Original Article

Understanding Readmission Risks in End-Stage Kidney Disease: A Study from Wangaya Hospital

Ni Nyoman Gita Kharisma Dewi[1], Made Sindy Astri Pratiwi[1], Made Priska Arya Agustini[1], Putu Itta Sandi Lesmana Dewi[1], Cindy Fahira[1], I Wayan Sunaka[2]

[1]Intern Doctor, Department of Internal Medicine, Wangaya Regional General Hospital, Denpasar, Indonesia
[2]Internal Internist, Department of Internal Medicine, Wangaya Regional General Hospital, Denpasar, Indonesia

ARTICLE INFO

Article history:
Received: September 16, 2025
Accepted: December 19, 2025
Published Online: December 24, 2025

Corresponding Author:
Ni Nyoman Gita Kharisma Dewi,
Intern Doctor, Department of Internal Medicine, Wangaya Regional General Hospital, Denpasar, 80231, Bali, Indonesia,
gitakharismadewi67@gmail.com

ABSTRACT

Background: End-stage kidney disease (ESKD) is a growing health burden. Poor patient knowledge and treatment adherence contribute to increased morbidity, as reflected in readmission rates.
Objective: This study aimed to identify factors associated with readmission among ESKD patients in Bali.
Methods: A retrospective cohort study was conducted at Wangaya Hospital. Adult patients (≥18 years) diagnosed with ESKD, with or without dialysis, between 2022 and 2024 were included. Patients with incomplete records or a solitary kidney were excluded. Bivariate analysis (chi-square test) and multivariate analysis (binary logistic regression) were used to assess associations, with significance set at $p < 0.05$.
Results: A total of 199 patients met the inclusion criteria; 61.8% were male, with a median age of 57 years (range: 22–88 years). Readmission rates within and beyond one month were 18.6% and 15.1%, respectively. Reduced eGFR was significantly associated with 30-day readmission ($p = 0.041$). For readmission beyond 30 days, significant predictors included diabetes mellitus ($p = 0.014$), neurologic disorders ($p < 0.001$), and adherence ($p = 0.019$).
Conclusion: eGFR predicts early readmission, while diabetes mellitus, neurological disorders, and treatment adherence influence later readmissions. Identifying these factors is vital for improving patient education and reducing healthcare burdens.
Keywords: End-stage kidney disease, readmission, predictive factors.

Introduction

Chronic kidney disease (CKD) is a progressive condition characterized by structural or functional kidney abnormalities or a sustained reduction in estimated glomerular filtration rate (eGFR) below 60 mL/min/1.73 m² for at least three months. These abnormalities may include pathological findings on imaging or biopsy, persistent albuminuria, or abnormal urinary sediment.[1] Over time, CKD can advance to end-stage kidney disease (ESKD), the most severe stage of CKD, where kidney function declines to an eGFR below 15 mL/min/1.73 m². At this point, the kidneys can no longer support the body's metabolic and fluid balance, necessitating renal replacement therapy, such as dialysis or kidney transplantation, to sustain life.

The global burden of CKD is substantial and increasing. Approximately 13.4% of the world's population is affected, with most cases falling into stages 3–5 of the disease. However,

Cite this as:
Dewi NNGK, Pratiwi MSA, Agustini MPA, et al. Understanding Readmission Risks in End-Stage Kidney Disease: A Study from Wangaya Hospital. InaKidney. 2025;2(3):114-125. doi:10.32867/inakidney.v2i3.206

the early stages of CKD (stages 1–2) are likely underdiagnosed due to their asymptomatic nature.[2–4] CKD has been linked to approximately 5–10 million deaths annually, according to the World Health Organization.[4,5] This growing prevalence is closely associated with the rising incidence of chronic conditions such as type 2 diabetes mellitus, hypertension, obesity, and cardiovascular disease, each of which serves as a major risk factor for the development and progression of CKD.[4,6–8]

Despite advancements in treatment, CKD and ESKD patients continue to face high morbidity and mortality, with frequent hospital readmissions contributing significantly to poor outcomes. A major contributor to this is the lack of disease awareness among patients and caregivers, which often results in poor disease management and treatment adherence.[4,9,10] High readmission rates among ESKD patients are often driven by disease complications, comorbid conditions, and suboptimal discharge planning or outpatient follow-up. These repeated hospitalizations not only strain healthcare resources but also reflect inadequacies in the continuity of care provided to these patients.

Recent studies have identified several modifiable and non-modifiable risk factors for hospital readmission among CKD and ESKD patients. For instance, Wijayanti (2019) found that poor hemodialysis adherence ($p = 0.002$), anemia ($p = 0.048$), and limited social support ($p = 0.034$) significantly increased the risk of readmission.[11] Similarly, Wagle (2022) reported that comorbidities such as hypertension, diabetes mellitus, and tuberculosis were associated with higher readmission risks, as were low hemoglobin and serum albumin levels, markers of poor nutritional and clinical status. These findings suggest that addressing these factors may help reduce the burden of readmissions and improve clinical outcomes.[12]

Given the clinical and economic implications of readmissions among ESKD patients, it is crucial to identify the contributing risk factors within local healthcare contexts. Therefore, this study aims to evaluate the factors associated with increased readmission rates among ESKD patients at Wangaya Hospital. The results of this study may support targeted interventions to improve patient outcomes and reduce preventable hospital readmissions.

Methods

Design and participants

This study utilized a single-center, retrospective cohort design conducted at Wangaya Regional General Hospital, Bali, Indonesia. The inclusion criteria encompassed all adult patients aged ≥18 years who were diagnosed with end-stage kidney disease (ESKD), with or without dialysis, between 2022 and 2024 at the aforementioned hospital. Patients with incomplete medical records and those with a solitary kidney were excluded from the study. Following the selection process, a total of 199 patients met the eligibility criteria.

Clinical data, including the history of readmission within one month or beyond one month from the initial diagnosis of ESKD and their first hospitalization, were retrieved from medical records. Laboratory parameters were obtained from the initial test results at the time of kidney failure diagnosis.

Study Covariate

This study examined several variables hypothesized to contribute to the occurrence of readmission in patients with ESKD. These variables included age, gender, comorbid conditions (diabetes mellitus, cardiovascular disease, malignancy, psychiatric disorders, infections, orthopedic disorders, pulmonary disease, neurological disorders, liver and gastrointestinal disorders), anemia, treatment adherence, dialysis status, hemoglobin levels, blood urea nitrogen (BUN), serum creatinine (SC), estimated glomerular filtration rate (eGFR), and potassium levels. Treatment adherence in this study was assessed based on whether patients attended regular follow-up visits at the nephrology–hypertension outpatient clinic according to the scheduled appointments provided.

Gender was classified as male or female, while comorbid conditions were categorized as present or absent. Adherence to treatment was defined as either compliant or non-compliant, and dialysis status was recorded as either "yes" or "no." Laboratory parameters, including hemoglobin, BUN, SC, and potassium levels, were extracted from medical records, while eGFR was calculated using the CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) equation via a medical calculator. The cut-off values for numerical parameters were determined based on receiver operating characteristic (ROC) analysis. The dependent variable in this study was patient readmission. Readmission in patients with chronic kidney disease in this study was defined as a subsequent hospitalization following a previous inpatient admission. Readmissions were classified into two groups: those occurring within 30 days and those occurring more than 30 days after discharge.

Statistical analysis

Demographic, clinical, and laboratory data of the patients were analyzed using descriptive statistics and presented in a study characteristics table. Categorical data were reported as frequencies and percentages. Numerical data underwent normality testing and were expressed as either mean ± SD or median (range), depending on the normality test results.

Bivariate and multivariate analyses were conducted to assess factors suspected to determine readmission within one month and beyond one month in ESKD patients, regardless of dialysis status. Bivariate analysis was performed using the Chi-square test, with all data converted into categorical variables. Numerical variables (age, BUN, SC, hemoglobin, and potassium) were analyzed using ROC curve analysis to determine appropriate cut-off values, subsequently transforming them into categorical variables. Variables with a p-value ≤ 0.25 in the bivariate analysis were included in the multivariate analysis using binary logistic regression. The results of the binary logistic regression analysis were considered statistically significant if the p-value was < 0.05.

Results

Study Characteristics

A total of 199 participants were included in this study. The sample was predominantly male (61.8%) compared to female (38.2%). The median age was 57 years, with a range of 22–88 years. The most common comorbid condition was cardiovascular disease (80.4%), followed by diabetes mellitus (47.7%) and pulmonary disease (25.1%). The majority of participants adhered to their scheduled follow-up visits and were willing to undergo dialysis as part of their treatment. The 1-month readmission rate was 18.6%, while the readmission rate beyond one month was 15.1%. Detailed data are presented in Table 1.

Table 1. Study characteristics

Variable	N = 199
Gender, n (%)	
Male	123 (61.8)
Female	76 (38.2)
Age, median (range)	57 (22-88)
Comorbid factors, n (%)	
Diabetes mellitus	95 (47.7)
Cardiovascular disease	160 (80.4)
Tumor or malignancy	8 (4.0)
Psychiatric disease	2 (1.0)
Orthopedic disease	2 (1.0)
Pulmonary disease	50 (25.1)
Neurologic disorders	9 (4.5)
Liver and Gastrointestinal disorders	13 (6.5)

Other infectious diseases	5 (2.5)
Anemia, n (%)	60 (30.2)
Adherence, n (%)	
Yes	141 (70.9)
No	58 (29.1)
Dialysis, n (%)	
Yes	161 (80.9)
No	38 (19.1)
Hemoglobin, mean ± SD	8.05 ± 1.89
Blood urea nitrogen, median (range)	162 (30-448)
Serum creatinine, median (range)	9.1 (2.59-35)
Glomerular filtration rate, median (range)	6.0 (1.0-28)
Kalium, median (range)	4.7 (2.1-8.0)
Readmission status, n (%)	
1 month	37 (18.6)
> 1 month	30 (15.1)
No readmission	1326.3)

Bivariate Analysis of Independent Variables and One-Month Readmission

Based on the bivariate analysis, only the estimated glomerular filtration rate was found to be significantly associated with readmission within one month. However, eight out of nineteen variables had a p-value of <0.25, meeting the criteria for inclusion in the multivariate analysis. These variables include diabetes mellitus (p = 0.122), neurologic disorders (p = 0.169), dialysis (p = 0.057), anemia (p = 0.099), hemoglobin ≥ 8.05 g/dL (p = 0.066), BUN ≥ 169 mg/dL (p = 0.079), serum creatinine ≥ 9.45 mg/dL (p = 0.154), and eGFR ≤ 5.5 mL/min/1.73 m² (p = 0.024). Detailed results of the bivariate analysis are presented in Table 2.

Table 2. Bivariate Analysis of Independent Variables and Readmission in One Month

Variable	Readmission in 1 Month		P value
	Yes	No	
Gender, n (%)			
Male	21 (19.8)	85 (80.2)	0.396
Female	16 (25.4)	47 (74.6)	
Age, n (%)			
≥ 57.5	20 (23.8)	64 (76.2)	0.549
< 57.5	17 (20)	68 (80)	
Diabetes mellitus			
Yes	21 (27.3)	56 (72.7)	**0.122**
No	16 (17.4)	76 (82.6)	
Cardiovascular disease			
Yes	31 (22.8)	105 (77.2)	0.565
No	6 (18.2)	27 (81.8)	
Tumor or malignancy			
Yes	1 (20)	4 (80)	0.917

No	36 (22)	128 (78)	
Psychiatric disorder			
Yes	1 (50)	1 (50)	0.334
No	36 (21.6)	131 (78.4)	
Other infection			
Yes	2 (40)	3 (60)	0.320
No	35 (21.3)	129 (78.7)	
Orthopedic disorders			
Yes	0 (0)	2 (100)	0.451
No	37 (22.2)	130 (77.8)	
Pulmonary disease			
Yes	9 (22)	32 (78)	0.992
No	28 (21.9)	100 (78.1)	
Neurologic disorders			
Yes	2 (50)	2 (50)	**0.169**
No	35 (21.2)	130 (78.8)	
Liver and gastrointestinal disorders			
Yes	1 (11.1)	8 (88.9)	0.421
No	36 (22.5)	124 (77.5)	
Adherence			
No	28 (24.3)	87 (75.7)	0.260
Yes	9 (16.7)	45 (83.3)	
Dialysis			
No	34 (24.8	103 (75.2)	**0.057**
Yes	3 (9.4)	29 (90.6)	
Anemia			
Yes	15 (30)	35 (70)	**0.099**
No	22 (18.5)	97 (81.5)	
Hemoglobin			
≥ 8.05	22 (28.2)	56 (71.8)	**0.066**
< 8.05	15 (16.5)	76 (83.5)	
BUN			
≥ 169	22 (27.8)	57 (72.2)	**0.079**
< 169	15 (16.7)	75 (83.3)	
SC			
≥ 9.45	21 (26.9)	57 (73.1)	**0.154**
<9.45	16 (17.8)	74 (82.2)	
eGFR			
≤ 5.5	24 (29.3)	58 (70.7)	**0.024**
> 5.5	13 (14.9)	74 (85.1)	
Potassium level			
≥ 4.75	19 (25.7)	55 (74.3)	0.777
< 4.75	18 (23.7)	58 (76.3)	

BUN: blood urea nitrogen, SC: serum creatinine, eGFR: estimated glomerular filtration rate. Data analyzed by the chi-square test.

The bivariate analysis of variables associated with readmission beyond one month found that only two variables were statistically significant, namely neurologic disorders ($p < 0.001$) and adherence ($p = 0.025$), with p-values <0.05. Additionally, seven out of nineteen variables had p-values <0.25, qualifying them for inclusion in the multivariate analysis. These variables included age ≥ 54.5 years ($p = 0.071$), diabetes mellitus ($p = 0.081$), tumor or malignancy ($p = 0.090$), neurologic disorders ($p < 0.001$), liver and gastrointestinal disorders ($p = 0.170$), adherence ($p = 0.025$), and potassium level ≥ 4.65 mmol/L ($p = 0.216$). A detailed summary of the bivariate analysis results is presented in Table 3.

Table 3. Bivariate Analysis of Independent Variables and Readmission Beyond One Month

Variable	Readmission in 1 Month		P value
	Yes	No	
Gender, n (%)			
Male	17 (16.7)	85 (83.3)	0.429
Female	13 (21.7)	47 (78.3)	
Age, n (%)			
≥ 54.5	13 (13.8)	81 (86.2)	**0.071**
< 54.5	17 (25)	51 (75)	
Diabetes mellitus			
Yes	18 (24.3)	56 (75.7)	**0.081**
No	12 (13.6)	76 (86.4)	
Cardiovascular disease			
Yes	24 (18.6)	105 (81.4)	
No	6 (18.2)	27 (81.8)	0.956
Tumor or malignancy			
Yes	3 (42.9)	4 (57.1)	
No	27 (17.4)	128 (82.6)	**0.090**
Psychiatric disorder			
Yes	0 (0)	1 (100)	
No	30 (18.6)	131 (81.4)	0.633
Other infection			
Yes	0 (0)	3 (100)	0.405
No	30 (18.9)	129 (81.1)	
Orthopedic disorders			
Yes	0 (0)	2 (100)	0.498
No	30 (18.8)	130 (81.3)	
Pulmonary disease			
Yes	9 (22)	32 (78)	0.513
No	21 (17.4)	100 (82.6)	
Neurologic disorders			
Yes	5 (71.4)	2 (28.6)	**<0.001**

No	25 (16.1)	130 (83.9)	
Liver and gastrointestinal disorders			
Yes	4 (33.3)	8 (66.7)	**0.170**
No	26 (17.3)	124 (82.7)	
Adherence			
No	4 (8.2)	45 (91.8)	**0.025**
Yes	26 (23)	87 (77)	
Dialysis			
No	6 (17.1)	29 (82.9)	0.813
Yes	24 (18.9)	103 (81.1)	
Anemia			
Yes	10 (22.2)	35 (77.8)	0.452
No	20 (17.1)	97 (82.9)	
Hemoglobin			
≥ 8.35	12 (15.4)	66 (84.6)	0.400
< 8.35	17 (20.5)	66 (79.5)	
BUN			
≥ 151.5	13 (15.5)	71 (84.5)	0.382
< 151.5	16 (20.8)	61 (79.2)	
SC			
≥ 8.8	14 (17.5)	66 (82.5)	0.837
< 8.8	15 (18.8)	65 (81.3)	
eGFR			
≤ 5.5	15 (16.5)	76 (83.5)	0.565
> 5.5	14 (20.0)	56 (80.0)	
Potassium level			
≥ 4.65	11 (15.3)	61 (84.7)	**0.216**
< 4.65	16 (23.5)	52 76.5)	

BUN: blood urea nitrogen, SC: serum creatinine, eGFR: estimated glomerular filtration rate. Data analyzed by the chi-square test.

Multivariate Analysis of Independent Variables and One-Month Readmission

The multivariate analysis in this study found that only an estimated glomerular filtration rate (eGFR) ≤ 5.5 was significantly associated with readmission within one month for ESKD patients. This finding suggests that the lower the eGFR at the time of diagnosis, the higher the likelihood of readmission within one month, which in turn increases the risk of morbidity and mortality. Detailed data on the multivariate analysis results are presented in Table 4.

Table 4. Multivariate Analysis of Independent Variables and One-Month Readmission

Variable	P value	OR (95% CI)
Step 1		
Diabetes mellitus	0.142	1.81 (0.82 – 4.01)
Neurologic disorder	0.346	2.90 (0.32 – 26.63)
Dialysis	0.122	0.36 (0.10 – 1.31)
HB	0.304	1.57 (0.66 - 3.72)
BUN	0.554	1.33 (0.52 - 3.38)
SC	0.342	0.50 (0.12 - 2.08)
eGFR	0.141	2.95 (0.70 – 12.41)
Anemia	0.495	1.34 (0.58 - 3.13)
Step 7		
Dialysis	0.102	0.35 (0.10 – 1.23)
eGFR	**0.041**	**2.22 (1.03 – 4.79)**

BUN: blood urea nitrogen, SC: serum creatinine, eGFR: estimated glomerular filtration rate. Data analyzed by a binary logistic regression test.

The multivariate analysis in this study found that diabetes mellitus ($p = 0.014$), neurologic disorders ($p < 0.001$), and adherence ($p = 0.019$) were significantly associated with readmission beyond one month in ESKD patients. These findings suggest that comorbid factors such as diabetes mellitus and neurologic disorders play a role in increasing the likelihood of readmission in ESKD patients. Additionally, patient adherence to scheduled follow-up visits also contributes to the likelihood of readmission. These three variables should be considered in clinical practice to help reduce morbidity and mortality rates. Detailed results of the multivariate analysis are presented in Table 5.

Table 5. Multivariate Analysis of Independent Variables and Readmission Beyond One Month

Variable	P value	OR (95% CI)
Step 1		
Age	0.107	0.44 (0.16 – 1.19)
Potassium level	0.074	0.38 (0.13 – 1.10)
Diabetes mellitus	0.015	3.66 (1.29 – 10.36)
Neurologic disorders	0.002	235.66 (8.06 – 6887.88)
Liver and gastrointestinal disorders	0.800	1.29 (0.18 – 8.99)
Adherence	0.019	0.08 (0.01 – 0.67)
Tumor or malignancy	0.927	1.13 (0.08-16.58)
Step 3		
Age	0.102	0.44 (0.16 – 1.18)
Potassium level	0.073	0.38 (0.14 – 1.09)
Diabetes mellitus	**0.014**	**3.69 (1.31 – 10.42)**
Neurologic disorders	**< 0.001**	**249.73 (10.75 – 5803.81)**
Adherence	**0.019**	**0.08 (0.01 – 0.66)**

Data analyzed by a binary logistic regression test.

Discussion

In this study, the sample was predominantly male (61.8%), with a median age of 57 years (range 22-88). The most common comorbidity was cardiovascular disease (80.4%), followed by diabetes mellitus (47.7%) and pulmonary disease (25.1%). The adherence rate among the sample was relatively high (70.9%). However, a notable portion of the sample (19.1%) was found not to have undergone dialysis at ESKD. A total of 67 individuals were readmitted, with 37 of them being readmitted within one month, and the rest after more than one month.

The results of this study are consistent with the study by Vaidya and Aeddula (2024), which states that male gender is a risk factor for the development of CKD.[1] One of the comorbidities identified as a risk factor for end-stage renal disease is cardiovascular disease, particularly hypertension. The findings of this study also correspond with the study by Surasura (2024). According to this study, patients with ESKD are older on average, at 68.1 years, compared to those with CKD stage 3 (55.6 years) and stage 4 (62.4 years) ($p < 0.001$).[13] The study further indicates that male patients have a higher prevalence in the earlier stages, such as stage 3 and stage 4, while female patients show a higher prevalence at ESKD ($p = 0.023$). However, the results of this study do not align with these findings.

In this study, a bivariate analysis was performed to examine factors associated with readmission events within 1 month and after 1 month. For readmissions within 1 month, eight out of the nineteen variables had a p-value < 0.25, which allowed them to proceed to the multivariate analysis stage. These variables included diabetes mellitus ($p = 0.122$), neurologic disorders ($p = 0.169$), dialysis ($p = 0.057$), anemia ($p = 0.099$), hemoglobin ≥ 8.05 ($p = 0.066$), BUN ≥ 169 ($p = 0.079$), serum creatinine ≥ 9.45 ($p = 0.154$), and GFR ≤ 5.5 ($p = 0.024$). Following the multivariate analysis, only one of these variables was found to be statistically significant: GFR ≤ 5.5 ($p = 0.041$, 95% CI 1.033 – 4.788).

Studies show that a significant decline in eGFR can increase readmission rates in patients with ESKD. Lower eGFR reflects poorer kidney function, leading to the accumulation of toxins and metabolic waste products that cause uremia. In addition, fluid and electrolyte imbalances further worsen the patient's condition on a recurrent basis. Such conditions often cannot be managed in outpatient settings, thereby increasing the need for inpatient hospital care.[14,15]

Different results were observed in the bivariate and multivariate tests for the group with readmissions occurring after one month. In the bivariate analysis, seven out of nineteen variables had a p-value < 0.25, which allowed them to proceed to the multivariate analysis. These seven variables included age ≥ 54.5 ($p = 0.071$), diabetes mellitus ($p = 0.081$), tumor or malignancy ($p = 0.090$), neurologic disorders ($p < 0.001$), liver and gastrointestinal disorders ($p = 0.170$), adherence ($p = 0.025$), and potassium ≥ 4.65 ($p = 0.216$). The multivariate analysis revealed that only three of the seven variables were statistically significant in relation to readmissions after one month: diabetes mellitus ($p = 0.014$, 95% CI 1.308–10.415), neurologic disorders ($p < 0.001$, 95% CI 10.746–5803.811), and adherence ($p = 0.019$, 95% CI 0.010–0.661).

Diabetes mellitus is a major comorbidity that significantly correlates with increased readmission events among patients with ESKD. Persistent hyperglycemia in diabetes activates metabolic and hemodynamic pathways, including advanced glycation end products, oxidative stress, and renin–angiotensin–aldosterone system dysregulation, which accelerate nephron loss and promote diabetic kidney disease progression. In patients with end-stage renal disease, diabetes further contributes to cardiovascular instability, infection susceptibility, volume overload, and poor glycemic control during renal replacement therapy, all of which are common causes of hospital readmission. Moreover, diabetic patients with advanced CKD often have higher comorbidity burdens and impaired physiological reserve, making them more vulnerable to acute decompensations requiring rehospitalization. These pathophysiological mechanisms explain

why diabetes mellitus remains a strong predictor of frequent readmission among ESKD.[16,17]

Neurological disorders such as stroke are associated with high readmission rates due to complex multisystem pathophysiological processes. Brain injury following stroke leads to motor, sensory, cognitive, and autonomic dysfunction, predisposing patients to complications such as immobility, dysphagia, aspiration pneumonia, and urinary tract infections.[18,19] In addition, stroke induces systemic inflammation and autonomic dysregulation, which can worsen cardiovascular instability, including arrhythmias and blood pressure fluctuations.[18] Persistent neurological deficits combined with common comorbidities such as hypertension and diabetes mellitus further increase the risk of clinical deterioration and hospital readmission.[20]

The findings of this study are consistent with previous research. Surasura's study (2024) discovered that age (per 10 years) ($p = 0.003$), comorbidities ($p < 0.001$), and a history of prior hospitalizations ($p < 0.001$) were significantly linked to readmission events in CKD patients.[13] Similarly, Wijayanti's study (2019) identified several factors associated with readmission in CKD patients undergoing hemodialysis. This research found that adherence to hemodialysis ($p = 0.002$), anemia ($p = 0.048$), and social support ($p = 0.034$) were statistically significant factors in readmissions among ESKD patients on hemodialysis.[11] Wagle's study (2022) also identified factors related to 30-day readmissions in CKD patients. This study revealed that higher readmission rates were found in individuals over 75 years old and those aged 25-50 years. Patients with comorbidities such as hypertension, diabetes mellitus, and tuberculosis had higher readmission rates, with odds ratios of (1.51, CI 0.60-3.77), (1.48, CI 0.79-2.76), and (1.569, CI 0.441-4.468), respectively. Additionally, hemoglobin levels below 9 g/dL and serum albumin levels under 35 g/L were linked to increased readmission rates, with odds ratios of 1.109 (95% CI 0.605-2.033) and 1.877 (95% CI 0.869-4.054), respectively.[12]

This study has successfully identified several factors related to readmission events in ESKD patients within 1 month and after 1 month.

Conclusion

The estimated glomerular filtration rate serves as a significant prognostic factor for readmission within one month, indicating its role in predicting short-term hospital readmissions in ESKD patients. On the other hand, factors such as diabetes mellitus, neurological disorders, and patient adherence are important prognostic indicators for readmission beyond one month. These factors help in understanding long-term outcomes and potential complications that could lead to extended hospital stays. Identifying and understanding these predictive factors is crucial for improving the overall management of ESKD patients. By recognizing these key elements, healthcare providers can tailor treatment plans and patient education more effectively, addressing the specific needs of patients and improving adherence to care protocols. Ultimately, this proactive approach can lead to better patient outcomes, reduce the rates of readmission, and help decrease the associated morbidity, mortality, and strain on healthcare resources.

Limitations of the Study

However, a limitation of this study is the small sample size, as the data were only collected from a single center. As a result, the findings should be validated through future research that includes a larger sample size and data from multiple centers to provide a more comprehensive representation of the general population.

Declarations

Ethics approval and consent to participate

This research has been approved by the ethics committee of Wangaya Regional General Hospital with number 000.9.2/531/RSUDW.

Competing interests

The author has declared that they have no conflicts of interest.

Funding source

Not applicable.

Acknowledgments

The author would like to express gratitude to the team for their support in preparing this study.

Author's Contribution

Idea/concept: NNGKD. Design: NNGKD, MSAP. Control/supervision: IWS. Data collection/ processing: NNGKD, MSAP, MPAA, PISL, CF. Analysis/interpretation: NNGKD. Writing the article: NNGKD, MSAP, MPAA, PISL, CF. Critical review: IWS. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

References

1. Vaidya SR, Aeddula NR. Chronic Kidney Disease. StatPearls Publishing; 2025.
2. Organisation KI. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int Suppl. 2013;3(1):1.
3. Hill NR, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS. Global Prevalence of Chronic Kidney Disease – A Systematic Review and Meta-Analysis. PLoS One. 2016;11(7):e0158765. doi:10.1371/journal.pone.0158765
4. Evans M, Lewis RD, Morgan AR, Whyte MB, Hanif W, Bain SC. A Narrative Review of Chronic Kidney Disease in Clinical Practice: Current Challenges and Future Perspectives. Adv Ther. 2022;39(1):33–43. doi:10.1007/s12325-021-01927-z
5. Luyckx VA, Tonelli M, Stanifer JW. The global burden of kidney disease and the sustainable development goals. Bull World Heal Organ. 2018;96(6):414–422D. doi:10.2471/blt.17.206441
6. Thomas R, Kanso A, Sedor JR. Chronic Kidney Disease and Its Complications. Prim Care. 2008;35(2):329–44. doi:10.1016/j.pop.2008.01.008
7. Jha V, Garcia-Garcia G, Iseki K, Li Z, Naicker S, Plattner B. Chronic kidney disease: global dimension and perspectives. Lancet. 2013;382(9888):260–72. doi:10.1016/s0140-6736(13)60687-x
8. Go AS, Chertow GM, Fan D, McCulloch CE, Yuan HC. Chronic Kidney Disease and the Risks of Death, Cardiovascular Events, and Hospitalization. N Engl J Med. 2004;351(13):1296–305. doi:10.1056/nejmoa041031
9. Plantinga LC, Tuot DS, Powe NR. Awareness of Chronic Kidney Disease Among Patients and Providers. Adv Chronic Kidney Dis. 2010;17(3):225–36. doi:10.1053/j.ackd.2010.03.002
10. Tuot DS, Wong KK, Velasquez A, Crews DC, Zonderman AB, Evans MK. CKD Awareness in the General Population: Performance of CKD-Specific Questions. Kidney Med. 2019;1(2):43–50. doi:10.1016/j.xkme.2019.01.005
11. Wijayanti S, Pujiarto P, Dewi AR. Hubungan Kepatuhan Hemodialisis dengan Interdialytic Weight Gain (IDWG) Pada Pasien Hemodialisis. MAHESA Malahayati Heal Student J. 2024;4(2):475–84. doi:10.33024/mahesa.v4i2.13148
12. Wagle A, Sigdel MR. Factors Affecting Readmission in Hospitalized Patients with Chronic Kidney Disease: a Single Center Study. J Inst Med Nepal. 2022;44(2):14–21. doi:10.59779/jiomnepal.1217
13. Surasura A, Siva Krishna Pavan Kumar BG, Chinamanagonda S, Durga D, Gubbala S. Understanding Hospital Readmissions: Insights, Patterns, and Interventions for Improvement in Chronic Kidney Disease. Cureus. 2024;16(5):e59524. doi:10.7759/cureus.59524
14. Xie Y, Bowe B, Xian H, Balasubramanian S, Al-Aly Z. Rate of Kidney Function Decline and Risk of Hospitalizations in Stage 3A CKD. Clin J Am Soc Nephrol. 2015;10(11):1946–55. doi:10.2215/cjn.04480415
15. Dhondup T, Qian Q. Electrolyte and acid-base disorders in chronic kidney disease and end-stage kidney failure.

Blood Purif. 2017;43(1–3):179–188. doi:10.1159/000452725

16. Alicic RZ, Rooney MT, Tuttle KR. Diabetic Kidney Disease: Challenges, Progress, and Possibilities. Clin J Am Soc Nephrol. 2017;12(12):2032–45. doi:10.2215/cjn.11491116

17. Hickson LJ, Thorsteinsdottir B, Ramar P, Reinalda MS, Crowson CS, Williams AW, et al. Hospital Readmission among New Dialysis Patients Associated with Young Age and Poor Functional Status. Nephron. 2018;139(1):1–12. doi:10.1159/000485985

18. Feigin VL, Roth GA, Naghavi M, Parmar P, Krishnamurthi R, Chugh S. Global burden of stroke and risk factors in 188 countries, during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet Neurol. 2016;15(9):913–924. doi:10.1016/s1474-4422(16)30073-4

19. Langhorne P, Bernhardt J, Kwakkel G. Stroke rehabilitation. Lancet. 2011;377(9778):1693–1702. doi:10.1016/s0140-6736(11)60325-5

20. Kumar V, Abbas AK, Aster JC. Robbins and Cotran Pathologic Basis of Disease. 10th ed. Elsevier; 2020.