|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
PubMed (National Library of Medicine ID: 101738825)
Index Copernicus Value 2018: 75.71
Original Research Article
Volume 3, Issue 11; November: 2019; Page No. 95-102

PREVALENCE OF DEPRESSION AND ITS ASSOCIATED FACTORS AMONG PATIENTS OF CHRONIC KIDNEY DISEASE IN A TERTIARY CARE HOSPITAL FROM ASSAM: A CROSS-SECTIONAL STUDY.

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Article Info: Received 05 October 2019; Accepted 14 November. 2019
DOI: https://doi.org/10.32553/ijmbs.v3i11.717
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Conflict of interest: No conflict of interest.

Abstract

Background: Chronic kidney disease (CKD) patients are at high risk of depressive disorders because of considerable psychological stress due to physical and social changes brought on by disease. The aim of this study is to assess the prevalence of depression in patients with CKD and the factors affecting it at a public tertiary care hospital.

Methods: This cross-sectional study was carried out at the renal clinic of a tertiary care hospital. Data on 629 patients diagnosed with CKD from September 2014 to April 2016 was obtained. Nine-item Patient Health Questionnaire from PRIME-MD was used to assess the depression.

Results: Of all the patients, 44.7% had depression. Mild depression was found to affect 28.9% of the patients followed by moderate depression and severe depression (15.4% and 0.4%, respectively). According to multiple logistic regression, the occurrence of depression was significantly higher with age below 60 years [odds ratio (OR) 1.5, 0.9–2.7; *P*<0.05], male gender (OR 1.4, 1.0–3.1; *P*<0.05), no treatment funding (OR 2.7, 1.3–4.6; *P*<0.05), education less than grade 12 (OR 1.3, 1.3–3.2; *P*<0.05), monthly income ≤INR 20,000 (OR 1.6, 1.1–3.6; *P*<0.05), CKD stage V (OR 1.4 1.0– 2.9; *P* <0.05), Patients on hemodialysis (HD) (OR 2.5, 1.2–4.5; *P*<0.05), comorbidities ≥3 (OR 1.6, 1.3–3.0; *P*<0.05), overweight (OR 2.4, 1.3–2.9; *P*<0.05), and duration of CKD >2 (OR 2.4, 1.4–4.4; *P*<0.05).

Conclusion: About 44.7% of the patients were found to have depression. Patients' age, gender, body mass index, treatment funding, education status, income, CKD duration and stage, HD status, and comorbidities were found to be significant factors affecting depression.

Introduction:

Chronic kidney disease (CKD) is a major public health problem.It has serious implications to health in the form of high morbidity, mortality and reduced quality of life. Its worldwide prevalence is around 10%.[1-3] Psychiatric disorders are common among chronic diseases, and end stage renal (ESRD) is not an exception. In case of ESRD there are multiple psychosocial stress factors which can lead to mental disturbances. Common problems are depression, anxiety disorders, psychoses, dementia & delirium, & personality disorders. Depression is the most common and most important due to high risk of noncompliance to medication, dialysis and the risk of suicide. It has negative impact on social and occupationalwell-being. But it remains widely underdiagnosed and untreated.

In general population life time risk of depression is 7%.[4] Recent meta-analytic study have shown that among patients with ESRD, prevalence of depression was 39.3% whenevaluated by screening questionnaires, and 22.8%when evaluated by clinical interview.In patients withCKD, the prevalence of depression was 26.5%when evaluated by screening questionnaires, and21.4% when evaluated by clinical interview.[5] Depression is characterised by both cognitive & somatic features. The somatic features of depression are similar to symptoms of uraemia such as anorexia, sleep disturbances and fatigue.[6-8] Symptoms suggestive of depression include depressed mood most of the time, loss of interest or pleasure in most of the activities for most of the time.

Co-morbid depression impacts negatively on life in CKD & improved detection & intervention (pharmacological & non- pharmacological) will improves its outcomes.

Beck depression inventory (BDI), Hamilton Depression Scale (Hamilton), Hospital Anxietyand Depression Scale (HADS), Patient Health Questionnaire-9 (PHQ-9) and Center for Epidemiological Studies Depression Scale are some of the validated questionnaires tostudy the depression. PHQ-9 is validated, inthe Hindi language, and freely available toolfor academic research to study the depressionin Indian patients.

The aim of this study is to determine the prevalence of depression in patients with CKD and the factors associated with depression in CKD patients at a public tertiary care hospital.

Methods

This was a cross-sectional study conducted at Gauhati Medical College and Hospital Assam, a tertiary care center from March 2017 to April 2019. CKD Patients who were 18 years or above, on regular treatment, and willing to participate were included. Those who were critically ill, had cognitive impairment or not willing to take part in the study were not included. Study was approved by Ethical Committee of Gauhati Medical College Assam. Patients were fully explained about the procedure and objectives of study. Informed consent was obtained from all the participants. Questionnaire response, Socio-demographic, clinical variables and anthropometric measurements were included in a data collection form via patient interview and hospital record. PHQ-9 is a validated tool to assess the depression.[9]This is already validated in Indian population.[10] It consists of a set of nine questions to assess depression and severity. Each question score ranging from 0–3 (maximum score-27). The Depression was furthered classified on the basis of score “minimal” to “severe” depression. Score 0–4 were taken as “minimal;” 5–9 as “mild;” 10–14 as “moderate;” 15–19 as “moderately severe” and 20–27 as “severe” depression. Internal consistency of PHQ-9 in Indian CKD patients was assessed by using Cronbach’s alpha (α). The Cronbach’s α in this Study was 0.92, indicates a good internal consistency of PHQ-9 in this population. Modified Kuppuswamy’s scale was used to assess the patients’ socioeconomic status. It classifies the patients into five classes on the basis of occupation, patients’ education, and family monthly income.[11]

Kidney Disease Improving Global Outcomes guidelines were used to define and classify CKD. Patients were classified on the basis of glomerular filtration rate (GFR) and albuminuria. The Cockcroft-gault equation was used for calculation of creatinine clearance. Patients were classified into different Body Mass Index (BMI) categories according to the World Health Organization Global database on BMI. The patients with 60 years of age or beyond were defined as “elderly.” Descriptive and inferential statistics were used. Patients’ age, weight, disease duration, and biochemical data were expressed as mean with standard deviation (SD). Categorical variables such as gender, age group categories,CKD stages, comorbidities, and income were represented using percentage. Chi-square test and one-way analysis of variance for continuous variables were used to explore the relationship between the depression and other variables. Various factors that determine the prevalence of depression were assessed by using multiple logistic regression analysis. Predictors were represented using the OR and 95% confidence intervals and $P<0.05$ was considered as statistically significant.

Result

A total of 629 patients were included .The mean age of the patients was 54.3 years and 56.2% of them were male. 36 % of the patients were elderly. Moreover, 31% and 37% were found to be smoker and alcoholic, respectively. Around one-fourth of the patients were receiving the treatment funding (24%) whereas 76% of the patients paid out of pocket. Of the total, 44% of the patients were unemployed/retired and 13% had attended school only up to eighth standard. Among total patients, 58 % were residing in the urban area and only 39 % had monthly income over INR 20,000. Socioeconomic status classification of the patients revealed that the maximum number of the patients belonged to middle class followed by lower and upper class, respectively (60 %, 22%, and 17%; Table 1).

Table 1: Socio-demographic characteristic of the chronic kidney disease patients on the basis of the Presence of depression.

Characteristics	Number of patients	No depression N= 348	Mild N= 182	Moderate –severe N= 99	*P*
Gender					
Male	354	180 (51)	110 (31)	64 (18)	0.026
Female	275	168 (61)	72 (26)	35 (13)	
Age in years, Mean (SD)		53.8 (9.1)	52.4 (11.5)	54.9 (9.1)	NS
≤60 year	402	217 (54)	117 (29)	68 (17)	0.011
>60 year	227	133 (59)	64 (28)	30 (13)	
Smoker					
Yes	195	115(59)	53(27)	27 (14)	NS
No	434	238 (55)	126 (29)	70(16)	
Alcoholic					0.038
Yes	237	126 (53)	71 (30)	40(17)	
No	392	227 (58)	106 (27)	59 (15)	
Treatment funding					
Yes	150	87 (58)	40 (27)	23 (15)	0.01
No	479	263 (55)	139 (29)	77 (16)	
Employment					
Retired	125	70(56)	35 (28)	20 (16)	0.02
Employed	354	195 (55)	102 (29)	57 (16)	
Unemployed	150	91(61)	39 (26)	20 (13)	
Education					
Grade ≤8	85	48 (56)	23 (28)	14 (16)	NS
Grade 9 to 12	187	110 (59)	51 (27)	26 (14)	
Grade ≥12	357	197 (55)	103 (29)	57 (16)	
Monthly income					
≤20,000	386	200(52)	120(31)	66 (17)	0.001
>20,000	243	150 (62)	60 (25)	30 (13)	
Residence					
Urban	365	200 (55)	106(29)	59 (16)	0.04
Rural	264	156 (59)	71(27)	37 (14)	
Social status					
Upper	112	63(56)	31 (28)	18 (16)	0.01
Middle	379	216(57)	106 (28)	57 (15)	
Lower	138	71 (51)	43 (31)	24 (18)	

No depression = (PHQ 9 score: <5), Mild depression = (PHQ 9 score: 5–9), Moderate-severe = (PHQ 9 Score: ≥10). Chi-square test for categorical and one-way analysis of variance (ANOVA) for continues Variables were used. NS: non-significant

The patients were classified by GFR. About 38% of them were in CKD stage V, 30 % were on hemodialysis (HD), and 42% were diagnosed with CKD for >2 years. Among the enrolled patients, 37% were found to have at least three or more comorbidities. 56% had hypertension, 32% had diabetes, 39% had hyperlipidemia, and 32 % of patients had anemia. BMI classification revealed that 34% of the patients were overweight (Table 2).

Table 2: Clinical characteristics of the patients with chronic kidney disease by PHQ 9 score

Clinical characteristics	Number of patients	No depression *n* = 348	Mild *n* = 182	Moderate-severe *n* = 99	*P*
Stages of CKD					
CKD I–IV	392	223 (57)	110(28)	58 (15)	0.034
CKD V	237	125(52)	72 (30)	41 (17)	
DOC (year)					
Median (IQR)		2 (1-5)	1 (1-6)	3 (1-3)	0.012
≤2	364	211 (58)	98 (27)	50 (14)	
>2	265	137 (51)	84 (32)	49(18)	
Scr, Mean (SD)		3.7 (0.8)	4.5 (1.5)	4.8 (1.8)	0.352
Hemodialysis					
Yes	192	100 (52)	59 (31)	33 (17)	0.033
No	437	248 (57)	123 (27)	66 (15)	
Co-morbidities					
Mean (SD)		4.1 (0.3)	3.2 (0.2)	3.9 (1.4)	0.045
<3	395	223 (59)	106 (27)	55 (14)	0.001
≥3	234	125 (53)	76 (32)	44 (19)	
HTN					
Yes	350	182 (52)	105 (30)	59 (17)	0.014
No	279	166 (60)	77 (27)	40 (14)	
DOH (year)					
Median (IQR)	327	7 (2-11)	8 (1-10)	7 (3-8)	0.038
≤6	216	136 (63)	54 (25)	26 (12)	0.001
>6	198	95 (48)	64 (32)	39 (20)	
BP (mm Hg)					
SBP mean (SD)		143.2 (12.2)	143.2 (12.2)	142.8 (6.9)	0.316
DBP mean (SD)		143.2 (12.2)	86.9 (9.1)	89.7 (4.6)	0.429
T2DM					
Yes	245	127 (52)	76 (31)	44 (18)	
No	384	221 (57)	106 (28)	55 (14)	
DOD (year)					
Median (IQR)		11 (5-19)	9 (3-11)	12 (4-13)	12 (4-13)
≤10	145	87 (60)	38(26)	19 (13)	
>10	109	54 (50)	34 (31)	19 (18)	
HbA1c (%)	160	7.7 (1.5)	6.9 (2.4)	8.3 (1.8)	0.046
Hyperlipidemia					
Yes	204	108 (53)	61 (30)	35 (17)	0.011
No	425	240 (57)	121(28)	64 (15)	
Anemia					
Yes	212	115 (54)	61 (29)	36 (17)	0.0235
No	417	233 (55)	121 (29)	63 (15)	
Hb, Mean (SD)		9.5 (1.5)	9.5 (3.7)	9.6 (1.3)	
BMI					
Underweight	124	75(61)	32 (26)	16 (13)	0.017
Normal range	302	175 (58)	84(28)	45 (15)	
Overweight	203	98 (48)	66 (32)	38 (19)	
Median (IQR)		23.2 (22.3-28.0)	23.9 (20.5-26.3)	22.6 (22.4-30.5)	0.193

CKD: Chronic kidney disease, DOC: Duration of CKD, Scr: Serum creatinine, HTN: Hypertension, DOH: Duration of hypertension, BP: Blood pressure, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, T2DM: Type 2 diabetes, DOD: Duration of Diabetes, HbA1c: Glycatedhemoglobin, Hb: Hemoglobin, BMI: Body mass index. DOD, DOC, DOH, and BMI are represented as median with interquartile range; Hemoglobin, Glycatedhemoglobin, SBP, DBP, and serum creatinine were represented as mean and standard deviation. No depression = (PHQ 9 score: <5), Mild depression = (PHQ 9 score: 5–

9), Moderate-severe = (PHQ 9 score: ≥10). Chi-square test for categorical and one-way analysis of variance (ANOVA) for continues variables were used.

The median (IQR) BMI of the patients was 24.1 (20.3–28.5). The median (IQR) duration of CKD, diabetes, hypertension was found to be 2 (1– 6), seven (1–11), and 10 (3–19), respectively.The overall prevalence of depression in this study was 44.7%. The mean (SD) score of depression was 7.1 (3.5). The patients were classified by the PHQ-9 score into none, mild, moderate, moderately severe, and severe depression.

Of the 629 patients, 348 did not report any sign of depression, but 28.9 % of the patients were found to have mild depression, 15.4 % had moderate, and only 0.4% of patients had severe depression. The prevalence of depression was assessed across different sociodemographic variables and found statistically significantly different across gender, age, alcoholic, treatment reimbursement, employment, residence area, and socioeconomic status of the patients (Table 1).

Further, depression was classified by clinical characteristics of the patients; and, it was found statistically significant different across stages of CKD, duration of CKD, patients' HD status, comorbidities, the presence of hypertension, duration of hypertension, the presence of diabetes and duration of diabetes, the presence of hyperlipidemia, anemia, and different BMI categories (Table 2).

Gender, age, treatment funding, education, monthly family income, CKD stage, HD status, existing comorbidities, BMI, and duration of CKD was found to be statistically significant predictors for the occurrence of depression in CKD patients using multivariable regression model (Table 3).

Table 3: Statistically significant predictors of depression in CKD using multivariate logistic regression

Variable	Multivariate, OR (95% CI)
Gender	
Male	1.4 (1.0–3.1)
Female	1.0 (ref.)
Age	
≤60 year	1.5 (0.9–2.7)
>60 year	1.0 (ref.)
Treatment funding	
No	2.7 (1.3–4.6)
Yes	1.0 (ref.)
Education	
Grade <12	1.3 (1.3–3.2)
Grade ≥12	1.0 (ref.)
Monthly income	
≤20,000	1.6 (1.1–3.6)
>20,000	1.0 (ref.)
Stages of CKD	
CKD V	1.4 (1.0–2.9)
CKD I–IV	1.0 (ref.)
Hemodialysis	
Yes	2.5 (1.2–4.5)
No	1.0 (ref.)
Co-morbidities	
≥3	1.6 (1.3–3.0)
<3	1.0 (ref.)
BMI	
Underweight	0.8 (0.4–3.4)
Overweight	2.4 (1.3–2.9)
Normal range	1.0 (ref.)

DOC (year)	
>2	2.4 (1.4–4.4)
≤2	1.0 (ref.)

OR: odds ratio, CKD: Chronic kidney disease, BMI: Body mass index, DOC: Duration of CKD. No depression = (PHQ 9 score: <5), Mild depression = (PHQ 9 score: 5–9), Moderate-severe = (PHQ 9 score: ≥10)

DISCUSSION

CKD patients commonly develop symptoms of depression. The reasons for this are an increasing number of co-morbidities, financial burden due to disease, and lifelong diagnosis and treatment of CKD. CKD treatment over a period leads to a loss in terms of health, wealth and status of the patients and family. This study describes the prevalence and predictors of depression in CKD patients.

The mean age of the CKD patients in our study population was 53.59 (SD 9.3), which was comparable with Ahlawat et al but higher than first Indian CKD registry.[12] In our study, 56% of the patients were male while as, in CKD registry it was around 70%. Monthly family income, as per the registry, was less than INR 20,000 in 20.5% of the patients and in the current study, this was 61%. In a study by Rajapukar et al, 48.1% of the patients in CKD stage V; and, in our study, this was 38%. This variation can be due to our study being a single centre study.[13] In our study, 58% of the patients were residing in urban regions compared to 73.4% in SEEK study.[14]

In SEEK study, hypertension and diabetes mellitus were the most common causes of CKD (64.5% and 31.6%, respectively). This was comparable to our study with hypertension in 56% and diabetes in 39%. According to SEEK and START studies, 31.6% and 41.2% of the patients, respectively were found overweight (compared to 32% in the present study).[14,15]

In the present study, 44.7% of the patients were found to be depressed. The prevalence was found higher than that of study carried out by Andrade et al (using the BDI questionnaire-37.3%), Amira et al (using Zung depression questionnaire - 23.7%), Balogun et al (using PHQ - 30%), Chiang et al (using Taiwanese Depression questionnaire - 22.6%), and Yu et al (using PHQ - 19.9%).[16-19] According to study carried out by Al-Zaben et al, the prevalence of depressive disorder was 6.8% (major -3.2%, minor - 3.6%), and significant depressive symptoms were present in 24.2%.[20]

Prevalence of depression was found lower than that of the study carried out by Makara-Studzińska et al (using BDI - 66%); Tanvir et al (using HADS - 57%); Bossola et al (using BDI - 52.5%); Lee et al (using HADS - 47%).[21-24] Over 50% of the patients were found depressed according to the study carried out by Macaron et al.[25]

The higher prevalence of depression in our study may be due to use of different tool to assess the depression. Also, the financial burden associated with HD therapy in India and the fact that the cost of treatment is entirely borne by the patients and their family. In addition, loss of patient's job, loss of wages and time of the family members due to illness, the severity of disease, the presence of several comorbidities, and fear of death is present with advanced CKD. All of these factors might be contributing to increased prevalence of depression in CKD patients.

The findings of our study suggest that the depressive symptoms aggravate with the increase in the duration of CKD. Amira et al and Hedayati et al have reported similar observations in CKD patients.[17,26]. In our study, patients with end stage kidney disease (ESKD) on dialysis were more likely to be depressed as compared to those patients not on dialysis. These findings were consistent with the results of Amira et al that also observed that patients on dialysis are at higher risk of depression in comparison to those not on dialysis.[17] Watnick et al showed that there is no difference in the prevalence of depression among predialysis and ESKD patient.[27] Similarly, the prevalence of depression was found similar to that reported by Abdel-kaber et al in ESRD patients on HD and CKD stage IV and V patients not on HD, using PHQ.[28] Younger age group (≤60 years) was found to be a significant risk factor for the depression in CKD patients. These findings were found to be consistent with the findings of Yu et al using PHQ in ESRD patients.[19]

LIMITATIONS

There could be chance of reporting bias in the study as the patients were interviewed for the presence of

depression. As our study was cross-sectional in nature, a causal relationship between the occurrence of depression and CKD could not be established.

CONCLUSIONS

In our study, prevalence of depression in patients of CKD was seen in around half of patients (44.7%). Patients' age, gender, BMI, treatment funding, education level, income, CKD duration and stage, dialysis status, and existing comorbidities were found to be significant predictors of depression among CKD patients. Thus, an early diagnosis of depression could be helpful in improving the quality of life of CKD patients.

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