

ORIGINAL ARTICLE

Kidney Health for All – Bridging the gap to better kidney care in Africa

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ABSTRACT

Introduction: The prevalence of chronic kidney disease (CKD) in Africa is generally higher than global averages. Moreover, the management of patients with CKD suffers huge disparities compared to the rest of the world. We reviewed the literature on the major challenges in the management of kidney disease in Africa and suggest ways to bridge the gap for better kidney care on the African continent.

Results and recommendations: The prevalence of CKD in Africa is 15.8%. Kidney failure is associated with increased morbidity and mortality as a result of limited infrastructure and out-of-pocket payment for renal replacement therapy in most parts of the continent. The increasing prevalence of CKD results from epidemiological transition with increasing non-communicable diseases (NCDs) and established communicable diseases. Furthermore, Africa has unique risk factors and causes of kidney disease such as sickle cell disease, APOL1 risk alleles, and chronic infections such HIV, and hepatitis B and C.

Challenges facing kidney care in Africa include poverty, weak health systems, inadequate primary health care, misplaced priorities by political leaders, a relatively low nephrology workforce, poor identification of acute kidney injury (AKI), low transplantation rates as well as a lack of sustainable prevention policies and renal registries. To bridge the gap to better kidney care, there should be more community engagement, advocacy for increased government support into kidney care, comprehensive renal registries, training of a greater nephrology workforce, task shifting of nephrology services to non-nephrologists, expanded access to renal replacement therapy and promotion of organ donation.

Conclusion: Africa needs greater investment in kidney health.

Keywords: chronic kidney disease, Africa, sub-Saharan Africa, kidney failure.

INTRODUCTION

Chronic kidney disease (CKD) is a public health problem with relatively high prevalence, morbidity and mortality in Africa. This is due partly to the unavailability and high cost of optimum management to many patients with kidney failure. The prevalence of CKD in the continent has been reported in a recent meta-analysis to be 15.8% and even higher in sub-Saharan Africa (SSA) [1]. The increased mortality of kidney failure in over 80% of

incident cases is mainly as a result of limited infrastructure and out-of-pocket payment – that is, payments required to be made by the patients themselves – leading to failure to initiate renal replacement therapy (RRT) or discontinuation of treatment in about 60% of patients in SSA [2]. The increasing prevalence may be related to the epidemiological transition with increased incidence of non-communicable diseases as well as prevalent com-

municable diseases such as HIV/AIDS, hepatitis B and hepatitis C.

CAUSES OF KIDNEY DISEASES IN AFRICA

The relative lack of renal registries most parts of Africa makes it difficult to report the actual incidence and mortalities of CKD. In SSA, CKD occurs predominantly in young people in their economically productive age of less than 50 years and commonly secondary to hypertension, diabetes and glomerular diseases [3, 4]. Although there are insufficient data to accurately reconstruct evolutionary trends, the pattern of causes of CKD has changed over past decades. In North Africa, glomerular diseases (9–20%), diabetes mellitus (11–18%), hypertension (10–35%) and chronic interstitial nephritis (7–17%) account for the majority of causes of CKD. Schistosoma nephropathy is currently receding at the expense of hepatitis C nephropathy and focal segmental glomerulosclerosis (FSGS) in North Africa [5].

The unavailability of kidney biopsies in most parts of Africa makes it difficult for the accurate diagnosis of CKD, so that “CKD with cause unknown” or chronic glomerulonephritis are documented by some physicians in patients presenting with proteinuria and echogenic shrunken kidneys [6]. The high prevalence of CKD in Africa may also be explained genetically. The apolipoprotein L1 (APOL1) gene has been suggested to increase the risk of hypertension, FSGS and HIV-associated nephropathy (HIVAN), which leads to rapid progression to kidney failure in Blacks [7].

The poor identification and management of acute kidney injury (AKI) as well as the rampant use of herbal medications may also increase the prevalence of CKD, as AKI has been shown to increase the risk of CKD [8]. The prevalence of HIV, diarrhoeal diseases, malaria, the use of nephrotoxic medications coupled with late presentation and poor healthcare resources all contribute to challenges in the management of AKI in Africa [9].

CHALLENGES IN KIDNEY CARE IN AFRICA

Africa has its unique challenges with kidney care. These include poverty, poor health financing, weak health systems, lack of preventative programmes, poor identification and management of AKI, the widespread absence of renal registries, a relatively small nephrology workforce and low rates of kidney transplantation. Solutions to these problems will go a long way to bridging the gap and improve kidney care in Africa.

Weak health systems

Although Africa is endowed with immense natural and human resources, it is the most underdeveloped continent with the lowest gross domestic product (GDP). In SSA, 80% of the population live on less than US\$2.50 per day [10]. Healthcare delivery in Africa is characterized by a shortage of skilled human personnel, misallocation of healthcare resources and lack of infrastructure. Civil wars, religious and ethnic conflicts, mismanagement, corruption and military interventions have contributed not only to the fragility of African health systems in general but also to a brain drain exacerbating the shortages of skilled human personnel. In this context, the development of speciality programmes (including nephrology) are in their infancy – and far from optimum – even in relatively advanced economies like South Africa [11]. The growing burden of NCDs has strained the health systems even more, which have historically been overwhelmed by communicable diseases such as tuberculosis, HIV/AIDS, schistosomiasis and malaria [12]. Nephrology services including diagnostic and management modalities, needed to reduce the burden of kidney disease, are either limited or non-existent in Africa.

Globally, the requirement for kidney health care and RRT is increasing, yet only a few countries in Africa can meet the needs of patients with kidney failure. While dialysis and transplantation consume an ever-increasing proportion of the budget in high-income countries, there is little availability of these expensive therapies in most parts of Africa. Indeed, in many African countries, chronic haemodialysis is not sustainable with many patients unable to pay for haemodialysis beyond three months [2]. Peritoneal dialysis is the least utilized form of RRT. Medical care in Africa is mainly privately funded and access to important medicines such as angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers and erythropoietin stimulating agents is limited [13].

Poverty

Africa is the poorest continent in the world, hosting 23 of the 27 lowest-income countries (LIC) globally. The average gross domestic product per capita in SSA is \$1,484 as compared to \$33,928 in Europe and \$61,453 in North America [14]. Low socio-economic status has been shown to be a risk factor for CKD in a meta-analysis [15] and also influences the causes of AKI [16]. Poverty may lead to poor maternal nutrition and absence of antenatal visits may lead to intrauterine growth restriction, low birth weight and prematurity, which increases the risk of CKD from low nephron numbers [17]. Low nephron numbers have been postulated to cause CKD [18]. Furthermore, infections prevalent in childhood among the poor, such as diarrhoeal

diseases and malaria, may cause recurrent AKI and progress to kidney failure [9]. Lack of access to healthcare services and resorting to cheap herbal medication leads to late reporting to medical facilities, which may lead to AKI and rapid progression of CKD. These reasons may explain why patients in Africa report with kidney failure at younger ages than in high-income countries [16].

Less attention on non-communicable diseases

There seems to be more attention by most governments and policymakers in Africa to communicable diseases at the neglect of NCDs such as CKD [19]. The resources spent on the prevention and management of communicable diseases far exceed those for NCDs, though the latter are currently the leading cause of death globally with over 80% of these cases occurring in low- and low- and lower middle income countries (LLMICs) [20]. The recent COVID-19 pandemic as well as endemic conditions such as malaria, tuberculosis and HIV/AIDS are examples that illustrate the focus on communicable diseases in Africa. It is important to note that a focus on COVID-19, for example, at the neglect of NCDs such as diabetes, hypertension and CKD leads to increased mortality as NCDs are comorbidities which increase the risk of mortality in patients with COVID-19 [21].

Though most patients in Africa have to pay out-of-pocket for dialysis services, some countries including Kenya, Tanzania and South Africa currently offer some form of RRT to some eligible patients. If governments were to prioritize kidney care and offer some form of support for RRT, it would go a long way to improve kidney care in Africa. There is therefore a need for African nephrologists to advocate for their governments to improve kidney care financing following the examples in East Africa [22].

Lack of sustainable preventative programmes

As patients in Africa develop CKD and kidney failure at a relatively young age, there is the need to promote awareness of kidney disease, regular screening of high-risk patients such as those with diabetes, hypertension, HIV/AIDS or a family history of kidney disease, and opportunistic screening for patients who report to healthcare facilities for AKI and CKD is suggested [3, 23]. Unfortunately, most countries lack sustainable kidney prevention programmes and patients report late with advanced disease associated with increased mortality [24]. Patients at risk of kidney disease are not routinely screened in most primary healthcare facilities. This may be due to a small nephrology workforce or relatively few trained physicians to ensure early screening for albuminuria or elevated serum creatinine to estimate glomerular filtration rate (eGFR) in high-risk patients [25].

Furthermore, some primary healthcare facilities lack the ability to carry out simple tests such as urinalysis and to measure serum creatinine for early detection of CKD [26].

There are efforts in low-income settings by the International Society of Nephrology (ISN), through its World Kidney Day (WKD) initiatives, to create awareness and screen for kidney disease, but these need to be conducted frequently on a large scale. Most African countries lack nationally funded programmes but have a few based on individual efforts [23]. One of the well-conducted national prevention programmes was the “100 million healthy lives initiative” launched in Egypt in October 2018, whose aim was to eradicate hepatitis C viral infection and to detect NCDs among 100 million Egyptians [27]. Another well-established prevention programme in Africa was the Chronic Disease Outreach Primary Prevention Programme (CHOPPP), established in Soweto, South Africa, by Dr Ivor Katz, with assistance from the ISN and the Australian Chronic Disease Outreach Programme. A third programme, established by the ISN, is the 0by25 initiative, which advocates reducing or eliminating mortality in treatable cases of AKI by 2025 [28]. There have been calls recently to establish CKD prevention programmes in LMICs by colleagues in Nigeria and South Africa [29]. In the absence of optimal care for kidney failure in most parts of Africa, efforts should be channelled into preventative programmes.

Poor and late identification of acute kidney injury

The incidence and prevalence of AKI in Africa have been poorly reported. The prevalence was recorded in a single-centre study to be 0.3–1.9% in adults [30]. The early identification of AKI requires a high index of suspicion, the monitoring of urine output as well as serum creatinine measurements in admitted cases. These may not be available or done routinely in most primary healthcare facilities, leading to increased mortality related to late diagnosis coupled with poor access to RRT [2, 9]. When patients report with risk of AKI such as cases of HIV/AIDS, sepsis, diarrhoeal diseases, obstetric and surgical conditions, hypovolaemia as well as heart and liver failure, it is imperative to ensure that AKI is identified promptly and treated appropriately. Most clinicians in community hospitals are overwhelmed with high patient loads of general medical and surgical cases and therefore may not have the time for appropriate care and monitoring of patients at risk of AKI. Unfortunately, due to the small nephrology workforce in most African countries, care of patients with AKI in primary healthcare hospitals is suboptimum, leading to increased mortality [25].

Small nephrology workforce

The nephrology workforce in Africa is the smallest in the world with no nephrologists practising in many countries on the continent. The median distribution of nephrologists in Africa is less than 1 per million population (pmp), compared to a global average of 8.83 pmp. There is also a shortage of allied health professionals and technical expertise in most parts of Africa, which needs to be bridged for better kidney care [25]. According to a recent joint report from the American Society of Nephrology (ASN), the European Renal Association and the European Dialysis and Transplant Association (ERA-EDTA) and the ISN, the number of nephrologists is 0.5 pmp in SSA, 5.9 pmp in the Middle East and North Africa, and 25.3 pmp in North America [31].

Kidney health education, prevention, early diagnosis and the management of patients with kidney disease and kidney failure on dialysis require investment in the training of an adequate nephrology workforce [25]. Such personnel include nephrologists, renal nurses, dieticians, transplant coordinators, social workers, technicians, transplant surgeons, vascular surgeons, renal pathologists, nuclear medicine physicians and all cadres involved directly or indirectly in the management of patients with kidney disease. Unfortunately, only a few countries in Africa can boast of a full complement of all these professionals required for the optimum care of patients with kidney disease. Factors contributing to this shortage of personnel include: lack of exposure to nephrology by medical students, the unavailability of certified training in some countries, the high cost of specialist training, inflexible working hours, low income and erosion of nephrology practice by other, more appealing specialities [32]. This has improved over the past 25 years through the efforts of the ISN fellowship programmes providing training for nephrologists in LMICs [33] – but there are still many countries that lack an essential nephrology workforce.

Low transplant rates

Kidney transplantation improves survival, is less costly and is associated with better quality of life than dialysis – but transplant rates in Africa are very low, averaging 4 pmp and even decreasing in some countries [3, 34]. In 2012, Pozo et al. demonstrated that Kenya, Nigeria and South Africa were the only countries in SSA with established kidney transplantation programmes and reported rates of 0.60, 0.23 and 5.12 pmp, respectively [35]. This is associated with increased length of stay on dialysis when available, or with mortality in countries with minimal or without any form of RRT. African countries face many challenges with kidney transplantation. These include poor public knowledge of the importance of organ donation, organ shortages,

limited acceptance of deceased organs, cultural, religious and spiritual barriers, the unavailability of trained transplant teams and the absence of an established legal framework [36]. Other challenges include organ trafficking, insufficient health expenditure and lack of tissue typing in transplant patients' work-up. These barriers affect the establishment and sustainability of successful kidney transplant programmes in many African countries, with limited resources being the main constraint [37].

Lack of renal registries

National renal registries of CKD and kidney failure patients on dialysis are lacking in most African countries. Registries provide useful information that can guide decision making by policymakers and governments. Information on incidence, prevalence, aetiologies and outcomes of kidney failure can readily be extracted from renal registry data [38]. Most of the registries established in Africa have not been sustainable due to limitations of resources. The African Association of Nephrology (AFRAN) and the African Pediatric Nephrology Association have agreed to establish the African Renal Registry, using the Web-based platform of the South African Renal Registry [39]. South Africa currently has the most successful and complete renal registry data and has published annual reports for the past 8 years. Ghana published the first annual report of its registry data in 2021 [40]. It is hoped that these efforts will be maintained and reproduced in other countries to establish and strengthen renal registries data in Africa [41].

PROPOSED SOLUTIONS

There has to be pragmatic and sustainable efforts among member states to improve kidney care in Africa. Most countries have to cooperate and support each other to improve kidney health where weaker nations can draw strength from those better endowed. With a more united front, Africa can solve its problems championed by AFRAN. We propose below some solutions to the challenges of kidney care in Africa.

Investment in health care

In most parts of Africa, health expenditure per capita is very low, and healthcare delivery is mainly paid out-of-pocket by patients. The private sector provides up to 50% of the service in some regions in Africa left unsupported by the public sector. Despite a previous agreement of allocating 15% of the budget to health care, only Tanzania had achieved the target 10 years later, with the majority of countries in Africa unable to achieve this agreement of the Abuja declaration in 2001 [42]. Countries need to allocate more resources to health care, some of which will

trickle then into the improvement of kidney care. Capital injection into health care will improve the quality of health services generally as well as kidney care. This is because the management of kidney failure is capital intensive and adequate government support will go a long way to bridge the gap in kidney care in Africa.

Training of nephrology workforce

The generally small nephrology workforce urgently needs to be expanded for quality kidney health care. Governments should set up kidney care units and transplant programmes to meet the needs of its citizens with an adequate nephrology workforce to manage these units, to augment the efforts of the ISN. Augmenting nephrology professionals in Africa will improve the prevention, screening and management of kidney disease on the continent. Training sites in South Africa, Kenya, Egypt and Senegal have been approved by the ISN Fellowship training programme. This will make it easier for fellows to train on the continent instead of travelling abroad for training that may not be relevant on their return to their poorly resourced home country. Medical students should be educated and encouraged to take up nephrology courses after completing medical school; this will be easier if they see good outcomes in the management of patients with kidney failure during their training. This specialized instruction should also include the other cadres of the nephrology workforce such as renal nurses, dietitians, transplant coordinators, social workers, technicians, transplant surgeons, vascular surgeons, renal pathologists and nuclear medicine physicians. The African Association of Nephrology should pay attention to the declining interest in nephrology practice and plan steps to regain medical students' and trainees' interest in the nephrology as a speciality.

Task shifting of nephrology workforce

The global nephrology community recognizes the need for a cohesive plan to address the growing burden of CKD. The provision of comprehensive kidney disease care, including early detection, risk factor modification, slowing disease progression and RRT, requires a large nephrology workforce with adequate geographical coverage to meet the growing healthcare needs of patients with CKD globally and in Africa [43]. The efforts by the ISN, since 1985, to increase the numbers of nephrology personnel in many countries in Africa is commendable but still inadequate [33].

Task shifting offers a realistic opportunity to increase the capacity of the kidney health workforce necessary to respond to the growing burden of CKD, especially in rural communities. Task shifting involves assigning the work of nephrologists to non-nephrologist specialists, general prac-

tioners and nurses. They can then provide some basic nephrology services such as early detection by screening high-risk patients, prevent progression of kidney disease and ensure early referrals in advanced cases. They can also provide counselling for patients and family members on risk factors of CKD, especially the avoidance of herbal medications, indiscriminate use of nonsteroidal anti-inflammatory drugs and other nephrotoxic medication for the proper management of chronic conditions such as diabetes, hypertension and HIV/AIDS, which are major causes of CKD [44]. Training non-nephrologists on the early identification and management of AKI will also go a long way to prevent AKI-related mortality and kidney failure in the long run. There is the need for the provision of simple, easy to manage protocols for the management and referral of patients with kidney diseases.

We can also leverage on established non-nephrology clinics, such as those serving diabetes, hypertension and HIV/AIDS, instead of focusing on setting up "kidney clinics" for "one-stop" care. The AFRAN, through its committees, has organized webinars to instruct and improve the knowledge of its members on relevant topics in nephrology in Africa. The African Journal of Nephrology has also had a great impact on education with the publication of quality manuscripts that also encourages research in the continent. In spite of all these efforts, there is still more to be done to bridge the gap to better kidney health in Africa.

Improving access to renal replacement therapy

The demand for RRT is increasing with the rapid rise in the number of patients with kidney failure though the transplant rates are still low [34]. Most national health insurance schemes do not reimburse providers for haemodialysis services [45], though others like South Africa, Tanzania and Kenya reimburse providers to various extents [22, 46]. Governments need to be encouraged to reimburse providers of RRT to make dialysis services more available to reduce morbidity and mortality. Improving infrastructure, expanding the nephrology workforce, promoting organ donors and better community education are ways we propose to improve dialysis and transplant rates in Africa [36].

Owing to the absence of programmes to supply organs from deceased donors, provision of living organ donation should be encouraged as it is preferred when starting transplant programmes. Poor knowledge of transplantation protocol and resistance to organ donation due to socio-cultural and religious beliefs can be addressed with adequate health education [47]. Brainstorming on this issue by specialists and stakeholders has yielded various benefits including

improvement in government funding, adoption of certain transplant models with or without donor incentives, organ sharing, the establishment of comprehensive legal frameworks, and the expansion of facilities and manpower [47]. Even if infrastructure, manpower and a comprehensive legal framework are achieved, as seen in some countries, the heart of the matter still appears to be preventing kidney failure in the first place through prevention programmes in communities [23].

Improving renal registries

Registry data guide efforts to prevent, detect and prevent the progression of CKD. Published registry data can be used to improve awareness of the under-appreciated epidemic of CKD and provide critical information to support the planning, delivery and evaluation of renal services for advocacy and planning by governments and policymakers. Discrepancies in the provision of services within and between countries could be highlighted and this may encourage governments to allocate more resources for the treatment of kidney failure. Unfortunately, because few countries in Africa have renal registries, efforts should be channelled into establishing an accurate renal registry for all countries in the continent, to report the true incidence and prevalence of kidney disease. The value of registries is illustrated in Figure 1 [48].

The South African Renal Registry has been a great example of its kind on the Africa continent, as championed by

Professor Razeen Davids. With plans advanced to roll this out across all countries in Africa, AFRAN needs to support the establishment of sustainable renal registries in all member countries, based on the structures of the well-established South African Renal Registry, to improve research in CKD and also to learn from the United Kingdom, Scottish and French registries [41]. Stakeholders should provide sufficient resources to sustain their respective renal registry and thereby improve access to dedicated information for African researchers [49].

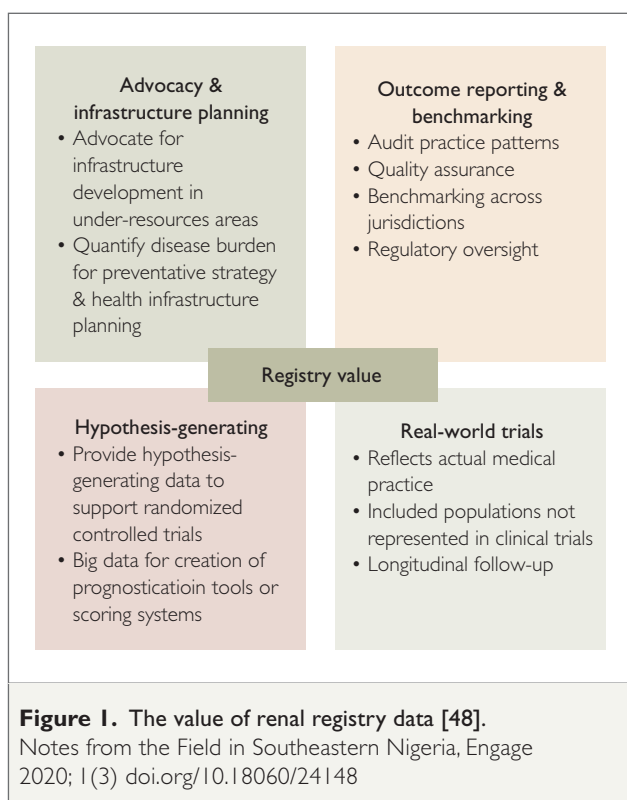
Community engagement with education on prevention

Community engagement has been defined as “the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest or similar situations to address issues affecting the well-being of those people” [50]. Community engagement is believed to impact positively on health promotion as well as health research in the management of kidney disease. However, there is poor knowledge in Africa about the prevention and management of kidney disease coupled with the growing cost of RRT.

Prevention, therefore, presents a valuable option to improve kidney health in Africa. Effective community engagement can disseminate information capable of improving community awareness about kidney disease, its prevention and management as well as organ donation for kidney transplants. Appropriate information, especially in an easily understandable local language, can aid the awareness of risk factors, signs and symptoms and treatment options for kidney diseases. People should be educated to check and know their estimated glomerular filtration rate (eGFR), especially if they are at risk of CKD. It will also demystify any antagonistic cultural or religious misconceptions that may increase the risk of kidney disease. Community engagement programmes have huge financial implications, which can be mitigated by taking advantage of the educational activities of World Kidney Day (WKD).

Taking advantage of World Kidney Day celebrations for education

WKD is an initiative of the ISN and the International Federation of Kidney Foundations (IFKF), established in 2006 and celebrated on the second Thursday of March every year. It is organized as a global awareness campaign to draw attention to the kidneys, their functions for prevention of kidney disease and its risk factors. During this celebration, WKD educational materials provided to complement the theme of the events are distributed and health talks focusing on kidney disease prevention and care are delivered. Screening for kidney diseases and their risk



factors is conducted and educational materials are provided. Mass media is used for education in a community's local language to disseminate information about kidney health. These activities should be extended beyond the usual venues to markets, hospitals, educational sites, religious groups, social media and cultural centres. We could also take advantage of other health days such as World Diabetes Day and World Hypertension Day as such major comorbidities affect kidney health [23]. Although WKD is celebrated annually, its impact can be sustained throughout the year in partnership with NGOs and philanthropists as well as political, traditional and religious leaders and media houses, to ensure that the WKD message is sustained to promote kidney health for all.

CONCLUSION

The theme for WKD 2022 was "Kidney Health for All". Among Africa's many challenges, there is the need to advocate that our political leaders invest more resources in kidney health care, encourage the training of more members of the nephrology workforce, improve access to affordable renal replacement therapy, and establish renal registries with quality data to support our case.

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Authors' contribution

EKT initiated the write-up and drafted the outline. YN, MEE, OUC and VN wrote various sections of the text, which were then integrated by EKT and circulated to all authors. All authors were involved in critically revising the manuscript and approved the final version.

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