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Global Dialysis Perspective: Uganda

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1. Introduction

Kidney injury and chronic kidney disease are common complications from both infectious and non-communicable diseases alike. Patients with advanced kidney disease need renal replacement therapy in form of dialysis or renal transplantation. Both these interventions require substantial financing, as well as infrastructural development. Low-income countries, such as Uganda face challenges in developing these services, yet they bear a big burden of advancing kidney disease because of lack of access to preventive measures. Uganda is a landlocked country in East Africa of close to 44 million people. It has a young population with 53% of its citizens below 18 years of age, and only 4.0% above 60 years. There is no universal health coverage and most of the costs for the care of non-communicable diseases (NCDs) is out-of-pocket \(^1\). We report about the burden of kidney disease and financing of dialysis in Uganda.

2. Burden of kidney disease in Sub-Saharan Africa and Uganda

Kidney disease in Sub-Saharan Africa is estimated to be between 10-13% of the population, depending on the criteria used to define those two entities \(^2\). In Uganda, the prevalence of chronic kidney disease in the community ranges from 1.7% to 6.5% \(^3,4\) and up to 15% among patients with HIV and those with hypertension \(^5,6\). Kidney disease in Uganda is increasing, and is among the top 10 causes of death in the country, with a case fatality rate of 21% among patients admitted with CKD (51.2% with end stage kidney disease-ESKD) \(^7\). The commonest causes of CKD/ESKD in our setting are not yet well established. While population-based studies have found that close to two-thirds of those with CKD do not have the traditional risk factors of diabetes mellitus, hypertension or HIV-infection \(^3,4\); patients admitted with CKD in Mulago National Referral Hospital (which admits patients from the whole country) had 16.1% with diabetes mellitus, 14.8% with HIV infection while 90% had hypertension \(^8\). This highlights
hypertension as a common problem in CKD but does not indicate causation of CKD. In children the leading cause of kidney disease are infections, such as malaria, which lead to AKI and CKD. Occurrence of acute kidney injury with malaria carries a mortality of 11.9% compared to 4.2% in children without AKI, so it is a real cause of concern. Access to dialysis and ICU services in Uganda is abysmal, and most of its citizens who need life-sustaining dialysis have no access to it because of cost and very limited availability. In addition to mechanical infrastructure such as dialysis units, the human resource is equally inadequate with only fourteen formally trained nephrologists (11 adult and 3 pediatric) for a population of more than 44.7 million people (table 1).

3. Common presentations of kidney disease in Uganda

Many patients with kidney diseases in Uganda present late for care (51.1% present for the first time in end stage kidney disease) and with advanced symptoms such as edema severe hypertension and life threatening electrolyte imbalances such as acidosis or hyperkalemia. Among those on dialysis (hemodialysis); majority of patients undertake two sessions per week (due to limited space and finances) and often have cardiovascular complications.

Most of the patients on dialysis have a poor quality of life because they live their lives very uremic, often under-dialyzed because of cost and availability. Many are quite debilitated by the time they present for dialysis because of lack of access to basic preventive CKD care, and even when on chronic renal replacement therapy, they are plagued by ongoing uremic symptoms and anemia. Though the Ugandan population with CKD is quite young and would be expected to be more resilient, the possibility of long life on dialysis and the ability to get kidney transplant is overshadowed by the poor ill health and poor quality of life even among the few that make it to hospital for dialysis.
4. Access to dialysis services in Uganda

In Uganda, the mainstay of end stage kidney care is palliation, because the vast majority of patients cannot afford to pay for dialysis. In-center hemodialysis is the most common dialysis modality available in the country, and even this has very limited availability. Dialysis centers are only available in two districts (Kampala and Mbarara) out of over 130 districts in the country with each district serving between 400,000 and 1,500,000 people. Figure 1 shows the in-center dialysis units highlighting government/public (only 3) and private units. It also shows the number of machines/ chairs per Unit. There is one free standing dialysis unit open to the public for a fee. Uganda has two patients that do home hemodialysis on a private arrangement (not included in figure 1), they have set up dialysis units in their homes.

As in many parts of the world, many more men are on dialysis than women. Out of 351 patients on hemodialysis only 144 (41%) are females. Peritoneal dialysis (PD) was once the only method available in Uganda but the logistics around peritoneal dialysis delivery, lack of water and proper hygiene as well as lack of community acceptance of the method made it difficult to sustain after introduction of hemodialysis. As a result, PD is currently not readily available in Uganda. In rare instances, usually in acutely ill children, peritoneal dialysis has been managed through support from Kenya, or through improvisation of dialysates using locally mixed dextrose. Intermittent hemodialysis is normally undertaken two to three times a week for patients with chronic disease. The majority of patients have 2 sessions of dialysis per week in government dialysis units due to the excess numbers of patients, the limited number of dialysis machines, and the limited number of trained healthcare workers. Some shifts of dialysis have to begin at 3:00 am to ensure that all patients who need dialysis can get it. Uganda follows the international eligibility criteria for initiating dialysis. This option is available to all irrespective of whether they are candidates for kidney transplantation or not. The greatest determinant of who gets dialysis and who doesn’t is their financial status. Whereas government/public centers fill to capacity at
times, the private centers often have empty dialysis chairs/beds that go un filled for days because of their relatively high costs. Those that are not able to afford hemodialysis at all are offered palliative care at the hospitals and dialysis units while others are referred to be monitored by peripheral hospitals. We have palliative care services throughout Uganda, but the concept of palliative dialysis for young patients with kidney disease still needs additional advocacy and awareness.

In regards to acute kidney injury (AKI); most patients with AKI (often children or pregnant women) recover but the few that progress to acute kidney disease (7-90 days) or chronic kidney disease (>90 days) resort to palliative care. Those who can afford often use intermittent hemodialysis and few are offered Slow Low Efficiency Dialysis (SLED) using the conventional dialysis machines.

As of February 2022, Uganda had only two continuous renal replacement therapy (CRRT) machines in two private hospitals and these are quite expensive for most ordinally Ugandans costing up to 2,000 USD per session often lasting between 24-72 hours. Most patients with acute kidney injury (AKI) cannot afford ICU or dialysis due to the current prevailing costs as well as lack of availability in most of the Ugandan hospitals.  

The nephrology workforce in Uganda is too small for the amount of need. Our current nephrologist to population ratio is 0.3 nephrologists per million people (pmp) compared to the global median of 9.1 nephrologists pmp. Our nursing dialysis expert to population ratio is 1.0 pmp and the nurse to dialysis patient ratio in the centers is estimated to be 1:13 in public hospitals and 1:4 in private centers. All dialysis patients are reviewed once every month by the nephrologist as standard practice.

5. Financing for dialysis in Uganda
Dialysis in Uganda is mostly out-of-pocket costs. For those in government (public) hospitals, each dialysis session ranges from 20-45 USD equivalent to a ten days’ wage for an average Ugandan while in private units each dialysis session costs between 90 and 150 USD equivalent to a 24 days’ average wage. In case of continuous renal replacement therapy (CRRT) the cost is about 2,000 USD per session of 24-72 hours.

See table 2 for costs related to dialysis in Uganda. There is unfortunately no central data on the cost of dialysis from the suppliers. Many suppliers exist, some hospitals and dialysis units import dialysis supplies directly from the manufactures from outside countries. Because public hospitals make large purchases, they are able to negotiate lower prices than private hospitals. Nevertheless, the price of dialysis in private hospitals is still way below the purchase price. The government subsidizes dialysis in public one of the two public hospitals.

It is common for public hospitals to run out of supplies such as dialyzers and acid/base concentrates as well as heparin, in which case the patients have to procure these items from the nearby pharmacies and carry these to the dialysis center. There is no universal health insurance in Uganda and this presents the greatest hinderance to dialysis access. Most of the private health insurance plans also exclude kidney transplant and dialysis fees, further limiting access to dialysis. Most insurance companies are, however, willing to cover for the cost of drugs like iron sucrose, hypertensive medications, heparin and erythropoietin that are often needed for patients on dialysis. These accessory treatments are not included in the package for dialysis.

Transportation to/from dialysis is also a major issue for many. There is no ready transportation to the dialysis unit and because of the scarcity of units; some patients have to travel up to 300 kilometers to access this lifesaving procedure, which is a real practical and financial burden for them and their families. In order to get dialysis, many patients have had to relocate themselves to cities like Kampala, which further incurs costs of rent, livelihoods as well as loss of jobs and lack of support. Even then, only an estimated 15% of the people who need dialysis in Uganda can afford it.
Most dialysis units are run by dialysis nurses supported by technicians and nephrologists. In public dialysis units, dialysis experts are recruited as part of the health workforce while in the private units they are recruited as consultants. It is very common for dialysis Nurses and Nephrologists to work in more than one dialysis unit. We do not have a central dialysis coordinating unit in the country and each unit has its own operating standard and costs. Efforts are under way by the Uganda Kidney Foundation in collaboration with Uganda Ministry of Health to regulate these processes.

6. Future plans for kidney care in Uganda

Without universal health insurance, limited number of dialysis nurses and nephrologist and few centers for dialysis, the future of kidney care in Uganda is still uncertain. However, there are a lot of efforts to change this trajectory. Working with the Uganda Kidney Foundation (UKF), International Society of Nephrology, International Pediatric Nephrology Association (IPNA) and other international partners such as Yale School of Medicine, McMaster University, University of Cape Town, India and Kenya; we have been able to train nephrologists and dialysis nurses. We are also working with the Uganda parliamentary committee to ensure that we improve access to dialysis (including peritoneal dialysis) as well as kidney transplantation. A multi-disciplinary task force has been set up by the Uganda Ministry of Health to establish a kidney transplant program in Uganda. The UKF is made of people from different professions including lawyers, social scientists, patients and advocacy experts. This helps in ensuring that the few nephrologists and dialysis nurses concentrate on caring for the patients and help where technical support is needed for the foundation. The main mandate of UKF is prevention of kidney disease and advocacy for kidney health. Organizations such as the Uganda Kidney Psychosocial Support Organization (UKPSO), support UKF to enhance awareness of kidney disease and the preventive strategies to slow progression.
We have set up a dialysis training program for nurses and plan to establish a nephrology fellowship program in the near future. This will be more certain once the kidney transplant program is underway.

7. Conclusion and recommendations

Uganda has made tremendous steps in improving access to renal replacement therapies over the last five years. While we had only two dialysis chairs and two nephrologists in 2012, we now (2022) have 94 dialysis chairs and 14 nephrologists in Uganda. However, access to dialysis and kidney transplantation remain out of reach for the vast majority of the population due to high cost and lack of health insurance schemes to support patients with CKD. International partners and the Uganda government are encouraged to join hands to help Uganda improve prevention and care for kidney disease.
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| Country Area       | 241,550 Km²¹ |
|-------------------|-------------|
| Population        | 44.7 million ¹ |
| Capital           | Kampala     |
| Gross Domestic Product (GDP) | 25.89 billion $USD |
| GDP per capita    | 604.04 USD  |
| Human Development Index (HDI) | 0.516 |
| Official currency | Uganda Shillings |
| Total number of nephrologists | 14 (11 Adult and 3 Pediatric nephrologists) |
| Total number of dialysis support staff | Nurses: 49 Technicians: 10 |
| National society of nephrology | Uganda Kidney Foundation |

Table 1: Demographics of Uganda
Table 2: ESRD and Dialysis in Uganda

| Prevalence of End-Stage Renal Disease | 2020 - 51.8 pmp (per million population)\(^4\) |
|--------------------------------------|-----------------------------------------------|
| Number of patients in hemodialysis\(^5\) | 2020: 173                                      |
|                                      | 2021: 351                                      |
| Number of patients in peritoneal dialysis\(^5\) | 2020: 3                                       |
|                                      | 2021: 2                                        |
| Percent of patients on home dialysis  | 0.3%                                           |
| Percent of patients with Insurance coverage for dialysis sessions | <5 %                                           |
| % of free-standing dialysis units in Uganda vs. in-hospital | 20% (3 of 15 units)                           |
| Cost of dialysis session in Uganda   | Public unit: 20-45USD                          |
|                                      | Private for-profit unit: 90-150USD             |
| Average length of dialysis session   | 4 hours                                        |
| How many times per month are patients seen by a nephrologist during dialysis sessions? | Once a month standard; additional as needed |
| Dialysis access, AVF, AVG and CVC?   | AVF: 20.6%                                     |
|                                      | AVG: 0.9%                                      |
|                                      | CVC 78.5%                                      |

\(^4\) ESRD End-stage renal disease, \(^5\) Statistics from the Uganda Kidney Registry, AVF-arteriovenous fistula, AVG-arteriovenous graft; CVC- Central venous catheter
**Figure 1: Dialysis Units in Uganda**

*Legend: NGO-Non govermental organisation.  
Illustration by Helmut Krauss, German*
