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Original article

Clinical and Laboratory Correlates Of Depression among Kidney Disease Patients: A Cross-Sectional Study

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Abstract

Background: Even though depression is one of the most common psychiatric disorders complicating physical illnesses, not many studies have elucidated the clinical and laboratory correlates and predictors of depression in patients with kidney disease. ***Method:*** Data was collected from 153 consented participants with chronic kidney disease (CKD) in a cross-sectional study using depression module of MINI International Neuropsychiatric Inventory (MINI). Clinical, laboratory and sociodemographic profile of each participant were obtained from patient`s folder. Analysis was done with descriptive statistics, Spearman correlation test and Logistic regression test. ***Result:*** Eight-nine (58.12%) participants were depressed; and depression positively correlated with one having being transfused blood; having received Erythropoietin (EPO), parenteral Iron; having being on Dialysis; Urea and Creatinine levels. Also found was negative correlation of depression with Packed Cell Volume (PCV) and Estimated Glomerular Filtration Rate (EGFR) levels. However, only the EGFR level and having being on dialysis were predictors of depression in CKD. ***Conclusion:*** Depression was highly prevalent among the participants, and clinicians should watch closely the above identified clinical and laboratory correlates and predictors so that early detection and appropriate treatment of depression in kidney disease patients may be enhanced.

Keywords: ***Laboratory; Clinical; Correlates; Kidney; Disease.***

Introduction

Chronic kidney disease (CKD) affects approximately 10-15% 0f adults in the world [1]. Like every other chronic illnesses, people living with CKD have the challenge of accepting a life threatening diagnosis; adjusting to the chronic nature of the disease; lifelong treatment; coping with dialysis techniques, incorporating treatment into their routine live pattern; difficulties encountering treatment failures/transitions, side-effects and complications of medications [2]. Due to these attendant substantial disease burden, management of CKD has gone through treatment of the clinical manifestations to improving the quality of life and end of life care. The assessment of depression is rather challenging in the CKD patient population, partly because of overlapping physical symptoms of uremia and depression, such as fatigue, loss of appetite, sleep disruption, impaired attention and memory and so on.

Higher prevalence rates of depression have been demonstrated in patients with CKD and/ or end stage renal disease (ESRD) than that of other chronic diseases [3]. The reported prevalence of depression in patients with CKD ranges from 20% to 30% [4]. At University of Lagos Nigeria, using Zung depression questionnaire, 23.7% prevalence of depression in chronic kidney disease patient was reported [5]. Also using Hamilton depression rating scale to assess 226 participants in a hospital in Saudi Arabia undergoing heamodialysis, 70% were found to have different levels of depression [6].

However, several factors can predispose CKD patients to depression. Female gender, age ≥ 60 years, comorbid chronic illness (hypertension and diabetes), living alone and poor social support were significantly associated with depression among patients with chronic kidney disease [7]. In some studies, depressive symptoms increased with unemployment and loss among patients with higher co-morbid physical illness [8]. Major depression episode (MDE) is associated with progression to maintenance dialysis, hospitalization, or death in CKD patients, independent of comorbidities and chronic kidney disease severity [9]. Perception of loss has been reported as a strong predictor of depression among CKD patients. Some studies have clear demonstration of the association of depression and mortality of patients treated with

haemodialysis (HD), higher incidences of peritonitis in peritoneal dialysis patients [10,11], increased rate of hospitalization [12] and poor quality of life [13]. Furthermore, depression among CKD patients has been associated with microalbuminuria [14] and low EGFR [15] and elevated creatinine level [16].

Patients on HD with clinical diagnosis of depression experience higher rate of hospitalization, longer hospital stay, and higher incidences of dialysis withdrawal and mortality [17]. For CKD patients not requiring dialysis, depression predicted progression to end stage renal disease (ESRD), faster initiation of dialysis and death [18].

Only few studies have tried to highlight the laboratory and clinical correlates cum predictors of depression in CKD patients thereby improving the outcome.

Materials and Method

Study population

This was a hospital based cross-sectional study of patients with chronic kidney disease who presented to the renal unit of ESUT Teaching Hospital Enugu from 1st November 2018 to 30th April 2019.

Procedure

Consecutive patients who met the inclusion criteria and gave informed consent for the study were recruited. The sociodemographic characteristics like educational level, age and occupation were recorded. The clinical variables like body mass index (BMI); comorbid conditions like hypertension (HTN), diabetes mellitus (DM) and those who had both of them; those who had needed and received blood transfusion, erythropoietin, parenteral Iron or dialysis were also noted as well as laboratory parameters like (Packed Cell Volume) PCV, Creatinine and urea levels of the patients. Diagnosis of depression was made using depression module of MINI International Neuropsychiatric Inventory (MINI) to interview the participants.

Data analysis

Data were analyzed with statistical package of social science (SPSS) version 20. The variables were expressed as percentages, means and standard deviation using descriptive statistics. Spearman`s Correlation Test and Binomial Logistic Regression Test were used to evaluate the correlates and predictors of depression respectively. Depression was correlated with the various outlined variables above. The parameters that correlated positively or negatively were subjected logistic regression test. A p-value of ≤ 0.05 was considered statistically significant and confidence interval was at 95%.

Results

The mean age of the 153 participants was 51.4 ± 15.5 years. The majority of the participants were male civil servants who attained tertiary education. Over four-fifth of the participants were depressed. Depression correlated positively with dialysis, urea level e.t.c., and negatively with EGFR, PCV, and however had no correlation with comorbid HTN, DM and body mass Index (BMI). EGFR and dialysis were found predictors.

Table 1: Sociodemographic characteristics of the Participants

Characteristics	Male	Female	Total	P
Age (years)				
Mean 51.4				
Median 52.0				
Standard deviation ±15.5				
Range 71				
Gender N (%)	97 (63.4)	56 (36.6)	153	
Education				
Primary N (%)	16 (10.5)	9 (5.9)	25	
Secondary N (%)	35 (22.9)	21 (13.7)	56	.99
Tertiary N (%)	46 (30.1)	26 (17.0)	72	
Occupation				
Civil servant N (%)	41 (26.8)	24 (15.7)	65	
Business N (%)	27 (17.6)	26 (17.0)	53	.01
Farming N (%)	9 (5.9)	5 (3.3)	14	
Artisan N (%)	7 (4.6)	1 (0.7)	8	
Unemployed N (%)	13 (8.5)	0 (0.0)	13	

Table 2: The prevalence of depression among the participants

Variable	Yes	No	Total
Depression N (%)	89 (58.2)	64 (41.8)	153 (100)

Table 3: Laboratory correlates

Variables	1	2	3	4	5	6
1 BMI	-					
2 PCV	-.24**	-				
3. Creatinine	.19*	-.50**	-			
4. urea	.18*	-.41**	.63**	-		
5. EGFR	.17*	.48**	-.99**	-.64**	-	
6. Depress	.05	-.19*	.37**	.19*	-.36**	-

***= p<0.01, * = p<0.05.*

Table 4: Clinical correlates

Variab	1	2	3	4	5	6	7	8	9	10	11
1HTN	-										
2Both	.33**	-									
3DM	.03	.87**	-								
4Dialys	.21**	-.23*	-.32*	-							
5Regu1	.05	.11	.15	.09	-						
6EPO	.16**	-.07	-.07	.59**	.25*	-					
7Regu2	.16	.12	.06	-.03	.48**		-				
8EPOty	.15	.42**	.34*	-.07	-.19	.09	-.04	-			
9Blood	.16	-.13	-.18	.61**	.23*	.62**	-.12	.14**	-		
10Iron	.07	-.06	-.08	.47**	.07	.43**			.44**	-	
11Depr	.13	-.03	-.13	**.35****	-.13	**.24****	-.22	.10	**.18***	**.26****	-

***= p<0.01, *= p<0.05*
Regu1= Regularity of dialysis.
Regu2= Regularity of erythropoietin treatment.
Depr= Depression.
Both= Those with both DM and HTN.
EPOty= EPO type (alpha or beta).

Table 5: Predictors of depression

Variable	**B**	**p**	**95% CI**
PCV	.01	.77	.944-1.082
Urea	.01	.43	.982-1.043
Creatinine	.01	.09	.998-1.000
EGFR	**.05**	**.007**	**.923-.988**
Dialysis	**1.25**	**.025**	**1.173-10.393**
EPO	.05	.93	.360-3.081
Blood	.71	.22	.157-1.541
Iron	.70	.19	.707-5.689

Discussion

The prevalence rate of depression among CKD patients in this study was 58.12%. This figure is higher than what was reported in Lagos, Nigeria by Amira 2011[5], using Zung Depression Questionnaire and is lower than (70%) [6] found in Saudi Arabia with Hamilton Depression rating scale among haemodialysis patients. This wide variation among studies may be attributed to differences in methodology, study population characteristics and individual differences.

In this study, depression correlated positively with having being transfused blood, received iron dextran and erythropoietin irrespective of the type (either α or β); and correlated negatively with PCV (packed cell volume). In other words, anaemia may be considered a risk factor for depression in CKD probably because alongside reduced blood levels there might also be deficient B Vitamins [19,20] and minerals [21] which are also predisposing factors for depression.

It was also found in this study that being on dialysis, increasing levels of Urea and Creatinine and decreasing level of EGFR were correlated with depression. The same has been reported about dialysis by Symister et al, 2003 [9] and about EGFR by Fischer et al, 2010 [15]. One can infer that the presence of these correlates imply severity of disease which would impose much psychosocial stressors on the patient and consequent manifestation of depressive symptoms. In concordance with this, Amira 2011 [5] and Hedayati et al, 2004 [22] reported rising rate of depression with increasing severity of CKD. However, it is worthy of note that this study found no association of depression among these participants with comorbid diabetes mellitus and hypertension which is not in keeping with Bizuayeh et al, 2016 [7] that reported significant association of depression with diabetes mellitus and hypertension in patients living with chronic kidney disease.

In this study, being on dialysis predicted depression. But this is not in keeping with the result of Abdel-kaber et al, 2009 [23] study who found no difference on the prevalence of major depressive disorder between patients on dialysis and those not on dialysis. Possible reasons for this increased prevalence of depression with increasing severity of illness might be the enormous financial involvement (haemodialysis/ transplant) and payment is out-of-pocket in Nigeria; uncertainties including non-response to treatment, complications of treatment and death; perceived sense of loss e.g. work and so on because of long standing illness. Lowing EGFR as predictor of depression in CKD patients projected EGFR as an important parameter which clinicians should watch closely for early detection and treatment of depression.

Limitations

1. Even though correlates and predictors of depression in CKD patients were established from this study, causal implications cannot still be inferred. This is a common short-coming of cross-sectional studies and short term longitudinal studies.
2. This is a hospital based cross-sectional study; hence the findings may not be generalisable to the entire populace in Nigeria.
3. The clinical and laboratory parameters obtained from the participants were taken at different stages of illness and the influence of age, gender and other factors that could

affect the emotional status of the participants were not put into consideration.

Conclusion

The above identified correlates and predictors are worthy of note by the clinicians. It may be necessary that they are assessed routinely in patients with chronic kidney disease so that early detection and treatment could be enhanced. In view of the high rate of depression in CKD, and the negative impact of depression on the outcome of patients, carefully randomized controlled trials with antidepressants may be useful in order to direct clinicians on a more evidence based approach to help these patients.

Ethical Approval

The study was approved by ethical committee of the hospital, and written consent was obtained from each participant before he/she was interviewed.

List of Abbreviations

MINI = MINI International Neuropsychiatric Inventory.
CKD = Chronic kidney disease.
EPO = Erythropoietin.
PCV = Packed Cell Volume.
EGFR = Estimated Glomerular Filtration Rate.
MDE = Major depression episode.
DM = Diabetes Mellitus.
HTN = Hypertension.
HD = Haemodialysis.
ESRD = End stage renal disease.
ESUT = Enugu State University of Science and Technology.
BMI = Body Mass Index.
PTSD = Post-traumatic stress disorder.
SPSSS = statistical package of social science.

Conflict of interest

The authors however declare that there is no conflict of interest regarding the publication of this article.

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Authors` Contributions

SO was involved in the data collection, MS entered the data in the SPSS and did analysis and interpretation of the result obtained, while UH did the whole literature search. This manuscript has been read and approved by the authors.

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