

Fuel smoke linked to cardiovascular issues

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A Peruvian woman cooks in her home, filling the air with smoke. Researchers have linked such smoke to cardiovascular problems. Credit: William Checkley

(Medical Xpress)—Rural households in developing countries often rely on burning biomass, such as wood, animal dung and waste from agricultural crops, to cook and heat their homes. The practice is long known to cause lung disease, but a new study from Washington University School of Medicine in St. Louis and Johns Hopkins University School of Medicine links the resulting smoke to cardiovascular problems, including an increase in artery-clogging plaques, artery thickness and higher blood pressure.

"In these homes, you can hardly see your hand in front of your face when families are cooking or burning fuel for heat," said Washington University cardiologist Victor Davila-Roman, MD, professor of medicine. "Everyone in the household is affected, but women in particular take the brunt of it because they are home much of the day and do the cooking."

The researchers, including the study's first author, Matthew Scott Painschab, MD, a School of Medicine graduate who did this work as a National Institutes of Health (NIH) Fogarty Scholar, studied 266 men and women in Puno, Peru, and the surrounding rural communities. People in the city, which has a population of about 100,000, primarily use cleaner fuels including liquid propane gas, kerosene and electricity to cook. In contrast, people in the surrounding communities use open-fire stoves.

Reporting their results recently in the journal *Heart*, the investigators found that indoor particulate matter measured 20 times higher in the rural homes. Comparing the two groups, they also found significantly thicker carotid arteries – the vessels that feed blood to the brain – in the rural [study participants](#), even after adjusting for age, gender, [cholesterol levels](#), [body mass index](#) and other factors known to affect cardiovascular health. The rural residents also had more [plaque buildup](#) in the carotid arteries and higher blood pressure than their city-dwelling counterparts. Such factors are known to increase the risk of heart attack and stroke.

"Our study brings attention to the fact that reducing biomass fuel smoke through improved cook stove programs could potentially decrease the risk of heart disease and stroke in resource-limited settings," said Johns Hopkins University pulmonologist William Checkley, MD, PhD, assistant professor of medicine, who co-mentored Painschab with Davila-Roman.

With 90 percent of rural households worldwide burning biomass fuel, the researchers say their data highlights a major public health problem. Davila-Roman said the study and others like it lay the groundwork for future trials that look at the effects of altering these cooking stoves to direct the smoke outside the home.

"The alterations can't be too expensive," Davila-Roman said. "And even with a reasonable cost, we have to have solid evidence to convince the people making the decisions that modifying these stoves is worthwhile."

More information: Painschab, M. et al. Chronic exposure to biomass fuel is associated with increased carotid artery intima-media thickness and a higher prevalence of atherosclerotic plaque, *Heart*. Online April 25, 2013.

Provided by Washington University School of Medicine in St. Louis

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