



<https://doi.org/10.59298/RIJPP/2024/3236367>

# Clinico-Demographic Profiling of Patients Diagnosed with Chronic Kidney Disease using C.T. Scan Imaging in Enugu Nigeria. A Single Center Research

<sup>1,2,3</sup> Ozor Ignatius Ikemefuna; <sup>1</sup>Ogbo F. Ovie; <sup>1</sup>Nnamchi Ifenna Salvator; <sup>1</sup>Okpala Onyedikachukwu Precious; <sup>1,2</sup>Ugwu Valentine Ifebuchekwuwu; <sup>2</sup>Okoye-oli, Ifeoma peace; <sup>2</sup>Nwobodo, Holymass Onyedikachi.

<sup>1</sup>Department of Anatomy, Faculty of Basic Medical Sciences, College of Medicine, State University of Medical and Applied sciences (SUMAS), Igbo-Eno, Enugu State, Nigeria.

<sup>2</sup>Department of Anatomy, Faculty of Basic Medical Sciences, College of Medicine, Enugu State University of Science and Technology (ESUT), Enugu, Nigeria.

<sup>3</sup>Department of Surgery, Faculty of Clinical Medicine, College of Medicine, Enugu State University of Science and Technology, Enugu, Nigeria.

Corresponding author: Ugwu, Valentine Ifebuchekwuwu ([valentineugwu66@gmail.com](mailto:valentineugwu66@gmail.com), [valentine.ugwu@sumas.edu.ng](mailto:valentine.ugwu@sumas.edu.ng), +2348136236747)

## ABSTRACT

Chronic kidney disease (CKD) is a severe pathological condition of the kidney associated with gradual loss or impairment of kidney functions. If not diagnosed and treated early, chronic kidney disease usually comes with morbid consequences. This study aims to investigate the clinic-demographic profile of patients diagnosed with chronic kidney disease using C.T Scan imaging in Enugu Nigeria. This is a descriptive study carried out in the department of radiography Hansa Clinic, Enugu Nigeria. 100 participants of both sexes that met with the inclusion criteria was used for the study. Data was analyzed using the statistical program SPSS version 23. This study results showed that, CKD affects more male (54%) than female (46%). Individuals at the highest risk of developing CKD are those at the age of 50 years and above while those below 19yrs (6%) have the least risk. Patient indication result (35%) and Helical abdominal CT scan (43%) showed nephrolithiasis to be the most prevalent with cancer as the least. Cross tabulation with gender showed nephrolithiasis to be higher in females at 51.2% while normal CT urography (61.5%), Ureteric obstruction (71.4%) and Renal cyst (54.5%) to be higher in males. Cross tabulation with age also shows nephrolithiasis to be higher at 37.2% for patients between the ages of 30-39. Conclusively, the study has shown CKD to be predominant in males of which the risk increases with age. While our study provides valuable insights, this study still suggests further research on CKD.

Keywords: Clinico-Demographic, Profiling, Patients, Diagnosed, Chronic Kidney, Disease and Imaging

## INTRODUCTION

The kidneys are two bean shaped organs that lie in the retroperitoneal space extending from the 12<sup>th</sup> thoracic to the 3<sup>rd</sup> lumbar vertebrae, each weighing about 150g. The kidney just like every other organ is affected by diseases which can be acute to chronic. Chronic kidney disease (CKD) causes gradual loss or impairment of kidney functions and is a serious, widespread, global disease that has dramatically increased over the past few years, affecting about 800 million individuals and resulting in 1.2 million deaths globally every year [1]. CKD is manifested by abnormal albumin secretion, and is assessed by albumin creatinine rate (ACR), and/or abnormal kidney function computed by the glomerular filtration rate (GFR). Kidney disease is considered chronic when these functional impairments are observed over a period exceeding 3 months [2]. In Nigeria, kidney disease with an associated functional impairment has been widely reported, but the prevalence which can be up to 26% varies depending on the population studied and type of kidney disease [3]. Early detection and diagnosis are important measures to reduce the medical burden of CKD patients. Various communicable and non-communicable diseases including hypertension, diabetes mellitus, glomerulonephritis, infections, obesity, obstructive urinary diseases, and cystic kidney diseases have been reported to cause kidney function impairment and associated kidney diseases [3]. Also, Family history of kidney disease, socioeconomic status, cigarette smoking, and analgesic abuse have documented to be associated with kidney disease development [4]. Progressive CKD is linked to several complications with higher prevalence and

intensity at lower levels of kidney function, which interact with each other [5]. These complications contribute to high morbidity and mortality and poor quality of life. In addition to laboratory testing, medical imaging has been used to assess renal functional and morphological abnormalities [6]. Computed Tomography (CT) scans are the routine diagnostic modality for CKD. It has the significant advantage of high resolution and can obtain information on tissue microcirculation in patients, providing a scientific basis for physicians to diagnose CKD [7]. CT scans has evolved into one of the most important techniques in medical imaging, with applications in various fields and various organ assessments. It was first used on the kidney to detect kidney stones [8], and have since then have been used for the diagnosis of many other kidney problems, such as tumours, cysts, infections, congenital anomalies, and fluid accumulation. This study therefore aims at investigating the clinico-demographic profiling of patients diagnosed with chronic kidney disease using C.T Scan imaging in Enugu Nigeria.

### MATERIALS AND METHODS

This is a retrospective study of cases of CKD presented in the department of radiography Hansa Clinic, Enugu Nigeria. The sample population comprises of patients diagnosed with CKD from January 2013 to June 2023. A total of 100 patients comprising of 54 (54%) males and 46 (46%) females were used for this study. The patients' folders were retrieved and the clinicodemographic biodata, associated complications, etiology, types and scan reports were retrieved. Analysis of data was done using the statistical program SPSS version 23, accurate descriptive statistical analyses were measured. Chi – squared tests were used to determine the relationships between components of the survey.

### RESULTS

**Table 1: Distribution of the Patients by Gender**

SEX	FREQUENCY	PERCENTAGE
Male	54	54.0%
Female	46	46.0%
Total	100	100.0%

Table 1 shows that the majority of the patients were males, 54 in total, making up (54.0%) of the total population, while females consisted of a lesser population of 46 individuals the remaining (46.0%) of the participants.

**Table 2: Distribution of the patients according to their age**

AGE RANGE	FREQUENCY	PERCENT
≤19yrs	6	6.0
20 – 29yrs	9	9.0
30 – 39yrs	27	27.0
40 – 49yrs	21	21.0
≥50yrs	37	37.0
Total	100	100.0%

Table 2 above shows the distribution of patients with chronic kidney disease. It was more common in patients above 50 years of age; with 37 (37.0%) of the patients falling into this range. Age range of ≤19yrs had the least number of patients; with only 6 (6.0%) patients belonging to this group.

**Table 3: Distribution of the patients according to their indications**

INDICATIONS	FREQUENCY	PERCENT
Nephrolithiasis	35	35.0%
Ureteric obstruction	7	7.0%
Flank pain	16	16.0%
Haematuria	12	12.0%
Cancer	7	7.0%
Loin pain	5	5.0%
Renal cyst	7	7.0%
Pyelonephritis	3	3.0%
Renal mass	3	3.0%
Hydronephrosis	4	4.0%
Urethrocele	1	1.0%
Total	100	100.0%

Table 3 above shows the distribution of patients according to their indications. Nephrolithiasis was the most prevalent indication, occurring in (35%) of the participants studied, followed by pain in the flank, which was observed in (16%) of the participants, then haematuria, which occurred in (12%) of the total population. Ureteric Obstruction, Cancer and renal cysts were all observed to occur

in (7%) of the total population each. Loin pain was observed in (5%) of the total population. Pyelonephritis and renal masses both occurred in (3%) of the studied population. Finally, Urethrocele was observed to be the least occurring indication with only (1%) of the population affected.

**Table 4: Distribution of the patients according to Helical Abdominal CT scan**

REPORT	FREQUENCY	PERCENT
Nephrolithiasis	43	43.0%
Lytic changes	1	1.0%
Ureteric obstruction	7	7.0%
Normal CT urography	13	13.0%
Polycystic disease	2	2.0%
Bladder diverticuli	1	1.0%
Benign prostatic hyperplasia	2	2.0%
Liver cyst	1	1.0%
Pyelonephritis	2	2.0%
Renal papillary necrosis	2	2.0%
Renal cyst	11	11.0%
Hydronephrosis	7	7.0%
Hypertrophied column of Bertini	1	1.0%
Ectopic kidney	1	1.0%
Cancer	6	6.0%
<b>Total</b>	<b>100</b>	<b>100.0</b>

Table 4 above shows the distribution of patients according to helical abdominal CT scan. From the result, incidence of nephrolithiasis (43.0%) was higher than any other case reported. And followed by renal cyst at (11.0%) of the population, Utereric obstruction and Hydronephrosis occurring in (7%) of the population, Cancer occurring in (6%) of the population. Polycystic kidney disease, benign prostatic hyperplasia and renal papillary necrosis all occurring in (2%) of the population. Meanwhile, (13%) of the patients had their CT scan result reported as being normal.

**Table 5: A cross tabulation of the patients report with their gender**

Report	Male		Female	
	N	%	N	%
Nephrolithiasis	21	48.8	22	51.2
Lytic changes	0	0.0	1	100
Ureteric obstruction	5	71.4	2	28.6
Normal CT urography	8	61.5	5	38.5
Polycystic disease	1	50.0	1	50.0
Bladder diverticuli	1	100.0	0	0.00
Benign prostatic hyperplasia	2	100.0	0	0.00
Liver cyst	0	0.0	1	100.0
Pyelonephritis	2	100.0	0	0.0
Renal papillary necrosis	0	0.0	2	100.0
Renal cyst	6	54.5	5	45.5
Hydronephrosis	4	57.1	3	42.9
Hypertrophied column of Bertini	0	0.0	1	100.0
Ectopic kidney	0	0.0	1	100.0
Cancer	4	66.7	2	33.3
<b>Total</b>	<b>54</b>	<b>54.0</b>	<b>46</b>	<b>46.0</b>

Across all the conditions reported, the table 5 showed that majority of the patients are males. For the patients reported to have nephrolithiasis, the females are 22 (51.2%) while the males are 21 (48.8%).

**Table 6: A cross tabulation of the patients report with their age**

Report	≤19yrs		20 –29yrs		30 – 39		40–49		≥50yrs	
	N	%	N	%	N	%	N	%	N	%
Nephrolithiasis	0	0.0	4	9.3	16	37.2	11	25.6	12	27.9
Lytic changes	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0
Ureteric obstruction	2	28.6	0	0.0	2	28.6	1	14.3	2	28.6
Normal CT urography	1	7.7	3	23.1	4	30.8	4	30.8	1	7.7
Polycystic disease	0	0.0	0	0.0	1	50.0	1	50.0	0	0.0
Bladder diverticuli	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0
Benign prostatic hyperplasia	0	0.0	0	0.0	0	0.0	0	0.0	2	100.0
Liver cyst	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0
Pyelonephritis	0	0.0	0	0.0	0	0.0	0	0.0	2	100.0
Renal papillary necrosis	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0
Renal cyst	1	9.1	0	0.0	0	0.0	1	9.1	9	81.8
Hydronephrosis	0	0.0	0	0.0	4	57.1	0	0.0	3	42.9
Hypertrophied column of Bertini	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0
Ectopic kidney	1	100.0	0	0.0	0	0.0	0	0.0	0	0.0
Cancer	1	16.7	1	16.7	0	0.0	2	33.3	2	33.3
<b>Total</b>	<b>6</b>	<b>6.0</b>	<b>9</b>	<b>9.0</b>	<b>27</b>	<b>27.0</b>	<b>21</b>	<b>21.0</b>	<b>37</b>	<b>37.0</b>

Across all the conditions reported, the table 6 showed that majority of the patients have nephrolithiasis. For the patients reported to have nephrolithiasis, majority are elderly people above the age of 50 years.

**DISCUSSION**

In line with documentations of [9]; [10] and [11], the results from this study reveals that there is a higher prevalence of chronic kidney disease amongst the male participants (54%) when compared to the female (46%) as shown in table one. The chances of developing CKD were seen to increase with age and individual at the ages of 50 years (37%) and above having the highest risk of as shown in table 2 corroborates with the findings of [12]; [13]; [14] and [15].

The most commonly observed indication amongst the studied population was nephrolithiasis, otherwise known as kidney stones, which occurred in 35% of the 100 people (table 3 and table 4), all of whom were adults and Urethrocele being the rarest only occurring in 1 individual. Nephrolithiasis also has the highest incidence rate of all other cases reported at 43% occurring almost evenly across both genders, with 21 (48.8 %) of males and 22 (51.2%) of females out of the 100 that was studied being diagnosed, which is significantly higher than the other cases such as lytic changes, polycystic kidney disease, renal cysts as shown in table 5. It can also be observed in table 6, that as the ages advance, so does the risk of developing nephrolithiasis, with patients above the age of 29 being more prone to developing nephrolithiasis due to the gradual buildup of solute particles in the kidney which can arguably be as a result of lifestyle factors, such as diet or drug use over time. These results corroborate existing research on Nephrolithiasis by [16]; [17] and [18]. Also, [19], records Nephrolithiasis or kidney stones, as the most common condition affecting the urinary system, affecting about 12% of the world population between the ages 20 to 49. Also, comparatively, females show a higher incidence of nephrolithiasis while males dominate in cases of ureteric obstruction, benign prostatic hyperplasia (BPH) and pyelonephritis, which causes obstruction to the urinary tract as well. According to [20], older males may experience an increased risk of pyelonephritis due to conditions like BPH or urinary retention, making them susceptible to ascending urinary tract infections, this is among the reason why women have lower risk of CKD progression and death when compared with men.

**CONCLUSION**

In conclusion, chronic kidney disease (CKD) exhibits a higher prevalence in men, with the likelihood of developing CKD increasing with age for both genders. Among the various risk factors and causes associated with CKD, nephrolithiasis, or kidney stones, emerges as the most significant contributor. This correlation underscores the critical need for early detection and management of kidney stones to mitigate the progression to CKD. Comprehensive public health strategies and targeted interventions are essential to address the modifiable risk factors and to improve outcomes for those at risk of or currently managing CKD.

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**CITE AS: Ozor Ignatius Ikemefuna; Ogbo F. Ovie; Nnamchi Ifenna Salvator; Okpala Onyedikachukwu Precious; Ugwu Valentine Ifebuchekukwu; Okoye-oli Ifeoma peace and Nwobodo Holymass Onyedikachi (2024). Clinico-Demographic Profiling of Patients Diagnosed with Chronic Kidney Disease using C.T. Scan Imaging in Enugu Nigeria. A Single Center Research. RESEARCH INVENTION JOURNAL OF PUBLIC HEALTH AND PHARMACY 3(2): 63-67. <https://doi.org/10.59298/RIJPP/2024/3236367>**