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Assessment of the Level of Knowledge about Chronic Renal Failure in 271 Hypertensive Patients in Brazzaville

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Abstract

Background and Objectives: Chronic kidney disease (CKD) is now a global public health problem. In low- and middle-income countries such as the Congo, access to dialysis is low and inequitable. The prevention of CKD involves raising awareness among patients at risk, such as those suffering from arterial hypertension (AH), by improving their knowledge of CKD. The objectives of our work were to determine the level of knowledge about CKD among hypertensive patients and to identify the factors associated with a low level of knowledge. **Methodology:** We conducted a 3-month descriptive and analytical cross-sectional study from 1 August to 30 October 2023 in 3 large public hospitals in Brazzaville (capital of the Republic of Congo). We included: hypertensive patients aged 18 and over who had freely consented to participate in our study and were able to answer the questions on the survey form. Patients with known hypertension who had been followed for less than 3 years and those with known chronic renal failure were not included. **Results:** The mean age was 58.4 ± 14.4 years (29 - 88 years). There were 121 men and 150 women (sex ratio = 0.8). All the patients were educated; 37.2% with a higher level of education and 13.6% with primary education. 24 patients (9%) had a good level of knowledge about CKD and 153 (56%) had poor knowledge. A good level of knowledge was associated with the duration of hypertension, intellectual level and the existence of associated heart disease. **Conclusion:** Our study reveals a significant lack of knowledge about chronic kidney disease among hypertensive patients in Brazzaville.

1. Introduction

Chronic kidney disease (CKD) is a major global public health problem [1]. The prevalence of CKD is constantly rising, affecting around 13% of the world's adult population, with high morbidity and mortality rates. [1]. It is a major financial burden for national healthcare systems, particularly at stage 5 of chronic kidney disease (CKD), due to the need for renal replacement therapies: peritoneal dialysis, haemodialysis and renal transplantation. [2] But also because of the management of complications associated with CKD [3].

In many low-income countries, there is a huge gap between the total number of patients with kidney failure and the number of patients with dialysis access. [4]. The International Society of Nephrology (ISN), in its reference framework to help set up dialysis programmes in developing countries [3] recommended that governments pay particular attention to the prevention of CKD, especially in high-risk groups, in order to reduce the incidence of CKD at the dialysis stage.

Cost-effective preventive health strategies to raise awareness and screen patients at risk of developing CKD have been shown to be effective in reducing the burden of CKD complications in patients at high risk of developing CKD [5] [6].

Diabetes mellitus and hypertension are respectively the main risk factors for CKD worldwide [1] [7]. Although CKD is common in black Africa, there are few epidemiological data. Previous studies in Africa show a prevalence of CKD of 10.4% [7] and proteinuria of 12.4% [8] with hypertension being the main risk factor [1] [9]. In Congo, the national programme to combat renal failure; has reported an incidence of stage 5–CKD of 252 new cases/year in 2021, with a low rate of dialysis access estimated at 13.9% [10]. By way of comparison, this rate is over 80% in Cameroon, Gabon and Equatorial Guinea [9]. In-hospital studies carried out in "Brazzaville" [11] and "Pointe-Noire" [12] revealed that the primary renal factor was also hypertension.

Hypertensive patients are therefore at high risk of developing chronic kidney disease in the Congo, as in other Black African countries. [7] [8] [13]. As access to haemodialysis is poor, there is an urgent need not only to set up programmes to prevent chronic kidney disease in patients at risk. This prevention involves raising awareness among patients at risk. It was in the interest of improving and laying the foundations for the preventive management of patients at risk of CKD that we carried out this study, the objectives of which were to determine the level of knowledge of CKD among hypertensive patients undergoing outpatient treatment in Brazzaville and to identify the factors associated with poor knowledge of CKD.

2. Methodology

This is a descriptive and analytical cross-sectional study, lasting 3 months from 1 August to 30 October 2023. It was conducted in 3 major public hospitals in Brazzaville (capital of the Republic of Congo). These were the University Hospital Center of Brazzaville, the general hospital of "Talangai" and the general hospital of "Makélékélé". We included: hypertensive patients aged 18 years and over who freely consented to participate in our study and were able to answer the questions on the survey form. Patients with known hypertension followed for less than 3 months and those with CKD were not included. The minimum sample size was calculated using the Schwartz formula:

$$N = P(1 - P)(Z_\alpha / d)^2$$

N = required sample size

P = estimated prevalence of hypertensive subjects in Brazzaville [14]

d = margin of error of 5% (standard value of 0.05)

Z_a = confidence level (standard value 1.96)

This gives a minimum number of 259 patients.

A total of 271 patients meeting the selection criteria were definitively included in the study.

We studied the socio-demographic characteristics of the patients and their intellectual level, classified them into 4 groups:

- None: anyone who has never received schooling.
- Primary: first level of education.
- Secondary: second level of education.
- Higher education: university level.

The existence of an associated co-morbidity (diabetes, heart disease, stroke, obesity) was also studied.

The level of knowledge was assessed on the basis of the knowledge component of a CAP (Knowledge, Attitude, Practice) survey, which breaks down knowledge into 4 levels on the basis of the analysis grid [1]:

Less than 25% correct answers	Wrong
Less than 50% correct answers	Insufficient
Less than 70% correct answers	Average
Over 70% correct answers	Good

Our questionnaire combined the questions asked by other surveys [7] [8] whose questionnaires had confirmed internal validity. The content and validity of the questionnaire were then examined by 2 nephrologists, 2 nurses and a member of the research staff. For each section, the reviewers were asked to assess all items in the questionnaire and to highlight those deemed inappropriate in terms of wording and applicability. As a result, some items were deleted and several were reworded so that they could be better understood by patients. The final version of the questionnaire is provided in **Appendix**. The questionnaire consists of a total of 119 multiple-choice, "Yes", "No" and "Don't know" questions.

For better comparative analysis, patients with poor and insufficient knowledge of CKD were grouped into a group with poor knowledge of CKD and those with fair and good knowledge were grouped into a group with good knowledge of CKD. Data were collected on a survey form. Data was captured on Android phones using the Android Kobo Collect application and processed using Epi-Info7 software.

Tables and graphs were enhanced using Microsoft Excel 2019. Categorical variables were presented as numbers and percentages in brackets with their confidence intervals. The mean and its typical deviation, the maximum and minimum were used to present continuous quantitative variables. Discrete quantitative variables were presented as the mean and its standard deviation. For comparison purposes, the chi-square test was used for percentages and Student's t-test for means. The significance level was set at $p < 0.05$. Data were analysed using Epi-Info 7 version 23.0 software.

2.1. Outcome of Patients Who Took Part in the Study

All the hypertensive patients who took part in our study were made aware of CKD and its risk factors.

Patients detected with CKD were referred to a nephrology consultation.

2.2. Ethical Considerations

Authorisation was obtained from the ethics committee after it had been approved. As this was a research study, the confidentiality of the data was guaranteed, as was the informed consent required. The forms and samples were destroyed immediately after the study.

3. Results

3.1. Socio-Demographic Characteristics

The mean age was 58.4 ± 14.4 years, with a minimum of 29 and a maximum of 88. There were 121 men (44.7%) for 150 women (55.3%), giving a sex ratio of 0.8. The most represented age group is 46 to 60 years old (n = 114: 42.1%). The distribution of our sample according to age and sex is shown in Figure 1.

All the hypertensive patients in our sample were educated; Figure 2 shows the proportion of the different intellectual levels.

3.2. Knowledge of CKD

Of the 271 hypertensive patients, 24 had good knowledge of CKD and 153 (56%) had poor knowledge of CKD. The different levels of knowledge about CKD and their proportions are shown in Figure 3.

3.3. Factors Associated with a Good Knowledge of the CKD

By performing a multivariate analysis between the groups of patients with a good knowledge of CKD and those with a poor knowledge, 3 factors were associated
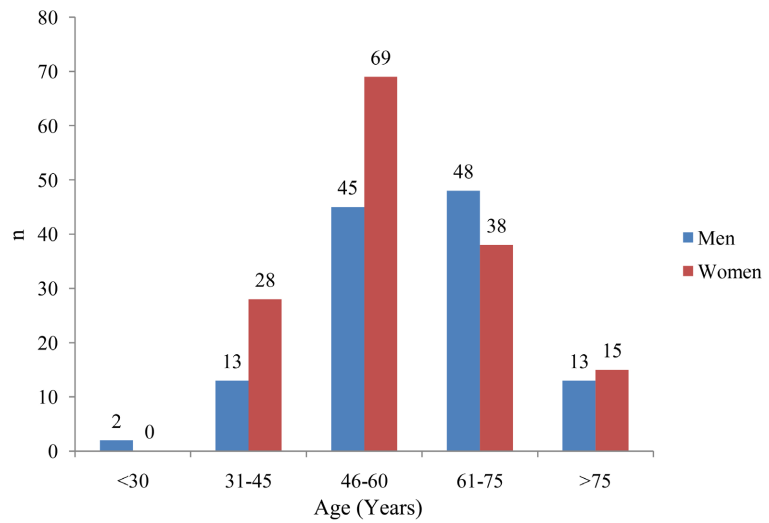
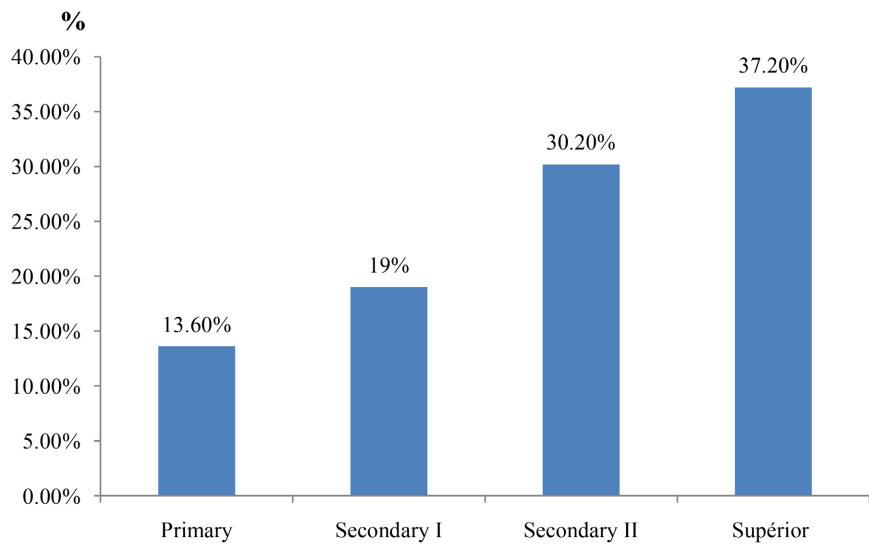**Figure 1.** Breakdown of patients by age group and sex.

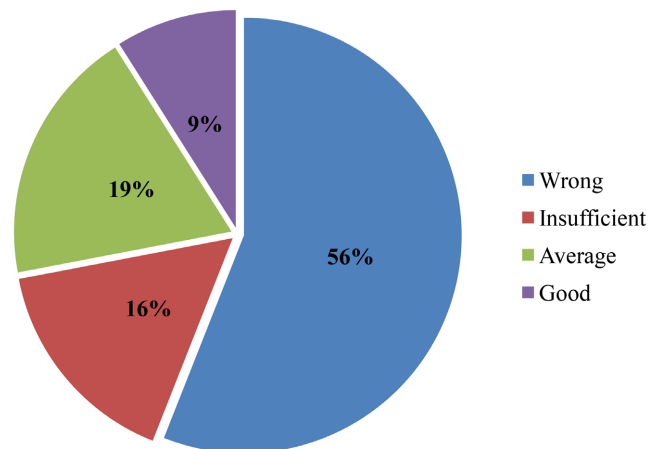**Figure 2.** Distribution of patients according to intellectual level.

Figure 3. Levels of knowledge about CKD.

with a good knowledge of CKD: intellectual level, the existence of heart disease and a history of hypertension of 10 years or more. Table 1 summarises the comparison of the different variabes of the two groups mentioned above.

4. Discussion

4.1. Methodological Aspects and Sample

This study is the first to investigate knowledge of CKD in a sample of Congolese patients at risk of developing CKD. Our study took place in Brazzaville, the capital city of Congo, which is the country's largest city in terms of surface area and population. The population is varied and representative of all socio-economic strata and all regions of the Congo. Individuals were invited to enrol in the study, so it was not a random selection of patients suffering from hypertension in Brazzaville. With this in mind, more than 50% of the patients studied were women. For these reasons, our results cannot be generalised to the entire population of Congo. The limitation of our study is that we were unable to find a validated questionnaire recommended for assessing the level of knowledge about CKD. Our questionnaire was validated by nephrologists and doctors at Brazzaville University Hospital, but its reliability was not compared.

Table 1. Factors associated with unawareness of CKD in hypertensive patients.

Variables		Ignorance of the MRC N = 196	Knowledge of the MRC N = 75	OR 95% CI	p
		n (%)	n (%)		
Gender Female		103	47	0.66 [0.38; 1.1]	0.15
Level Intellectual	Primary	32 (16.3)	5 (6.7)	2.73 [1.02; 7.3]	0.04
	Secondary I	40 (20.4)	11 (14.7)		
	Upper Secondary	60 (30.6)	22 (29.3)		
	Superior	64 (32.6)	37 (49.3)		
Diabetes Mellitus		65 (33.2)	23 (30.7)	1.12 [0.63; 1.99]	0.9
Heart disease		1 (00.5)	5 (06.7)	0.07 [0.01; 1.17]	<0.01
Obesity		15 (07.6)	8 (10.7)	0.69 [0.28; 1.7]	0.4
Follow-Up/General Practitioner		23 (11.7)	12 (12.0)	0.81 [0.41; 1.6]	0.9
History of Hypertension > 10 Years		99 (50.5%)	45 (30%)	0.68 [0.4; 1.17]	<0.001

4.2. Socio-Demographic Characteristics of Participants

In our study, women predominated (55%), with a mean age of 58.4 ± 14.4 years. These data contrast with those of previous studies on the profile of hypertensive patients in Brazzaville. In 2018 Ellenga Mbolla *et al.* [15] found during a screening for hypertension in 3 cities in Congo (Pointe Noire, Brazzaville and Nkayi): a male predominance of nearly 61%, with a mean age of 30.9 ± 14.7 years [15]. Further on, in 2009 Kimbally *et al.* reported a mean age of 37.5 years with a male predominance [14]. This difference in results could be explained by the methodology used in the last 2 studies. The previous studies were carried out in urban areas; the Kimbally study used the WHO STEPS approach. [14] and that of Ellenga Mbolla [15] screening in non-hospital settings [15]. This contrast raises the question of awareness and management of hypertension, a genuine global public health problem. Young people often feel unconcerned by this chronic disease, and will only consult a doctor after the disease has progressed for a long time, with the onset of complications including CKD.

4.3. Level of Knowledge of the Renal Risk Associated with Hypertension

It is crucial that hypertensive patients have a good level of knowledge about hypertension and its risks, in order to improve health education and prevent major complications such as chronic renal failure. In our study, we therefore assessed hypertensive patients' knowledge of prevention, early detection of chronic renal failure and the renal risk associated with hypertension. In our study, only 9% of hypertensive patients had a good knowledge of chronic renal failure. Our results are lower than those reported by other authors. In Tanzania, 37.5% of hypertensive patients had a good knowledge of chronic kidney disease [16]. In Nigeria, 26.1 [17] and in Ethiopia 47.9 [18]. This difference between countries may be due to differences in study design and tools. The studies conducted in Tanzania and Nigeria used a community-based cross-sectional study design [16] [17]. The maximum school enrolment rate (100%) of our hypertensive patients had no impact on the rate of good knowledge of CKD, since in other studies where the school enrolment rate was lower than in our study, there were more patients with good knowledge of CKD than in our study. John W. Stanifer *et al.* in Tanzania [16] reported a non-education rate of 12.5% and a higher education level of only 5.9%. However, several studies report that the rate of patients with good knowledge of CKD is strongly related to the rate of education [16] [18]. The contrast observed in our study may be explained by the fact that nephrology in Congo is still in its infancy, with only 1 nephrologist per 500,000 inhabitants in 2021 [9] [19]. And only 2 hospital departments are specialising in nephrology [19]. This results in short communication times between patients and healthcare providers, a lack of organised educational programmes for hypertensive patients and a decrease in awareness-raising activities.

4.4. Factors Associated with a Good Knowledge of the CKD

Intellectual level had an impact on the level of knowledge, since almost half (49.3%) of the patients with knowledge of CKD had a higher level of education, whereas less than a fifth of this group had attended primary school, with a significantly different level of education. Participants with higher education were 3 times more likely to have good knowledge than other participants. This could be explained by the fact that participants with higher education were more likely to be exposed to different educational media such as the Internet. In addition to intellectual level, patients with associated heart disease and those with hypertension of more than 10 years were more familiar with CKD and the renal risk of hypertension. Patients with known hypertension for several years were seen on several occasions. Our sample shows a low level of follow-up by GPs, whatever the level of knowledge. Hypertensive patients are therefore mainly followed up by specialists, and after 10 years of follow-up, awareness of CKD is probably well established.

5. Conclusion

In Brazzaville, hypertensive patients are unaware of chronic kidney disease and the renal risk attributed to arterial hypertension. The level of knowledge was related to the age of the hypertension, the level of education and the existence of heart disease. Our challenges reveal the lack of awareness of the risk of CKD among patients at risk, *i.e.* hypertensive patients. Awareness-raising programmes are needed, with tools in local languages that are accessible to all.

Conflicts of Interest

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

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Appendix

Table A1. Evaluation of hypertensive patients' knowledge of chronic kidney disease.

Questions	Yes	No	JNSP*
1. Kidney disease has nothing to do with high blood pressure, but is related to diet?			
2. Have you ever heard of chronic kidney disease or chronic renal failure?			
3. Hypertension is the leading cause of kidney failure in Africa?			
4. Does hypertension lead to kidney failure that can be cured?			
5. Nephrology is the medical speciality that really deals with nerve disorders?			
6. Does kidney failure cause back pain?			
7. Do kidney diseases only affect the elderly?			
8. To avoid the dialysis stage of renal failure, blood pressure must be below 140/90mmHg?			
9. Does kidney disease occur when creatinine levels rise?			
10. The 24-hour proteinuria test enables early detection of kidney disease?			
11. Is screening for chronic kidney disease important?			
12. Can certain medications help slow the worsening of chronic kidney disease?			
13. Can herbal supplements be effective in the treatment of chronic kidney disease?			
14. Is chronic kidney disease reversible without treatment?			
15. Anti-inflammatory drugs have a good effect on the kidneys.			
16. What tests should be carried out to detect kidney failure?	Blood sugar		
	Creatininemia		
	Ionogram		
	NFS		
	I don't know		
17. What treatments are available for chronic kidney disease?	Antihypertensives		
	Dialysis at renal death stage		
	Low protein diet		
	Renal transplantation at the stage of renal death		
	Plants		
	I don't know		

Continued

	Diabetes
	Female sex
	Male sex
	Hypertension
	Heart problems
18. What are the risk factors for chronic kidney disease?	Asthma
	Obesity
	Kidney stones
	Smoking
	Low birth weight
	I don't know
19. Which urine test can detect kidney disease?	

*JNSP: I don't know.