

World Kidney Day 2015: CKD in Disadvantaged Populations



Of all of the forms of inequality, injustice in health is the most shocking and inhumane.

Dr Martin Luther King Jr

March 12, 2015, will mark the 10th anniversary of World Kidney Day (WKD), an initiative of the International Society of Nephrology (ISN) and the International Federation of Kidney Foundations. Since its inception in 2006, WKD has become the most successful effort ever mounted to raise awareness among decision makers and the general public about the importance of kidney disease. Each year WKD reminds us that kidney disease is common, harmful, and treatable. The focus of WKD 2015 is chronic kidney disease (CKD) in disadvantaged populations. This editorial reviews the key links between poverty and CKD and the consequent implications for the prevention of kidney disease and the care of patients with kidney disease in these populations.

CKD increasingly is recognized as a global public health problem and a key determinant of the poor health outcomes. There is compelling evidence that disadvantaged communities, that is, those from low resource and minority racial and ethnic communities and/or indigenous and socially disadvantaged backgrounds, have marked increases in the burden of unrecognized and untreated CKD. Although the entire populations of some low- and middle-income countries could be considered disadvantaged, further discrimination on the basis of local factors creates a position of extreme disadvantage for certain population groups (peasants, those living in some rural areas, women, the elderly, religious minorities, etc). Even in developed countries, racial and ethnic minorities bear a disproportionate burden of CKD and have worse outcomes, which suggests there is much to learn beyond the traditional risk factors contributing to CKD-associated complications.¹

About 1.2 billion people live in extreme poverty worldwide. Poverty negatively influences healthy behaviors, health care access, and environmental exposure, all of which contribute to health care disparities² (Box 1). The poor are more susceptible to disease because of lack of access to goods and services, in particular, clean water and sanitation, information about preventive behaviors, and adequate nutrition, and have reduced access to health care.³

CKD IN DEVELOPED COUNTRIES

In the United States, ethnic minorities have a higher incidence of end-stage renal disease (ESRD). Despite similar prevalence rates for early stages of CKD,⁴ poor outcomes such as ESRD are 1.5 to 4 times higher^{2,5,6,7}

among minorities (ie, African Americans, Hispanics, and Native Americans). Poverty further increases the disparity in ESRD, with African Americans being at greater risk.⁸ In the United Kingdom, rates of treated chronic kidney failure are higher in ethnic minority groups and with increasing social deprivation.⁹ Similarly in Singapore, the CKD prevalence is higher among Malays and Indians compared with the Chinese, with socioeconomic and behavioral factors accounting for 70% to 80% of the excess risk.¹⁰

ESRD incidence also is higher among the less advantaged indigenous populations in developed countries. Canadian First Nations people experience ESRD at rates 2.5 to 4 times higher than the general population.¹¹ In Australia, the increase in the number of indigenous people starting renal replacement therapy (RRT) during the past 25 years exceeded that of the nonindigenous population by 3.5-fold, largely due to a disproportionate (>10-fold) difference in ESRD due to type 2 diabetic nephropathy, a disease largely attributable to lifestyle issues such as poor nutrition and lack of exercise.¹² Indigenous populations also have a higher incidence of ESRD due to glomerulonephritis and hypertension.¹³ Compared with the US general population, the ESRD incidence rate is higher in Guam and Hawaii, where the proportion of indigenous people is high, again driven primarily by diabetic ESRD.¹⁴ Native Americans have a greater prevalence of albuminuria and higher ESRD incidence rate.¹⁵⁻¹⁸ Nearly three-quarters of all incident ESRD cases among this population have been attributable to type 2 diabetes.

CKD IN DEVELOPING COUNTRIES

Poverty-related factors such as infectious diseases secondary to poor sanitation, inadequate supply of safe water, environmental pollutants, and high concentrations of disease-transmitting vectors continue to play an important role in the development of CKD in low-income countries. Although rates of diabetic nephropathy are increasing, chronic glomerulonephritis

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Box 1. Possible Mechanisms by Which Poverty Increases the Burden of Disease**Health Behaviors**

- Lack of information on preventive behaviors
- Lack of knowledge on how best to respond to an episode of illness
- Health beliefs and unhealthy behaviors

Access to Health Care

- Lack of access to health care
- Greater distance from health care providers
- Lack of out-of-pocket resources

Biological Factors

- Low birth weight
- Genetic predisposition
- Cumulative biological risk profiles
- Inadequate nutrition

Environmental Factors

- Increased exposure to pollutants
- Increased exposure to communicable diseases
- Lack of clean water and sanitation

and interstitial nephritis are among the principal causes of CKD in many countries. Of note is the emergence of human immunodeficiency virus (HIV)-associated nephropathy as the major cause of CKD in Sub-Saharan Africa.¹⁹

A high prevalence of CKD of unknown cause has been reported in rural agricultural communities from Central America, Egypt, India, and Sri Lanka. Male farmworkers are affected disproportionately, and the clinical presentation is suggestive of interstitial nephritis, confirmed on kidney biopsies. The strong association with farm work has led to suggestions that exposure to agrochemicals, dehydration, and consumption of contaminated water might be responsible.²⁰ Additionally, the use of traditional herbal medications is common and frequently associated with CKD among the poor.^{21,22} In Mexico, CKD prevalence among the poor is 2- to 3-fold higher than in the general population, and the cause is unknown in 30% of patients with ESRD.²³⁻²⁶

LOW BIRTH WEIGHT AND RISK OF CKD IN THE DISADVANTAGED POPULATIONS

An association between low birth weight due primarily to nutritional factors and kidney disease has been described in disadvantaged populations. In Australia, the frequency of low birth weight is more than double in the aboriginal population than in the nonaboriginal population. The high prevalence of albuminuria in this population has been linked to low nephron number related to low birth weight.^{27,28} Morphometric studies of kidney biopsies in aboriginals show glomerulomegaly, perhaps secondary to nephron deficiency, which might predispose to glomerulosclerosis.^{29,30} A correlation between low birth

weight and CKD also has been described in poor African Americans and whites living in the South-eastern United States.³¹ Similarly, in an Indian cohort, low birth weight and early malnutrition were associated with later development of metabolic syndrome, diabetes, and diabetic nephropathy.³² The finding of a high prevalence of proteinuria, elevated blood pressure, and CKD of unknown cause in South Asian children also may be explained by this mechanism.^{33,34}

DISPARITIES IN ACCESS TO RRT

A recent analysis shows that globally, there were 2.6 million people receiving dialysis in 2010, of which 93% were in high- or upper-middle-income countries. By contrast, the number of people requiring RRT was estimated at 4.9 to 9 million, suggesting that at least 2.3 million died prematurely because of lack of access to RRT. Although diabetes and hypertension increase the burden of CKD, the current provision of RRT is linked largely to 2 factors: per capita gross national product and age, suggesting that poverty is a major disadvantage for receiving RRT. By 2030, the number of people receiving RRT around the world is projected to increase to 5.4 million. Most of this increase will be in developing countries of Asia and Africa.³⁵

Access to RRT in the emerging world is dependent mostly on the health care expenditures and economic strength of individual countries, with the relationship between income and access to RRT being almost linear in low- and middle-income countries.^{19,36} In Latin America, RRT prevalence and kidney transplantation rates correlate significantly with gross national income and health expenditure,³⁷ whereas in India and Pakistan, <10% of all patients with ESRD have access to RRT.³⁸ Additionally, developing countries have low transplantation rates because of a combination of low levels of infrastructure; geographical remoteness; lack of legislation governing brain death; religious, cultural, and social constraints; and commercial incentives that favor dialysis.³⁹

There also are differences in the use of RRT modalities between indigenous and nonindigenous groups in developed countries. In Australia and New Zealand, the proportion of people receiving home dialysis is considerably lower among indigenous people. At the end of 2007 in Australia, 33% of nonindigenous people requiring RRT were receiving home-based dialysis therapies, in contrast to 18% of aboriginal people. In New Zealand, home-based dialysis was used by 62% of the nonindigenous RRT population but only 42% of Maori/Pacific Islanders.¹² The rate of kidney transplantation also is lower among disadvantaged communities. Maori and Pacific people are only 25% as likely to get a transplant as European New Zealanders, and the proportion of indigenous people

who underwent transplantation and had a functioning kidney transplant is lower among aboriginal Australians (12%) compared with nonindigenous Australians (45%). In the United Kingdom, white individuals from socially deprived areas, South Asians, and blacks were all less likely to receive a preemptive kidney transplant or living donor transplant than their more affluent white counterparts.⁹ A multinational study found that compared with white patients, the likelihood of receiving a transplant for aboriginal patients was 77% lower in Australia and New Zealand and 66% lower in Canadian First Nations individuals.⁴⁰

Disparities in renal care are more evident in developing nations. Data from India show that there are fewer nephrologists and nephrology services in the poorer states. As a result, people living in these states are likely to receive less care.⁴¹ In Mexico, fragmentation of the health care system has resulted in unequal access to RRT. In the state of Jalisco, RRT acceptance and prevalence rates in the more economically advantaged insured population were higher (327 and 939 per million population [pmp], respectively) than for patients without medical insurance (99 and 166 pmp, respectively). The transplantation rate also was dramatically different, at 72 pmp for those with health insurance and 7.5 pmp for those without it.⁴²

THE BIDIRECTIONAL RELATIONSHIP BETWEEN POVERTY AND CKD

In addition to having a higher disease burden, the poor have limited access to resources for meeting treatment costs. A large proportion of patients who are forced to meet the expensive ESRD treatment costs by incurring out-of-pocket expenditure get pushed into extreme poverty. In one Indian study, >70% of patients undergoing kidney transplantation experienced catastrophic health care expenditures.⁴³ Entire families felt the impact of this, including job losses and interruptions in education of children.

OUTCOMES

Overall mortality rates among those who receive RRT are higher in indigenous, minority, and uninsured populations, even after adjustment for comorbid conditions. Hazard ratios for death on dialysis therapy relative to the nonindigenous group are 1.4 for aboriginal Australians and New Zealand Maori.⁴⁴ Canadian First Nations patients achieve target levels for blood pressure and mineral metabolism less frequently than patients in the majority population.⁴⁵ In the United States, living in predominantly black neighborhoods was associated with higher than expected mortality rates on dialysis therapy and increased time to transplantation.⁴⁶ Similarly, black patients treated by peritoneal dialysis had a higher

risk of death or technique failure compared with whites.⁴⁷

In Mexico, mortality on peritoneal dialysis therapy is 3-fold higher among the uninsured population compared with Mexican patients receiving treatment in the United States, and the survival rate is significantly lower than in the insured Mexican population,⁴⁸ whereas in India, almost two-thirds of patients are unable to continue dialysis therapy beyond the first 3 months due to financial reasons.⁴⁹

SUMMARY

The increased burden of CKD in disadvantaged populations is due to both global factors and population-specific issues. Low socioeconomic status and poor access to care contribute to health care disparities and exacerbate the negative effects of genetic or biological predisposition. Provision of appropriate renal care to these populations requires a 2-pronged approach: expanding the reach of dialysis through the development of low-cost alternatives that can be practiced in remote locations and implementation and evaluation of cost-effective prevention strategies. Kidney transplantation should be promoted by expanding deceased donor transplant programs and use of inexpensive generic immunosuppressive drugs. The message of WKD 2015 is that a concerted attack against the diseases that lead to ESRD, by increasing community outreach, better education, improved economic opportunity, and access to preventive medicine for those at highest risk, could end the unacceptable relationship between CKD and disadvantage in these communities.

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