



TO STUDY THE PSYCHIATRIC MANIFESTATIONS IN PATIENTS WITH CHRONIC KIDNEY DISEASES

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ABSTRACT

Background: Chronic kidney disease (CKD) is a progressive multisystem disorder associated with substantial physical, psychological, and social burden. Psychiatric manifestations such as depression, anxiety, sleep disturbances, and cognitive impairment are common but often under-recognized, particularly in resource-limited settings. This study aimed to assess the prevalence and pattern of psychiatric manifestations among patients with CKD attending a tertiary care center in Central India.

Methods: This prospective observational study was conducted in the Departments of General Medicine and Psychiatry at L.N. Medical College & Research Centre and J.K. Hospital, Bhopal. A total of 219 adult patients with diagnosed CKD were enrolled. Patients with a prior psychiatric illness were excluded. Psychiatric assessment was performed using the Hamilton Depression Rating Scale (HDRS), Beck Anxiety Inventory (BAI), and Brief Psychiatric Rating Scale (BPRS). Associations between psychiatric manifestations, CKD stage, dialysis status, and sociodemographic variables were analyzed.

Results: Psychiatric manifestations were identified in 64.8% of patients. Insomnia/sleep disturbance was the most common manifestation (53.9%), followed by depression (49.3%), anxiety (39.3%), cognitive dysfunction (12.8%), and psychotic symptoms (6.8%). Depression prevalence increased significantly with advancing CKD stage, rising from 30% in early-stage disease to 59.3% in Stage 5 CKD. Patients undergoing maintenance hemodialysis had significantly higher rates of depression (55.1% vs. 41.3%, $p=0.041$), anxiety (44.9% vs. 31.5%, $p=0.035$), and insomnia (59.1% vs. 46.7%, $p=0.029$) compared with predialysis patients. Female gender, lower educational status, unemployment, and lower socioeconomic status were significantly associated with depression. Psychiatric symptom severity demonstrated a negative correlation with estimated glomerular filtration rate (eGFR).

Conclusions: Psychiatric manifestations are highly prevalent among CKD patients and are associated with disease severity and dialysis dependence. Routine psychiatric screening and integrated multidisciplinary care should be incorporated into CKD management to improve quality of life, treatment adherence, and overall clinical outcomes.

Keywords: Chronic Kidney Disease, Depression, Anxiety, Psychiatric Manifestations, Hemodialysis, Sleep Disturbance, Cognitive Dysfunction.

INTRODUCTION

Chronic kidney disease (CKD) is a major global public health problem characterized by persistent structural or functional abnormalities of the kidneys resulting in progressive loss of renal function. According to the Kidney Disease: Improving Global Outcomes (KDIGO) guidelines, CKD is defined by the presence of kidney damage or an estimated glomerular filtration rate (eGFR) <60 mL/min/1.73 m² for at least three months.¹

The global prevalence of CKD is estimated to be approximately 10–13%, and its burden continues to rise due to increasing prevalence of diabetes mellitus, hypertension, obesity, and population ageing.^{2,3} In India, CKD has emerged as a significant healthcare challenge, contributing substantially to morbidity, mortality, and healthcare expenditure.^{4,5} While the physical complications of CKD have been extensively studied, the psychological and psychiatric consequences of the disease have received comparatively less attention. Patients with CKD face multiple stressors, including progressive loss of kidney function, lifelong medication use, dietary restrictions, frequent hospital visits, financial



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burden, uncertainty regarding prognosis, and dependence on renal replacement therapies such as hemodialysis.^{6,7} These factors can significantly affect mental well-being and quality of life. In addition, biological mechanisms such as accumulation of uremic toxins, chronic inflammation, anemia, electrolyte disturbances, and cerebrovascular changes may directly influence central nervous system function and contribute to the development of psychiatric symptoms.^{8,9} Depression is among the most common psychiatric disorders reported in CKD patients. Previous studies have demonstrated that depressive symptoms occur in approximately 20–40% of CKD patients, with even higher prevalence among individuals receiving maintenance hemodialysis.^{10–12} Depression has been associated with poor treatment adherence, increased hospitalization, reduced quality of life, faster progression of kidney disease, and increased mortality.^{13–15} Similarly, anxiety disorders are highly prevalent and may arise from concerns regarding disease progression, dialysis procedures, transplantation, financial dependency, and uncertainty about the future.^{16,17} Anxiety has also been linked to impaired treatment compliance and poorer health outcomes.¹⁸

Apart from depression and anxiety, CKD patients frequently experience sleep disturbances, cognitive impairment, adjustment disorders, and psychotic symptoms.^{19,20} Sleep disorders, including insomnia and restless legs syndrome, are particularly common among patients undergoing dialysis and may contribute to fatigue, impaired daily functioning, and worsening psychological distress.^{21,22} Cognitive dysfunction has also emerged as an important neuropsychiatric complication of CKD, potentially affecting memory, executive function, and decision-making capacity, thereby complicating disease management and adherence to treatment recommendations.^{23,24}

Despite growing evidence regarding psychiatric morbidity in CKD, mental health assessment remains underutilized in routine nephrology practice, particularly in low- and middle-income countries.²⁵ In India, psychiatric manifestations in CKD are often overlooked because clinical attention is primarily directed toward medical stabilization and management of renal complications. Consequently, many patients remain undiagnosed and untreated, leading to avoidable deterioration in quality of life and clinical outcomes.²⁶ Furthermore, data regarding the prevalence and pattern of psychiatric manifestations among CKD patients from Central India remain limited. Sociocultural factors, economic challenges, healthcare accessibility, and varying levels of health literacy may influence the occurrence and presentation of psychiatric symptoms in this population.^{27,28}

Given the substantial impact of psychiatric disorders on treatment adherence, quality of life, and overall prognosis, early identification and appropriate intervention are essential components of comprehensive CKD care. The present study was therefore undertaken to assess the prevalence and pattern of psychiatric manifestations among patients with chronic kidney disease attending a tertiary care center in Central India and to evaluate their association with disease severity and dialysis status. The findings may help inform routine psychiatric screening strategies and promote an integrated multidisciplinary approach to CKD management.

MATERIALS AND METHODS

Study Design and Setting

This hospital-based prospective observational study was conducted in the Department of General Medicine in collaboration with the Department of Psychiatry at L.N. Medical College & Research Centre and J.K. Hospital, Bhopal, Madhya Pradesh, India. The study was conducted over a period of 18 months. Ethical approval was obtained from the Institutional Ethics Committee of L.N. Medical College & Research Centre, Bhopal (IEC No. LNMC&RC/DEAN/2024/ETHICS/331). Written informed consent was obtained from all participants before enrolment.

Study Population

Adult patients aged ≥ 18 years with a diagnosis of chronic kidney disease (CKD) attending the outpatient and inpatient services of the study centre were screened for eligibility. CKD was defined and staged according to the Kidney Disease: Improving Global Outcomes (KDIGO) classification. A total of 219 patients fulfilling the inclusion criteria were consecutively enrolled during the study period. Patients with a documented psychiatric illness preceding the diagnosis of CKD and those unwilling to provide informed consent were excluded from the study.

Data Collection

A structured case-record form was used to collect sociodemographic and clinical information, including age, sex, and educational status, occupation, marital status, and socioeconomic status, and CKD stage, duration of CKD, dialysis status, and associated comorbidities. Laboratory parameters including hemoglobin, blood urea, serum creatinine, estimated glomerular filtration rate (eGFR), serum sodium, and serum potassium were recorded from patients' medical records.

Psychiatric Assessment

All participants underwent psychiatric evaluation by trained psychiatrists using standardized and validated assessment tools.

Depression Assessment

Depression was assessed using the Hamilton Depression Rating Scale (HDRS). Scores were

categorized as normal (0–7), mild (8–13), moderate (14–18), severe (19–22), and very severe (>23). An HDRS score ≥ 8 was considered indicative of clinically significant depression.

Anxiety Assessment

Anxiety was evaluated using the Beck Anxiety Inventory (BAI). Scores were categorized as minimal (0–7), mild (8–15), moderate (16–25), and severe (≥ 26). A BAI score ≥ 8 was considered indicative of clinically significant anxiety.

Assessment of Psychiatric Symptom Burden

Overall psychiatric symptom severity was assessed using the Brief Psychiatric Rating Scale (BPRS). Scores were categorized as minimal (18–30), mild (31–40), moderate (41–52), and severe (>52). A BPRS score ≥ 32 was considered indicative of clinically significant psychiatric symptoms.

Other Psychiatric Manifestations

Sleep disturbances, cognitive dysfunction, and psychotic symptoms were identified through clinical psychiatric evaluation and documented as part of the study protocol.

Outcome Measures

The primary outcome was the prevalence of psychiatric manifestations among patients with CKD. Secondary outcomes included assessment of the severity of depression and anxiety and evaluation of associations between psychiatric manifestations and CKD stage, dialysis status, and sociodemographic variables.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 27.0. Continuous variables were expressed as mean $\pm$ standard deviation (SD), whereas categorical variables were presented as frequencies and percentages. Associations between categorical variables were analyzed using the Chi-square test or Fisher's exact test, as appropriate. Correlations between psychiatric symptom scores and clinical variables were assessed, and a two-tailed p-value < 0.05 was considered statistically significant.

Ethical Considerations

The study adhered to the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants before

enrolment. Participant confidentiality was maintained by assigning unique identification numbers and storing study data in secure, password protected systems accessible only to the investigators.

RESULTS

A total of 219 patients with chronic kidney disease (CKD) were included in the study. The mean age of the study population was 46.8 ± 12.4 years, and 63% were male. Advanced kidney disease was common, with 58.9% of patients belonging to CKD Stages 4–5 and 58.0% receiving maintenance hemodialysis. Hypertension (78.5%), anemia (71.2%), and diabetes mellitus (44.7%) were the most prevalent comorbidities.

Overall Burden of Psychiatric Morbidity

Psychiatric manifestations were identified in 142 patients, corresponding to an overall prevalence of 64.8%. Sleep disturbance was the most common psychiatric manifestation (53.9%), followed by depression (49.3%) and anxiety (39.3%). Coexisting depression and anxiety were observed in 23.7% of patients. Cognitive dysfunction and psychotic symptoms were present in 12.8% and 6.8% of participants, respectively.

Among depressive disorders, mild depression was the predominant presentation (21.9%), whereas moderate, severe, and very severe depression were observed in 16.0%, 8.2%, and 3.2% of patients, respectively. Anxiety symptoms were similarly frequent, with mild anxiety representing the largest subgroup.

Association between CKD Severity and Depression

A significant association was observed between CKD stage and depression ($\chi^2=8.62$, $p=0.035$). Depression prevalence increased progressively with worsening renal function, rising from 30.0% in Stage 1–2 CKD to 40.0% in Stage 3, 54.2% in Stage 4, and 59.3% in Stage 5/end-stage renal disease (ESRD).

This stage-wise increase demonstrates a clear relationship between advancing kidney dysfunction and psychiatric morbidity.

Table 1. Association between CKD Stage and Depression

CKD Stage	Depression Present n (%)	Depression Absent n (%)
Stage 1–2	6 (30.0)	14 (70.0)
Stage 3	28 (40.0)	42 (60.0)
Stage 4	26 (54.2)	22 (45.8)
Stage 5/ESRD	48 (59.3)	33 (40.7)

Chi-square = 8.62, $p = 0.035$

Effect of Hemodialysis on Psychiatric Morbidity

Patients receiving maintenance hemodialysis exhibited substantially greater psychiatric morbidity than predialysis patients. Depression was

significantly more prevalent among dialysis patients compared with predialysis patients (55.1% vs. 41.3%; $p=0.041$). Similarly, anxiety (44.9% vs. 31.5%; $p=0.035$) and insomnia (59.1% vs. 46.7%;

p=0.029) occurred significantly more frequently in the dialysis group. Moreover, dialysis patients demonstrated significantly higher psychiatric symptom severity.

Mean HDRS, BAI, and BPRS scores were all significantly elevated among hemodialysis patients compared with predialysis patients.

Table 2. Psychiatric Morbidity According to Dialysis Status

Variable	Predialysis (n=92)	Hemodialysis (n=127)	p value
Depression	41.3%	55.1%	0.041
Anxiety	31.5%	44.9%	0.035
Insomnia	46.7%	59.1%	0.029
Mean HDRS score	8.4 ± 5.6	11.8 ± 6.8	0.002
Mean BAI score	7.4 ± 7.0	10.2 ± 8.4	0.012
Mean BPRS score	24.8 ± 7.0	28.6 ± 9.2	0.001

Sociodemographic Factors Associated With Depression

Depression was significantly associated with female sex, lower educational attainment, unemployment, and lower socioeconomic status. Female patients had a higher prevalence of depression than males

(56.8% vs. 44.9%; p=0.048). Similarly, depression was more common among patients with lower educational status (67.9% vs. 42.9%; p=0.002), unemployed individuals (65.3% vs. 44.7%; p=0.012), and those belonging to lower socioeconomic classes (60.7% vs. 37.4%; p=0.001).

Table 3. Sociodemographic Factors Associated With Depression

Variable	Depression Present (%)	p value
Female sex	56.8	0.048
Lower education	67.9	0.002
Unemployment	65.3	0.012
Lower socioeconomic status	60.7	0.001

Correlation between Renal Function and Psychiatric Scores

Psychiatric symptom severity showed significant correlations with clinical markers of CKD severity. Estimated glomerular filtration rate (eGFR) demonstrated significant negative correlations with HDRS (r=-0.286), BAI (r=-0.218), and BPRS scores (r=-0.245), indicating worsening psychiatric

symptoms with declining renal function. Conversely, serum creatinine, blood urea, and duration of CKD showed significant positive correlations with psychiatric symptom scores. Hemoglobin levels demonstrated a significant inverse correlation with depression and anxiety scores.

Table 4. Correlation between Clinical Variables and Psychiatric Scores

Variable	HDRS (r)	BAI (r)	BPRS (r)
eGFR	-0.286**	-0.218**	-0.245**
Duration of CKD	0.324**	0.268**	0.198*
Hemoglobin	-0.198*	-0.156*	-0.142
Serum Creatinine	0.312**	0.234**	0.268**
Blood Urea	0.278**	0.212*	0.242**

- p<0.05; ** p<0.01

Pattern of Psychiatric Symptoms

Assessment using the Brief Psychiatric Rating Scale demonstrated that psychiatric morbidity in CKD was predominantly affective rather than psychotic in nature. Somatic concern was the most frequent symptom domain (64.8%), followed by anxiety (49.3%) and depressive mood (42.0%). Hallucinatory behavior (3.7%) and unusual thought content (5.5%) were uncommon. These findings suggest that psychiatric manifestations in CKD are largely driven by mood symptoms, anxiety, sleep disturbance, and illness-

related psychological distress rather than severe psychotic disorders.

DISCUSSION

The present study demonstrates a substantial burden of psychiatric morbidity among patients with chronic kidney disease (CKD), with nearly two-thirds (64.8%) of participants exhibiting at least one psychiatric manifestation. Sleep disturbance (53.9%), depression (49.3%), and anxiety (39.3%) were the most prevalent psychiatric conditions identified. Importantly, psychiatric morbidity

showed a significant association with advancing CKD stage, dialysis dependence, and adverse sociodemographic factors. Furthermore, psychiatric symptom severity demonstrated significant correlations with markers of renal dysfunction, suggesting a close relationship between declining kidney function and worsening psychological health.

Overall Burden of Psychiatric Morbidity

Psychiatric manifestations are increasingly recognized as major non-traditional complications of CKD. The overall prevalence of psychiatric morbidity observed in the present study (64.8%) is consistent with previous literature demonstrating that psychological disorders occur more frequently in CKD patients than in the general population.^{10, 11} CKD imposes a chronic disease burden characterized by lifelong treatment, dietary restrictions, financial stress, uncertainty regarding prognosis, and progressive loss of functional independence. These factors collectively contribute to psychological distress and reduced quality of life.^{12, 13}

Our findings are comparable to those reported by Gadia et al. from India, who observed depression and anxiety in 66% and 61% of maintenance hemodialysis patients, respectively.¹⁴ Similar observations have been reported by Elhadad et al. in Egypt and Kunwar et al. in Nepal, both of whom documented a high prevalence of psychiatric disorders among CKD patients and highlighted their adverse impact on quality of life.^{15, 16}

The predominance of affective symptoms observed in the present study is supported by BPRS findings, where somatic concern, anxiety, and depressive mood emerged as the most frequent symptom domains, while psychotic manifestations were uncommon. This suggests that psychiatric morbidity in CKD is primarily characterized by mood and anxiety disorders rather than severe psychotic illness.

Depression in Chronic Kidney Disease

Depression was identified in 49.3% of study participants, making it one of the most prevalent psychiatric disorders in the cohort. This prevalence is higher than that reported in several earlier studies, including those by Hedayati et al. and Palmer et al., which documented prevalence rates ranging from 20% to 40%.^{10, 17} The higher prevalence observed in our study may be explained by the large proportion of patients with advanced CKD and dialysis dependence, both of which are recognized risk factors for depression.

Depression in CKD is clinically significant because it has been associated with poor treatment adherence, reduced quality of life, increased hospitalization rates, and higher mortality.^{18, 19} Previous studies have demonstrated that depressive symptoms independently predict adverse renal and

cardiovascular outcomes.²⁰ Consequently, failure to identify and treat depression may negatively influence both psychological well-being and overall disease prognosis.

Several biological mechanisms may explain the high prevalence of depression in CKD. Chronic inflammation, elevated cytokine levels, oxidative stress, anemia, endocrine dysfunction, and accumulation of uremic toxins may alter neurotransmitter metabolism and contribute to mood disturbances.²¹ Additionally, psychosocial stressors such as occupational limitations, financial burden, and dependency on caregivers further amplify depressive symptoms.

Anxiety and Psychological Distress

Anxiety symptoms were identified in 39.3% of patients. Similar prevalence rates have been reported by Cukor et al. and Feroze et al., who emphasized that anxiety is frequently under-recognized among CKD patients despite its significant impact on quality of life and treatment adherence.^{22, 23}

Anxiety in CKD may arise from fear of disease progression, concerns regarding dialysis initiation, uncertainty surrounding transplantation, financial insecurity, and fear of premature death. In addition, repeated hospitalization and invasive procedures may reinforce chronic psychological stress. Anxiety often coexists with depression, creating a cycle of worsening psychological and physical health.²²

Association between CKD Severity and Depression

One of the most important findings of the present study was the significant relationship between CKD stage and depression. Depression prevalence increased progressively from 30.0% in Stage 1–2 CKD to 59.3% in Stage 5 disease, demonstrating a clear dose–response relationship between worsening renal function and psychiatric morbidity.

This finding is consistent with reports by Loosman et al. and Hedayati and Finkelstein, who observed increasing rates of depression as patients progressed toward end-stage renal disease.^{24, 25} Advanced CKD is associated with greater symptom burden, increased healthcare utilization, reduced physical functioning, and heightened dependence on medical support, all of which contribute to emotional distress.

The biological basis for this association may involve accumulation of uremic toxins, chronic systemic inflammation, endothelial dysfunction, electrolyte abnormalities, and neurohormonal disturbances. Together, these factors may adversely affect central nervous system functioning and predispose patients to depression and anxiety.²¹

Impact of Hemodialysis on Psychiatric Morbidity

Another clinically significant finding was the markedly higher psychiatric burden among patients undergoing maintenance hemodialysis. Depression, anxiety, and insomnia were all significantly more

common among dialysis patients compared with predialysis patients. In addition, dialysis patients demonstrated significantly higher HDRS, BAI, and BPRS scores, indicating greater psychiatric symptom severity.

These findings are consistent with observations by Feroze et al., Watnick et al., and Goyal et al., who reported substantially higher psychiatric morbidity among dialysis-dependent patients.^{23, 26, 27} Hemodialysis represents a major lifestyle transition requiring repeated hospital visits, vascular access procedures, strict dietary restrictions, and prolonged treatment sessions. Such disruptions may adversely affect employment, family dynamics, social functioning, and personal independence.

The higher prevalence of psychiatric symptoms among dialysis patients emphasizes the need for routine psychological assessment within dialysis units. Early recognition and intervention may improve treatment adherence, quality of life, and potentially long-term clinical outcomes.

Sleep Disturbances and Psychiatric Symptoms

Sleep disturbance was the most common psychiatric manifestation in the present study, affecting more than half of all participants. Furthermore, insomnia was significantly more prevalent among dialysis patients than predialysis patients.

These findings are consistent with reports by Zubair and Butt and Unruh et al., who documented sleep disturbances in approximately 60–70% of dialysis patients.^{28, 29} Multiple factors may contribute to sleep dysfunction in CKD, including restless legs syndrome, pruritus, nocturnal muscle cramps, fluid overload, sleep apnea, circadian rhythm disruption, and metabolic abnormalities. Sleep disturbances frequently coexist with depression and anxiety, creating a bidirectional relationship that worsens psychological distress and quality of life.²⁹

Sociodemographic Determinants of Depression

The present study identified female gender, lower educational attainment, unemployment, and lower socioeconomic status as significant determinants of depression.

These findings are consistent with previous studies demonstrating the importance of social determinants in psychiatric outcomes among CKD patients.³⁰ Lower educational status may limit health literacy and disease understanding, while unemployment and financial insecurity can intensify stress and feelings of helplessness. Similarly, socioeconomic disadvantage may restrict access to healthcare resources and psychosocial support systems. Collectively, these factors contribute to increased vulnerability to depression and anxiety.

Correlation between Psychiatric Symptoms and Renal Function

A notable strength of the present study was the demonstration of significant correlations between psychiatric symptom scores and objective markers

of kidney disease severity. Psychiatric scores showed significant negative correlations with eGFR and positive correlations with serum creatinine, blood urea, and CKD duration.

These findings support the hypothesis that psychiatric manifestations are not solely psychological reactions to chronic illness but may also reflect biological consequences of progressive renal dysfunction.^{24, 25} The observed dose–response relationship strengthens the evidence linking CKD severity to psychiatric morbidity and highlights the importance of integrating mental health assessment into routine nephrology care.

CONCLUSION

The present study demonstrates that psychiatric manifestations are highly prevalent among patients with chronic kidney disease, affecting nearly two-thirds (64.8%) of the study population. Sleep disturbances, depression, and anxiety emerged as the most common psychiatric conditions, highlighting the substantial psychological burden associated with CKD. Depression was present in almost half of all patients and showed a significant increase with advancing CKD stage, rising from 30.0% in early-stage disease to 59.3% among patients with Stage 5 CKD. Furthermore, patients undergoing maintenance hemodialysis exhibited significantly higher rates and greater severity of depression, anxiety, and sleep disturbances compared with predialysis patients.

The study also identified important sociodemographic determinants of depression, including female gender, lower educational status, unemployment, and lower socioeconomic status. In addition, psychiatric symptom severity demonstrated significant correlations with declining renal function, longer disease duration, and worsening biochemical parameters, suggesting that both psychosocial and biological factors contribute to psychiatric morbidity in CKD.

These findings underscore the need for routine mental health screening as an integral component of CKD management, particularly among patients with advanced disease and those receiving hemodialysis. Early identification and timely intervention for psychiatric disorders may improve quality of life, treatment adherence, and overall clinical outcomes. A multidisciplinary approach involving nephrologists, psychiatrists, psychologists, dialysis personnel, and social support services should be incorporated into standard CKD care to address the often-overlooked psychological dimensions of this chronic illness.

Key Message

Psychiatric morbidity is common, progressive, and closely linked to CKD severity and dialysis dependence. Routine psychiatric screening and integrated psychosocial care should be considered

essential components of comprehensive chronic kidney disease management.

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