

# Hospital Mortality Related to Chronic Renal Failure Chu-National Reference

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**Abstract:** Chronic renal failure is a public health problem worldwide because of its high mortality rate and the cost of its management. Our study aims to determine the mortality factors related to CKD at the University Hospital of the National Reference of N'Djamena (Chad). This was a cross-sectional, descriptive study over a period of three (3) years from January 1, 2016 to December 31, 2018. The study focused on the records of patients hospitalized and whose death was related to chronic renal failure at the CHU-RN of N'Djamena. The mortality rate related to CKD was 10.52%. The mean age was  $48 \pm 16.3$  years with a sex ratio of 1.2. The main causative nephropathies were hypertension and diabetes. 83,8 % were in the terminal stage of CKD. Hemodialysis was performed in 17 patients (21.3%). The average length of hospitalization of our patients was  $20.1 \pm 16.9$  days. Hemodynamic PAO was the main cause of death. One third of the deaths occurred between 00:00 and 5:59 with a frequency of 30%. Deaths occurring between 12:00 and 17:59 minutes represented 21%. In developing countries, CKD is diagnosed in the end stage as indicated by our study (83%). Hemodialysis remains the best treatment to reduce the mortality rate.

**Keywords:** Mortality, Chronic Renal Failure, CHU-RN, N'Djamena, CHAD

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## 1. Introduction

Worldwide, chronic kidney disease (CKD) is the 11th leading cause of death, with 2.7 million deaths per year [1].

Among the causes of hospital deaths related to CKD, uremia, cardiovascular complications, and anemia were significant [2].

Mortality related to CKD would be high, due to insufficient material, financial and human resources [3].

CKD is a burden in sub-Saharan Africa with 27.8% in Cote d'Ivoire [4]. A study conducted in Madagascar found a hospital mortality rate related to CKD of 28,8% [4].

In our country, we do not have data on mortality related to CKD.

The aim of this study is to determine the mortality factors related to CKD at the University Hospital of the National Reference (CHU-RN).

## 2. Patients and Methods

This was a cross-sectional study over a period of three (3) years, from January 01, 2016 to December 31, 2018 in the nephrology-hemodialysis, cardiology, infectious disease and endocrinology departments of the University Hospital Center National Reference (CHU-RN) in N'djamena, Chad. The CHU-RN is one of the largest university hospital centers in the Republic of Chad, located in the center of the city of Ndjamen. Patients whose death was related to CKD were

included in our study. We defined CKD, independently of its cause, by the presence, for more than three (3) months, of markers of renal damage or a drop in the estimated glomerular filtration rate (GFR) below 60 ml/min/1.73 m<sup>2</sup>. The classification used was that of KDIGO 2012 [5]. The variables used were: Socio-demographic (Age, Sex, Residence, Quality of care); clinical namely medical history (terrain, Comorbidities and Lifestyle); paraclinical: Biological (CBC, creatinemia, uric acid, azotemia, ionogram), morphology (renal ultrasound, ECG and trans-thoracic cardiac ultrasound); Therapeutics (Antihypertensives, Blood transfusion, emergency dialysis, iron, calcium, EPO, Vit D; Evolutionary (Duration of hospitalization and treatment and Time of death). The data were collected from the patients' files on a pre-established collection form. The data were entered and analyzed using SPSS version 18.0 (Statistical Package for Social Sciences18.0). The results were expressed as numbers, percentages and means. The study was authorized by the ethics committee and by the administrative authorities of CHU-RN.

### 3. Results

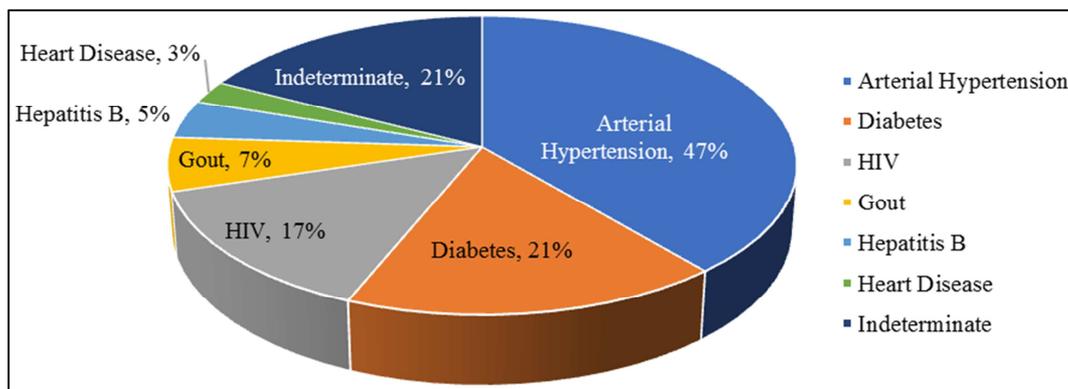
Three thousand six seventy-five (3675) patients hospitalized in the internal medicine departments during the study period. 20.68% of these patients had died. 10.52% of the cases were related to chronic kidney disease (CKD). The

mean age was 48.1 years (18 to 85 years). The age range of 41 to 60 years represented 46.3%. The sex ratio was 1.2. 87.5% of patients lived in Ndjamena (table 1).

**Table 1.** General characteristics of deceased patients.

| Variables                       |        |
|---------------------------------|--------|
| Mean age (year)                 | 48.1   |
| Comorbidities                   |        |
| HTN                             | 47 %   |
| Diabete                         | 21 %   |
| HIV                             | 17 %   |
| Initial nephropathy             |        |
| HTN                             | 31.3 % |
| Diabete                         | 17.5 % |
| Stages of chronic renal failure |        |
| Stage 4                         | 11.2 % |
| Stage 5                         | 83.8 % |
| Treatments received             |        |
| Hemodialysis                    | 21.3 % |
| Converting Enzyme Inhibitors    | 37.5 % |
| Diuretics                       | 55 %   |
| Blood transfusion               | 46.3 % |
| Causes of death                 |        |
| Acute lung oedema               | 35.1 % |
| Uremia                          | 21.3 % |

Their main risk factors were arterial hypertension, diabetes and HIV with proportions of 47%, 21% and 17% respectively. Other conditions (gout, hepatitis B and heart disease) represented 15% (figure 1).



**Figure 1.** Comorbidities.

A total of 42.5% of patients were referred and 57.5% had consulted on their own. Overall, 22.5% had been hospitalized for renal function impairment, 16.25% for acute lung edema, 13.75% for anemia, 11.25% for urinary tract infections. The initial nephropathies were arterial hypertension and diabetes and accounted for 31.3% and 17.5% respectively. The causative nephropathy was undetermined in 23.4%.

Biologically, the mean of creatinine was 117.16 mg/l. Mean azotemia was 2.29 g/l with a range of (0.2 to 4.41 g/l). Blood calcium was mean level 70 mg/L, (35.8 to 116 mg/l). Phosphatemia was 98.1 mg/l (23.81 to 241.17 mg/l). Anemia was noted with a mean hemoglobin level of 5 g/dl (3.4-13.7).

Morphologically, all patients had undergone renal ultrasound, which showed small kidneys in 52 patients and cortico-medullary dedifferentiation in 69 patients.

83.8% of the patients who died were in the end stage (stage 5) of CKD. There were 11.3% of patients in stage 4 and 3% of patients in stage 3 (stage 3b: 2 and stage 3a: 1).

Emergency hemodialysis (1st session) was performed in 21.3%, no patient received peritoneal dialysis and renal transplantation. The average length of hospitalization was 21.1 days with extremes of 1 to 89 days. Among the causes of death, hemodynamic PAO was 35% followed by uremia 21.3%. Anemia and stroke accounted for 16.3% and 7.5% respectively.

The circumstances of death were not known in 51.3%. However, among the main clinical pictures that could explain the occurrence of death were PAO 22.6% and cardiorespiratory arrest was 13.8%. One third of the deaths occurred between 00:00 and 5:59 with a frequency of 30%.

Deaths occurring between 12:00 and 17:59 minutes represented 21%.

## 4. Discussion

Mortality rate related to CKD was 10.52%. The risk of mortality increases with the progression of chronic insufficiency [5]. Our results reported that 83.8% of the patients were in the terminal stage. The mortality rate of our study was much lower than that found by other African authors [2, 6]. This low CKD mortality rate in our study would be explained by the fact that the majority of the population did not have access to the UHC for diagnosis of CKD. This would be justified by the results of our study which found that 87.5% of patients resided in N'Djamena where the UHC are located. In addition, CKD is a little-known pathology. This hypothesis would be justified by the work of Luc Frimat and al in France [7] who reported that CKD was unknown by more than 60% of general practitioners. The average age of the patients was 48.1 years with a ratio M/F=1.2. This average age was similar to those of Bah et al in Guinea Conakry [8] and Hermine et al in Cameroon [3] who reported respectively 44.4 and 47.97 years. Several other African studies reported a mean age of less than 50 years [9, 10]. On the other hand, Tuppi et al, 2013 in France [11] and Pietro et al, 2017 in France [12] had reported respectively 68 years and 60 years and years as the average age. This difference in age could be explained by the lack of technical means for diagnosis and early detection of chronic renal failure in Africa. This is in line with the results of Bendja et al [4] who found that 75.31% of patients had consulted a nephrologist at the end stage of chronic renal failure.

In our study, hypertension and diabetes were the main conditions found. This high prevalence of hypertension was noted in several other African studies [8, 13].

Impaired renal function and PAO were the main reasons for hospitalization. This predominance can be explained by the delay in diagnosis of CKD in Africa. More than 80% of our patients had consulted the end stage of CKD. This was in accordance with the results of studies by Bah et al [2] who reported that 65% of patients were seen in consultation at the end stage.

The etiologies of CKD were dominated by hypertension and diabetes. Nephropathy was undetermined in 23.4% of cases. Hypertension and diabetes were reported by Marri HALLE et al [14] and Diawara et al [13] as the main etiologies of CKD. Several other studies had confirmed that hypertension and diabetes were the main causes of CKD [15, 16].

Our hypothesis is in line with that found by the epidemiological and informatics network in nephrology (REIN) in France [12], which found a predominance of hypertension and diabetes in patients with chronic renal failure.

The etiology of CKD was undetermined in 23.4% of our patients. Indeed, the indeterminacy of the etiology of CKD in Africa could be explained by the lack of diagnostic means and the lack of financial resources to perform certain examinations [8].

Renal failure was moderate in 5%, severe in 11.2% and

end-stage in 83.8%. Several African studies had concluded that the rate of end-stage renal disease was above 50% [2, 9, 16]. This high frequency of end-stage renal disease is thought to be a consequence of late consultations in developing countries due to lack of access to health facilities, lack of diagnostic facilities in peripheral health facilities for early diagnosis of CKD, and poverty [9, 11].

Therapeutically, only 21.3% (n=17) of the patients had benefited from hemodialysis replacement therapy although 83.8% were end-stage. In sub-Saharan Africa, dialysis poses a real health challenge and concerns only 5% of all CKD treatment [10].

The mortality related to CKD in our study could be related to the low accessibility to hemodialysis for most of the patients in the terminal stage. This low frequency of emergency hemodialysis treatment reflects the limited access to hemodialysis due to an insufficient number of machines. Several African authors have reported the low rate of access to hemodialysis [9, 13, 15, 16].

Among the probable causes of death, hemodynamic PAO represented 35%. Followed by uremic encephalopathy in 21.3%. Anemia and stroke accounted for 16.3%. Other studies such as that of Bah and al [2] have reported a significant association between mortality and cardiac damage on the one hand and between mortality and anemia on the other. Indeed, hemodialysis could improve the survival of CKD patients. However, it could not be sufficient to avoid certain complications such as anemia, mineral-bone disorders and cardiovascular complications as indicated by the work of Bah and al [2].

## 5. Conclusion

Chronic kidney disease is a public health problem in the developing world. The mortality rate of CKD in our study was significant. The affected subjects were mostly young and diagnosed with end-stage CKD. Hypertension and diabetes are the main causes of CKD. Management of the factors that cause CKD can reduce the occurrence of the disease and prevent progression to end-stage disease. However, access to replacement therapy such as hemodialysis and peritoneal dialysis can reduce CKD mortality.

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