

Epidemiological and Clinical Aspects of Chronic Renal Failure in the Medical Department at the Hospital of Sikasso

Djénéba Maïga^{1,2*}, Drissa Goïta³, Magara Samaké^{2,4}, Aboudou Messoum Dolo^{1,2}, Yohanna Koné¹, Aboubacar Sidiki Fofana⁴, Seydou Sy^{5,6}, Mactar Coulibaly⁷, Atabième Kodio⁵, Sahdit Baba Coulibaly⁵, Saharé Fongoro^{5,6}

¹Nephrology Unit of Sikasso Hospital, Sikasso, Mali

²National Center for Scientific and Technological Research (CNRST), Bamako, Mali

³Service de Médecine, CHU Mère-Enfant le Luxembourg, Bamako, Mali

⁴Nephrology Unit of the Fousseyni DAOU Hospital, Kayes, Mali

⁵Nephrology and Hemodialysis Service, CHU du Point-G, Bamako, Mali

⁶Faculty of Medicine of Bamako, Bamako, Mali

⁷Nephrology Unit of Mali GAVARDO Hospital of Sebenicoro, Bamako, Mali

Email: *zenahassane@gmail.com

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Abstract

Introduction: Chronic renal failure is a real public health problem because of its prevalence, the cost of its management and the high morbidity and mortality rate associated with it. The objective of this study was to determine the frequency, causes and main aggravating factors of chronic renal failure in the medical department of the hospital of Sikasso. **Materials and Methods:** This was a cross-sectional, retrospective, descriptive study conducted in the medical department of the Sikasso hospital from January 1, 2021 to November 30, 2022. It covered all the records of patients with chronic renal failure hospitalized in the department during this period. The MDRD formula was used to estimate the glomerular filtration rate. The KDIGO 2012 classification was used to stage CKD. **Results:** Of 820 patient records reviewed, we retained 197 records. The mean age of our patients was 42.25 ± 10 years. The male sex represented 114 (57.9%). The socio-economic level was considered low and precarious in 79.8% of cases. The frequency of chronic renal failure was 24%. The reason for hospitalization was mostly hyper creatinine $> 185 \mu\text{mol/l}$ (92.4%). Herbal medicine was reported in 103 cases (52.3%). Medical history was hypertension 101 cases (51.3%), undocumented gastro duodenal ulcer (UGD) 14 cases (7.6%), hypertension and diabetes 11 cases (5.1%), diabetes 8 cases (4%), lower limb edema 9 cases (4.6%). Hypocalcemia was 147 cases (75.6%) with hyper phosphoremia was 153 cases (77.7%). Hemoglobin level

was: <6 g/dl, 44 cases (22.3%); between 6 - 8 g/dl, 77 cases (39.1%), from 8 - 10 g/dl, 54 cases (27.4%). The etiologies of CKD were vascular nephropathy 106 cases (53.8%), interstitial nephropathy, 44 cases (22.3%), glomerular nephropathy, 33 cases (16.8%), diabetic nephropathy, 12 cases (6.1%) and polycystic kidney disease 2 (1%). CKD was classified as stage 5, 171 cases (86.8%), stage 4, 11 cases (5.6%), stage 3, 13 cases (6.6%) and stage 2, 2 cases (1%). Dialysis was performed in 1095 (5.3%) of our patients. All these patients started dialysis with a central line. Conclusion: This study reveals the high prevalence of chronic renal failure in the department and above all the late diagnosis at very advanced stages. This imposes policies of prevention and effective management of the responsible diseases.

Keywords

Epidemiology, Clinical, Chronic Renal Failure, Sikasso, Mali

1. Introduction

Chronic renal failure is defined as progressive and irreversible destruction of glomerular filtration rate (GFR) below 60 ml/min/1.73 m² [1] [2]. Its chronic character is affirmed by the presence of biological signs for more than 3 months [3].

Chronic renal failure is increasingly becoming a global public health problem due to its prevalence and the high morbidity and mortality rate associated with it [4] [5] [6] [7].

The prevalence of chronic renal failure is constantly increasing and is estimated to be around 10% of the general population [5]. This prevalence varies from one country to another and from one study to another. In France, it affects approximately 1.74 to 2.5 million people, 45,000 of whom are in the end-stage, and 30% of these patients begin dialysis as emergencies. In the United States and Japan, 180 new cases per million inhabitants have been reported annually [8].

In sub-Saharan Africa, the frequency of chronic kidney disease (CKD) in the general population is not known. However, several studies have been carried out to establish the epidemiological and clinical profile of CKD in hospitals. In Côte d'Ivoire at the University Hospital Center (CHU) of Treichville, its prevalence has been estimated at 5.8% [9]. In Togo in 2019, a hospital frequency of 93.7% of end-stage chronic renal disease (ESRD) had been reported in primary nephrology consultation [10]. In Benin GBenguidi G had found a prevalence of 16.6% in 2020 [11]. Thus in Mali its hospital incidence was 51% 2015 at the Fousseyni DAOU hospital in Kayes [12], and 21.17% in 2016 in the nephrology and hemodialysis department at the Point G University Hospital [6] [13].

The incidence increases significantly with age, with men having a high risk of 67% compared to women [5].

It is a condition with heavy management in a low-income country, because of

the costs generated by its management and the high cardiovascular risk that accompanies it (40% of death before dialysis) [10] [14].

Chronic renal failure is a frequent cause of hospitalization of patients with renal disease in the medical department of the regional hospital of Sikasso. The objective of this study was to determine the prevalence, the main aggravating factors and the causes of chronic renal failure in the medicine department of the hospital of Sikasso in Mali.

2. Materials and Methods

This was a cross-sectional, retrospective, descriptive study conducted in the medical department of Sikasso Hospital over a period of 23 months (from January 1, 2021 to November 30, 2022). The study involved all the records of patients hospitalized in the department during the study period. Complete inpatient records labeled with chronic failure were included in this study.

The mandatory tests for each eligible file included: creatinine, urea, uric acid, renal ultrasound, blood count, calcium, phosphorus, 24-hour urine cytobacteriological examination (UCE) and proteinuria (PU), and fundus. Data were collected on an anonymous questionnaire from the patients' medical records. Age, sex, occupation, clinical signs, history of general diseases (hypertension, diabetes, heart failure, gastro duodenal ulcer (UGD), uro-nephrological pathology), as well as creatinine, calcium, phosphorus, hemoglobin, etiologies and stage of CKD were the variables studied. The MDRD (modification of diet in renal disease) formula was used to estimate the glomerular filtration rate. This formula is one of the methods to assess the decrease of glomerular filtration rate by determining the creatinine clearance [4]. The diagnosis of chronic renal failure was made on the basis of a decrease in glomerular filtration rate (less than 60 ml/min/1.73 m²) with a parallel increase in blood urea and creatinine levels for more than three months and a renal hyper-echogenicity with loss of corticomedullary differentiation. The K/DIGO (kidney disease improving global outcomes quality) 2012 classification had been chosen to staging CKD.

Data entry was performed on a 2013 ACCES database. This database was transferred to SPSS version 20.0 software for statistical analysis of the data.

Ethical consideration: in order to guarantee confidentiality, strict respect of the anonymity of the files was observed.

3. Results

During the study period, 197 patients with chronic renal failure were retained out of 820 files examined, *i.e.* a frequency of 24%. The average age of our patients was 42.25 ± 10 years. The male sex represented 57.9% (114) with a sex ratio of 1.73. The socio-professional strata were mainly housewives (38.5%), farmers (30.5%) and traders (11.2%) (Table 1). The reason for hospitalization was the alteration of renal function estimated by hyper creatinemia in 92.4% (182) of cases. The clinical manifestations were marked by: vomiting in 114 cases

Table 1. Sociodemographic characteristics of patients.

	Number	Percentage (%)
Gender		
Male	114	57.9
Female	83	42.1
Total	197	100
Profession		
Housewife	76	38.5
Farmer	60	30.5
shopkeeper	22	11.2
Pupil/Student	10	5.1
Driver	8	4.1
Teacher	8	4.1
Breeder	4	2
Worker	3	1.5
Accountant	2	1
Military	2	1
Vétérinarian	1	0.5
Child	1	0.5
Total	197	100

(57.9%), exertional dyspnea 97 (49.2%), dizziness 74 (37.6%), tinnitus 50 (25.4%), oligo-anuria 43 (21.8%), micturition burning 14 (7.1%), dysuria 6 (3%) (**Table 2**). Calcemia was normal in 24.4% (48), hypocalcemia and hypercalcemia were 75.1% (148) and 0.5% (1) respectively. Phosphoremia was normal in 21.3% (42) of cases; hyperphosphoremia 77.7% (153) and hypophosphoremia 1% (2). The medical history found in our patients (**Table 2**) was also considered as the main aggravating factor of chronic renal failure. These were: hypertension (HTA) poorly followed 101 (51.3%), diabetes 8 (4); and HTA+ diabetes 11 (5.1%), undocumented gastro duodenal ulcer 14 (7.1%), HIV 2 (1%), herbal medicine reported in (103) 52.3%, anemia with a Hemoglobin level: <6 g/dl 24.8% (44); between 6 - 8 g/dl 39.1% (77), from 8 - 10 g/dl 27.4% (54) and >10 g/dl 11.2% (22). We found vascular nephropathy 106 (53.8%), interstitial nephropathy 44 (22.3%), glomerular nephropathy 33 (16.8%), diabetic 12 (6.1%) and polycystic kidney disease 2 (1%) as etiologies. Our patients came mostly to the end stage of CKD: stage 5, 171 (86.8%), stage 4, 11 (5.6%), stage 3, 13 (6.6%) and stage 2, 2 (1%) (**Table 3**). The socio-economic level in 79.8% was low with a precarious economic situation. Dialysis was performed in 1095 (5.3%) of our patients and all these dialysis patients started with a central line.

Table 2. Distribution of patients by clinical signs and medical history.

	Number	Percentage (%)
Clinical signs		
Vomiting	114	57.9
Headache	110	55.8
Dyspnea	97	49.2
Dizziness	74	37.6
Asthenia	56	28.4
Tinnitus	50	25.4
Oligo-anuria	43	21.8
Burning of the bladder	14	7.1
Dysuria	6	3
Medical history		
Arterial hypertension	101	51.3
Hypertension-diabetes	11	5.1
Undocumented gastro duodenal ulcer (UGD)	14	7.6
Diabetes	8	4
Edema of the lower limbs	9	4.6
HIV	2	1
None	52	26.4
Total	197	100

PUD = Peptic Ulcer Disease, HIV = Human Immunodeficiency Virus.

Table 3. Distribution of patients according to etiologies and stage of CKD in patients.

	Number	Percentage (%)
Etiological diagnosis		
Vascular nephropathy	106	53.8
Interstitial nephropathy	44	22.3
Glomerular nephropathy	33	16.8
Diabetic nephropathy	12	6.1
Polycystic kidney disease	2	1
Total	197	100
Stage of chronic renal failure		
Stage 2	2	1
Stage 3	13	6.6
Stage 4	11	5.6
Stage 5	171	86.8
Total	197	100

4. Discussion

The incidence during our study period was 24%. The mean age of our patients was 42.25 ± 10 years with extremes of 10 and 86 years. The male sex predominated (57.9%) with a sex ratio of 1.73. This age is similar to those found in Africa. Tounkara *et al.*, reported an incidence of 21.17% with a mean age of 43.77 ± 17.58 years [6]. Diarra A *et al.* found an incidence of 17% with a mean age of 36 ± 15 years in the internal medicine department of the Point-G hospital in Mali. [15]. Ahoui S [5], and B Gbenguidi [11] reported respectively a frequency of 15.57% with a mean age of 47.02 ± 17.46 years and 16.5% with a mean age of 45.4 years (16 and 82 years). Ramilitiana B *et al.* reported an incidence of 8.51% among hospitalized patients in Madagascar [16]. The mean age of patients was 45.4 years with extremes of 16 and 82 years [16]. Male predominance has been reported by several authors [5] [17] [18]. The socio-professional strata were predominantly represented by housewives (38.5%), farmers (30.5%) and traders (11.2%). This could be explained by the fact that the economy of the Sikasso region is essentially based on agriculture and trade.

In Africa, CKD is a condition that affects young adults, able-bodied, still of productive age in societies with very young populations [6]. However, studies carried out in Western countries have shown that patients on chronic hemodialysis are older than 60 years [8] [10]. This difference may be related to the medical advancements in developed countries, resulting in longer life expectancy with broader age pyramids at the top. It could also be due to the lack of control of cardiovascular risk factors, which are the cause of end-stage renal disease in developing countries [10] [18].

The clinical signs found in were: vomiting 57.9% (114), headache 55.8% (110), dyspnea 49.2% (97), vertigo 37.6% (56), tinnitus 25.4% (50); oligo-anuria 21.8% (43), micturition burning 7.1% (14), dysuria 3% (6). Sabi KA *et al.* reported clinical signs such as oliguria or anuria (59.1%), nausea and vomiting (37.7%), signs of fluid overload (32.6%), diarrhea (10.6%), anorexia (34.4%), agueusia (5.5%), uremic breath (24, 6%), hiccups (24.1%), epigastralgiias (5%) and bleeding (9.5%), urea frosting (12.8%) and pruritus (10.3%), hematuria (2.5%) and other renal call signs (nocturnal pollakiuria, pyuria and dysuria) (1.5%) [19].

The majority of our patients (86.8%) consulted at the stage of end-stage CKD. Similar results (90.3%) were observed by Tounkara *et al.* in Mali [6]. Ahoui S *et al.*, [5] and Konan Serge *et al.* [18] reported respectively 63.16% and 73.5% in their studies. B Ramilitiana reported end-stage renal failure in 75.31% of cases [16] and B Ouattara in 82.4% [20]. On the other hand, Tsevi YM reported that all of these patients at the first consultation were at the stage of end-stage renal disease [10]. These results demonstrate the generally late diagnosis of CKD in our developing countries, where health coverage remains low, coupled with often difficult access to health care for the population. Especially, for a pathology that is generally silent until an advanced or terminal stage of the disease [6].

Hypocalcemia was present in 75.8% (148) of our patients. This rate is lower

than that reported by Lengani *et al.* (91.76%) [9]. As for abnormalities of phosphocalcic metabolism, hypocalcemia represented 75.8% and hyperphosphatemia 77.7%. Different studies have found similar results [6] [9] [10] [14] [20]. These disorders appear early in the course of CKD due to decreased renal excretion of phosphates resulting in hyperphosphatemia which in turn prevents calcium absorption [18].

Anemia was found in the majority of our patients with an Hb level below 6 g/dl in 22.3% (44) of cases, between 6 - 8 g/dl 77 (39.1%), between 8 - 10 g/dl 54 (27.4%) and above 10 g/dl 22 (11.2%). Tounkara reported Hb level was: less than 6 g/dl (13.5%); between 6 - 8 g/dl (35.5%), 8 - 10 g/dl (38.7%) and greater than 10 g/dl (12.1%) [6].

The main antecedents were hypertension 51.3 (59.8%), diabetes and hypertension 11 (5.1%), traditional treatment 103 (52.3%). In Benin, Ahoui S *et al.* reported as antecedents: alcohol consumption (59.02%), self-medication (65.57%), smoking (18.85%) and herbal medicine (52.46%) [5].

As CKD is a silent disease, most of the patients did herbal therapy 1003 (52.3%). According to the literature, the more cardiovascular risk factors existed, the higher the frequency of renal failure [21] [22]. Tsevi YM *et al.* [10] in a similar study reported risk factors for chronic renal failure such as: hypertension in 66.1% of cases, diabetes in 10.2% of cases, HIV in 20.3% of cases, polycystic kidney disease in 1.7% of cases, smoking in 5.1% of cases, traditional medicines in 62.5% of cases. The high prevalence of these risk factors in our countries could be explained by the toxicity of traditional drugs, self-medication, the low socio-economic level of the majority of patients, which does not allow them to have a consultation and to carry out complementary examinations, the costs of which remain high, and a poor dietary condition such as the excessive consumption of salt, sugar, oil, tobacco and alcohol, which are responsible for cardiovascular diseases (hypertension, diabetes) and precursors of chronic kidney disease [18].

According to the literature, hypertension and diabetes are responsible for more than half of the cases of CKD in developed countries [8]. On the other hand, many studies have found that chronic glomerulonephritis (CGN) is the primary cause of CKD in Mali and Sub-Saharan Africa [6] [3] [11] [12] [16].

In our series, the main etiologies of CKD were dominated by vascular nephropathy 106 (53.8%), chronic interstitial nephropathy (CIN) 44 (22.3%), chronic glomerular nephropathy 33 (16.8%), and diabetic nephropathy 12 (6.1%). His results were similar to those of Samaké M [14] who reported respectively nephroangiosclerosis (42.6%) and GNC (25.64%), Tsevi YM [10] reported: HTA (61.6%), diabetes (44%), polycystic kidney disease (6.2%), traditional drugs (44.3%), and of Ouattara B *et al.* [20] reported as causes: vascular nephropathy 25.3%, human immunodeficiency virus (HIV)-related nephropathy 17%, and CIN 10.3%. This difference can be explained by the importance of hypertension in the black subject. This high frequency of use of traditional drugs is explained by the low socio-economic level of the majority of patients, which does not allow for a con-

sultation with complementary examinations, the cost of which is high.

Extra renal purification was performed in 109/197 of our patients, *i.e.* 55.3%, and all of these patients started with a central line. According to Konan Serge *et al.* [18] and Sanogo A *et al.* [23] respectively 97.2% and 97.44% of the patients had started the extra renal purification session by central line. This therapy makes it possible to supplement the functions of purification of uremic toxins and hydrolytic balance, thus improving their prognosis. The catheter is the main vascular approach for emergency hemodialysis, as reported by different authors [18].

The limitations of our study were, among others, the retrospective nature of the data collection, incomplete records due to failure to perform complementary examinations, non-availability of biological examinations on a permanent basis in the facility, lack of means for performing outpatient checkups. Renal biopsy was not performed in our patients, which could limit the etiological research of renal failure.

5. Conclusion

In Mali, infectious pathologies remain responsible for an important part of the etiologies of CKD. In our context, it is mainly vascular nephropathy, followed by CIN. This imposes policies of prevention and effective management of the responsible diseases, in order to reduce the morbidity and mortality of CKD.

Conflicts of Interest

The authors declare no conflict.

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