

## Pattern of co-morbidities in chronic kidney disease patients on haemodialysis in Delta State, Nigeria: a retrospective study

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### Abstract

**Background:** Chronic kidney disease is regarded as a significant cause of mortality and morbidity in this current century, with a prevalence rate ranging between 1.6% and 12.4% in Nigeria.

**Objective:** To identify the prevalence rates of the various co-morbidities in CKD patients undergoing haemodialysis in a private centre in Delta State, Nigeria.

**Methods:** This study is a 6-year retrospective study, which reviewed all records of chronic kidney disease patients who visited the private centre in Delta State from 2016–2021. The variables accessible and retrieved from the registry were: age, sex, and co-morbid conditions. Data obtained were entered and analysed using Microsoft Excel. Descriptive statistics were used to present the results.

**Result:** Of the 7490 patients who received care for chronic kidney disease within the period under review, 1940 patients had 7262 sessions of haemodialysis and were included in the study. The mean age of patients was 50.36±17.16. About 1222(63.7%) are males while 718(36.3%) are females. The prevalence rate of the various co-morbid conditions identified were: hypertension (96.1%), diabetes (67%), HIV (14.4%), Hepatitis C (8.8%), Hepatitis B (6.9%), and obesity (5.2%).

**Conclusion:** Majority of CKD patients present with various co-morbid conditions, with the most frequently occurring condition being hypertension. It is recommended that CKD patients should be evaluated for other conditions with increased likelihood of occurrence.

## Modèle de comorbidités chez les patients atteints d'insuffisance rénale chronique sous hémodialyse dans l'État du Delta, Nigéria : une étude rétrospective

### Resume

**Contexte:** L'insuffisance rénale chronique est considérée comme une cause importante de mortalité et de morbidité au cours de ce siècle, avec un taux de prévalence compris entre 1,6 % et 12,4 % au Nigeria.

**Objectif:** Identifier les taux de prévalence des différentes comorbidités chez les patients atteints d'IRC subissant une hémodialyse dans un centre privé de l'État du Delta, au Nigeria.

**Méthodes:** Cette étude est une étude rétrospective de 6 ans, qui a examiné tous les dossiers de patients atteints d'insuffisance rénale chronique ayant visité le centre privé de l'État du Delta de 2016 à 2021. Les variables accessibles et extraites du registre étaient : l'âge, le sexe et co -conditions morbides. Les données obtenues ont été saisies et analysées à l'aide de Microsoft Excel. Des statistiques descriptives ont été utilisées pour présenter les résultats.

**Résultat:** Parmi les 7 490 patients ayant reçu des soins pour une maladie rénale chronique au cours de la période sous revue, 1 940 patients ont eu 7 262 séances d'hémodialyse et ont été inclus dans l'étude. L'âge moyen des patients était de 50,36 ± 17,16. Environ 1 222 (63,7 %) sont des hommes tandis que 718 (36,3 %) sont des femmes. Les taux de prévalence des différentes comorbidités identifiées étaient : l'hypertension (96,1 %), le diabète (67 %), le VIH (14,4 %), l'hépatite C (8,8 %), l'hépatite B (6,9 %) et l'obésité (5,2 %).

**Conclusion:** La majorité des patients atteints d'IRC présentent diverses pathologies comorbides, la pathologie la plus fréquente étant l'hypertension. Il est recommandé que les patients atteints d'IRC soient évalués pour d'autres affections présentant un risque accru d'apparition.

## INTRODUCTION

Chronic kidney disease (CKD) is one of the global public health problems and widely recognized as a notable cause of death and morbidity globally (1,2,3). According to Global Burden of Disease in 2016 and 2017, CKD ranked 13<sup>th</sup> and 12<sup>th</sup> position respectively and there's a likelihood that it will rank 5<sup>th</sup> in terms of human life lost globally in 2040 (4). The worldwide prevalence rate of CKD is estimated to be between 8% and 16% (5). However, the prevalence of CKD in Africa is estimated between 2% to 41% (6,7), and 1.6% to 12.4% in Nigeria (9). The age of onset of CKD is estimated between 20 and 50 years, and it is more common among women than men (9,10).

There is also an increased risk of development of cardiovascular events and death among CKD patients with co-morbidities (10). The concept of co-morbidity deals with the presentation of more than one morbid condition, while multimorbidity deals with two or more co-morbidity. People with CKD who have one or more comorbidities fall under the term of "multimorbidity," which is typically applied to people who have two or more chronic morbidities (11,12). The apt management of multimorbidity in patients leads to more effective disease management and enhanced outcomes of patients (13). Various co-morbid conditions that present with CKD are: hypertension, diabetes, HIV/AIDS, cardiovascular diseases etc (11,14,15). However, the co-morbid condition of CKD and hypertension is considered the leading cause of death globally (16,17).

Universally, diabetes and hypertension are among the most common aetiology/risk factors for CKD (18). It is further highlighted that thirty to fifty percent of cases of chronic kidney disease and end stage renal disease are attributed to diabetes (19), while, hypertension is present in eighty to eighty-five percent of individuals diagnosed with chronic kidney disease.

It is imperative to ascertain comorbidities that are present with various chronic conditions because of the role they play in treatment burden, disease progression administered medication, healthcare costs, patient's quality of life and survival rate (20,21,23,24). Evaluation of the various co-morbid conditions present with CKD aids in effective management and treatment outcome (20). Thus, this study was carried out with the aim of identifying the prevalence rates and types of the various co-morbidities that are seen in CKD patients undergoing haemodialysis in a private

centre in Delta State, Nigeria.

## MATERIALS AND METHODS

**Study Area:** This study was carried out in a private renal healthcare centre in Delta State of southern Nigeria.

**Study Design and Study Population:** This study is a 6-year retrospective study, which reviewed all records of chronic kidney disease patients who visited the private centre from 2016 –2021.

**Inclusion criteria: Chronic kidney disease patients who undertook haemodialysis within the study period.**

**Exclusion criteria:** Incomplete records were excluded from this study. Children were excluded from this study.

**Research Instruments:** A proforma was designed to retrieve information from the registry. The variables accessed and retrieved from the registry were age, sex, and co-morbid conditions.

**Data Analysis:** Data obtained was entered and analysed using Microsoft Excel. Descriptive statistics (frequency and percentage) was used to present the results.

**Ethical Consideration:** Permission to use the data was obtained from the Director of the private centre used for this study and all data obtained were kept confidential and used solely for the purpose of the research.

## RESULTS

A total of 7490 patients were receiving care for chronic kidney disease within the period under review. Overall, about 1940 patients had 7262 sessions of haemodialysis during the six years review and were included in the study.

A total of 652 patients (38.8%) were below 40years of age while 1248 patients (61.2%) were above 40years of age. The mean age of patients was 50.36±17.16. About 1222(63.7%) were males while 718(36.3%) were females. **Table 1**

### Co-morbid conditions with Chronic Kidney Disease

Of the 1940 CKD patients undergoing haemodialysis, various co-morbid conditions were identified, which includes: Hypertension,

Diabetes, HIV, Hepatitis C, Hepatitis B and obesity.

The prevalence rate of the various co-morbid conditions identified is: 96.1% (1864) for hypertension, 67% (1300) were diabetic, 14.4% (279) for HIV, 8.8% (171) for Hepatitis C, 6.9% (134) for Hepatitis B, and 5.2% (101) for obesity. **Table 2** Thus the most prevalent co-morbid condition was hypertension, while the least prevalent condition is obesity.

## DISCUSSION

This study has reviewed some of the co-morbid conditions in CKD patients undergoing haemodialysis and the prevalence rates of the various co-morbid conditions in a private renal care centre within 2016 – 2021. Various adverse outcomes are associated with CKD which includes: kidney failure, cardiovascular disease, and premature death (25).

Amongst 1940 CKD patients who undertook haemodialysis, the common co-morbid conditions present include HIV, hypertension, Hepatitis C, Hepatitis B, obesity and diabetes. Similar comorbid conditions have been previously reported in studies conducted by Fasipe et al. and Fraser et al. (20,24).

The prevalence rate of the co-morbid conditions identified varies, with hypertension being the most prevalent occurring in nearly all CKD patients, followed by diabetes present in about two-third of patients. This is similar to previous studies conducted by Fasipe, et al., Fraser et al., Sgnaolin et al., Marquito et al., Venisetti et al. (20,24,25,26,27,28). On the other hand, obesity was the least prevalent comorbid condition found in a few of the patients which is contrary to the finding by Fasipe et al., who reported obesity to be the third most common co-morbid condition identified in their study (20).

Hypertension and diabetes being the most presenting comorbid conditions could be attributed to the high prevalence of hypertension, with an estimated prevalence ranging from 29 to 38% (29,30,31), and increase in diabetes prevalence from 2.2% in 1992 to 5.77% in 2018 in Nigeria (32). It could also be attributed to the fact that both conditions are common predisposing risk factors and, in some cases, aetiologic in the development of chronic kidney disease (20, 33,34). Hypertension is known to play a dual function of both an effect and aetiology of CKD (35). Parati et al., also reports that hypertension is highly prevalent in chronic kidney disease (CKD), particularly in patients with end-stage renal disease (ESRD) receiving

haemodialysis (36). Various authors have reported that the coexistence of renal impairment and hypertension is a known frequent occurrence and forms a very significant predictor of an increased risk of morbidity and mortality associated with cardiovascular events, progression to end-stage renal disease (4,34,37,38). In CKD patients, the pathophysiology of hypertension is intricate and multifaceted (39,40,41). This elevated blood pressure is thought to be caused by a number of plausible mechanisms, including neurological and hormonal alterations that frequently work together to interfere with healthy blood pressure regulation (42).

In this study, diabetes was the second most common comorbidity seen in CKD patients. Akpor et al. reported that the prevalence of CKD for people with diabetes was 39.8% (43). It is estimated that up to 40% of the 422 million adults living with diabetes will develop CKD in their lifetime (44). Poorly managed diabetes mellitus has been reported to be associated with the development of CKD (45). There exists a bidirectional association between diabetes and the kidney; CKD occurs either as complication of diabetes or diabetes occurring as a complication of treatment of CKD patients (46). Kidney involvement in patients with diabetes has a wide spectrum of clinical presentations ranging from asymptomatic to overt proteinuria and kidney failure. The development of kidney disease in diabetes is associated with structural changes in multiple kidney compartments, such as the vascular system and glomeruli (46).

In this present study, the prevalence of HIV among CKD patients was 14.4%. Bertoldi et al. reported that CKD is a common complication among HIV patients with the prevalence of CKD in HIV patients ranging from 2 to 38% based on geographic location (47). A higher risk of incidence of CKD has also been reported among HIV patients (48). A possible mechanism for the development of CKD among HIV patients is premature aging and chronic inflammation that leads to the development of metabolic disorders, and the administration of anti-retroviral therapy (49,50).

In this present study, the least prevalent condition is obesity (5.2%). It has been previously reported that high BMI is significantly associated with CKD (51). This could be attributed to the fact that through direct mechanisms like hemodynamic and hormonal effects, increased BMI might result to hyperfusion and hyperfiltration of the glomerulus,

leading to increased pressure in the glomerular capillary and subsequent decline in glomerular filtration rate (43).

This study is limited by its descriptive design, and does not infer any cause-effect relationship between identified risk factors and CKD in the patients. The use of BMI for assessing obesity in patients with advanced CKD where there is fluid retention that may add to the weight of the patients is another limitation of this study.

## CONCLUSION

Majority of CKD patients presented with various co-morbid conditions, with the most frequently occurring condition being hypertension. Thus, it is recommended that, CKD should be evaluated for other such as hypertension, DM, obesity, Hepatitis B and C.

**Author's contribution:** OAB did the concept design, acquisition of data, revision/approval of the final article. ANS did the concept design, draft and revision/approval of the final article. UEJ was involved in concept design, data collection, design of the methodology, approval of the final article, and UEC conducted the analysis, interpretation of data and drafting the article.

**Conflict of interest:** None to declare

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**Table 1: Socio-demographic characteristics of participants**

Variable	Frequency (n=1940)	Percentage
Age category		
Youth (below 40)	652	38.8
Adult (40 years and above)	1288	61.2
Age (Mean ± SD)	50.36 ± 17.16	
Sex		
Male	1222	63.7
Female	718	36.3

**Table 2: Co-morbidity of CKD haemodialysis patients**

Disease Condition	Frequency	Percentage
HIV		
Positive	279	14.3
Negative	1661	85.6
Hypertension		
Hypertensive (> 140/90)	1864	96.1
Non-Hypertensive	76	3.9
Body mass index category		
Obese (>30)	101	5.2
Not Obese (<30)	1839	94.8
Hepatitis C		
Positive	171	8.8
Negative	1769	91.2
Hepatitis B		
Positive	134	6.9
Negative	1806	93.1
Diabetes		
Positive	1300	67
Negative	640	33