International Journal of Multidisciplinary and Current Research ISSN: 2321-3124
Research Article Available at: https://ijmcr.com

The Burden and Management of Chronic Kidney Disease in Nigeria: The Role of the Physiologist in a Growing Public Health Challenge

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Received 01 Feb 2026, Accepted 08 March 2026, Available online 09 Mar 2026, **Vol.14, No.2 (Mar/Apr 2026)**

Abstract

Background*: Chronic Kidney Disease (CKD) is an escalating non- communicable disease marked by a gradual and irreversible decline in renal function. Globally, CKD contributes significantly to morbidity, mortality, and healthcare expenditure, with a particularly heavy burden in low- and middle- income countries like Nigeria.*
Methods*: This study employed a secondary research design, conducting an extensive literature review of peer-reviewed journals, global health databases, national surveys, and relevant clinical guidelines using Medical Subject Headings (MeSH) search terms and text words from Bibliographic databases: MEDLINE, PubMed, Cochrane Library and Google Scholar National/International reports. Sources were selected to capture current evidence on the pathophysiology, epidemiology, risk factors, complications, and management strategies of CKD, with emphasis on Nigerian data and health systems.*
Results*: CKD affects over 10% of the global population and between 8–26% of Nigerians, disproportionately impacting the productive age group (18–60 years). Late presentation, poor awareness, and high out-of-pocket treatment costs exacerbate disease outcomes. Major risk factors include hypertension, diabetes, obesity, aging, and unhealthy lifestyle practices. Management strategies such as early screening, blood pressure control, proteinuria reduction, and lifestyle modification remain underutilized in Nigeria.*
Conclusion*: CKD is a silent epidemic with severe clinical and socioeconomic consequences. There is an urgent need for coordinated public health interventions—including prevention, early detection, improved access to care, and policy support—to mitigate its impact in Nigeria. Strengthening physiologists' roles in multidisciplinary kidney health promotion could offer sustainable solutions.*

Keywords*: Chronic Kidney Disease, Non-Communicable Diseases, Nigeria, Risk Factors, Public Health, Physiology*

Introduction

The kidneys are a pair of vital organs responsible for filtering blood and excreting waste products and excess water in the form of urine. Within the renal cortex are specialized capillaries known as glomeruli, which, along with a network of tubules, form the nephrons—the kidney's functional filtering units [1]. Nephrons filter blood under pressure and selectively reabsorb water and essential substances back into circulation, while the remaining materials are excreted as urine [1]. Beyond waste removal, the kidneys help maintain the body's fluid balance and regulate acid–base equilibrium by adjusting urine acidity. They also play a key role in hormonal regulation, influencing red blood cell production and blood pressure control [2].

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DOI: https://doi.org/10.14741/ijmcr.v.14.2.5

When these functions are impaired, chronic kidney disease (CKD) may develop, representing the progressive stage of various chronic renal disorders. [3].

Chronic Kidney Disease (CKD)

Chronic kidney disease (CKD) is characterized by a gradual, irreversible decline in renal function that develops over an extended period [3], [4]. While the definition and classification of CKD have evolved, current international guidelines define it as either reduced kidney function—indicated by a glomerular filtration rate (GFR) below 60 mL/min/1.73 m^2—or the presence of markers of kidney damage, or both, persisting for at least three months, irrespective of the underlying cause [5]. GFR remains the most reliable indicator of overall kidney function and forms the basis for staging the disease [5], [6]. Clinically, CKD is often first suspected when elevated serum urea and creatinine levels are detected incidentally during routine screening, particularly among high-risk

groups such as individuals with diabetes or hypertension. Many patients with slowly progressive CKD remain asymptomatic until GFR declines below 30 mL/min/1.73 m², and some may continue without noticeable symptoms even at lower levels [7], [8].

Criteria for referral of chronic kidney disease patients to a nephrologist [3]:

• eGFR < 30 mL/min/1.73 m2
• Rapid deterioration in renal function (> 25% from previous or > 15 mL/min/1.73
m2 /year)
• Significant proteinuria (PCR > 100 mg/mmol or ACR > 70 mg/ mmol), unless
known to be due to diabetes and patient is already on appropriate medications
• ACR > 30 mg/mmol with non-visible haematuria
• Hypertension that remains poorly controlled despite at least four antihypertensive medications
• Suspicion of renal involvement in multisystem disease

In many instances, the underlying diagnosis is unclear especially in elderly patients. Many patients diagnosed late have bilateral small kidneys; renal biopsy is rarely undertaken in this group since it is more risky, less likely to provide a histological diagnosis because of the severity of damage and unlikely to alter management. The 2002 Kidney Disease Outcomes Quality Initiative (KDOQI) guidelines defined a five-stage system for classification of CKD based on GFR and the 2012 KDIGO (Kidney Disease: Improving Global Outcomes) guidelines updated this staging to include the cause of CKD and the degree of albuminuria (staging by cause, GFR, and albuminuria [CGA]) [9]. CKD is progressive disorder associated with a myriad of complications and elevated risk for future outcomes. Like with most Non – Communicable Diseases, CKD unfortunately has complications. Some of these complications are directly consequences of loss of kidney function such as volume overload, hyperkalemia, hyperphosphatemia, metabolic acidosis, secondary hyperparathyroidism, as well as anaemia and hypertension. Complications include increased cardiovascular mortality, kidney- disease progression, acute kidney injury, cognitive decline, anaemia, mineral and bone disorders, and fractures. Many complications are also the result of treatment of causes of CKD as in the case of diagnosis [10].

Chronic Kidney Disease in Nigeria

Chronic kidney disease (CKD) is a significant health concern globally and a growing public health challenge in low- and middle-income countries, particularly in sub-Saharan Africa. This is more in countries like Nigeria where patients often present late or not at all to health facilities for several reasons which range from prohibitive cost of health care services to use of alternative treatment like spiritual healing and traditional/native healers [11], [12], [13], [14]. The growing challenge of CKD in Nigeria can be summarised thus: age, access to health care, socio – economic impact, etc.

Studies done across Nigeria estimated the prevalence of CKD in Nigeria to range from 8% in the Southeast to 18.8% in the Southwest and 26% in the North showing the enormity of the problem [15]. The incidence of CKD in Nigeria has been reported to range between 1.6% and 12.4% respectively from hospital- based studies with exclusion of patients who lack access to hospital care [16], [17]. In Nigeria some of the causes of CKD include: Chronic glomerulonephritis, interstitial nephritis, diabetes nephropathy and hypertension, reflecting the high prevalence of bacterial, viral, chronic and parasitic infections that affect the kidneys [18], [19] .

Access To Healthcare

Access to renal replacement therapy (RRT) in Nigeria is significantly constrained, reflecting the challenges typical of resource-limited settings [20]. Reported dialysis access rates are low, with two studies documenting 22.2% [21], [22] and another reporting 10.9% [23]. Renal transplantation services are available in only four centres across the country: Obafemi Awolowo University Teaching Hospital (Osun State), University College Hospital (Oyo State), Aminu Kano Teaching Hospital (Kano State), and a private hospital in Lagos State. Of these, three are located in the south-western region, while only one centre (AKTH) serves the northern zone, forcing patients from other regions to travel considerable distances to access care [20]. Even in centres where transplantation is offered, affordability remains a major barrier. Key factors limiting access to RRT in Nigeria include inadequate funding, unavailability or frequent breakdown of dialysis machines, a shortage of trained personnel for renal transplantation, and negative cultural attitudes toward organ donation [20], [23], [24].

Age

CKD affects every age but in Nigeria highest burden is recorded amongst persons aged 30 – 60 years and this is a serious issue as this age range make up a majority of the working-class group that contributes to economic growth. This is also a contrast from what is obtained in developed countries where burden was seen in older population [11], [25].

Healthcare Seeking Behaviour

In Nigeria, most patients present to health facilities at advanced stages of illness. Prior to seeking formal medical care, many resort to alternative treatments such as spiritual healing or traditional/native medicine, largely due to issues of accessibility and affordability of healthcare services. Consequently, a significant proportion of individuals with chronic illnesses die without ever presenting to a health facility [26], [27], [28].

Awareness

The major challenge of individuals with CKD is the late presentation in an advanced stage which is stemmed from poor knowledge of the disease and its risk factors as cited by many studies. To a great extent, knowledge is central to social behaviour and the level of knowledge on any issue/phenomenon will have implication for man's disposition towards it. Knowledge affects the ability to make informed decisions. Thus, medical knowledge of any health condition will inform an individual's actions towards the health condition and health-seeking behaviour. Specifically, knowledge of KD will make people take actions to avoid kidney problems and get knowledge on how to manage one if it exists [29], [30], [31]

Socio – Economic Impact

In Nigeria health expenses are mostly out of pockets and with diseases such as CKD that incur huge financial costs this is a challenge especially as most patients do not have health insurance to meet the massive financial demands the disease places on its sufferers and their families this leads to huge depletion of funds, absenteeism from work and often time loss of jobs for the individual and for the nation, economic implications and reduction in viable workforce. [32], [33]. CKD is an important public health problem associated with substantial morbidity, impaired quality of life, shortened life expectancy, and excessive health care costs, huge cost of provision of health care services for these patients and increased hospital admissions. The cost of care includes not only the direct cost of dialysis and transplant services but also indirect cost like man hours lost at the workplace [34].

Prevention and Management of Chronic Kidney Disease

The management of patients with CKD is focused on early detection or prevention, treatment of the underlying cause (if possible) to curb progression and attention to secondary processes that contribute to ongoing nephron loss [35]. Without treatment, the prognosis is poor; relentless progression to uremia and death is the rule [36]. Given its long preclinical latency, screening of asymptomatic individuals for CKD has been considered as a potentially useful means of early detection, with a goal of reducing CKD progression and its complications [37], [38]. The aims of management in CKD are to: monitor renal function, prevent or slow further renal damage, limit complications of renal failure, treat risk factors for cardiovascular disease and prepare for RRTs [3].

Public Health Implications of Chronic Kidney Disease

Chronic kidney disease (CKD) is a major public health concern, both in Nigeria and worldwide, with rising incidence and prevalence [39]. CKD is an emerging major public health problem. First, the costs of renal replacement therapy is exceedingly high and consuming a significant proportion of health care budgets of developed countries, while in developing countries it is out of reach. Second, is the complex relationship between chronic kidney, cardiovascular disease, and diabetes [40]. The world's disease profile is changing, and chronic diseases such as CKD now account for the majority of global morbidity and mortality, rather than infectious diseases [41]. The causes of chronic kidney diseases reveal this change and diabetes, together with hypertension, is now the major cause of end-stage renal failure worldwide [33]. This places an enormous financial burden on countries and individuals through loss of life, multiple Disability-adjusted life years (DALYs), including the cost of the management of end-stage renal failure [42], [43]. Thus, it is medically and economically imperative for awareness, detection, and prevention programs to be introduced across the world, particularly in the developing countries. This will require concerted action from global institutions, governments, health service providers, and medical practitioners. The increased prevalence of kidney failure and early stages of chronic kidney disease, and the high costs and poor outcomes of treatment constitute a worldwide public health threat. Costs for dialysis and transplantation are increasing alongside costs for other chronic diseases.

In COVID – 19 patients with comorbidities such as diabetes, hypertension or renal diseases had severe cases than those without any pre – existing disease [44]. In a study conducted in a semi-urban community of South-East Nigeria, the independent risk factors for CKD observed included old age, family history of kidney disease, hypertension, generalised obesity and central obesity [45].

The early stages of CKD (stages 1-3a) are generally asymptomatic; therefore, the burden of the disease at these early stages goes largely undetected and difficult to assess. Most patients therefore present late to hospital, usually in the advanced diseased states and in need of salvage dialysis this contributes to the poor outcomes recorded among CKD patients [46], [47].

Patients with CKD are at high risk of cardiovascular diseases (CVD) and cerebrovascular diseases, and they are more likely to die of CVD than to develop terminal renal failure. The presence of CKD increases the risk of death of CVD in patients with diabetes [40], [48]. CKD causes premature morbidity and mortality and reduces quality of life, but treating it is expensive. Treating kidney failure imposes a large economic burden on patients, the health care system, and society [49].

The Role of Physiologists in the Management of Chronic Kidney Disease (CKD)

Physiologists are scientists who study how the body functions. In clinical settings, particularly in CKD management, they contribute in the following areas [50], [51], [52], [53]:

• Perform tests to assess the function of various organ systems (e.g., cardiovascular, respiratory, renal).
• Monitor progression of CKD and assess complications such as hypertension or cardiovascular disease (CVD), which are common in CKD patients.
• Specialize in exercise testing and prescription for individuals with chronic diseases.
• Design safe, individualized physical activity programs to improve physical function, reduce fatigue, and enhance cardiovascular health in CKD patients.
• Cardiopulmonary testing. CKD patients often suffer from cardiovascular issues; physiologists assess heart and lung function.
• Determine patients' baseline physical capacity, which informs treatment plans.
• Muscle wasting assessment. Sarcopenia (muscle loss) is common in CKD; physiologists monitor body composition and muscular strength.
• Develop tailored exercise programs for pre-dialysis and dialysis patients.
• Supervise intradialytic exercise (exercise during dialysis sessions).
• Educate patients on the importance of physical activity and its role in managing CKD.
• Support During Dialysis and Transplantation

Conclusion

Chronic Kidney Disease is a growing health crisis in Nigeria, characterized by high prevalence, late presentation, and limited access to life-saving therapies. The disease disproportionately affects young and middle-aged adults, amplifying its economic and social impact. Although the challenges are significant, opportunities for prevention and control exist through lifestyle modification, early detection, and health system reforms. Strengthening surveillance systems, expanding access to affordable care, and raising public awareness are critical steps toward reducing the burden of CKD in Nigeria.

Funding

No external funding was received for this review.

Declarations

Ethics approval and consent to participate Not applicable as the study is based on publicly available secondary data.

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