Article original

Overview of kidney failure in the general medicine department of the Regional University Hospital of Ouahigouya (Burkina Faso)

Etat des lieux de l'insuffisance rénale dans le service de médecine générale
du Centre Hospitalier Universitaire Régional de Ouahigouya (Burkina Faso)

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Résumé

Introduction : L'insuffisance rénale (IR) est une altération de la fonction rénale. L'IR est un motif de consultation fréquent dans les services de néphrologie en Afrique. Au Burkina Faso, les données sur l'insuffisance rénale proviennent des centres hospitaliers universitaires de Ouagadougou et de Bobo-Dioulasso. Le but de cette étude était de faire l'état des lieux de cette affection dans un service clinique polyvalent du centre de référence de l'une des régions les plus chaudes, arides et pauvres avec une incidence de pauvreté estimée à 70,4% en 2020. Méthodologie : il s'est agi d'une série de cas collectée entre le 1er janvier 2017 et le 30 juin 2020 dans le centre de référence de la pyramide sanitaire de la région du nord du Burkina Faso. Ont été inclus dans l'étude, tous les patients âgés d'au moins 15 ans hospitalisés pour une IR.
Résultats : Au total 316 patients atteints d'IR sur 3945 patients hospitalisés durant la période ont été recensés. Les hommes étaient majoritaires avec une sex-ratio de 1,3. L'âge moyen des patients était de 46,7 ± 19,9 ans. Selon le type d'IR nous avions : une insuffisance rénale aigue, une insuffisance rénale chronique (IRC) et une insuffisance rénale non classable respectivement dans 123 ; 136 et 57 cas. Parmi les 136 patients atteints d'IRC, 122 (89,7%) étaient au stade terminal au moment du diagnostic. La mortalité intra hospitalière de l'IR était de 18,03% (57/316). Parmi les 316 patients, 98 étaient sortis contre avis médical.

Conclusion : l'IRC demeure une cause de mortalité importante dans nos hôpitaux. Les difficultés inhérentes au traitement amènent de nombreux patients à abandonner les soins.

Mots-clés : insuffisance rénale, CHUR de Ouahigouya, Burkina Faso.

Abstract

Introduction: Renal failure (RI) is an impairment of kidney function. RI is a frequent reason for consultation in nephrology departments in Africa. In Burkina Faso, data on kidney failure come from the university hospitals of Ouagadougou and Bobo-

Dioulasso. The aim of this study was to take stock of this condition in a multi-purpose clinical department of the reference centre in one of the hottest, arid and poorest regions with an estimated incidence of poverty of 70.4% in 2020.

Methodology: this was a series of cases collected between 1 January 2017 and 30 June 2020 in the reference centre of the health pyramid in the northern region of Burkina Faso. All patients aged at least 15 years hospitalized for IR were included in the study.

Results: A total of 316 patients with IR out of 3945 patients hospitalized during the period were identified. Men were in the majority with a sex ratio of 1.3. The mean age of patients was 46.7 ± 19.9 years. Depending on the type of IR we had: acute renal failure, chronic kidney disease (CKD) and renal failure not classifiable in 123 respectively; 136 and 57 cases. Of the 136 patients with CKD, 122 (89.7%) were end-stage at the time of diagnosis. In-hospital mortality from IR was 18.03% (57/316). Of the 316 patients, 98 were discharged against medical advice.

Conclusion: CKD remains a major cause of death in our hospitals. The difficulties inherent in treatment lead many patients to drop out of care.

Keywords: kidney failure, CHUR of Ouahigouya, Burkina Faso.

Introduction

Kidney disease is a global public health problem, especially in low- and middle-income countries [1]. Nearly 850 million people were affected worldwide in 2017 [2], This is about twice the number of people with diabetes (422 million in 2014) [3] and more than 20 times the number of patients with human immunodeficiency virus (39 million in 2022) [4]. Renal failure (RI) is the main reason for nephrology consultation in several countries in Africa [5–7].

In developing countries, the hospital frequency of acute kidney injury (AKI) varies between 0.36 and 7.9 per 1000 hospitalizations, depending on the country (8–11]. Chronic kidney disease (CKD) will become the fifth leading cause of death worldwide by 2040 [12]. In sub-Saharan Africa, the prevalence of chronic kidney disease is estimated at 13.9% [13]. In Burkina Faso, the hospital prevalence of CKD was 49.1% in 2012 in the nephrology and hemodialysis department of the Yalgado Ouédraogo University Hospital (CHUYO) [14] and 18.4% in the department of internal medicine and infectious diseases at the Souro Sanou University Hospital (CHUSS) in Bobo-Dioulasso in 2015 [15]. And according to the projections of the Global Burden Disease (GBD) Chronic Kidney Disease CollaborationThe prevalence of chronic kidney disease (CKD) was 11.35% in 2017 in the general population [16]. According to the statistical yearbook of the Ministry of Health of Burkina Faso, in 2018, in the northern region, 5.36% and 3.03% of AKI and CKD were reported respectively in Burkina Faso [17].

The Centre Hospitalier Universitaire Régional de Ouahigouya (CHUR-OHG) is located in the northern region of Burkina Faso, one of the hottest, arid regions with a The climate is Sahelo-Sudanian with an area of 16,199 km2 and a predominantly rural and poorer population with an estimated poverty incidence of 70.4% in 2020. This population is estimated at 1,771,689 inhabitants in 2020 according to the projections of the 2006 General Population and Housing Census (RGPH) with a density of 84 inhabitants/km [18]. The practice of nephrology by a specialist at this centre began in October 2018 without a specific department or a larger staff; and without a great possibility of diagnostic means or renal replacement therapy. In addition, no studies had yet been conducted on renal failure in this setting. The aim of this study was therefore to take stock of the situation and provide the first statistical data on RI in this region.

Methodology

This was a series of cases collected between 1 January 2017 and 30 June 2020 among patients admitted to the general medicine department of the CHUR-OHG

during the study period. The CHUR-OHG is a 2nd level Regional University Hospital that acts as a regional center of last resort in the health pyramid of Burkina Faso. It is the reference centre for 2nd level health facilities in the health districts of the North region. It includes several clinical services, including the general medicine department, which is the framework of our study. This department, with a capacity of 40 beds, is considered a multi-purpose medicine department because it brings together several medical specialties such as cardiology, neurology, gastroenterology, dermatology, rheumatology, internal medicine, as well as nephrology from October 2018 to March 2021. All these specialties ensure the coordinated care of hospitalized patients. Most patients are transferred from the medical emergency room of the CHUR-OHG or by direct admission during specialist consultations. Prior authorization from the head of the hospital was obtained for the conduct of this study. Reference sheets, medical records, and hospitalization records were our data sources. We routinely sampled all patients with at least elevated serum creatinine in their medical records. All patients aged 15 years and over who were diagnosed with renal impairment were included. An anonymous individual survey form was developed for data collection. We distinguished three types of renal failure. These were acute kidney failure, chronic kidney disease, and unclassifiable kidney failure.

Acute IR was defined according to the following criteria:

- normalization of serum creatinine in less than three months and/or;
- a recent increase in serum creatinine ≥ 1.5 times baseline [19] ;
- an increase in serum creatinine in a context of sudden onset of symptoms in the absence of evidence related to: chronic kidney disease, hypertension (hypertension) or diabetes with more than 10 years of age, aregenerative normochromic normocytic anemia, hypocalcemia, bilateral renal atrophy.

Chronic kidney disease; defined by a glomerular filtration rate (GFR) < 60 mL/min/1.73m2 body surface area for more than three months or criteria related to its chronic nature [20]:

- history of kidney disease, history of elevated serum creatinine;
- atrophic or non-atrophic kidneys with loss of corticosinus differentiation;
- aregenerative normochromic normocytic anemia, hypocalcemia with or without hyperphosphatemia.

GFR was calculated using the formula Modification of the Diet in Renal Disease (MDRD) [21]. The GFR has allowed us to define five stages of chronic kidney disease and we talk about CKD from stage 3 [22].

Unclassifiable renal impairment was selected when clinical and paraclinical assessment did not determine whether IR was acute or chronic.

Clinical improvement was defined as improvement in acute uremic syndrome.

In patients with AKI, the serum value at admission was used for averaging.

Data were analyzed using SPSS version 22 and Excel version 2019. Quantitative variables were expressed as their mean ± standard deviation, and qualitative variables as numbers and percentages.

Results

A total of 3945 patients were hospitalized in the general medicine department of the Ouahigouya University Hospital during the study period, including 316 patients with RI, i.e. a hospital prevalence of 8%. They averaged 46.7 ± 19.9 years and the 45-54 age group was the most represented. The sex ratio was 1.3 (180 men).

The age group distribution of our patient series is shown in Figure 1.

The most represented occupations were housewives (38.6%), farmers (32.9%) and workers in artisanal mining sites commonly known as artisanal miners (9.8%). All the socio-professional characteristics of our patients are summarized in Table I.

Clinical characteristics of patients in the series

The different types of renal failure were distributed as follows: 57 cases (18%) of unclassifiable IR; 123 cases (39%) of AKI and 136 cases (43%) of CKD. Regarding AKI, the most represented pathophysiological type was functional AKI in 77 cases (62.3%) and for CKD indeterminate nephropathy was the most common presumed baseline nephropathy with 74 cases (54.8%). Of the 136 patients with CKD, 122 (90.4%) of them had end-stage CKD. Hypertension was the most common comorbidity in all 316 patients with 69 cases (21.8%) and treatment with traditional drugs was found in 20 patients (6.3%). Figure 2 represents the history and comorbidities of the patients in our study.

Circumstances of discovery of renal failure

Abdominal pain, asthenia, vomiting, hyperthermia, and edema were the reasons for hospitalization in patients with AKI or unclassifiable IR. The different circumstances under which chronic kidney disease is discovered are presented in Table II. Several associated circumstances could be present in the same patient.

Characteristics of patients in the series according to the results of complementary examinations

In patients with AKI, mean serum creatinine was 458.2 ± 455.9 μmol/L. Plasma urea was available in 133 patients, with a mean of 18.6 ± 11.8 mmol/L. The mean serum creatinine in patients with CKD was 1624.0 ± 975.4 μmol/L and blood urea was performed in 113 patients with a mean value of 30.7 ± 17.1 mmol/L. One hundred and thirty-three CKD patients had a blood count and the mean haemoglobin level was 6.9 g/dl ± 2.4. Laboratory outcomes in CKD patients are presented in Table III.

Ultrasound of the urinary tract was performed in 124 patients, or 39.2% of patients. Renal atrophy was noted in 39 patients (31.5%), asymmetry in 10 patients (8.1%), bilateral pyelocalicial dilation in 22 patients (17, 17%) and stones in the urinary tract in six patients (4.8%).

Becoming patients at the end of the study

The mean length of hospital stay for our patients was 8.6 ± 5.7 days (range: 1 and 31 days). Discharge after improvement in clinical status in 157 (49.7%) of cases; 98 patients (31%) were discharged against medical advice and 57 (18%) died during hospitalization.

Table V summarizes the different output modes according to the types of IR.
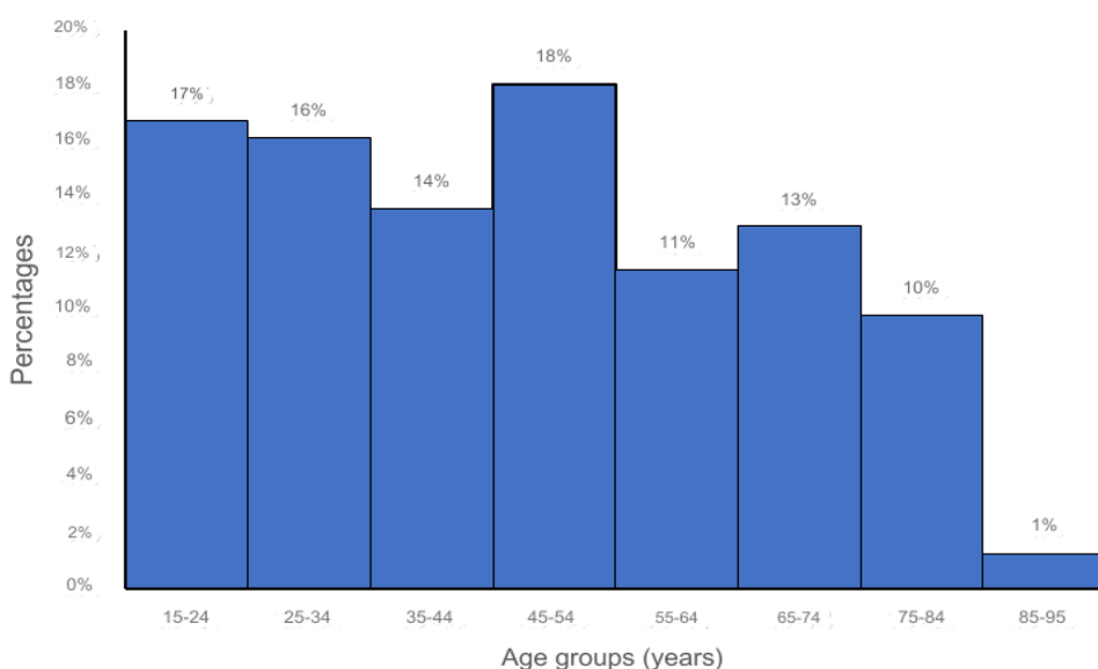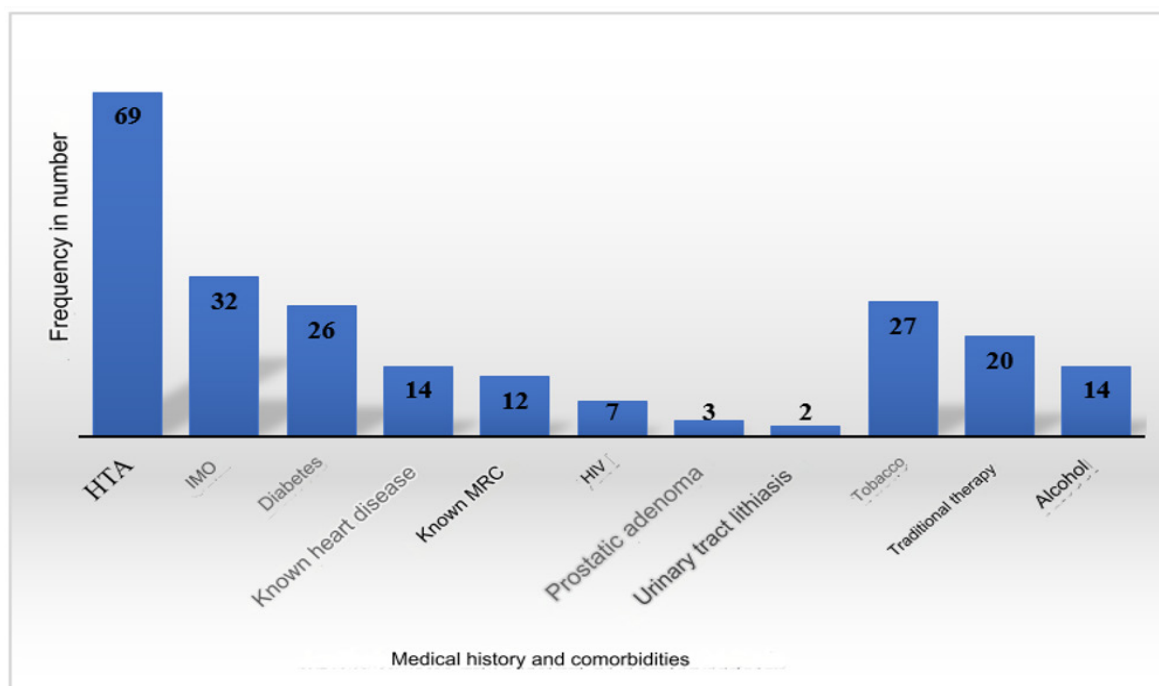

Figure 1: Distribution of patients with RI in the general medicine department of the Ouahigouya University Hospital according to age groups (n = 316).

Table I: distribution of patients with renal insufficiency in the general medicine department of the Ouahigouya University Hospital according to their profession (N = 316)

Professions	Number of employees (n)	Percentage (%)
Housewife	122	38,6
Farmer	104	32,9
Gold Miner	31	9,8
Pupil/Student	16	5,1
Merchant	14	4,4
Labourer/Labourer	11	3,5
Public Employee	9	2,9
Retired	5	1,6
Breeder	2	0,6
Unemployed	1	0,3
Employee in the private sector	1	0,3
Total	316	100,0

Hypertension: High Blood Pressure, IMO: Edema of the Lower Limbs, CKD: Chronic Kidney Disease, HIV: Human Immunodeficiency Virus.

Figure 2: Medical history and comorbidities of patients with renal impairment in the general medicine department of the Ouahigouya University Hospital

Table II: Circumstances of discovery of chronic kidney disease in patients in the general medicine department of the Ouahigouya University Hospital (n = 136)

Circumstances	Actual	Percentage (%)
IMO/BV	76	56,3
Nausea/Vomiting	47	34,8
Dyspnoea	46	34,1
Asthenia	31	23,0
Abdominal pain	29	21,5
Dizziness	28	20,7
Headache	25	18,5
Cough	18	13,3
Oligoanuria	18	13,3
Hyperthermia	15	11,1
Anorexia	13	9,6
Burning urination	6	4,4
Dysuria	4	3,0
Impaired consciousness	2	1,5
Chest pain	2	1,5
Haematuria	1	0,7
Polyuria	1	0,7

IMO/BV: Lower limb edema/puffiness of the face

Table III: Biological characteristics of patients with chronic IR in the general medicine department of the Ouahigouya University Hospital.

Results	n (%)	Mean ± Standard Deviation	Extreme
Creatinine (µmol/L)	136 (100)	1624.0 ± 975.4	202,2 – 6147
eGFR	136 (100)	6.0 ± 6.5	0,9 - 39,2
Uremia (mmol/L)	113 (83,1)	30.7 ± 17.1	3,9 - 89,3
Blood glucose (mmol/L)	106 (78)	6.0 ± 2.3	2,4 - 15,5
Urate (µmol/L)	25 (18,4)	610.9 ± 224.0	137 - 1127,5
Natremia (mEq/L)	101 (74,3)	138.1 ± 10.7	107 - 173,0
Kaliemia (mEq/L)	111 (81,6)	4.9 ± 1.2	1,9 - 8,3
Calcium Calcium (mEq/L)	111 (81,6)	1.9 ± 0.5	0,2 - 3,2
Bicarbonaemia (mmol/L)	86 (63,2)	17.0 ± 7.1	5,9 - 48,8
Phosphatemia (mmol/L)	103 (75,7)	2.8 ± 1.3	0,6 - 7,3
Proteinemia (g/L)	91 (66,9)	64.0 ± 16.4	25,9 - 156,4
Hemoglobin level (g/dL)	133 (97,8)	6.9 ± 2.4	2,3 - 12,7
Proteinuria (g/24h)	43 (31,6)	1.6 ± 1.2	0,16 - 6,3

eGFR: estimated glomerular filtration rate

Table IV: Distribution of patients in the general medicine department of the Ouahigouya University Hospital according to the mode of discharge and the type of renal failure (N=316)

Output Mode	IRA n (%)	IRC n (%)	Unclassifiable IR n (%)	Total n (%)
Normal Output	91 (28,8)	59 (18,7)	7 (2,2)	157 (49,7)
SCAM	12 (3,8)	46 (14,5)	40 (12,7)	98 (31)
Death	20 (6,3)	26 (8,2)	11 (3,5)	57 (18)
Transfer to another clinical department	0 (0)	4 (1,3)	0 (0)	4 (1,3)
Total	123 (39)	135 (42,7)	58 (18,3)	316 (100)

CAM: discharge against medical advice

Discussion

Frequency of renal impairment

The frequency of IR in patients hospitalized in the general medicine department was 8.0%. This frequency is lower than that reported by Kyelem et al. in 2020, which was 18.4% in an Internal Medicine department of the CHUSS of Bobo-Dioulasso [15], a service that also treats several pathologies. This could be explained by the difference in the way data is collected. On the other hand, our results are better than those of Nebié which in 2012 noted a frequency of 2.1% in the paediatric department of the CHUSS of Bobo-Dioulasso [23]. The difference in populations in the two studies could explain these results.

Socio-demographic characteristics

We noted a male predominance with a sex ratio of 1.3. In the literature, male predominance was also reported during RI with a sex ratio ranging from 1.25 to 1.45 (24–28).

The average age of our IR patients was 46.7 years. Kidney failure is more prevalent in young people in Burkina Faso [5,15].

Farmers (32.9%) and housewives (38.6%) accounted for the majority of all patients. This is in line with the general population of Burkina Faso. According to the General Population Census, farmers and housewives accounted for 81.2 per cent and 70.3 per cent, respectively [18].

Personal History

In our study, hypertension was the most common history (69 cases or 21.8% of patients). This finding confirms the high prevalence reported in the literature of high blood pressure in patients with chronic kidney disease [29].

Regular use of traditional African medicines was noted in 20 patients. The practice of traditional African medicine is common in our context. Part of the reason for this is ignorance and poverty.

Circumstances of discovery of renal failure

In our study, the most common functional signs in CKD patients were lower extremity edema and/or facial puffiness (56.3%), followed by nausea and/or vomiting (34.8%) and dyspnea (34.1%). Generally speaking, the signs we have noted are classically found during severe or terminal CKD [20].

Paraclinical data

Apart from serum creatinine which was performed in all patients, the measurement of blood urea as well as 24-hour proteinuria, blood ionogram and even blood count are not permanently available in our context.

The mean hemoglobin level in our study was 6.9 ± 2.4 g/dL. Sabi et al in Togo and Kissou in Burkina Faso found averages of 7.3 ± 2.4 g/dL and 7.4 ± 2.0 g/dL, respectively [14,25]. Anaemia is generally common in patients with chronic and severe kidney disease in resource-limited countries where erythropoietin and injectable iron are difficult to access [30].

Ultrasound of the urinary tract was performed in 124 patients, or only 39.2%. This low completion rate is partly explained by the poverty of our study population as well as the permanent unavailability of

the exam. This is a limiting factor in the diagnosis of renal failure that may explain the high frequency of cases of unclassifiable IR.

Pathophysiological types of kidney disease and stages of CKD

In our study, we observed 62.3% of cases of acute kidney failure, 29.1% of organic AKI, and 8.6% of obstructive AKI. This pattern is different from that observed by Lengani et al in Burkina Faso with 35.5%, 47.1% and 12.4% respectively [26].

In addition, it should be noted that cases of AKI that are initially functional may become organic by tubular necrosis if ischemia persists for a long time or as a result of the use of nephrotoxic drugs [20].

Indeterminate nephropathy affected more than half (54.8%) of CKD patients in our study. Ouattara et al also noted that indeterminate nephropathy was the most common in their series [24]. Other studies have reported significant rates of chronic vascular kidney disease during CKD [31–33]. Etiological research into chronic kidney disease is a difficult stage in the management of chronic kidney disease in our regions. Kidney biopsy, due to its unavailability in the country, is rarely performed, as well as immunological tests because of their high costs. These difficulties may explain much of the high rate of undetermined causes of chronic kidney disease. In addition, patients reach a very advanced stage of deterioration of renal function where glomerulosclerosis, combined with signs of fluid retention, cause all nephropathy to have the same semiology.

End-stage CKD was the most common in our series (90.4% of CKD cases), as well as in studies of Ouattara et al (82,4%) [24], of Kissou (90,9%) [14] and Ramilitiana et al (75,3%) [31]. This could be explained by the fact that patients consult or are referred to the CHUR only late, at the stage of advanced CKD. Indeed, it is the importance of functional discomfort that ends up motivating the consultation or referral to a high-level structure.

Scalable data

The average length of hospital stay for our patients was 8.6 ± 5.7 days with durations of 1 and 31 days.

This duration was 7.8 ± 5.5 days for AKI cases. Lengani et al [26] and Somé [32] all reported a longer average length of hospital stay than we did, at 20.4 ± 14.9 days and 14.8 ± 8.8 days, respectively. This could be explained by the high proportion (34.1%) of discharges against medical advice in our series. For CKD cases, it was 9.4 ± 6.0 days in our study. Kyelem et al [15] reported a mean length of hospital stay of 12.7 ± 12.1 days in CKD. These relatively short hospital stays for a chronic disease such as CKD can be explained by the many medical discharges, deaths and referrals to other specialized centers for dialysis. Hospital mortality during our study was 18%. This rate is almost similar to those found by Pan et al [34] as well as El Ghani [33] in 2016, which were 15.9% and 15.6% respectively.

The in-hospital mortality of CKD during our study was 19.3%. Kyelem et al found a hospital mortality rate close to ours, i.e. 21.7% [15]. Ramilitiana et al and Ouattara et al respectively, 28.9% mortality was reported [31] and 54.0% [24]. This high mortality rate is related to the inaccessibility of dialysis by the largest number of patients in our region. Forty-six CKD patients (34.1%) were discharged against medical advice in our study. Kyelem et al in Bobo-Dioulasso noted 27.5% of discharges against medical advice [15]. The high frequency of discharges against medical advice can be explained by the poverty of our study population, which very quickly runs out of financial means. Indeed, in our country, there is no health insurance. All costs of care are borne by the patient and his/her family. In addition, the lack of availability of adequate means of treatment, including the absence of a hemodialysis centre at the CHUR-OHG at that time, and the belief in traditional medicinal practices contributed to an increase in the proportion of discharges against medical advice.

Conclusion

Our study shows that kidney failure is common in the general medicine department of the Ouahigouya University Hospital. CKD was the most common.

Lower socio-economic classes were the most affected by RI.

Functional AKI and indeterminate nephropathy were the most common pathophysiological type of AKI and the presumed cause of CKD, respectively. A high proportion of unclassifiable IR was noted, largely related to insufficient diagnostic means.

Patients were regularly admitted at a terminal stage of impaired kidney function and the Ouahigouya University Hospital did not have a haemodialysis centre at that time. This makes it difficult to take care of them.

Mortality of patients with renal impairment was high. An increase in infrastructure, an improvement in diagnostic and therapeutic means and preventive actions are essential for a better outcome for our patients.

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Conflict of interest : None

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