

Profile of Patients Admitted to the Nephrology Department of Thies Regional Hospital Center (Senegal) From 2019 To 2021

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Abstract

Introduction: This work reported on the profile of patients hospitalized in the nephrology unit of the regional hospital of Thies in Senegal from 2019 to 2021.

Methods: We included all medical records of adult patients hospitalized for at least 24 hours during this period and clinical, biological, therapeutic, and evolutionary data were studied.

Results: We included 153 cases. The mean age was 45.43 with a sex ratio of 1.53. Patients were mainly referred from the emergency department (75.33%) and internal medicine (13%). The average length of hospitalization was 11.66 ± 8.24 days and was prolonged in 53 patients (34.64%). The main medical history was hypertension (78.82%), followed by renal disease (37.61%) and diabetes (18.35%). Impaired renal function (33.99%), dyspnoea (22.88%), and vomiting (20.92%) were the main reasons for admission. Biological abnormalities were: anemia (97.37%), hyponatremia (47.59%), positive C-Reactive Protein (CRP) (91.46%), hyperkalemia (50%), elevated creatinine (98.63%), elevated urea (97.26%), hypocalcemia (56.44%), hyperphosphatemia (94.79%). Renal biopsy was performed in 11 patients (7.19%). The main histological lesions were focal segmental hyalinosis (FSH) in 4 patients and minimal glomerular damage (MGD) in 2 patients. Chronic kidney disease (CKD) was noted in 87.58% and acute kidney injury (AKI) in 10.46%. Nephroangiosclerosis (24.84%) was the most common causative nephropathy. Benign prostatic hypertrophy was the most frequent non-nephrological pathology in 22.45%. The main treatments were antihypertensive drugs (91.50%), antibiotics (75.82%), blood transfusion (87.5%), and hemodialysis (66.01%).

In univariate analysis, diabetes, smoking, and the cause of kidney disease were associated with length of hospitalization. Mortality was correlated with diuresis and cardiovascular complications.

Conclusion: Most patients are admitted in advanced stages of CKD with complications that often require dialysis. Associated factors have been identified to guide patient management.

Keywords: Nephrologist; Hospitalization; Dialysis; Mortality

Introduction

Renal diseases in Senegal, as everywhere in the world, constitute a group of pathologies whose importance is growing in terms of both their prevalence and their diversity in the general population. The analysis of morbidity and mortality is a powerful tool for evaluating the activities and practices of medical services. The challenge is to improve the quality of care, which is defined by the World Health Organisation (WHO) as the guarantee that each patient receives the combination of diagnostic and therapeutic acts that ensure the best result in terms of health, in accordance with the current state of medical science, at the best cost for the best result, with the least iatrogenic risk, and for the greatest satisfaction in terms of the procedure, the results and the human contacts within [1]. Data on nephrology hospitalizations are

limited in sub-Saharan Africa, particularly in Senegal. Regardless of the causes, hospitalizations increased with the stage of CKD [2] and lasted on average between 10 and 28 days [3-5]. In South Africa, the main clinical presentations of hospitalized patients were CKD (37.9%), nephrotic syndrome (16.7%), hypertension (13.2%), and urinary tract abnormalities (10.5%) [6].

Based on these findings, we considered it necessary to carry out this study with the aim of determining the clinical, biological, therapeutic, and evolutionary profile of hospitalized patients and then to analyze the factors associated with hospital duration and mortality.

Patients and Methods

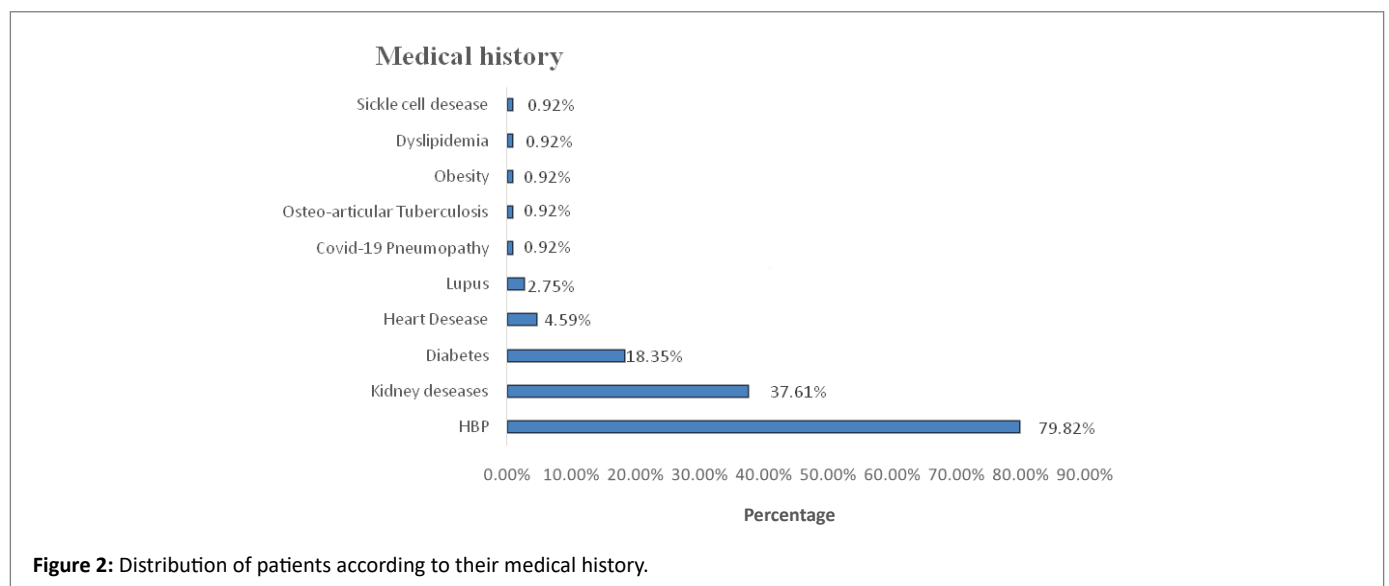
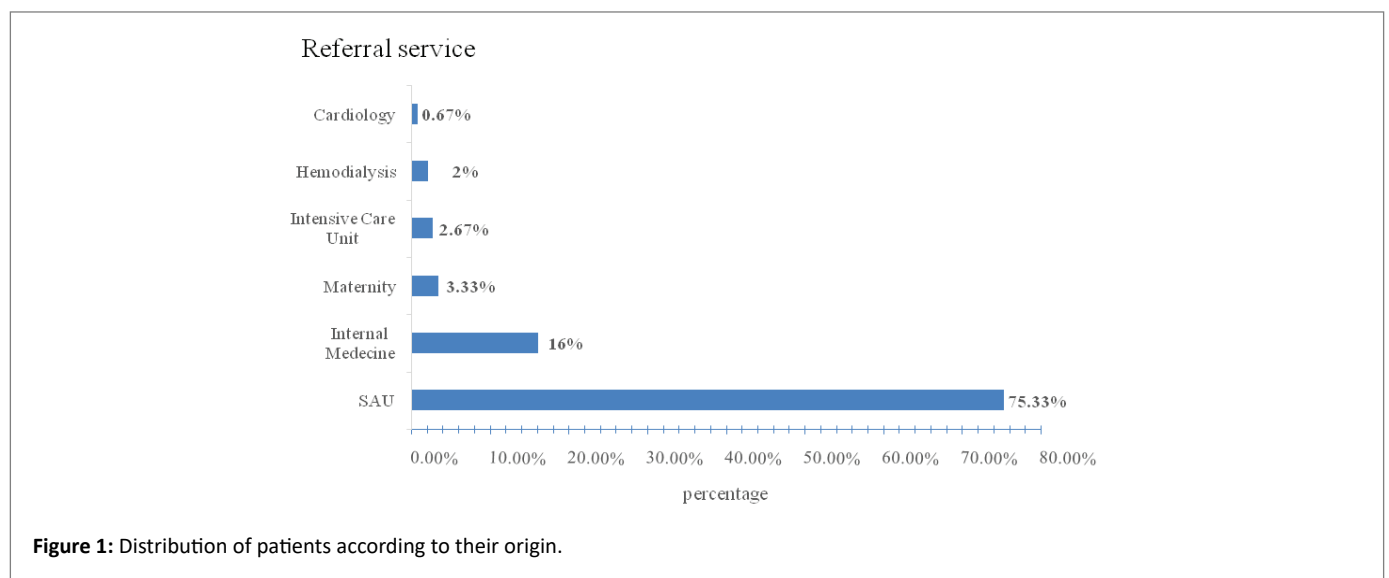
This was a retrospective, descriptive and analytical study carried out

over a 25-month period from 5 July 2019 to 13 August 2021 involving the medical records of patients hospitalized in the nephrology department of Thies regional hospital. The latter is the only one service in the whole region and houses a hemodialysis unit that performs an average of 800 dialyzes per month. Patients hospitalized for at least 24 hours and over 16 years old were included. The study was carried out by manual chart review and the data were established by means of a survey form containing the socio demographic, clinical, biological, therapeutic, and evolutionary parameters of the patients. The length of hospitalization, causative nephropathies, and non-nephrological pathologies were studied. Hospitalization was considered prolonged if >12 days. Acute kidney injury (AKI) and CKD were defined according to the KDIGO references [7].

Data entry was done by Epi info software and processed by SPSS version 21. The Chi-square test was used for percentage comparison. The difference was statistically significant when the p-value was strictly less than 0.05.

Results

During our study, 169 patients' medical records were collected. Sixteen medical records were not included, including 2 records of patients under 16 years of age and 14 records that could not be used. One hundred and fifty-three (153) medical records were retained. The average age of the patients was 45.43 ± 16.35 years and the majority were male (57.52%), representing a sex ratio of 1.53. The socio-economic level was low in 61.74% and the geographical origin of the patients was mainly rural at 47.06%. Patients were mainly referred by the emergency department (75.33%) and internal medicine (13%) (Figure 1). The average length of hospital stay was 11.66 ± 8.24 days. The median was 10 days and was prolonged in 53 patients (34.64%). The main medical history was high blood pressure (HBP) in 78.82%, followed by renal disease (37.61%) and diabetes (18.35%) (Figure 2). Herbal medicine was found in 48.37%. Thirteen patients were on a special diet, 11 of which were low-carbohydrate and 2 were low-salt. Renal failure (33.99%) was the main reason for admission followed by



dyspnoea (22.88%) and vomiting (20.92%). The mean systolic blood pressure (SBP) was 149 ± 27.8 mmHg and the mean diastolic blood pressure (DBP) was 93 ± 16.8 mmHg. Ninety-six patients (62.74%) had edema and 21.56% had hydrops. Chronic uremic syndrome was the main renal manifestation in 69.93%. The biological abnormalities were: anemia (97.37%), hyponatremia (47.59%), positive C-Reactive Protein (CRP) (91.46%), hyperkalemia (50%), elevated creatinine (98.63%), elevated urea (97.26%), hypocalcemia (56.44%), hyperphosphatemia (94.79%). Fifty-eight patients, representing 37.9% of the study population, had undergone a bacteriological examination of the urine. Germs were identified in 26 patients or 44.82% and *E. coli* was most frequently observed in 27.58%. Electrocardiogram (ECG) performed on 60 patients showed left ventricular hypertrophy (94.87%), left atrial hypertrophy (92.31%), and rhythm disturbances (79.49%) as the main abnormalities. Renal biopsy was performed in 11 patients (7.19%). The main histological lesions were focal segmental hyalinosis (FSH) in 4 patients and minimal glomerular damage (MGD) in 2 patients. According to the KDIGO classification, 89.54% of the study population had CKD of which 87.59% were in stage 5. Sixteen patients or 10.46% of the study population were in AKI. Nephroangiosclerosis (24.84%) was the most common causal nephropathy (Table 1). Prostatic hypertrophy was the most frequent non-nephrological pathology in 22.45% of the patients.

One hundred and forty patients (91.50%) were on antihypertensive drugs. Diuretics were prescribed in 79.29% of cases, conversion enzyme inhibitors (76.43%), and calcium channel blockers (60.71%). Antibiotic therapy was noted in 75.82% and the most commonly used class was 3rd generation cephalosporins. Blood transfusion was resorted to in 112 patients (87.5%). Hemodialysis was performed in 66.01% of the hospitalized patients with an average delay of 3 ± 3.6 days and an average frequency of 4 ± 2.2 sessions. The main indications were stage 5 CKD (90.10%), poorly tolerated uremia (87.13%), hyperkalemia (48.51%), anuria (18.81%), acute pulmonary edema (15.84%) and severe acidosis (6.93%).

Table 1: Distribution of patients according to the causative nephropathy.

Causal nephropathy	Prolonged hospitalization				Total	p-value
	Yes		No			
	n	%	n	%		
Glomerular nephropathy	9	47,37	10	52,63	19	0,040*
Diabetic and hypertensive nephropathy	1	25,00	3	75,00	4	
Nephroangiosclerosis	8	21,05	30	78,95	38	
Diabetic nephropathy	4	44,44	5	55,56	9	
Undetermined Nephropathy	11	32,35	23	67,65	34	
Lupus nephritis	1	16,67	5	83,33	6	
Obstructive nephropathy	0	0,00	1	100,00	1	
Acute tubular necrosis	3	23,08	10	76,92	13	
Chronic tubulo-interstitial nephropathy	12	70,59	5	29,41	17	
Renal polycystosis	3	37,50	5	62,50	8	
Cardio-renal syndrome	0	0,00	3	100,00	3	
Renal arterystenosis	0	0,00	1	100,00	1	

In terms of evolution, 27.78% of patients had a recovery of renal function. One hundred and twelve patients (79.74%) were discharged. Four patients (2.61%) had been transferred to another department. One hundred and five patients (68.63%) needed to undergo chronic dialysis. Thirty patients (19.61%) had bacterial infections. Eleven patients (7.19%) had cardiovascular complications. Seven patients had decubitus complications such as pressure sores. In-hospital mortality was 18.95%. The average time to death was 12.6 ± 13.9 days. Dialysis vascular access infections and decubitus complications were the main causes of death. Nineteen patients (15.32%) were rehospitalized with a mean delay of 86.47 ± 114.76 days.

After these descriptive results, we performed a univariate analysis and statistically significant associations were found. The mean length of hospitalization was correlated with diabetes ($p=0.035$) and smoking ($p=0.044$, Table 2). There was an association between prolonged hospitalization and the type of causative kidney disease ($p=0.04$, Table 1). Mortality was correlated with diuresis abnormalities ($p=0.04$) and cardiovascular complications ($p=0.02$) (Table 3).

Discussion

The nephrology department of Thies regional hospital is the only one in the whole region. Due to its geographical position, it covers a large population in terms of nephrological care. Our study population was relatively young with an average age of 45.43 ± 16.35 years. Studies in Morocco and Senegal found a similar age of 49 and 45.22 years, respectively [3,8]. In China [4], Italy [9], and the United States [10] the age of hospitalized patients was older. The aging of the general population in high-income countries may be the cause. The low socio-economic level noted in our patients could be a factor limiting access to care and the delay in treatment. The average length of hospital stay for our patients was 11.66 ± 8.24 days. This was in agreement with the work of Dieng A, et al. in Senegal (11.14 ± 9.89 days) [8] and Ezziyani M, et al. in Morocco (10 ± 11 days) [3]. A longer length of hospital stay was noted in the Chinese study reported by Zhang L, et al. with an average of 20.33 days [4]. This difference could be related to the high proportion of comorbidities and the percentage of dialysis patients in the different

Table 2: Factors associated with length of hospitalization.

		Length of hospitalization (days)			
		n	Mean	Standard deviation	p-value
Age range	< 60 years	115	11,70	8,21	0,618
	≥ 60 years	38	11,55	8,43	
Sex	Male	88	12,30	9,50	0,268
	Feminine	65	10,80	6,11	
Smoking	Yes	19	8,11	3,41	0,044*
	No	134	12,16	8,60	
Herbal medicine	Yes	74	10,97	6,16	0,320
	No	79	12,30	9,80	
High Blood Pressure	Grade 1	32	12,94	9,28	0,564
	Grade 2	45	10,49	6,09	
	Grade 3	26	11,04	6,15	
	Normal	50	12,22	10,03	
Diabetes	Yes	20	15,15	12,05	0,035*
	No	133	11,14	7,43	
AKI		16	9,4	6,0	0,242
CKD		137	11,9	8,4	

Table 3: Factors associated with mortality.

		Death				Total	p-value
		Yes		No			
		n	%	n	%		
Age range	< 60 years	21	18,26	94	81,74	115	0,651
	≥ 60 years	8	21,05	30	78,95	38	
Sex	Male	13	14,77	75	85,23	88	0,133
	Feminine	16	24,62	49	75,38	65	
Prolonged hospitalization	Yes	12	22,64	41	77,36	53	0,413
	No	17	17,00	83	83,00	100	
Diabetes	Yes	5	25,00	15	75,00	20	0,459
	No	24	18,18	108	81,82	132	
Smoking	Yes	1	5,26	18	94,74	19	0,104
	No	28	21,05	105	78,95	133	
Herbal medicine	Yes	12	16,22	62	83,78	74	0,403
	No	17	21,79	61	78,21	78	
High Blood Pressure	Grade 1	7	21,88	25	78,13	32	0,759
	Grade 2	9	20,00	36	80,00	45	
	Grade 3	3	11,54	23	88,46	26	
	Normal	10	20,00	40	80,00	50	
Diuresis	Not Specified	7	26,92	19	73,08	26	0,040*
	Normal	6	10,17	53	89,83	59	
	Anuria	2	9,52	19	90,48	21	
	Oliguria	14	31,11	31	68,89	45	
AKI		4	25,00	12	75,00	16	0,514
CKD		25	18,25	112	81,75	137	
Bacterial complications	Yes	6	20,00	24	80,00	30	0,871
	No	23	18,70	100	81,30	123	
Cardiovascular complications	Yes	5	45,45	6	54,55	11	0,020*
	No	24	16,90	118	83,10	142	

studies. We were able to demonstrate that diabetic patients had a longer in patient stay (p-value=0.035). This correlation would be linked to the numerous comorbidities, particularly cardiovascular, to which diabetics are exposed and which can prolong their length of hospital stay. In our series, hospitalization was prolonged in 34.64% and there was a statistically significant association with causative nephropathy (p-value=0.04). Since causative nephropathy is considered a prognostic factor for CKD, it may prolong hospitalization. Hypertension (78.82%) was the main comorbidity. Similar proportions were found by Becker BN, et al. in the USA (84.8%) [10] and Molnar AO, et al. in Canada (76.5%) [11]. On the other hand, in Senegal, Dieng A, et al. observed a lower rate (57.57%) of hypertensive patients in hospitals [8]. This shows a heterogeneous distribution of hypertension throughout the country. It is important to underline that 48.37% of the patients had resorted to herbal therapy often considered a reason for the delay in consultation and management in nephrology in our context.

The main reason for admission was renal failure (33.99%). In South Africa, van Rensburg BWJ reported 37.9% of CKD as the main reason for hospitalization [6]. The delay in diagnosis and adequate management of kidney disease is often linked to human resource problems, especially nephrologists in our context. As a result, in our series, most patients were admitted in a late stage of CKD, thus exposing them to complications, notably uremia. Diuresis abnormalities were noted in 53.18%. However, we found that mortality was higher in patients with

oliguria (p-value 0.04). Oliguria-related fluid retention would explain complications such as APE and life-threatening electrolyte disorders. The high percentage of anemia (97.37%) is thought to be due to insufficient stock in blood banks and difficult access to erythropoiesis-stimulating agents (ESAs) as well as the severity and proportion of CKD in our cohort. Chronic kidney disease was noted in 87.58% and AKI in 10.46%. This shows that the stage of kidney disease has an impact on the rate of hospitalization. Go AS, et al. [2] demonstrated an independent association between GFR and the risk of death, cardiovascular events, and hospitalization in 1.120.295 adults who did not receive renal replacement therapy. These risks were evident at GFR <60 ml/min/1.73m² and increased significantly at GFR <45 ml/min/1.73m² [2]. Renal biopsy was performed in 11 patients (7.19%). This low percentage of renal biopsies is related to the high proportion of CKD patients in our cohort. At this stage of their disease, the reduced size of the kidneys, hematological complications, structural fibrosis of the renal parenchyma, etc. constitute contraindications to renal biopsy. Nephroangiosclerosis was the main causal nephropathy in 24.84% of patients. This corroborates with the proportion of hypertensive patients in our series. Prostatic hypertrophy was the most frequent non-nephrological pathology with 22.45%. This urological condition is often complicated by obstructive renal failure due to bilateral ureterohydronephrosis responsible for severe hyperkalemia or metabolic acidosis requiring emergency dialysis. Hemodialysis was the only renal replacement therapy in 66.01% of hospitalized patients and the need for continued chronic dialysis was estimated at 68.63%.

The mortality rate in our study was 18.95% with a mean delay of 12.6 ± 13.9 days. Lower rates have been reported in Morocco (7.5%) and China (2.56%) [3,4]. The relatively high mortality in our study would be attributed to the majority of patients who were admitted at an advanced stage of CKD, predisposing to complications and the difficult access to dialysis in our regions. We found that mortality was higher in patients with cardiovascular complications (p-value=0.02). According to the annual report of the Réseau Epidémiologie et Information en Néphrologie (REIN), the presence of diabetes or cardiovascular comorbidities significantly worsened patient survival [12]. The main causes of death in our patients were vascular infections and decubitus complications. Cardiovascular disease accounted for 23% of the causes of death, followed by infectious disease (13%) and cancer (10%) [12]. According to KDIGO recommendations in 2012, it was suggested that patients with CKD should be managed in a multidisciplinary care setting [7].

Conclusion

The study of the profile of patients hospitalized in nephrology has shown that the majority of our patients are admitted in an advanced stage of CKD, exposing them to life-threatening complications. The only nephrology unit in this region of Senegal is by far insufficient for the care of kidney diseases in this locality. Analysis of the associated factors could guide measures to reduce hospitalization and mortality. Socio-political prevention strategies including the whole community are needed.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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