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Chronic Kidney Disease: Epidemiological, Clinical, and Paraclinical Characteristics at the Nephrology Unit of the Fousseyni Daou Hospital in Kayes, Mali

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Abstract

Introduction: Chronic kidney disease (CKD) is a major public health issue. In Kayes, there are little data on CKD, hence the interest of our study, which aimed to describe the epidemiological, clinical, and paraclinical profile of patients with chronic kidney disease at the nephrology unit of Fousseyni Daou Hospital in Kayes. **Materials and methods:** This was a prospective, single-center, cross-sectional, descriptive study conducted from January 1 to December 31, 2022. All patients diagnosed with chronic renal failure in the aforementioned department during the study period with a complete medical record were included. **Results:** Of the 169 patients under follow-up, 77 met our inclusion criteria, representing a frequency of 45.56%. Women accounted for 53% of the sample, with a sex ratio of 0.8. The mean age was 50.97 ± 16.33 years, with extremes of 11 and 80 years. The 16 - 45 age group accounted for 40.2% of cases. Hypertension (67.5%, 52 cases) and diabetes (7.8%, 6 cases) were the main medical histories among our patients. The mean creatinine level was 1200.81 µmol/L, with extremes of 208 and 3453 µmol/L. Renal failure was end-stage in 80.5% (62 cases), severe in 18.2% (14

cases), and moderate in 1.3% (1 case). The most common criterion for severity was hyperkalemia, accounting for 27.3% of cases. The outcome was favorable in 63.6% of patients, with stabilization of renal function through conservative treatment. **Conclusion:** Chronic renal failure is a fairly common condition affecting young adults in disadvantaged areas. Clinical manifestations were polymorphic, dominated by uremic syndrome.

Keywords

Chronic Renal Failure, Hospital, Kayes, Mali

1. Introduction

Chronic kidney disease (CKD) is a major public health problem. CKD is the progressive and irreversible loss of kidney function. It results from a reduction in functional renal parenchyma. It is diagnosed based on a decrease in glomerular filtration rate (GFR), which results in a gradual increase in plasma creatinine concentrations [1]. Its incidence continues to rise in developed countries due to the ageing population and the increase in vascular diseases, which affect the kidneys and can lead to CKD [1]. In Africa, changes in people's eating habits and lifestyles have led to the emergence of certain diseases such as diabetes and high blood pressure (HBP), which are complicated by CRF in most patients in our context due to the lack of early screening and medical follow-up. Madore F [2] reported that patients starting dialysis were diabetic and hypertensive in 54% and 96% of cases, respectively. In addition, the persistence of neglected tropical diseases such as urinary bilharzia and other infectious diseases that are not adequately treated, as well as self-medication encouraged by the increased availability of street drugs, are other equally important risk factors for CRF in our context [3].

In Côte d'Ivoire, CKD is the second leading cause of death in the internal medicine department of the Treichville University Hospital [4] and accounts for 4 to 20% of deaths at the Yalgado Ouédraogo National Hospital in Burkina Faso [5]. Its prevalence is underestimated given its silent progression in the early stages.

In Mali, it accounts for 15.98% of admissions to the nephrology department of Point G University Hospital [6].

Extrarenal purification (ERP) by haemodialysis (HD) forms the basis of the medical management of end-stage CRF in our countries. In Mali, 20% of patients reaching the CRF stage benefit from this technique [7].

In Kayes, there are little data on CRF, hence the interest of our study, which aimed to describe the epidemiological, clinical, and paraclinical profile of patients with chronic renal failure in the nephrology unit of the Fousseyni Daou Hospital in Kayes.

2. Materials and Methods

This was a prospective, single-centre, cross-sectional, and descriptive study conducted from 1 January to 31 December 2022. All patients diagnosed with chronic

renal failure in the aforementioned department during the study period with a complete medical record were included. Patients seen outside the study period, those without CRF, or those with incomplete medical records were not included.

The variables studied were:

Sociodemographic data: age, gender, occupation, marital status, place of residence, and ethnicity.

2.1. Clinical Data

- Reason for hospitalization or consultation
- Medical, urological, nephrological, and surgical history.
- Cardiovascular risk factors: age, gender, smoking, hypertension, diabetes, dyslipidaemia, obesity, heredity, sedentary lifestyle, and alcohol consumption.
- General signs: blood pressure, temperature, weight, pulse, height, BMI, and urine output.
- Symptoms: oedema of the lower limbs, facial swelling, anorexia, vomiting, nausea, insomnia, drowsiness, diarrhoea, pruritus, asthenia, dizziness, muscle cramps, headache, tinnitus, lower back pain, chest pain, etc.
- Physical signs: oedema, uraemic frost, crackles, jugular turgidity, hepatojugular reflux, abdominal mass, bladder globe, pericardial friction, etc.

2.2. Paraclinical Data

2.2.1. Biological

- Creatinine level: its measurement enabled the GFR to be calculated and thus renal impairment to be classified according to MDRD.
  1=CMI (GFR ≥ 90); 2=mild CRF (GFR = 60 - 89); 3=moderate CRF (3A GFR = 45 - 59 and 3B GFR = 30 - 44); 4=severe CRF (GFR = 15 - 29); 5=end-stage CRF (GFR < 15)
- Blood urea and uric acid levels: these levels were used to assess the extent of nitrogen retention.
- Complete blood count (CBC): to check for anaemia defined by an Hb level < 11 g/dl, as well as other CBC abnormalities.
- Complete blood ionogram (sodium, potassium, calcium, and phosphorus levels, PTH, vitamin D): to check for water-electrolyte imbalances and calcium-phosphorus metabolism disorders.
- 24-hour proteinuria test Proteinuria: Minimal: < 1 g/24 h; Moderate: 1 to 3 g/24 h; Massive: > 3 g/24 h
- Cytological and bacteriological examination of urine (ECBU): ECBU to check for leukocyturia, hematuria, and urinary tract infection.

2.2.2. Radiological

- Abdominal ultrasound to assess the size and echostructure of the kidneys, as well as the condition of the excretory tracts.
- Frontal chest X-ray: to check for cardiomegaly, pulmonary oedema, or pleuroparenchymal involvement.

- Cardiac ultrasound: to check for hypertrophy and/or dilation of the heart chambers, heart failure, pericarditis, valvular heart disease, or pericardial effusion.
- ECG: to check for LVH and other signs.
- Fundus examination: to check for retinopathy
- Diabetic retinopathy, if associated with diabetes:
- Absence of diabetic retinopathy Minimal non-proliferative DR
- Moderate non-proliferative DR
- Severe non-proliferative RD
- Early proliferative RD
- Moderate proliferative RD
- Severe proliferative RD
- Complicated proliferative RD
- Oedematous maculopathy
- Ischemic maculopathy
- Hypertensive retinopathy is associated with hypertension (Kirkendall classification):
- I: severe and widespread arterial narrowing,
- stage II: haemorrhages and/or exudates,
- stage III: dysoric nodules/papillary oedema.

3. Operational Definitions

- CKD: elevated creatinine levels for > 3 months + reduced kidney size (<10 cm or 3 vertebrae)
- Chronic kidney disease: morphological abnormality of the kidneys and/or proteinuria and/or urinary sediment abnormality without impaired kidney function (creatinine clearance is normal), persisting for more than three (3) months.
- Criteria for chronic kidney failure:
- Medical history criteria: history of elevated creatinine levels for more than 3 months.
- Morphological criteria: reduction in kidney size to less than 10 cm in length on ultrasound (except in cases of diabetes, hydronephrosis, and polycystic kidney disease)
- Biological criteria: normochromic normocytic aregenerative anaemia, hypocalcaemia with hypocalciuria.
- For patients with a history of pathological creatinine levels that was unknown, the chronic nature of renal failure was confirmed based on the presence of morphological and biological criteria and the lack of recovery of renal function after 3 months of follow-up.
- Glomerular nephropathy: PU/24 h > 2 g or PU/24 h < 2 g + hematuria.
- Vascular nephropathy (nephroangiosclerosis): HTN + PU < 1 g/24 h + IR + hypertensive retinopathy at the back of the eye;
- HIV-associated nephropathy (HIN): PU > 3 g/24 h – HTN + severe and rapidly progressive IR from the outset + patient infected with HIV;
- Diabetic nephropathy (DN): PU > 500 mg/24 h + diabetic retinopathy at the

back of the eye;

- Favorable outcome: an outcome characterized by the absence of worsening and/or partial recovery from renal insufficiency due to conservative treatments throughout the study period. It excludes all cases of vision loss or those requiring renal replacement therapy.

4. Results

Of the 169 patients under follow-up, 77 met our inclusion criteria, representing a frequency of 45.56%. Of the 92 patients not included in the study, 54 were excluded due to acute kidney failure, 20 because the data were unusable due to a lack of financial resources to perform the tests necessary for diagnosing chronic kidney disease, and 18 due to conditions other than kidney failure. Women accounted for 53% with a sex ratio of 0.8. The average age was 50.97 ± 16.33 years, with extremes of 11 and 80 years. The 16 to 45 age group accounted for 40.2% of cases (see Table 1).

Housewives accounted for 49.3% of cases. Elevated creatinine levels were the main reason for consultation in 89.6% (69 cases), while the other reasons (10 cases) were oedema syndrome (1); OAP (1); anaemia (1); bilateral renal hypotrophy (1); papillary oedema (1); hypersalivation (1); renal distress on ultrasound (1); vomiting (1). The emergency department was the main referral service for patients, accounting for 45.5% (35 cases), followed by cardiology and private practitioners, accounting for 15.9% (12 cases) and 14.3% (11 cases), respectively (see Table 2).

Table 1. Distribution of patients by age.

Age (year)	Workforce	Percentages (%)
[0 - 15]	2	2.6
[16 - 30]	5	6.5
[31 - 45]	26	33.7
[46 - 60]	17	22.1
>60	27	35.1
Total	77	100

Table 2. Distribution of patients by referral service.

Referral services	Workforce	Percentages (%)
Emergency	35	45.5
Cardiology	12	15.6
Private structure	11	14.3
Internal medicine	7	9
Self-reference	6	7.8
Hepatology and Gastroenterology	2	2.6
Others*	4	5.2
Total	77	100

Others*: Gynaecology and obstetrics (1); Pulmonology (1); Traumatology (1); Senior healthcare technician (1).

High blood pressure (67.5% or 52 cases) and diabetes (7.8% or 6 cases) were the main medical conditions in our patients. Nocturia accounted for 33.8% of cases (Table 3).

Table 3. Distribution of patients according to urological and nephrological history.

Urological and nephrological history	Workforce	Percentages (%)
Nocturia	26	33.8
Edema of the lower limbs	20	26
Burning sensation when urinating	17	22.1
Pollakiuria	15	19.5
Dysuria	8	10.4
Gross hematuria	5	6.5
Polyuria	4	5.2
Pathological creatinine	3	3.9
others*	8	10.4

Others*: oliguria (2), earache (2), ear discharge (2), tonsillitis (1), urinary incontinence (1).

Phytotherapy was used in 51.9% of our patients (see Table 4). Self-medication was found in 12 patients, or 15.6%.

Table 4. Distribution of patients according to previous treatment.

History of medication use	Workforce	Percentages (%)
Herbal medicine	40	51.9
Antihypertensive	33	42.9
Antibiotic	23	29.9
Nonsteroidal anti-inflammatory drug	9	11.7
Antimalarial	7	9.1
Diuretic	11	14.3
Allopurinol	6	7.8
Others*	21	27.3

Vomiting accounted for 55.8% (43 cases), headache for 40.3% (31 cases), and vertigo for 39% (30 cases) (see Table 5).

Table 5. Distribution of patients according to clinical symptoms.

Symptoms	Workforce	Percentages (%)
Vomiting	43	55.8
Headache	31	40.3
Vertigo	30	39
Anorexia	23	29.9

Continued

Asthenia	23	29.9
Shortness of breath	20	26
Edema of the lower limbs	16	20.6
Nausea	14	18.2
Cough	9	11.7
Insomnia	8	10.4
Abdominal pain	8	10.4
Epigastric pain	7	9.1
Facial swelling	7	9.1
Tinnitus	5	6.5
Phosphenes	5	6.5
Hemorrhagic syndrome	5	6.5
Diarrhea	4	5.2
Lower back pain	4	5.2
Pollakiuria	3	3.9
others*	11	14.3

Others*: tremor (2); burning sensation when urinating (1); dysuria (1); pruritus (1); muscle cramps (1); hypersalivation (1); dysgeusia (1); dysarthria (1); hemiplegia (1); plantar warmth (1).

More than half of the patients had serum creatinine levels above 800 µmol/l (see Table 6). The mean creatinine level was 1200.81 µmol/l, with extremes of 208 and 3453 µmol/l.

Table 6. Distribution of patients according to serum creatinine levels.

Creatinine level (µmol/L)	Workforce	Percentages (%)
[150 - 300]	4	5.2
[301 - 600]	23	29.9
[601 - 800]	7	9.1
>800	43	55.8
Total	77	100

Renal failure was end-stage in 80.5% (62 cases), severe in 18.2% (14 cases), and moderate in 1.3% (1 case). The average blood urea nitrogen level was 31.23 mmol/l, with extremes of 4 and 66 mmol/l. It was above 30 mmol/l in 39 patients (50.6%) and below 30 mmol/l in 38 patients (49.4%). The average uric acid level was 543.5 µmol/l, with extremes of 262 and 930 µmol/l. It was above 600 µmol/l in 50 (64.9%) patients and below 600 µmol/l in 27 patients (5.1%).

Anaemia was present in 84.4% (65 cases) of our patients. It was normochromic normocytic, microcytic hypochromic, microcytic normochromic, and normocytic hypochromic in 50.76% (33 cases), 38.46% (25 cases), 7.70% (5 cases), and 3.08% (2

cases), respectively. Calcaemia was reduced in 45.5% of patients (see Table 7).

Table 7. Distribution of patients according to calcium and phosphorus levels and potassaemia.

Settings	Decreased	Augmented	Normal
Calcemia (n = 77)	35 (45.5%)	36 (46.8%)	6 (7.8%)
Phosphatemia (n = 22)	-	20 (90.9%)	2 (9.1%)
Active vitamin D (n = 13)	5 (38.5%)	-	8 (61.5%)
parathyroid hormone (n = 12)	2 (16.7%)	8 (66.6%)	2 (16.7%)
Kaliemia (n = 77)	7 (9.1%)	21 (27.3%)	49 (63.6%)

Kidney size was reduced, normal, and enlarged in 67.5% (52 cases), 28.6% (22 cases), and 3.9% (3 cases) of our patients, respectively. The kidneys were poorly differentiated and not dilated in 89.60% (69 cases) and 93.50% (72 cases), respectively. Urine culture performed in 43 patients revealed urinary tract infection in 81.4% (35 cases) with the presence of Enterococcus in 13 cases (37.14%), Escherichia coli in 11 cases (31.43%), and Staphylococcus aureus in 3 cases (8.57%). Proteinuria was found in 13 patients, 92.3% (12) of whom had minimal proteinuria (less than 1 g/24 h) in 12 cases (92.3%) and moderate proteinuria (1 - 3 g/24 h) in 1 case (7.7%). The most common complication was hyperkalaemia, occurring in 27.3% of cases (see Table 8).

Table 8. Distribution of patients according to severity criteria.

Severity criteria	Workforce	Percentages (%)
Hyperkalemia	21	27.3
Uremic coma	14	18.3
Acute pulmonary edema	10	13
Metabolic acidosis	6	7.8
Pericarditis	3	3.9

The most common cause of CRF was vascular nephropathy, accounting for 50.6% of cases (see Table 9).

Table 9. Distribution of patients according to aetiology.

Etiologies	Workforce	Percentages (%)
High blood pressure	39	50.6
Chronic glomerulonephritis	15	19.5
Chronic interstitial nephritis	11	14.3
Diabetes	6	7.8
Undetermined	5	6.5
Autoimmune (Lupus)	1	1.3
Total	77	100

5. Discussion

From 1 January to 31 December 2022, 169 patients were admitted to the nephrology unit, 77 of whom had CRF, representing a frequency of 45.6%. This frequency was 15.98% and 23.65%, respectively, according to studies conducted in 2008 and 2011 in the nephrology department of the Point G University Hospital [6] [8]. The average age was 50.97 ± 16.33 years, with extremes of 11 and 80 years. The 16 - 45 age group was the most common, accounting for 40.2%. Many African authors have reported a predominance of young people among patients with chronic renal failure [4] [6] [9]. In contrast, in developed countries, more than 50% of patients with chronic renal failure are over 60 years of age. This disparity could be explained by the ever-increasing life expectancy in these countries, but also by a predominantly ageing population. The prevalence of CRF increases with age. The incidence of end-stage renal disease increases with age, from 7 cases per million people under the age of 20 to 590 cases per million people over the age of 75; 64% of patients are over 65 years of age [10]. The predominance of women (sex ratio of 0.88) in our study was reported by Samaké M *et al.* [11]. This contrasts with the data from several studies [12]-[15] and could be explained by the high level of male migration in the region on the one hand, and the predominance of women in the general population on the other. In the literature, the prevalence is mainly male [6] [16] [17] because male sex hormones have a direct effect on the initiation and progression of chronic renal failure. Sex hormones play a role in the progression of chronic kidney disease by influencing the synthesis and activity of cytokines and vasoactive agents, as well as the generation of reactive oxygen species and the production of matrix components. Furthermore, the effects of oestrogen on these processes confer a protective role on females in the progression of chronic kidney disease, explaining the lower number of women in chronic kidney failure populations [18].

The main reason for consultation was renal failure, with a predominance (55.8%) of plasma creatinine levels above 800 µmol/l. This finding has been reported by several authors [19]-[21]. This can be explained, on the one hand, by the fact that most practitioners reduce nephrology to the management of renal failure, due to a lack of information [22] [23] and training (practitioners' lack of knowledge of risk factors and early markers of chronic kidney disease such as proteinuria and haematuria) and, on the other hand, by the absence of reasons that could justify referral to a nephrologist.

In Tunisia, 'signs of renal impairment: oedema, deterioration in general health, oligo-anuria, and mental confusion' are the most common reasons, accounting for 48.5% of cases. Sakandé J *et al.* reported high blood pressure (30.4%) followed by nephrotic syndrome (23.8%) as the main reasons for hospitalisation [5]. In the literature, hypertension has been found to be a pathological history in patients with CRF [24] [25]. Its association with diabetes further compromises the prognosis of diabetic patients.

The uraemic symptoms were very varied but were dominated by morning sick-

ness (55.8%), asthenia (29.9%), and anorexia (29.9%). Lengani A. in Burkina Faso reported asthenia and vomiting in 78.2% and 63.2% of cases, respectively [15]. The polymorphism of these symptoms can be explained by the late treatment of patients, most of whom arrive at the terminal stage, which accounts for 80.5% of cases in our study, with an average plasma creatinine level of 1200.81 ± 853 µmol/l. Akinsola *et al.* in Nigeria [26] and Ramiltiana in Madagascar [27] reported mean creatinine levels of 1130 ± 576 and 911.3 µmol/l, respectively.

Chronic renal failure was terminal in 80.5% of cases. These data are consistent with those of Ouattara [12], Tia WM [16], and Yao [28], who reported rates of 82.4%, 91.33%, and 94.5%, respectively. This finding is a very relevant reminder of the importance of focusing on the prevention of factors contributing to CKD through public awareness campaigns on self-medication, high blood pressure, infections, and diabetes mellitus, as well as early screening for chronic kidney disease.

Urea, the main waste product of nitrogen metabolism, was elevated in almost all patients, *i.e.*, 97.4% of cases. The average urea level in patients with CRF was 31.23 mmol/l. This level increases as glomerular filtration rate decreases, reflecting the severity of renal function loss. Ramiltian [27] observed an average urea level of 14.37 mmol/l.

Anaemia is a major characteristic of CRF. Anaemia in patients with CRF is multifactorial. It is due to a deficiency in erythropoietin, inhibition of erythropoiesis induced by uraemia, and an imbalance in iron homeostasis. In our study, 65 patients, or 84.4%, had anaemia. It was normocytic normochromic (50.76%), hypochromic microcytic (38.46%), normochromic microcytic (7.7%), and hypochromic normocytic (3.08%).

This frequency of microcytic anaemia in CRF has been found in several studies in Africa [27]. This can be explained by the fact that during CRF, the increase in plasma hepcidin concentration (promoted by an inflammatory syndrome) reduces the absorption of dietary iron and promotes iron sequestration in the cells of the reticuloendothelial system. This results in functional iron deficiency, which is often associated with absolute iron deficiency secondary to increased iron loss (microhemorrhages) on the one hand, and tropical parasitic diseases on the other [8] [29]. Hemorrhagic diathesis, encountered in the terminal stage, due to prolonged bleeding time, could be the most plausible explanation for the severity of anemia.

In general, in the West, anemia in CRF is normochromic, normocytic, and aregenerative in almost all patients, and hemoglobin levels vary between 8 and 10 g/dL [30].

The hemoglobin level was below 8 g/dL in 33.8% of our patients. This level was found in 58.3% of patients in the series by Abderahim.

Hyperkalemia is one of the complications of CRF, especially in the terminal stage. In our study, it was found in 21 patients, or 27.3%, with an average of 5.13 ± 1.39 mmol/L. Its etiology is mixed, with decreased renal function leading to in-

adequate potassium excretion at glomerular filtration rates < 15 - 20 ml/min/1.73 m² in the face of a potassium-rich diet, and metabolic acidosis promoting extracellular potassium transfer [31]. In addition to CKD, diabetes and heart failure are frequently encountered comorbidities that indicate treatment with RAAS blockers for their nephroprotective and cardioprotective effects. Associated with these comorbidities, this type of treatment increases the risk of hyperkalemia [32].

Phosphocalcic metabolism disorders (hypocalcemia and hyperphosphatemia) are common in CRF. In addition to bone damage, they are accompanied by metabolic and vascular risks, particularly due to the risks of hyperphosphatemia and hypercalcemia, which are frequently associated with them [33]. Hypocalcemia was present in 36 patients (46.8%), including 32 patients in the terminal stage, compared with 90.9% of cases of hyperphosphatemia. Similar results were reported by Bourquia A in Morocco [24].

Renal failure was vascular (50.6%), glomerular (19.5%), interstitial (14.3%), diabetic (7.8%), autoimmune (lupus 1.3%), and undetermined (6.5%) in origin. Alhadji Ahmadou Tounkara *et al.* [34] reported the respective etiologies as hereditary nephropathies (1.3%), chronic interstitial nephritis (15.5%), CKD (34.8%), vascular nephropathies (VN = 28.4%), myelomatous kidney (2.6%), diabetic nephropathy (9.03%), and unclassifiable nephropathies (8.38%). The main etiologies in Bouaké were vascular nephropathies linked to high blood pressure (34.7%), chronic glomerular nephropathies (29.3%), HIV-related nephropathies (11.4%), and diabetic nephropathies (9.3%) [16]. This predominance of high blood pressure was confirmed in a systematic review of 152 articles published between January 1, 1995, and April 7, 2017, on CRF in Africa [35].

The management of CRF remained difficult in our context given the lack of financial resources and adequate technical facilities, particularly the absence of functional dialysis in the public hospital. The outcome was favorable in 63.8% of our patients, with partial and stable recovery of renal function. 20.6% were lost to follow-up, 7.8% were referred to a center with functional and accessible dialysis facilities, and we recorded six (6) deaths, or 7.8% of cases, related to the lack of dialysis in an emergency setting.

6. Limitations of the Study

However, our study suffered from a few shortcomings:

- The low socioeconomic status of our patients and the high cost of examinations.
- Inadequate technical facilities.
- The very fragile health of our patients, who were already at an advanced stage.

7. Conclusions

Chronic renal failure is a fairly common condition affecting young adults in disadvantaged areas. The clinical manifestations are polymorphic, dominated by uremic syndrome.

Its management remained difficult in our context, especially in the terminal stage, due to the limited financial resources of our patients and the poor technical facilities in our institutions.

Data Collection and Analysis

Data were collected using a survey form designed for this purpose, based on patients' outpatient and hospitalization records. Data entry and analysis were performed using Word 2016, Excel 2016, and SPSS version 20.0 software.

Ethical Considerations

The free and informed verbal consent of each patient was obtained with strict respect for the anonymity of the survey form.

Author Contributions

Conceptualization, Magara Samake and Aboubacar Sidiki Fofana.; methodology, Moctar Coulibaly.; software, SPSS version 20.0.; validation, Famory Kamissoko, Seydou Sy, Hamadoun Yattara., and Goundo Soumbounou Sissoko.; formal analysis, Bakary Diarra; investigation, Sah dit Baba Coulibaly.; resources, Ousmane Youssouf Djiguiba Singadou.; data curation, Famory Kamissoko.; writing—original draft preparation, Magara Samake.; writing—review and editing, Niagale Diakite.; visualization, Sahare Fongoro.; supervision, Sahare Fongoro.; project administration, Seydou Sy.; funding acquisition, Magara Samake., Aboubacar Sidiki Fofana., Moctar Coulibaly. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Lacour, B. and Massy, Z. (2013) Diagnostic, suivi biologique de l'insuffisance rénale chronique et prise en charge de l'insuffisance rénale chronique terminale. *Revue Francophone des Laboratoires*, **2013**, 59-73. https://doi.org/10.1016/s1773-035x(13)71996-8

[2] Madore, F. (2004) Facteurs de risque vasculaire et insuffisance rénale. *Médecine/Sciences*, **20**, 1100-1103. https://doi.org/10.1051/medsci/200420121100

[3] Togo, A. (2014) Évolution des patients hémodialysés chroniques dans le service de Néphrologie et d'Hémodialyse du CHU du Point G. Thèse de Médecine, Université de Bamako.

[4] Diallo, A.D., Niamkey, E. and Beda Yao, B. (1997) L'insuffisance rénale chronique en Côte d'Ivoire: Étude de 800 cas hospitaliers. *Bulletin de la Société de Pathologie Exotique*, **90**, 346-348.

[5] Sakandé, J., Sawadogo, M., Nacouima, E.W.C., Saizonou, E.S., Kabré, E. and Sawadogo, S. (2006) Profil biologique de l'insuffisance rénale chronique. *Annales de Biologie Clinique du Québec*, **43**, 3-8.

[6] Samaké, M., Sy, S., Yattara, H., Eyram, M., Diallo, D., Coulibaly, M., *et al.* (2022) Aspects épidémio-clinique de l'insuffisance rénale chronique au service de néphrologie hémodialyse du CHU du Point G, Bamako, Mali. *Jaccr Africa*, **6**, 158-165.

[7] Ahmed, M.A. (2006) Problématique de la prise en charge des insuffisants rénaux chroniques en dialyse à l'hôpital du Point G en 2005. Thèse de Médecine, Université de Bamako, 64 p.

[8] Hermine, O., Maciel, T. and Moura, I. (2017) Quel pourrait être le futur de la prise en charge de l'anémie dans l'insuffisance rénale chronique? *Néphrologie & Thérapeutique*, **13**, 6S7-6S10. https://doi.org/10.1016/s1769-7255(18)30034-8

[9] Ramilitiana, B., Ranivoharisoa, E.M., Dodo, M., Razafimandimby, E. and Randriamarotia, W.F. (2016) Une étude rétrospective sur l'incidence de l'insuffisance rénale chronique dans le service de médecine interne et néphrologie du centre hospitalier Universitaire d'Antananarivo. *Pan African Medical Journal*, **23**, Article 141. https://doi.org/10.11604/pamj.2016.23.141.8874

[10] Masse, V., Richard, J.-B. and Landais, P. (2006) Épidémiologie de l'insuffisance rénale terminale traitée par dialyse. *EMC-Néphrologie*, **1**, 1-12. https://doi.org/10.1016/S1762-0945(09)50460-3

[11] Samaké, M., Sy, S., Coulibaly, M., Yattara, H., Soumbounou, G., Kodio, A., *et al.* (2021) Prévalence de la maladie rénale au service des urgences de l'hôpital Fousseyni Daou de Kayes. *Mali Médical*, **36**, 1-7.

[12] Ouattara, B., Kra, O., Yao, H., Kadjo, K. and Niamkey, E.K. (2011) Particularités de l'insuffisance rénale chronique chez des patients adultes noirs hospitalisés dans le service de médecine interne du CHU de Treichville. *Néphrologie & Thérapeutique*, **7**, 531-534. https://doi.org/10.1016/j.nephro.2011.03.009

[13] Frimat, L., Loos-Ayav, C., Briançon, S. and Kessler, M. (2005) Épidémiologie des maladies rénales chroniques. *EMC-Néphrologie*, **2**, 139-157. https://doi.org/10.1016/j.emcnep.2005.09.003

[14] Stengel, B., Billon, S., Van Dijk, P.C., Jager, K.J., Dekker, F.W., Simpson, K., *et al.* (2003) Trends in the Incidence of Renal Replacement Therapy for End-Stage Renal Disease in Europe, 1990-1999. *Nephrology Dialysis Transplantation*, **18**, 1824-1833. https://doi.org/10.1093/ndt/gfg233

[15] Lengani, A., Kargougou, D., Fogazzi, G.B. and Laville, M. (2010) L'insuffisance rénale aiguë au Burkina Faso. *Néphrologie & Thérapeutique*, **6**, 28-34. https://doi.org/10.1016/j.nephro.2009.07.013

[16] Tia, M.W., Nda, J.K., Kouame, G.R., Daingui, D. and Ouattara, B. (2022) Insuffisance rénale chronique: Aspects épidémiologique, diagnostique, thérapeutique et évolutif au CHU de Bouaké de 2016 à 2020. *Revue Africaine de Médecine Interne*, **9**, 60-66.

[17] Eyeni Sinomono, D.T., Gassongo Koumou, G.C. and Loumingou, R. (2017) Profil épidémiologique de l'insuffisance rénale chronique au CHU de Brazzaville en 2016. *Néphrologie & Thérapeutique*, **13**, 396-404. https://doi.org/10.1016/j.nephro.2017.08.302

[18] Neugarten, J. and Golestaneh, L. (2019) Influence of Sex on the Progression of Chronic Kidney Disease. *Mayo Clinic Proceedings*, **94**, 1339-1356. https://doi.org/10.1016/j.mayocp.2018.12.024

[19] Sabi, K.A., Noto-Kadou-Kaza, B., Amekoudi, Y.E., Tsevi, M.C., Kossidze, K. and Amedegnato, D. (2014) Epidemiologic and Clinical Profile of Patients at Their First Consultation with a Nephrologist in Togo. *Médecine et Santé Tropicales*, **24**, 169-171. https://doi.org/10.1684/mst.2014.0318

[20] Coulibaly, G., Guissou, C. and Lengani, A. (2011) Primo-consultation néphrologique

au Centre Hospitalier Universitaire Yalgado Ouedraogo de Ouagadougou (Burkina Faso). *Néphrologie & Thérapeutique*, **7**, Article 369.
https://doi.org/10.1016/j.nephro.2011.07.235

[21] Mbarki, H., El Youbi, R., Maaroufi, C., Benzakour, K., Batta, F.Z., Arrayhani, M., *et al*. (2009) Profil épidémiologique des patients en première consultation de néphrologie. *Revue d'Épidémiologie et de Santé Publique*, **57**, S41.
https://doi.org/10.1016/j.respe.2009.02.141

[22] Frimat, L., Siewe, G., Loos-Ayav, C., Briançon, S., Kessler, M. and Aubrège, A. (2006) Insuffisance rénale chronique: Connaissances et perception par les médecins généralistes. *Néphrologie & Thérapeutique*, **2**, 127-135.
https://doi.org/10.1016/j.nephro.2006.04.007

[23] Wauters, J.-P., Lameire, N., Davison, A. and Ritz, E. (2005) Why Patients with Progressing Kidney Disease Are Referred Late to the Nephrologist: On Causes and Proposals for Improvement. *Nephrology Dialysis Transplantation*, **20**, 490-496.
https://doi.org/10.1093/ndt/gfh709

[24] Bourquia, A. (1999) État actuel du traitement de l'insuffisance rénale chronique au Maroc. *Néphrologie*, **20**, 75-80.

[25] Rostand, S.G. (1992) Hypertension and Renal Disease in Blacks: Role of Genetic and/or Environmental Factors? *Advances in Nephrology from the Necker Hospital*, **21**, 99-116.

[26] Akinsola, A., Durosinmi, M.O. and Akinola, N.O. (2000) The Haematological Profile of Nigerians with Chronic Renal Failure. *African Journal of Medicine and Medical Sciences*, **29**, 13-16.

[27] Ramilitian, B. (2010) Profil épidémio-clinique et devenir des insuffisant rénaux chronique bénéficiaire d'hémodialyse au CHU HJRB antananarivo madagascar. *Revue d'Anesthésie-Réanimation et de Médecine d'Urgence*, **2**, 11-14.

[28] Yao, H., Konan, S., Sanogo, S., Diopoh, S. and Diallo, A. (2018) Prevalence and Risk Factors of Chronic Kidney Disease in Cote d'ivoire: An Analytic Study Conducted in the Department of Internal Medicine. *Saudi Journal of Kidney Diseases and Transplantation*, **29**, 153-159. https://doi.org/10.4103/1319-2442.225201

[29] Dysney, A.P.S. (1995) Demography and Survival of Patients Receiving Treatment for Chronic Renal Failure in Australia and New Zealand: Report on Dialysis and Renal Transplantation Treatment from the Australia and New Zealand Dialysis and Transplant Registry. *American Journal of Kidney Diseases*, **25**, 165-175.
https://doi.org/10.1016/0272-6386(95)90641-x

[30] Delcourt, C. and Papoz, L. (1996) Le diabète et ses complications dans la population française.Éditions INSERM, 106 p.

[31] Palmer, B.F. (2015) Regulation of Potassium Homeostasis. *Clinical Journal of the American Society of Nephrology*, **10**, 1050-1060.
https://doi.org/10.2215/cjn.08580813

[32] Blanc, C. (2018) Traitement de l'hyperkaliémie version 2.0. *Revue Médicale Suisse*, **14**, 406-410. https://doi.org/10.53738/revmed.2018.14.595.0406

[33] Block, G.A. (2000) Prevalence and Clinical Consequences of Elevated Ca x P Product in Hemodialysis Patients. *Clinical Nephrology*, **54**, 318-324.

[34] Tounkara, A.A., Fofana, A.S., Sissoko, I., Coulibaly, N., Coulibaly, A.A.M.S. and Maiga, M.K. (2016) Causes of Chronic Renal Insufficiency of the African Black Subject: A Retrospective Study of 18 Months in the Department of Nephrology and Hemodialysis of the University Hospital of Point G Mali. *Batna Journal of Medical Sci-*

ences (*BJMS*), **3**, 86-89. https://doi.org/10.48087/bjmsoa.2016.3206

[35] Abd ElHafeez, S., Bolignano, D., D'Arrigo, G., Dounousi, E., Tripepi, G. and Zoccali, C. (2018) Prevalence and Burden of Chronic Kidney Disease among the General Population and High-Risk Groups in Africa: A Systematic Review. *BMJ Open*, **8**, e015069. https://doi.org/10.1136/bmjopen-2016-015069