

## Identifying the Barriers to Achieving Sustainable Dialysis Programs in Sub-Saharan Africa: Nigeria as a Reference Point

Bello BT\*

Department of Medicine, College of Medicine, University of Lagos, Idi-Araba, Lagos, Nigeria

### Abstract

About 19 million people worldwide have end-stage renal disease, a stage of chronic kidney disease where affected individuals require long-term renal replacement therapy of which 75% are on maintenance hemodialysis. Africa has the lowest dialysis uptake rates in the world despite chronic kidney disease being three to four times more common in Africa than it is in the developed world.

Several factors are responsible for this low rate of dialysis uptake in sub-Saharan Africa. These include inadequacy of dialysis infrastructure, lack of reimbursements or government subsidies for dialysis and severe shortage of trained nephrology personnel. In addition, there is no regulation governing dialysis practice in most countries in the region, and no renal data on basis of which plans to tackle these issues can be developed.

Increased financial commitments on the part of governments in sub-Saharan Africa are essential not only to improve patient access to dialysis, but also to fund research needed to provide epidemiologic data on kidney disease, train and retain nephrology personnel and develop effective, safe and affordable dialysis modalities for patients with ESRD in the region.

**Keywords:** Barriers; End-stage renal disease; Dialysis

### Introduction

Chronic kidney disease (CKD) has become a disease of worldwide public health concern because of its rising incidence and prevalence, high costs of treatment and poor outcomes [1-5]. It is a relentlessly progressive disease, with affected individuals experiencing a steady deterioration of kidney function over months to years. Ultimately, they develop end-stage renal disease (ESRD), a stage of CKD where affected individuals require long-term renal replacement therapy (RRT). The number of patients receiving long-term RRT worldwide is put at about 19 million, of these, over 75% are treated with maintenance hemodialysis (HD) [6]. There are however geographical inequalities in the uptake of RRT worldwide, with rates of 1228 per million population in developed countries such as the United States (US) and western Europe while in sub-Saharan Africa, RRT uptake rates have been estimated to be about 20 per million population [6,7]. This huge gulf in the uptake of RRT between the developed world and sub-Saharan Africa is definitely not due to a lower prevalence of ESRD in Africa. In fact, it has been suggested that CKD and, it could be argued, by extension ESRD is three to four times more common in Africa than it is in the developed world [8]. It is therefore apparent that certain factors in sub-Saharan Africa interfere with the uptake of RRT by the ESRD population. A clear understanding of these barriers will serve as a veritable platform on which policies and programs geared towards providing sustainable dialysis and kidney transplantation services in these resource-limited countries can be built. The aim of this article is to highlight some of the barriers to achieving the goal of establishing sustainable dialysis programs in sub-Saharan Africa.

### Paucity of Data on Burden of ESRD

In Nigeria, as is the case in most parts of sub-Saharan Africa, the focus of healthcare policy over the years, has been on the control of communicable diseases (such as malaria and recently human immunodeficiency virus infection) and maternal and child health [9]. The belief amongst policy makers in the region appears to be that these are the major contributors to the healthcare burden in these countries. This has led to a situation where the lion share of the annual budgetary

allocation to health care as well as international aid are put into programs related to control of communicable diseases and addressing maternal and child health challenges. The cost of this focus on communicable diseases and maternal and child health challenges has been an inadvertent lack of appreciation of the growing burden of non-communicable diseases in these countries to which CKD is a major contributor [10-12]. A sure way to highlight the contribution of CKD to the overall disease burden in these countries would be to provide epidemiologic data on CKD. However, there is a paucity of epidemiologic data on CKD in the region. In Nigeria, most of the available data are from single centres scattered all around the country with no national collation of the data. Unlike what obtains in developed countries where there are national and sometimes international renal registries, Nigeria has no national renal registry and although there have been recent efforts at starting a renal registry in Lagos, Nigeria's most populous state [13] this has not been replicated in other states. This paucity of renal data has, on one hand, limited the ability of the renal community to convince policy makers to act now in order to avert future disaster from the looming epidemic of CKD and ESRD; and on the other hand it has hampered efforts at generating public discussion about the burden of CKD and ESRD in the country. The implication of this lack of public discussion on CKD and ESRD is that the general populace remains unaware of the problem and affected individuals continue to present late to the nephrologist because they are unaware of the early symptoms of CKD and where to seek care.

\*Corresponding author: Bello BT, Department of Medicine, College of Medicine, University of Lagos; Idi-Araba, Lagos, Nigeria, Tel: +2348023120993; E-mail: [bbello@unilag.edu.ng](mailto:bbello@unilag.edu.ng)

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## Poor Funding for the Maintenance Dialysis

Lack of funding for maintenance dialysis is arguably the single most important barrier to the provision of maintenance dialysis in sub-Saharan Africa. In most parts of the region, there are no reimbursements or government subsidies for dialysis and national health insurance programs do not exist. This has led to a situation where patients have to pay out-of-pocket for dialysis. On a continent where up to 80% the population live on less than 2.5 dollars per day [14] and a session of hemodialysis costs as much as USD 100 – 200 [15,16] most patients with ESRD have to rely on financial support from their extended families, religious organizations and philanthropists to be able to pay for dialysis. Even where government subsidies or payments are available to cover dialysis, many patients with ESRD are denied access to long-term dialysis because of rationing policies that limit provision of dialysis to patient with few co-morbidities [17,18]. With very few exceptions, there are no re-imbursements or government subsidies for dialysis in Nigeria and until very recently, dialysis was not even on the list of treatments paid for by the government-run National Health Insurance Scheme (NHIS). However, the NHIS recently approved payment for up to six sessions of acute dialysis for subscribers to the scheme who present to hospital with renal failure [19]. This poor funding of dialysis by governments in sub-Saharan Africa is a manifestation of the larger problem of poor funding of healthcare by governments in the region. The per capita expenditure on health in countries on the continent ranges from USD 9 – 58, while in Europe it is as much as USD 2000 [20]. In the year 2013 in Nigeria for example, only 4% of the national budget was allocated to healthcare with almost 80% of this set aside for recurrent expenditure such as payment of salaries of staff [9]. The need to pay for dialysis out-of-pocket has been associated with a non-adherence of patients to prescribed dialysis in Nigeria. In our unit located in Lagos, southwest Nigeria, only 3.3% were able to afford thrice weekly dialysis [15] while in Uyo, south-south Nigeria, only 13% of patients achieved 70% of scheduled twice weekly dialysis sessions [21].

Among patients dialyzing at Port Harcourt also in south-south Nigeria, more than 98% of patients could not sustain dialysis beyond 12 weeks [22]. The picture is somewhat different among patients dialyzing at a government run dialysis facility located in Bauchi, northwest Nigeria where majority of the patients were had at least twice weekly dialysis [22]. The reason for this difference is the fact that the Bauchi state government heavily subsidizes dialysis, providing evidence that government subsidies and or re-imbursements for dialysis is likely to lead to higher rates of dialysis uptake amongst the ESRD population.

## Inadequacy of Dialysis Infrastructure

Dialysis infrastructure is inadequate in most parts of sub-Saharan Africa and is not even available in some countries in the regions. HD, whilst the more readily available option is not accessible to the majority of the populace. This is because most of the HD units are located in urban commercial areas and state capitals. As up to 65% of the population of sub-Saharan Africa resides in rural areas, majority of patients in need of dialysis have to travel long distances to be able to access these facilities. It has even been suggested that in some cases, entire families have to relocate to the cities to be closer to the dialysis units [14,23,24] with its attendant loss of productivity and the additional costs of transportation and accommodation. In the last 10 years, there has been a sharp increase in the number of dialysis units in Nigeria from a mere 27 in 2003 [25] to over 70 in 2011 [21]. However, most of the units are located in the southwestern part of the country and in the federal capital city of Abuja with close to 10 out of the 36 states making

up the country still having no dialysis units, the majority of these states being in the northern part of the country [21]. Many of the units are equipped with old refurbished machines with no available spare parts and very little technical backup resulting in frequent breakdown of these machines. This picture is further complicated by the frequent public power fluctuations and outages in the country. Many units are largely dependent on power generating sets thus further increasing the running costs which are subsequently transmitted to the patients. Many units still restrict access to patients with hepatitis Band C and HIV infections while those that allow access to these patients charge them a premium.

Peritoneal dialysis (PD) which is a more practical alternative to HD in sub-Saharan Africa because of its significantly lower setup cost, ease of deployment to remote areas and non-requirement of regular power supply is not widely used in the region. South Africa has the highest PD uptake rates in Africa at about 24.2 per million population (pmp). This contrasts sharply with figures from other developing countries like Mexico, El Salvador and Brunei with PD rates of 378pmp, 323.7pmp and 170pmp respectively [26]. Most other countries in sub-Saharan Africa including Nigeria, report no patients with ESRD on PD. These low rates of PD uptake in the region have been attributed to two main factors; the relatively high costs of PD and high peritonitis rates. In most developed countries, PD is significantly cheaper than HD, with HD costing between 1.25 and 2.35 times the cost of PD [27]. The reverse is the case in most sub-Saharan African countries with HD costing between 0.22 and 0.90 times the cost of PD [27]. The single most important fact responsible for this difference in HD/PD cost ratio between sub-Saharan Africa and the developed world is the need to import PD fluids by most sub-Saharan African countries. Indeed, in countries where PD fluids are manufactured locally, PD is, at the least, not more expensive and in many cases actually cheaper than HD [27]. Arogundade et al at Ile-Ife, Nigeria, reported two groups of twenty patients each, who had renal failure [28]. While both groups were matched for age and clinical diagnosis, one group was managed with intermittent PD using locally manufactured PD fluids and the other group was managed using HD. They compared the effectiveness, costs and complications of both modalities and found that PD was significantly cheaper than HD while being comparable in effectiveness in solute removal as well as clinical outcomes.

Many nephrologists in sub-Saharan Africa continue to avoid prescribing PD for patients with ESRD because of the fear of peritonitis. They argue that the peritonitis rates in PD patients are particularly high in this part of the world due to the humid climate in the tropics as well as the poor level of hygiene among the populace [16,29]. Although, it is our belief that this fear of peritonitis is exaggerated; there may be some evidence in its support. Akinsola et al. in a preliminary study designed to assess the practicability of continuous ambulatory peritoneal dialysis as a treatment modality for ESRD in Nigeria followed up nine patients over a total of 44 patient months. They reported a total of 16 episodes of peritonitis amongst seven patients [30]. In fact, three of the patients reportedly died from “sepsis syndrome”.

## Dearth of Trained Nephrology and Allied Personnel

There is a deficit of trained healthcare personnel in sub-Saharan Africa [31-33]. This deficit cuts across all cadres of healthcare professionals and amount to about 2.4 million doctors and nurses [33]. It has been estimated that there are 2 doctors and 11 nursing/midwifery personnel per 10,000 population in the region, compared with 19 doctors and 49 nursing/midwifery personnel per 10,000 for the Americas, and 32 doctors and 78 nursing/midwifery personnel

per 10,000 for Europe [33]. Of the 53 countries in sub-Saharan Africa, only 12 have more than one medical school; while 11 have none at all [34]. This shortage of trained personnel is further compounded by the migration of these personnel to Europe and North America in search of the proverbial "greener pastures". It is estimated that 60% of doctors trained in Ghana in the 1980s have emigrated from the country while more than 1000 UK work permits were reported to have been issued to healthcare professionals from Nigeria in 2003[32]. Reasons that have been adduced for this "brain drain" include; a lack of adequate health infrastructure in sub-Saharan Africa, a need for better remuneration and quality of life, the search for better opportunities for career advancement, and the quest for postgraduate/post qualification training. The nephrology specialty is not spared this dearth of healthcare personnel [31,34]. While in developed countries like the United States and Europe the number of nephrologists per million population is as high as 16 – 20, the figures in Africa are particularly dismal. Nigeria has about 0.6 nephrologists per million population [31] while in the Democratic Republic of Congo there are only 7 nephrologists (0.11PMP). Some countries in the region still have no nephrologists [31,33,35]. On a continent with a rapidly growing CKD population, there is a huge shortage of specialists available to care for them and this fact is at least partly responsible for the poor outcome of patients with ESRD in Africa. The fear for the future is that the shortage of nephrology personnel to care for ESRD patients will worsen as more and more personnel emigrate from the continent. This fear is based on the predicted future shortages of nephrologists and other nephrology personnel in the developed world as the number of doctors showing an interest in a future career in nephrology dwindles [36,37].

### Absence of Regulatory Framework to Ensure Quality of Dialysis

As had been alluded to earlier in this paper, there has been a recent increase in the number of dialysis units in Nigeria. Many of these new units are privately owned and run. Much as this development is welcomed, it has raised several worrying questions bordering on the quality of dialysis being offered patients at these units. These concerns have arisen from the fact that many of the proprietors of these units are business people who see these units as financial investments designed to generate a profit. This backdrop of a combination of the pressure to generate profit and the shortage of qualified nephrology personnel in the country as a whole is what has led the Nephrology Association of Nigeria (NAN) and many leading nephrologists in the country to raise concerns about the quality and safety of the dialysis services being offered at many these units [19,38].

Dialysis in Nigeria is largely unregulated. Almost anyone, with sufficient funds can open or run a dialysis unit. This lack of regulatory oversight results in non-standardization of dialysis practices at the various units. This issue is made worse by the fact that there are no local guidelines regarding minimum standards for dialysis unit practices. Most units have no nephrologist cover; even fewer are staffed by trained nephrology nurses and technicians. Patients are not segregated in a way to minimize the transmission of infections such as hepatitis B and C. There are also questions about specific practices such as dialysis duration, types of dialyzers used and the quality of the water for HD [19,38]. Some units practice dialyzer re-use in a bid to cut costs and improve profit margins without evidence of following safety guidelines for this procedure. Most centres do not carry out frequent testing of water for HD. In one study of water used for HD in 6 dialysis units in Lagos, none met standards for either microbial or chemical purity [39].

It is therefore clear that this lack of regulatory oversight may be putting dialysis patients at risk of adverse outcomes.

### Conclusion

Many barriers continue to restrict access to maintenance dialysis among the ESRD population of sub-Saharan Africa chief amongst these being lack of reimbursement/government subsidies, poor dialysis infrastructure and dearth of trained nephrology personnel. As efforts are being made to tackle these issues, other challenges are assuming greater prominence such as the need for regulatory oversight of practices at the various dialysis units. It is clear that a holistic approach to addressing these issues is required. Increased financial commitments on the part of governments in the region are essential to achieving long-term success; not only of improving patient access to dialysis, but also to fund research needed to provide epidemiologic data on ESRD, train and retain nephrology personnel and develop effective, safe and affordable dialysis modalities for patients with ESRD in sub-Saharan Africa.

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