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Internal Medicine

Epidemiological and Clinical Profile and Pathologies Associated with Chronic Kidney Disease in Internal Medecine Departement at the Abdou Aziz Sy Dabakh Hospital in Tivaouane

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Abstract **Original Research Article**

Introduction: Chronic kidney disease (CKD) is a major global public health problem. Its prevalence varies according to studies and is influenced by sociodemographic, clinical, and individual factors, the increase of which is correlated with the prevalence of CKD. ***Material and method*:** We conducted a retrospective descriptive study in the internal medicine department of the HAAD in Tivaouane. The study period was 3 years, from January 1st, 2019, to December 31st, 2021. The study involved all patients at least 18 years of age followed or hospitalized in the internal medicine department who presented with chronic kidney disease during their follow-up. ***Results*:** We Collected Data From 102 Patients Out of a Total of 816 Patients, Representing a Prevalence of 12.5%. The Average Age of Our Patients Was 55.22 Years with ages ranging from 18 to 92 Years. The 60-70 Age Group Was the Most Represented at 28.43% (n=29). The Female Sex Was Predominant with a Sex Ratio of 0.73. Most of Our Patients Were in the Primary Sector and of Low Socioeconomic Status. The clinical manifestations were dominated by clinical anemia (60%), edema of renal origin (33.33%) and altered general condition (72%). The Mean Creatinine Clearance Value According to MDRD Was 51.94 ± 31.25 ml/min/1.73m^2 with ranges from of 1.31 to 195.4 ml/min/1.73m^2. Most patients were in stage 3 chronic kidney disease (36%), followed by stage 4 (20%). Associated etiologies included benign prostatic hyperplasia (39.22%), diabetes (10.78%), systemic lupus (5.88%) and HIV (5.88%). The prescribed treatment consisted of: diet (56 patients), conservative treatment (64 patients), treatment of hyperkalemia (34 patients). ***Conclusion*:** Chronic kidney disease is a frequent complaint in internal medicine departments. It can often complicate certain chronic pathologies.

Keywords: Chronic, kidney, disease, internal medicine.

INTRODUCTION

Chronic kidney disease (CKD) is the presence or persistence of a marker of kidney damage for more than three months and/or a decrease in GFR of less than 60 ml/min/1.73m^2 BSA. This may include proteinuria, hematuria, leukocyturia, or histological or ultrasound abnormalities [1]. It is a major global public health problem. Its prevalence varies according to studies and is influenced by sociodemographic, clinical, and individual factors, the increase of which is correlated with the prevalence of CKD [2]. The most frequent risk factors in our context are diabetes mellitus, hypertension, collagen diseases, aging of the population, communicable diseases, and phytotherapy. Prevention of CKD involves, above all, controlling these risk factors [3]. We have observed an increase in the frequency of chronic kidney disease in our context, often associated with chronic diseases. The objective of this study is to determine the prevalence of CKD and its associated pathologies in an internal medicine department.

MATERIAL AND METHOD

We conducted a retrospective descriptive and analytical study in the internal medicine department of the HAAD in Tivaouane.

The study period was 3 years, from January 1st, 2019, to December 31st, 2021. The study involved all

patients at least 18 years of age followed or hospitalized in the internal medicine department who presented with chronic kidney disease during their follow-up.

We excluded from the study patients who did not have a proper assessment of renal function or those who had an incomplete medical record.

Sociodemographic (age, sex, profession, marital status), clinical (general, functional, and physical signs), laboratory (urea, serum creatinine, albuminuria and creatinine ratio, 24-hour proteinuria, leukocyturia, hematuria), ultrasound (kidney size and morphology), etiological, therapeutic, and evolutionary data were collected on a survey form.

Chronic kidney disease was defined as an evolution of more than 3 months of the following parameters:

- Proteinuria with an albumin-to-creatinine ratio >30mg/g
- Persistent hematuria or leukocyturia on urine dipstick testing
- Impaired glomerular filtration rate < 60ml/min/1.73m²; the latter was calculated using the MDRD formula
- Changes in renal morphology on ultrasound with corticomedullary differentiation and decreased or increased kidney size, with or without focal lesions.

Data were analyzed using Excel 2013 and Prism 8.0 software.

Definition of variables: anemia if hemoglobin less than 13g/dl in men and 12g/dl in women; thrombocytopenia if platelet count less than 150,000e/µl; renal disease if glomerular filtration rate less than 60ml/min/1.73m²; hypocalcemia if calcium level less than 88mg/l; proteinuria if level greater than 150mg/l; hypokalemia if potassium level less than 3.5mmol/l; hyponatremia if blood sodium level less than 135mmol/l.

RESULTS

We Collected Data From 102 Patients Out of a Total of 816 Patients, Representing a Prevalence of 12.5%. The Average Age of Our Patients Was 55.22 Years, with ages ranging from 18 to 92 Years. The 60-70 Age Group Was the Most Represented at 28.43% (n=29). The Female Sex Was Predominant with a Sex Ratio of 0.73. Most of Our Patients Were in the Primary Sector and of Low Socioeconomic Status. Table I illustrates the Sociodemographic Data.

Table I: Distribution of patients according to sociodemographic data

Sociodemographic Data	Variables	Value	Percentage
Sex	Female Male		57,84% 42,16%
Ages	Mean Maximum Minimum <25years 25-50years 50-75ans >75ans	55.22 years 92 years old 18 years old	 4 % 32% 48% 16%
Area of activity	primary secondary Tertiary		85,61% 12,2% 2,19%
Socioeconomic Status	Bottom Average High		81,72% 17,20% 1,08%
Residence	Urban Semi-urban rural		49,47% 20% 30,53%

Diabetes, high blood pressure and phytotherapy were the main medical history and chronic diseases found in our patients. Figure 1 shows the distribution of patients according to the medical history and chronic diseases of the patients

The clinical manifestations were dominated by clinical anemia (60%), edema of renal origin (33.33%) and altered general condition (72%). Table II illustrates the distribution of patients according to the clinical manifestations found. These clinical signs depended on the underlying etiology and associated disease

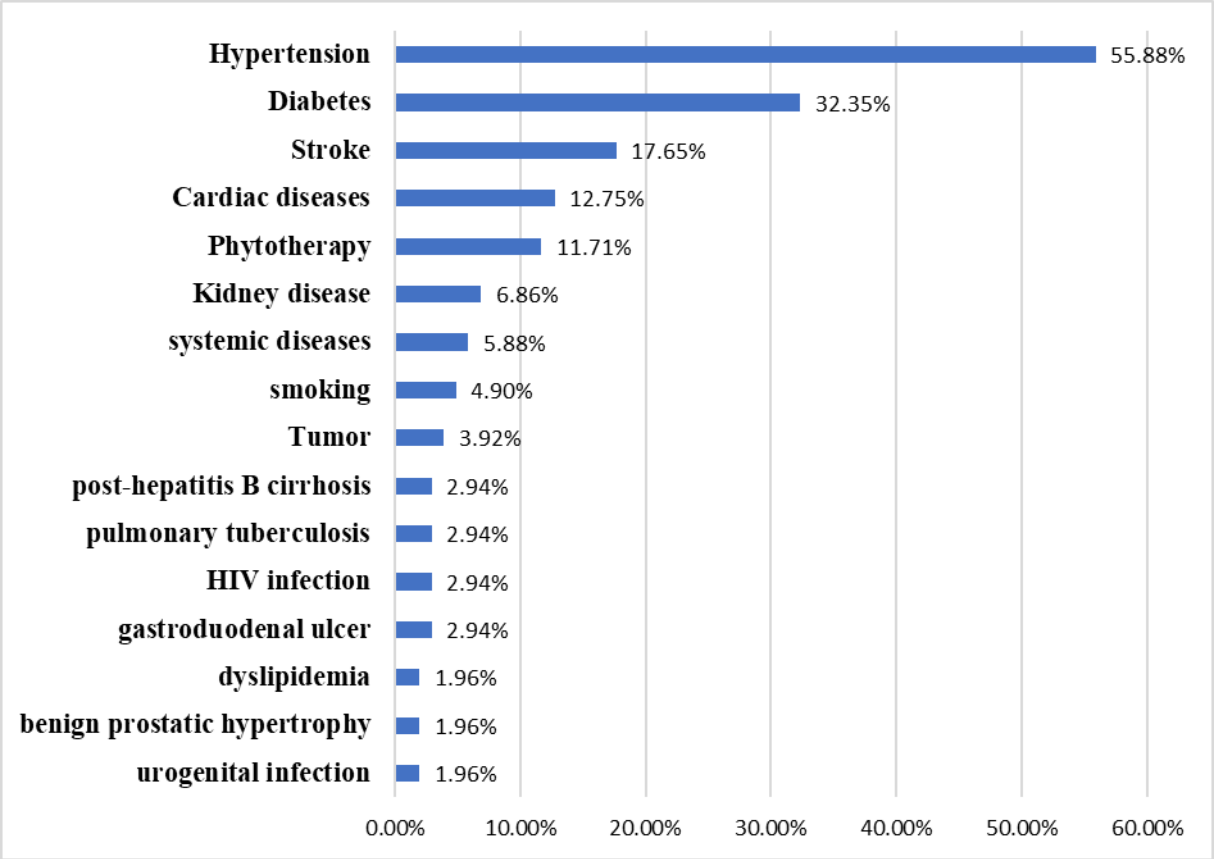

Figure 1: Distribution of patients according to medical history and chronic diseases

Table II: Distribution according to clinical signs

Clinical Signs	Number (s)	Percentage (%)
clinical anemia	61	60%
edematous syndrome	34	33,33%
Dehydration	21	20,59%
Malnutrition	15	14,7%
ECG	72	70,59%
Smooth tongue	21	20,58%
Pulmonary condensation SD	23	22,55%
Signs of heart failure	12	11,76%
Respiratory distress/Pulmonary edema	14	13,73%
Uremic breath	12	11,76%
Prostatic hypertrophy	7	6,86%
vomiting	16	15,68%
Macroscopic hematuria	8	7,84%

Uremia was reported in 95 patients with a mean of 0.98 ± 0.89g/L with extremes of 0.10 and 4.54g/L. The median was 0.78. It was increased in 37.5% of patients. The mean serum creatinine was 28.73±19.55mg/L with extremes of 3.2 and 212mg/L. The median was 18.7. It was increased in 64.36% of cases.

The Mean Creatinine Clearance Value According to MDRD Was 51.94 ± 31.25 ml/min/1.73m^2 with ranges from of 1.31 to 195.4 ml/min/1.73m^2. The Median Was 40.9. The Calculation of the Clearance Allowed Us to Classify the Kidney Disease Into Stages of Increasing Severity, Which Is Illustrated in Figure 2.

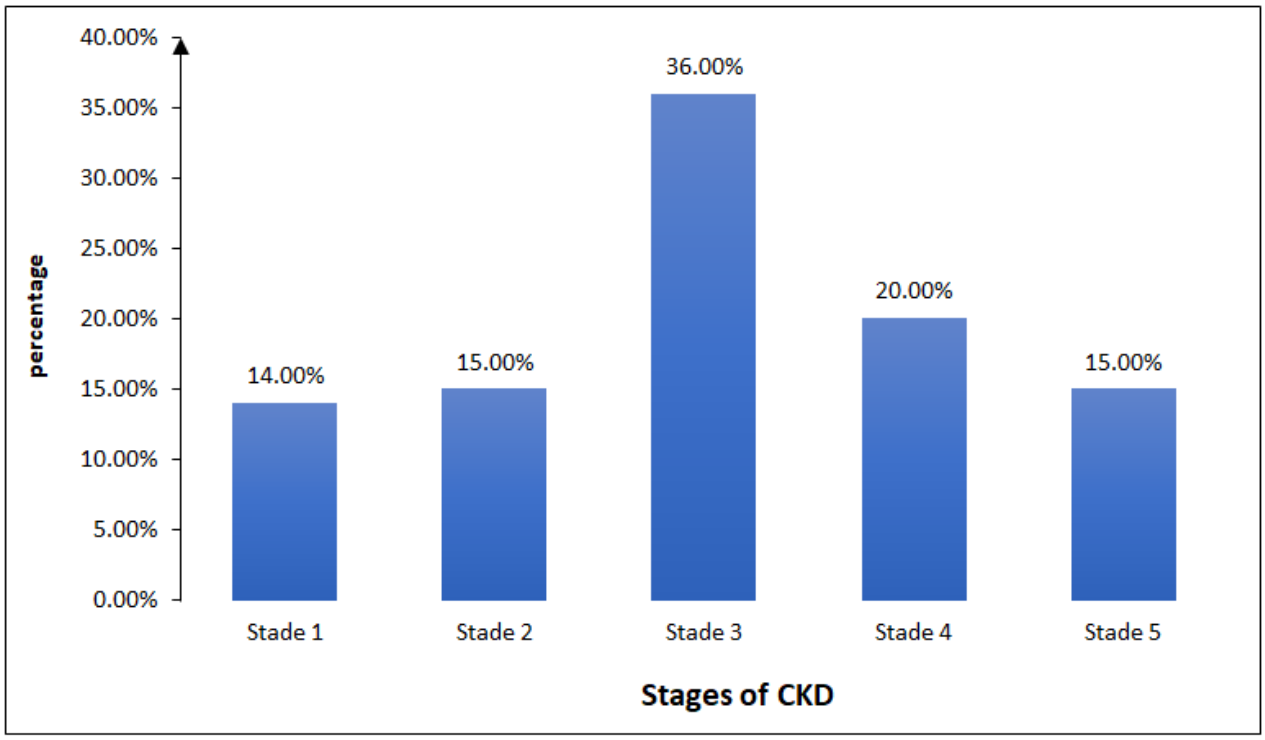

Figure 2: Distribution of patients according to CKD stage

24H PU was reported in 61 patients with a mean of 1.763 ± 1.73 g/24h with ranges of 1.22 to 7.23g/24h. The median was 1.34. Sixty patients had elevated proteinuria, of whom 13.33% had nephrotic-range proteinuria. Other laboratory abnormalities are listed in Table III.

Ultrasound of the urinary tract was performed in 48 patients (47.05%). Twenty patients had normal-sized kidneys and 23 (47.94%) had small kidneys. Five patients had prostate hypertrophy. Kidney size was increased in 5 patients (10.42%) and decreased in 23 patients (47.95%). Cortico-medullary differentiation was poor in 38 patients (79.17%) and good in 10 patients (20.83%).

Table III: Distribution according to other laboratory abnormalities

Abnormalities		Number	Percentage
Anemia	Microcytic	30	20%
	Normocytic	59	57,80%
	Macrocytic	1	1,00%
Thrombocytosis		16	15,70%
Thrombocytopenia		10	9,80%
Hypercholesterolemia		21	20,60%
Hypocalcemia		16	15,70%
Hypercalcemia		1	1,00%
Hyperphosphatemia		8	7,80%
Hypokalemia		6	5,90%
Hyperkalemia		40	39,21%
Hyponatremia		32	31,37%
Hypernatremia		5	4,90%
Hyperglycemia		23	22,50%
Proteinuria		60	58,80%

Nephroangiosclerosis (NAS) was the main initial nephropathy found in 40 patients, or 39.22%. Hypertension (39.22%), diabetes (10.78%), and phytotherapy (8.82%) were the main risk factors found. Pathologies associated with kidney disease are listed in Table IV.

Table IV: Distribution of patients according to diseases associated with kidney disease

Etiologies	Frequency (n)	Percentage (%)
NAS (Hypertension)	40	*39,22*
Mixed	14	*13,73*
Diabetes	11	*10,78*
Toxic (p)	9	*8,82*
Obstructive	7	*6,86*
Lupus	6	*5,88*
HIV	6	*5,88*
Hepatitis B	3	*2,94*
Tuberculosis	3	*2,94*
HSF	1	*0,98*
WBCS	1	*0,98*
PKD	1	*0,98*
Total	**100**	***100,00***

The prescribed treatment consisted of: diet (56 patients), conservative treatment (64 patients), treatment of hyperkalemia (34 patients).

Conservative treatments consisted of blood transfusion iso group (39 patients), iron (14 patients), erythropoietin (4 patients), and treatment of hypocalcemia (7 patients).

Seven patients (6.68%) had received renal replacement therapy, namely hemodialysis. No patient had received peritoneal dialysis.

In multivariate analysis, kidney disease was more severe in females with a p-value of 0.003; severity was not correlated with age and risk factors.

DISCUSSION

During the study period, 102 cases were collected. The prevalence of CKD in the internal medicine department of Tivaouane was 12.5%. This prevalence seems lower than that found in Benin by Ahoui S *et al*., (15.57%) in a study carried out in the internal medicine department of Bogou in 2021 [4] and lower than those carried out in Burkina-Faso in 2020 by Kyelem *et al*., [5] and in Mexico in 2014 by Cueto-Manzano *et al*., [6] with respectively 18.4% and 17.4%.

The prevalence appears similar to that described in Kinshasa in the Democratic Republic of Congo in 2010 by Sumaili *et al*., where the percentage of patients with CKD was 12.4% [7]. This increase in the prevalence of CKD in our countries is partly linked to the resurgence of risk factors such as diabetes and high blood pressure, but also to the use of phytotherapy.

In our study, the average age was 55.22 ± 17.83 years with age ranges of 18 to 92 years. This result was similar to those reported by several authors; Seck *et al*., [8] in a study conducted in 2012 in Saint-Louis, Senegal, Diawara *et al*., in Thiès in 2017 [9], reported respective mean ages of 48 years and 50.86 years.

In developed countries, kidney failure rather affects older people. In France, CKD generally affects people in their 7th decade [10].

On the other hand, in the USA, the average age was relatively young; indeed, the NHANES data from 2003 to 2006, which differ according to ethnic origin in a study of adults, the average age was 43.8% ± 0.5 years for African Americans and 48.3 ± 0.5 years for Caucasians [11].

This age difference between African countries and the West can be explained by the aging of the Western population, where life expectancy is higher. The female sex was predominant (57.84%) with a sex ratio of 0.73. Our results appear different from those of Kyelem *et al*., [5] and Ramilitiana *et al*., [12] and Ahoui S *et al*., [4] where a male predominance was noted with sex ratios of 1.15, 1.46 and 1.3 respectively. The work carried out in Guéoul also found a female predominance with 74.68% [3].

The average serum creatinine clearance according to MDRD was 51.94 ± 31.25 ml/min/1.73m2 with ranges of 1.31 ml/min/1.73 m2 to 19^{5}.4 ml/min/1.73 m2. In France, it was estimated at 34 ml/min/1.73 m2 in the EPIRAN study [10]. In Cameroon, Kaze *et al*., found an average rate of 93.7 ± 24.9 ml/min/1.73 m2 (14). In Saint-Louis, an average clearance of 90.6 ± 23.8 was found in 2012 [8]. The prevalence at stage 3 in our study was 36% and 15% at stage 5.

Comparison between results is often difficult due to differences in the criteria for defining CKD and the selection of participants according to the types of studies (prevalence in the general population, hospital-based, and the type of service).

In our study, 80% of patients had a hemoglobin level below 12g/dl. A hemoglobin level below 9g/dl was noted in 48% of patients and among them, 40% had severe anemia with a hemoglobin level below 7g/dl.

Anemia in CKD is explained by disturbances in the endocrine functions of the kidney, which lead to a defect in erythropoietin synthesis in the bone marrow, but also to a reduced half-life of red blood cells and occult bleeding. In addition, the multifocal nature of anemia with other associated pathologies could explain these different types encountered [15].

In our study, 14 patients had normal calcemia, sixteen had hypocalcemia, and 1 patient had hypercalcemia. During kidney failure, hypocalcemia is multifactorial; it is explained by hyperphosphatemia (which contributes to the precipitation of calcium phosphates and leads to a decrease in digestive absorption of calcium). It is also explained in particular in chronic kidney disease by a decrease in the production of vitamin D and bone response to PTH [16].

Hyperkalemia is one of the threatening biological signs associated with CKD due to the lack of potassium elimination in patients with chronic kidney disease [17].

Proteinuria appears to be a major determinant of CKD. It is both a marker of kidney damage but also a contributing factor to the progression towards kidney failure, by glomerular sclerosis and, by inflammatory cascade at the tubulointerstitial level, resulting in fibrosis. The relationship between the risk of CKD progression and the rate of proteinuria is generally value-dependent; the more abundant the proteinuria, the greater the risk of progression to stage 5 [3, 18].

Regarding the echography results, Twenty-three patients, or 47.94%, had small kidneys, five patients had enlarged kidneys (1 with polycystic disease and 4 with pyelocalyceal dilatation). Ultrasound assesses the chronic nature of renal failure if the kidneys are atrophied and undifferentiated with the exception of chronic renal failure secondary to diabetes, amyloidosis, HIV and polycystic kidney disease [7, 19].

The prevalence of hypertension in our study was 39.22%. This result appears lower to that of Diouf B *et al*., [13] with 51% and Maria Faye [6] in Guéoul with (55.5%), Ahoui *et al*., in 2021 [5] with 68.85%, Kyelem *et al*., [5] in Ouagadougou in 2020 with 69.6%, Diawara *et al*., [9] in 2017 with 76.7% and Zhang L *et al*., in China in 2012 with 60% [20]. In a prospective cohort study, the risk of developing CKD increased with the stage of hypertension, higher in women compared to men [21].

In Western countries, hypertension also ranks first among the causes of chronic kidney failure, followed by diabetes. In these countries, the extended life expectancy favors the emergence of these conditions in old age**.** Our results could be explained by the change in eating habits in our underdeveloped countries where the population is engaging in an unhealthy diet with a high consumption of salt, refined sugar, fat, and low consumption of fruits and vegetables [22].

This surge in Hypertension could probably be explained by the change in environmental and behavioral determinants (tobacco, alcohol, lack of physical activity.

Diabetes comes second in the history, with a prevalence of 32.35% (n=33) much higher than those reported by Seck *et al*., in 2014 (53) (12.7%) and Kaze *et al*., in Cameroon (2.8%) [14]. However, it seems similar to that recently reported in Benin by Ahoui *et al*., with 26.23% [5]. This prevalence of diabetes varies greatly from one country to another and is also influenced by dietary and behavioral factors. Diabetes mellitus is the leading cause of CKD in developed countries and in some developing countries [8, 9]. In diabetics, the deterioration of renal function varies according to age, duration of diabetes, as well as treatment [23]. In our study, there was no statistically significant correlation between diabetes and CKD (p=0.147). This frequency of diabetic nephropathy could be explained, according to Diouf *et al*., by the late detection of diabetic disease, poor adherence to treatment and lack of patient follow-up [13].

Of the 102 patients, fifty-six, or 54.9%, were on a CKD diet. Regarding conservative treatment, 45 patients received it, of which 95.56%, or 43 patients, for anemia.

Fourteen patients had received oral iron, or 32.56%; 39 patients (86.67%) had been transfused. The total number of packed red blood cells received by each patient was not specified.

EPO is the ideal treatment for anemia in chronic renal failure, as it avoids the complications associated with blood transfusion [24]. In our study, only 4 patients (8.80%) were on EPO. Its low use could be explained by its high cost and unavailability at the Tivaouane hospital.

Treatment of hypertension was mainly represented by angiotensin-converting enzyme inhibitors followed by calcium channel blockers, then ARBs and diuretics and beta-blockers. In St. Louis, with Seck *et al*., antihypertensive treatment consisted of: Furosemide (55%), calcium channel blocker (23%), angiotensin-converting enzyme inhibitor (20%), beta-blocker (8%) and thiazide diuretics (5%) [8].

Seven patients were on hemodialysis (6.68%). In St. Louis, only six patients were referred to hemodialysis centers [8].

The low uptake of hemodialysis is partly explained by:

- The high cost of sessions in private facilities,
- For public structures (where the procedure is free) by the long waiting lists for CKD in the

terminal stage, in correlation with the shortage of hemodialysis stations and qualified personnel in these centers.

Among the 102 patients, 62 or 58.82% were regularly followed. The vast majority were in the advanced stage of CKD. The treatment initiated led to an improvement in 44 patients, or 58.82%. 12.5% had progressed to complications and 8.93% to end-stage renal disease. 20 patients were lost to follow-up, certainly due to lack of financial resources. Nineteen patients died, a rate of 18.63%, following complications from their disease (hyperkalemia, pulmonary edema, etc.). This high mortality rate was partly explained by the difficulty of access to extra-renal purification techniques for most of our patients, and late consultation.

CONCLUSION

Chronic kidney disease is a frequent complaint in internal medicine departments. It can often complicate certain chronic pathologies. Management must be appropriate to avoid progression to other complications. It's worth stepping up prevention of this disease in sub-Saharan Africa.

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