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ORIGINAL RESEARCH ARTICLE

Screening for Chronic Kidney Disease in the Adult Population of Brazzaville (Congo), March 2024

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Abstract

Introduction: Chronic kidney disease (CKD) remains a major public health problem in sub-Saharan Africa, often underdiagnosed due to its silent progression. This study aims to estimate the prevalence of kidney disease markers and identify associated factors in the general adult population of Brazzaville.

Methods: A cross-sectional survey was conducted in 2024 among 1629 adults aged ≥ 18 years. Data collected included sex, age, blood glucose, blood pressure, body mass index (BMI), serum creatinine, proteinuria (PU), and hematuria (HU). The presence of a renal marker was defined as serum creatinine ≥ 14 mg/L, proteinuria, and/or hematuria. Multivariate logistic regression was used to determine associated factors.

Results: The overall prevalence of renal involvement was 25.3%. The most common abnormalities were proteinuria (31.9%) and elevated serum creatinine (17.5%). Significantly associated factors were male sex (OR = 1.68; 95% CI [1.38-2.05]), age > 65 years (OR = 1.71; 95% CI [1.16-2.53]), and overweight/obesity (OR = 1.37; 95% CI [1.10-1.71]).

Conclusion: A quarter of the adult population of Brazzaville has at least one marker of kidney disease. These results, well above regional averages, highlight the urgent need to implement targeted screening and prevention strategies, particularly among older and overweight men.

Keywords

Chronic kidney disease, Screening, Brazzaville

Introduction

Chronic kidney disease (CKD) is defined by the existence of a renal abnormality (biological, morphological or functional) and/or by a decrease in the glomerular filtration rate (GFR < 60 ml/min/1.73 m²), persisting for more than three months, according to the KDIGO criteria [1]. It constitutes a major public health problem on a global scale, with an increasing prevalence linked to the increase in diabetes, high blood pressure, and aging populations [2]. In resource-limited countries, CKD is often diagnosed late, at the terminal stage, requiring hemodialysis treatment; this is often inaccessible for the majority of patients due to high costs and insufficient healthcare provision [3]. There is therefore an urgent need for developing countries to focus on prevention.

In Brazzaville, no large-scale study has yet been conducted to estimate the actual prevalence of CKD in the general population. The objective of this study is to determine the prevalence of CKD in the adult population of Brazzaville, as well as the frequency of its main risk factors.

Methodology

Type of study and setting

This is a cross-sectional, descriptive, community-based study conducted in six health districts of Brazzaville: Makélékélé, Bacongo, Talangaï, Ouenze, Moungali, and Poto-Poto. Brazzaville is the capital of the

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Congo, a country in Central Africa. It has a population of approximately 2.1 million across nine municipalities.

Population and recruitment

A call for screening was launched via social media and radio and television channels over a one-month period among the general adult population. A free screening campaign was then carried out over three days (March 10, 11, and 12, 2024). Recruitment was voluntary.

Data collected

Each participant completed a standardized questionnaire including:

- Socio-demographic data
- Co-morbidities (diabetes, hypertension, obesity, heart disease)

The questions were asked by registered nurses, who also took blood and urine samples. The diagnosis of chronic kidney disease was confirmed by a doctor.

- Blood samples (creatinine level)

Creatinine levels were measured on serum using an enzymatic method (-traceable IDMS).

The analyses were carried out in the laboratory of the Faculty of Health Sciences of the Marien Ngouabi University of Brazzaville, with internal and external quality controls according to ISO 15189 standards.

- Urine analysis (proteinuria, hematuria)

Urine analyses were performed using semi-quantitative urine strips (Combur -Test®) according to the manufacturer's recommendations. Each fresh urine sample was collected in a clean, single-use container and immediately tested. The strip was briefly immersed in the urine, read after 60 seconds for proteinuria and hematuria, and compared to the provided color scale.

-Proteinuria: Any result ≥ a cross was considered positive.

-Hematuria: The presence of blood ≥ a cross on the strip was considered positive.

- Renal ultrasound (if abnormalities detected)

Definition criteria

Chronic kidney disease was defined by a GFR < 60 ml/min/1.73 m² (CKD-EPI formula) or the presence of a urinary abnormality (proteinuria, hematuria) or persistent morphological abnormality for more than 3 months [1]. The diagnosis of chronic kidney disease was made by nephrologists from the nephrology department of the Brazzaville University Hospital.

Data collection and analysis

Data were entered and processed using Epi Info™ software version 7.2 (CDC, Atlanta, USA). Quantitative variables are expressed as means ± standard deviation (SD). Qualitative variables are presented as numbers (n). And percentages (%).

Comparisons between groups were performed using the Chi- -square (χ^2) test.

A multivariate analysis by binary logistic regression was conducted to identify factors independently associated with the presence of a marker of renal damage (binary dependent variable: yes/no). The results are presented as adjusted Odds Ratios (OR) with their 95% confidence intervals (95% CI).

The threshold for statistical significance was set at $p < 0.05$.

Results

Sample size and distribution

We screened 1629 people over 18 years old, with a mean age of 44.9 years ± 15.4 years and a male predominance of 54% (880 men) for 46% women (749).

Cardiovascular factors

Markers of kidney damage

413 people screened (25.3%) had a positive kidney damage marker.

Chronic kidney disease

Chronic kidney disease was diagnosed in 369 individuals (22.6%).

Multivariate logistic regression correlation analysis

Discussion

Prevalence of CKD

The prevalence of chronic kidney disease (CKD) observed in our study is 22.6%, which remains significantly higher than African community data, which often range between 10 and 18% in the general population [4]. It should be noted that many studies in sub-Saharan Africa rely exclusively on the estimation of glomerular filtration rate (eGFR) to diagnose CKD, while our protocol incorporated a combined approach including serum creatinine, proteinuria and hematuria, which increases its diagnostic sensitivity.

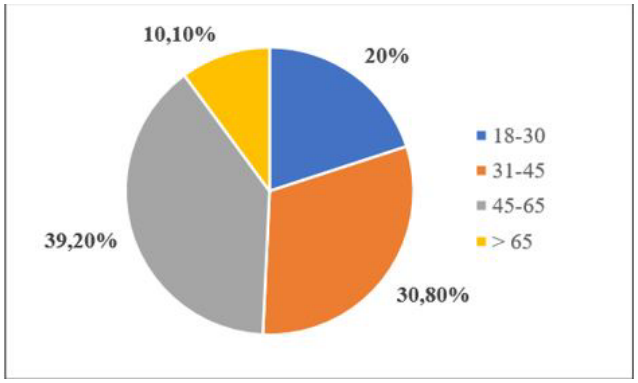

Figure 1: Distribution of the sample according to age groups.

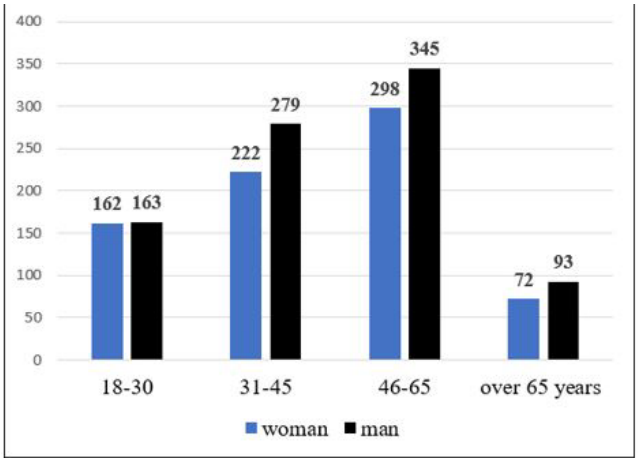

Figure 2: Distribution of the sample according to age and gender.

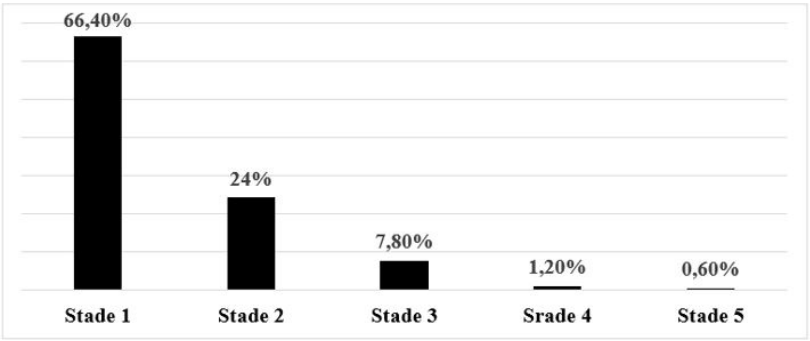

Figure 3: Distribution of diagnosed CKD cases according to stage.

Table 1: Distribution according to cardiovascular risk factors.

Factor	n	%
Diabetes mettitus	593	36.4
HBP*	310	19
Stoke	65	3.9
Overweight	415	25.5
Obesity	738	45.3
Smoking	30	1.8
Alcoholism	321	19.7

Table 2: Population distribution according to serum creatinine values.

Category	Number	%
Normal (14 mg /1)	1344	82.5
High (≥ 15 mg /1)	285	17.5

Table 3: Distribution according to the level of positivity of hematuria and proteinuria on urine dipstick.

Results	Traces	+ n (%)	++ ≥ n (%)		Negative n (%)
Proteinuria	246 (15)	207 (12.7)	52 (3.2)	14 (0.9)	1110 (68.2)
hematuria	3 (0.2)	132 (8.1)	52 (3.2)	59 (3.6)	1383 (84.9)

Table 4: Factors associated with the presence of chronic kidney disease.

Postman	With MRC n (%)	Without MRC n (%)	OR [95% CI]	P-value
Male gender	328 (67.5)	552 (48.3)	1.68 [1.38-2.05]	< 0.001
Age > 65 years	65 (13.4)	100 (08.7)	1.71 [1.16-2.53]	< 0.05
Obesity / Overweight	370 (76.1)	783 (68.5)	1.37 [1.10-1.71]	0.013
Diabetes mellitus	165 (33.9)	428 (37.4)	0.87 [0.70-1.07]	0.8
HBP	205 (42.2)	105 (09.2)	7.21 [5.50-9.44]	< 0.001
Alcoholism	92 (18.9%)	229 (20.0)	0.95 [0.73-1.25]	0.7
Smoking	19 (03.9)	11 (00.9)	4.2 [1.90-8.80]	< 0.001

*High blood pressure

In the Democratic Republic of Congo (South Kivu), an AWI- Gen study reported a prevalence of 10.7% based on eGFR and albuminuria [4]. In Nigeria, urban studies found a prevalence of between 12 and 13% [5], while in Cameroon, Kaze, et al. reported a prevalence of 11.7% in 433 adults [6]. Generally, in sub-Saharan Africa, estimates range between 13.9 and 17.7% [7]. The 22.6% found in Brazzaville therefore greatly exceeds these values, which can be explained by the inclusion of urinary markers and a population at high metabolic risk, with a prevalence of 70.8% of overweight or obesity, compared to 21 to 45% in previous surveys [8].

Furthermore, an analysis of the progression of CKD shows that 66.4% of detected cases are at stage I, suggesting early, asymptomatic, and potentially reversible renal involvement. In contrast, only 0.6% of screened patients are at stage 5, which reinforces the importance of early screening in the general population before the onset of terminal complications.

Factors associated with CKD

- Several factors were independently associated with the presence of a marker of kidney damage in our study. These included male sex, age over 65-years, overweight/obesity, high blood pressure, and active smoking.
- Male gender was associated with an increased risk of CKD (OR = 1.68; 95% CI [1.38-2.05]), a finding regularly found in African literature [9,10]. This phenomenon could be linked to hormonal and behavioral factors, or to increased exposure to occupational and environmental risks in men.
- Advanced age (> 65-years) remains a well-established factor for impaired renal function (OR = 1.71; 95% CI [1.16-2.53]) [9], probably due to glomerular sclerosis, chronic inflammation and frequent comorbidities at this age.
- Overweight/obesity (OR = 1.37; 95% CI [1.10-1.71]) is also confirmed as an independent risk factor. This result is consistent with those of Yao et al. in Ivory Coast, who reported an OR = 2.04 for obesity [11]. Excess weight promotes glomerular hyper filtration and chronic inflammation, two mechanisms directly involved in the pathophysiology of CKD [12].
- Hypertension appears here as a strong factor associated with CKD with an OR = 7.21 (95% CI [5.50-9.44]). This result is consistent with numerous studies conducted in sub-Saharan Africa, where hypertension is frequently cited as the first identified cause of chronic kidney disease [5,6,13].
- Active smoking is also significantly associated with CKD in our sample (OR = 4.20; 95% CI [1.90-8.80]). This association is less frequently explored in Africa, but well known in the international literature [14]. Tobacco contributes to systemic inflammation, oxidative stress, endothelial dysfunction, and progression of chronic kidney disease.
- In contrast, hyperglycemia (OR = 0.87; 95% CI [0.70-1.07]) was not significantly associated with CKD in our model. This lack of association could be explained by:
- A one-time assessment of capillary blood glucose (non-fasting),
- Heterogeneity of diabetes types,
- Possible adequate glycemic control in some participants [15].

In some populations in sub-Saharan Africa, infectious diseases (HIV, tuberculosis, schistosomiasis) increase the risk of chronic kidney disease [16]. These pathologies were not evaluated in our study, but could partly explain the prevalence detected.

CKD Diagnosis and Implications

The fact that two-thirds of diagnosed cases are at stage I is particularly encouraging. This represents a window of therapeutic opportunity, during which early interventions can slow or reverse progression to later stages [17].

From our study we can deduce that the use of multiple markers increases sensitivity but may reduce specificity, potentially inducing false positives.

High rates of hyperglycemia, obesity, and uncontrolled hypertension indicate an urgent need for improved health policies based on prevention and education.

Conclusion

This study reveals a worrying prevalence (22.6%) of CKD in the adult population of Brazzaville, with a predominance of early-onset forms. The main associated factors are: male sex, age ≥ 65 years, overweight/obesity, high blood pressure, and active smoking. These results call for urgent action to implement targeted screening programs, manage cardiovascular risk factors, and strengthen community education in the African context.

Conflicts of Interest

The authors declare no conflicts of interest.

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References

1. KDIGO (2013) Clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int 105:S117-S314.
2. GBD Chronic Kidney Disease Collaboration (2020) Global, regional, and national burden of chronic kidney disease, 1990-2017: A systematic analysis for the Global Burden of Disease Study 2017. Lancet 395: 709-733.
3. Stanifer JW, Muiru A, Jafar TH, Patel UD (2016) Chronic kidney disease in low- and middle- income countries. Nephrol Dial Transplant 31: 868-874.
4. Houenassi M, Sumaili EK, Raji YR, Nigel J Crowther, Godfred Agongo, et al. (2019) Kidney damage and associated risk factors in rural and urban sub- Saharan Africa: The AWI- Gen study. Lancet Global Health 7: e1133-e1142.
5. Ulasi II, Ijoma CK, Onodugo OD (2013) Towards prevention of chronic kidney disease in Nigeria: A community-based study. Kidney 3: 195-201.
6. Kaze FF, Ashuntantang G, Kengne AP, et al. (2015) Prevalence and determinants of chronic kidney disease among hypertensive Cameroonians according to KDIGO 2012 guidelines. BMC Nephrol 16: 103.
7. Stanifer JW, Jing B, Tolan S, et al. (2014) The epidemiology of chronic kidney disease in sub- Saharan Africa: Has systematic review and meta -analysis. Lancet Global Health 2: e174-e181.
8. Kengne AP, Echouffo Tcheugui JB, Sobngwi E, Jean-Claude Mbanya (2013) New insights on diabetes mellitus and obesity in Africa-Part 1: prevalence, pathogenesis and comorbidities. Heart 99: 979-983.
9. Seck SM, Doupa D, Dia CA, et al. (2010) Prevalence of chronic kidney disease in Senegalese populations: A community-based study. Nephrol Ther 6: 214-219.
10. Sumaili EK, Krzesinski JM, Zinga CV, Eric P Cohen, Pierre Delanaye, et al. (2009) Prevalence of chronic kidney disease in Kinshasa: Rresults of a pilot study. Nephrol Dial Transplant 24: 117-122.
11. Yao H, Ekou A, Konan D, et al. (2016) Prevalence of renal disease in diabetics in Abidjan. Nephrol Ther 12: 171-176.
12. Hall JE, Do Carmo JM, Da Silva AA, Zhen Wang, Michael E Hall (2015) Obesity-induced hypertension: Interaction of neurohumoral and renal mechanisms. Circ Res 116: 991-1006.
13. Naicker S (2010) End-stage renal disease in sub- Saharan Africa. Kidney Int Suppl 11: S161-S163.
14. Orth SR, Hallan SI (2008) Smoking: A risk factor for progression of chronic kidney disease and for cardiovascular morbidity and mortality in renal patients. Am J Kidney Say 51: 291-301.
15. Kazancioğlu R (2013) Risk factors for chronic kidney disease: An update. Kidney Int Suppl 3: 368-371.
16. Barsum RS (2006) Chronic kidney disease in the developing world. N Engl J Med 354: 997-999.
17. Levey AS, Coresh J (2012) Chronic kidney disease. Lancet 379: 165-180.