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Pattern of Admission and Outcomes for Chronic Kidney Disease in a Nigerian Tertiary Institution: A 5 Year Retrospective Study

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Chronic kidney disease is a global issue with a rising incidence and hospitalization rate. It coexists with cardiovascular diseases and presents higher morbidity and mortality.
Aims: We aim to examine the admission and outcomes of patients with chronic kidney disease admitted to medical wards over a 5 year period; (November 2018 to October 2023).
Study Design: This is a single-center retrospective descriptive study that examines patients with chronic kidney disease admitted to medical wards over a 5 - year period, from November 2018 to October 2023.

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Place and Duration of Study: This study was conducted at the University of Uyo Teaching Hospital, Nigeria. Data of patients admitted into the medical ward from November 2018 to October 2023 (5-year period) were retrieved.
Methodology: Patients' case notes were retrieved from the hospital's records department. Demographic data such as age, sex, occupation, and religion were retrieved from the case notes. Other data that were retrieved included diagnosis, date of admission and discharge, and duration of stay.
Results: A total of 567 patients were admitted during the study period consisting of 237(41.8%) females and 330(58.2%) males. The mean age of the patients was 49.75±15.44 years. The Median duration of stay was 10 days. Diabetic Nephropathy was the leading cause of CKD 160(28.2%), followed by hypertensive Nephrosclerosis 152(26.8%).
Approximately 60.1% of the patients were discharged, while 19.6% left against medical advice and 20.3% of the patients died. Patients with a diagnosis of chronic kidney of unknown cause (CKDu) had a higher likelihood of dying (54.05%).
Conclusion: This study observed an increasing trend of CKD patients, with the majority presenting late to the hospital. It also revealed that diabetic nephropathy is gradually becoming the most common cause of CKD in this environment.

Keywords: Chronic kidney disease; admission; outcomes; tertiary institution.

ABBREVIATIONS

CGN : Chronic Glomerulonephritis
CKD : Chronic Kidney Disease
CIN : Chronic Interstitial Nephritis
CKDu : Chronic Kidney Disease of Unknown Origin
FSGS : Focal Segmental Glomerulosclerosis
LAMA : Left Against Medical Advice

1. INTRODUCTION

Chronic kidney disease (CKD) is defined as a chronic progressive reduction in renal function characterized by a glomerular filtration rate (GFR) of ≤60ml/min 1.73m^2 and or the presence of structural or functional abnormalities lasting up to ≥3monrhs [1] The commonest functional abnormality is proteinuria.

Chronic kidney disease is a global issue with a rising incidence and hospitalization [2]. It coexists with cardiovascular diseases and presents higher mobility and mortality. Mortality due to chronic kidney is 20 times more common than in the general population [3]. This is attributed to the increasing prevalence of risk factors for CKD, such as hypertension, obesity, and diabetes [4]. CKD affects an estimated 843.6 million people worldwide [4], which is approximately 10% of the global population [5]. A systematic analysis of 33 population- based studies highlights the significant differences in CKD prevalence by geographic region, classified by income level. The age-standardized prevalence of 8.6% and 9.6% in men and women in high-income countries, and 10.6% in men and 12.5% in women in low- and middle-income countries [6]. However, a more recent systemic review and meta-analysis of 100 studies observed a global prevalence rate of 13.4% for CKD stages 1-5 and 10.6% for CKD stages 3-5 [7]. The prevalence rates for CKD ranged from 6.4 to 8.7% in South Africa [8-9],10.7–13.9% in sub-Saharan Africa [10-11], and 4.6–10.1% across the whole of Africa [10,12]. A systematic review of the prevalence of chronic kidney in Nigeria showed a rate of 2.5% to 26% depending on the formula used in calculating the glomerular filtration rate [13]. This wide variation is attributed to a lack of uniformity in their definition of CKD. In a community study, Ulasi et al observed a prevalence rate of 11.4% [14].

With the recent shift from communicable to non-communicable diseases in low and middle-income countries, the burden of chronic kidney disease has also been increasing [15]. A study in Southwestern, Uganda regional referral hospital revealed a prevalence rate of 15.3% [16].

Global Burden of Disease (GBD) studies have shown that CKD has emerged as a leading cause of worldwide mortality [17-18]. A study conducted in a specialized University Hospital in Southwest Ethiopia found that chronic kidney accounted for 4.6% of admissions [19]. Meanwhile, 6.6% of patients admitted into medical wards in a hospital in Lahore were attributed to chronic kidney disease [20]. In Nigeria, a study conducted in a secondary care hospital reported a high prevalence of non-

communicable diseases with a mortality rate of 19.9%. [21]. This study did not consider CKD, although there was a high prevalence of hypertension and diabetes which are considered the leading cause of CKD worldwide [22]. Understanding the disease pattern and outcomes is necessary for proper planning, prevention, and better outcomes.

This study aims to review the prevalence and outcomes of patients admitted with chronic kidney in our hospital's medical wards in a middle- income economy.

2. METHODOLOGY

This is a single - center retrospective descriptive study of patients with chronic kidney disease admitted into medical wards from November 2018 to October 2023.

Location of study: The study location is the University of Uyo Teaching Hospital, Nigeria. There are five medical wards at the University of Uyo Teaching Hospital: three male wards and two female wards, each with 14 beds, giving a total of 70 beds.

Study Design: Patients' case notes were retrieved from the hospital's records department. Demographic data such as age, sex, occupation, and religion were retrieved from the case notes. Other data that were retrieved included diagnosis, date of admission and discharge, and duration of stay. The reasons for signing against medical advice were recorded for those who did so. The number of patients who died was retrieved. Patients' investigation results were also recorded.

The Glomerular filtration rate was calculated using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) formula [23]. Chronic disease staging was performed using Kidney Disease: Improving Global Outcomes (KDIGO) guidelines [24].

Data handling: Data was analyzed using SPSS version 23. Continuous variables were presented as mean with standard deviation. While categorical variables were represented as frequencies and percentages. Chi-square was used for the calculation of P value. A p-value < 0.05 was considered as significant.

3. RESULTS

Table 1 shows the socio-demographic characteristics of patients with chronic kidney disease. A total of 567 patients were admitted during the study period, consisting of 237(41.8%) females and 330(58.2%) males. Minimum 18 years, maximum 90 years with mean age of 49.75±15.44 years. Most of the admitted patients were within age range of 41-60 years 256(45.1%), followed by 21-40 years, 155(27.3%), 61 years and above 144(25.4%), and those below 20 years 129(2.1%). Majority of the patients were Artisans 239 (42%), followed by Public servants 112 (19.8%), Retirees 75(13.3%) and, Students 44 (7.8%).

Table 1. Socio-demographic characteristics of chronic kidney disease patients

Socio-demography	Frequency(n=567)	Percentages	
Females	237	41.8	
Males	330	58.2	
Occupation			
Artisan	239	42.2	
Civil Servant	2	.4	
Clergy	21	3.7	
Farming	32	5.6	
Public Servant	112	19.8	
Retirees	75	13.2	
Student	44	7.8	
Unemployed	42	7.4	
Age Range			
20 years and below	12	2.1	Age
21 - 40 years	155	27.3	Mean = 49.75
41 - 60 years	256	45.1	SD = ±15.44
61 years and above	144	25.4	Maximum = 90
		100.0	Minimum = 18

Fig. 1 illustrates the yearly admissions trend from November, 2018 to October 2023. The highest number of admission occurred in 2023, with159 (28.00%) followed by 2022, 118(20.80%), 2020, 104(18.30%), 2019, 78(13.80%) and 2021, 77(13.60%).

Fig. 2 depicts the duration of hospital stay. The minimum stay was 1 day, the maximum stay was 85 days, and the median stay of 10 days. The majority of patients stayed in the hospital was between 1and10days, 301(53.10%), followed by 11-20 days, 164(28.92%), 21-30days 62 (10.93%) 31-40 days,25(4.41%) and more than 40 days, 15(2.64%).

Table 2 presents the causes of CKD. Diabetic Nephropathy was the leading cause of CKD160

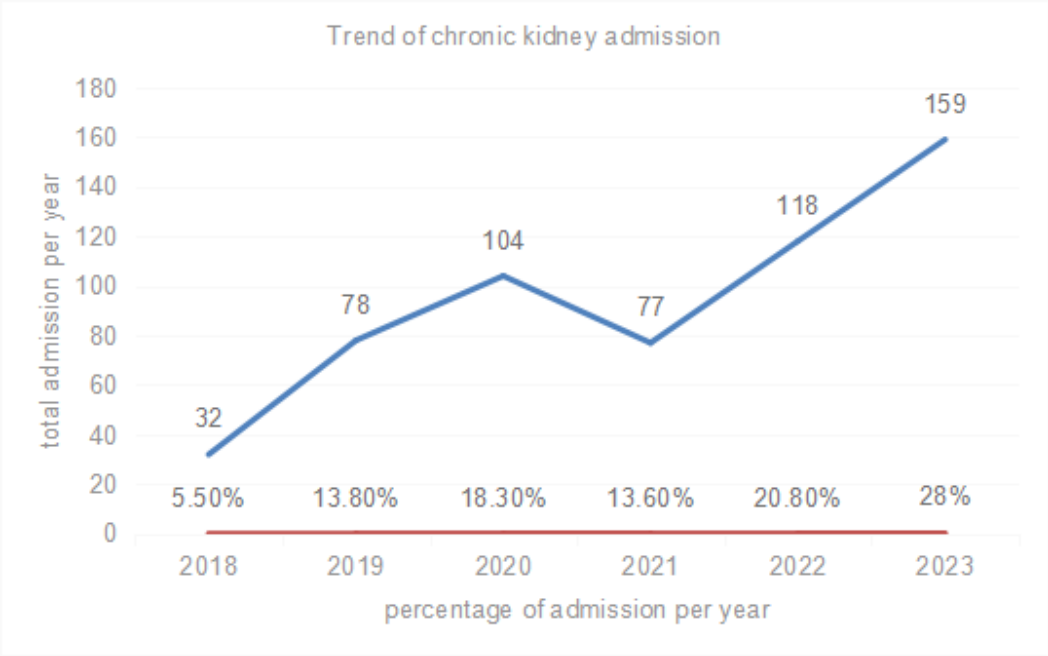

Fig. 1. Admission trend from november 2018 to October 2023 with a dip only in 2021

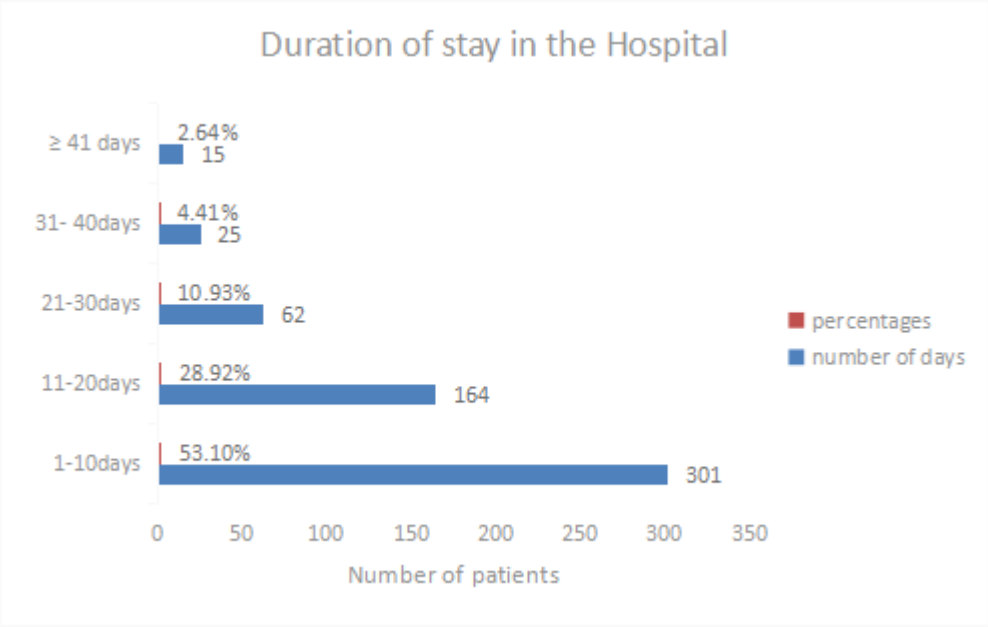

Fig. 2. Duration of hospital stay

(28.2%), followed by hypertensive nephrosclerosis 152(26.8%), HIV - related nephropathy 88 (15.5%), chronic glomerulonephritis 81(14.3), obstructive nephropathy 32 (5.6%). Chronic kidney disease of unknown origin (CKDu) 37(6.5%), and lupus nephritis 2(0.4%). While, chronic allograft dysfunction, focal segmental sclerosis, multiple myeloma nephritis, seronegative vacuities, mixed connective tissue disease; and single left kidney with calculi contributed 1(0.2%) each.

Fig. 3 illustrates the outcomes of patient admissions. A majority (60.1%) were treated successfully and discharged, while, 19.6% left against medical advice, and 20.3% died.

Table 2. Causes of chronic kidney disease among the patients

Causes of chronic kidney disease	Frequency	Percentages
CGN*	81	14.3
Chronic allograft dysfunction	1	0.2
CIN**	8	1.4
DM nephropathy	160	28.2
FSGS ***	1	0.2
HIV related Nephropathy	88	15.5
Hypertensive Nephrosclerosis	152	26.8
Lupus nephritis	2	0.4
Mixed connective tissue disease	1	0.2
Multiple myeloma, nephrotic syndrome	1	0.2
Nephrolithiasis	1	0.2
Obstructive nephropathy	32	5.6
Seronegative vasculitis	1	0.2
Single left kidney with calculi	1	0.2
CKDu****	37	6.5
Total	567	100.0

CGN- chronic glomerulonephritis **CIN – chronic interstitial nephritis, * Focal segmental glomerulosclerosis. **** CKDu- chronic kidney disease of unknown origin*

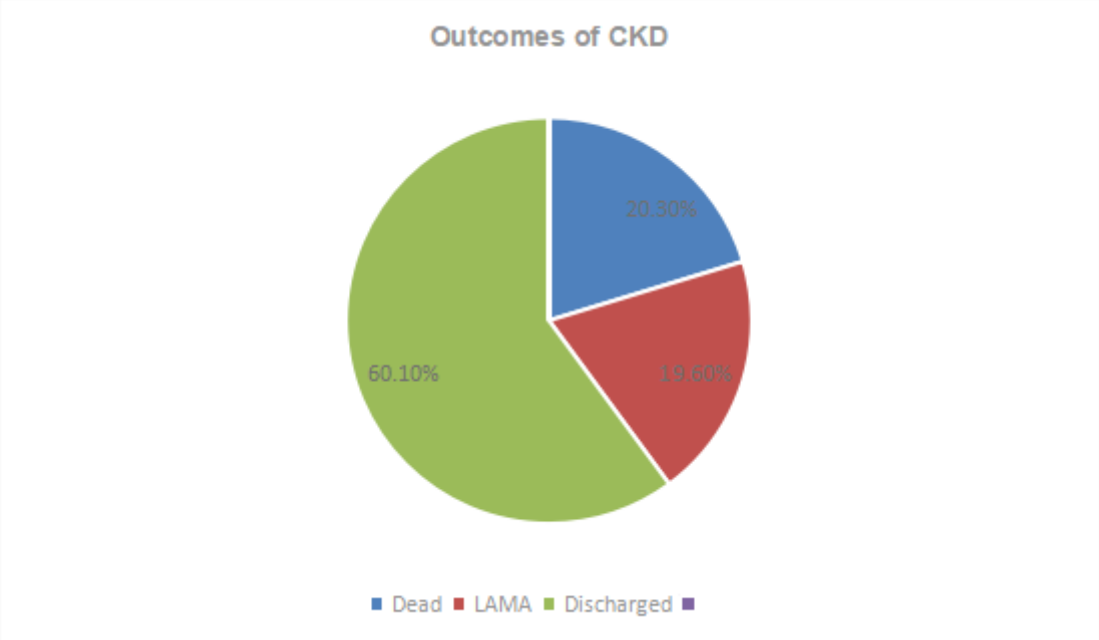

Fig. 3. Outcome of patients admitted with chronic kidney disease

Fig. 4 depicts death outcomes based on the etiology of CKD. Patients diagnosed chronic kidney disease of unknown etiology (CKDu) had the highest mortality rate (54.05%), followed by chronic interstitial nephritis (37.50%), hypertensive nephrosclerosis (20.39%), diabetic nephropathy (19.38%), HIV-related nephropathy (19.32%) and obstructive uropathy (18.75%). Chronic glomerulonephritis was least associated with the tendency to die.

Table 3 Presents the reasons why patients left the hospital against medical advice with financial constraints being the predominant factor (89.2%).

Table 4 shows that most of the patients were in CKD stage five 378(66.7%), followed by stage four 87(15.3%), stage three 40(8.8%), stage two 27(4.8%) and stage one 25(4.4%) .It also shows the mortality outcomes across different CKD. Stages. Out of 25 patients in stage 1, 1(0.2%) died, stage 2 , 3(0.6%) out of 27 patients, stage 3a , 2(0.4%) out of 22 patients , stage 3b, 5(1.0%) of 28, stage 4, 17(3.5%) out of 83 and stage 5, 62(12.9%) out of 382. *(P*= 0.396).

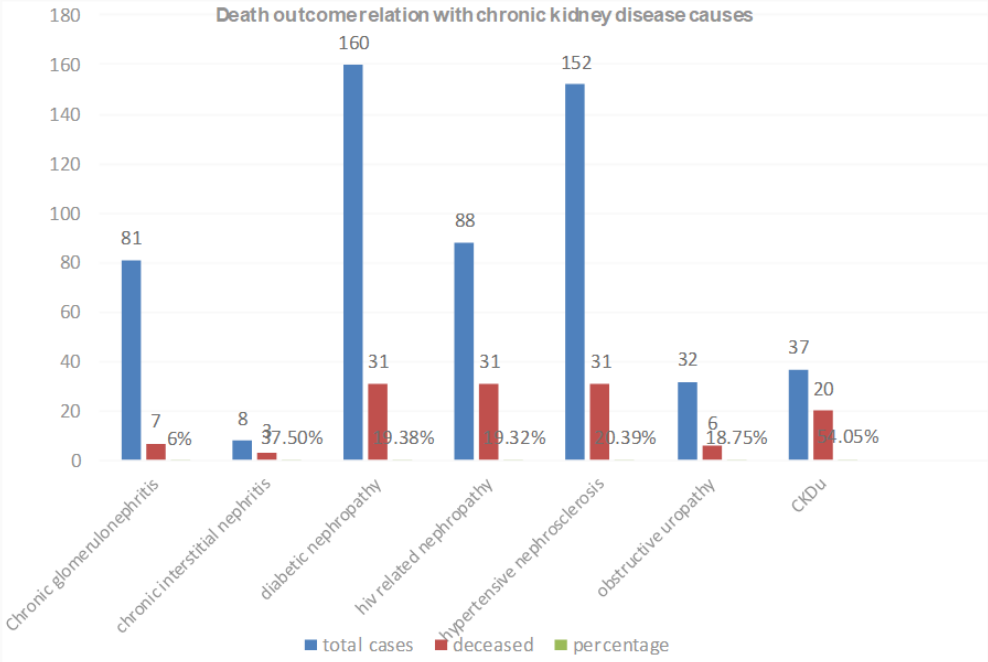

Fig. 4. Death outcome and etiology of chronic kidney disease

Table 3. Reasons for leaving against medical advice. (LAMA)

Reasons	Frequency (n=111)	Percentages (%)
Financial constraint	99	89.20
Home treatment	1	0.9
No improvement	3	2.7
No functioning dialysis machine	1	0.9
Personal reason	3	2.7
Strike	2	1.8
To another hospital	2	1.8

Table 4. Stages of chronic and death outcomes kidney disease

	CKD Stages (n-567)						
	Stage 1 F(%)n=25	Stage 2 F(%)n=27	Stage 3a F(%)n=22	Stage 3b F(%)n=28	Stage 4 F(%)n=83	Stage 5 F(%)n=382	P=0.396
Death							
No	24(4.2)	24(4.2)	20(3.5)	23(4.0)	66(11.6)	320(56.4)	
Yes	1(0.2)	3(0.6)	2(0.4)	5(1.0)	17(3.5)	62(12.9)	

Table 5. Shows relationship of death outcome and dialysis

	Dialysis n=567		
Death	No F(%) n =387	Yes F(%) n=180	P=0.73
No	310(54.0)	142(25.0)	
Yes	77(13.6)	38(6.7)	

Table 5 Death outcomes of patients who received dialysis versus those who did not. This table compares the death outcomes of patients who received dialysis versus those who did not. Of the 180 patients (31.7%) who had dialysis, 38 (6.7%) died. Meanwhile, of the 387 patients (68.3%) who did not have dialysis, 77 (13.6%) died (*P*=0.73).

4. DISCUSSION

The study shows that more males were admitted than females. This observation, however, is not consistent with other studies that have found CKD to be more prevalent in females than males [13], [25]. This discrepancy may be attributed to lifestyle factors that expose males to greater risks for chronic kidney disease, such as diabetes and hypertension. Additionally, men may prioritize raising funds for their families and spend more time working, often neglecting their health. Another possible explanation is the higher incidence of obstructive nephropathy in men, which can result from conditions like benign prostatic hyperplasia (BPH) and prostate cancer, both of which occur solely in men.

The study also revealed that most of the patients were between the ages of 21-60. This contrasts with developed economies, where CKD is more prevalent in older age groups [5,7]. This difference may be due to the high prevalence of chronic glomerulonephritis (CGN) and HIV - associated nephropathy among the young and middle population in low-income and middle - income economies like ours. CGN primarily affects the young and middle-aged, and it has been identified as one of the leading causes of chronic kidney disease in Nigeria [26-27]. In this study, HIV- related nephropathy and CGN were the 3rd and 4th leading causes of CKD. A previous study in Uyo noted that HIV-related kidney disease was the leading cause of CKD [28]. The high prevalence of CKD in the younger and middle - aged groups, as observed in this study, poses a significant burden on the low and middle-income economies, which are ill-equipped to manage the long-term consequences. This age group represents the most productive segment of the population, and without urgent intervention, the economic impact could be severe. Therefore, concerted efforts should be made by the government, private organizations, and non-governmental organizations to prioritize prevention.

The study observed an increasing trend in hospital admissions, except for a small dip in 2021(Fig. 1). This rising trend may be attributed growing prevalence of non-communicable diseases in low- income middle- income economies [29] driven by increasing rates of diabetes and hypertension, both of which were identified as the leading causes of CKD in this study. The decline in admissions in 2021 could explained by the general decrease in hospital admissions observed post COVID-19,as noted in other studies [30-31]. COVID-19 was first diagnosed in Nigeria on February 27, 2020, in a 44-year old Italian Citizen February 27, 2020. This led to a drop in hospital admissions between 2020 and 2021 [31].

The median length of stay among patients was 10 days, which is lower than the 14 days reported in a study from Port Harcourt [32]. The disparity may be due to the inclusion of all patients with renal diseases, including those with acute kidney injury in the Port Harcourt study.

We observed that diabetes nephropathy was the leading cause of chronic kidney disease, followed by hypertensive nephrosclerosis, HIV - related nephropathy, and chronic glomerulonephritis. Diabetes mellitus remains the leading cause of CKD worldwide [7,33]. However, this finding contrasts with other Nigeria studies, where CGN and hypertension were identified as the leading cause of CKD [34]. Most of those studies were community-based studies, while ours focused on hospitalized patients with CKD. Chronic glomerulonephritis is often linked to infectious diseases like streptococcal throat and skin infections.

Therefore, with a reduction in infectious diseases in low and middle – income economies [29], the prevalence of CGN is also likely to reduce.

The prominence of diabetic nephropathy in this study may be attributed to the shift from communicable to non-communicable diseases in low-income and middle-income economies driven by a transition from the traditional lifestyle to more Westernized habits [29].

Chronic kidney disease of unknown origin (CKDu) was seen in 6.5% of the patients. The Patient is said to have CKDu after all the common etiologies of CKD have been excluded, and it predominantly affects young and middle-aged adults, particularly males engaged in work, such as agriculture and manual labor [35]. Patients with CKDu typically have minimal or no proteinuria, are non-diabetic and have either normal blood pressure or only mildly hypertensive [35-36]. CKDu is increasingly recognized as a growing public health concern affecting the working-age population. The 6.5% prevalence observed in this study is lower than the 20.5% found by Suliaman et al in Northern Nigeria [37]. Other studies in Nigeria revealed that up to 21.5% of all renal admissions and 15% of renal deaths were attributable to CKDu [14,32].

Over the review period, 60.1% of patients were discharged, a higher rate than 53.3% observed in a study on renal admission in Port Harcourt. [32]. The mortality rate in this study was 20.3% which aligns with earlier study in Nigerian tertiary institution [32]. Alarming, 114(19.6%) of patients left against medical advice (LAMA), a higher rate than reported in most other studies [32,38-40]. The primary reason for LAMA was financial constraints, accounting for 99(89.2%) of cases. Other reasons included lack of improvement, personal reasons, strikes by medical personnel, preference for other hospitals, and alternative treatment at home. Financial difficulties as the cause of LAMA have been noted in other Nigerian studies [39 -40]. This is likely because healthcare in Nigeria is mostly out-of-pocket. The Federal Government of Nigeria only cover for six sessions of dialysis for the enrollees in the National Health Insurance scheme. There is a pressing need for the government to include all patients with CKD under the National Health Insurance scheme (NHIS) and take full responsibility for their medical care. States government should also consider establishing state insurance schemes for their residents.

Most patients in this study presented with CKD stage 5, requiring urgent dialysis. This is consistent with earlier studies in Nigeria [27,41]. This may be because our patients often opt for alternative care from traditional and spiritual caregivers before presenting at a late stage for orthodox care. [42]. Additionally, CKD patients often remain asymptomatic until the late stages of the disease. Therefore, there is an urgent need for public health campaigns and educational efforts through schools, churches, town criers, and mass media at regular intervals to promote early detection and intervention.

The study also observed that Patients diagnosed with CKDu were more likely to die than those with other causes of CKD (54.05%). An earlier study observed HIV- related kidney was the leading cause of death among renal patients with 15% of deaths attributed to with CKDu [32]. This high mortality rate associated CKDu may be due to its insidious onset and lack of symptoms until the disease is advanced. CKDu often progresses rapidly and can be fatal due to genetic and environmental factors [43]. Chronic interstitial nephritis, and hypertensive nephrosclerosis were also associated with high mortality in this study.

There was no statistically significant difference between the various stages of CKD and death outcomes in this study, which may be attributed to the late presentation of patients.

Similarly, dialysis also did not significantly affect mortality outcomes, possibly due to the inability of many patients to sustain long-term dialysis and delays in initiating treatment due to financial constraints. An earlier study at the same center indicated that the majority of the patients were unable to maintain regular hemodialysis [44].

6. CONCLUSION

This study observed an increasing trend in the number of patients with CKD, with the majority presenting late to the hospital. It also highlighted that diabetic nephropathy is gradually becoming the most common cause of CKD in low- and middle-income countries. Additionally, the study revealed an increasing number of patients leaving the hospital against medical advice due to financial constraints.

There is a need to place greater emphasis on prevention, early detection, and control of CKD risk factors. Furthermore, the government should consider expanding the National Health

Insurance Scheme to cover patients with chronic kidney disease, improving access to care and reducing financial burdens.

7. LIMITATION

A major limitation of this study is the manual storage of patient records. Not all patient folders were retrievable, and some folders were damaged or incomplete, resulting in the loss of vital information.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Ethical approval was sought for and obtained from the University of Uyo Health Research Ethics Committee, with UUTH NHREC Registration Number- NHREC/24/06/22/UUTH and HREC Protocol assigned number UUTH/ AD/S/96/VOL.XXI/854.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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