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Nephrology outpatient care in South-Southern Nigeria: clinical and socio-demographic insights from a tertiary hospital.

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Abstract

Introduction: Renal diseases are a major global health issue affecting all ages and races. This research aimed to investigate the clinical and socio-demographic characteristics of patients attending a Nephrology clinic in the South-South geopolitical zone of Nigeria. The study identified referral patterns, determined the prevalence and causes of chronic kidney disease (CKD) among these patients, and analyzed the outcomes. Method: A non-randomized sampling technique was used to select patients at a Nephrology clinic between 1st June 2023 and 31stDecember 2023. Patient data, clinical evaluations, and investigation results were recorded electronically. Data analysis was done using STATA v.18. Result: During the research period, 208 patients were recruited from the Nephrology clinic. Their mean age was 53.0 ± 17.4 years. The majority were male (67.8%) and employed (70.2%). The median BMI was 25.0 (IQR, 22.0 – 29.0) kg/m^2. The mean systolic blood pressure was 140.8 ± 24.2mmHg. The median random blood glucose was 110 (IQR, 96.0 – 121.0) mg/dl. Most referrals were from hospital outpatient clinics (68.2%), on account of elevated urea and creatinine levels (70.7%). The major diagnosis was CKD (87.5%) in stage 5 (45.1%). Diabetic nephropathy was the leading cause of CKD. About half underwent haemodialysis (50.5%), mostly once per week (33.2%). There were 23 recorded deaths (11.1%), and 5.8% of the patients were referred for renal transplantation. Conclusion: Chronic kidney disease is the main diagnosis in our Outpatient Nephrology care, mainly due to diabetic nephropathy. Many patients had advanced CKD and could not sustain the recommended dialysis frequency.

Keywords: CKD, Diabetic nephropathy, Nephrology clinic.

Introduction

Renal diseases have progressively emerged as a predominant cause of morbidity and mortality on a global scale. According to the 2023 International Society of Nephrology- Global Kidney Health Atlas (ISN-GKHA), a comprehensive multinational study on the prevalence of kidney disease, an estimated 850 million individuals worldwide are afflicted by chronic kidney disease (CKD). This condition transcends age and race, with individuals from disadvantaged populations facing a heightened susceptibility.[1]

The 2023 ISN-GKHA report also indicates that the global burden of kidney disease remains substantial, attributed to the exorbitant costs of treatment and the profound impacts on the health and overall well-being of individuals grappling with kidney disease.[1]

ISN-GKHA endeavours to pinpoint deficiencies in crucial facets of kidney care on a global scale, revealing a pronounced prevalence of these gaps in

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low- and middle-income nations. A juxtaposition with the previous (2019) edition unveils significant positive advancements in the worldwide capacity for providing kidney care, particularly evidenced by a noteworthy expansion in dialysis facilities across the globe.[1] The repercussions of CKD encompass kidney failure, cardiovascular disease (CVD), and premature death.[2] CKD impacts more than 10% of the global population with an estimated 843.6 million individuals worldwide being affected.[3]

Kidney disease must be promptly identified and referred, closely monitored, and effectively treated to avert swift progression to End Stage Kidney Disease (ESRD). *Smart et al,* in a comprehensive meta-analysis, unveiled that timely referral to Nephrologists within one to six months before the onset of dialysis was correlated with diminished mortality rates and hospital admissions, enhanced preparation for vascular access, and improved dialysis outcomes.[4]

There are numerous clinical practice guidelines and recommendations regarding the management of CKD with varying referral criteria to specialist Nephrology services. These recommendations are based on the distinctive differences and challenges present in healthcare settings. The Kidney Disease Improving Global Outcome (KDIGO, 2012), the British guideline from the National Institute of Clinical Excellence (NICE, 2014), and the German College of General Practitioners and Family Physicians (DEGAM, 2019) suggest referral starting from stage 4 (GFR < 30ml/min) or GFR 30-59 ml/min with additional specified criteria.[5,6,7] Referral criteria are designed to ensure prompt and adequate access to Nephrology services for patients who are at the highest risk of complications or progression to End-Stage Renal Disease (ESRD). Common reasons for referral include abnormal renal ultrasound findings, elevated levels of serum creatinine and urea, and abnormalities detected in urine analysis.[8]

Types of renal diseases presenting to Nephrologists encompass acute kidney injury (AKI), chronic kidney disease (CKD), nephrotic syndrome, nephrolithiasis, renal colic, and acute pyelonephritis.[9]

The aetiology of chronic kidney disease encompasses chronic glomerulonephritis (CGN), systemic hypertension, diabetic nephropathy, obstructive uropathy, and sickle cell nephropathy[10]. The epidemiological landscape of End-Stage Renal Disease (ESRD) in sub-Saharan Africa markedly differs from that of more developed economies.[11]

In Sub-Saharan African nations, the dual challenge of non-communicable and infectious diseases may lead to an increase in prevalence and a shift in the spectrum of renal diseases.

Chronic kidney disease (CKD) continues to be the predominant renal disease affecting primarily young male adults in their economically productive years among those seeking care at the Nephrology clinic.[9, 11]

While there have been studies on the socio-demographic and clinical profiles of patients receiving Nephrology care in the South-West and South-East regions of Nigeria, there is a paucity of such studies from the South-South geopolitical zone of the country which incidentally is the most diverse region in Southern Nigeria in terms of ethnic and cultural profiles. This study aimed to ascertain the clinical and socio-demographic characteristics of patients who presented to the Nephrology clinic at Irrua Specialist Teaching Hospital (ISTH) over 6 months. Moreover, our objective included determining the reasons for referral, the prevalence of CKD among referred patients, the causes of CKD, and the subsequent outcomes observed in this patient cohort.

Materials and Methods

A prospective, non-randomized sampling technique was employed to select patients who visited the adult Nephrology clinic at ISTH. All individuals with any type of renal disease who sought care or were referred between the period of 1stJune 2023 to 31stDecember 2023, and whose records were complete, were included in this investigation.

Irrua Specialist Teaching Hospital (ISTH), located in Irrua town, within the Esan central senatorial district along the Benin-Abuja highway in Edo State, South-South geopolitical zone of Nigeria, stands as a prominent referral centre for adjacent regions and states.

The Nephrology clinic, managed by Nephrologists, functions biweekly on Mondays and Fridays as a

specialized outpatient facility. Patients exhibiting symptoms and signs of kidney disease, abnormal urinalysis results, or unusual ultrasound findings were referred to the Nephrology clinic if their condition did not require immediate in-patient care. Additionally, patients who had previously received in-patient Nephrology care are discharged to the clinic for follow-up. Comprehensive patient information, including clinical evaluations, detailed medical history, referral documentation, reasons for referral, vital signs, physical examinations, diagnostic tests, and diagnosis were recorded in the hospital's electronic medical records (EMR) and subsequently extracted using a standardized proforma into a Microsoft Excel spreadsheet.

This study protocol was approved by the ethics and research committee of ISTH, the assigned protocol number is ISTH/HREC/20241704606.

Inclusion criteria

All patients, aged 17 and above, who received a diagnosis of renal disease at the Nephrology clinic of ISTH during the specified period and gave their consent to participate in the study were enlisted.

Exclusion criteria

Patients with missing or incomplete records were excluded from the study.

The operational diagnostic criteria utilized in this study are as delineated:

- Hypertensive nephrosclerosis (HTN) was diagnosed in patients that were 40 years or older with a history of essential systemic hypertension for at least 5 years predating kidney disease, thickened arterial wall on palpation, features of left ventricular hypertrophy, grade 3 or 4 hypertensive retinopathy, progressive azotaemia, and persistent minimal proteinuria 1+ to 2+ on urinalysis.[12,13,14]
- Chronic glomerulonephritis (CGN) was diagnosed in patients with a history of acute or post-infectious glomerulonephritis, nephrotic syndrome, recurrent body swelling, with moderate to massive proteinuria (>2+), microscopic haematuria, systemic hypertension, ultrasound evidence of bilaterally shrunken kidneys.[15]
- Diabetic nephropathy (DN) was made in those patients with diabetes mellitus (DM) diagnosed at least five years before presentation, who also had systemic hypertension, peripheral neuropathy, diabetic retinopathy, and persistent proteinuria.[16]
- Patients with obstructive uropathy were those who had either benign prostatic hypertrophy (BPH), prostatic cancer or urolithiasis, and ultrasonographic evidence of advanced obstructive uropathy (trabeculation/sacculation/thickening of bladder wall, hydronephrosis, pelvicalyceal dilatation, and thinning of the cortex).[17]
- Autosomal dominant polycystic kidney disease was diagnosed in patients that had ultrasonic evidence of multiple cysts in the kidney (unilateral or bilateral in patients below the age of 30 years, bilateral in patients that were 30 years and above), with or without cysts in other internal organs, with a history of polycystic kidney disease in first-degree relatives, and/or onset of symptoms after the age of 18years.[18]
- Human Immunodeficiency Virus-Associated Nephropathy (HIVAN) was diagnosed in patients positive for human immunodeficiency virus (HIV), with persistent moderate to nephrotic range proteinuria (≥2+), azotaemia, normal or large echogenic kidneys on ultrasound scan, normal blood pressure, without peripheral oedema or microscopic haematuria, with or without supporting kidney biopsy histological findings.[19]
- Human Immunodeficiency Virus-Associated Immune Complex Kidney Diseases (HIVICK) was diagnosed in patients positive for HIV, with persistent proteinuria, microscopic haematuria, azotaemia, peripheral oedema and systemic hypertension with or without supporting kidney biopsy histological findings.[19]
- Patients who did not fit into any of these groups were classified as CKD with unknown aetiology.
- Nephrotic syndrome diagnosis was made in patients who presented with massive proteinuria (≥3+), hypoalbuminemia, hyperlipidemia, and generalized oedema, with or without supporting kidney biopsy histological findings.[20]
- Sickle cell nephropathy was diagnosed in patients with sickle cell disease, hyposthenuria, persistent proteinuria, and haematuria (microscopic or gross) with or without ultrasonic evidence of renal papillary necrosis.[21]

Chronic kidney disease (CKD) was diagnosed and staged based on KDIGO definitions.[2] The estimated

glomerular filtration rate (eGFR) of the patients with CKD was calculated with the CKD - EPI equation.[22]

Statistical analysis

The data generated was analysed using STATA v.18 (StataCorp, College Station, TX, USA). Categorical data were presented as counts and percentages. Numerical data were summarized either as mean with standard deviation (SD) or median with interquartile range (IQR), depending on the degree of skewness in the distributions.

Result

During the period under review, 208patients with complete records were seen. Table 1 below shows the socio-demographic and clinical characteristics of the patients. The mean age of patients was 53 ± 17.4(range, 17 - 91) years. The majority of the patients were male (67.8%), giving a male-to-female ratio of 2.1:1. Most of the patients were employed (70.2%). The median BMI was 25.0 (IQR, 22.0 – 29.0) kg/m^2. The mean systolic blood pressure of the patients at the initial presentation was 140.8 ± 24.2 (range, 70 – 220) mmHg. The median random blood glucose level at the initial presentation was 110 (IQR, 96.0 – 121.0) mg/dl. Systemic hypertension was the main recorded comorbidity (55.2%), but about one-third of the patients had no underlying co-morbidity (30%). Referrals were mostly (68.2%) from the hospital outpatient clinics, mainly the General Outpatient Department (50.7%; 72/142).

The major indication for referral to the Nephrology clinic was elevated serum urea and creatinine levels (70.7%). The main presenting symptom was bilateral leg swelling (35.1%). Additionally, 27.9% of patients reported no symptoms at the initial presentation.

Table 2 below details the clinical findings and outcomes in the patients. The main diagnosis was chronic kidney disease (CKD) in 87.5% of the patients. The median eGFR was 23.5 (IQR, 7.0 - 43.5) ml/min/1.73m^2. Most of the patients with CKD had stage 5 disease (45.1%). Diabetic nephropathy (27.4%) was the leading cause of CKD, followed by hypertensive nephrosclerosis (21.2%). Approximately half (50.5%) of the patients underwent haemodialysis, the majority of the patients had one session per week (33.2%). There were 23 deaths recorded, accounting for 11.1%, and 5.8% of the cases were referred for renal transplantation.

Table 1. Baseline socio-demographic and clinical characteristics of patients (N = 208)

Characteristic	n (%)
Age [years], mean ± SD (range)	53.0 ± 17.4 (17 - 91)
Male sex	134 (67.8)
Level of Education	
Primary	23 (11.1)
Secondary	67 (32.2)
Tertiary	118 (56.7)
Occupation	
Employed	146 (70.2)
Unemployed	9 (4.3)
Retired	36 (17.3)
Student	17 (8.2)
BMI [kg/m^2], median (IQR)	25.0 (22.0 – 29.0)
Systolic BP[a] [mmHg], mean ± SD (range)	140.8 ± 24.2 (70 – 220)
Diastolic BP[a] [mmHg], mean ± SD (range)	82.8 ± 14.6 (44 – 120)
Random Blood Glucose level[a] [mg/dl], median (IQR)	110.0 (96.0 – 121.0)
Comorbidity[b]	
None	63 (30.3)
BPH	24 (11.5)
Chronic hepatitis B	2 (1.0)
Chronic hepatitis C	2 (1.0)
Diabetes	57 (27.4)
HIV infection	17 (8.2)
Hypertension	115 (55.2)
Sickle cell disease	4 (1.9)
Others[c]	4 (1.9)
Source of referral	
District general hospital	1 (0.5)
Hospital outpatient	142 (68.2)
Private health facilities	64 (30.8)
Tertiary hospital	1 (0.5)
The main indication for referral	
Abnormal renal ultrasound findings	4 (1.9)
Abnormalities in urinalysis	9 (4.3)
Body swelling (leg and facial)	21 (10.1)
Elevated BP	14 (6.7)
Elevated serum urea and creatinine	147 (70.7)
Flank pain	5 (2.4)
Previous renal transplant/haemodialysis	4 (1.9)
Urinary symptoms[d]	4 (1.9)
The main clinical symptom at presentation	
Abdominal/loin pain	6 (2.9)
Bilateral leg swelling	73 (35.1)
General body weakness	26 (12.5)
Breathlessness	6 (2.9)
Reduced urine output	9 (4.3)
Swelling of other parts of the body	9 (4.3)
Other urinary symptoms	9 (4.3)
Non-specific[e]	12 (5.8)
Asymptomatic	58 (27.9)

Data are presented as n (%) unless otherwise indicated.
BMI = body mass index; BP = blood pressure; BPH = benign prostatic hyperplasia; HIV = human immunodeficiency virus; IQR = interquartile range; SD = standard deviation
[a] Readings at the initial presentation
[b] Some patients had more than one comorbidity
[c]Other comorbidities included heart failure (n = 1), Parkinson's disease (n = 1), renal stone (n = 1), and solitary kidney (n = 1)

[d] Urinary symptoms included haematuria, frequency, reduced urine output, and urgency.
[e] Non-specific symptoms included headache, cough, poor sleep, leg pain, restlessness, and tremor.

Table 2. Clinical Findings and Outcomes ($N = 208$)

Characteristic	n (%)
Diagnosis	
Acute kidney injury	16 (7.7)
Acute pyelonephritis	3 (1.4)
Chronic kidney disease	182 (87.5)
Lower urinary tract infection	3 (1.4)
Others[a]	4 (1.9)
Ultrasound Findings	
Corticomedullary differentiation Loss	55 (26.4)
Corticomedullary differentiation Preserved	150 (72.1)
Urine dipstick analysis[b]	
Specific gravity, median (IQR)	1.02 (1.01 –1.03)
pH, median (IQR)	6.0 (6.0 – 6.5)
Presence of haematuria	39 (18.8)
Presence of proteinuria[c]	144 (69.2)
Serum urea and electrolytes test[b]	
Sodium level [mmol/L], median (IQR)	140 (136.5 – 144.0)
Chloride level [mmol/L], median (IQR)	101 (98.0 – 105.5)
Urea level [mg/dl], median (IQR)	72 (40.0 – 150.0)
Creatinine level [mg/dl], median (IQR)	2.8 (1.7 – 8.0)
Bicarbonate level [mmol/L],median (IQR)	20 (15.0 – 23.0)
Full blood count[b]	
Packed cell volume [%], median (IQR)	30 (25.0 – 35.2)
White cell count [10^9/L], median (IQR)	6.6 (4.8 – 8.5)
Platelet count [10^9/L], median (IQR)	186 (150.0 – 289.0)
eGFR (ml/min/1.73m²), median (IQR)	23.5 (7.0 - 43.5)
Stage of CKD[d]	
Stage 1	4 (2.2)*
Stage 2	16 (8.8)*
Stage 3a	14 (7.7)*
Stage 3b	36 (19.8)*
Stage 4	30 (16.5)*
Stage 5	82 (45.1)*
Cause of chronic kidney disease	
Chronic glomerulonephritis	29 (13.9)
Diabetic nephropathy	57 (27.4)
HIV-associated nephropathy	14 (6.7)
Hypertensive nephrosclerosis	44 (21.2)
Nephrotic syndrome	10 (4.8)
Obstructive nephropathy	14 (6.7)
Sickle cell nephropathy	4 (1.9)
Other causes[e]	6 (2.9)
Unknown aetiology	30 (14.4)
Haemodialysis	
Yes	105 (50.5)
No	103 (49.5)
Number of haemodialysis sessions, median (IQR)	1 (0 - 6)
Frequency of haemodialysis[f]	
Fortnightly	1 (0.5)
Twice a week	35 (16.8)
Weekly	69 (33.2)
Outcomes	
Death	23 (11.1)
Discharge	5 (2.4)
Lost to follow-up	8 (3.8)
On follow-up	160 (76.9)
Referred for renal transplant	12 (5.8)

Data are presented as n (%) unless otherwise indicated.
CKD = chronic kidney disease; eGFR = estimated glomerular filtration rate; HIV = human immunodeficiency virus; IQR, = interquartile range.
*As a percentage of the total number of patients with chronic kidney disease.
[a] Other diagnosis included simple renal cyst ($n = 1$), and post-renal transplant ($n = 3$)
[b] Readings at the initial presentation
[c] Protein readings on a dipstick test ranging from 1+ to 4+
[d] Based on estimated glomerular filtration rate (ml/min/1.73m²) in 182 patients with chronic kidney disease.
[e]Otheraetiology included autosomal dominant polycystic kidney disease ($n = 1$), HIVICK ($n = 1$), renal cell cancer ($n = 1$), renovascular disease ($n = 2$), and toxic nephropathy ($n = 1$)
[f] Haemodialysis was required for only 105 patients

Discussion

Kidney disease is a significant factor leading to the referral of patients to tertiary health institutions for specialized care, and the prevalence of kidney disease is escalating at a concerning pace.[1] Among various objectives, our study aimed to investigate the socio-demographic attributes of patients referred to the Nephrology clinic at Irrua Specialist Teaching Hospital, a tertiary medical facility situated in a rural area within the South-South geopolitical zone of Nigeria. Previous reports in Nigeria have predominantly originated from urban regions and concentrated on Chronic Kidney Disease (CKD) specifically, with a scarcity of information from the South-South region of Nigeria.[8,23,24] Our research unveiled that the average age of presentation for Nephrology Outpatient care was 53 years, exhibiting a male predominance, and the majority of the patients possessed a tertiary level of education. In a preceding study in South-West, Nigeria by *Adejumo et al,* the gender distribution and the average age of the patients were in alignment with our findings.[23] In a comparable investigation conducted by *Dada et al*, the average age of patients seeking care at the Nephrology clinic was 49.29 years, with a male-to-female ratio of 1.3:1. However, unlike in this current study, the educational attainment of the patients was not assessed.[8] It is intriguing to note that a predominant portion of the patients in this study exhibited a high level of education. Our observation that the majority of the patients had a tertiary level of education is consistent with the report by *Okaka et a*l, in another study in the same geopolitical zone, but conducted in an urban setting.[25] Tertiary level of education should theoretically correlate with an enhanced awareness of optimal lifestyle choices, heightened health literacy, a more effective approach to disease management, increased accessibility to healthcare services facilitating early detection and treatment of kidney diseases, as well as a superior socioeconomic status potentially reducing the likelihood of exposure to environmental toxins and infections. Nonetheless, it is plausible that our findings reflect the superior

healthcare-seeking behaviour characteristic of individuals with advanced levels of education, consequently leading to a heightened detection rate of kidney diseases within this demographic. In accordance with our research findings, *Barzegar et al,* also noted that a higher level of education was correlated with an increased prevalence of CKD following adjustments for age and gender.[26] *Thio et al*, however, found an inverse association of educational level with CKD.[27] These seemingly conflicting observations might be indicative of the influence of geographical variations and societal customs on distinct populations.

The median body mass index (BMI) of the patients in our study was 25kg/m², indicating a substantial proportion of the patients were overweight or obese. Elevated BMI has been identified as a potent risk factor for the onset of CKD.[28] This is postulated to be partly due to the consequences of compensatory hyperfiltration in the kidneys to meet the increased metabolic demands of increased body weight. Studies from the South-East geopolitical zone of Nigeria also reported a strong correlation between increasing BMI and CKD.[29,30, 31]

We noted that the majority of the patients in our study were referred from other Outpatient clinics of ISTH, accounting for 68.2% of the cases. The primary reason for referral was elevated serum urea and creatinine in 70.7% of the patients. The observed source of referral in our study is understandable since ISTH is a tertiary hospital with specialists in various fields of Medicine and Surgery who are knowledgeable and well-equipped to identify kidney diseases and know the implication of referral to Nephrologists for expert intervention on prognosis. Although in the study by *Adejumo et al*, secondary (29%) and private health (22%) facilities constituted the major sources of referral,[23] there is a paucity of data on sources of and reasons for referral for Nephrology care from earlier studies, but the focus has mainly been on the timing of the referral and associated factors.[25,32] It has been documented that prompt referral to Outpatient Nephrology care is correlated with decelerated progression of renal disease, decreased hospitalization rates, minimized treatment expenses, reduced hospital admissions, and enhanced survival outcomes for individuals with kidney disease.[33]

The finding of systemic hypertension as the most common co-morbidity in our study is consistent with the observations in other studies from outside Nigeria.[34,35,36] The correlation between renal disease and systemic hypertension is reciprocal, akin to the relationship between the egg and the chicken. Systemic hypertension serves as a predisposing factor for the onset of CKD, a primary contributor to ESRD, and is linked to an accelerated progression of the kidney disease.[37,38] Renal disease inherently contributes to systemic hypertension, as well as intensifying its severity through volume expansion and heightened systemic vascular resistance.[37,38] The most common presenting symptom at the Nephrology clinic was bilateral leg oedema, aligning with the findings of *Amoako* et al, in a prospective cross-sectional study conducted over a 1-year duration at Komfo Anokye Teaching Hospital, the second largest healthcare facility in Ghana, and that of *Adejumo et al,* in a study done in South-West Nigeria.[23,39] Body swelling in kidney disease is a consequence of the impaired ability of the kidneys to excrete salt and water from the body.

An overwhelming majority of the patients seen at the Nephrology clinic during the reviewed period were diagnosed with CKD at a rate of 87.5%, with acute kidney injury (AKI) accounting for 7.7% of cases. Diabetic nephropathy emerged as the most prevalent aetiology of CKD (27.4%), followed by hypertensive nephrosclerosis (21.2%) and chronic glomerulonephritis (13.9%). Nearly half of the CKD patients presented with KDIGO stage 5 disease (45.1%). These observations on the leading causes and stage of CKD at presentation are consistent with reports from earlier studies in Nigeria.[8,23,24,25]. *Dada et al,* identified hypertensive nephrosclerosis as the most prevalent cause of CKD at 27%, followed by CGN at 14.5%.[8] Interestingly, diabetic nephropathy ranked as the fourth leading cause of CKD in Ekiti State, located in the South-West region of Nigeria.[8] In the research conducted by *Adejumo et al*, in Ondo, a state also located in the South-West region of Nigeria, the primary causes of CKD were identified as chronic glomerulonephritis (CGN), systemic hypertension, and diabetic nephropathy, in that respective order.[23] Diabetic nephropathy stands as the predominant aetiology of CKD on a global scale.[40,41,42,43] Contrary to previous reports positioning it as the third most common cause of CKD in developing countries, our

investigation reveals its dominance in the South-South region of Nigeria.[40,41,42,43] The Same observation was reported in a recent study from Oghara, Delta State, in the South-South geopolitical zone of Nigeria.[44] With the escalating global incidence and prevalence of diabetes mellitus, coupled with its profound impact on kidney health, it is inevitable that it will continue to hold a prominent position as the primary cause of kidney disease. This worldwide burden of diabetes mellitus is predominantly ascribed to the heightened consumption of processed food, diminished physical activity, and the pervasive sedentary lifestyle due to the increasing adoption of the Western way of life.[43] This trend is rapidly spreading even to the rural areas of developing nations like Nigeria, which explains our findings in this research. Though in line with findings from previous studies, it remains disconcerting that the vast majority of individuals with CKD present themselves at a late stage, specifically stage 5.[8,23,24,25] It signifies delayed referral by healthcare professionals, a low level of suspicion, and delayed presentation by patients to Nephrologists for specialized care. The delayed presentation can have a detrimental impact on the prognosis, leading to unfavourable patient outcomes.

Consistent with earlier reports from Nigeria, none of the patients could sustain the recommended thrice weekly maintenance haemodialysis,[5] and very few could afford renal transplantation.[8,23,24,25] This is due to the exorbitant cost of renal replacement therapy, and inadequate health insurance coverage in developing countries where a significant proportion of the population is of low socioeconomic status, and the cost of living is high. This made the dropout rate from renal replacement therapy to be very high in Nigeria.[45,46] The mortality rate in the patients during the period under review was 11.1%, the majority of the patients were still on follow-up. Despite the majority of our patients with CKD presenting with late stage, this observation is not a far cry from the literature review by *Kiousi et al*, who quoted a mortality rate for patients with early follow-up at out-patient Nephrology clinic of 8.4 per 100 patient-years.[47]

Our research stands out as a rare contribution from the South-South geopolitical zone of Nigeria, distinguished by its focus on a rural population setting. Nevertheless, the study is constrained by its brief duration of 6 months and the limited sample size of the participants, factors that have impeded the robustness and generalizability of the findings.

Conclusion

Patients seeking specialized care at the Nephrology clinic of ISTH span various age groups, predominantly comprising males who are employed and possess tertiary education. The majority of these individuals present with co-morbidity, primarily systemic hypertension. Referrals mainly originated from other outpatient clinics of the hospital due to elevated serum urea and creatinine levels, with the most prevalent symptom being bilateral leg swelling. Chronic kidney disease emerged as the predominant diagnosis, with diabetic nephropathy as the major cause, followed by hypertensive nephrosclerosis and chronic glomerulonephritis. A significant portion of patients presented at an advanced stage of CKD, and very few could adhere to the recommended dialysis frequency. Financial constraints limit the number of patients eligible for renal transplantation. This study underscores the substantial burden of CKD, necessitating intensified efforts to enhance awareness, preventive strategies, and early referrals to Nephrologists. It also underscores the urgent need for governmental and non-governmental entities to subsidize Nephrology care in Nigeria.

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