



Sleep Disorders in Chronic Kidney Disease Patients

Muksuda Begum Mony¹, Chiranjeeb Biswas², Debabrata Das³, Enamul Haque⁴, Rajee Mahmud Talukder⁵

Abstract

Background: Chronic kidney disease (CKD) is associated with a variety of comorbidities, including sleep disorders, which significantly impact patients' quality of life. Sleep disturbances in CKD patients are underreported and poorly managed, despite their potential to exacerbate CKD-related complications.

Aim of the study: This study aims to assess the prevalence and types of sleep disorders among CKD patients and explore their clinical characteristics.

Methods: A cross-sectional study was conducted on 50 CKD patients at conducted at the Department of Nephrology, Medical College for Women & Hospital, Dhaka Bangladesh. During 1 year from January 2024 to December 2024. Sleep disorders were evaluated using the Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS). Clinical and demographic data were also collected.

Result: The study revealed that 40% of participants experienced insomnia, 30% had obstructive sleep apnea (OSA), 20% suffered from restless legs syndrome (RLS), and 10% reported excessive daytime sleepiness. A total of 80% of the participants exhibited poor sleep quality based on the PSQI score, and 30% showed excessive daytime sleepiness according to the ESS. The majority of patients were in advanced stages of CKD (stage 5D), with a high prevalence of comorbidities such as hypertension and diabetes mellitus.

Conclusion: In our study, sleep disorders were highly prevalent in CKD patients, significantly affecting their quality of life. The findings underscore the need for routine screening and management of sleep disturbances in this population. Further research is needed to explore the mechanisms linking CKD and sleep disorders, as well as the efficacy of targeted interventions to improve sleep quality in these patients.

Keywords: Chronic Kidney Disease; Sleep Disorders; Insomnia; Obstructive Sleep Apnea; Restless Legs Syndrome; Pittsburgh Sleep Quality Index (PSQI); Epworth Sleepiness Scale (ESS)

Introduction

Chronic kidney disease (CKD) is a progressive health condition characterized by reduced glomerular filtration rate (GFR) and/or proteinuria, with stages ranging from 1 to 5 based on severity [1]. Affecting approximately 10%–15% of the global adult population, CKD is increasingly prevalent due to aging populations and the growing burden of conditions such as diabetes and hypertension [2]. If untreated, CKD can advance to end-stage kidney disease (ESKD), requiring dialysis or kidney transplantation, imposing

Affiliation:

¹Associate Professor and Head, Department of Nephrology, Medical College for Women & Hospital, Dhaka Bangladesh

²Associate Professor and Head, Department of Psychiatry, Medical College for Women & Hospital, Dhaka Bangladesh

³Jr. Consultant (Medicine), Gazaria UHC, Gazaria, Munsiganj. Bangladesh

⁴Assistant Professor, Department of Medicine, Medical College for Women & Hospital, Dhaka Bangladesh

⁵Associate Professor, Department of Medicine, Medical College for Women & Hospital, Dhaka Bangladesh

*Corresponding author:

Muksuda Begum Mony. Associate Professor and Head, Department of Nephrology, Medical College for Women & Hospital, Dhaka Bangladesh

Citation: Muksuda Begum Mony, Debabrata Das, Chiranjeeb Biswas, Enamul Haque, Rajee Mahmud Talukder. Sleep Disorders in Chronic Kidney Disease Patients. Archives of Nephrology and Urology. 8 (2025): 63-67.

Received: March 11, 2025

Accepted: March 19, 2025

Published: April 01, 2025

significant individual and healthcare system burdens [3]. Sleep disturbances, including insomnia, obstructive sleep apnea (OSA), and restless leg syndrome (RLS), are common comorbidities in CKD patients [4]. In patients with advanced CKD, particularly those on renal replacement therapy (RRT), sleep disorders are more prevalent due to factors such as uremia, metabolic abnormalities, and associated psychological distress [5]. Around 50%–75% of patients with kidney failure and 8%–36% of individuals in the earlier stages of chronic kidney disease (CKD) report experiencing symptoms of insomnia [6]. Globally, sleep disorders affect approximately 20%–40% of the general population, with the prevalence being significantly higher among patients with chronic kidney disease (CKD) [7]. Cross-sectional and longitudinal studies consistently show a significant association between OSA and CKD, independent of other comorbidities like hypertension, diabetes, and obesity [8]. The bi-directional relationship between sleep disorders and CKD involves multiple pathophysiological mechanisms. Sleep disturbances, such as OSA and insomnia, can exacerbate CKD progression through factors like intermittent hypoxia, sympathetic activation, and nocturnal hypertension [9]. In addition, poor sleep quality has been associated with increased inflammation, oxidative stress, and metabolic imbalances, all of which play a role in exacerbating kidney damage [10]. Conversely, CKD-related factors, including uremia and deranged electrolytes, contribute to sleep disturbances, creating a complex interplay between these conditions [5]. Additionally, awareness among patients and healthcare providers about the association between sleep disorders and CKD remains low, especially since early-stage CKD is often asymptomatic [11]. Sleep disturbances in patients with chronic kidney disease (CKD) not only negatively affect their overall quality of life but also contribute to higher rates of morbidity and mortality [12,13]. Poor sleep is associated with cognitive dysfunction, cardiovascular disease, and metabolic syndrome, all of which are common in CKD patients [14]. Moreover, the subjective nature of sleep assessments, such as the Pittsburgh Sleep Quality Index (PSQI), complicates the accurate evaluation of sleep quality in CKD patients [15]. Objective assessment of sleep quality typically involves polysomnography (PSG), a complex, time-consuming, and expensive procedure. This adds to the treatment burden for patients who already spend significant time in the hospital for dialysis sessions [14]. Addressing sleep disturbances in CKD patients is essential for improving overall outcomes and reducing disease burden. The aim of this study is to investigate the relationship between sleep disorders and chronic kidney disease (CKD), focusing on the prevalence and impact of poor sleep quality across different CKD stages.

Materials & Methods

This cross-sectional study was conducted on patients

diagnosed with chronic kidney disease (CKD) at conducted at the Department of Nephrology, Medical College for Women & Hospital, Dhaka Bangladesh. During 1 year from January 2024 to December 2024. A total of 50 patients were recruited using purposive sampling to ensure representation across CKD stages and etiologies. Written informed consent was obtained from each participant, and the study was conducted in accordance with ethical guidelines set by the Institutional Review Board (IRB) of the hospital.

Inclusion Criteria:

- Patients diagnosed with CKD at stages 3–5D.
- Aged 18 years or older.
- Willing to provide informed consent and participate in sleep quality assessments.

Exclusion Criteria:

- Presence of comorbid conditions such as advanced cancer or neurodegenerative diseases.
- Ongoing use of sedative medications not related to CKD management.

Data Collection

Demographic and clinical data were collected through structured interviews, medical records, and laboratory tests. Demographic variables such as age, gender, marital status, educational level, occupation, smoking habits, and coffee intake were recorded. Clinical characteristics including the duration of CKD, the stage of CKD, comorbid conditions (e.g., hypertension, diabetes mellitus), eGFR (estimated glomerular filtration rate), creatinine levels, and medications (e.g., antihypertensive agents, erythropoietin) were assessed. Biochemical parameters such as potassium, calcium, phosphorus, hemoglobin, ferritin, and iron levels were also measured.

Sleep disorders were assessed using two validated tools: the Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale (ESS). The PSQI was used to measure the quality of sleep over the past month, with scores >5 indicating poor sleep quality. The ESS was used to assess daytime sleepiness, with scores >10 indicating excessive daytime sleepiness. Based on the findings from clinical assessments and sleep scales, patients were categorized into different sleep disorder types, including insomnia, obstructive sleep apnea (OSA), restless legs syndrome (RLS), and daytime sleepiness.

Statistical Analysis

Descriptive statistics were used to summarize demographic and clinical characteristics, with means \pm standard deviations (SD) for continuous variables and frequencies and percentages for categorical variables. The prevalence of different sleep

disorders was calculated by categorizing patients based on their scores in the PSQI and ESS. The statistical software SPSS version 26.0 was used for all analyses.

Results

Table 1: Demographic Characteristics of the study population (N=50)

Variables	Frequency (N)	Percentage (%)
Age (in years)		
18–30	10	20
31–50	20	40
>50	20	40
Mean ± SD	51.4 ± 13.6	
BMI (kg/m ²)		
Underweight (<20)	4	8
Normal (20–25)	18	36
Overweight (>30)	16	32
Obese (>35)	12	24
Gender		
Male	27	54
Female	23	46
Marital status		
Married	6	12
Single/divorced/widowed	44	88
Educational level		
Illiterate	22	44
High school or less	23	46
More than high school	5	10
Occupation		
Employed	8	16
Unemployed	42	84
Habits		
Non-smoker/ex-smoker	39	78
Smoker	11	22
Coffee intake	38	76

Table 2: Clinical Characteristics of study population (N=50)

Variables	Frequency (N)	Percentage (%)
Creatinine(mg/dl)		
Mean ± SD	1.7 ± 1.3	
eGFR (ml/min/m ²)		
≥90	23	46
60–89.9	14	28
30–59.9	12	24
≤30	1	2
Aetiology of CKD		

Hypertension	17	34
Diabetes mellitus	13	26
Chronic glomerulonephritis	11	22
HIVAN	3	6
ADPKD	2	4
Obstructive uropathy	1	2
SLE	1	2
Others	2	4
CKD stage		
3	10	20
4	9	18
5	11	22
5D	20	40
Duration of CKD (years)		
Mean ± SD	6.5 ± 3.1	
Medication		
Erythropoietin and iron supply	48	96
Vitamins	46	92
Anti-hypertensive agents	42	84
Anti-osteoporosis	30	60
Diabetic agents	26	52
Antidepressants	4	8
Others	8	16
Biochemical data		
Mean ± SD		
Potassium (mmol/L)	4.32 ± 1.12	
Calcium (mmol/L)	2.34 ± 0.41	
Phosphorus (mmol/L)	1.6 ± 3.4	
Hemoglobin (g/L)	114.6 ± 15.4	
Ferritin (mg/L)	455.6 ± 379.9	
Iron (mmol/L)	10.7 ± 3.8	

Table 3: Prevalence of Sleep Disorders in CKD Patients (N=50)

Sleep Disorder	Frequency (N)	Percentage (%)
Insomnia	20	40
Obstructive Sleep Apnea (OSA)	15	30
Restless Legs Syndrome (RLS)	10	20
Daytime Sleepiness	5	10
Normal Sleep Pattern	10	20

Table 4: Sleep Quality Assessment Scores

Assessment Tool	Mean ± SD	Cut-off for Poor Sleep Quality	Poor Sleep Quality	
			n	%
Pittsburgh Sleep Quality Index (PSQI)	12.3 ± 3.4	>5	40	80
Epworth Sleepiness Scale (ESS)	8.7 ± 4.2	>10	15	30

Discussion

Sleep disorders are common but often underrecognized complications in patients with chronic kidney disease (CKD). These disturbances significantly impact the quality of life and overall health outcomes, contributing to increased morbidity and mortality [5]. Chronic kidney disease disrupts metabolic homeostasis, alters circadian rhythms, and elevates inflammatory markers, all of which negatively affect sleep patterns [16]. Early identification and management of sleep disorders can enhance patient care and reduce the progression of CKD-related complications. Our findings suggest that 40% of the study participants had insomnia, a common sleep disorder seen in CKD patients, consistent with previous studies that reported high rates of insomnia in this group [17]. In addition, 30% of our participants were diagnosed with obstructive sleep apnea (OSA), a prevalence that aligns with existing literature where OSA is often found in CKD patients due to factors like fluid retention, airway obstruction, and metabolic changes [18]. The prevalence of restless legs syndrome (RLS) in our study was 20%, which is comparable to other research indicating that RLS is common among CKD patients [4]. Furthermore, our findings revealed that 10% of the participants reported excessive daytime sleepiness, which is frequently observed in CKD patients, possibly due to factors such as nocturnal disturbances and uremia [19]. The remaining 20% exhibited normal sleep patterns. Interestingly, when we assessed overall sleep quality using the Pittsburgh Sleep Quality Index (PSQI), 80% of participants scored above the cutoff for poor sleep quality, emphasizing the severity of sleep disturbances in this cohort. This aligns with research by Gela et al. (2024), who demonstrated that poor sleep quality is a prevalent issue among CKD patients, often correlating with worse outcomes in terms of quality of life and disease progression [20]. In a recent study, researchers reported that 77.8% of chronic kidney disease (CKD) patients were classified as poor sleepers, indicated by a Pittsburgh Sleep Quality Index (PSQI) score greater than 5 [21]. Similarly, previous literature has documented that the prevalence of poor sleep among CKD patients falls within the 45% to 80% range, including sleep-wake disturbances, sleep-disordered breathing, and excessive daytime sleepiness within this population [22]. The Epworth Sleepiness Scale (ESS) also indicated a significant proportion (30%) of participants experienced excessive daytime sleepiness, a finding that is often linked to impaired kidney function and the underlying metabolic derangements in CKD. In a cohort of 168 patients

with end-stage renal disease (ESRD) receiving daytime hemodialysis, 70% demonstrated an increased tendency for inappropriate daytime sleep, as indicated by elevated ESS scores [19]. Similarly, another study reported that 56% of CKD patients exhibited high ESS scores (ESS > 10), indicating a substantial prevalence of EDS, with a median ESS value of 10.0 [23]. Our study adds to the growing body of evidence that sleep disorders are a critical concern in CKD management. Notably, the mean age of participants in our study was 51.4 years, which may have contributed to the high prevalence of sleep disturbances, as aging is often associated with an increased risk of sleep disorders [5]. This finding is consistent with previous research, which reported a similar mean age of approximately 55.6 years for CKD patients experiencing poor sleep quality [17]. Additionally, the high incidence of sleep disorders in individuals with hypertension and diabetes mellitus (the most common etiologies in our cohort) supports the view that these comorbidities may exacerbate sleep disturbances [24].

Limitations of the study:

Every hospital-based study has some limitations and the present study undertaken is no exception to this fact. The limitations of the present study are mentioned.

- The cross-sectional design of the study prevents causal inferences between CKD and sleep disorders.
- The absence of a control group limits comparisons between CKD patients and the general population regarding sleep disturbances.
- The data collected on comorbidities and medications was retrospective, which may have introduced recall bias.

Conclusion and Recommendations

Among lupus nephritis patients, the use of hydroxychloroquine, cyclophosphamide, MMF, and corticosteroids aligns with current clinical practice guidelines and demonstrates the effectiveness of these therapies in achieving favorable treatment outcomes. The significant associations between urine KIM-1 levels and disease severity, as well as its correlation with renal function markers, highlight its utility in clinical practice. Future research should focus on further validating urine KIM-1 as a biomarker and exploring its potential in guiding treatment decisions and predicting patient outcomes in lupus nephritis.

References

- Levin A, Stevens PE, Bilous RW, et al., Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney international supplements* 3 (2013): 1-50.
- Hill NR, Fatoba ST, Oke JL, et al., Global prevalence of chronic kidney disease—a systematic review and meta-analysis. *PloS one*. 2016 Jul 6;11(2016): e0158765.
- James MT, Hemmelgarn BR, Tonelli M. Early recognition and prevention of chronic kidney disease. *The Lancet*. 375 (2010): 1296-1309.
- Lin XW, Zhang JF, Qiu MY, et al., Restless legs syndrome in end stage renal disease patients undergoing hemodialysis. *BMC neurology* 19 (2019): 1-7.
- Maung SC, El Sara A, Chapman C, et al., Sleep disorders and chronic kidney disease. *World journal of nephrology* 5 (2016): 224.
- Tu CY, Chou YH, Lin YH, et al., Sleep and emotional disturbance in patients with non-dialysis chronic kidney disease. *Journal of the Formosan Medical Association* 118 (2019): 986-994.
- Matsumoto T, Chin K. Prevalence of sleep disturbances: Sleep disordered breathing, short sleep duration, and non-restorative sleep. *Respiratory investigation* 57 (2019): 227-237.
- Umbro I, Fabiani V, Fabiani M, et al., A systematic review on the association between obstructive sleep apnea and chronic kidney disease. *Sleep Medicine Reviews* 53 (2020): 101337.
- Abuyassin B, Sharma K, Ayas NT, et al., Obstructive sleep apnea and kidney disease: a potential bidirectional relationship?. *Journal of Clinical Sleep Medicine* 11 (2015): 915-924.
- Yeo BS, Koh JH, Ng AC, et al., The association of obstructive sleep apnea with blood and cerebrospinal fluid biomarkers of Alzheimer's Dementia-A systematic review and meta-analysis. *Sleep Medicine Reviews* 70 (2023): 101790.
- Chen TK, Knicely DH, Grams ME. Chronic kidney disease diagnosis and management: a review. *Jama* 322 (2019): 1294-1304.
- Empana JP, Dauvilliers Y, Dartigues JF, et al., Excessive daytime sleepiness is an independent risk indicator for cardiovascular mortality in community-dwelling elderly: the three city study. *Stroke* 40 (2009):1219-1224.
- Anothaisintawee T, Reutrakul S, Van Cauter E, et al., sleep disturbances compared to traditional risk factors for diabetes development: systematic review and meta-analysis. *Sleep medicine reviews* 30 (2016): 11-24.
- Orr WC. Utilization of polysomnography in the assessment of sleep disorders. *The Medical Clinics of North America* 69 (1985):1153-1167.
- Chu G, Suthers B, Moore L, Paech GM, Hensley MJ, McDonald VM, Choi P. Risk factors of sleep-disordered breathing in haemodialysis patients. *PLoS One* 14 (2019): e0220932.
- Koh JH, Lim CY, Yam KJ, et al., Bidirectional association of sleep disorders with chronic kidney disease: a systematic review and meta-analysis. *Clinical Kidney Journal* 17 (2024): sfae279.
- Tan LH, Chen PS, Chiang HY, et al., Insomnia and poor sleep in CKD: a systematic review and meta-analysis. *Kidney medicine* 4 (2022): 100458.
- Mavanur M, Sanders M, Unruh M. Sleep disordered breathing in patients with chronic kidney disease. *Indian Journal of Medical Research* 131 (2010): 277-284.
- Fonsêca NT, Santos IR, Fernandes V, et al., Excessive daytime sleepiness in patients with chronic kidney disease undergone hemodialysis. *Fisioterapia em Movimento* 27 (2014): 653-660.
- Gela YY, Limenh LW, Simegn W, et al., Poor sleep quality and associated factors among adult chronic kidney disease patients. *Frontiers in Medicine* 11 (2024): 1366010.
- Zhang J, Wang C, Gong W, et al., Association between sleep quality and cardiovascular damage in pre-dialysis patients with chronic kidney disease. *BMC nephrology* 15 (2014): 1-9.
- Iliescu EA, Yeates KE, Holland DC. Quality of sleep in patients with chronic kidney disease. *Nephrology Dialysis Transplantation* 19 (2004): 95-99.
- Sayed SS, Kotb S, Omar A, et al., Excessive Daytime Sleepiness among Chronic Kidney Disease Patients. *SVU-International Journal of Medical Sciences* 4 (2021): 303-312.
- Abuyassin B, Sharma K, Ayas NT, et al., Obstructive sleep apnea and kidney disease: a potential bidirectional relationship? *Journal of Clinical Sleep Medicine* 11 (2015): 915-924.



This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC-BY\) license 4.0](https://creativecommons.org/licenses/by/4.0/)