

Incidence of Chronic Kidney Disease in the Emergency Department of the Hospital Peace in Ziguinchor

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Abstract

Introduction: The aim of this study was to determine the incidence of chronic kidney disease (CKD) in the emergency department of the Hospital de la Paix in Ziguinchor. **Patients and Methods:** This was a retrospective descriptive and analytical study covering a period of five years (January 1, 2017, to December 31, 2021). The study included all patients seen for the first time in the emergency department with chronic renal failure and usable medical records. **Results:** The incidence of CKD was 5.7% with an average annual incidence of 21 cases/year. The average age of patients was 48.47 years \pm 14.76 years with a sex ratio of 0.89. Hypertension was the most common comorbidity in 52 patients (49.9%), followed by diabetes in 19 patients (18.27%). The mean glomerular filtration rate according to MDRD was (6.94 \pm 7.98) ml/minute/1.73m², and 97 patients (93.3%) were in stage V of chronic kidney disease. The etiologies of CRF were dominated by nephroangiosclerosis (35.6%), followed by chronic tubulointerstitial nephropathy (27.9%) and diabetic nephropathy (17.3%). Death occurred in 45 patients (43.3%), with the main causes being acute pulmonary edema (35.6%) and poorly tolerated uremia (22.2%). **Conclusion:** The incidence of chronic renal failure remains high in our study. Diagnosis is often late and often fatal, hence the importance of a good prevention strategy.

Keywords

Incidence, Chronic Kidney Disease, Ziguinchor

1. Introduction

Chronic kidney disease (CKD) is a real public health problem due to its extremely

high morbidity and mortality rates worldwide. Its incidence varies from one country to another and remains difficult to estimate, especially in Africa.

According to estimates by the International Society of Nephrology (ISN) for 2024, approximately 850 million people live with this disease, representing 10 to 16% of the world's population [1]. There has been a clear increase in prevalence of 33% between 1990 and 2017, and it will be the fifth leading cause of global mortality by 2050 [1]. The majority of these people (approximately 80%) live in low- and middle-income countries. In Africa, there are no comprehensive data on the actual prevalence of this disease due to the lack of large-scale studies. However, estimates indicate a prevalence of 250 per million inhabitants with an incidence of 150 new cases per million inhabitants per year [2].

In Senegal, many hospital-based studies have been conducted, with prevalence rates varying from one study to another. Sidy Seck *et al.* noted a prevalence of 4.9% in a cross-sectional survey of a sample of 1037 adults over the age of 18 in the population of Saint-Louis [3], whereas Diawara *et al.* noted a much lower prevalence of 0.68% in 12,567 patients followed in Thiès [4].

The etiologies differ from country to country and remain dominated in Senegal by benign nephroangiosclerosis in approximately 25% of cases, followed by diabetic nephropathy in 20.69% and primary chronic glomerulonephritis in 15.76% [5].

In Ziguinchor, no study had been conducted to accurately determine this prevalence and identify the various epidemiological factors of CKD. This work was carried out with the aim of providing data on this pathology in the region.

2. Patients and Methods

This was a retrospective descriptive and analytical study covering a period of five years (January 1, 2017, to December 31, 2021) in the emergency department of the Hôpital de la Paix in Ziguinchor. Patients seen for the first time in consultation and presenting with CKD with a usable medical record were included in the study. Data collection was carried out using a pre-established form providing information on identity (age, sex, initial nephropathy, duration of dialysis, etc.), comorbidities (high blood pressure (HBP), diabetes, pre-existing heart disease, use of herbal medicine, etc.), clinical signs of renal failure with uremic syndrome, biological data (hemoglobin level, calcium level, phosphate level, creatinine level with GFR calculation according to MDRD, 24-hour proteinuria, etc.), radiological data (renal ultrasound to assess renal size and differentiation, renal biopsy if performed, etc.), etiological data (primary and secondary glomerular nephropathies, vascular, tubulointerstitial), and therapeutic data (conservative treatment, dialysis, etc.) and evolutionary data (favorable with stabilization or unfavorable with progression or death).

CKD was diagnosed based on a set of epidemiological, clinical, and paraclinical arguments:

- Epidemiology: Concept of impaired renal function progressing for more than

3 months.

- Clinical: Presence of chronic uremic syndrome.
- Paraclinical:
 - Elevated urea and creatinine levels with an estimated GFR using the MDRD formula $< 60 \text{ ml/min/1.73m}^2$.
 - Normochromic normocytic aregenerative anemia.
 - Hypocalcemia and hyperphosphatemia.
 - Ultrasound showing small, poorly differentiated kidneys, except in cases of diabetes, polycystic kidney disease, amyloidosis, and HIV etc.

The data were analyzed using Excel and R version 4.03 software. The results were presented as means and standard deviations for quantitative variables and as proportions for qualitative variables. The analytical study was performed using cross-tabulation, and the KHI 2 test was used to compare frequencies with a significance threshold of $p < 0.05$.

3. Results

During the study period, 3,700 records were collected, of which 212 presented with CKD, representing a hospital incidence of 5.7%. The average age of the patients was $48.47 \text{ years} \pm 14.76 \text{ years}$, with extremes of 20 and 82 years, and a sex ratio (M/F) of 0.89. Regarding medical history, 52 patients (49.9%) had hypertension, 19 patients (18.27%) had diabetes, and 31 patients (29.81%) had a history of herbal medicine use. The reasons for consultation were dyspnea in 74 patients (39.4%), vomiting in 33 patients (17.6%), and headache in 32 patients (17%). High blood pressure was noted in 52 patients (49.9%), of whom 19 patients were Grade 3, or 18.23% (**Table 1**). Regarding biological data, the mean creatinine level was $165.85 \text{ mg/L} \pm 98.26 \text{ mg/L}$, and the mean glomerular filtration rate (GFR) according to the MDRD was $(6.94 \pm 7.98) \text{ ml/minute/1.73m}^2$, with 97 patients (93.3%) at stage V of CKD. Anemia was noted in all patients, 14 patients had hypocalcemia (13.5%), and 53 patients had hyperkalemia (51%) (**Table 2**). Renal and urinary tract ultrasound was performed in 84 patients (80.7%), of whom 76.1% had small kidneys and 70.2% had poor corticomedullary differentiation. Renal biopsy was not performed. The etiology of CKD was benign nephroangiosclerosis (BNAS) in 37 patients (35.6%), followed by chronic tubulointerstitial nephropathy (CTIN) in 29 patients (27.9%) and diabetic nephropathy (DN) in 18 patients (17.3%) (**Figure 1**). Thirty patients (28.8%) underwent emergency hemodialysis due to acute pulmonary edema (APE) refractory to diuretics in 10 patients, life-threatening hyperkalemia in 7 patients, severe metabolic acidosis in 3 patients, and poorly tolerated uremia in 10 patients. Death occurred in 45 patients (43.3%), with the main causes being AP in 35.6% and poorly tolerated uremia in 22.2%. Regarding the analytical data, there was no statistically significant correlation between age groups and stages of CKD progression, nor with comorbidities (**Table 3**).

Table 1. Distribution of the 104 patients according to sociodemographic and clinical data.

Sociodemographic and Clinical Data	Proportion (%)
Comorbidities	
• High blood pressure	49.9
• Diabetes	18.27
• HIV	5.77
• Asthma	0.96
• Herbal medicine	28.81
Reasons for Consultation	
• Dyspnea	39.4
• Vomiting	17.6
• Headaches	17
• Other (Altered consciousness, facial swelling, burning sensation during urination, muscle cramps, diarrhea, abdominal pain, lower back pain, bone pain)	24.5
Examination	
• Asthenia, anorexia, pallor	100 everyone
• Weight loss	84.6
• Oliguria	70.1
• Edema	47.3
• Anuria	6.7
High Blood Pressure	
• Grade 1 hypertension	18.23
• Grade 2 hypertension	16.31
• Grade 3 hypertension	15.35

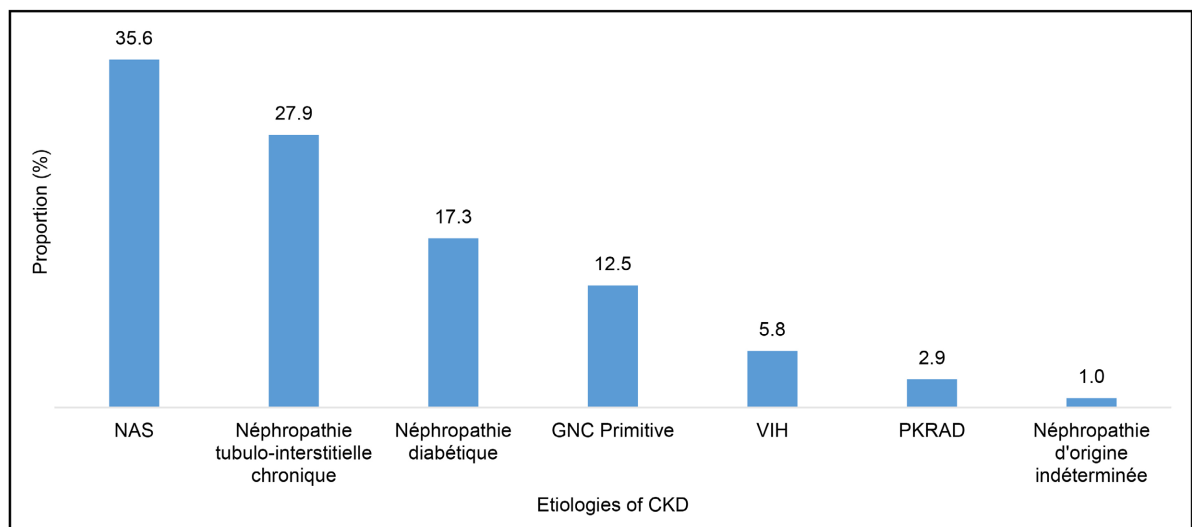
**Figure 1.** Distribution of patients according to the causes of chronic kidney disease.

Table 2. Distribution of the 104 patients according to biological data.

Biological Data	Means	Proportion (%)
Creatinine level	(16.58 ± 9.826) mg/dL	
Glomerular filtration rate	(6.94 ± 7.98) ml/minute/1.73m ²	
• GFR stage V		93.3
• GFR stage IV		3.8
• GFR stage III		2.9
Hemoglobin	(6.33 ± 6.98) g/dl	
Calcemia	(80.81 ± 20.56) mg/l	
• Hypocalcemia		11.5
Kaliemia	(5.53 ± 1.6) mmol/L	
• Hyperkaliemia		51.5
• Hypokaliemia		10.6
Albuminemia	(31 ± 7.37) g/L	

Table 3. Distribution of patients according to age, lifestyle, and terrain in relation to the occurrence of death.

Parameters	Death		P
	Yes	No	
Age ≥ 60 years	10 (12.5%)	15 (11.5%)	0.39
High Blood Pressure	18 (21.15%)	34 (28.4%)	0.12
Diabetes	6 (6.73%)	13 (11.53%)	0.24
Herbal Medicine	10 (17.3%)	21 (20.25%)	0.37

4. Discussion

The hospital incidence of CKD in our study was 21 cases/year, which varies from one country to another according to different studies. Olutayo (Nigeria) [6] and Ramilitiana (Madagascar) [7] found lower incidences of 15.3 cases/year and 13 cases/year, respectively. On the other hand, studies conducted by Chaabouni (Tunisia) [8] and in the United States [9] found higher incidences of 170 cases per year and 50.8 cases per year, respectively. This difference could be explained, on the one hand, by the variability in the duration of the studies, but above all by the existence of several nephrology departments in developed countries, where patients have a culture of seeking hospital consultation as soon as possible, unlike in our country.

The average age was 48.47 years, and the most affected age group was between 40 and 50 years old (28.8%). The average age of onset of CKD varies from country to country. It is generally higher in developed countries, with 63.3 years in China [10] and 76.4 years in France [11]. In contrast, in low-income countries, the average age was much lower. It was 34.4 years in Mali [12] and 39.6 years in Nigeria

[13]. This contrast can be explained by easier access to medical care, increased life expectancy, and aging populations in developed countries, and especially by the young nature of populations in most developing countries in general and in sub-Saharan Africa in particular.

Anemia was very significant in our study, partly explained by the delay in diagnosis of the disease because many patients arrive at the late stage where the impact of CKD is present, especially hematologically, but also the inaccessibility of erythropoietin, which can correct these disorders.

The etiologies were dominated by benign nephroangiosclerosis (BNAS) in 35.6% of cases, followed by chronic tubulointerstitial nephropathy (27.9%), diabetic nephropathy (17.3%), and chronic glomerulonephritis (12.5%). These results are similar to those of Saudan *et al.* [14] (Switzerland) with 31.2% for NAS and 28% for DN, and those of Yassine [15] (Morocco) with 42.1% for NAS and 23.6% for DN. In contrast, in developed countries, diabetes is the leading cause, with 31% reported by Loos-Ayav *et al.* in France [16] and 43.8% by Collins *et al.* in the United States [9]. Hypertension is the leading cause of CKD in our study, although the frequency of hypertension and diabetes remains unknown. This could be linked to several factors, including non-compliance with treatment among hypertensive patients with late detection of hypertension (often associated with complications), the importance of cardiovascular risk factors, particularly smoking, and a lack of awareness among the population of the seriousness of this disease. The high frequency of NTIC in our study can be explained by the significant use of phytotherapy because this treatment is more accessible than medical treatment in our area.

Hemodialysis was indicated in all patients with stage V CKD (93.3%). However, 30 patients (28.8%) underwent emergency hemodialysis.

In developed countries, hemodialysis is most often scheduled for patients who are under regular nephrological follow-up. Unfortunately, this is not the case in our developing countries, where hemodialysis is started on an emergency, unscheduled basis in patients with severe uremic syndrome or serious alterations in biological variables, which are indications of necessity.

5. Conclusion

This study has provided important information, particularly on the incidence of CKD in the Ziguinchor region, which is high and similar to that found in the literature. It also highlights the poor prognosis for these patients, with high mortality due to several factors, including the lack of medical facilities, the improvement of which would allow for better care of these patients.

Limit of Study

- Dependence on the quality and accuracy of existing historical CKD data collection;
- Lack of control over data collection for inclusion of patients with CKD;

- Increased risk of bias (including selection and recall bias);
- Difficulty in establishing precise causal links between the data studied and CKD mortality.

Conflicts of Interest

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

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