

# A retrospective review of nephrectomies at a tertiary hospital in northern Ghana

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**Background:** Nephrectomy is the surgical removal of a diseased kidney or the removal of a kidney for transplantation. Benign and malignant kidney conditions may necessitate kidney removal to reduce morbidity and prevent death. Healthcare accessibility and affordability are relatively poor in Africa, alongside limited human resources for diagnosing and managing medical conditions. Kidney conditions, which can be treated to prevent loss of kidney function, may be undiagnosed or untreated, leading to the loss of kidney function and nephrectomy. We evaluated the common reasons for non-trauma-related nephrectomy at a tertiary hospital in northern Ghana. The study aimed to provide baseline information to improve patient care and prevent kidney function loss leading to nephrectomy.

**Materials and methods:** The retrospective, descriptive study evaluated the operative records of patients who underwent open nephrectomy at the only teaching hospital in northern Ghana from 2014 to 2024.

**Results:** The median age of the study subjects was 28 years, with an almost equal number of males (50.4%) and females (49.6%). The most common indication for nephrectomy at our centre was loss of kidney function from treatable causes, mainly pelvi-ureteric junction (PUJ) obstruction (34.9%) and renal/ureteric stones (19.3%). Renal cell carcinoma and Wilms' tumour each constituted 15.7% of nephrectomy indications.

**Conclusion:** Nephrectomy is a common surgical procedure performed in northern Ghana; however, the indications are commonly due to treatable conditions. Thus, improvements in healthcare will significantly reduce the need for nephrectomies in our area.

**Keywords:** nephrectomy, diseased kidney, surgical removal

## Introduction

The kidney is a paired organ that plays a vital role in removing metabolic waste products from the human body.<sup>1</sup> In addition, it regulates electrolytes and the acid–base balance, and secretes some hormones, including renin that helps regulate blood pressure and erythropoietin that helps in erythropoiesis.<sup>1</sup> Nephrectomy refers to the surgical removal of a diseased kidney or kidney removal for transplantation.<sup>2</sup>

A variety of conditions may lead to irreversible kidney damage, such as infections/inflammations and longstanding obstruction of drainage from the kidney due to urinary calculi and PUJ obstruction.<sup>1</sup> Moreover, malignant conditions such as renal cell carcinoma and Wilms' tumour not only destroy the kidney but also have the potential to cause death.<sup>1</sup> Thus, it may become necessary to remove the kidney to improve the patient's quality of life or prevent death.

Healthcare accessibility and affordability are relatively poor in Africa, and there are limited human resources for diagnosing and managing medical conditions.<sup>3</sup> Consequently, there are delays in receiving appropriate care and an inability to obtain preventive services.<sup>4</sup> Thus, treatable kidney conditions may be undiagnosed or untreated, leading to the loss of kidney function and, hence, nephrectomy. In this context, we reviewed records of adults and children who underwent nephrectomy at a tertiary hospital in northern Ghana over 11 years. Data analysis aimed to identify the common reasons for nephrectomy to inform and implement a disease control programme focused on preventing kidney loss.

## Materials and methods

This was a descriptive, retrospective evaluation of nephrectomies performed at Tamale Teaching Hospital from January 2014 to December 2024. Data were extracted from the theatre operation logbook and included demographics such as age and gender. The laterality and indication for nephrectomy were also extracted. Data were entered into Microsoft Excel and cleaned. Analysis was performed using IBM SPSS Statistics.

## Results

The theatre operation logbook contained 83 cases of open nephrectomy, all of which were included in the analysis. There was an almost equal number of males (50.6%) and females (49.4%) (Figure 1). The youngest patient was one year old, and the oldest was 75, with a median age of 28 (Table 1). Nephrectomy cases

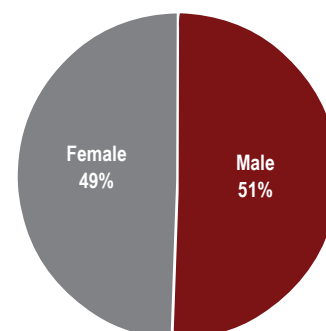


Figure 1: Gender distribution

Table I: Age distribution

Variables	n	%
Age median (min, max) in years	28 (1, 75)	
<b>Age group (years)</b>		
< 15	27	32.5
16–25	10	12.0
26–35	11	13.2
36–45	12	14.5
≥ 46	23	27.7

Table II: Indications for nephrectomy

Diagnosis	n	%
Cystic dysplastic kidney	8	9.6
Non-functioning kidney secondary to PUJ obstruction	29	34.9
Non-functioning kidney secondary to ureteric/renal stone	16	19.3
Xanthogranulomatous pyelonephritis	2	2.4
Renal cell carcinoma	13	15.7
Nephroblastoma/Wilms' tumour	13	15.7
Other renal tumour	2	2.4

PUJ – pelvi-ureteric junction

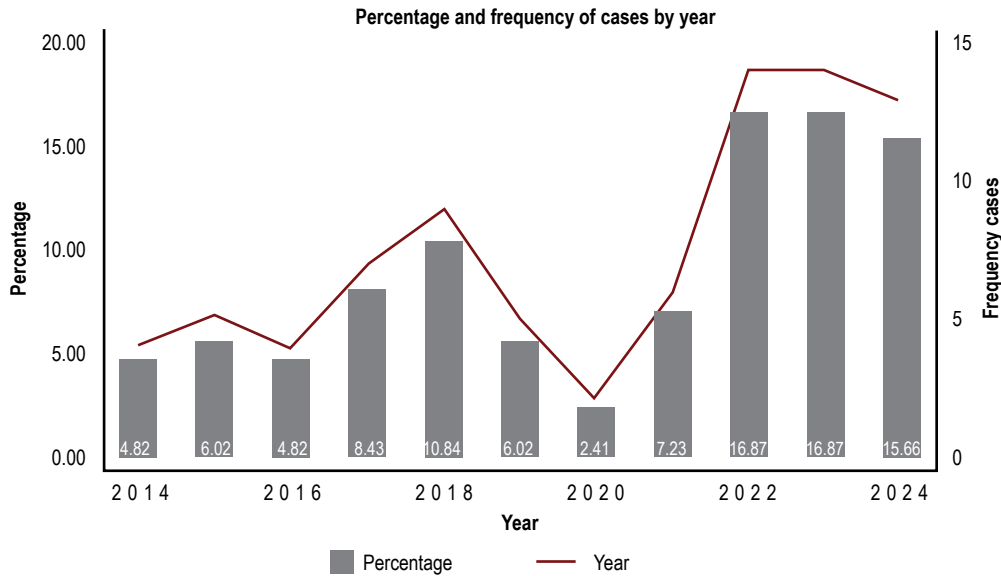


Figure 2: Nephrectomy distribution by year

showed a high trend since 2014, with a drop in 2020. Thereafter, it increased sharply over the last four years (Figure 2).

Urinary tract obstruction accounted for the largest proportion (54.2%) of nephrectomy indications (Table II). Of the nephrectomies, 56.6% were the right kidney (Figure 3). Tumours were common nephrectomy indications in early and late life; however, loss of kidney function due to PUJ obstruction and renal/ureteric stones accounted for the highest proportions of nephrectomy in these age categories (Figure 4).

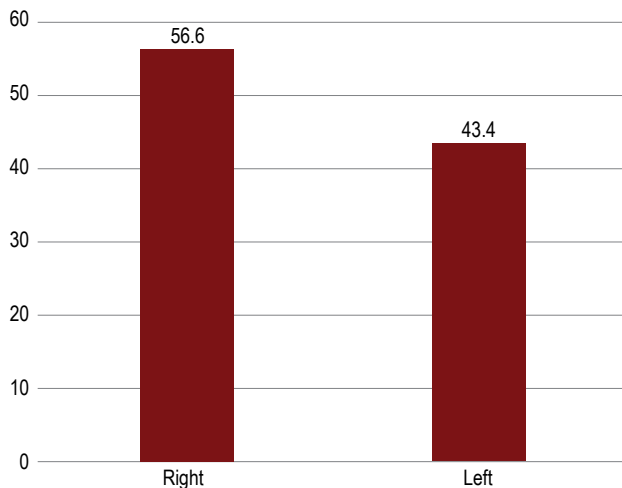


Figure 3: Laterality of nephrectomy

## Discussion

The most common nephrectomy indications at our centre were loss of kidney function from treatable causes, mainly PUJ obstruction (34.9%) and renal/ureteric stones (19.3%). Similar to our findings, a study in Iraq found that urinary tract obstruction accounted for the largest proportion (84%) of nephrectomy indications. However, investigators found that stone disease accounted for 52%, while other forms of obstruction, including PUJ, accounted for 32%.<sup>6</sup> Low socio-economic status and relatively poor healthcare systems are common at these two sites. Thus, the treatable conditions are not diagnosed/treated early, accounting for the loss of kidney function leading to nephrectomy.

PUJ obstruction was the most common nephrectomy indication from childhood to about 40 years, with stone disease thereafter. Tumours accounted for the second-largest indication for nephrectomy in both young and adult groups. Conversely, a Nigerian study of paediatric nephrectomy reported that Wilms' tumour accounted for the largest indication (67.3%), followed by obstruction (17.3%).<sup>7</sup> Despite sharing a similar healthcare status with Nigeria, it is likely that our patients in northern Ghana present late with Wilms' tumour and do not benefit from surgery (nephrectomy). This assertion of late presentation may enforce our high proportion of nephrectomy due to PUJ obstruction (37.9%) among those aged < 15 years, when expertise is available to treat it.

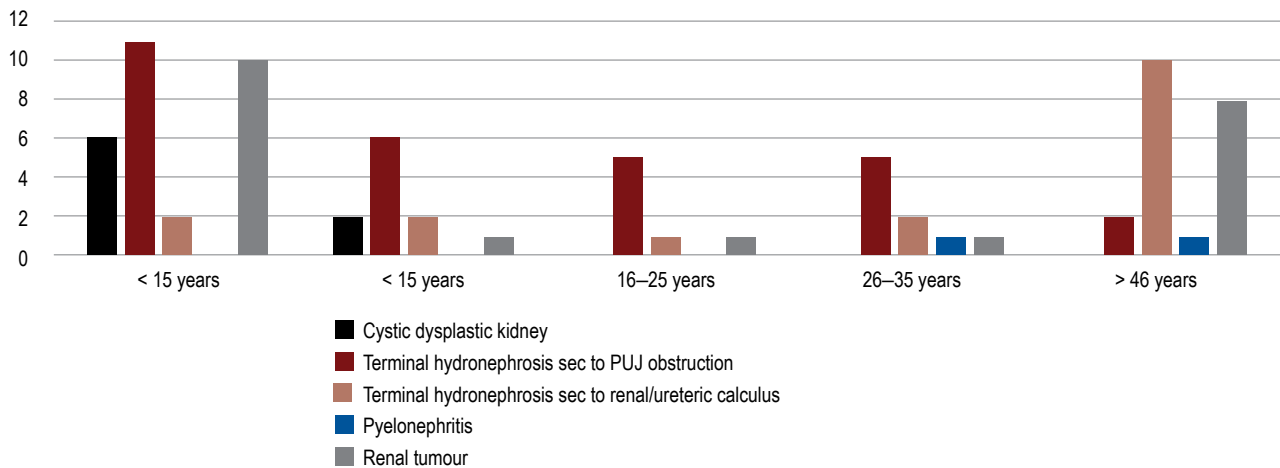


Figure 4: Age categories and indications for nephrectomy

The age of our study subjects ranged from 1 to 75 years, with a median of 28. Compared with a study in India, the participants' ages ranged from 5 to 76 years, with a mean of 45.6.<sup>5</sup> In our study, more than half of the patients were aged < 40 years, probably due to improved paediatric care at our hospital. In the adult population aged > 40 years, renal obstruction due to stone disease constituted the largest indication for nephrectomy compared with anomalies in the younger age group. An earlier study of stone disease in the same institution revealed a slightly higher proportion of adults than children (52.7%), with most adult stones located in the upper urinary tract, where they can easily obstruct kidney drainage.<sup>8</sup> In contrast, malignant renal lesions accounted for 54.6% of nephrectomy indications in Accra, the capital of Ghana.<sup>9</sup>

Urology practice is relatively newer in the north compared with southern Ghana, with more urologists, expertise, and equipment. Also, patients' socio-economic status in southern Ghana is relatively higher than in the north. These factors may improve urinary stone treatment, especially in the upper tract in southern Ghana.

### Study limitations

Our study used retrospective data with very limited information, including the histological pattern of the nephrectomy specimen. Also, the clinical presentations of these patients could not be retrieved due to poor record-keeping, making evaluation difficult. Loss of kidney function was assessed only on computed tomography scans, and renal scintigraphy was unavailable.

### Recommendation

There is a need to improve case documentation to ascertain clinical presentations and histological patterns of nephrectomy specimens. Moreover, educating the populace is key in convincing patients to report early for treatment. Finally, we recommend building capacity in human resources and equipment to diagnose and treat renal conditions early, to prevent kidney destruction and the need for nephrectomy.

### Conclusion

Nephrectomy is a common surgical procedure performed in northern Ghana; however, the indications are commonly due to treatable conditions. Thus, urology care improvement in this area

will significantly reduce the number of nephrectomies and the associated healthcare burden.

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### Conflict of interest

The authors declare no conflict of interest.

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