

Psychiatric Morbidity, Sleep Quality, and Cognitive Impairment in Patients with Chronic Kidney Disease Attending a Tertiary Care Center: A Cross-sectional Study.

¹Dr. Shashank S. Shetty, Assistant Professor, Department of Psychiatry, SUIMS, Shimoga, Karnataka, India

²Dr. Vishwanatha Sham Alamela, Assistant Professor, Department of Psychiatry, S. Nijalingappa Medical College, Bagalkot, Karnataka, India.

³Dr. Ambika S. K., Assistant Professor, Department of Psychiatry, DIMHANS, Dharwad, Karnataka, India.

⁴Dr. Narayan R. Mutalik, Professor & Head, Department of Psychiatry, S. Nijalingappa Medical College, Bagalkot, Karnataka, India.

Corresponding Author: Dr. Ambika S. K., Assistant Professor, Department of Psychiatry, DIMHANS, Dharwad, Karnataka, India.

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Abstract

Background: Chronic kidney disease (CKD) is a progressive condition characterized by the gradual loss of kidney function, with an increasing prevalence worldwide. Patients with a CKD diagnosis face multiple comorbidities, including not only other medical conditions but also psychiatric disorders.

Aim and Objectives: 1. To evaluate the prevalence of psychiatric morbidities in CKD patients. 2. To assess sleep quality and cognitive impairment in CKD patients using the.

Material and Methods: A hospital-based cross-sectional study was conducted among 70 patients attending the

Nephrology Outpatient Department of a tertiary care teaching hospital. Sociodemographic and clinical details, including the stage of chronic kidney disease (CKD) and dialysis status, were recorded. Psychiatric morbidity was assessed using the Mini-International Neuropsychiatric Interview (M.I.N.I-Plus), cognitive function was evaluated using the Montreal Cognitive Assessment (MoCA), and sleep quality was assessed using the Insomnia Severity Index (ISI). These standardized assessment tools were administered to evaluate psychiatric disorders, cognitive impairment, and insomnia severity among the study participants.

Results: The majority of participants belonged to the 41–50-year age group, with a predominance of females. Most participants were married, belonged to the lower socioeconomic group, and resided in rural areas. According to the KDIGO classification, 25.7% of participants had stage 4 CKD, while 31.4% had stage 5 CKD. The study identified generalized anxiety disorder, major depressive episodes, and panic disorder as the prominent psychiatric morbidities among patients with chronic kidney disease. Cognitive impairment and sleep disturbances were also observed, with a higher frequency among participants with advanced stages of CKD.

Conclusion: Psychiatric morbidity, cognitive impairment, and sleep disturbances were significantly more prevalent among participants with advanced stages of chronic kidney disease in the present study.

Keywords: Chronic Kidney Disease, Psychiatric Morbidity, Cognitive Impairment, Sleep Disturbances, KDIGO Classification.

Introduction

Chronic kidney disease (CKD) is a complex, often overwhelming storm that impacts mental health in addition to being a physical ailment. As Addison carefully noted in 1868, the very nature of renal insufficiency forces people to go through a psychological crisis. Current research demonstrates that CKD is linked to a significant burden of psychiatric comorbidities, supporting this previous conclusion.^{1, 2}

This burden is particularly shocking in India, where the prevalence of CKD varies by stage and affects 7%, 4.3%, 4.3%, 0.8%, and 0.8% of the population in stages 1 through 5, respectively. A recent Indian study found that a surprising 45% of CKD patients have mental health issues.³

Numerous studies have shown a connection between cognitive decline and reduced renal function. For every 15 ml/min/1.73 m² decrease in glomerular filtration rate (GFR), there is an estimated decline in cognitive function equivalent to three years of aging. Thus, chronic kidney disease (CKD) is a recognized independent risk factor for cognitive impairment. Furthermore, mental health problems are common in CKD patients.⁴

Sleep problems are common in patients with chronic kidney disease (CKD), particularly in those with end-stage renal disease (ESRD). Eighty percent of ESRD patients receiving dialysis report having trouble sleeping, with daytime sleepiness being the most often reported symptom. This review discusses the likely multifactorial explanation for the increased prevalence of sleep-related issues and disorders in this population. Sleep issues are associated with increased mortality and health hazards in addition to a lower quality of life.^{5, 6}

The studies relating to psychiatric morbidity, Sleep Quality and Cognitive impairment in chronic kidney disease patients are lacking. Hence this study was undertaken in order to study the psychiatric morbidities, Sleep quality and cognitive impairment in chronic kidney disease cases.

Material and Methods

A cross-sectional study was conducted among 70 patients attending the Department of Nephrology at a tertiary care hospital. CKD patients with stages 1-5, whether on dialysis or non-dialysis, aged between 18 and 60 years, were included in the study. Patients with a history of psychiatric morbidity or neurological disease, patients who were too ill to undergo assessment, and patients with dementia were excluded from the study.

Sociodemographic variables were collected from all the cases by using a predesigned proforma. The details

regarding duration of CKD, cause of CKD and complications were entered. All the cases were assessed using the Mini-International Neuropsychiatric Interview (MINI plus), Montreal Cognitive Assessment (MOCA), and Insomnia Severity Index (ISI) scales applied to look for psychiatric morbidities, cognitive impairment, and sleep quality, respectively.

Mini International Neuropsychiatric Interview (MINI plus) was used to assess psychiatric disorders. This tool is short, structured diagnostic tool which is used to identify the major psychiatric disorders which covers the criteria from DSM and ICD system and can be administered in 15 minutes. Montreal Cognitive Assessment (MOCA) is a brief thirty-point screening test used to detect mild cognitive impairment. This tool is designed to evaluate short – term memory, executive functions, and attention. Insomnia Severity Index (ISI) is a brief validated tool consisting of 7 items to assess the severity of insomnia and its impact on daytime functioning over a 2-week period.

The details were compiled using a Microsoft Excel sheet and transferred and analysed using Statistical Package for the Social Sciences (Version 20). Suitable statistical tables and tests were applied.

Results

About 41.4% of the CKD cases in this study group were aged 41–50 years, and most were female. About 30.0% of the cases were educated up to the higher secondary level. About 28.6% of the cases were unemployed [Table. 1]. About 41.4% of the cases belonged to the lower middle class. About 67.1% of the cases were married, and 71.4% of the cases belonged to rural areas.

Table 1: Socio-demographic variables of the study group

Socio–demographic characteristics	Category	Frequency(n)	Percentage(%)
Age group(years)	<30	6	8.6
	31 – 40 years	17	24.3
	41 – 50 years	29	41.4
	51 – 60 years	18	25.7
Gender	Male	29	41.4
	Female	41	58.6
Education	Illiterate	6	8.6
	Primary	13	18.6
	School	11	15.7
	Higher secondary	21	30.0
	Graduate	19	27.1
	Professional	13	18.6
Occupation	Business	5	7.1
	Clerical	6	8.6
	Farmer	14	20.0
	Housewife	16	22.9
	Professional	4	5.7
	Skilled	4	5.7
	Student	1	1.4
	Unemployed	20	28.6

Table 2: CKD stages of the study group

CKD stage	Frequency(n)	Percentage(%)
Stage 1	4	5.7
Stage 2	15	21.4
Stage 3	11	15.7
Stage 4	18	25.7
Stage 5	22	31.4

Table 2 presents the distribution of study participants according to the stage of chronic kidney disease (CKD- as per As per the KDIGO classification). Among the 70 participants, 4 (5.7%) were classified as having stage 1 CKD, 15 (21.4%) had stage 2 CKD, and 11 (15.7%) had stage 3 CKD. Stage 4 CKD was observed in 18 (25.7%) participants, while 22 (31.4%) had stage 5 CKD. Thus, stage 5 CKD constituted the largest proportion of the study group, followed by stage 4 CKD.

Table 3: Psychiatric morbidity in the study group

Psychiatric morbidity	CKD stage		Total n (%)
	Stage 1 – 2 n (%)	Stage 3 – 5 n (%)	
Alcohol Dependence Syndrome	0	2 (3.9)	2 (2.9)
AUD	0	3 (5.9)	3 (4.3)
Generalized Anxiety disorder	0	10 (19.6)	10 (14.3)
Major depressive episode	0	7 (13.7)	7 (10.0)
Nicotine dependence syndrome	0	3 (5.9)	3 (4.3)
Panic disorder	0	5 (9.8)	5 (7.1)
Nil	19 (100.0)	21 (41.2)	40 (57.1)
Total	19 (100)	51 (100)	70 (100)

χ^2 value=19.559, df=6, p-value =0.003, Sig

Table 3 presents the distribution of psychiatric morbidity among the study participants according to CKD stage. Among participants with stage 1–2 CKD, none had a psychiatric morbidity, whereas 30 (58.8%) participants with stage 3–5 CKD had at least one psychiatric morbidity. Generalized anxiety disorder was the most frequently observed psychiatric morbidity, affecting 10 (19.6%) participants with stage 3–5 CKD, followed by major depressive episode in 7 (13.7%) and panic disorder in 5 (9.8%) participants. Nicotine dependence syndrome and alcohol use disorder (AUD) were each reported in 3 (5.9%) participants, while alcohol dependence syndrome was observed in 2 (3.9%) participants with stage 3–5 CKD. Overall, 40 (57.1%) participants had no psychiatric morbidity. The difference in the distribution of psychiatric morbidity between the two CKD groups was statistically significant ($\chi^2 = 19.559$, df = 6, p = 0.003), indicating a significant association between CKD stage and psychiatric morbidity.

Table 4: Cognitive Impairment in the study group

MOCA - Severity	CKD stage	
	Stage 1 – 2 n (%)	Stage 3 – 5 n (%)
Mild	0	20 (39.2)
Moderate	0	20 (39.2)
Severe	0	5 (9.8)
Nil	19 (100.0)	6 (11.8)
Total	19 (100)	51 (100)

χ^2 value=46.941, df=3, sig=0.000, Sig

Table 4 shows the distribution of cognitive impairment according to CKD stage. Among participants with stage 1–2 CKD, all 19 (100%) had no cognitive impairment. In contrast, among participants with stage 3–5 CKD, 20 (39.2%) had mild cognitive impairment, 20 (39.2%) had moderate cognitive impairment, and 5 (9.8%) had severe cognitive impairment, while 6 (11.8%) had no cognitive impairment. The difference in the distribution of cognitive impairment between the two CKD groups was statistically significant ($\chi^2 = 46.941$, df = 3, p < 0.001), indicating a significant association between advanced CKD and cognitive impairment.

Table 5: Cognitive Impairment scores in the study group

MOCA - Scores	CKD stage		t	P value, Sig
	Stage 1 – 2	Stage 3 - 5		
Mean $\pm$ SD	27.31 $\pm$ 1.06	17.86 $\pm$ 5.8	7.034	0.000, Sig

Table 5 presents the comparison of mean MoCA scores between participants with stage 1–2 and stage 3–5 CKD. The mean MoCA score was 27.31 $\pm$ 1.06 among participants with stage 1–2 CKD, whereas it was substantially lower at 17.86 $\pm$ 5.80 among those with stage 3–5 CKD. The difference in mean MoCA scores between the two groups was statistically significant (t = 7.034, p < 0.001), indicating significantly greater cognitive impairment among participants with advanced CKD.

Table 6: Insomnia Severity Index in the study group

ISI - Severity	CKD stage	
	Stage 1 – 2 n (%)	Stage 3 – 5 n (%)
Subthreshold	9 (47.4)	16 (31.4)
Moderate	0	25 (49.0)
Severe	0	10 (19.6)
Nil	10 (52.6)	0
Total	19 (100)	51 (100)

χ^2 value=40.873, df=3, sig=0.000, SigTable 6 demonstrates the distribution of insomnia severity according to CKD stage. Among participants with stage 1–2 CKD, 52.6% had no insomnia and 47.4% had subthreshold insomnia. In contrast, among those with stage 3–5 CKD, 31.4% had subthreshold insomnia, 49.0% had moderate insomnia, and 19.6% had severe insomnia. A statistically significant association was observed between CKD stage and insomnia severity ($\chi^2 = 40.873$, df = 3, $p < 0.001$), with greater insomnia severity observed among participants with advanced CKD.

Table 7: Insomnia Severity Index scores in the study group

ISI - Scores	CKD stage		t	P value, Sig
	Stage 1 – 2	Stage 3 - 5		
Mean $\pm$ SD	7.47 $\pm$ 3.87	17.35 $\pm$ 5.22	7.502	0.000, Sig

Table 7 compares the mean Insomnia Severity Index (ISI) scores between participants with stage 1–2 and stage 3–5 CKD. The mean ISI score was 7.47 ± 3.87 in the stage 1–2 group, compared with 17.35 ± 5.22 in the stage 3–5 group. The difference in mean ISI scores between the two groups was statistically significant ($t = 7.502$, $p < 0.001$), indicating greater insomnia severity among participants with advanced CKD.

Discussion

The present study was undertaken to assess psychiatric morbidity, cognitive impairment, and sleep disturbances

among patients with chronic kidney disease (CKD). Previous studies have documented the occurrence of psychiatric morbidity, cognitive impairment, and sleep disturbances in patients with CKD.

In the present study, CKD was more frequently observed among older participants and females. The majority of participants were educated, although a substantial proportion were unemployed, which may be related to limitations imposed by the disease. Most participants belonged to the lower-middle and lower socioeconomic groups, were married, and resided in rural areas. Malaviya et al. reported a mean age of 42.08 years among patients with CKD, with a male predominance, which differs from the findings of the present study.⁷

More than half of the participants in the present study had stage 3–5 CKD, indicating a substantial representation of advanced disease. Similarly, Malaviya et al. reported that approximately 66% of their participants had stage 5 CKD.⁷

Generalized anxiety disorder was the most frequently observed psychiatric morbidity in the present study, followed by major depressive episode and panic disorder. In comparison, Malaviya et al. reported depression in 73% of patients and anxiety in 14% of patients with CKD.⁷ Singh et al. reported mild depression in approximately 33% of patients, moderate depression in 30%, and severe depression in 16% of patients. Anxiety disorders were reported in 77.08% of patients with CKD in their study.⁸ The variation in the prevalence of psychiatric morbidity across studies may be related to differences in study populations, CKD severity, assessment instruments, and clinical characteristics.

Mild to moderate cognitive impairment was observed among participants with CKD in the present study. Mean MoCA scores were significantly higher among

participants with stage 1–2 CKD than among those with stage 3–5 CKD, suggesting greater cognitive impairment with advancing CKD stage. Similarly, Singh et al. reported better cognitive scores among patients with stage 3 CKD compared with those with stage 4 disease undergoing hemodialysis.⁸ Zubair et al. reported cognitive impairment in 86.9% of patients with CKD.⁹ These findings support the observation that cognitive impairment is an important comorbidity among patients with advanced CKD.

With regard to sleep disturbances, moderate and severe insomnia were observed among a substantial proportion of participants in the present study. The distribution of insomnia severity differed significantly according to CKD stage, and mean ISI scores were significantly higher among participants with stage 3–5 CKD. Both domestic and international studies have reported poor sleep quality among patients undergoing hemodialysis.^{10,11}

Previous studies have also reported an association between sleep disturbances and cognitive impairment in patients with CKD. Longer dialysis sessions have been associated with poorer sleep quality and cognitive impairment, while previous studies have also described an association between prolonged dialysis treatment and various mental health problems.^{12,13} The prolonged duration and financial burden of CKD treatment may contribute to psychological distress and may coexist with sleep disturbances and cognitive difficulties. In addition, metabolic abnormalities associated with advanced CKD may contribute to the complex interplay between psychiatric symptoms, sleep disturbances, and cognitive impairment. Previous studies have also demonstrated an association between depression and poor sleep quality, suggesting that these conditions may coexist and potentially influence one another in patients with CKD.

Conclusion

The present study highlights the substantial burden of psychiatric morbidity, cognitive impairment, and sleep disturbances among patients with chronic kidney disease, particularly those with advanced CKD. Generalized anxiety disorder, major depressive episode, and panic disorder were the predominant psychiatric morbidities identified. Cognitive impairment and insomnia were also more pronounced among participants with stage 3–5 CKD, with significantly lower MoCA scores and higher ISI scores compared with those having stage 1–2 CKD. These findings emphasize the importance of routine assessment of psychiatric symptoms, cognitive function, and sleep disturbances in patients with CKD, especially in those with advanced disease. Early identification and appropriate management of these comorbidities may contribute to comprehensive and patient-centred care in CKD.

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