

# Assessment of Factors Affecting Treatment Adherence in Patients with Chronic Kidney Disease in Nigeria: A Survey from a Tertiary Health-care Centre

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## Abstract

**Background:** Chronic kidney disease (CKD) is a growing global public health problem with the poorest populations being at the highest risk. Strict adherence to treatment has been found to reduce and may halt progression to end-stage kidney disease. Unfortunately, no data on this is available in this clime. The study was carried out to evaluate factors associated with treatment adherence in patients with CKD attending Lagos University Teaching Hospital. **Patients, Materials and Methods:** This was a cross-sectional study of 124 previously diagnosed CKD patients being managed at the nephrology unit of Lagos University Teaching Hospital, Nigeria. Using a semi-structured questionnaire, data were collected to evaluate the factors affecting treatment adherence in these patients. **Results:** The mean age of participants was  $50.47 \pm 13.7$  years. Majority were male 71 (57.3%), married 84 (67.7%), employed 71 (57.3%), Christians 85 (68.5%), and had tertiary education 92 (74.1%). More than half of the population (57%) adhered to the prescribed treatment. However, the majority (69%) of the study population also practiced alternative treatment. Major reasons for nonadherence included alternative medications (69%), forgetfulness 30 (24.2%), high cost of medication 28 (22.6%), high pill burden 28 (22.6%), and being tired of drugs (22%). **Conclusion:** There is an appreciable level of adherence to treatment among our study population mainly affected by high education and income levels with being gainfully employed. However, a lot more needs to be done to further improve compliance through continuous counseling, reduced pill burden, and lowering the cost of treatment.

**Keywords:** Chronic kidney disease, progression, treatment adherence

## INTRODUCTION

Chronic kidney disease (CKD) defined as abnormalities of kidney structure or function, present for at least three months,<sup>[1]</sup> has become a global public health challenge. From 1990 to 2017, the rate at which CKD moved on the list of global high-impact disease mortality from 29<sup>th</sup> to 18<sup>th</sup> position was alarming, leaving the poorest populations at the highest risk.<sup>[2]</sup> CKD has been projected to become the 8<sup>th</sup> most common cause of death by 2025.<sup>[3]</sup>

This increasing burden of CKD is not exclusive to developed countries as the prevalence of CKD was reported to range between 11.4% and 18.8% in community studies from Nigeria.<sup>[4-6]</sup> The prevalence is likely to continue to rise as risk factors such as diabetes mellitus and hypertension are projected to increase in the coming years in developing economies.<sup>[4]</sup> The treatment modalities for CKD include medications, dialysis, and kidney transplantation, depending on the stage of disease.

These treatment modalities place several challenges on patients with CKD as they have one of the highest daily pill burdens of all chronic conditions.<sup>[7,8]</sup> This imposes a high personal and monetary burden on patients and their families, making adherence to treatment a major challenge for both CKD patients and their caregivers.<sup>[7]</sup>

Adherence, as defined by the World Health Organization (WHO), is the extent to which a person's behavior (taking medication,

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following a diet, and/or executing lifestyle changes) corresponds with agreed recommendations from a health-care provider.<sup>[9]</sup> Nonadherence will lead to the progression of disease, resulting in increased morbidity and mortality. In CKD patients, nonadherence causes poor blood pressure control, increased cardiovascular risk, high pill burden, and hospitalisation-related costs.<sup>[7]</sup>

According to the WHO, there are two types of nonadherence: unintentional (where patients do not comply with the treatment because they are unable to or do not have resources to do so. They may forget to take the drug, unable to buy prescribed medications, or go to the hospital to obtain treatment/medical advice. These are practical barriers to adherence) and intentional, where patients do not comply because they consciously decided not to do so because of their beliefs or preferences.<sup>[10]</sup> These are perceived barriers to adherence. In this case, motivating the patients becomes essential for obtaining appropriate results as nonadherence reduces the benefits of therapy and encourages progression to end-stage renal disease.<sup>[11]</sup>

Patients undergoing treatment for CKD are required to follow a multifaceted and comprehensive treatment plan that is complex and sometimes difficult to comprehend.<sup>[12]</sup> A substantial number of CKD patients are not adherent to treatment recommendations thereby worsening the on-going challenges in health care.<sup>[13]</sup>

Nonadherence rates to dialysis among CKD patients from previous studies ranged from 2% to 98% and low adherence to fluid restriction ranging from 9.2% to 72% have also been found in previous studies.<sup>[14,15]</sup> Similarly, poor adherence to medication and dietary restriction has been documented among CKD patients to range from 3%–80% to 2%–81%, respectively.<sup>[16]</sup> Nonadherence to dialysis is a cause for concern as it leads to several life-threatening complications in CKD patients, including severe anaemia, neurologic dysfunction, congestive heart failure, white blood cell dysfunction, excessive bleeding, infection, mineral bone disease, and pulmonary complications.<sup>[17]</sup>

In a study of more than 3000 patients with CKD, medication nonadherence was found to be associated with uncontrolled hypertension, which causes rapid progression to end-stage kidney disease while good blood pressure control was found to slow the progression of CKD.<sup>[18]</sup> Poor adherence to treatment will worsen the condition and hasten the need for more expensive kidney transplantation. Strict adherence to treatment of CKD will reduce morbidity, mortality as well as economic and public health burden.

Given the daunting challenges of poor sustainability of treatment, limited health resources, and social-economic implications of CKD especially in resource-constrained countries like ours, its management through emphasis on strict adherence to treatment could significantly improve the quality of life and increase productivity. This study was conducted to

determine the factors associated with patients' adherence to treatment in a tertiary hospital care setting.

## PATIENTS, MATERIALS AND METHODS

This was a cross-sectional study of individuals diagnosed with CKD, attending renal clinics of Lagos University Teaching Hospital. The renal clinic has an average attendance of 3000 visits per annum, 5 nephrologists and 10 residents (6 senior and 4 junior residents), 4 clinics per week which include general nephrology, dialysis and transplant clinics.

Sample size determination was calculated using the Fisher formula

$$z \sqrt{pq}$$

where

$N$  = sample size

$z$  = standard deviation = 1.96, corresponding to 95% confidence interval

$P$  = prevalence of CKD = 7.8%

$q = 1 - P = 1.0 - 0.078 = 0.922$

$d$  = degree of accuracy desired set (error margin) at 0.05

$$N = \frac{(1.96)^2 \times 0.078 \times 0.922}{(0.05)^2} = 110.5$$

$N = 111$

Adding 10% attrition rate,  $N = 122$

## Inclusion and exclusion criteria

Included were stable adult patients aged 18 years and above, with a diagnosis CKD (eGFR of <60 ml/min/1.73 m<sup>2</sup> for at least three months with or without kidney damage)<sup>[1]</sup> who are on treatment and attending nephrology clinic in LUTH and who gave consent. Excluded were CKD patients on admission for acute conditions such as sepsis, acute pulmonary edema or any other medical emergencies.

Sampling was done with random sampling method.

Ethical approval was obtained from the Health Research Ethics Committee of the Lagos University Teaching Hospital. Written informed consent was obtained from all study participants. An interviewer-administered semi-structured questionnaire was used to obtain demographic and relevant clinical data. 8-item Morisky Medication Adherence Scale questionnaire [Appendix] which is validated in a pilot study of CKD patients was used to assess adherence to medication in this study. A score of 6 and above indicate high adherence while a score of <6 indicate low adherence/nonadherence.

## Data analysis

Data collected were entered into an excel spreadsheet and analysed using statistical package for social sciences

version 22.0 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp. USA). Data on age, weight, height, body mass index, systolic blood pressure, and diastolic blood pressure parameters were expressed as means and standard deviations. Categorical variables were presented as frequencies (proportions or percentages) and group differences compared with the Chi-square test. A  $P < 0.05$  was considered statistically significant at a 95% confidence interval.

## RESULTS

The mean age of the study population was  $50.47 \pm 13.7$  years. Table 1 shows the socio-demographics of the study population. The majority (62.9%) of the respondents were hypertensive while 16.1% had diabetes mellitus.

Level of income, employment status, and level of education were associated with adherence to medication ( $P = 0.2$ ,  $P = 0.0001$ , and  $P = 0.0001$ , respectively) as shown in Table 2.

Figure 1 shows the etiology of CKD in the study population with hypertension and diabetes mellitus being the most common causes of CKD in this study.

Figure 2 shows the percentage of respondents that adhered to treatment. Nonadherence was mainly due to the practice of alternative medicine (69% of subjects), high pill burden, and high cost of the drug (50%) as shown in Figure 3.

## DISCUSSION

This was a hospital-based cross-sectional study designed to evaluate the awareness of CKD by the respondents and factors associated with treatment adherence in patients living with CKD attending Lagos University Teaching Hospital.

The older respondents were likely to adhere more to treatment than the younger respondents. This is similar to the finding of Lam *et al.*, which reported that younger patients are less adherent to treatment in chronic diseases than their older counterparts.<sup>[14]</sup> A probable reason for this may be because they are less busy and therefore more likely to remember to take their medications and also less likely to dare the consequences of nonadherence than the younger age group.

This study found no significant relationship between gender and treatment adherence. This is in contrast to the findings of Plantinga *et al.*, who in their study showed that males were likely to adhere more to treatment than females in the United States.<sup>[19]</sup> The reason for this is not clear but may be related to the economic status of some women combining socio-economic activities and less likely to remember their medications. Furthermore, the relatively smaller sample size of this study may be responsible for this discrepancy. The level of education affected adherence to treatment from this study. Patients with a higher level of education had better adherence while those with a primary level of education exhibit the highest level of nonadherence. This is in agreement with the report of Mitch that a low level of

**Table 1: Sociodemographic factors of the study population**

Characteristics	Adherence to medication (n=71)	Nonadherence to medication (n=53)	$\chi^2$	P
Age (years)				
<50	39	26	0.22	0.64
>50	32	27		
Sex				
Male	44	47	1.09	0.29
Female	27	26		
Marital status				
Single	6	10	2.9	0.22
Married	51	33		
Widowed	14	10		
Religion				
Christianity	52	33	1.95	0.37
Islam	11	10		
Traditional religion	8	10		
Living arrangement				
Alone	4	6	0.66	0.27
Living with people	67	47		
Knowledge of CKD				
Yes	57	38	0.81	0.36
No	13	15		

\*Significant P-values. CKD: Chronic kidney disease

**Table 2: Relationship between income, educational and employment status on adherence in the study population**

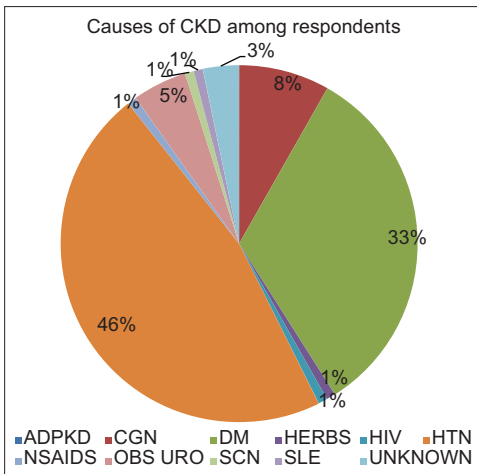
Characteristics	Adherence to medication (n=71)	Nonadherence to medication (n=53)	$\chi^2$	P
Income/month				
<50,000	19	25	5.47	0.02*
>50,000	52	28		
Educational status				
Primary	2	15	20.9	0.0001*
Secondary	6	9		
Tertiary	63	29		
Employment status				
Employed	54	17	22.2	0.0001*
Unemployed	17	36		

\*Significant P-values

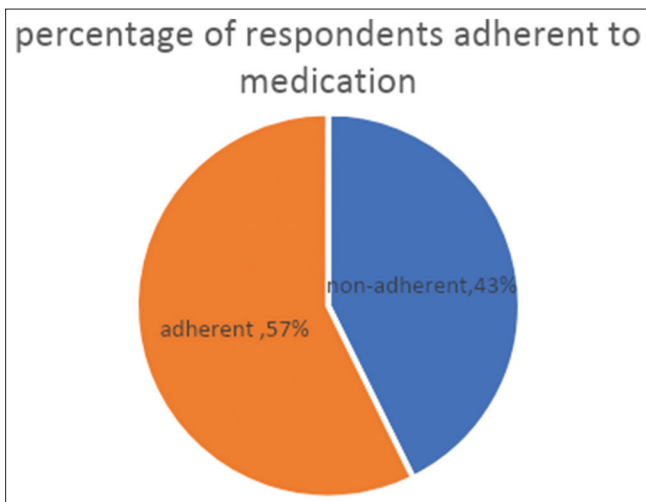
education was associated with decreased adherence due to poor knowledge of disease and therefore poor adherence to treatment.<sup>[16]</sup>

The married subjects adhered better to treatment compared with the unmarried. This may be due to stronger social support from the spouses and immediate family members, a finding similar to what Karamanidou *et al.* found in their study.<sup>[10]</sup>

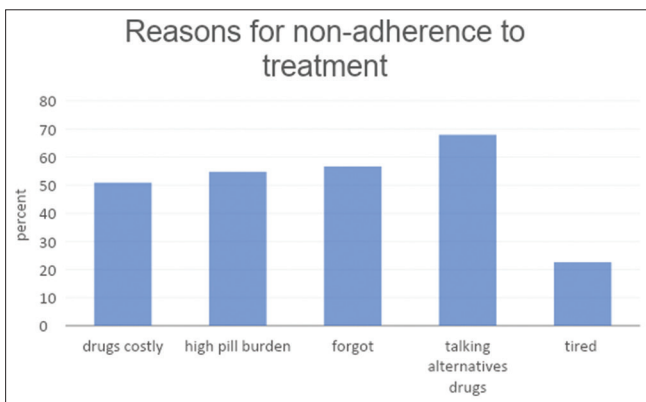
Economic status also significantly affected treatment adherence. The low-income earners were less adherent to treatment. This is not surprising as there are several other



**Figure 1:** The etiology of CKD in the study population. ADPKD: Autosomal Dominance Polycystic Kidney Disease, CGN: Chronic glomerulonephritis, DM: Diabetes mellitus, HIV: Human immunodeficiency virus, HTN: Hypertension, NSAIDS: Nonsteroidal anti-inflammatory drugs, OBS URO: Obstructive uropathy, SCN: Sickle cell nephropathy, SLE: Systemic lupus erythematosus



**Figure 2:** Chart showing proportion of respondents that adhered to treatment



**Figure 3:** Chart showing reasons for nonadherence to treatment among the study population

competing interests for the meager income available. This has been similarly reported by Kefale *et al.* in their study.<sup>[20]</sup>

Almost all the subjects forgot to take their medication at one time or the other. This is similar to the finding of Singh, who found in his study that forgetfulness to take medication was a significant contributor to nonadherence.<sup>[18]</sup>

Diabetes mellitus and hypertension were major causes of CKD from this study, similar to what Barsoum found in their study.<sup>[21]</sup> This is not surprising as diabetes mellitus and hypertension are recognised globally as major causes of CKD, fuelled largely by modern lifestyles.

The majority of patients (51.6%) were unaware of the seriousness of their condition. This is consistent with the reports of Chu *et al.* in their study<sup>[22]</sup> although this did not affect the compliance level in our study.

Employment status also significantly affected adherence to treatment in this study. This is not surprising as the employed subjects are likely to be able to buy their medications more regularly compared with the unemployed. This is similar to what Elshahat *et al.* found in their study and reported that unemployment is a significant stressor for CKD patients.<sup>[17]</sup>

The practice of alternative medicine (69%) contributed significantly to treatment nonadherence as most of our subjects alluded to this. A similar finding was made by Karamanidou *et al.*<sup>[10]</sup> This may be connected to different beliefs which may sometimes be at variance with orthodox medical practice as well as the cheaper cost of the alternative.

The high cost of medications also contributed to poor adherence to treatment among our study subjects as over half of our study population referred to this as an important reason. Schieppati *et al.* also found this as a significant reason for nonadherence in their report.<sup>[23]</sup> This is not surprising as the high cost of medications will limit their availability to patients, resulting in poor adherence.

Our study has some limitations such as being a cross-sectional survey without a control group to compare with. It was also a single-centre study, which makes it impossible to generalise our findings among the entire population of CKD in Nigeria. Notwithstanding these limitations, our study is among the new studies on this topic and has provided some important clinical findings that may be helpful to clinicians in exploring measures to improve treatment adherence to CKD.

### CONCLUSION

A high level of education, being gainfully employed, and higher income had the most impact on adherence to treatment. Subsidising the cost of medications, a low pill burden, use of reminders, and more enlightenment campaigns will help improve adherence to treatment.

This study further confirmed the influence of adequate awareness of the disease and other factors on adherence to treatment by CKD patients.

## Recommendation

There is an urgent need for a more aggressive awareness campaign to increase knowledge to correct the misconceptions about CKD to encourage improved adherence to treatment and thereby reduce the morbidity and mortality of this scourge. Attending physicians should put more emphasis on addressing factors that could affect patients' adherence to treatment to achieve good treatment outcomes. Government should also expand the health insurance scheme to fully accommodate the management of CKD, especially among low-income earners to improve adherence.

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## Conflicts of interest

There are no conflicts of interest.

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**Appendix: 8-item Morisky Medication Adherence Scale**

Item	Answer
1. Do you sometimes forget to take your (health concern) pills?	Yes/no
2. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?	Yes/no
3. Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?	Yes/no
4. When you travel or leave home, do you sometimes forget to bring along your medication?	Yes/no
5. Did you take your medicine yesterday?	Yes/no
6. When you feel like your health is under control, do you sometimes stop taking your medicine?	Yes/no
7. Taking medication every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	Yes/no
8. Do you have difficulty remembering to take all your medications?	Yes/no