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THE EMERGENCY OF CHRONIC KIDNEY DISEASE PATIENT IN THE HOSPITAL EMERGENCY'S DEPARTEMENT

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ABSTRACT
Chronic kidney disease (CKD) is a condition in which kidney function gradually declines. CKD has become a major global health issue due to its increasing prevalence each year. Emergencies in CKD patients include metabolic acidosis, hyperkalemia, pulmonary edema, and others. These conditions require immediate intervention to prevent organ damage or death. Objective: This study aims to describe cases of kidney disease emergencies in hospitals. Method: This study used a retrospective descriptive design. The sample size consists of 187 medical records of chronic kidney disease (CKD) patients. The sampling technique employed is Non-probability Sampling with a purposive sampling approach. The inclusion criteria are emergency department patient medical records with complete data, while the exclusion criteria are medical records from outside the year 2023. Data were collected using secondary data from CKD patient medical records in the Emergency Department. The analysis used univariate analysis with frequency distribution. Results: The majority of CKD patients experiencing emergencies were admitted to the emergency department (ED) with pulmonary edema. More than half of these patients were aged between 19-59 years, predominantly female, nearly half were housewives, and most had a history of hypertension. Almost all patients were undergoing hemodialysis therapy.Conclusions: This study shows that the most common emergency condition in chronic kidney disease (CKD) patients is pulmonary edema.

Keywords: edema; emergency; chronic kidney diseases

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INTRODUCTION

Chronic Kidney Disease (CKD) is a condition characterized by the reduced ability of the kidneys to maintain balance within the body, caused by damage to nephrons, including the glomerulus and kidney tubules. Damaged nephrons cannot regain normal function (Siregar, 2020). CKD is a non-communicable disease that poses a significant health issue globally due to its increasing prevalence each year. CKD affects over 10% of the global population, amounting to 843.6 million people, or 1 in 10 people worldwide. CKD is more common among older adults, women, minority races, and individuals with diabetes mellitus and hypertension (Kovesdy, 2022).As a result, CKD ranked as the 12th leading cause of death globally in 2017, up from 27th place in 1990 and 13th in 2016. This increase represents a 41.5% rise over two decades, and if preventive measures are not taken, it is projected to rise to the 5th leading cause of death by 2040 (Ilhan Rakha Aryawardana, 2024)According to national data, there were 713,783 CKD cases, with approximately 60% of patients requiring hemodialysis treatment (Ministry of Health, 2021). West Java has the highest prevalence. Based on the 2019 Basic Health Research (Riskesdas), 0.2% of the population aged 15 and older were diagnosed with chronic kidney failure, with prevalence increasing with age and a sharp rise seen in the 35-44 age group compared to the 25-34 age group. The prevalence among men (0.3%) is higher than among women (0.2%) (Lubis Roju, 2023).

The causes of CKD include diabetes mellitus, hypertension, ischemia, infection, obstruction, toxins, autoimmune, and infiltrative diseases. Progressive chronic kidney disease can lead to complications with higher prevalence and intensity in those with reduced kidney function. CKD complications include cardiovascular disease, hypertension, anemia, mineral bone disorders, electrolyte disturbances, diabetes mellitus, and metabolic acidosis (Kandou, 2019).The main reasons for CKD patients frequently visiting the emergency department include high blood pressure, anemia, high potassium levels, increased metabolic acidosis, pulmonary edema, hypoxia, hypocapnia, heart failure, and other cardiovascular issues (Marano & Gennari (2017) in (Shrestha, 2021)). Emergency conditions in CKD patients encompass hypertension, hyperkalemia, metabolic acidosis, and anemia (Utami, 2020). Additionally, Sirait (2017) notes that one of the complications of kidney failure is Uremic Encephalopathy, an organic brain disorder that can occur in patients with both acute and chronic kidney failure (Sirait, 2017 in (Purbasari, 2023)).

At-home emergency incidents for individuals with CKD show the highest severity in cases of metabolic acidosis (53.1%) and the lowest in uremic encephalopathy (37.8%) ((Purbasari, 2023). Chronic kidney disease is among the most common reasons for patients visiting the emergency department. In a study by Nurseskasatmata et al. (2019), 80 patients arrived at the ER with a CKD diagnosis and shortness of breath, with most undergoing hemodialysis. CKD patients often visit the ER for various reasons such as high blood pressure, anemia, elevated potassium levels, increased metabolic acidosis, pulmonary edema, hypoxia, hypocapnia, heart failure, and other cardiovascular issues, often accompanied by diabetes, hypertension, glomerulonephritis, and other conditions ((Shrestha, 2021).In the study by Siddiqi et al. (2023), of 2,580 patients visiting the ER, 134 had CKD. A similar study in Nepal indicated that emergency cases in CKD patients were due to obesity (20%), hypertension (5.0%), diabetes (38.6%), and proteinuria (7.5%), with cardiovascular disease (30.2%) as the most common cause of death among CKD patients (Tirtha Man Shrestha et al., 2021). Consistent with the study by Marano S and Gennari FJ (2017 in (Shrestha, 2021), the main reasons for CKD patients frequently visiting the ER are high blood pressure, anemia, high potassium levels, increased metabolic acidosis, pulmonary edema, hypoxia, hypocapnia, heart failure, and other cardiovascular problems. This research aimed to identify the emergency conditions of chronic kidney disease patients in the hospital emergency department.

METHOD

This study used a quantitative research design with a retrospective descriptive method. The sampling technique employed was Non-probability Sampling with a purposive sampling approach. The inclusion criteria are emergency department patient medical records with complete data, while the exclusion criteria are medical records from outside the year 2023. Data were collected using secondary data from CKD patient medical records in the Emergency Department by using the Chronic Kidney Disease Emergency Case Identification Form. The sample size was 187 medical records. The analysis used univariate analysis with frequency distribution. This study was approved by the Research Ethics Committee of Bhakti Kencana University with ethical clearance number 130/09.KEPK/UBK/VII/2024 issued on July 15th 2024.

RESULT

The research results show that 66.31% of respondents are aged 19–59 years, 56.1% are female, and 40.6% are housewives. Nearly half of the respondents (36.4%) have hypertension as a comorbidity, while 21.4% have no comorbidities. Almost all respondents (85%) undergo hemodialysis therapy, 2.7% undergo CAPD (Continuous Ambulatory Peritoneal Dialysis), and the remaining 12.3% do not receive renal replacement therapy (Table 1). The most

common emergency in chronic kidney disease patients requiring a visit to the emergency department is pulmonary edema, at 21.81% (Table 2).

Table 1.
Respondent characteristics (n= 187)

Respondent characteristics	f	%
Age		
≤ 5 year	1	0,53
6-9 year	0	0
10-18 year	1	0,53
19-59 year	124	66,31
>60 year	61	32,63
Gender		
Male	82	43,9
Female	105	56,1
Occupation		
Housewifes	76	40,6
Civils	5	2,7
Employee	58	31
Laborer	5	2,7
Retire	10	5,3
Farmer	12	6,4
Others	21	11,3
Comorbidities		
Diabetes Mellitus	44	23
Hipertension	71	36,4
Cardiovaskular Diseases	23	12,3
Others	9	7
No Comorbidities	40	21,4
Renal Replacement Therapy		
Hemodialysis	159	85
Countinous Ambulatory Peritoneal Dialysis (CAPD)	5	2,7
No Therapy	23	12,3

Table 2.
Emergency case in Chronic Kidney Disease Patients (n= 187)

	f	%
Metabolic Acidocis	2	1,07
Hyperkalemia	18	9,63
Uremic Encephalopathy	5	2,67
Hypertension	21	11,23
Anemia	26	13,9
Fluid Overload	23	12,3
Pulmonary Edema	52	27,81
Stroke	6	3,21
Cardiovaskular	7	3,74
Gastropaty Uremikum	11	5,88
Pneumonia	3	1,61
Others	13	6,95

DISCUSSION

Respondents Characteristic

The majority of CKD (Chronic Kidney Disease) patients (56.1%) experiencing emergency conditions in this study were female. This aligns with research by Eka Yanti et al. (2022), which showed that there are more female CKD patients than male. According to the National

Kidney Foundation, women are more likely to develop CKD because they are more prone to urinary tract infections (UTIs). UTIs, as noted by (Dicu-Andreescu, 2023) affect nearly 50% of women and 5% of men and lead to faster kidney function decline. These infections, along with accompanying complications, can result in kidney damage.In women, pregnancy-related issues such as high blood pressure or eclampsia also contribute to the risk. Furthermore, women are at a higher risk of kidney function disorders due to comorbid factors. These comorbidities typically arise from severe complications in individuals with multiple diseases, such as diabetes mellitus (Mufidah, n.d)In this study, diabetes mellitus was the second most common comorbid disease (23%) after hypertension (36.4%). This is consistent with the findings of Adnan & Azizah (2023), which showed that hypertension accounted for 41.5% of comorbidities. Hypertension is the most prevalent comorbid condition in CKD. This is supported by research at the Hemodialysis Unit of PKU Muhammadiyah Hospital in Yogyakarta, where hypertension was identified as the leading comorbidity.

Hypertension is closely related to kidney health, as it is a major triggering factor for kidney failure. Hypertension exacerbates kidney damage by increasing intraglomerular pressure, leading to structural and functional disorders in the glomeruli. The high intravascular pressure is transmitted through the afferent arterioles into the glomeruli, causing the afferent arterioles to constrict due to hypertension. The most common age category in this study falls within the range of 19-59 years (66.31%). According to Violita & Mardiana (2022), aging is directly proportional to physiological changes, such as electrolyte imbalances and decreased creatinine levels. Increasing age impacts the cytology, anatomy, and physiology of the kidneys. After the age of 30, kidney atrophy and a thinning of the renal cortex by 20% can occur per decade. Starting at age 40, the kidneys begin to lose nephrons. With each passing decade, kidney function declines by approximately 10 ml/min/1.73 m^2. By age 40, mild kidney impairment may occur, with an estimated glomerular filtration rate (GFR) of 60–89 ml/min/1.73 m^2. This reduction in GFR equates to about 10% of normal kidney function (Gani NSM, 2014, as cited in (Tombokan, 2024).

The gradual decline in kidney function is a common process experienced by everyone as they age. However, this decline generally does not cause symptoms because it remains within a tolerable range for the kidneys. Nevertheless, certain risk factors can trigger complaints, as the gradual reduction in kidney function leads to symptoms associated with the severity of CKD (Hasanah et al., 2023).The most common occupation among patients in this study was housewives, accounting for 76 individuals (40.6%). This finding aligns with the research by Eka Yanti et al. (2022), which noted a higher prevalence of CKD (Chronic Kidney Disease) among housewives. According to Khajehdehi et al. (2014), domestic work is associated with a higher prevalence of CKD, especially among lower socioeconomic groups. Housewives are at increased risk of CKD due to preexisting conditions and risk factors influencing CKD progression (Parviz Khajehdehi, 2014).

The most common renal replacement therapy observed in this study was hemodialysis (HD). This is consistent with the estimates by the United States Department of Health and Human Services (USDHHS, 2017), which reported that 85% of CKD patients undergo HD, compared to only 2.7% who receive Continuous Ambulatory Peritoneal Dialysis (CAPD). End-stage CKD patients require hemodialysis as a renal replacement therapy to maintain body homeostasis.Patients undergoing hemodialysis are at risk of emergencies, one of which is fluid overload, which can lead to complications. Emergencies in CKD patients undergoing hemodialysis may include fluid overload, metabolic acidosis, and hyperkalemia. These complications arise because terminal kidney failure reduces the glomerular filtration rate to less than 15 ml per minute.Fluid overload during interdialytic periods often leads to

symptoms such as shortness of breath (tachypnea), positive rales, extremity edema, ascites, jugular vein distension (+5 cmH2O), elevated blood pressure (>130/90 mmHg), muscle cramps, dizziness, panic, reduced consciousness, and multi-organ failure. These findings are consistent with data from Rustiawati et al. (2021).

Emergencies in Chronic Kidney Diseases Patients

Emergency cases of chronic kidney disease (CKD) patients in hospital primarily involved pulmonary edema, affecting 52 patients (27.81%). Other conditions observed included cardiovascular diseases, stroke, uremic gastropathy, and hypoglycemia. This aligns with research by Bello et al. (2018), which found that 80% of CKD-related emergency room admissions were due to pulmonary edema, alongside other conditions such as uremia, azotemia, severe hyperkalemia, severe anemia, and cardiovascular diseases (heart failure, hypertensive crises, stroke, and hypotension), contributing to 26.5% of cases. Similarly, a study by Pant et al. (2019) reported that respiratory system emergencies in CKD patients included pulmonary edema in 41 cases (24.84%). Pulmonary edema is one of the most common complications in CKD patients and is associated with high morbidity and mortality rates.Pulmonary edema in CKD patients is often caused by the pathological condition of the lungs, characterized by a combination of fluid overload and abnormal microvascular permeability. Hypoalbuminemia, a common feature of chronic kidney failure, reduces plasma oncotic pressure, promoting the movement of fluid from the pulmonary capillaries (Narsa, 2022).Pulmonary edema is a common complication in both chronic and acute kidney disease. Fluid overload in the body can manifest in two ways: increased blood volume and edema. A sharp rise in hydrostatic pressure forces fluid into the pulmonary capillary membranes, resulting in pulmonary edema. Its clinical manifestations include sputum accumulation, dyspnea, coughing, and wet rales upon auscultation. Pulmonary edema is a medical emergency that requires immediate intervention.

Shortness of breath is a frequent symptom in CKD patients. The manifestation of pulmonary edema is often accompanied by respiratory issues and increased blood volume. Pulmonary edema in CKD patients arises from extracellular fluid accumulation due to impaired excretion of fluids and solutes. Under normal conditions, fluid, colloid, and solutes exchange between blood vessels and interstitial spaces. However, pulmonary edema occurs when fluid movement from the blood to interstitial or alveolar spaces exceeds the amount returned to blood vessels or drained through the lymphatic system.CKD also leads to complex manifestations, including fluid overload, which causes pulmonary edema. Impaired filtration and reabsorption in the kidneys result in fluid accumulation, leading to fluid overload in the body. If fluid and electrolyte imbalances are not managed effectively, CKD patients may experience other complications, such as a decline in all bodily functions, potentially resulting in death.Thus, pulmonary edema is a critical emergency condition in CKD patients that must be addressed promptly to prevent further complications, such as severe respiratory distress and systemic functional decline that could be life-threatening. Rapid and appropriate management is crucial to preventing the progression of this serious and potentially fatal condition.

CONCLUSION

The majority of CKD patients experiencing emergencies were admitted to the emergency department (ED) with pulmonary edema. More than half of these patients were aged between 19-59 years, predominantly female, nearly half were housewives, and most had a history of hypertension. Almost all patients were undergoing hemodialysis therapy.

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