Scientific Research Publishing

Open Journal of Nephrology, 2022, 12, 142-153
https://www.scirp.org/journal/ojneph
ISSN Online: 2164-2869
ISSN Print: 2164-2842

Epidemiological and Clinical Profile of Patients Undergoing Primary Nephrological Consultation at the Fousseyni DAOU Hospital in Kayes, Mali

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How to cite this paper: Samaké, M., Sy, S., Fofana, A.S., Yattara, H., Coulibaly, S.D.B., Diallo, D., Doumbia, N., Coulibaly, M., Atabieme, K., Maiga, D., Dolo, A.M., Coulibaly, N. and Fongoro, S. (2022) Epidemiological and Clinical Profile of Patients Undergoing Primary Nephrological Consultation at the Fousseyni DAOU Hospital in Kayes, Mali. *Open Journal of Nephrology*, **12**, 142-153.
https://doi.org/10.4236/ojneph.2022.121014

Received: January 26, 2022
Accepted: March 15, 2022
Published: March 18, 2022

Abstract

Introduction: The first nephrological consultation is often late, even in developed countries. This delay is related to the insidious nature of renal disease, the lack of qualified personnel and structures for the management of these conditions and the context of chronic insecurity in our country. In Kayes, there is no data related to the first consultations of patients with the nephrologist, hence the interest of this study, which aimed to describe the epidemiological and clinical characteristics of patients undergoing a first nephrological consultation in Kayes hospital. **Materials and methods:** This was a retrospective, descriptive study conducted from January 1 to December 31, 2020 at the nephrology unit of the Fousseyni DAOU hospital in Kayes. All patients received for nephrological consultation for whom a medical record was made were included. The following data were collected and analyzed: the specialty of the medical referent, the reason for consultation, sociodemographic characteristics and the renal assessment of patients. Patients who consulted for non-nephrological pathologies and those who had no medical record were not included. **Results:** We collected the records of 346 patients, composed of

180 (52%) women and 166 (48%) men, *i.e.* a sex ratio of 0.92. The age group [20 - 40 years] was the most represented, 107 cases or 30.9%, with a mean age of 48.84 ± 21.33 years and extremes of 1 and 90 years. Housewives were the most consulted population, 149 cases (41.33%). Patients consulted more between the months of January and February, 116 cases (33.5%), this period was followed by the months of October-December, July-September and April-June with respectively 94 cases (27.2%), 76 cases (22.0%) and 60 cases (17.3%). The patients were referred by the general practitioner in 59.5% (209 cases), specialist doctor, 26.0% (90 cases). The patients came mainly from hospital practitioners, 172 cases (49.7%), private clinic and practice 81 cases (23.4%), community health center (CSCOM), 69 cases (19.9%). The main reasons for consultation were hypercreatinemia 205 cases (59.2%), low back pain 46 cases (13.3%) and edematous syndrome 16 cases (4.6%). The mean blood pressure was 140/80 mmHg with extremes of 70 and 240 mmHg for systolic and 40 and 160 mmHg for diastolic. Mean creatinine was 660.53 µmol/l ± 821.311 with extremes of 46 and 5447 µmol/l. Patients transferred from the emergency department had a creatinine level above 700 µmol/l in 41.1% (39) of cases (p = 0.003 Person's Chi-square = 8643 ddl = 1). Among the 316 patients who had a blood count, anemia was found in 221 (69.9%) and the mean hemoglobin level was 9.61 g/dl ± 3.11 with extremes of 1.70 g/dl and 19.56 g/dl. The diagnostic hypotheses evoked were acute renal failure (124 cases, *i.e.* 38.5%), chronic renal failure (81 cases, *i.e.* 23.7%). **Conclusion:** Primary nephrological consultation is more solicited by general practitioners. The consultations, often in the emergency room, were motivated by significant hypercreatinemia. Awareness of the nursing staff, the patients and the political authorities are necessary to encourage nephrological consultations at an early stage of the renal disease.

Keywords

Primary Consultation, Nephrology, Kayes, Mali

1. Introduction

The first nephrological consultation is often late, even in developed countries. The consequences of these late first consultations are multiple, with difficulties both in terms of management and renal or even vital prognosis. The few studies [1] [2], which have looked at the nephrological primary consultation, have reported delays with patients seen at advanced stages of renal disease. Ninety-five point five percent presented with signs of chronic renal failure (anemia, hypocalcemia, and renal atrophy on ultrasound with kidneys less than 10 cm in size) [1]. Renal insufficiency, as evidenced by hypercreatininemia, remains the first reason for recourse to the nephrologist [1] [2] [3] [4], reflecting the late consultation of patients on the one hand and the difficulties for practitioners to diagnose the reasons for recourse to the nephrologist, particularly by general practi-

tioners who represent the first referral of patients to nephrologists [2] [3], but who consider it difficult (75%) to diagnose chronic renal insufficiency [2].

This delay in primary consultation can therefore be explained by the insidious nature of renal disease, the lack of qualified personnel and structures for the management of these conditions and the context of chronic insecurity in our country. In Kayes, there is no data related to the first consultations of patients with the nephrologist, hence the interest of this study which aimed to describe the epidemiological and paraclinical characteristics of patients in first nephrological consultations at the hospital of Kayes.

2. Materials and Methods

This was a retrospective, descriptive study conducted from January 1 to December 31, 2020 at the nephrology unit of the Fousseyni DAOU hospital in Kayes. All patients received for nephrological consultation and for whom a medical record was made were included.

The following data were collected and analyzed: the specialty of the medical referent, the reason for consultation, the sociodemographic characteristics and the renal assessment of patients. During the study period, the Kayes region had a population of 2,741,000, with three nephrologists all practicing at the regional hospital and 190 general practitioners.

Patients who consulted for non-nephrological pathologies and those without medical records were not included.

Data were collected from medical records and previously completed information sheets containing the following information:

- reason for visit;
- the specialty of the physician referring the patient;
- the socio-demographic characteristics of the patients,
- the socio-demographic characteristics of the patients,
- results of paraclinical examinations: CBC, GFR according to the CK-EPI formula, clinical proteinuria, urine sediment, renal imaging;
- the conclusion of the consultation: probable diagnosis.

Data entry was performed on EPI-DATA 3.1 software. Statistical analysis was performed using SPSS 20.0 French version. The statistical test for comparison was Pearson's chi-square. A P value less than or equal to 0.05 was considered statistically significant

Quantitative variables will be expressed as means, standard deviations and qualitative variables will be expressed as percentages.

3. Results

We collected the records of 346 patients, composed of 180 (52%) women and 166 (48%) men, *i.e.* a sex ratio of 0.92. The age group [20 - 40 years] was the most represented, 107 cases or 30.9%, with a mean age of 48.84 ± 21.33 years and extremes of 1 and 90 years. Housewives were the most consulted population,

149 cases (41.33%) (see Figure 1).

Patients consulted more between the months of January and February, 116 cases (33.5%), this period was followed by the months of October-December, July-September and April-June with respectively 94 cases (27.2%), 76 cases (22.0%) and 60 cases (17.3%). The patients were referred by the general practitioner in 59.5% (209 cases), the specialist in 26.0% (90 cases), the senior health technician in 8.7% (30 cases), the patient himself in 4.6% (16 cases) and the health technician in 1.2% (4 cases). The patients came mainly from hospital practitioners, 175 cases (50.6%), clinics and private practices, 73 cases (21.1%), and community health centers (CSCOM), 67 cases (19.4%) (see Table 1).

Among the 186 patients referred by the specialized services, 98 (52.7%) and 18 (9.7%) came from the emergency department and the gynecological-obstetrical department respectively (see Table 2).

The main reasons for consultation were renal insufficiency 206 cases (59.5%), nephrotic syndrome 48 cases (13.9%) and low back pain 16 cases (4.6%) (see Table 3).

Arterial hypertension, 158 cases (45.7%) and urinary disorders, 141 cases (40.8%) were the most common medical history (see Table 4).

The main clinical signs found were altered general condition 251 cases (72.8%), asthenia 207 cases (60%), conjunctival pallor 207 cases (60%), edema of the lower limbs 137 cases (39.8%), clinical polymorphism observed with involvement of

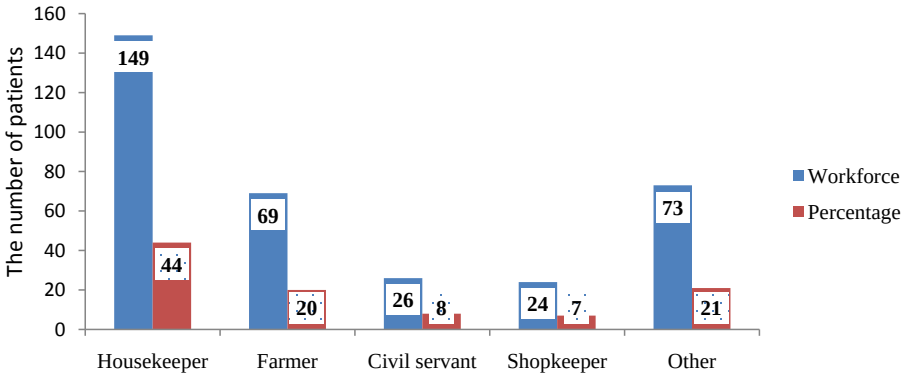

Figure 1. Distribution of patients by occupation (n = 341).

Table 1. Distribution of patients according to referral structures.

Reference structures	Effectives	Percentage
hospital of Kayes	175	50.6
CSCOM	73	21.1
private clinic	67	19.4
medical practice	17	4.9
CSref	14	4.0
Total	346	100.0

CSCOM: Community health center. CSref: Reference health center.

Table 2. Distribution of hospital patients by referral services (n = 186).

Specialties	Effectives	Percentage
Emergencies	98	52.7
Gyneco-obstetrics	18	9.7
General surgeon	15	8.1
Dermatology	12	6.5
Cardiology	11	5.9
Urology	10	5.4
Gastro-Hepato-Enterology	6	3.2
Pediatrics	6	3.2
Internal Medicine	5	2.6
Infectiology	3	1.6
Anesthesiologist	2	1.1
Total	186	100

Table 3. Distribution of patients by reason for consultation.

Reasons for consultation	Effectives	Percentage
renal insufficiency	206	59.5
nephrotic syndrome	48	13.9
back pain	16	4.6
HTA	15	4.3
Hydronephrosis	11	3.2
renal suffering on ultrasound	11	3.2
oliguria or anuria	7	2.0
polycystic kidney disease	4	1.2
hematuria	2	0.6
*Other	26	7.5
Total	346	100.0

HTA: high blood pressure. *Other: headache (3), urinary burning (2), renal cortical cyst (2), renal asymmetry (1), diabetic workup (1), renal colic (1), hand cramp (1), epigastric pain (1), hypogastric pain (1), right renal ectopia (1), lower extremity weakness (1), malignant hypertension (1), bilateral hypoacusis (1), renal hypotrophy on ultrasound (1), uremic coma (1), acute lung edema (1), hypertension + IOM (1), single kidney (1), ion disorder (1), renal tumor on abdominal ultrasound (1), vertigo (1), incoercible vomiting (1).

Table 4. Distribution of patients by disease history.

pathological history	Effectives	Percentages
no pathological history	96	27.7
HTA	158	45.7

Continued

Urination disorder	141	40.8
Edematous syndrome	59	17.1
Hematuria	38	11.0
Diabetes	19	5.5
Tuberculosis	7	0.2
Sickle cell disease	6	0.2
Proteinuria	6	0.2
CRI	4	0.1
Obesity	4	0.1
Asthma	3	0.1
AKI	2	0.1

Table 5. Distribution of patients by clinical signs.

Clinical signs		Effectives	Percentage
general signs	Alteration of the general condition	251	72.8
	Asthenia	207	60.0
	Conjunctival pallor	207	60.0
	IMO	137	39.8
	Facial puffiness	113	32.8
	Extracellular dehydration folds	84	24.3
	Fever	66	19.1
	Chest pain	62	18.0
	Thrill	21	6.1
	Uremic frostbite	18	5.2
Uro-nephrological	Nycturia	227	65.8
	Burning of the bladder	210	60.9
	Pollakiuria	199	57.7
	Lumbar pain	80	23.3
	Dysuria	75	21.7
	Oliguria	74	21.4
	Hematuria	48	13.9
	Polyuria	25	7.2
	Anuria	9	2.6
	Pyuria	1	0.3
Cardiovascular	Mitral systolic murmur	136	39.5
	Pericardial friction	6	1.7
Pleuro-pulmonary	Dyspnea	159	46.1
	Pulmonary crepitus	68	19.7
	Cough	58	16.8

Continued

Digestive	Anorexia	215	62.3
	Vomiting	157	45.8
	Abdominal pain	47	13.6
	Epigastralgia	42	12.2
	Constipation	22	6.4
	Liquid diarrhea	22	6.4
Neuro-sensorial	Vertigo	203	58.8
	Headache	187	54.4
	Ringing in the ear	174	50.6
	Visual blur	172	50.0
	Insomnia	85	24.7
Rheumatology	Joint pain	17	4.9

IMO: edema of the lower limbs.

Table 6. Distribution of patients in emergency departments/other services according to creatinine levels at 700 µmol/l.

		Creatininemia		Total
		Creatininemia < 700 µmol/l	Creatininemia > 700 µmol/l	
Emergency Department	Yes	56 (58.9%)	**39 (41.1%)**	95 (100.0%)
	No	171 (75.3%)	56 (24.7%)	227 (100.0%)

Patients coming from the emergency department had a creatinine level of 700 µmol/l with P = 0.003.

various organs, uro-nephrological: nocturia 227 cases (65.8%), urinary burning 210 cases (60.9%), pollakiuria 199 cases (57.7%), cardiovascular: mitral systolic murmur 136 cases (39.5%), pleuropulmonary: dyspnea 159 cases (46.1%), pulmonary crepitus 68 cases (19.7%), digestive: anorexia, 215 cases (62.3%), vomiting 157 cases (45.8%), neurosensory: vertigo 203 cases (58.8%), headache 187 cases (54.4%), ringing in the ears 174 cases (50.6%) and rheumatological: joint pain 17 cases (4.9%) testify to the severe nature of the renal failure at the time of the first consultations (see Table 5).

The mean blood pressure was 140/80 mmHg with extremes of 70 and 240 mmHg for systolic and 40 and 160 mmHg for diastolic. The mean creatinine level was 660.53 µmol/l ± 821.311 with extremes of 46 and 5447 µmol/l. In this study, there was a correlation between the origin of the patients in the emergency department and hypercreatinemia greater than 700 µmol/l (Person's Chi-square = 8643 ddl = 1 p = 0.003) (see Table 6).

Among the patients referred with hypercreatinine levels above 700 µmol/l, 33.7% (67 cases), 23.8% (20 cases) came from general practitioner and specialist consultations respectively (see Table 7).

Table 7. Distribution of patients according to medical referent and creatinine level at 700 µmol/l.

		Creatininemia		Total
		Creatininemia < 700 µmol/l	Creatininemia < 700 µmol/l	
Referrers	Health Technician	2 (100.0%)	-	2 (100%)
	Senior health technician	17 (70.8%)	7 (29.2%)	24 (100.0%)
	General practitioner	132 (66.3%)	67 (33.7%)	199 (100.0%)
	Medical specialist	64 (76.2%)	20 (23.8%)	84 (100.0%)
	Without reference	12 (92.3%)	1 (7.7%)	13 (100.0%)

Table 8. Distribution of patients by probable diagnosis.

Presumptive diagnosis	Effectives	Percentage
AKI	124	35.8
CRI	82	23.7
HTA	49	14.2
nephrotic syndrome	29	8.4
Urinary tract infection	26	7.5
Others	36	10.4
Total	346	100

AKI: Acute Renal Failure. CRI: Chronic Renal Failure. Others: renal colic (17 cases), renal tumor (6 cases), polycystic kidney disease (5 cases), simple renal cyst (3 cases), renal ectopy (2 cases), renal asymmetry (2 cases) and heart failure (1 case).

Of the 316 patients who had a blood count, anemia was found in 221 patients, *i.e.* 69.9%, and the mean hemoglobin level was 9.61 g/dl ± 3.11 with extremes of 1.70 g/dl and 19.56 g/dl. The diagnostic hypotheses evoked were acute renal failure (124 cases, *i.e.* 35.8%), chronic renal failure (81 cases, *i.e.* 23.7%) (Cf. **Table 8**).

4. Discussion

During the study period, we included 346 patient files with a predominance of women (52%). This predominance was reported by Samaké M *et al.* [5] and could be explained by the high rate of male emigration in this region. However, this predominance was male according to Yattara H *et al.* [3]. Our population was young with a mean age of 48.84 ± 21.33 years. This young age of patients with renal disease was reported by several African authors [3] [4] [5]. In developed countries, there is little data on primary nephrological consultation, an Australian study on the knowledge of patients seen in primary consultation found an average age of 66.5 years, [6]. In developed countries, the ageing of the general population can be explained by a better organization of coordinated care around a primary care physician. The latter has a central role in the orientation,

follow-up and access to specialized consultations of patients [7], in particular the presence of a list of reasons that may justify recourse to the nephrologist [8] and better socio-economic conditions. The difference observed between the consultation rates in the different quarters of the year could be explained by the predominance of farmers and housewives in our study, who during the rainy seasons are confronted with difficulties in accessing specialized health care structures linked to the deterioration of the roads on the one hand, and on the other hand by the priority given to field work by these populations. In our series, as also reported in Togo [1], Ouagadougou (Burkina Faso) [4] and Fez (Morocco) [9], renal failure is still the main reason for consultation (59.2%). This can be explained by the fact that most practitioners reduce nephrology to the management of renal failure. The lack of information [10] [11] and training (practitioners' lack of knowledge of risk factors and early markers of chronic renal disease such as proteinuria and haematuria) and the absence of reasons that could justify recourse to a nephrologist. This renal failure is often seen at the end stage translating the "renal death", leads to serious consequences for the whole organism, related to the uremic intoxication, on the one hand, and to the failures of the renal endocrine functions, on the other hand [12]. In Canada, nephrological consultation is requested in the case of chronic renal disease, infectious or acute inflammatory renal pathologies, lithiasis, hydroelectrolytic disorders, hemodynamic imbalances, refractory hypertension and systemic diseases with possible renal involvement [6]. In France, the French National Authority for Health (HAS) recommends that a nephrologist be consulted [7], as a matter of urgency, in the event of renal failure associated with certain situations: rapidly progressive glomerulonephritis, acute renal failure, calculus, hydronephrosis, tumor, refractory hypertension, nephrotic syndrome, edema, hematuria, extrarenal and general signs. Apart from these situations, and in the presence of chronic kidney disease (CKD), referral to a nephrologist is recommended in cases of doubt about the etiological diagnosis, rapidly evolving forms, from stage 3B or in the presence of complications, adapting the indication for referral to the context (comorbidities) [2]. We found that 59.2% of our patients, mainly referred by hospital practitioners, were referred for hypercreatinemia with a mean creatinine level of 660.53 µmol/l ± 821.31. These are explained, on the one hand, by the lack of qualified personnel in community structures, late consultations of patients and insufficient equipment for complementary examinations (biology, biochemistry, imaging), thus favoring the use of ineffective or even dangerous therapies for the residual renal function. These patients, who were often seen in the emergency room, had hypercreatinine levels (greater than 700 µmol/l) that were more pronounced than the average creatinine level. These hypercreatinine levels have dramatic consequences despite dialysis, with an excess of early mortality of around 25% in diabetics [13] and a significant deterioration in quality of life in elderly subjects [14]. As evidence of the late referral of our patients, 72.8% had an altered general condition on clinical examination. This late referral to

nephrology has multiple unfavorable consequences: more precarious clinical condition and more marked biological abnormalities at the time of approaching replacement therapy, longer hospital stay, higher short- and long-term mortality [15]. It is therefore advisable to refer the patient to a nephrologist if hypercreatinine levels exceed 150 µmol/L and are persistent or rapidly progressive. Therapeutic interventions include early nephroprotective measures, combined with prevention of aggravating factors and cardiovascular risk factors [11].

A significant proportion of patients came on their own or was referred by nurses, which demonstrates the need to set up an information, education and communication program for the general population.

World Kidney Day, declared in March 2006 [16] and proposed by the International Society of Nephrology and the World Federation of Kidney Foundations, was intended to draw the attention of the public, governmental authorities and health professionals to the frequency of chronic kidney disease as well as its severity and means of prevention. Thus, general practitioners can play an active role in prevention, identification of patients, slowing down the progression of chronic kidney disease by referring patients early to nephrologists.

The Commission for the Global Advancement of Nephrology (Comgan) [17] of the International Society of Nephrology, established in 1993, had the objective of educating and training personnel in developing countries in the management of chronic kidney disease. The anamnestic analysis, clinical and paraclinical examinations allowed the diagnosis of acute renal failure (124 cases, *i.e.* 38.5%), chronic renal failure (81 cases, *i.e.* 23.7%), arterial hypertension (15.8%), nephrotic syndrome (8.9%). Glomerular nephropathy (25.2%) [3], hypertension (63.6%) [4] and chronic renal failure (56.9%) [2] were the main diagnoses evoked.

Limitations of the study: incomplete medical records due to failure to perform complementary examinations because of lack of funding, absence of civil or clinical data allowing diagnostic orientation and those who did not give their consent were not included in the study.

5. Conclusions

Primary nephrological consultation is more solicited by general practitioners. The consultations, often in the emergency room, were motivated by significant hypercreatinemia. Awareness-raising among healthcare personnel, patients and political authorities is necessary to encourage nephrological consultations at an early stage of kidney disease.

For an efficient management of renal disease in Mali, it is essential to create a renal disease registry, to revise the content of training in health schools, and to improve medical practices through postgraduate education.

Acknowledgements

We would like to thank the staff of the Kayes hospital, the Point G UHC, the Mali-Gavardo hospital in Sebenicoro and the hospital in Sikasso.

Ethics Approval and Consent to Participate

To ensure confidentiality of the results, the anonymity of the medical records was strictly respected.

Funding

We have received no funding related to the writing of this article.

Availability of Data and Materials

The datasets generated and/or analyzed during this study are not publicly available to ensure the anonymity of the patients included in this study but are available from the corresponding author upon reasonable request.

Authors' Contributions

- Magara Samaké, Seydou Sy, Aboubacar Sidiki Fofana, Hamadoun Yattara were responsible for data collection and the design of the article.
- Sah dit Baba Coulibaly, Djénéba Diallo, Nanko Doumbia, Moctar Coulibaly, Kodio Atabieme, were responsible for the bibliographic research.
- Djénéba Maiga, Aboudou Messoum Dolo, Nouhoum Coulibaly, Saharé Fongoro, were in charge of writing the document.

All authors have read and approved the final version of this article.

Conflicts of Interest

The authors declare that they have no ties of interest.

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