

Kidney biopsies in Kinshasa: Epidemiology and histopathology

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ABSTRACT

Introduction

Renal biopsy (Renal Puncture Biopsy, RPB) is essential for the diagnosis and prognosis of kidney disease. However, it is rarely performed in African countries, particularly in French-speaking regions, despite its importance for assessing disease progression and guiding treatment.

Purpose

To determine the epidemiological and histopathological profiles of kidney biopsies in Kinshasa from 2020 to 2022.

Methods

This retrospective cross-sectional study was conducted across various laboratories in Kinshasa and covered the period from January 2020 to December 2022.

Results

Among the 1,642 biopsies performed between 2020 and 2022 at Kinshasa University Clinic (KUC), Nganda Center (NC), and the National Institute for Biomedical Research (NIBR), only 51 were renal biopsies, representing 2% (n = 51). The most represented age group was 38–47 years (35%). Men accounted for 67.7% of cases. Nephrotic syndrome was the most common clinical indication (39.2%). Segmental and focal hyalinosis predominated histologically, accounting for 45.1% of cases.

Conclusions

Although infrequent in our setting, renal biopsies remain indispensable when kidney disease is suspected. They constitute a critical tool in the nosological, diagnostic, and therapeutic approach to nephrology for the effective management of kidney disease.

INTRODUCTION

Kidney disease is a global public health problem, imposing a heavy financial burden on affected patients and healthcare systems, and is associated with high mortality risk, particularly among poor and disadvantaged populations.

Worldwide, approximately 850 million people are currently affected by kidney disease (World Health Organization [WHO], as cited in Renaloo, 2024), representing about one in ten adults. The vast majority have no access to diagnosis or treatment. Kidney disease has become the world's seventh leading cause of death, accounting for between 5 and 11 million deaths annually (WHO, as cited in Renaloo, 2024).

In the United States, the estimated prevalence of kidney disease is about 13 in every 100 people, affecting nearly 20 million Americans (University of Geneva, 2022).

In Africa, reliable data on incidence and mortality are scarce and are generally based on hospital statistics and estimates. According to the Secretary General of the African Society of Nephrology, Professor Fayçal, kidney disease rose from being the 16th leading cause of death in 2016 to the 5th leading cause of death projected by 2024 in Africa (Diamniadio, 2025).

In the Democratic Republic of the Congo (DRC), and particularly in Kinshasa, the traditional healthcare system—which primarily focuses on communicable diseases—has not been adequately prepared to address the rising burden of noncommunicable diseases (NCDs), including kidney disease. According to the Congolese Society of Nephrology (SOCONEPH), 12.4% of Congolese adults suffer from kidney disease (Ernest et al., 2010).

The global burden of kidney disease increased by more than 33% between 1990 and 2017 (Ernest et al., 2010). This rapid increase is linked to the rising incidence and prevalence associated with hypertension, obesity, diabetes mellitus, and population ageing. Kidney disease also contributes to elevated cardiovascular risk, even in its early stages. Further contributing factors include the prohibitive cost of renal replacement therapy, ethical and logistical challenges around kidney donation and recipient eligibility, and the limited availability of treatment. Nonetheless,

opportunities exist for effective primary prevention (preventing onset) and secondary prevention (slowing or halting progression) through early detection (Ernest et al., 2010).

Diagnosis, prognosis, and treatment of kidney disease often require advanced investigations, including renal biopsy. Renal puncture biopsy (RPB) is common practice in Western countries, Asia, North Africa, and South Africa. However, in sub-Saharan Africa—particularly in French-speaking countries—it is rarely performed (Li et al., 2004). The contribution of renal biopsy to diagnosis, therapeutic choice, and prognostic assessment is considerable in clinical nephrology. To our knowledge, studies focusing on the frequency of renal biopsies are almost non-existent. This justifies the present study, which aims to evaluate the frequency of renal biopsies and describe renal pathologies in Congolese patients from Kinshasa.

Research Question

What is the prevalence of renal biopsies in Kinshasa between January 1, 2020, and December 31, 2022?

Objectives

General objective

- To determine the epidemiological and histopathological profiles of kidney biopsies in Kinshasa.

Specific objectives

- To determine the prevalence of renal biopsies in Kinshasa.
- To describe patients' socio-demographic characteristics.
- To describe patients' clinical characteristics.
- To describe the histopathological results of renal biopsies.

Work Plan

This study is divided into two main parts:

- A synthetic and critical review of the literature.
- Our personal research, including:
 - A section devoted to the methods used.
 - Results and discussion.
 - Conclusion.

METHODS

Type of study

This was a retrospective cross-sectional study.

Type of sampling

We used an exhaustive sampling method, including all kidney biopsies performed at Kinshasa University Clinics, Nganda Hospital, and the National Institute for Biomedical Research—the three sites recognised as having pathology laboratories in Kinshasa.

Sample size

Since our sampling was based on convenience, we considered all biopsies recorded during the study period (n = 2,450). From these, 51 renal biopsies (n = 51) were selected.

Inclusion criteria

Our study included:

- All kidney biopsies performed between January 1, 2020, and December 31, 2022, at Kinshasa University Clinics, Nganda Hospital, and the National Institute for Biomedical Research.
- Any protocol with relevant information (age, sex, histological type).

Exclusion criteria

The study excluded:

- Any renal biopsy performed outside the study setting and period.
- Any biopsy missing key data such as age, sex, or histological type.

Data collection

Data were obtained from the registers of the Anatomopathology Department and individual survey forms completed by the research team.

Study variables

- i. Age
- ii. Sex
- iii. Biopsy location
- iv. Histological type
- v. Frequency of renal biopsies

Statistical analysis

Data were compiled and analysed statistically using SPSS version 22.0. Descriptive statistics, including mean and standard deviation, were applied.

Ethical considerations

The principles of confidentiality and anonymity were strictly observed.

RESULTS

During the study period, 1,642 samples were analysed at the University Clinics of Kinshasa (CUK), 221 at the Nganda Centre, and 587 at the National Institute for Biomedical Research (INRB). Of these, 38 patients at CUK underwent renal biopsy, representing a frequency of 2.3%. At the Nganda Centre, 11 patients underwent renal biopsy, representing 4.9%. At the INRB, 2 patients underwent renal biopsy, representing 0.3%.

Frequency

Table 1:
Relative frequency of renal biopsies compared with all biopsies

Biopsy	Number (n) N=2450	Percentage (%)
Renal biopsy	51	2
Other	2399	98

Kidney biopsies accounted for 2% of all biopsies analysed in Kinshasa.

Table 2:
Relative frequency of renal biopsies by institution

Institution	Workforce	Sample	%
CUK	1642	38	2.3
Nganda	221	11	4.9
INRB	587	2	0.34

Renal biopsies were most frequent at Nganda Hospital (4.9%).

Breakdown of cases by age group

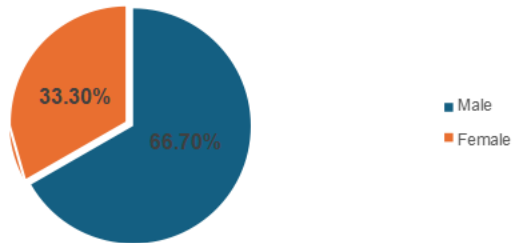
Table 3:
Age distribution of subjects studied

Age (years)	Number (n) N=51	Percentage (%)
< 38	16	31.3
38–47	18	35.3
48–58	12	23.5
59+	5	9.8

The mean age of the study population was 38.8 ± 18.3 years. The most represented age group was 38–47 years (35%).

Breakdown of cases by sex

Figure 1:
Distribution of cases by sex



Men accounted for 67.7% of subjects, showing male predominance.

Distribution of cases according to clinical data

Table 4:
Population distribution by clinical signs

Type of sample	Number (n) N=51	Percentage (%)
Nephrotic syndrome	20	39.2
Renal insufficiency	12	23.5
Hematuria	10	19.6
Kidney mass	7	13.7
HTA	2	3.9

Nephrotic syndrome was the most common clinical sign (39.2%).

Distribution by post-biopsy anatomopathological diagnosis

Table 5:
Distribution of subjects by post-biopsy anatomopathological diagnoses

Diagnosis	Number (n) N=51	Percentage (%)
Segmental and focal hyalinosis	23	45.1
Extra-membranous glomerulonephritis	11	21.6
Clear renal cell carcinoma	9	17.6
Nephroblastoma	4	7.8
Lupus glomerulonephritis	3	5.9
Thrombotic microangiopathy	1	1.9

Segmental and focal hyalinosis was the most common diagnosis (45.1%).

DISCUSSION

Frequency of renal biopsies

Out of 2,450 samples analysed (CUK: 1,642; Nganda: 221; INRB: 587), the renal biopsy frequency was 2%. Our results are comparable to those of Djarou et al. (2021) in Senegal, who reported a biopsy rate of 3.5%. Similarly, Oluseyi et al. (2019) in Nigeria observed a rate of 2.1%. Diallo et al. (2019) in Côte d’Ivoire reported a prevalence of 1.8%, slightly lower than our findings.

Breakdown of cases by age group

In our study, the mean age was 38.8 ± 18.3 years, with the 38–47 age group most represented (35%). These results align with Tayebi et al. (2019) in Tunisia, who reported a mean age of 48.7 ± 16.3 years. Diallo et al. (2019) in Côte d’Ivoire found a mean age of 45.8 ± 11.2 years, while Hautemanière et al. (2018) in France reported 52.3 ± 10.5 years. Thus, the 40–50 years age bracket is often predominant in renal biopsy studies, which is consistent with our findings.

Breakdown of cases by sex

Our study shows a male predominance (67.7%). This finding is consistent with Kouadio et al. (2020) in Côte d’Ivoire, who reported 62% male cases. In contrast, Stengel et al. (2017) in France observed a more balanced sex distribution. Male predominance in African studies may be explained by biological (hormonal influences such as testosterone) and lifestyle factors (smoking, alcohol consumption). Limited biopsy use may also be attributed to inadequate infrastructure, lack of skilled personnel, and the burden of other diseases.

Distribution of cases according to clinical signs

Nephrotic syndrome was the most frequent clinical indication (39.2%).

This is consistent with Sano et al. (2017) in Japan, who reported nephrotic syndrome as a frequent indication (32.5%). Nasr et al. (2013) in the USA found nephrotic syndrome as the leading indication (42%).

Distribution of cases by anatomopathological findings

Segmental and focal hyalinosis was the most frequent diagnosis (45.1%).

This is comparable to Mbanya et al. (2018), who found 41%. Rivera et al. (2020) in Spain also reported focal segmental hyalinosis in 33% of cases.

Limitations

The main limitation of this study lies in the cross-sectional design and the small, non-representative sample of the DRC population.

CONCLUSION

Although infrequently performed in our setting, renal biopsies remain essential in the diagnostic, prognostic, and therapeutic approach to nephrology. The under-utilisation of renal biopsies – due to lack of infrastructure and skilled personnel – explains the scarcity of epidemiological data and often results in untargeted, delayed patient management.

We call on health and political authorities to subsidise public hospitals to ensure that biopsy costs are not borne solely by patients, and to equip hospitals adequately.

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Ethical Approval: This study was approved by the Ethics Committee of Bel Campus Technological University.

Conflicts of Interest: None declared.

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