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Chronic kidney disease (CKD) is extremely common in younger men (under the age of 40) along the Pacific coast of Central America and is having a devastating impact. This type of CKD, for which there are only suspected and not established causes, is referred to as Mesoamerican Nephropathy. It is especially frequent among workers in the agricultural sector. The Boston University Research Group for the study of CKD in Central America, which has been studying this disease for over 10 years, began the Mesoamerican Nephropathy Occupation Study (MANOS) in 2018 to investigate how it affects workers in different industries in two countries, and whether exposures (heat, heavy metals, and pesticides) contribute to kidney injury and/or disease.

Our Boston University research team includes collaborators in El Salvador and Nicaragua. They recruited 569 male participants between the ages of 18 and 45 and with no known history of CKD or related health issues. Initial, Round 1, data collection included questionnaires about demographics, health behaviors, and possible occupational and home-based exposures. Participants were then monitored for three days during their work shift and completed a pre- and post-shift physical examination and blood and urine collection. Ambient temperature was measured using wet bulb globe thermometers and most participants were fitted with accelerometers, heart-rate monitors, and internal temperature devices to measure their physical exertion, heart rate, and core body temperature during their shift.

Participants were followed up six months later for a second round of data collection, including questionnaires, blood and urine. Estimated glomerular filtration rate (eGFR), a measure of how well the kidneys filter waste from the blood, was calculated for each participant at each round. Participants with eGFR values of <60mL/min/1.73m^2 at both rounds were considered as having CKD. We found that the percentage of people with CKD was 7.4, despite excluding participants with known kidney disease. Most cases were classified as Stage 3. CKD prevalence increased with age (0.6% of 18–24-year-olds presented with CKD, compared to 18.4% of those aged 35-45). The occupations with the highest CKD prevalence were sugarcane (14.1%) and corn (11.6%) in El Salvador, followed by brick in Nicaragua (8.1%). A prevalence of 0.9% was observed in Nicaraguan sugarcane workers, yet it should be noted that this low prevalence is likely due to pre-employment screening in Nicaragua that excludes workers with poor kidney function.

The study highlights notably high CKD rates in Salvadoran agriculture sectors (especially corn, which has not previously been studied) and Nicaraguan brickmaking. Participants with a family history of disease were at greater risk, consistent with prior studies in the region. Serum potassium and uric acid levels among our study participants with CKD were not typical compared with people who have other forms of CKD, providing clues for further analysis as to the cause of disease. The next steps for MANOS are to analyze kidney function over all rounds of data collection in relation to various exposures.