# Prevalence of symptoms of depression among patients with chronic kidney disease

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## Abstract

**Objective:** Depression is the most common psychiatric illness in patients with chronic kidney disease (CKD). Depression has been shown to affect mortality in end-stage renal disease patients. The objective of this study was to determine prevalence of depressive symptoms among CKD patients.

**Materials and Methods:** A cross-sectional study of patients with CKD (Stages 3-5) attending the renal clinic of a tertiary hospital was conducted. Demographic and clinical data were documented. A self-administered Zung depression questionnaire was administered. The Zung depression questionnaire has 20 weighted questions. Individuals with a total score of 50 are considered to be depressed, while a score of 70 and above is indicative of severe depression.

**Results:** One hundred and eighteen patients and fifty controls were interviewed. There were 73 (61.9%) males and 45 (38.1%) female patients. The mean age did not differ: males 43.8 ± 15.4 years, females 43.2 ± 14.7 yrs, $P = 0.83$. The prevalence of depression among the CKD patients was 23.7%, while for the control group was 2%; $\chi^2 = 10.14$, $P < 0.001$. Further analysis showed that CKD patients on dialysis were more likely to be depressed than the pre-dialysis patients with frequency of depressive symptoms of 34.5% for dialysis patients versus 13.3% in pre-dialysis patients; $\chi^2 = 6.17$, $P = 0.01$. No difference was observed in the mean Zung score among males, and female patients mean Zung score was 40.1 in females and 40.7 in male patients; $P > 0.05$.

**Conclusion:** Depression is highly prevalent among our patients with CKD and treatment modality was the major predictor of depression among our patients.

**Key words:** Chronic kidney disease, depression, Zung depression scale

## Introduction

Psychiatric disorders are common among patients with chronic kidney disease (CKD) and these include depression, dementia, delirium, psychosis, anxiety, personality disorders, and substance abuse.[1] Depression is the most common psychiatric problem in patients with end-stage renal disease ESRD.[1-3] The prevalence of depression in CKD patients has varied widely in different studies, in different populations, using different assessment tools.[1-3] Prevalence rates as high as 30% have been reported in some studies.[2-4]

Depression is characterized by both cognitive and somatic features. The somatic characteristics of depression are very similar to the symptoms of uraemia, such as anorexia, sleep disturbances, fatigue, gastrointestinal disorders.[1-3] These similarities make the recognition of a depressive disorder difficult. Symptoms suggestive of depression include: depressed mood most of the time, loss of interest or pleasure in most activities for most of the time.[1]

Some studies have demonstrated a clear relationship between depression and mortality in patients treated with haemodialysis.[5-10] Depression among peritoneal dialysis patients has been associated with higher incidence of

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peritonitis.[11] It has also been associated with increased rate of hospitalization.[12] Co-morbid depression impacts negatively on quality of life in CKD[13,14] and improved detection and intervention (pharmacological and non-pharmacological) will improve outcomes. In this study we evaluated the frequency of symptoms of depression in Nigerians with CKD and also determined the relationship between treatment category (pre-dialysis and haemodialysis) and frequency of depressive symptoms.

## Materials and Methods

This was a cross-sectional study of patients with CKD attending the renal out-patients clinic of the Lagos University Teaching Hospital, Lagos State, South West Nigeria. Approval was given by the Health Research and Ethics Committee of the institution. Consecutive CKD patients who agreed to participate in the study were recruited. The control group consisted of apparently healthy age-matched individuals from among staff and students. Demographic and clinical data were documented. The glomerular filtration rate (GFR) among patients was estimated using the using the 4-variable Modification of Diet in Renal Disease Study equation.[15]

Major depressive disorder (MDD) diagnoses are made according to a set of symptoms that are present for 2 weeks, involving both somatic and cognitive symptoms, including suicidal ideation.[1-3] A diagnosis of major depressive disorder should be made if during a period of at least 2 weeks, a patient experiences depressed mood most of the time or loss of interest or pleasure in usual activities and at least five of the following symptoms: loss of weight, change in sleep pattern, e.g., insomnia or hypersomnia, psychomotor retardation, fatigue or loss of energy most days, feelings of worthlessness or guilt, decreased ability to think or concentrate, suicidal ideation, and thoughts of death.[1]

We used the Zung Self-rating Depression Scale (ZSDS), which is a widely validated 20-weighted item questionnaire including questions to identify the presence of affective, psychological and somatic symptoms associated with depression.[16] The cut-off for defining depression using the ZSDS is 50. A score of 60-69 is indicative of moderate depression while ≥ 70 is severe depression. The ZSDS questionnaire was also translated into Yoruba and local English (pidgin English) for patients who could not speak English. The patients with end-stage renal disease (ESRD) on dialysis were compared with those with pre-dialysis CKD (stages 3 to 5 but not on dialysis) and CKD patients with controls.

### Data analysis
Data were analysed using Epi Info ® 2002. Continuous variables are presented as mean ± standard deviation (SD) and compared using students T test. Categorical variables are presented as proportions and compared using Yates corrected $X^2$ test. Multivariate analysis was used to determine risk factors associated with depression. P value <0.05 is regarded as being statistically significant.

## Results

A total of 118 CKD patients and 50 control subjects were interviewed. There were 73 (61.9%) male and 45 female (38.1%) patients; 26 (52%) male and 24 (48%) female control subjects. The mean age for the CKD patients and controls were similar (43.6 ± 15.1 for CKD patients and 40.3 ± 12.1 years, $P = 0.17$), age range was 16-87 years. Table 1 shows the clinical data of the patients and controls. The duration of CKD ranged from 3 months to 36 months. The etiology of CKD was hypertension in 50.8% of the patients, glomerulonephritis in 17.8%, diabetes in 11%, unknown in 5.9% and other causes like obstructive nephropathy, human immunodeficiency virus associated nephropathy, sickle cell nephropathy and lupus nephritis accounted for 14.5%.

Thirty-eight patients (30.6%) were in CKD stage III, 23 (18.5%) CKD stage IV and 63 (50.8%) CKD stage V. The mean GFR for patients in stage III was 46.8 ± 8.58 ml/minute/1.73m², stage IV 19.8 ± 4.18 ml/minute/1.73m² and 8.13 ± 3.11 ml/minute/1.73m².

### Prevalence of depression
CKD patients were much more likely to be depressed compared with controls; the prevalence of symptoms of depression among the CKD patients was 23.7%, while for the control group was 2% $X^2 = 10.14$, $P < 0.001$. Further analysis showed that 10.5% of patients in CKD stage 3 had depression , 13% in CKD stage 4 and 33.3% in CKD stage 5 $X^2$ 8.52, df 2 $P = 0.014$; 3.4% of CKD patients had moderate depression no case of severe depression was recorded in the study population. No difference was observed in the mean

| Table 1: Comparison of demographic characteristics and ZSDS parameters in CKD patients and controls | | | |
|---|---|---|---|
| Clinical parameter | CKD patients $N = 118$ | Controls $N = 50$ | P value |
| Mean age (years) ± SD | 43.6 ± 15.1 | 40.3 ± 12.1 | NS |
| Number of male/female subjects | 73/45 | 26/24 | NS |
| Mean Zung score ± SD | 40.7 ± 11 | 34.0 ± 7.4 | < 0.0001 |
| Number of patients with depression | 28 (23.7%) | 1 (2%) | < 0.01 |

ZSDS = Zung Self-rating Depression Scale

Zung score among the male and female patients mean Zung score was 40.1 in females and 40.7 in male patients, $P > 0.05$.

When we compared the pre-dialysis CKD patients on conservative treatment with CKD patients on dialysis, the dialysis patients were more likely to be depressed with frequency of depressive symptoms of 34.5% in dialysis patients versus 13.3% in pre-dialysis patients $X^{[2]} = 6.17$, $P = 0.01$ (OR 0.29, 95% CI 0.10-0.80). Table 2 shows comparison of clinico-demographic data in pre-dialysis and HD patients. Multivariate analysis showed that treatment modality was the only risk factor associated with depression. Duration of CKD, gender and age were not associated with CKD [Table 3].

## Discussion

Depression is frequently seen in CKD patients both as a reaction to the diagnosis and treatment as well as the losses experienced in terms of health, life style, finances, and status.[1] In this study the frequency of depressive symptoms among patients with CKD was high. This is consistent with reports in the literature.[5,17-19] Aghanwa et al., using the Diagnostic and Statistical Manual of Mental Disorders revised third edition (DSM III), reported a prevalence of major depressive episode of 25% among patients undergoing haemodialysis in Ile-Ife compared with 0% among their controls.[17] Hedayati reported prevalence of major depressive episode of 21% among a cohort of male veterans with CKD using the DSM IV instrument.[18] Watnick et al., also found a high prevalence of depressive disorder in a small population of ESRD patients treated with both hemodialysis and peritoneal dialysis using the Beck Depression Inventory (BDI), the Patient Health Questionnaire 9 (PHQ-9), and a structured, clinical psychiatric interview.[19]

We noted a rising prevalence of depressive symptoms with increasing severity of CKD from 10.5% in CKD stage III to 33.3% in CKD stage V. This is similar to findings from the study by Hedayati et al., that reported an association of increased prevalence of depression and severe CKD using the BD) as a screening instrument and the National Institute of Mental Health Diagnostic Interview Schedule (DIS) for diagnosis of major depression. In their study patients with severe CKD, defined as GFR of <30 ml/minute were more likely to have depressive symptoms (54.5%) and major depression (21.6%) compared with those without severe CKD (32.8% and 13%, respectively).[5]

In our study, patients with ESRD on dialysis were more likely to be depressed compared with the predialysis CKD patients. This differs from some reports in the literature which showed no difference in the prevalence of depression among pre-dialysis and ESRD patients.[18,20,21] Abdel-kaber et al., compared prevalence of depressive disorder among ESRD patients on haemodialysis and patients with CKD stages 4 and 5 not on dialysis using Patient Health Questionnaire - 9 (PHQ-9), they found no difference in prevalence of major depression among both groups.[20] The different instruments used for the assessment of depression in our study and other studies may account for these differences. Other possible reasons for the observed higher prevalence of depressive symptoms among our dialysis patients are: the huge financial burden of haemodialysis therapy in Nigeria and the fact that cost of treatment is borne entirely by patients and their relatives thus putting a strain on the family finances. In addition there are uncertainties about outcomes of treatment coupled with the fear of death and the severity of disease with its attendant numerous complications all of these could contribute to higher frequency of depression among these patients. There may also be marital conflicts, strained inter-personal relationships with family and medical personnel, and risk of job losses as a result of frequent absenteeism from work.

**Table 2: Comparison of demographic characteristics and ZSDS parameters in pre-dialysis and ESRD patients**

| Clinical parameter | Pre-dialysis patients $N = 60$ | ESRD patients $N = 58$ | P value |
|---|---|---|---|
| Mean age (years) ± SD | 45.1 ± 15.1 | 42.0 ± 15.04 | NS |
| Mean Zung score | 37.4 ± 9.7 | 43.7 ± 0.2 | 0.0001 |
| Number of patients with depression | 8 (13.3%) | 20 (34.5%) | 0.007 |
| Number of patients with moderate depression | 1 (1.7%) | 3 (5.2%) | NS |

ZSDS = Zung Self-rating Depression Scale; ESRD = End-stage renal disease

**Table 3: Logistic regression analysis showing the risk factors associated with depression**

| Variable | Coefficient | Standard error | F test | P value |
|---|---|---|---|---|
| Age (years) | 0.001 | 0.003 | 0.187 | 0.67 |
| CKD duration (months) | -0.008 | 0.005 | 2.358 | 0.13 |
| Sex (male/female) | -0.029 | 0.098 | 0.087 | 0.77 |
| Treatment (HD/conservative) | 0.181 | 0.092 | 3.893 | 0.05 |

CKD = Chronic kidney disease; HD = haemodialysis

The effect of depression on survival is controversial, while a few studies involving small numbers have not shown any association between baseline depression scores and outcomes,[22,23] majority of studies showed that presence of depression impacts negatively on survival.[3,5,10] Depression has also been shown to impact negatively on the quality of life (QOL).[14] The mechanism whereby depression impacts on QOL and survival include non-compliance with medications and dialysis prescription, poor nutrition and possible increased inflammation from dysregulation of cytokine metabolism.[2,3]

Despite the high prevalence of depression in ESRD, few patients diagnosed with depression are on treatment.[3] Reasons for this are lack of carefully planned randomised controlled trials evaluating the efficacy and safety of antidepressants in this population of patients. It is important to treat depression among CKD patients given its negative impact on survival and QOL. Cognitive behavioural therapy (CBT) has been recognised as an effective psychological treatment for mild to moderate depression.[14] A combination of antidepressants medications such as selective serotonin uptake inhibitors and psychotherapy may be the optimal form of therapy.[2,3]

Our limitation is the use of self-reported measurement of depressive symptoms; we did not use the DSM IV instrument which is the gold standard for diagnosis of major depressive disorder (MDD). Further research using this instrument as well as carrying out a comparative study of prevalence of depression among patients with different chronic illnesses is desirable so as to assess the impact of the chronic medical illness on depression as well as on outcomes.

## Conclusions

In conclusion, depressive symptoms are common among patients with CKD and treatment modality was the major predictor of depression among our patients. Patients with CKD should be screened routinely for depression.

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