

# Chronic Kidney Failure in the Elderly at the Nephrology Department of the Amirou Boubacar Diallo National Hospital in Niamey

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## Abstract

**Introduction:** Chronic Kidney Disease (CKD) is defined as the progressive and irreversible decrease in Glomerular Filtration Rate (GFR). It is a progressive stage of Chronic Kidney Disease (CKD). It affects individuals of all ages, with particularities in elderly subjects in whom its occurrence is influenced by many related factors, such as kidney aging. The objective of this study is to evaluate the profile of chronic kidney disease in elderly subjects in the Nephrology Department of the Amirou Boubacar Diallo National Hospital (HNABD) in Niamey (Niger). **Methods:** This was a cross-sectional, descriptive, and analytical retrospective study of 115 cases collected over an 18-month period from 01/01/2023 to 30/06/2024 at the HNABD in Niamey (Niger). All patients aged 65 years and over who consulted and/or were hospitalized in the nephrology department and diagnosed with chronic kidney failure were included. The Simplified MDRD Method is used to calculate the Glomerular Filtration Rate (GFR). **Results:** the frequency was 4.07%. The age group from 65 to 74 years old was the most affected, with 67.62%. The mean age of patients was 72.15 years, with extremes of 65 and 100 years. The male sex was the most affected, with 78.26% of cases and a sex ratio of 3.6. The mean length of hospital stay was 9.96 days, with extremes of one and 30 days. Patients with a low socio-economic level were the most affected in 64.34% of cases. High blood pressure was the predominant medical history in 45.21%. The mean GFR was 9.89 ml/min, with extremes of 2.13 and 57.34 ml/min. 3.48% of patients were in stage 3 CKD, 6.96% were in stage 4, and 89.56% were in stage 5. Obstructive

nephropathy was the predominant etiology in 37.39% of cases. Therapeutically, the most commonly used treatments were antihypertensives, vitamin D, iron, calcium, and hemodialysis. The evolution of the patients in the study was marked as follows: 46.09% of the patients continued hemodialysis, 27.82% were on iron, calcium, and vitamin D alone, and 26.09% had died. We found an association between GFR degradation and advanced age (P-value = 0.0213); between GFR and male sex (P-value = 0.0032); and between CKD and diabetes (P-value < 0.05).

## Keywords

Elderly Subject, Chronic Kidney Failure, Niamey, Niger

## 1. Introduction

Chronic Kidney Disease (CKD) is defined as the progressive and irreversible decrease in Glomerular Filtration Rate (GFR), which is the best indicator of renal function [1]. It is a progressive stage of Chronic Kidney Disease (CKD). It is 2 to 3 times more common in men than in women [2]. In Mali, the incidence of CKD in the nephrology and hemodialysis department of the Point D University Hospital was 21.17% in 2016 [3].

Chronic kidney disease in the elderly represents a real challenge for the years to come and a major public health issue. According to the 2022 edition of the United Nations' World Population Outlook Report, the population aged 65 or older is growing faster than that of other age groups. The percentage of the population aged 65 and over at the global level is expected to increase from 10% in 2022 to 16% in 2050 [4].

Life expectancy has been increasing for 50 years, and in 2008 in France (at birth) it reached 77.5 years for men and 84.3 years for women. People over 65 represent 16.2% of the French population, and people over 75 represent more than 8% [5].

In Niger, according to the National Institute of Statistics, the elderly represented 3.7% of the population in 2012 [6].

Longer life expectancy is accompanied by an increased risk of diseases, linked both to a functional loss of the organ in connection with the physiological ageing process and to the increase in the incidence of organ diseases. Attainment Kidney in east an illustration [5]. End-stage chronic kidney disease is on average five times more common in elderly subjects than in middle-aged subjects. Vascular and diabetic nephropathy are the main causes. In this specific population, the risk of cardiovascular mortality becomes particularly high and exceeds the risk of progression to end-stage chronic kidney disease [7]. In 2018, Diarra in Mali brought 4.5% of chronic kidney failure in elderly subjects to internal medicine [8]. In Niger, there is very little previous data on CKD in this age group; hence the interest we have in this study to evaluate chronic kidney failure in elderly subjects in the nephrology department of the Amirou Boubacar Diallo National Hospital (HNABD)

in Niamey.

## 2. Methodology

The Nephrology Department of the Amirou Boubacar Diallo Hospital (HNABD) served as the framework for our study. This was a descriptive and analytical cross-sectional retrospective study ranging from 01/01/2023 to 30/06/2024. The study population consisted of all patients hospitalized and/or seen in consultations in the nephrology department of the Amirou Boubacar Diallo National Hospital in Niamey during the period of our study, *i.e.*, a total of 2824 patients. All hospitalized patients aged 65 years and older, and those seen in consultation at the nephrology department of the HNABD in Niamey and diagnosed with chronic kidney failure who had given their consent, were included. Data collection was based on the consultation of patients' medical records, hospitalization and consultation records, as well as individual interviews with patients seen in consultations and hospitalizations. For data collection, we used pre-established individual data collection sheets with questionnaires. Study variables: Epidemiological (frequency, sex, age); Clinical variables (general signs, functional signs, signs of severity); Para-clinical variables (blood count, azotemia, serum creatinine, serum calcium, phosphoremia, renal ultrasound); Therapeutic variables: medical treatment, extra-renal purification, kidney transplantation; Evolutionary variables: continuation of dialysis, on adjuvant therapy alone, death; Operational variables. Conduct of the collection: Data collection took place over a period of 18 months (from 01/01/2023 to 30/06/2024). Prior to the start of the survey, all data collection tools were tested. We had sought research authorization before starting the study. After verification of the completion of the forms, an input mask was made for this purpose and an analysis program for each questionnaire. The processing and analysis of the data were done with the Epi-Info software in its version 7.2.4.0; this analysis focused on the calculation of the different parameters and the assessment of the relationships existing between them (using the Khi2 test). The texts and tables were processed in Word 2016, and the graphical representations were made in Excel 2016. The tables and graphs were made with Excel and Word software. Our research took place after the agreement of the Faculty of Health Sciences and the approval of the Amirou Boubacar Diallo National Hospital in Niamey.

## 3. Results

During our study, 2824 patients were admitted to the nephrology department, including 115 elderly subjects suffering from chronic kidney disease, *i.e.*, an overall frequency of 4.07%. The male sex was the most represented in 78.26% of cases, with a sex ratio M/F = 3.6. The age group from 65 to 74 was the most represented in 67.82% of cases ( $n = 62$ ). The mean age of patients was 72.15 years, with extremes of 65 years and 100 years. The city of Niamey was the most represented in 53.92% of cases. Patients with a low socioeconomic level were the most represented in 64.34% of cases. Hypertension was the most common medical history

in 45.21% of cases. Adenectomy was the most common surgical antecedent in 1.73% of cases (n = 2). 36.52% of our patients were hospitalized between 8 and 14 days (n = 42). The mean length of hospital stay was 9.96 days, with extremes of one and 30 days. 20% were seen only in consultation (n = 23). Vomiting was represented in 83.47% of cases (n = 96). Hyperkalemia and uremic encephalopathy were the main signs of severity in 77.41% and 22.59% of cases, respectively. Anemia was represented in 93.91% of cases (n = 108). It was severe in 41.73% (n = 48). Hypocalcemia and hyperphosphatemia were present in 86.08% (n = 99) and 87.82% (n = 101) of cases, respectively. Hepatitis B was represented in 4.34% of cases (n = 5). HIV serology was positive in 0.86% of cases (n = 1). 89.56% of patients in the study were at stage 5 CKD, *i.e.*, a GFR of less than 15 mL/min/1.73m<sup>2</sup>. (n = 103). The mean glomerular filtration rate was 9.89 mL/min/1.73m<sup>2</sup>, with extremes of 2.13 and 57.34 mL/min/1.73m<sup>2</sup> according to the Simplified MDRD Method (**Table 1**).

**Table 1.** Distribution by RCN stage.

DFG (ml/min/1.73m <sup>2</sup> )	Actual	Percentage (%)
<15 (Stage 5)	103	89.56
15 - 29 (Stage 4)	8	6.96
30 - 59 (stage 3)	4	3.48
<b>Total</b>	<b>115</b>	<b>100</b>

Obstructive nephropathy was the most common in 37.39% of cases (n = 43) (**Table 2**).

**Table 2.** Distribution by etiological diagnosis.

Etiological diagnosis	Actual	Percentage (%)
<b>N. Obstructive</b>	43	37.39
<b>Undetermined etiology</b>	37	32.18
<b>N. Hypertensive</b>	23	20
<b>N. Diabetic</b>	11	9.57
<b>HIVAN</b>	1	0.86
<b>Total</b>	<b>115</b>	<b>100</b>

Antihypertensive drugs were represented in 51.30% of cases (n = 59). 60% of patients underwent hemodialysis (n = 69). 46.09% of patients continued dialysis (n = 53), 27.82% were on adjuvant therapy alone (n = 32), and 26.09% died (n = 30).

In analytical studies, there is an association between hypertension and chronic kidney disease in the elderly, with a statistically significant association (P < 0.05). Diabetes is thought to be a risk factor for the occurrence of chronic kidney disease in the elderly (OR > 1), with a statistically significant link (P < 0.05). There is a

statistically significant association between glomerular filtration rate and age (P-value = 0.0213), as well as between GFR and sex (P-value = 0.0032).

#### 4. Discussions/Comments

During our study, 2824 patients were admitted to the nephrology department (1593 outpatients and 1231 inpatients), including 115 elderly subjects suffering from chronic kidney failure, *i.e.*, an overall frequency of 4.07%.

Our result is similar to those obtained by Brahima D. [9] in Mali in 2020 and Mélanie W. in 2022 in Côte d'Ivoire [10], which had recovered frequencies of 6.61% and 3.6%, respectively. This similarity between these frequencies could be explained by the fact that the socio-demographic and health realities of these three countries are similar.

In some, the frequency of CKD reaches 13% to 25% of the population over 65 years of age. These variations are a function of the methods used to estimate the GFR and the populations of elderly subjects studied [11]. Accurately assessing the prevalence of renal failure in the elderly is difficult because, on the one hand, the number of elderly patients is increasing, and on the other hand, the deterioration of renal function is favored by the ageing of the population [12].

The male sex was the most represented in 78.26% of cases, with a sex ratio M/F = 3.6. Diarra A. *et al.* in Mali in 2018 [8] and Antoine D. in Côte d'Ivoire in 2022 [13] reported this male predominance, with frequencies of 62.54% and 79% respectively; this was also the case for Brahima D. [9] in Mali in 2020, with 55% of cases. According to Poutell-Noble and Villar, this male predominance could be explained by a higher frequency of kidney disease in men, and it would seem that the progression of kidney disease to kidney failure is faster in men [14].

The age group of 65 to 74 years old was the most represented in 67.82% of cases.

The mean age of patients was 72.15 years, with extremes of 65 years and 100 years.

An average age of  $65.7 \pm 17.5$  was found by Bourhaima O. in Côte d'Ivoire in 2011 [15], with a predominance of the age group of 60 to 70 years old at 51.63% of cases.

Our result is similar to that of Diarra A. in Mali in 2018 [8], which reported a predominance of this same age group in 63.4% of cases.

In fact, age is one of the risk factors for kidney disease, along with high blood pressure and diabetes [12]. On the other hand, our result differs from that of Taleb S. [16] [17] in Algeria in 2016, who reported 16% CKD in patients aged 70 to 90 years.

Hypertension was the most common medical history in 45.21% of cases. Indeed, hypertension is a major public health problem. In Niger, a survey conducted by the Ministry of Public Health on risk factors for noncommunicable diseases in 2008 reported a prevalence of 21.2% among adults [18]. This explains the predominance of this pathology as a personal medical history in our study. Diabetes was present in 11.30% of cases. Diabetes is also a growing health problem in Niger.

According to a study carried out by Maman Sani A., in the project “Improving the health of diabetics in Niger”, a project of the NGO FORSANI (Forum for Health in Niger) in 2022, the current prevalence of diabetes in Niger is 4.3% [19]. This also explains the non-negligible frequency of this pathology as a medical history in our patients. Asthenia and vomiting were present in 74.78% and 83.47% of cases, respectively. The high frequency of functional signs is explained by the fact that most patients consult at advanced stages of CKD, as reported by several African studies [9] [15] [20]. During our study, the prevalence of anemia was 93.91%. This high prevalence of anemia is explained by the fact that most patients do not have access to erythropoietin in our practice.

Hypocalcemia and hyperphosphoremia were present in 87.82% and 86.08% of cases, respectively. Nadia A *et al* in Algeria in 2019 [21] found hypocalcemia and hyperphosphoremia in 45% and 40% of cases, respectively. This higher proportion of phosphocalcic disorders in our study compared to the study conducted in the Maghreb could be explained not only by the delay in diagnosis but also by the lack of adherence to treatment, which is most often linked in our context to the lack of resources of our patients in the face of the high cost of calcium and phosphate binders in pharmacies. The GFR was less than 15 ml/min/1.73m<sup>2</sup> (stage 5 renal failure) in 89.56% of cases (MDRD Formula). This explains the late diagnosis in our patients. Obstructive nephropathy was the most common in 37.39% of cases. This predominance of obstructive nephropathy was reported by Diarra A. *et al* in Mali in [8] in 2018, who found 46.32% of cases, but also by Zulfiqar A. *et al* in Tunisia [17] in 2017 in 53.46% of cases.

Taleb S. [16] in Algeria in 2016 reported that hypertension and diabetes were the main causes of CKD with 50% and 23%, respectively. Benja R. *et al.* [22] in Madagascar reported that the main causes of CKD were chronic glomerulonephritis (40.16%), nephroangiosclerosis (35.56%), and diabetic nephropathy (12.55%).

It appears from the study of Brahma D in Mali in 2020 [9] that the etiologies of CKD in elderly subjects were dominated by glomerular nephropathy (21.95%), chronic tubulointerstitial nephropathy (15.85%), vascular nephropathy (18.29%), and diabetic nephropathy (7.32%). Haemodialysis was represented in 60% of cases.

Our result is higher than that obtained by Guindo A. *et al.* in Mali in 2023 [23], which found 40.07% of cases of hemodialysis treatment.

Diabetes is thought to be a risk factor for the occurrence of chronic kidney disease in the elderly (OR > 1), with a statistically significant link (P < 0.05). Zulfiqar A. *et al.* in Tunisia [17] in 2017 obtained a statistically significant link (P < 0.05) between the notion of diabetes and CKD in elderly subjects. Many studies have reported the association between CKD and hypertension and/or diabetes [24]-[26].

## 5. Conclusion

Chronic Kidney Disease in the elderly is a major clinical challenge due to its high

prevalence, the complexity of comorbidities, and the physiological particularities associated with aging. Risk factors, such as high blood pressure, diabetes, and multiple comorbidities, exacerbate the decline in kidney function and complicate management. In Niger, and more specifically in Niamey and its surroundings, our study highlighted a high prevalence of this pathology in the male population aged 65 years and over, with etiologies dominated by obstructive disorders. The low socio-economic level and limited access to health care of the Nigerien population are a source of delayed diagnosis and delayed care. In this context, an integrated and multidisciplinary approach is needed to improve the detection and early management of this condition, such as screening programs for hypertension or collaborations with urology.

### Conflicts of Interest

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

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