

# A Comparative Study of Depression and Insomnia among Patients on Continuous Ambulatory Peritoneal Dialysis versus Hemodialysis



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## ABSTRACT

**Background:** Depression and insomnia are common yet under-recognized comorbidities in end-stage kidney disease (ESKD) patients on dialysis. Comparative data on their prevalence between hemodialysis (HD) and peritoneal dialysis (PD) are limited.

**Objectives:** To compare the prevalence and severity of depression and insomnia in patients undergoing HD and PD and identify clinical and biochemical correlates.

**Materials and methods:** A multicenter, cross-sectional study was conducted across armed forces hospitals in Northern India from November 2024 to January 2025. Adult ESKD patients on HD or PD were assessed using the Patient Health Questionnaire-9 (PHQ-9) for depression. Insomnia was assessed using a response to a battery of questions. Demographic, clinical, and laboratory data were analyzed.

**Results:** Of 188 patients screened (HD 105, PD 83), 51 HD (48.6%) and 37 PD (44.6%) patients had PHQ-9 scores  $\geq 5$ , indicating depression. Most had mild depression (HD 25.7%; PD 22.6%). Moderately severe depression was present in a small number, with no difference between the dialysis modalities. Insomnia prevalence was comparable (HD 24.7%; PD 22.6%). Severe depression was associated with lower hemoglobin and albumin, especially in PD (albumin: 2.38 vs 3.10 gm/dL,  $p = 0.03$ ).

**Conclusion:** Depression and insomnia are highly prevalent but underrecognized in dialysis patients. Dialysis modality did not affect the prevalence of depression or insomnia. Lower hemoglobin and albumin correlate with severe depressive symptoms.

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## INTRODUCTION

Depression and insomnia represent major but often overlooked mental health challenges in patients with end-stage kidney disease (ESKD) undergoing dialysis. These psychiatric conditions significantly diminish quality of life, reduce adherence to therapy, and increase morbidity and mortality. While the prevalence of depression among dialysis patients is known to be higher than in the general population, comparative analyses of HD and PD populations are limited, especially in Indian settings. This study leverages the government-funded, multicenter armed forces dialysis program to fill this knowledge gap.

Chronic kidney disease (CKD) is a major and growing public health concern worldwide, with a rising number of patients progressing to ESKD that requires renal replacement therapy for survival. Dialysis remains the most commonly utilized treatment modality for ESKD, particularly in developing countries where access to renal transplantation is limited. Although advances in dialysis techniques have improved survival,

patients continue to experience a substantial burden of physical, psychological, and social stressors that adversely affect their quality of life.<sup>1</sup>

Among the psychological complications associated with ESKD, depression is one of the most prevalent and debilitating disorders. The chronic nature of kidney failure, lifelong dependence on dialysis, dietary and fluid restrictions, financial constraints, and uncertainty regarding prognosis contribute significantly to emotional distress in these patients.<sup>2</sup> Several studies have reported that the prevalence of depression in dialysis patients is significantly higher than in the general population.<sup>3</sup> Depression in ESKD has been linked to poor adherence to treatment, increased hospitalization, reduced quality of life, and higher mortality rates.<sup>4</sup> Despite these serious consequences, depression often remains underdiagnosed and undertreated due to overlapping somatic symptoms of uremia and inadequate routine psychiatric screening in dialysis units.<sup>5</sup>

Sleep disturbances, particularly insomnia, are another common yet under-recognized

problem in patients undergoing dialysis. Insomnia in ESKD may result from multiple factors, including uremia, anemia, pruritus, restless leg syndrome, altered circadian rhythm, anxiety, and the dialysis procedure itself.<sup>6</sup> Disturbed sleep leads to daytime fatigue, impaired concentration, and reduced functional capacity, further worsening overall well-being. Insomnia has also been identified as an independent predictor of poor quality of life and increased morbidity among dialysis patients.<sup>7</sup>

Depression and insomnia share a complex, bidirectional relationship. Insomnia can precipitate or worsen depressive symptoms, while depression itself can disrupt normal sleep patterns.<sup>8</sup> In patients with ESRD, this interaction becomes particularly relevant as both conditions are influenced by biological, psychological, and treatment-related factors. Failure to address either condition may perpetuate a cycle of worsening mental

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health and sleep quality, leading to adverse clinical outcomes.

The type of dialysis modality may significantly influence the prevalence and severity of depression and insomnia. Hemodialysis (HD) is typically performed in hospital-based settings, requiring patients to attend dialysis sessions three times per week for several hours. This rigid schedule often interferes with occupational, social, and family life, contributing to feelings of dependency, loss of autonomy, and psychological distress.<sup>9</sup> Additionally, postdialysis fatigue, intradialytic complications, and fluctuations in biochemical parameters may further impair mood and sleep quality in hemodialysis patients.<sup>10</sup>

In contrast, continuous ambulatory peritoneal dialysis (CAPD) is a home-based dialysis modality that allows greater flexibility and independence. CAPD enables patients to perform dialysis exchanges themselves, potentially enhancing autonomy and improving psychological well-being.<sup>11</sup> However, CAPD is associated with its own set of challenges, including the burden of self-care, fear of peritonitis, body image concerns related to the peritoneal catheter, and sleep disruption due to nocturnal exchanges.<sup>12</sup> As a result, the psychological impact of CAPD on depression and insomnia remains multifaceted and varies among individuals.

Previous studies comparing depression and sleep disturbances between CAPD and hemodialysis patients have yielded inconsistent results. Some studies suggest a higher prevalence of depression and insomnia among hemodialysis patients, while others report no significant difference or even greater psychological burden among CAPD patients.<sup>13</sup> Variations in study design, assessment tools, cultural background, and patient characteristics may account for these discrepancies. Moreover, many studies have focused on either depression or sleep disorders in isolation, with limited research evaluating both conditions concurrently across different dialysis modalities.

In the Indian context, the burden of CKD and ESKD is increasing rapidly, while psychosocial aspects of dialysis care often remain neglected. Cultural stigma surrounding mental health, limited access to psychiatric services, and a lack of standardized screening further exacerbate the problem.<sup>14</sup> Understanding modality-specific differences in depression and insomnia is essential to developing holistic, patient-centered approaches to dialysis care.

Therefore, the present study aims to conduct a comparative assessment of depression and insomnia among patients

undergoing continuous ambulatory peritoneal dialysis and those receiving maintenance hemodialysis, with the objective of improving early detection, guiding targeted interventions, and ultimately enhancing the quality of life of patients with ESKD.

## MATERIALS AND METHODS

### Study Design and Population

A hospital-based, multicenter, cross-sectional comparative study was performed from November 2024 to January 2025 among ESKD patients attending armed forces dialysis units in North India. Inclusion criteria included age  $\geq 18$  years, dialysis duration  $\geq 3$  months, and life expectancy  $> 1$  year. Exclusion criteria included preexisting psychiatric disorder, chronic active infections (e.g., TB, HIV), active malignancy, refusal or inability to provide consent.

### Data Collection

Patients were consecutively recruited and administered the PHQ-9 (for depression) and the insomnia questionnaire by trained psychologists. To assess insomnia, a series of questions consisting of disturbance in falling asleep, maintenance of sleep, nonrefreshing sleep, and inadequate sleep duration in the past 2 weeks were administered. Insomnia was considered to be present if any of the symptoms were marked as frequent. Demographic and biochemical data (hemoglobin, albumin, and creatinine) were extracted from medical records.

### Statistical Analysis

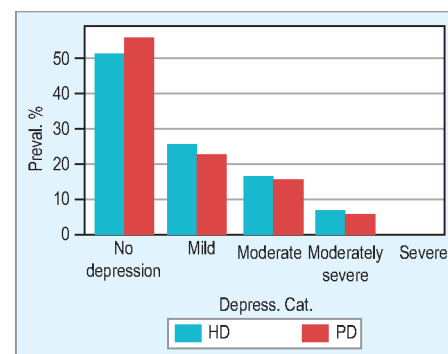
Descriptive statistics rendered means and standard deviations for continuous variables, frequencies for categorical variables. Chi-square and independent t-tests or Mann-Whitney *U* tests compared HD and PD groups. Logistic regression assessed predictors of depression and insomnia. Analysis was performed in SPSS v20. A *p*-value of 0.05 was considered significant.

**Table 1:** Demographic data

Variable	HD (n = 105)	PD (n = 83)	<i>p</i> -value
Age (years, mean $\pm$ SD)	45.2 $\pm$ 6.8	47.3 $\pm$ 8.5	0.07
Gender (M:F)	62:43 (1.44)	48:36 (1.33)	0.68
Education			0.53
Primary school	6	2	
Secondary school	96	79	
Graduate	3	3	
Dialysis vintage [years, median (range)]	4 (1–7)	3.5 (1–6)	0.12
Monthly income (Rs, mean $\pm$ SD)	45000 $\pm$ 12000	42000 $\pm$ 10500	0.07
Family members in house [median (range)]	4 (2–7)	4 (2–6)	0.91

## RESULTS

A total of 105 HD and 83 PD patients met the inclusion criteria (*n* = 188). The mean age was 45.2  $\pm$  6.8 years in HD and 47.3  $\pm$  8.5 years in PD patients, with a male predominance in both (Table 1). Both groups of patients were comparable in dialysis vintage and socioeconomic status indicators, including monthly income and crowding at home. Depression rates (by PHQ-9 at different severity levels) were similar in HD and PD patients (Table 2), with *p*-values  $> 0.05$ , indicating no statistically significant difference between groups for any category. Insomnia prevalence was also similar between HD and PD populations (24.7% vs 22.6%; *p* = 0.77), showing no significant difference (Table 3). Depression severity distribution is shown in Figure 1. Mild depression was the most frequent in both groups. No case of severe depression was detected in either of the groups. Various grades of depression were comparable in the two groups. We also analyzed the relationship of laboratory parameters with depression (Table 4). Lower hemoglobin showed statistically significant association with severe depression in both HD (*p*-value 0.04) and PD subgroup (*p*-value 0.01), and lower albumin showed statistically significant association with severe depression in the PD-subgroup (*p*-value 0.03) and a trend toward such an association in HD patients (*p*-value 0.10).



**Fig. 1:** Depression severity distribution

**Table 2:** Depression prevalence

Assessment	HD (n = 105)	PD (n = 83)	p-value
PHQ-9 $\geq$ 5 (depressed)	51 (47.9%)	37 (44.6%)	0.68
PHQ-9 (5–9) mild depression	27 (25.7%)	19 (22.6%)	0.58
PHQ-9 (10–14) moderate depression	17 (16.2%)	13 (15.7%)	0.92
PHQ-9 (15–19) moderately severe	7 (6.6%)	5 (6.0%)	0.87
PHQ-9 ( $\geq$ 20) severe	0	0	—

**Table 3:** Insomnia prevalence

Assessment	HD (n = 105)	PD (n = 83)	p-value
Insomnia	26 (24.7%)	19 (22.6%)	0.77

**Table 4:** Biochemical correlates

Variable	No depression (Mean $\pm$ SD)	Moderate/severe depression (Mean $\pm$ SD)	p-value
Hb HD, gm/dL	8.70 (0.56)	8.52 (0.34)	0.04
Hb PD, gm/dL	8.50 (0.49)	7.04 (0.71)	0.01
Albumin HD, gm/dL	3.20 (0.43)	2.69 (0.38)	0.10
Albumin PD, gm/dL	3.10 (0.35)	2.38 (0.31)	0.03

## DISCUSSION

In India, it is estimated that 14.3% of people are suffering from mental disorders.<sup>15</sup> Among them, depressive illness has the major contribution, with a prevalence of 3.3%. Depression and insomnia are also common in dialysis patients, including those on hemodialysis and peritoneal dialysis. Hemodialysis is generally performed in a clinical setting twice or thrice a week, leading to dependency on dialysis facilities, less patient control over the procedure, and may limit socialization due to its demanding schedule and the physical stress of the dialysis procedure. Patients often feel excessive fatigue, bear dietary restrictions, and financial burden, all of which can result in psychological distress and contribute to depressive symptoms.<sup>16</sup> On the other hand, peritoneal dialysis, which is home-based therapy, offers more flexibility and independence, minimizes some stressors associated with in-center therapy. However, PD patients may still experience significant psychological stress due to self-care pressure, fear of infection, and the psychological burden of chronic illness, which can contribute to anxiety and depression.

We used the PHQ-9 score to screen for depression, which is a validated screening tool for depression.<sup>17</sup> In our study, the prevalence of depression in patients on dialysis was higher than in the general population (HD = 47.9% vs PD = 44.6%). Using similar tools, the prevalence of depressive symptoms for CKD stage 5D was

39.3% in a meta-analysis by Palmer et al.<sup>3</sup> and approximately 50% as per a study by Zhang et al.<sup>18</sup> There was no significant difference between HD and PD patients for the prevalence of depression. A similar study by Nadort et al.<sup>19</sup> also found no difference in the prevalence of anxiety and depression between HD and PD. The comparable rates of depression between various modalities of renal replacement therapy suggest that differences in treatment delivery (center-based vs home-based) do not substantially influence depressive illness in this government-funded setting, likely due to the absence of financial burden. This data suggests that both hemodialysis and peritoneal dialysis patients have similar burdens of depression and insomnia.

Mild depression was the most common grade of depressive illness. There was a correlation between moderate to severe depression and lower hemoglobin and lower albumin. This difference was statistically significant, especially for PD ( $p = 0.01$ ) than for HD patients ( $p = 0.04$ ). Albumin was notably lower in moderately severe depressed PD patients ( $p = 0.03$ ), but the difference in HD did not reach statistical significance ( $p = 0.10$ ). Lower hemoglobin and albumin, markers of anemia and malnutrition/inflammation, are associated with more severe depression in dialysis patients, particularly for those on PD. This association suggests that the vicious cycle of poor nutrition contributes to poor mental health. This also suggests early treatment of anemia and hypoalbuminemia may significantly contribute to the mitigation of depressive illness and improve mental health.

Limitations of the study include a cross-sectional design, which precludes causality, and a small sample size. Use of self-report measures may have led to an overestimation of depression. The sample may not generalize beyond the unique armed forces cohort.

## CONCLUSION

Depression and insomnia are frequent, underrecognized comorbidities in ESKD patients on both HD and PD. There is a need for routine mental health screening and targeted intervention, especially in patients with declining nutritional status. This is the first study from India to compare depression prevalence between patients on hemodialysis and peritoneal dialysis. The modality of dialysis does not correlate with depression or insomnia in our study, provided it is delivered free of cost.

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## REFERENCES

- Jha V, Garcia-Garcia G, Iseki K, et al. Chronic kidney disease: Global dimension and perspectives. *Lancet* 2013;382(9888):260–272.
- Cukor D, Cohen SD, Peterson RA, et al. Psychosocial aspects of chronic disease: ESRD as a paradigmatic illness. *J Am Soc Nephrol* 2007;18(12):3042–3055.
- Palmer S, Vecchio M, Craig JC, et al. Prevalence of depression in chronic kidney disease: systematic review and meta-analysis. *Kidney Int* 2013;84(1):179–191.
- Hedayati SS, Minhajuddin AT, Afshar M, et al. Association between major depressive episodes and mortality in patients with chronic kidney disease. *JAMA* 2010;303(19):1946–1953.
- Kimmel PL. Depression in patients with chronic renal disease: What we know and what we need to know. *J Psychosom Res* 2002;53(4):951–956.
- Parker KP. Sleep disturbances in dialysis patients. *Sleep Med Rev* 2003;7(2):131–143.
- Unruh ML, Sanders MH, Redline S, et al. Sleep apnea in patients on conventional thrice-weekly hemodialysis. *N Engl J Med* 2003;348(7):581–588.
- Riemann D, Voderholzer U. Primary insomnia: a risk factor to develop depression? *J Affect Disord* 2003;76(1–3):255–259.
- Kimmel PL, Patel SS. Quality of life in patients with chronic kidney disease. *Nat Rev Nephrol* 2009;5(7):400–410.
- Merlino G, Gigli GL, Valente M. Sleep disorders in dialysis patients. *J Nephrol* 2008;21(Suppl 13):S66–S70.

11. Bakewell AB, Higgins RM, Edmunds ME. Quality of life in peritoneal dialysis patients. *Perit Dial Int* 2002;22(3):355–364.
12. Devins GM, Mendelssohn DC, Barré PE, et al. Predialysis psychoeducational intervention and coping styles influence time to dialysis in chronic kidney disease. *Am J Kidney Dis* 2003;42(4):693–703.
13. Chiang HH, Livneh H, Yen ML, et al. Prevalence of depression and sleep disorders in dialysis patients. *J Clin Nurs* 2011;20(11–12):1632–1640.
14. Grover S, Avasthi A. Consultation-liaison psychiatry in India. *Indian J Psychiatry* 2018;60(Suppl 4):S451–S460.
15. Sagar R, Dandona R, Gururaj G, et al. The burden of mental disorders across the states of India: The Global Burden of Disease Study 1990–2017. *Lancet Psychiatry* 2020;7(2):148–161.
16. Raghavan A, Billa V, Billa V. Factors contributing to the burden of depression amongst patients receiving hemodialysis at public and private dialysis centres. *Indian J Nephrol* 2025;35:530–535.
17. Kimmel PL, Cukor D, Cohen SD, et al. Depression in end-stage renal disease patients: Tools, correlates, outcomes, and needs. *Semin Dial* 2007;20(1):11–14.
18. Zhang S, Xu Y, Xia Y. The efficacy and safety of sertraline in maintenance hemodialysis patients with depression: A randomized controlled study. *J Affect Disord* 2024;352:60–66.
19. Nadort E, Schouten RW, Luijckx X, et al. Symptom dimensions of anxiety and depression in patients receiving peritoneal dialysis compared to haemodialysis. *Perit Dial Int* 2022;42(3):259–269.



## **ANNOUNCEMENT**

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<b>Hon. Secretary</b>	:	Dr Mohan Kumar Mahadevaiah
<b>Hon. Treasurer</b>	:	Dr Vishwanath Krishnamurthy