused by the three major risk factors for traditional kidney disease which are diabetes, hypertension, and age, but we don't know the cause, or causes if there's more than one. So that's a big part of the public health problem because if we don't know the cause, we can't easily find a solution.

Narrator: To better understand this unique form of kidney disease, Scammell and her team have been studying agricultural workers in El Salvador and Nicaragua. They're exploring whether environmental factors, such as heat and physical exertion and exposure to metals or herbicides, are contributing to decreased kidney function and kidney disease.

A key feature of Scammell's research is the active involvement of community members, an approach called community-based participatory research.

Scammell: It's really important that the origin of our research questions be rooted in the concerns and experiences of people on the ground, on the front lines of environmental health hazards, and that the questions we ask and the methods we use reflect their experience. So, on our research team we spend a lot of time trying to share power and decision making and talk through questions and challenges.

In terms of working with communities, I'm still learning about how deeply this disease is affecting a community and people, physically, economically and socially, and I'm learning that the stigma and barriers to treatment are profound. We definitely need solutions. I hope our study will help us understand some of the environmental and occupational exposures that contribute to the onset of chronic kidney disease so that we can identify solutions to protect public health.

Narrator: So far, Scammell and her team have found evidence that heat exposure contributes to kidney disease among sugarcane workers and brickmakers in Nicaragua. While they are still analyzing data to understand the potential role of exposure to metals and pesticides, Scammell stresses that it is unlikely that any one factor causes CKDu, and that it could be a combination of these factors and others that contribute to the disease.

As more attention is focused on CKDu and the many unknown factors involved, NIEHS and other institutes, like the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) are partnering to address this growing problem. In fact, NIEHS and NIDDK recently hosted a workshop that brought together clinicians, scientists, epidemiologists, and public health officials to discuss the current gaps in knowledge about the causes and potential treatments for chronic kidney diseases in agricultural communities. According to Scammell, seeing NIDDK and NIEHS collaborating on a major public health problem was very encouraging. She says that having the National Institutes of Health leading a coordinated effort among its institutes will provide opportunities for finding solutions that will make a difference in people's lives.

While there might not be a high risk for CKDu where you live, traditional chronic kidney disease still affects one in seven adults in the United States. As a researcher who has been investigating the factors involved in kidney disease in Central America, Scammell says one of the most important things you can do is drink enough water and stay hydrated. You can also protect yourself from potentially harmful exposures by using protective equipment if you must use pesticides and herbicides, and making safer consumer choices by selecting more natural personal care products and organically grown produce.

You can find out more about kidney disease and what NIEHS grantees like Scammell are doing to understand and address this problem on our website by visiting our Environmental Health Chat web page, where you can access related materials and publications.

Thanks to today's guest, Dr. Madeleine Scammell for joining us.

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