

Evaluation of Causes of Recurrent Hospitalization in Diabetic Chronic Kidney Disease

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ABSTRACT

Background: Recurrent hospitalization in patients with diabetic renal failure increases health care related expenditure and reduces performance status. Therefore, a knowledge of such causes and prompt management could potentially reducing hospitalization burden and health expenditure.

Objective: To determine the various causes of recurrent hospitalization in individuals with diabetic chronic kidney disease.

Methodology: Patients diagnosed with diabetic renal failure were enrolled from the department of nephrology, Khyber Teaching Hospital during the period July 2022 to June 2023. Chronic kidney disease was confirmed as per KDIGO recommendations including eGFR <40ml/min, reduction of kidney size and renal cortical echogenicity on ultrasound and renal biopsy findings consistent with diabetic nephropathy. Causes of hospitalization included urinary tract infection, anemia, ascites, gastritis and pneumonia.

Results: A total of 192 patients were registered for evaluation. The age of the patient ranged from 40 to 80 years. The mean age of the patients was 54.304 ± 12.097 years. The mean duration of diabetes was 13.298 ± 3.650 years while the mean duration for CKD diagnosis was 4.16 ± 0.989 years. Urinary tract infection was the most common cause of recurrent hospitalization recorded in 84 patients (43.7%) followed by anemia (n = 57, 29.7%), ascites (n = 29, 15.1%), pneumonia (n = 13, 6.8%) and gastritis (n = 09, 4.7%) respectively.

Conclusion: Infections are the most common cause of recurrent hospitalization in diabetic CKD patients. Male patients taking oral medications for diabetes are more prone to infections and recurrent hospitalization.

Keywords: Chronic Kidney Disease, Diabetes Mellitus, Recurrent Hospitalization

INTRODUCTION

End-stage kidney disease (ESKD) has remained a major health issue worldwide for a while [1,2], and investigative organisations from all over the world have explored the reasons and consequences of ESKD [3,4]. Developing countries have a higher proportion of ESKD incidence and prevalence than industrialized countries. ESKD has an exceptionally high medical expenditure and a high hospitalization rate in contrast to other disorders [5,6]. According to the United States Renal Data System's 2016 Annual Data Report, hospitalizations and return visits were the biggest financial burden for patients with ESKD, with the typical patient hospitalized to the hospital twice a year [7]. The hefty health care expenses of ESKD therapy are putting a strain on under-developed and developing countries healthcare system. Analysis shows an increasing number of admission rate among dialysis patients in the last two decades [8], and this rising pattern was mostly due to the admission of patients with ESKD. As a result, lowering the rate of hospitalisation and monitoring health related quality among ESKD patients have become pressing challenges for our and other international health policymakers.

ESKD has a higher death rate and higher utilisation of outpatient services, emergency, and inpatient care due to its more complicated medical complications (e.g., type 2 diabetes, coronary diseases, hemodynamic, and vascular complications, low serum protein level, and a higher probability of cerebrovascular accident, cardiac infarction, congestive heart failure, infectious disease, and septicemia [9]. Admissions and readmissions, which become more often and dangerous as the illness progresses, are the most difficult for patients with ESKD [10].

According to scientific studies conducted by a single healthcare institution or medical maintenance organisation, patients with ESKD experience a significant number of problems [11]. A 2016 study on the incidence rate of complications in dialysis patients in Taiwan found that infections, cerebrovascular and cardiovascular accidents were the most regularly occurring problems leading to repeated hospitalisation.

Early identification of the possibility of hospitalization in ESKD patients may lower the incidence of hospitalization [12].

According to studies, (1) the patient's state and hospitalization rate are strongly connected in ESKD patients, and (2) the rate and reason of hospital stays impact ESKD outcome [13]. Metcalfe et al, [5] found that investigations on patients with ESKD have largely focused on admission patterns and the mortality rate in the initial year of dialysis; these studies have seldom examined patient status prior to and following dialysis. This study performed a prospective analysis on all patients with chronic kidney disease secondary to diabetes mellitus to see if the reason for hospitalization in such patients.

MATERIALS AND METHODS

Ethical Permission: This study and related research methods were authorized by a board of review adhered to the Helsinki Declaration. The institutional review board relaxed the necessity for informed consent from patients due to the relatively safe aspect of the investigation and its approach.

Data Collection: This prospective observational study was carried out at the department of Nephrology, Khyber Teaching Hospital, Peshawar during the period July 2022 till June 2023. Patients with chronic kidney disease secondary to diabetes mellitus and admitted to hospital care for more than 2 times in a year were enrolled. Confirmation of chronic kidney disease was based on combination of clinical, biochemical, radiological and histological findings consistent with chronic renal disease. The parameters included eGFR<40ml/min, reduction in kidney size on ultrasound with echogenic renal cortex and presence of diabetic glomerulosclerosis on biopsy. Diabetes mellitus was confirmed from patient medical record as well as measuring serum fasting glucose and HbA1c level. Recurrent hospitalization was defined by more than 2 times admission to hospital care in a year. Data for the previous hospitalization was retrieved from patient discharge card as well as hospital electronic record system. The recorded data included patient demographics, dialysis status, duration of diabetes, duration of chronic kidney disease and current admitting diagnosis. Patients with obstructive nephropathy, renal malignancy, systemic disease with renal manifestations, history of

nephrectomy and immunocompromised patients (HIV, steroid) were excluded.

Data Analysis: The recorded data was entered and analyzed using statistical analysis program IBM SPSS version 24. Numerical parameters of interest were recorded as mean ± SD while categorical data was presented as frequencies and percentages. Heterogeneity among categorical variables was compared using chi square test. Similarly heterogeneity among numerical variables was analyzed with student t test. The cut off for statistical significance was set at p ≤ 0.05.

RESULTS

A total of 192 patients were registered for evaluation. The age of the patient ranged from 40 to 80 years. The mean age of the patients was 54.304 ± 12.097 years. The mean duration of diabetes was 13.298 ± 3.650 years while the mean duration for CKD diagnosis was 4.16 ± 0.989 years. These parameters are summarized in table 1.

Table 1: Basic demographics and baseline characteristics (n = 192)

Variables	Minimum	Maximum	Mean	SD
Age (years)	40	79	54.304	12.097
BMI (kg/m ²)	18.9	22.2	20.038	1.439
Diabetes Duration (years)	6	19	13.298	3.650
CKD duration (years)	2	9	4.160	0.989

The number of male participants was 119 (62.0%). 86 patients (44.8%) were dialysis dependent while the remaining 106 patients (55.2%) were under conservative management.

Table 2: Variables and their subgroups (n = 192)

Variables	Sub-Groups	Frequency	Percentages
Gender	Male	119	62.0%
	Female	73	38.0%
Dialysis	Dependent	86	44.8%
	Independent	106	55.2%
Diabetes Rx	Insulin	79	41.1%
	Oral	113	58.9%
Comorbids	Yes	55	28.6%
	No	137	71.2%

Urinary tract infection was the most common cause of recurrent hospitalization recorded in 84 patients (43.7%) followed by anemia (n = 57, 29.7%), ascites (n = 29, 15.1%), pneumonia (n = 13, 6.8%) and gastritis (n = 09, 4.7%) respectively. Recurrent hospitalization was more common dialysis dependent as compared to dialysis non-dependent (p < 0.05). Majority of patients with recurrent hospitalization were taking oral medications for diabetes mellitus (p = 0.046).

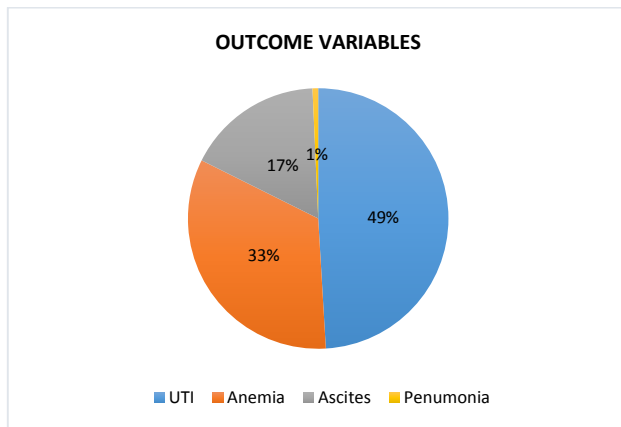


Figure 1: Frequency and percentages according to outcome variables (n = 192)

DISCUSSION

The current investigation on patients with diabetic chronic kidney disease, examined the grounds for recurrent hospitalization. This study used a cross-sectional research methodology to analyze data on four admitting diagnoses as causes of recurrent hospitalization. This study's sample included 119 male (62.0%), with almost equal numbers across all age categories. According to the findings in the literature, high blood pressure was the most common comorbidity among the enrolled individuals.

A cross-sectional investigation revealed that age and comorbidities were important factors influencing variations in the category of classification for individuals admitted to the hospital [14]. Furthermore, in a subgroup analysis by age, the rate of patients admitted to the hospital for urinary tract infection, pneumonia, and hyperkalemia decreased considerably across all age groups. Cardiovascular disorders are regarded as the most significant risk factor for individuals with ESKD during hospitalisation. Most patients with ESKD have one or more comorbidities, with diabetes and hypertension accounting for about two-thirds of all cases; cardiovascular disease is another common comorbidity of ESKD [15].

Pathogenic conditions were more common in the elderly [16]. Three separate investigations have found that the prevalence of ESKD rises with age. According to the findings of the current study, younger individuals were less likely to be admitted to the hospital owing to urinary tract infection or other complications. Those who experienced a urinary tract infection were generally older. Finally, those who got pneumonia only were older and urinary tract infection was more prevalent in the elderly.

According to a contemporary epidemiological investigation, uremia in ESKD altered cell and immune system function, making patients more susceptible to broad infection. Although a mild urinary tract infection is not detrimental to the functioning of the kidneys, its subsequent occurrence might alter the course of pre-existing renal disorders, causing renal function to deteriorate [17]. ESKD is a chronic inflammatory illness that makes patients more susceptible to infection, and its comorbidities, such as diabetes and inadequate bladder emptying, can lead to urinary tract infection [18].

CONCLUSION

This study looked at the reasons for ESKD patients' recurrent hospitalization irrespective of their dialysis status. According to the findings of this study, (1) recurrent hospitalization is more common among male patients. (2) Hospitalization rate was more among those taking oral medications for diabetes mellitus. In terms of the reasons for admission, urinary tract infection was the most common causes followed by anemia, ascites and pneumonia. As a result, while providing comprehensive nursing care and therapy for chronic kidney disease, doctors should consider issues other than comorbidities.

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