

Prevalence and Severity of Pruritus in Chronic Kidney Disease Dialysis Patients and Its Association with Sleep Quality

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Abstract

Pruritus is a common and distressing symptom in patients undergoing maintenance hemodialysis for chronic kidney disease. It significantly impairs quality of life and sleep quality. However, data on its prevalence and severity in Bangladeshi dialysis populations remain limited. To determine the prevalence and severity of pruritus in chronic kidney disease dialysis patients and to evaluate its association with sleep quality, this prospective cohort study was conducted at Department of Nephrology, BRB Hospitals Limited, Dhaka, Bangladesh, from January 2024 to December 2025. A total of 93 patients on maintenance hemodialysis were enrolled using purposive sampling. Pruritus severity was assessed using the visual analog scale score, and pruritus frequency was recorded as daily, weekly, or monthly. Sleep quality was evaluated based on the presence of restless sleep. Data were analyzed using SPSS version 23.0. Mean patient age was 60.4 years, and 62.4% were male. Pruritus prevalence was 51.6%. Moderate pruritus (visual analog scale score 3 to 7) was most common (32.3%). Among patients with pruritus, 50.0% reported daily symptoms. Restless sleep was reported by 74.2% of patients. A significant association existed between pruritus and restless sleep, with 89.9% of restless sleep patients experiencing muscle cramps and poor sleep quality ($p = 0.001$). Pruritus is highly prevalent among chronic kidney disease dialysis patients and is significantly associated with poor sleep quality. Routine screening and management of pruritus should be integrated into dialysis care to improve patient outcomes.

CBMJ 2026 July: Vol. 15 No. 02 P:336-342

Keywords: Chronic kidney disease, Dialysis, Hemodialysis, Prevalence, Pruritus, Severity, Sleep quality

Introduction

Chronic kidney disease-associated pruritus, commonly known as uremic itching, is a distressing and often underrecognized symptom affecting patients with end-stage kidney disease undergoing dialysis.¹ The condition is characterized by persistent, generalized itching without primary skin lesions, leading to significant impairment in health-related quality of life.^{2,3} The global burden of chronic kidney disease-associated pruritus is substantial. Recent international studies have reported prevalence rates ranging from 50.5% to 56.6% among dialysis patients during their first year of treatment.⁴ Data from the Peritoneal Dialysis Outcomes and Practice Patterns Study involving 5,535 patients across eight countries demonstrated that 43% of peritoneal dialysis patients experienced moderate-to-extreme pruritus, with the highest prevalence observed in Thailand (50%) and the lowest in the United States (33%).¹ Similarly, the CENSUS-EU interim analysis of 1,482 patients across seven European countries reported an overall

prevalence of 52.6%.⁵ A large Austrian national cohort study found mild, moderate, and severe pruritus prevalence rates of 34.4%, 11.4%, and 4.3% respectively.⁶ The impact of chronic kidney disease-associated pruritus on patients' well-being is profound. Studies have consistently demonstrated

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significant associations between pruritus severity and reduced health-related quality of life, increased depressive symptoms, and sleep disturbances.^{7,8} The Dutch DOMESTICO study involving 1,438 incident dialysis patients showed that pruritus was significantly associated with lower physical and mental health-related quality of life scores, irrespective of treatment received.⁴ Furthermore, patients with moderate-to-severe pruritus are at higher risk for mortality and transfer to hemodialysis.¹ Despite its high prevalence and substantial negative impact, chronic kidney disease-associated pruritus remains underrecognized and undertreated.⁹ The pathophysiology is incompletely understood, involving complex interactions between uremic toxin accumulation, systemic inflammation, dysregulation of the opioid system, and immune dysfunction.^{10,11} Consequently, treatment options remain limited, with many patients receiving no specific antipruritic therapy.^{4,6}

In Bangladesh, data on the prevalence and characteristics of chronic kidney disease-associated pruritus among dialysis patients are scarce. Understanding the local burden of this condition is essential for developing effective screening and management strategies. Therefore, this study aimed to determine the prevalence and severity of pruritus in chronic kidney disease dialysis patients and evaluate its association with sleep quality.

Methods

This prospective cohort study was conducted at Department of Nephrology, BRB Hospitals Limited, Dhaka, Bangladesh, from January 2024 to December 2025. All patients undergoing maintenance hemodialysis for chronic kidney disease during the study period were considered for enrollment. The purposive sampling technique was employed.

Inclusion criteria: Patients aged 18 years or older with a confirmed diagnosis of end-stage chronic kidney disease receiving maintenance hemodialysis for at least three months were included. Patients who provided written informed consent were enrolled.

Exclusion criteria: Patients with primary dermatological disorders unrelated to chronic kidney disease, such as psoriasis or eczema, active hepatitis or human immunodeficiency virus infection, pregnancy, or known malignancy were excluded from the study. Patients who were unable to complete the visual analog scale assessment due to cognitive impairment were also excluded.

Study procedure: Demographic and clinical data were collected using a structured case record form. Pruritus severity was assessed using the visual analog scale ranging from 0 to 10, categorized as no pruritus (0), mild (1 to 3), moderate (4 to 7), and severe (8 to 10). Pruritus frequency was recorded as daily, weekly, or monthly. Sleep quality was evaluated based on the presence of restless sleep. All assessments were performed by trained study personnel.

Data analysis: Data were entered and analyzed using SPSS version 23.0. Categorical variables were presented as frequencies and percentages. Continuous variables were expressed as mean with standard deviation. Chi-square test was used to examine associations between categorical variables. A p-value less than 0.05 was considered statistically significant.

Results

A total of 93 patients on maintenance hemodialysis were analyzed. The mean age was 60.4 years, with males comprising 62.4% of the cohort. Most patients resided in urban areas (87.1%) and belonged to

middle or upper socioeconomic classes (78.5%). Unemployed or day laborer status was observed in 12.9% of patients. Smoking and alcohol use were reported in 8.6% and 7.5% of patients, respectively. Hypertension was present in all patients (100%), followed by kidney disease in all patients (100%) and diabetes mellitus in 43.0%. The mean dialysis duration was 9.8 years. Pruritus was present in 51.6% of patients, with moderate pruritus defined as a visual analog scale score between 3 and 7 being the most common severity level (32.3%). Daily pruritus frequency was reported by 25.8% of all patients and by 50.0% of those with pruritus. Dry skin was observed in 60.2% of patients. Among those with pruritus, 83.3% received antihistamines and 100% received topical steroids. Restless sleep was reported by 74.2% of patients, while depression was noted in only 4.3%. Muscle cramps occurred in 80.6% of patients, and skin allergy was present in 12.9%. Edema was documented in 8.6% of patients. Anemia was present in all patients (100%), with 100% receiving erythropoietin therapy and 95.7% receiving intravenous iron. Phosphate binders were used by 44.1% of patients. High flux dialyzers were used in 49.5% of patients, and low flux dialyzers in 50.5%. No patient skipped dialysis sessions for more than one month. Family history of hypertension was present in 91.4% of patients, family history of diabetes in 31.2%, family history of kidney disease in 11.8%, and family history of cardiac disease in 12.9%. Hepatitis B surface antigen was negative in all patients tested, while anti hepatitis C virus was positive in 4.3% of patients. Human immunodeficiency virus was negative in all patients. A statistically significant association was observed between the presence of pruritus and dry skin, with 87.5% of patients with pruritus having dry skin compared to 31.1% of patients without pruritus. Similarly, restless sleep was

significantly associated with muscle cramps: 89.9% of patients with restless sleep experienced muscle cramps, compared with 54.2% of those without.

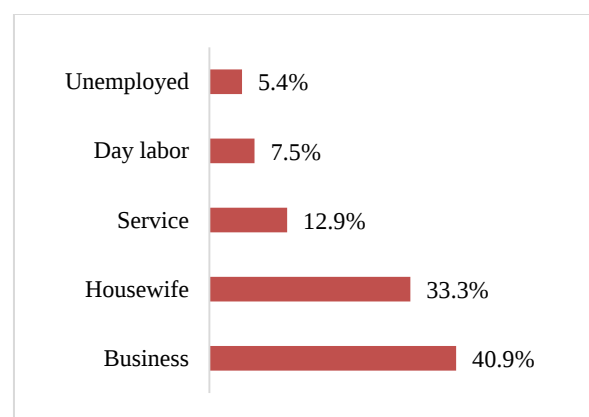


Figure 1: Occupational status distribution of the population

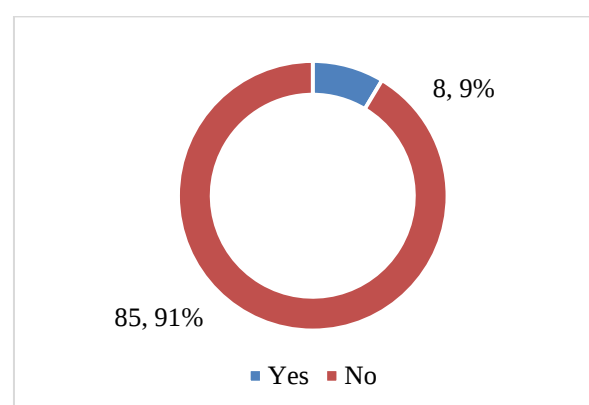


Figure 2: Frequency of smoking

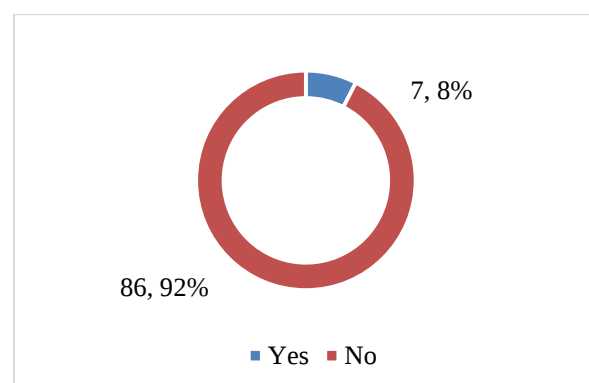


Figure 3: Frequency of alcohol intake

Table 1: Association between pruritus presence and dry skin

Pruritus	Dry skin		Total	p-value
	Present	Absent		
	n (%)			
Present	42(87.5)	6(12.5)	48	<0.001
Absent	14(31.1)	31(68.9)	45	
Total	56	37	93	

Chi-square test was used.

Table 2: Association between restless sleep and muscle cramps

R. Sleep	Muscle cramps		Total	p-value
	Present	Absent		
	n (%)			
Present	62(89.9)	7(10.1)	69	0.001
Absent	13(54.2)	11(45.8)	24	
Total	75	18	93	

R. Sleep: Restless sleep, Chi-square test was used.

Table 3: Distribution of pruritus severity by visual analog scale score

Visual analog scale severity	Total	%
No pruritus	45	48.4%
Mild pruritus less than 3	6	6.5%
Moderate Pruritus 3 to 7	30	32.3%
Severe pruritus greater than 7	12	12.9%
Total	93	100%

Table 4: Pruritus frequency among patients with pruritus

Frequency	n	%
Daily	24	50.0%
Weekly	21	43.8%
Monthly	3	6.2%
Total	48	100%

Table 5: Comparison of antihistamine use by pruritus severity

Severity	Antihistamine		Total	p-value
	Used	No used		
	n (%)			
Mild	6 (100)	0 (0.0)	6	<0.001
Moderate	30 (100)	0 (0.0)	30	
Severe	12 (100)	0 (0.0)	12	
No pruritus	0 (0.0)	45(100)	45	
Total	48	45	93	

Chi-square test was used.

Table 6: Distribution of dialyzer type by phosphate binder use

Type	Phosphate binder		N	p-value
	Used	No used		
	n (%)			
High flux	23(50.0)	23(50.0)	46	0.258
Low flux	18(38.3)	29(61.7)	47	
Total	41	52	93	

Chi-square test was used.

Discussion

In this prospective cohort study of 93 maintenance hemodialysis patients Department of Nephrology, BRB Hospitals Limited, Dhaka, Bangladesh, from January 2024 to December 2025, the prevalence of pruritus was 51.6%, with moderate pruritus being the most common severity level (32.3%). These findings align closely with international data. Recent large-scale studies have reported pruritus prevalence ranging from 50.5% to 56.6% among dialysis patients during their first year of treatment.⁴ Similarly, a multinational study across seven European countries found an overall prevalence of 52.6%.⁵ The consistency of these figures across different geographical regions suggests that chronic kidney disease-associated pruritus is a universal problem

affecting approximately half of all dialysis patients worldwide. The present study found that 50.0% of patients with pruritus experienced daily symptoms, while 43.8% reported weekly symptoms. This high frequency of symptoms is concerning, as persistent pruritus has been shown to substantially impair health-related quality of life.^{7,8} Studies have demonstrated that patients with moderate-to-severe pruritus have significantly lower physical and mental health component scores on validated quality of life instruments compared to those without pruritus.^{1,6} The daily burden of itching can lead to sleep disruption, fatigue, depression, and social withdrawal.¹² A significant association was observed between pruritus and restless sleep in the current study, with 74.2% of patients reporting restless sleep. Among patients with restless sleep, 89.9% experienced muscle cramps and poor sleep quality ($p = 0.001$). This finding is consistent with existing literature documenting strong links between pruritus severity and sleep disturbances.^{13,14} The proposed mechanisms include activation of cutaneous nerve fibers that transmit itch signals to the brain, which simultaneously disrupts normal sleep architecture and reduces total sleep time.¹⁵ The bidirectional relationship between pruritus and sleep disturbance creates a vicious cycle, where itching prevents sleep, and sleep deprivation lowers the threshold for itch perception.¹⁶ Dry skin was present in 60.2% of patients, and a strong association was found between pruritus presence and dry skin ($p < 0.001$). Xerosis is an extremely common finding in dialysis patients, affecting up to 85% of individuals in some studies.¹⁷ The pathophysiological link between dry skin and pruritus involves disruption of the epidermal barrier function, increased trans-epidermal water loss, and activation of protease-activated receptors that stimulate itch-sensing nerve fibers.¹⁸ Management

strategies focusing on skin hydration have shown moderate benefit in reducing pruritus severity.¹⁹ Regarding treatment patterns, all patients with pruritus in this study received antihistamines and topical steroids. However, current evidence does not strongly support antihistamine use for chronic kidney disease-associated pruritus, as histamine is not considered a primary mediator in this condition.^{10,20} More effective treatments include gabapentinoids, selective serotonin reuptake inhibitors, and recently, the kappa-opioid receptor agonist difelikefalin.^{21,22} The high rate of antihistamine use observed in this study reflects limited access to newer therapies in resource-limited settings. The prevalence of diabetes mellitus in this cohort was 43.0%, which is comparable to other dialysis populations in South Asia.²³ Diabetes is a known risk factor for pruritus through mechanisms involving peripheral neuropathy and microvascular changes.²⁴ Family history of hypertension (91.4%) and diabetes (31.2%) was notably high, suggesting a strong genetic predisposition in this population.²⁵

Limitations

This single-center study used purposive sampling, which may introduce selection bias. Sleep quality was assessed using a single question on restless sleep rather than a validated scale. Laboratory parameters, including calcium, phosphorus, and parathyroid hormone, were not uniformly available for all patients.

Conclusion

Pruritus affects more than half of hemodialysis patients in this Bangladeshi cohort and is significantly associated with poor sleep quality. Daily symptoms are common among those affected. The high prevalence of dry skin and restless sleep underscores the need for routine screening and effective

management. Improved awareness and access to evidence-based therapies are essential to reduce patient suffering.

Recommendation

Routine screening for pruritus using the visual analog scale should be integrated into monthly dialysis assessments. Sleep quality evaluation should accompany pruritus screening. Access to gabapentinoids and emollients should be prioritized over antihistamines. Future multicenter studies with validated sleep scales are recommended.

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