

## Poverty: The Common Denominator of CKD's Global Threat

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*"I think that we are an important voice speaking on behalf of the world's most voiceless people today—the sick and dying among the poorest of the poor. The stakes are high. Let's therefore speak boldly so that we can feel confident that we have fulfilled our task as well as possible."*

—Jeffrey Sachs

Chronic kidney disease (CKD) is increasingly recognized as a global public health problem and is a key determinant of poor health outcomes. Reports from Europe, Australia, Asia, Africa and Latin America confirm a high prevalence of CKD. While the magnitude of CKD has been better defined in developed countries, increasing evidence indicates that the burden of CKD is as great or even greater in developing countries. Disadvantaged communities—i.e., those from low socioeconomic status, racial and ethnic minority and/or indigenous backgrounds—suffer from marked increases in incidence, prevalence and/or complications of CKD. The fact that even in developed countries, racial and ethnic minorities bear a disproportionate burden of the disease suggests there is much to learn beyond the traditional risk factors contributing to CKD and its associated complications.

The lack of renal registries means that there are no reliable statistics about CKD prevalence in most of the developing world. However, it is known that diabetes and hypertension are the leading causes of chronic kidney disease in all developed and many developing countries. By contrast, infectious diseases continue to play an important role as a cause of end-stage renal disease in low-income countries, secondary to poor sanitation, inadequate supply of safe water and high concentrations of disease vectors.

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between poverty and ill health, in which among other factors, environmental exposures to heavy metals or other toxins and pollutants may play a significant role in the development of CKD. The elevated prevalence of CKD of unspecified cause that has been reported in male farmers in various developing countries confirms this relationship. Indeed, in Nicaragua, increased CKD rates in male farmers aged <60 years were found to be associated with pesticide exposure, dehydration, alcohol consumption and exposure to heavy metals.


Costa Rica has reported a higher incidence of chronic renal disease among young sugarcane workers, with clinical and histological findings of chronic interstitial nephritis. In El Salvador, a high prevalence of CKD (17%) was found among male farmers exposed to toxic pollutants. In Mexico, in one third of incident dialysis patients, the etiology is unknown.

Studies in Sri Lanka have found an association between pesticide poisoning and pollutants with repeated episodes of acute renal

failure and CKD, respectively. In India and Pakistan, a large percentage of CKD cases are of undetermined etiology and environmental factors have been postulated in causation of the disease.

Additionally, the use of traditional herbal medications is common and frequently associated with CKD among the poor. Nephrotoxicity resulting from their use has accounted for 37.5% of cases of acute tubular necrosis in Nigeria. In East Africa, about 11% of cases of acute renal failure have been attributed to traditional herbal remedies. In South Africa, use of herbal medicine and infections are among the commonest medical causes of acute renal failure. Traditional remedies have rarely been analyzed and the active nephrotoxic components have not been isolated and characterized in most cases.

The association of poverty and disease could explain the increased burden of CKD in these populations. Poverty negatively influences three major determinants of health: healthy behaviors, health care access and environmental exposure—all of which contribute to health care disparities through a number of mechanisms. First, the poor are much more susceptible to disease because of lack of access to clean water and sanitation, information about preventive behaviors and adequate nutrition. Second, they often lack access to medical care and/or are much less likely to seek it, because of greater distance from health care providers, lack of resources needed to pay for health expenditures and their lack of education on how best to respond to illness. Third, environmental exposure to heavy metals and other pollutants, as well as lifetime exposure to poverty, increase their risk of kidney disease. Additionally, genetic or biologic predisposition may be involved in cases with accelerated CKD progression in the setting of poverty, as seen in nondiabetic patients with focal segmental glomerulosclerosis.

In summary, poverty is associated with poor health outcomes, including CKD. A concerted attack against these diseases—by increased community outreach, better education, improved economic opportunity and access to preventive medicine for those at risk—could end the relationship between CKD and poverty in these communities. Investments in health therefore merit a special place within the strategies for poverty and disease reduction now under way in many low-income countries. 

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