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Research Article

Epidemiological Profile of Chronic Kidney Disease in Young Subjects Aged 15 to 45 Years in the Point G University Teaching Hospital

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Abstract

Introduction: Chronic kidney disease (CKD) is characterized by a progressive and irreversible loss of functional nephron mass. The aim of this study was to assess the epidemiological profile of CKD among young individuals aged 15 to 45 years in the Nephrology and Hemodialysis Department of Point G University Teaching Hospital. Methods: This was a prospective descriptive cross-sectional study involving 192 hospitalization records collected in the Nephrology and Hemodialysis Department of Point G University Teaching Hospital from January 1 to December 31, 2024. Socio-demographic characteristics, frequencies, and univariate analysis were performed using SPSS version 25. Results: A total of 750 patients were included, among whom 192 had CKD, corresponding to a prevalence of 25.6%, with a sex ratio of 0.84 in favor of females. The age group 36–45 years represented 46.9% of cases, and the mean age was 32.37 ± 8.98 years (range: 15–45 years). Hypertension was the most common underlying condition (67.7%). Uremic symptoms were diverse but predominantly included vomiting (72.4%), dizziness (63%), headache (62.5%), and anorexia (43.7%). The mean serum creatinine level was 1649.23 µmol/L. CKD was at end-stage in 97.4% of cases. Vascular nephropathy was the leading cause (28.6%). Outcomes were favorable in 22.4% of cases, and deaths were not related to the initial nephropathy. Conclusion: Management should focus on early stages, mainly through prompt diagnosis and treatment of common causes of CKD.

Keywords

Chronic Kidney Disease, Young Adults, Nephrology, Point G University Hospital, Bamako, Mali

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1. Introduction

Chronic kidney disease (CKD) is defined as a progressive and irreversible loss of functional nephron mass [1]. It results in decreased creatinine clearance. CKD occurs when the number of functioning nephrons declines to a level at which the kidneys can no longer maintain body homeostasis, including the elimination of waste products and fluids [2].

CKD is one of the leading causes of mortality worldwide. It was responsible for approximately 1 million deaths in 2013 and 1.2 million deaths in 2017 [3]. Thus, CKD represents a major public health issue due to its alarming increase in incidence. Its prevalence varies across countries, and access to treatment depends largely on the socioeconomic level of each country. In the United States, the prevalence was estimated at 13%, affecting nearly 20 million people in 2010 [4].

Currently, the number of CKD cases continues to rise globally. This increase is attributed to population aging in developed countries and changes in dietary habits and lifestyles in Africa [5]. These factors contribute to the emergence of conditions such as diabetes and hypertension, which are major causes of CKD in our setting [5].

In Africa, the true burden of CKD remains unclear. However, studies in Sub-Saharan Africa report hospital prevalence ranging from 2% to 12% [6]. In Côte d'Ivoire, CKD was the second leading cause of mortality, with a prevalence of 6.14% in the internal medicine department of Treichville University Hospital in 2013 [1].

In Mali, several recent studies have reported high prevalence rates of CKD, including those by Diakite (2009) [7], Eyram (2010) [8], Samake et al. (2021), Djibo (2022), Kamissoko (2022), and Melissa (2023), with frequencies ranging from 16% to 63%. However, none specifically addressed CKD among young individuals aged 15 to 45 years. This study was therefore conducted to describe the epidemiological characteristics of CKD in this age group at Point G University Teaching Hospital.

2. Methods

2.1. Study Setting

The study was conducted in Bamako, the capital city of Mali, specifically in the Nephrology and Hemodialysis Department of Point G University Teaching Hospital. This is a tertiary referral hospital located 8 km from the city center. It includes 20 medical and surgical departments, including nephrology and hemodialysis.

The Nephrology Department was established in 1981, with the hemodialysis unit created in 1997. The department includes:

1) A hospitalization unit with 30 beds
2) A dialysis unit with 41 generators (40 functional), providing four dialysis shifts per day from Monday to Saturday

The medical staff includes associate professors, nephrologists, residents, medical students, medical assistants, senior health technicians, nurses, and support staff.

2.2. Study Design and Period

This was a prospective descriptive cross-sectional study conducted over 12 months, from January 1 to December 31, 2024.

2.3. Study Population

The study included all patients aged 15 to 45 years diagnosed with CKD and hospitalized in the Nephrology and Hemodialysis Department.

2.4. Inclusion Criteria

1) Patients aged 15–45 years
2) Diagnosed with CKD
3) Hospitalized during the study period
4) Having complete and usable medical records

2.5. Exclusion Criteria

1) Acute kidney injury
2) Chronic kidney disease without renal failure
3) Patients <15 or >45 years
4) Incomplete medical records
5) Patients without informed consent

2.6. Sampling

An exhaustive sampling method was used, including all eligible patients admitted during the study period.

2.7. Data Collection

The collected data were entered and analyzed using SPSS version 20 and R software. Descriptive statistics were computed. For qualitative variables, frequencies and percentages were calculated. For quantitative variables, prevalence, median with ranges (minimum–maximum), or mean with standard deviation were computed as appropriate.

A univariate analysis was performed to assess the association between the dependent variable (end-stage chronic kidney disease) and independent variables using the Chi-square test or Fisher's exact test, as appropriate. Multivariate analysis was conducted by calculating odds ratios (ORs) with their 95% confidence intervals (95% CI). The level of statistical significance was set at 5% ($p < 0.05$).

2.8. Ethical Considerations

Verbal informed consent was obtained after clearly explaining the study objectives to participants. Data confidentiality

was strictly maintained, and results were used solely for scientific purposes.

2.9. Data Analysis

Data were entered and analyzed using SPSS version 22.0. Means were calculated with a significance level of $\alpha = 1.96$ and $p < 0.05$. Data processing was performed using Word and Excel.

3. Results

3.1. Sociodemographic Characteristics of Patients

Between January 1 and December 31, 2024, a total of 750 patients were admitted to the Nephrology and Hemodialysis Department of Point G University Hospital. Among them, 192 met the inclusion criteria, corresponding to a prevalence of 25.6%.

The overall prevalence of CKD was 25.6% (95% CI: [22.5–28.7]). It was higher in females (13.9%) than in males (11.7%), with a male-to-female ratio of 0.84. The mean age was 32.37 ± 8.98 years (range: 15–45 years). The 36–45 age group had the highest prevalence (12%).

CKD prevalence was highest among patients with primary education (15.9%) and among married individuals (20.3%). Patients residing in Bamako had the highest prevalence (17.6%) (Table 1).

Table 1. *Sociodemographic Characteristics of Patients with Chronic Kidney Disease (CKD).*

Variables	Frequency (n)	Prevalence (%)	95% CI
Sex			
Male	88	11.73	9.4–14.0
Female	104	13.87	11.4–16.3
Total CKD	192	25.60	
Age group (years)			
15–25	58	7.73	5.8–9.6
26–35	44	5.87	4.2–7.6
36–45	90	12.00	9.7–14.3
Total CKD	192	25.60	
Educational level			
Primary	119	15.87	13.3–18.5
Secondary	12	1.60	0.7–2.5
No formal education	61	8.13	6.2–10.1
Marital Status			
Married	152	20,27%	17,4–23,2
Single	38	5,07%	3,5–6,6
Widower	1	0,13%	0–0,39
Divorced	1	0,13%	0–0,39
Total CKD	192	25,60%	
Residence			
Bamako	132	17,60%	14,9–20,4
Koulikoro	27	3,60%	2,3–4,9
Sikasso	13	1,73%	0,8–2,7
Kayes	9	1,20%	0,4–1,9

3.2. Clinical Data and Medical History

Elevated serum creatinine was the main reason for consultation, with a prevalence of 18.7% (95% CI: 15.9–21.5). Uremic syndrome accounted for 4.1%, while severe clinical manifestations such as uremic coma were rare (0.5%). Hypertension was the main risk factor, with a prevalence of 17.3%. Other comorbidities were relatively uncommon. Schistosomiasis was the most frequent uro-nephrological history (2.1%). Surgical history was generally rare, with a maximum prevalence of 1.2% for cesarean section. Dizziness and headaches were the most frequent neurological manifestations (16%). Vomiting was the main gastrointestinal symptom (18.5%). Dyspnea was common, with a prevalence of 14%. Oliguria and anuria were the main urinary symptoms (Table 2).

Table 2. *Distribution of Patients with CKD According to Clinical Data and Medical History.*

Variables	Frequency (n)	Prevalence (%)	95% CI
Reason for consultation			
Elevated serum creatinine	140	18.7	15.9–21.5
Uremic syndrome	31	4.1	2.7–5.5
Anasarca	5	0.7	0.1–1.3
Uremic coma	4	0.5	0.01–1.0
Others	12	1.6	0.7–2.5
Comorbid conditions			
Hypertension	130	17.3	14.6–20.0
Peptic ulcer disease	24	3.2	1.9–4.4
Hypertension + Diabetes	7	0.9	0.2–1.6
Diabetes	4	0.5	0.01–1.0
Sickle cell disease	3	0.4	0–0.9
HIV infection	3	0.4	0–0.9
Asthma	2	0.3	0–0.7
Uro-nephrological history			
Schistosomiasis	16	2.1	1.1–3.1
Gross hematuria	14	1.9	0.9–2.9
Nocturia	13	1.7	0.8–2.7
Dysuria	10	1.3	0.5–2.1
Burning micturition	8	1.1	0.3–1.8
Surgical history			
Cesarean section	9	1.2	0.4–1.9
Inguinal hernia repair	4	0.5	0.01–1.0
Laparotomy	2	0.3	0–0.7
Appendectomy	2	0.3	0–0.7
Amputation	1	0.13	0–0.39
Nephrectomy	1	0.13	0–0.39
Cystolithotomy	1	0.13	0–0.39
Neurological symptoms			
Dizziness	121	16.1	13.5–18.7

Variables	Frequency (n)	Prevalence (%)	95% CI
Headache	120	16.0	13.4–18.6
Insomnia	14	1.9	0.9–2.9
Muscle cramps	13	1.7	0.8–2.7
Seizures	7	0.9	0.3–1.6
Tremor	4	0.5	0.01–1.0
Gastrointestinal symptoms			
Vomiting	139	18.5	15.7–21.3
Anorexia	84	11.2	9.0–13.5
Nausea	26	3.5	2.2–4.8
Hematemesis	6	0.8	0.2–1.4
Cardiopulmonary signs			
Dyspnea	105	14.0	11.5–16.5
Cough	40	5.3	3.7–6.9
Chest pain	32	4.3	2.9–5.8
Hemoptysis	7	0.9	0.3–1.6
Urinary symptoms			
Oliguria	62	8.3	6.3–10.3
Anuria	38	5.1	3.5–6.6
Pelvic pain	22	2.9	1.7–4.1
Burning micturition	20	2.7	1.5–3.8
Dysuria	14	1.9	0.9–2.9

3.3. Severity

Stage 3 was the most frequent, with a prevalence of 14.1% (95% CI: 11.6–16.6). Conjunctival pallor was predominant (24%). Grade 3 hypertension was the most frequent (9.2%). Oliguria was the most common disorder. The majority of patients had serum creatinine levels between 1000–2000 µmol/L (12.4%). The prevalence of end-stage disease was extremely high (24.9%). Normocytic normochromic anemia predominated (18.5%). *Escherichia coli* was the most frequently isolated pathogen (4.3%) (Table 3).

Table 3. *Distribution of Patients According to Disease Severity.*

Variables	Frequency (n)	Prevalence (%)	95% CI
WHO performance status			
Stage 1	4	0.53	0.01–1.05
Stage 2	59	7.87	5.95–9.78
Stage 3	106	14.13	11.64–16.62
Stage 4	23	3.07	1.84–4.31
General signs			
Conjunctival pallor	180	24.0	21.0–27.0

Variables	Frequency (n)	Prevalence (%)	95% CI
Asthenia	130	17.3	14.6–20.0
Tachycardia	102	13.6	11.1–16.0
Fever	32	4.27	2.82–5.72
Jaundice	6	0.8	0.16–1.44
Bradycardia	3	0.4	0–0.85
Hypertension grade			
Grade 1	29	3.87	2.49–5.25
Grade 2	31	4.13	2.71–5.55
Grade 3	69	9.2	7.13–11.27
Urine output			
Oliguria	62	8.27	6.29–10.25
Anuria	38	5.07	3.50–6.64
Preserved diuresis	14	1.87	0.90–2.84
Serum creatinine (µmol/L)			
200–1000	42	5.6	3.95–7.25
1000–2000	93	12.4	10.0–14.8
2000–3000	43	5.7	4.05–7.35
3000–4500	14	1.87	0.90–2.84
CKD stage			
Stage 3B	1	0.13	0–0.39
Stage 4	4	0.53	0.01–1.05
End-stage	187	24.9	21.8–28.0
Type of anemia			
Normocytic normochromic	139	18.5	15.7–21.3
Microcytic hypochromic	34	4.5	3.0–6.0
Microcytic normochromic	13	1.73	0.80–2.66
Normocytic hypochromic	3	0.4	0–0.85
Isolated pathogens			
Escherichia coli	32	4.27	2.82–5.72
Klebsiella pneumoniae	7	0.93	0.24–1.62
Other pathogens	≤3	<0.5	Wide CI

3.4. Imaging Findings

Renal atrophy had the highest prevalence (22.3%; 95% CI: 19.3–25.3). Poor corticomedullary differentiation was observed in nearly one-quarter of patients (24.7%). Urinary tract dilatation was rare in the study population. Cardiomegaly was the most frequent radiological abnormality (5.5%). Hypertrophic cardiomyopathy was the main cardiac abnormality (6.5%). Left ventricular hypertrophy (LVH) was the most frequent electrocardiographic abnormality (7.3%). Hypertensive retinopathy was the most common ophthalmologic finding (4.1%) (Table 4).

Table 4. Imaging Findings.

Variables	Frequency (n)	Prevalence (%)	95% CI
Renal ultrasound (kidney size)			
Renal atrophy	167	22.27	19.29–25.25
Normal size	19	2.53	1.40–3.66
Enlarged kidneys	6	0.80	0.16–1.44
Corticomedullary differentiation			
Poor differentiation	185	24.67	21.59–27.75
Preserved differentiation	7	0.93	0.24–1.62
Type of urinary tract dilatation			
Ureteropyelocaliceal dilatation	5	0.67	0.08–1.26
Calyceal dilatation	3	0.40	0–0.85
Chest X-ray findings			
Cardiomegaly	41	5.47	3.86–7.08
Pneumonia	18	2.40	1.31–3.49
Pleural effusion	15	2.00	1.00–3.00
Acute pulmonary edema	6	0.80	0.16–1.44
Normal	12	1.60	0.70–2.50
Other findings	8	1.07	0.34–1.80
Echocardiographic abnormalities			
Hypertrophic cardiomyopathy	49	6.53	4.76–8.30
Dilated cardiomyopathy	20	2.67	1.50–3.84
Pericardial effusion	16	2.13	1.10–3.16
Valvular heart disease	10	1.33	0.51–2.15
Normal	21	2.80	1.60–4.00
ECG findings			
Left ventricular hypertrophy (LVH)	55	7.33	5.48–9.18
Hyperkalemia signs	7	0.93	0.24–1.62
Hypokalemia signs	2	0.27	0–0.64
Arrhythmias	4	0.53	0.01–1.05
Normal	34	4.53	3.05–6.01
Fundoscopic findings			
Hypertensive retinopathy	31	4.13	2.71–5.55
Diabetic retinopathy	1	0.13	0–0.39
Mixed retinopathy	2	0.27	0–0.64
Normal	41	5.47	3.86–7.08

3.5. Univariate Analysis

In our study, none of the variables examined showed a statistically significant association with end-stage disease ($p > 0.05$) (Table 5).

Table 5. Association Between Selected Variables and End-Stage CKD.

Variables	End-stage CKD		p-value
	Yes n (%)	No n (%)	
Sex			0.181
Male	84 (44.9)	4 (80)	
Female	103 (55.1)	1 (20)	
Educational level			0.139
Primary	115 (61.5)	4 (80)	
Secondary	11 (5.9)	1 (20)	
No formal education	61 (32.6)	0 (0)	
Occupation			0.385
Student/Pupil	18 (9.6)	1 (20)	
Housewife	80 (42.8)	1 (20)	
Trader	23 (12.3)	1 (20)	
Manual worker	18 (9.6)	1 (20)	
Farmer	24 (12.8)	0 (0)	
Others	24 (12.8)	1 (20)	
Residence			0.83
Bamako	127 (67.9)	5 (100)	
Koulikoro	29 (15.5)	0 (0)	
Sikasso	13 (7.0)	0 (0)	
Kayes	9 (4.8)	0 (0)	
Segou	7 (3.7)	0 (0)	
Others	2 (1.1)	0 (0)	
Age group (years)			1.00
15–25	57 (30.5)	1 (20)	
26–35	43 (23.0)	1 (20)	
36–45	87 (46.5)	3 (60)	
Marital status			1.00
Married	150 (80.2)	4 (80)	
Single	37 (19.8)	1 (20)	
Urinary tract infection			1.00
Yes	58 (31.0)	1 (20)	
No	129 (69.0)	4 (80)	
Anemia			1.00
Yes	184 (98.4)	5 (100)	
No	3 (1.6)	0 (0)	

3.6. Multivariate Analysis

The variables included in the model were age, sex, level of education, occupation, marital status, residence, urinary tract infection, and anemia. After adjustment, none of the factors studied showed a statistically significant association with the occurrence of end-stage disease ($p > 0.05$) (Table 6).

Table 6. Factors Associated with the Occurrence of End-Stage Chronic Kidney Disease (CKD).

Variables	Adjusted OR	95% CI (Lower–Upper)	p-value
Age group (years)			
15–25	Reference		
26–35	0.623	0.011–0.900	0.819
36–45	0.947	0.063–1.020	0.969
Sex			
Male	Reference		
Female	0.85	0.452–1.550	0.997
Educational level			
Secondary	Reference		
Primary	10.536	9.561–11.589	0.997
No formal education	9.717	9.431–11.012	0.997
Occupation			
Civil servant	Reference		
Student/Pupil	2.000	0.076–3.376	0.677
Housewife	2.102	1.581–4.795	0.997
Trader	1.153	0.050–2.686	0.929
Manual worker	3.605	2.000–3.809	0.997
Farmer	0.87	0.150–0.994	0.998
Marital status			
Single	Reference		
Married	1.424	1.000–1.856	0.997
Residence			
Bamako	Reference		
Koulikoro	5.128	4.691–6.542	1.000
Sikasso	2.825	1.563–3.001	1.000
Kayes	5.952	4.000–6.143	1.000
Segou	1.626	1.453–2.794	1.000
Others	11.379	9.456–12.023	1.000
Urinary tract infection			
No	Reference		
Yes	0.467	0.042–1.212	0.536
Anemia			
No	Reference		

Variables	Adjusted OR	95% CI (Lower–Upper)	p-value
Yes	0.153	0.012–1.000	0.998

4. Discussion

4.1. Sociodemographic Characteristics

The mean age was 32.37 ± 8.98 years, with extremes ranging from 15 to 45 years. The 36–45-year age group was the most represented, accounting for 46.9% of patients. In a study conducted in the same department in 2023, 44.18% of patients were aged between 21 and 40 years [12]. In Côte d'Ivoire, at the Bouake University Hospital between 2016 and 2020, the mean age was 38.8 ± 10 years, while in Benin in 2019 it was 39 years [13, 14]. In Africa, chronic kidney disease (CKD) predominantly affects young, economically active adults, whereas in high-income countries, more than half of CKD patients are over 60 years old [11].

The study population comprised 54.2% females and 45.8% males, yielding a sex ratio of 0.84. This female predominance has also been reported in other studies conducted in Mali and Benin, where women accounted for 52.8%, 53.2%, and 77.3% of cases, respectively [9, 11, 14]. Conversely, other studies in Mali and across Africa have reported a male predominance [10, 12, 15]. A 2021 Algerian study attributed female predominance to increased susceptibility to autoimmune diseases such as systemic lupus erythematosus, obstetric complications (e.g., preeclampsia and eclampsia) leading to chronic kidney damage, and the loss of estrogenic hormonal protection after menopause, which accelerates CKD progression [16].

In our study, most participants were housewives (42.2%), followed by farmers (12.5%) and traders (12.5%). Housewives and farmers are generally considered to belong to lower socioeconomic groups. This finding is consistent with previous studies in Mali [10-12] and Algeria [16]. Rostand et al. reported an inverse relationship between CKD prevalence and socioeconomic status, particularly among Black populations in the United States [17]. The disproportionate burden in this group may be explained by low income, illiteracy, and limited healthcare coverage, leading to frequent use of nephrotoxic drugs and traditional herbal medicine, thereby increasing the risk of kidney injury.

Ethnically, patients were predominantly Bambara (35.9%), followed by Peulh (17.2%), Malinke (14.6%), and Soninke (10.9%). More than half of the patients (68.8%) were from Bamako, likely because the study was conducted in a tertiary hospital in the capital.

4.2. Clinical Data and Medical History

In this study, elevated serum creatinine was the main reason for consultation, reflecting delayed access to specialized care. Similar studies in sub-Saharan Africa have shown that CKD is often diagnosed at advanced stages, frequently during laboratory evaluation prompted by nonspecific symptoms or metabolic complications. A meta-analysis published in *The Lancet Global Health* by Bikbov et al. (2020) highlighted the increasing global burden of CKD, with a substantial proportion of undiagnosed cases in low- and middle-income countries [18]. Likewise, Ernest et al. (2023), in a systematic review in *Kidney International Reports*, reported that most patients in sub-Saharan Africa present at CKD stages 4 or 5, confirming the silent and late presentation of the disease [19]. In Mali, this situation may be explained by financial constraints and the limited availability of nephrologists in rural and peripheral areas.

The majority of patients had a history of hypertension (67.7%). This finding is consistent with recent literature identifying hypertension as both a major cause and consequence of CKD. According to the World Health Organization (2023), hypertension remains a key determinant of progression to end-stage renal disease (ESRD), particularly in Africa where blood pressure control is often inadequate. A multicenter African study by Lenguebanga et al. (2024) in *Hypertension* reported that over 60% of CKD patients had uncontrolled hypertension, a proportion comparable to our findings [20].

Urinary schistosomiasis (8.3%) was the most frequent uronephrological history. This parasitic disease, endemic in West Africa, may lead to chronic obstructive complications and progressive renal damage. Recent studies, including those by Fanny N et al. in Côte d'Ivoire, have highlighted the persistent role of neglected tropical diseases in the development of CKD in endemic regions [21]. In Mali, this reflects the dual burden of infectious and non-communicable diseases in CKD etiology.

Regarding surgical history, cesarean section was the most frequent, possibly reflecting the impact of hypertensive (preeclampsia/eclampsia) or hemorrhagic obstetric complications on renal function.

Oliguria (32.3%) was present in only one-third of patients, confirming that relatively preserved urine output does not exclude advanced CKD. This observation aligns with international guidelines, particularly those from Kidney Disease: Improving Global Outcomes (KDIGO 2021), which emphasize that CKD diagnosis relies primarily on biological criteria (estimated glomerular filtration rate and albuminuria) rather than urine output alone [22].

4.3. Severity

Most patients exhibited reduced functional status (50% autonomy in 55.2%), reflecting significant clinical deterioration

at diagnosis. This loss of autonomy is typically observed in advanced CKD stages and is associated with severe anemia, malnutrition, and metabolic complications.

Conjunctival pallor, observed in 93.7% of patients, reflects the high prevalence of anemia. Normocytic normochromic anemia (73.5%) corresponds to the typical pattern of anemia of chronic disease and erythropoietin deficiency in CKD. KDIGO (2021) guidelines indicate that anemia becomes nearly universal in stages 4 and 5 CKD.

The high proportion of patients with serum creatinine levels above 1000 µmol/L and a mean of 1649.23 µmol/L (range: 228.6–4266 µmol/L) confirms late diagnosis. These extremely elevated levels are consistent with end-stage disease, observed in 97.4% of cases. Similar findings have been reported in African hospital-based studies, including Ekrikpo et al. (2021) in *BMC Nephrology*, where over 80% of patients initiated care at stage 5 [23]. These data highlight inadequate early detection and limited access to nephrology services.

Oliguria was present in only 11% of cases, further confirming that urine output may remain relatively preserved even in ESRD. KDIGO guidelines emphasize that urine output is not a reliable criterion for excluding advanced CKD.

In our study, *Escherichia coli* was the most frequently isolated pathogen (62.7%). Recent studies, including Saran et al. (2022) in the *American Journal of Kidney Diseases*, show that bacterial infections, particularly urinary tract infections caused by *E. coli*, are a major cause of hospitalization in advanced CKD patients [24]. These infections are common due to uremia-associated immunosuppression and underlying anatomical or functional abnormalities, underscoring the need for careful microbiological monitoring and appropriate antibiotic therapy.

4.4. Imaging Findings

In our study, kidneys were reduced in size in 87% of cases and poorly differentiated in 96.4%. These ultrasound findings are characteristic of advanced CKD, reflecting interstitial fibrosis and diffuse glomerulosclerosis.

Cardiomegaly was present in 55.4% of patients, while hypertrophic cardiomyopathy and left ventricular hypertrophy (LVH) were observed in 57% and 54% of cases, respectively. These findings highlight the high burden of cardiovascular complications in advanced CKD. CKD is a well-established independent cardiovascular risk factor. The Global Burden of Disease (GBD 2019) study by Bikbov et al. in *The Lancet* emphasized that mortality in CKD patients is largely driven by cardiovascular complications [18].

LVH, frequently observed in our study, is mainly related to chronic hypertension, volume overload, and anemia. A meta-analysis by Paoletti et al. (2021) in *Nephrology Dialysis Transplantation* reported that LVH is present in more than 50% of patients with ESRD and is a major adverse prognostic factor [25]. These findings confirm the strong cardiorenal interaction, commonly referred to as cardiorenal syndrome.

Hypertensive retinopathy, observed in 41.3% of cases, is also a marker of systemic vascular damage. Retinal microvascular lesions are often correlated with renal impairment, sharing common pathophysiological mechanisms such as endothelial dysfunction and arteriolar sclerosis.

4.5. Univariate Analysis

No sociodemographic or clinical variables were significantly associated with end-stage CKD. This may be explained by the fact that most patients were already at the terminal stage at admission, limiting comparisons across disease stages. These findings underscore the importance of early CKD screening, particularly in low socioeconomic populations.

4.6. Factors Associated with End-stage CKD

Multivariate analysis did not identify any independent factors associated with end-stage CKD. This lack of association may be due to the predominance of advanced stages at diagnosis and the limited size of the comparison group. These results further emphasize the need for early detection, especially among high-risk populations.

5. Conclusion

Chronic kidney disease is a common condition with a poor prognosis, particularly in resource-limited settings. It predominantly affects young, economically active individuals with low socioeconomic status. In our study, most patients presented at the end stage, with polymorphic clinical manifestations dominated by digestive symptoms of uremic syndrome. Hypertension was identified as the main etiological factor, and mortality was not directly related to the initial nephropathy.

There is a critical need to strengthen screening, prevention, early diagnosis, and appropriate management of CKD risk factors to prevent progression to end-stage renal disease. Management remains particularly challenging in our context due to financial constraints and limited technical resources.

Abbreviations

CKD	Chronic Kidney Disease
UCRC	University Clinical Research Center
CI	Confidence Intervals
OR	Odds Ratios
INSP	National Institute of Public Health
UCRC	University Clinical Research Center
SPSS	Statistical Package for the Social Sciences
FMOS	Faculty of Medicine and Odonto-Stomatology of Bamako

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Conflicts of Interest

The authors declare no conflicts of interest.

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