

Should Kidney Donors in Kenya Receive Compensation? Perspectives from Patient, Doctor and Economists

by

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Prevalence & Trend in Kidney Disease and Kenya's Policy Affecting

Access to Treatment

by

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- Infectious diseases—led by HIV/AIDS, tuberculosis, and malaria—are still the leading cause of death in sub-Saharan Africa; however, the contribution of non-communicable diseases to morbidity and mortality in the region has grown over the past 30 years.
- These emerging non-communicable diseases in Africa have been attributed at least in part to the improving longevity, urbanisation, and modernisation of cultures in the region.
- Cardiometabolic diseases have been suggested to be the leading contributor to deaths due to non-communicable diseases in sub-Saharan Africa.

- High and rapidly increasing incidences of these cardiometabolic diseases reported across diverse settings in the region.
- International Diabetes Federation projects that Africa is set to witness the highest relative increase in diabetes, by 156% between 2017 and 2045, with the total population of adults with diabetes increasing from 16 million to 41 million people.
- Populations in sub-Saharan Africa have also been shown to have a high prevalence of hypertension (48%) and obesity (20%).

- To this list we can now add chronic kidney disease, as shown by Jaya George and colleagues in *The Lancet Global Health*.
- In a cross-sectional population study, that involved over 8000 participants aged 40–60 years at six centres from four African countries, the overall prevalence of chronic kidney disease was reported as 10·7% (95% CI 9·9–11·7).
- The study by George and colleagues supports the results of a 2018 meta-analysis that examined 98 432 individuals from 98 studies in Africa and reported an overall prevalence of chronic kidney disease stages 1–5 of 15·8% (95% CI 12·1–19·9) and a prevalence of chronic kidney disease stages 3–5 of 4·6% (3·3–6·1) for in the general population.

- Given the increasing incidence of hypertension, HIV, and diabetes in Africa, all of which were independently associated with chronic kidney disease in the study by George and colleagues, the stage is set for a major disruption in health provision that would demand major infrastructural changes and a hefty increase in health budgets if efforts are not immediately made to prevent the onset of chronic kidney disease.

- The significantly different prevalences in chronic kidney disease between the four sub-regions analysed is a clear indication of the different transition stages across participating countries.
- Prevention measures that have been put in place for HIV/AIDS, although not optimal, might be of use to halt the advancing prevalence of non-communicable diseases in Africa.
- In this regard, similar to campaigns in east and southern Africa aiming for individuals to find out their HIV status, individuals could be encouraged to find out their diabetes and hypertension status, which are strong determinants of chronic kidney disease.

- Renal registries might also be useful for establishing the causes of chronic kidney disease and end-stage renal disease.
- The establishment of an Africa Renal Registry in 2015 by the African Association of Nephrology and the African Paediatric Nephrology Association could provide further data that might assist various health organisations in Africa to plan effective strategies.

- Estimated glomerular filtration rate (eGFR) is considered the best overall index of kidney function and standardisation of creatinine measurements, a key component of calculating the eGFR, is crucial in identifying and stratifying patients accurately.
- In George and colleagues' study, creatinine measurements were done in one central laboratory using an isotope dilution mass spectrometry (IDMS)-traceable method; however, many laboratories in Africa are not using methods for creatinine that are IDMS-traceable.

- Africa in general faces huge challenges, with shortages of qualified personnel and quality of laboratory tests.
- According to the latest figures published by the African Society for Laboratory Medicine, few laboratories outside South Africa have been accredited to internationally recognised standards.
- Point-of-care measurement of creatinine is an attractive alternative to measuring creatinine in traditional laboratories.
- Point-of-care testing has been shown to be effective in diagnosing and monitoring of patients with HIV and tuberculosis in South Africa.

- With improvements in point-of-care testing technology and improved connectivity, such testing for creatinine can easily be introduced as part of a concerted effort to meet the quadruple burden of HIV, tuberculosis, diabetes, and chronic kidney disease.

- Of greater importance is that the four-variable Modification of Diet in Renal Disease (4-v MDRD) and Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equations used by George and colleagues have previously been shown to perform better without adjustments for African American ethnicity and are inaccurate for populations in South Africa, Kenya, and Ghana.
- Therefore, until these equations are validated in Africa, the accuracy of the findings of this Article and any other studies in Africa is unknown.
- These limitations have obvious public health implications for the implementation of large-scale screening and programmes for the prevention and management of chronic kidney disease.

Risk Factors for Kidney Disease

- Data in recent decades have linked a host of genetic, environmental, sociodemographic, and clinical factors to risk of kidney disease.
- The population burden of kidney disease is known to correlate with socially defined factors in most societies across the world.
- This phenomenon is better documented in high-income countries, where racial/ethnic minority groups and people of low socioeconomic status carry a high burden of disease.
- Extensive data have demonstrated that racial and ethnic minorities (e.g., African Americans in the United States, Aboriginal groups in Canada and Australia, Indo-Asians in the United Kingdom, and others) are affected disproportionately by advanced and progressive kidney disease.
- The associations of socioeconomic status and risk of progressive CKD and eventual kidney failure also have been well described, with persons of lower socioeconomic status bearing the greatest burden.

- Recent works have associated apolipoprotein L1 risk variants with increased kidney disease burden among persons with African ancestry.
- In Central America and Southeastern Mexico, Mesoamerican nephropathy (also referred to as CKD of unknown causes) has emerged as an important cause of kidney disease.
- While multiple exposures have been studied for their potential role in CKD of unknown causes, recurrent dehydration and heat stress are common denominators in most cases .
- Other perhaps more readily modifiable risk factors for kidney disease and CKD progression that disproportionately affect socially disadvantaged groups also have been identified, including disparate rates and poor control of clinical risk factors, such as diabetes and hypertension, as well as lifestyle behaviors.

- Diabetes is the leading cause of advanced kidney disease worldwide. In 2016, 1 in 11 adults worldwide had diabetes, and more than 80% were living in low- and middle-income countries where resources for optimal care are limited.
- Hypertension is also estimated to affect 1 billion persons worldwide and is the second leading attributed cause of CKD.
- Hypertension control is important for slowing CKD progression and decreasing mortality risk among persons with or without CKD.
- Hypertension is present in more than 90% of persons with advanced kidney disease, yet racial/ethnic minorities and low-income persons with CKD who live in high-income countries have poorer blood pressure control than their more socially advantaged counterparts.

- Lifestyle behaviors, including dietary patterns, are strongly influenced by socioeconomic status.
- In recent years, several healthful dietary patterns have been associated with favourable CKD outcomes.
- Low-income persons often face barriers to healthful eating that may increase their risk of kidney disease.
- People of low socioeconomic status often experience food insecurity (i.e., limited access to affordable nutritious foods), which is a risk factor for CKD and progression to kidney failure .

- In low-income countries, food insecurity may lead to *undernutrition* and starvation, which has implications for the individual and, in the case of women of child-bearing age, could lead to their children having low birth weight and related sequelae, including CKD.
- Rates of undernourishment are as high as 35% or more in countries such as Haiti, Namibia, and Zambia.
- However, in high-income countries, food insecurity is associated with *overnutrition*, and persons with food insecurity have increased risk of overweight and obesity.
- Further, food insecurity has been associated with several diet-related conditions, including diabetes and hypertension.

Acute Kidney Injury

- AKI is an under detected condition that is estimated to occur in 8–16% of hospital admissions and is now well established as a risk factor for CKD .
- Disparities in AKI risk are also common, following a pattern similar to that observed in persons with CKD.
- AKI related to nephrotoxins, alternative (traditional) medicines, infectious agents, and hospitalizations and related procedures are more pronounced in low-income and lower-middle-income countries and contribute to increased risk of mortality and CKD in those settings .
- Importantly, the majority of annual AKI cases worldwide (85% of more than 13 million cases) are experienced in low-income and lower-middle-income countries, leading to 1.4 million deaths.

Health Policies and Financing of Kidney Disease Care

- Because of the complex and costly nature of kidney disease care, its provision is tightly linked with the public policies and financial status of individual countries.
- For example, gross domestic product is correlated with lower dialysis-to-transplantation ratios, suggesting greater rates of kidney transplantation in more financially solvent nations.
- In several high-income countries, universal health care is provided by the government and includes CKD and ESRD care.

- In other countries, such as the United States, ESRD care is publicly financed for citizens; however, optimal treatment of CKD and its risk factors may not be accessible for persons lacking health insurance, and regular care of undocumented immigrants with kidney disease is not covered .
- In low-income and lower-middle-income countries, neither CKD nor ESRD care may be publicly financed, and CKD prevention efforts are often limited.
- In several such countries, collaborations between public and private sectors have emerged to provide funding for RRT.
- For example, in Karachi, Pakistan, a program of dialysis and kidney transplantation through joint community and government funding has existed for more than 25 years.

- In many settings, persons with advanced CKD who have no or limited public or private sector funding for care shoulder a substantial financial burden.
- A systematic review of 260 studies including patients from 30 countries identified significant challenges, including fragmented care of indeterminate duration, reliance on emergency care, and fear of catastrophic life events because of diminished financial capacity to withstand them.
- Authors of another study conducted in Mexico found that patients and families were burdened with having to navigate multiple health and social care structures, negotiate treatments and costs, finance their health care, and manage health information.
- Challenges may be even greater for families of children with ESRD, because many regions lack qualified pediatric care centers.

Organization and Structures for Kidney Disease Care

- The lack of recognition and, therefore, the absence of a global action plan for kidney disease partly explain the substantial variation in structures and capacity for kidney care around the globe.
- This situation has resulted in variations in government priorities, health-care budgets, care structures, and human resource availability.
- Effective and sustainable advocacy efforts are needed at global, regional, and national levels to get kidney disease recognized and placed on the global policy agenda.

- In 2017, the International Society of Nephrology collected data on country-level capacity for kidney care delivery using a survey, the Global Kidney Health Atlas , which aligned with the WHO's building blocks of a health system.
- The Global Kidney Health Atlas highlights limited awareness of kidney disease and its consequences and persistent inequities in resources required to tackle the burden of kidney disease across the globe.
- For example, CKD was recognized as a health-care priority by government in only 36% of countries that participated in this survey.
- The priority was inversely related to income level: CKD was a health-care priority in more than half of low-income and lower-middle-income countries but in less than 30% of upper-middle-income and high-income countries.

- Regarding capacity and resources for kidney care, many countries still lack access to basic diagnostics, a trained nephrology workforce, universal access to primary health care, and RRT technologies.
- Low-income and lower-middle-income countries, especially in Africa, had limited services for the diagnosis, management, and monitoring of CKD at the primary care level, with only 12% having serum creatinine measurement, including estimated glomerular filtration rate.
- Twenty-nine percent of low-income countries had access to qualitative urinalysis using urine test strips; however, no low-income country had access to urine albumin-to-creatinine ratio or urine protein-to-creatinine ratio measurements at the primary care level.
- Across all countries of the world, availability of services at the secondary/tertiary care level was considerably higher than at the primary care level

Renal Replacement Therapies

- The distribution of RRT technologies varied widely.
- On the surface, all countries reported having long-term hemodialysis services, and more than 90% of countries reported having short-term hemodialysis services.
- However, access to and distribution of RRT across countries and regions was highly inequitable, often requiring prohibitive out-of-pocket expenditure, particularly in low-income regions.
- For instance, more than 90% of upper-middle-income and high-income countries reported having chronic peritoneal dialysis services, whereas these services were available in 64 and 35% of low-income and lower-middle-income countries, respectively.

- In comparison, acute peritoneal dialysis had the lowest availability across all countries.
- More than 90% of upper-middle-income and high-income countries reported having kidney transplant services, with more than 85% of these countries reporting both living and deceased donors as the organ source.
- As expected, low-income countries had the lowest availability of kidney transplant services, with only 12% reporting availability, and live donors as the only source.

Workforce for Kidney Care

- Considerable international variation was also noted in the distribution of the kidney care workforce, particularly nephrologists.
- The lowest density (< 5 nephrologists per million population) was very common in low-income countries, whereas the highest density (> 15 nephrologists per million population) was reported mainly in high-income countries.

- Most countries reported nephrologists as primarily responsible for both CKD and AKI care.
- Primary care physicians had more responsibility for CKD care than for AKI care, as 64% of countries reported that primary care physicians are primarily responsible for CKD care and 35% reported that they are responsible for AKI care.
- Intensive care specialists were primarily responsible for AKI in 75% of countries, likely because AKI is typically treated in hospitals.
- However, only 45% of low-income countries reported that intensive care specialists were primarily responsible for AKI, compared with 90% of high-income countries; this discrepancy may be due to a general shortage of intensive care specialists in low-income countries.

- The appropriate number of nephrologists in a country depends on many factors, including need, priority, and resources, and as such there is no global standard with respect to nephrologist density.
- Regardless, the demonstrated low density in low-income countries calls for concern as nephrologists are essential to provide leadership in kidney disease care, and a lack of nephrologists may result in adverse consequences for policy and practice.

- However, it is quite encouraging that the number of nephrologists and nephron-pathologists is rising in low-income and lower-middle-income countries, in part thanks to fellowship programs supported by international nephrology organizations.
- It is important to note that the role of a nephrologist may differ depending on how the health-care system is structured.
- The density statistic merely represents the number of nephrologists per million population and provides no indication of the adequacy to meet the needs of the population or quality of care, which depends on volume of patients with kidney disease and other workforce support (e.g., availability of multidisciplinary teams).

- For other care providers essential for kidney care, international variations exist in distribution (availability and adequacy).
- Overall, provider shortages were highest for renal pathologists, vascular access coordinators, and dietitians (with 86, 81, and 78% of countries reporting a shortage, respectively), and the shortages were more common in low-income countries.
- Few countries (35%) reported a shortage in laboratory technicians.
- This information highlights significant inter- and intra-regional variability in the current capacity for kidney care across the world.
- Important gaps in awareness, services, workforce, and capacity for optimal care delivery were identified in many countries and regions.

- The findings have implications for policy development with regard to establishment of robust kidney care programs, particularly for low-income and lower-middle-income countries.
- The Global Kidney Health Atlas has therefore provided a baseline understanding of where countries and regions stand with respect to several domains of the health system, thus allowing the monitoring of progress through the implementation of various strategies aimed at achieving equitable and quality care for the many patients with kidney disease across the globe.

- How could this information be used to mitigate existing barriers to kidney care? First, basic infrastructure for services must be strengthened at the primary care level for early detection and management of AKI and CKD across all countries .
- Second, although optimal kidney care obviously should emphasize prevention to reduce adverse consequences of kidney disease at the population level, countries (particularly low-income and lower-middle-income countries) should be supported at the same time to adopt more pragmatic approaches in providing RRT.

- For example, acute peritoneal dialysis could be an attractive modality for AKI, because this type of dialysis is as effective as hemodialysis, requires far less infrastructure, and can be performed with solutions and catheters adapted to local resources.
- Third, kidney transplantation should be encouraged through increased awareness among the public and political leaders across countries, because this is the clinically optimal modality of RRT, and it is also cost-effective, provided that costs of the surgery and long-term medication and follow-up are made sustainable through public (and/or private) funding.
- Currently, most kidney transplants are conducted in high-income countries in part because of a lack of resources and knowledge in low-income and lower-middle-income countries, as well as cultural practices and absence of legal frameworks governing organ donation.

Conclusion

- Socially disadvantaged persons experience a disproportionate burden of kidney disease worldwide.
- The provision and delivery of kidney care varies widely across the world. Achieving universal health coverage worldwide by 2030 is one of the WHO Sustainable Development Goals.
- Although universal health coverage may not include all elements of kidney care in all countries (because this is usually a function of political, economic, and cultural factors), understanding what is feasible and important for a country or region with a focus on reducing the burden and consequences of kidney disease would be an important step toward achieving kidney health equity.

Demand Dynamics

by

Maureen Barasa

Objectives

- Elevate quality of debate around awareness of prevalence and severity and the Economic costs of kidney failure and transplant
- Inform policy about the markets on transplants and transfusion
- Are the available resources used in the most cost effective way?

Table 1: Data on Kidney Disease Prevalence in Kenya

Kenyan's suffering from Renal Disease=At least 4 Million
0.7 nephrologists per million population
No. of dialysis patients per million population=5670
Total dialysis units=214
Cost of dialysis per session funded by NHIF=\$ 95
Frequency of dialysis=4 hours twice weekly
Kidney transplantation funded by NHIF=\$5000 maximum
Kenya's death rate from kidney disease=23.30 per 100,000 population
Deaths resulting from kidney disease=4464 p.a or 1.69% of total causes of death
Deaths resulting from kidney disease=12.23 per day and 0.5 per hour

Source: [Global Dialysis Perspective, Kenya](#) and [World Life Expectancy 2022](#)

- Data from the [World Life Expectancy](#) website in collaboration with World Health Organisation (WHO) identifies kidney disease as the 15th distinct cause of deaths out of 27 in Kenya in 2022.
- Kenya was ranked 91st worldwide in terms of the share of its population that dies of kidney disease in 2022

Demand Side Problems

- **Demand for Renal Replacement Therapy**

- Costs

- Total cost of treatment from a milder chronic kidney disease is much higher than the cost of treating kidney failure by replacement therapy(Randolph, David & Rigmar 2013)

- Availability of organs

- Is it safe for both sides?

- **Altruism**

- Shortage of kidneys for transplantation is due to lack of legislation supported by local community, lack of ethical and moral approval, scarcity of professional skill, lack of quality equipment and institutions

- Governments encourage organ donation but forbid monetary payments to donors or heirs

- Compensation for kidney donation is legal in Iran

- **Coercion**

- Conversation around poor people being exploited

- **Income**

Supply Dynamics

by

Emmanuel Wa-Kyendo

Challenges to Providing Comprehensive Kidney Care in Kenya

Patient factors	<ul style="list-style-type: none"> • Late presentation • Poverty – contributes to poor adherence, poor nutrition and inability to afford medications • More reliance on temporary vascular access
Medications	<ul style="list-style-type: none"> • Iron and erythropoietin are expensive and paid for out-of-pocket • Inadequate vaccination of patients on KRT
Diagnostic tests	<ul style="list-style-type: none"> • Evaluation of anaemia and mineral bone diseases limited • Cost of serological screening (HIV, hepatitis B, hepatitis C) and screening for hepatitis B antibody responses • Inadequate renal histopathology support, very limited access to electron microscopy • Water quality analysis costly and availability limited
Dialysis and transplantation	<ul style="list-style-type: none"> • Low usage of PD • Only twice-weekly HD funded • Low transplant rates
Infrastructure	<ul style="list-style-type: none"> • Capacity of HD units not meeting demand • Lack of a reliable supply chain for dialysis consumables
Human resources	<ul style="list-style-type: none"> • Few nephrologists, vascular surgeons, renal nurses and renal technologists

Source:- [Global Dialysis Perspective, Kenya](#)

Supply Side Problems

- Meagre resources of a poor, developing country
- Shortage in supply of health insurance products
- Shortage in supply of kidney illness surveillance, data repository, infrastructure and specialists
- Shortage in supply of dialysis treatment + kidney transplant infrastructure and specialists
- Shortage of medical personnel:
 - Doctor to patient ration 1:16,000
 - 0.7 nephrologists per million population (pmp) vs global average of 10.0 pmp and 1.6 pmp in lower-middle-income countries
- Shortage in supply of kidneys
 - Restrictive legal framework

Thank You

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