



## **Spectrum of Renal Diseases in Benue State University Teaching Hospital Makurdi, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author MOO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors JO and IJI managed the analyses of the study. Author ABO managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Renal disease constitute an enormous health burden globally and is associated with high morbidity and mortality. This study aims to determine the spectrum of renal diseases admitted into the medical wards of a new teaching hospital – Benue State University Teaching Hospital Makurdi, Nigeria.

**Methodology:** This was a retrospective analysis of patients admitted into the medical wards for renal diseases from January 2013 to December 2015.

**Results:** A total of 1,147 patients were admitted of which 329 had renal disease. The mean age of the patients was  $28.9 \pm 11.4$ . The most prevalent renal diseases were chronic kidney disease (CKD) 147 (44.7%), acute kidney injury 104 (31.6%), HIV associated nephropathy 22 (6.7%) and obstructive uropathy 21 (6.4%). Others were urinary tract infections 18 (5.5%), nephrotic syndrome 12 (3.6%) and autosomal dominant polycystic kidney disease 5 (1.5%). Two hundred and fifty seven (78.1%) were discharged home, 15 (4.6%) were referred to other hospitals while 57 (17.3%) died.

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**Conclusion:** Renal disease is a significant cause of morbidity and mortality in Makurdi, North Central Nigeria. This underscores an urgent need to institute measures for prevention and early detection of renal disease. This will help to improve outcome as well as reduce the burden of kidney disease.

*Keywords: Spectrum; renal diseases; new teaching hospital.*

## 1. INTRODUCTION

Renal disease is a common health problem associated with high morbidity and mortality [1]. The increase in the prevalence of renal disease is associated with life style modifications, increase in life span and nephrotoxin abuse [2]. Chronic kidney disease (CKD) is common and is strongly associated with end stage renal disease (ESRD) and cardiovascular deaths [3]. Renal disease in Nigeria is characterized by late presentation, under reporting, poor literacy level of most patients and inability to afford renal replacement therapy. Additionally there is paucity of information regarding the magnitude of renal disease in our environment. Obtaining accurate data is hampered by the poor socio economic status of most patients with lack of access to specialized care in tertiary institutions, where most of the data is generated.

In developed countries, diabetes mellitus and hypertension constitutes the major causes of CKD [4]. Hypovolaemia, cardiovascular surgery and use of nephrotoxic agents are common causes of acute kidney injury (AKI) in developed countries [5,6]. However, in developing countries like Sub-Saharan Africa, the dual burden of non-communicable and infectious diseases predispose to an increase in prevalence and a modified spectrum of kidney diseases [7].

The common causes of CKD in Africa are chronic glomerulonephritis, hypertension and diabetes mellitus with CKD affecting mainly young adults [8,9,10]. The common aetiologies of AKI in developing countries are sepsis, diarrhoea, use of nephrotoxic agents and obstetric complication [11,12]. In Nigeria renal diseases tend to affect relatively younger individuals, most of whom are in the economically productive age group. This has important health and economic implications for the nation. Risk factors associated with renal diseases in previous studies carried out in Nigeria include age, elevated blood pressure, diabetes mellitus, habitual intake of analgesics, herbs and obesity [13].

In recent decades, there has been a shift in the major causes of death and disability from nutritional deficiency and infectious diseases toward non-communicable diseases with the highest mortality caused by cardiovascular diseases [14]. Kidney diseases particularly CKD play a key role in determining health outcomes of major non-communicable diseases such as diabetes and cardiovascular diseases and thus has become a major public health concern worldwide, greatly increasing the burden of chronic medical disorders in hospitals [15,16].

Medical audit of morbidity patterns is a useful tool in health planning and policy formulation in any given community. In addition it is useful in healthcare research and resource allocation particularly in economies where financial allocation to the health sector is not sufficient to meet the growing medical and financial demands [17].

## 2. METHODS

This was a retrospective analysis of medical records of patients admitted in Benue State University Teaching Hospital (BSUTH), Makurdi from January 2013 to December, 2015. BSUTH is a tertiary hospital located in North Central Nigeria serving all the general hospitals in the state as well as receiving referrals from neighbouring states of Nassarawa, Taraba and Kogi. Admission and discharge records were retrieved and the following information extracted: name, age, hospital number, sex, renal diagnosis, duration of hospital stay, investigations, treatment, co-morbidities and outcome.

Ethical clearance was obtained from the human research and ethics committee of the hospital. Patients with renal diseases were identified and classified as follows:

### 2.1 Definitions

Acute kidney injury (AKI) was defined according to the Kidney Disease Improving Global Outcome (KDIGO) criteria as serum creatinine

rise of 1.5 – 1.9 times baseline or  $\geq 26$  micromol/L increase or urinary output of  $< 0.5\text{mL/kg}$  per hour for over 6 hours [18].

CKD was defined according to kidney disease quality outcome initiative (KDOQI) criteria of kidney damage  $\geq 3$  months or estimated glomerular filtration rate (eGFR) of  $\leq 60$  mLs/min/1.73 m<sup>2</sup> for  $\geq 3$  months [19]. The eGFR was calculated using the CKD- Epidemiology Collaboration (EPI) equation [20].

Nephrotic syndrome was defined by the association of proteinuria  $> 3.5$  g/ 24 hours, hypoalbuminaemia  $< 3.0$  g/dL and oedema.

Chronic glomerulonephritis was referred to CKD patients with hypertension, proteinuria, haematuria and shrunken kidneys on ultrasonography.

Autosomal dominant polycystic kidney disease was defined by ultrasonography as bilaterally enlarged kidneys and the presence of multiple cysts throughout the renal parenchyma.

Hypertension was defined as systolic blood pressure of  $\geq 140$  mmHg and/or diastolic blood pressure  $\geq 90$  mmHg or use of anti – hypertensives.

Diabetes mellitus was defined as blood glucose  $>126$  mg/dl or use of anti diabetic agents.

Obstructive uropathy was defined as structural or functional changes in the urinary tract that impede normal urine flow [21]. The structural or functional changes were defined clinically e.g enlarged prostate on digital rectal examination or by ultrasonography e.g calyceal dilatation hydronephrosis or hydroureter or by intravenous urography.

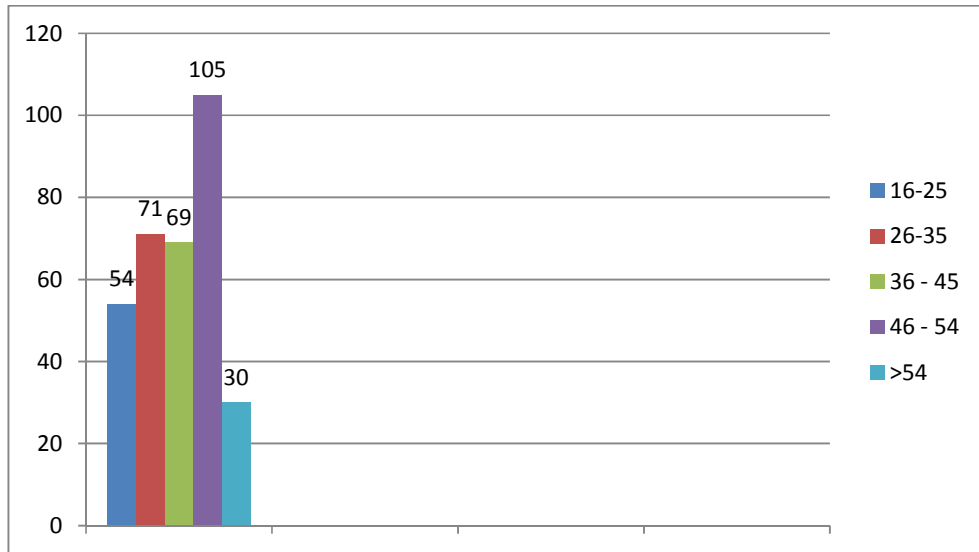
## 2.2 Data Analysis

Statistical analysis was done using the statistical package for social sciences (SPSS) version 19.0 by Chicago Inc. Data analysis was done using descriptive statistics (frequency, proportions, means and standard deviation to summarize variables). The level of significance was set at 5%.

## 3. RESULTS

During the period under review (January, 2013 – December, 2015), a total of 1,147 patients were admitted in the medical wards of the hospital. Renal diseases accounted for 329( 28.7%) of total medical admissions in the medical ward. The mean age of patients with renal disease was  $28.9 \pm 11.4$  years. The bulk of the patients were in the 26-35, 36-45 and 46 – 54 years age group. Two hundred and fourteen (65%) were males and 115 (35%) were females. The age group of the study population is shown in Fig. 1.

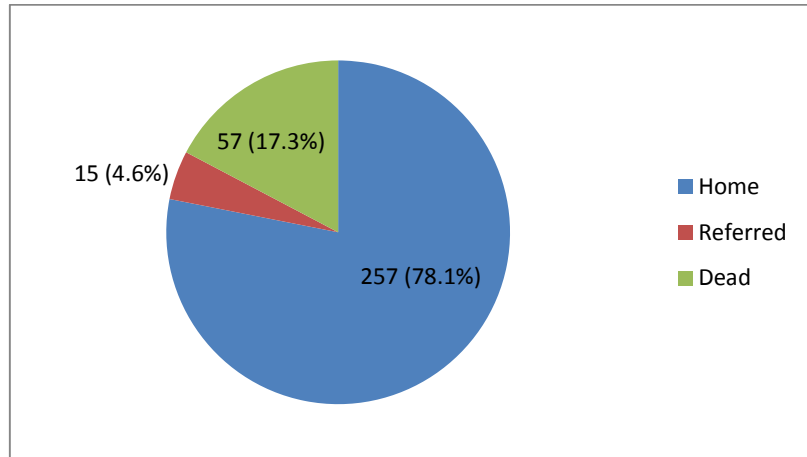
The distribution of renal diseases during the three year review period is shown in Table 1.



**Fig. 1. Histogram showing age group of the study population**  
 Mean age-  $28.9 \pm 11.4$  SD years

**Table 1. Annual distribution of renal diseases from 2013-2015**

Year	2013	2014	2015	Total
<b>Number of patient (%)</b>				
Total number of patients	341(29.7)	444(38.7)	362(31.6)	1147
Renal patients	98(29.8)	124(37.7)	107(32.5)	329



**Fig. 2. Pie chart showing outcome of patients with renal diseases**

**Table 2. Pattern of renal diseases during 3 year review period**

Renal diagnosis	Frequency	Percentage (%)
Chronic kidney disease	147	44.7
Aetiology of CKD		
*Hypertension	74	22.5
*Chronic glomerulonephritis	50	15.2
*Diabetic nephropathy	23	7.0
Acute Kidney injury	104	31.6
HIV-associated nephropathy	22	6.7
Obstructive uropathy	21	6.4
Urinary tract infection	18	5.5
Nephrotic syndrome	12	3.6
Autosomal Dominant Polycystic kidney disease	5	1.5

\*CKD

The five leading causes of kidney diseases were chronic kidney disease 147 (44.7%) acute kidney injury 104(31.6%), HIV associated nephropathy 22 (6.7%) obstructive uropathy 21 (6.4%),

Urinary tract infection 18 (5.7%). This is shown in Table 2.

Over the period under review 57 patients died representing 17.3% of the study population, 257 renal patients were discharged representing 78.1% of the total number of renal patients while 15(4.6%) were referred. This is shown in Fig. 2.

#### 4. DISCUSSION

The objective of this study was to determine the spectrum of renal diseases in patients admitted to the medical wards of BSUTH over a three year period.

The peak age of renal patients admitted over the period under review was between the third, fourth and fifth decades which is similar to previous studies done in Nigeria [22,23]. These patients are young and economically active. This is in sharp contrast with reports from United States where CKD is more prevalent in adults aged 60years and above [24].

Renal diseases accounted for 28.7% of all medical admission during the period under review. This is at variance with some studies done in Nigeria. For instance Etyang AO et al. [25] reported a prevalence of 2-3%. Similarly Ogunmola OJ and Oladosu OY [26] reported a

prevalence of 7.2%. The reason for the high prevalence of kidney disease in this centre was because the teaching hospital started as a renal centre before it became fully operational. During the time it operated solely as a renal centre we received a lot of referrals from neighbouring states because of the availability of renal replacement therapy. The high prevalence of renal diseases underscores the enormous burden of renal diseases in health care delivery in Nigeria. The majority of patients in Nigeria fund their treatment and this poses a huge financial burden on patients. In addition renal replacement therapy is not readily available as it is limited to urban areas and even when available the cost is prohibitive.

The most common causes of renal diseases admitted were CKD comprising hypertensive nephropathy, chronic glomerulonephritis (CGN) and diabetic nephropathy. Studies done in Nigeria also report hypertension, chronic glomerulonephritis and diabetic nephropathy as leading causes of CKD in Nigeria [9,27] and South Africa [28]. The burden of hypertension is high and target organ damage involving the kidneys is quite common [29,30]. In contrast to hypertension as a leading cause of CKD in Africa, diabetes mellitus is the leading cause of CKD and ESRD in other regions of the world [31].

In this study, AKI accounted for 104(31.6%) of admissions. Liangos O et al. [32] reported an incidence of 19.2 per 1000 hospitalizations. AKI is associated with high morbidity and mortality especially in developing countries [33,34,35].

This study showed a 6.7% prevalence of renal disease in HIV – infected patients. This is in contrast from reports from other studies which revealed higher prevalence [36]. This may be due to the fact that majority of HIV patients are treated in special centres and are only referred when they have renal complications. Most of the patients either presented late or were referred late.

The mortality rate was 57(17.3%) in this study. The high mortality observed from this study is similar to reports from other studies. Ngwogu KO et al. [37] reported a mortality of 30.6% and Wachukwu CM, Emem-Chioma PC et al. [38] also reported a mortality of 20.3%.

This study has some limitations. Some patients were excluded because of incomplete files.

There could have been selection bias as most patients were self-funded and only patients who could pay for their care were admitted into the hospital.

## 5. CONCLUSION

Renal diseases are common and account for a high proportion of medical admissions in BSUTH, North central, Nigeria. Majority of patients are young adults in their economically productive years and often present late. Most of these diseases are preventable and treatable especially in earlier stages hence health education should be reinforced with emphasis on lifestyle modification in addition to targeted screening of individuals at risk of kidney disease to detect early diseases and thus prevent and reduce the burden of kidney disease in Nigeria.

## CONSENT

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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