Characteristics of Patients With Chronic Kidney Disease: A Descriptive Study

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Abstract.
Chronic Kidney Disease (CKD) is a major non-communicable disease with a high health burden both globally and nationally. This study aims to describe the clinical and demographic characteristics of CKD patients hospitalized at the Universitas Kristen Indonesia General Hospital in 2023. This research employed a quantitative descriptive design with a cross-sectional approach. A total of 82 patients were selected through total sampling from medical records. The collected data included age, sex, occupation, highest educational level, place of residence, and history of hypertension and diabetes mellitus as the main comorbidities. The results showed that the 55–65-year age group was the most prevalent (35.6%). Female patients dominated the sample (55.9%). Based on occupation, most patients were housewives (35.4%). The highest level of education recorded was senior high school (54.9%). The most common comorbidities were hypertension (43.9%) and diabetes mellitus (13.4%). These findings indicate that older age, female sex, non-formal occupations, senior high school education level, and the presence of hypertension and diabetes mellitus are frequently observed characteristics among CKD patients at RSU UKI in the 2023 period. The results are expected to serve as a baseline for developing prevention and clinical management strategies for CKD and to raise public awareness regarding the importance of regular kidney function screening.
Keywords*: Chronic Kidney Disease, Patient Characteristics, Hospitalization, Risk Factors, Hypertension and Diabetes. Mellitus.*

I. INTRODUCTION

Chronic Kidney Disease (CKD) is a major non-communicable disease that poses a significant global health challenge due to its high morbidity and mortality rates. According to the Global Burden of Disease Study, chronic kidney disorders have entered the top ten leading causes of death worldwide, with an estimated prevalence exceeding 850 million people globally. The increasing global incidence of this disease is heavily driven by the rising prevalence of chronic metabolic conditions such as diabetes mellitus, hypertension, and obesity, alongside unhealthy lifestyle changes in modern society. A similar trend is observed across Asia, where approximately 200 million residents are estimated to live with various stages of declining kidney function.

Southeast Asia is particularly vulnerable to the expansion of this disease due to rapid urbanization, shifting dietary patterns, and limited access to equitable healthcare services. Nearly half of all CKD cases in Southeast Asia are directly associated with comorbidities like diabetes mellitus and hypertension among the adult population.

In Indonesia, the escalation of CKD cases has reached an alarming level, making it a critical public health concern. Data from the Basic Health Research (Riset Kesehatan Dasar) shows that the prevalence of chronic kidney disease in Indonesia stands at 0.38% of the total population. In line with these findings, the Indonesian Society of Nephrology (Perhimpunan Nefrologi Indonesia/PERNEFRI) projects that approximately 25 to 30 million Indonesian citizens experience a progressive decline in kidney function. Beyond deteriorating patients' physical and psychological quality of life, CKD imposes an immense financial burden on the state's healthcare system. Hemodialysis therapy consistently ranks among the top three most expensive treatments for catastrophic diseases managed by the national health insurance system (BPJS Kesehatan). Management challenges in Indonesia are further compounded by high rates of delayed diagnosis. Many patients are only identified after reaching advanced stages of the disease, immediately requiring renal replacement therapy such as dialysis or kidney transplantation. PERNEFRI data indicates a annual growth rate of 10% to 12% in the number of hemodialysis patients, highlighting a severe mismatch between the availability of supportive facilities and the volume of cases across various regions.

Medically, CKD is defined as structural damage or a progressive, irreversible decline in kidney function lasting for a period exceeding three months. Clinical diagnosis is established based on an estimated Glomerular Filtration Rate (eGFR) below 60 mL/min/1.73 m^2, or objective evidence of kidney parenchymal damage through persistent albuminuria and abnormal radiological imaging. The two largest primary causes are diabetes mellitus and hypertension. Chronic, uncontrolled high blood pressure damages the capillary structures within the glomerulus, accelerating sclerosis and drastically lowering the filtration capacity of the kidneys. The clinical characteristics and manifestations of CKD are highly heterogeneous and vary based on age, sex, primary etiology, and socioeconomic status. Various previous studies demonstrate that the patient population is predominantly composed of the elderly who have accumulated multiple chronic comorbidities. However, specific demographic distributions such as sex and occupational status remain highly dependent on the characteristics of the local population under study.

Given the high variability of comorbidities and demographic profiles, conducting local studies on the characteristics of CKD patients within teaching hospitals carries substantial urgency. The Universitas Kristen Indonesia General Hospital (Rumah Sakit Umum Universitas Kristen Indonesia/RSU UKI), located in East Jakarta, serves as a prominent urban healthcare center treating a significant

volume of hospitalized CKD cases. Regular evaluations of patient profiles at this institution are vital. Through a descriptive analysis of sociodemographic data and history of comorbidities, this study aims to identify the clinical and demographic characteristics of hospitalized CKD patients at RSU UKI during the 2023 period. The findings of this research are expected to contribute scientifically to the development of medical theories and literature, particularly in the fields of nephrology and clinical epidemiology. Furthermore, the resulting descriptive data can serve as a foundational reference for clinicians to map dominant risk factors, optimize hospital service delivery, formulate preventive strategies, and reduce the progression of complications among inpatients.

II. METODE

This study employed a quantitative descriptive design with a retrospective and cross-sectional approach. This approach enabled the collection of research variables at a single point in time without any clinical intervention to obtain a comprehensive overview of the patient characteristic distribution. The study was conducted at the Universitas Kristen Indonesia General Hospital (RSU UKI), located in East Jakarta, Indonesia. The retrospective data collection process took place from August 2025 until all medical records matching the study criteria were fully gathered. The target population encompassed all patients diagnosed with chronic kidney disease (CKD) who underwent hospitalization at RSU UKI throughout the period from January to December 2023. From an initial accessible population of 132 recorded patients, the researcher established a final sample size of 82 patients who strictly met the eligibility criteria using a total sampling technique.

The researcher applied rigorous inclusion and exclusion criteria during the medical record selection process. The inclusion criteria comprised patients with a primary diagnosis of chronic kidney disease hospitalized at RSU UKI during the 2023 period who possessed complete medical record data corresponding to the research variables. Conversely, the exclusion criteria excluded patients who left the hospital against medical advice, patients referred to further facilities, individuals who did not complete their inpatient treatment period, duplicate patient data from their first admission episode, and patients whose primary diagnosis was other than CKD despite having underlying kidney comorbidities. Data collection was executed retrospectively by screening files in the medical records department, logging the relevant variables, and categorizing them into frequency distribution tables. The collected parameters consisted of sociodemographic characteristics including age, sex, occupation, highest educational level, and place of residence, alongside clinical data regarding primary comorbidities, namely histories of hypertension and diabetes mellitus.

In accordance with the operational definitions, the measurement of the age variable was categorized based on the 2019 Ministry of Health of the Republic of

Indonesia criteria. The sex variable was classified into male and female. The occupational status was grouped into civil servants or private employees, entrepreneurs, housewives, students, retirees, and unemployed individuals. The highest educational level was divided into no formal schooling, elementary school, junior high school, senior high school, and diploma or bachelor degree. The place of residence was classified into the urban area of East Jakarta and regions outside East Jakarta. For the clinical parameters, the presence of hypertension and diabetes mellitus histories was determined dichotomously (yes or no) based on prior physician diagnoses or blood pressure measurements documented within the medical charts. The successfully gathered data were subsequently processed through numerical coding and entered into the Statistical Package for the Social Sciences (SPSS) software system. The researcher executed manual visual data verification to eliminate entry errors, followed by a descriptive statistical analysis to evaluate the frequency and percentage of each variable before presenting them in proportion tables and charts.

III. HASIL ANALISIS

Age-Based Distribution of CKD Patients

The most prevalent age group was 56 to 65 years old (36.6%). This finding is consistent with the study conducted by Bikbov and colleagues, which demonstrated that the highest prevalence of CKD occurs in the elderly population. This indicates that the findings of this study remain aligned with the global trend.

Table 1. Proportional Distribution of CKD Patients Based on Age at the Universitas Kristen Indonesia General Hospital for the 2023 Period

	Frequency	Percent
Valid		
Late adolescence: 18–25 Years	3	3.7%
Early adulthood: 26–35 Years	3	3.7%
Late adulthood: 36–45 Years	4	4.9%
Early elderly: 46–55 Years	16	19.5%
Late elderly: 56–65 Years	30	36.6%
Geriatric / Seniors: > 65 Years	26	31.7%
Total	82	100%

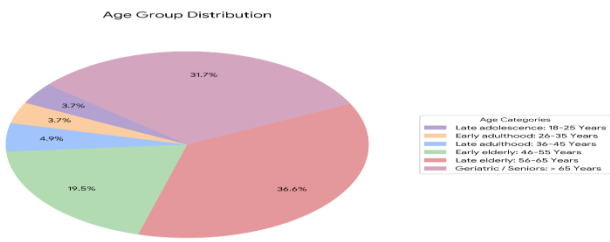

Fig. 1. Graphical Proportional Distribution of CKD Patients Based on Age at the Universitas Kristen Indonesia General Hospital for the 2023 Period

Sex-Based Distribution of CKD Patients

Female patients dominated the population with a proportion of 55.9%, while male patients accounted for 44.4%. This finding is consistent with a study conducted by Ricardo and colleagues in 2020, which reported that the prevalence of chronic kidney disease tends to be higher in females. However, a prior study by Jager in 2019 indicated that males have a greater propensity to progress to end-stage kidney disease. This disparity may reflect biological variations as well as healthcare-seeking behaviors, where females generally undergo routine health screenings more frequently, leading to higher detection rates during the early stages of the disease.

Table 2. Proportional Distribution of CKD Patients Based on Sex at the Universitas Kristen Indonesia General Hospital for the 2023 Period

	Frequency	Percent
Valid		
Male	36	44.4%
Famale	45	55.9%
Total	82	100%

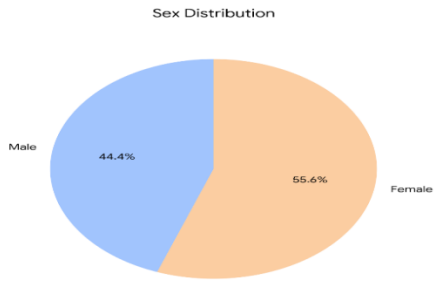

Fig. 2. Graphical Proportional Distribution of CKD Patients Based on Sex at the Universitas Kristen Indonesia General Hospital for the 2023 Period

Occupation-Based Distribution of CKD Patients

The most prevalent patient group was housewives, accounting for a proportion of 35.4%. Zeng, in a study conducted in 2018, reported that individuals with low occupational status carry a higher risk of developing chronic kidney disease. Previously, a study by Ritte and colleagues in 2017 also identified an association between unemployment and a decline in kidney function. The dominance of the housewife group in this study reflects the sociodemographic conditions of the community surrounding RSU UKI, where most women are not formally employed but are actively engaged in domestic activities and family healthcare management.

Table 3. Proportional Distribution of CKD Patients Based on Occupation at the Universitas Kristen Indonesia General Hospital for the 2023 Period

	Frequency	Percent

Valid		
Civil Servants / Private Employees	23	28,0%
Entrepreneurs	7	8,5%
Housewives	29	35,4%
Retirees	7	8,5%
Unemployed	3	3,7%
Others	13	15,9%
Total	82	100,0%

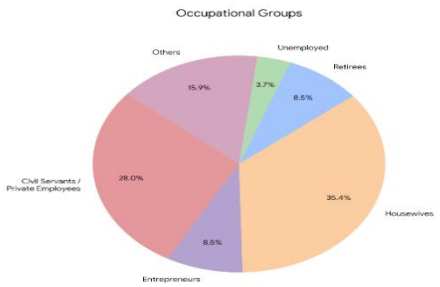

Fig. 3. Graphical Proportional Distribution of CKD Patients Based on Occupation at the Universitas Kristen Indonesia General Hospital for the 2023 Period

Distribution of CKD Patients Based on Highest Educational Level

The most prevalent patient group by educational level was senior high school, accounting for a proportion of 54.9%. Zhang, in their study, stated that low educational attainment is frequently associated with delayed diagnosis of chronic kidney disease. Reports from the Global Burden of Disease also indicate that educational levels influence an individual's understanding of kidney disease prevention and management. This outcome reflects that the majority of patients at RSU UKI belong to the secondary education group, which aligns with the characteristics of the studied population.

Table 4. Proportional Distribution of CKD Patients Based on Highest Educational Level at the Universitas Kristen Indonesia General Hospital for the 2023 Period

	Frequency	Percent
Valid		
Primary Education (Elementary School / Equivalent)	3	3,7%
Lower Secondary Education (Junior High School / Equivalent)	14	17,1%
Upper Secondary Education (Senior High School / Equivalent)		
Higher Education (Diploma Degree)	45	54,9%
Higher Education (Bachelor's Degree)		
	3	3,7%
	14	17,1%
Unknown / Missing	3	3,7 %
Total	82	100%

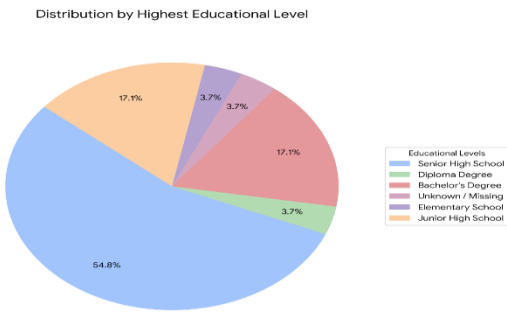

Fig. 4. Graphical Proportional Distribution of CKD Patients Based on Highest Educational Level at the Universitas Kristen Indonesia General Hospital for the 2023 Period

Distribution of CKD Patients Based on Residential Origin

Table 5. Proportional Distribution of CKD Patients Based on Residential Origin at the Universitas Kristen Indonesia General Hospital for the 2023 Period

	Frequency	Percent
Valid		
Within East Jakarta	63	76,8%
Outside East Jakarta (External to East Jakarta Administrative Region)	19	23,2%
Total	82	100%

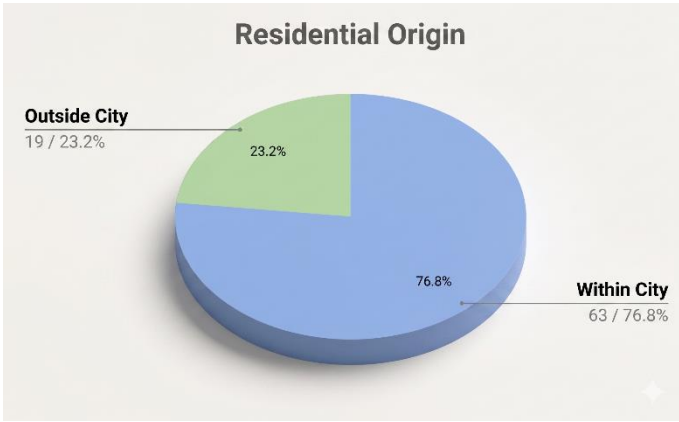

Fig. 5. Graphical Proportional Distribution of CKD Patients Based on Residential Origin at the Universitas Kristen Indonesia General Hospital for the 2023 Period

Distribution of CKD Patients Based on Hypertension History

Based on the study results, patients with a history of hypertension accounted for 43.9%, whereas patients without a history of hypertension stood at 56.1%. The KDIGO Guidelines in 2021 mention that hypertension is the most frequently encountered comorbidity in chronic kidney disease patients. Jager, in a study in 2019, also reported a strong association between hypertension and renal function impairment.

The results of this study indicate that although the proportion of patients with hypertension does not dominate, the condition remains an important clinical factor frequently found among CKD patients at RSU UKI.

Table 6. Proportional Distribution of CKD Patients Based on Hypertension History at the Universitas Kristen Indonesia General Hospital for the 2023 Period

	Frequency	Percent
Valid		
Yes (With Hypertension History)	36	43,9%
No (Without Hypertension History)	45	56,1%
Total	82	100%

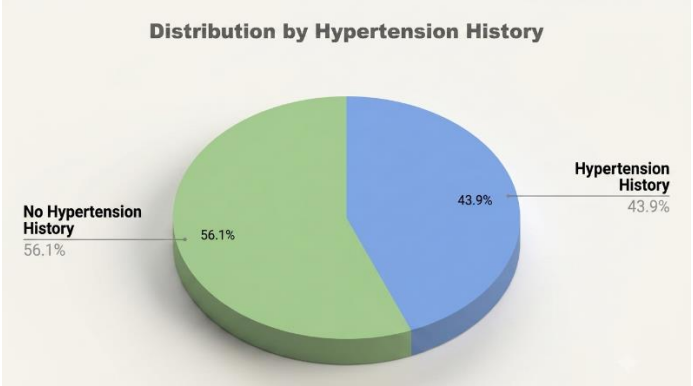

Fig 6. Proportional Distribution of CKD Patients Based on Hypertension History at the Universitas Kristen Indonesia General Hospital for the 2023 Period

Distribution of CKD Patients Based on Diabetes Mellitus History

Based on the study results, the majority of CKD patients at the Universitas Kristen Indonesia Hospital did not have a history of diabetes mellitus, accounting for 86.6%, while patients with a history of diabetes mellitus stood at 13.4%. This proportion indicates that during the 2023 study period, most CKD cases at RSU UKI occurred in non-diabetic patients. This outcome differs from global reports which cite diabetes mellitus as the primary cause of 30% to 40% of CKD cases. This discrepancy reflects variations in patient characteristics at RSU UKI, where non-diabetic factors appear more dominant in the studied population. Consequently, the proportion of CKD patients without a history of diabetes at RSU UKI is higher than global data, yet it remains relevant as an illustration of localized variations in causal factors of CKD.

Table 7. Proportional Distribution of CKD Patients Based on Diabetes Mellitus History at the Universitas Kristen Indonesia General Hospital for the 2023 Period

	Frequency	Percent
Valid		
Yes (With Diabetes Mellitus History)	11	13,4%
No (Without Diabetes Mellitus History)	71	86,6%
Total	82	100%

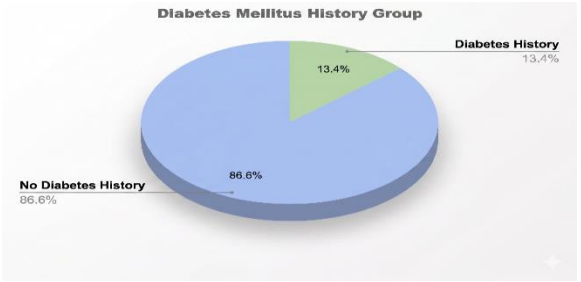

Fig. 7. Proportional Distribution of CKD Patients Based on Diabetes Mellitus History at the Universitas Kristen Indonesia General Hospital for the 2023 Period

IV. CONLUSION

Characteristics Based on Age

Age represents the lifespan of an individual calculated from the date of birth to the time of observation10. Age is a critical factor in determining the risk and prognosis of chronic kidney disease (CKD)2. In this study, age characteristic data came from 82 chronic kidney disease inpatients at the Universitas Kristen Indonesia General Hospital for the 2023 period. Based on data processing results, the late elderly age group (56 to 65 years) constituted the largest proportion, totaling 30 patients (36.6%).

Epidemiologically, the prevalence of CKD in the elderly also reflects global and national data. According to WHO and Riskesdas 2018 reports, the highest incidence of CKD occurs in the age group over 50 years as the primary risk group, whereas the younger age group shows a relatively lower incidence4. Generally, the results of this study underscore the need for health education and early screening of renal function, particularly in the elderly age group, to minimize early prevention gaps and complications from CKD while maintaining patient quality of life.

Characteristics Based on Gender

The gender distribution shows a dominance of female patients, totaling 45 patients (55.9%), compared to male patients, totaling 36 patients (44.4%), within the chronic kidney disease patient population at RSU UKI for the 2023 period. This finding remains consistent with epidemiological data showing a higher prevalence of CKD in women than in men, even though men tend to experience faster disease progression and a higher risk of mortality from CKD.

Various cross-country studies report a higher prevalence of CKD among women. Ricardo and colleagues revealed that CKD prevalence is greater in women (approximately 15.4%) compared to men (12.8%), although the risk of progression to end-stage renal disease remains higher in men. A study in Austria also reported that CKD prevalence increases significantly in women, particularly in the end-stage phase.
Nevertheless, this disparity poses distinct challenges in CKD management. Women with CKD tend to receive less access to advanced treatments such as dialysis and kidney transplantation compared to men, influenced by both biological and social

factors. This requires careful attention in clinical practice to ensure that CKD management is inclusive and equitable for both genders. Overall, the results of this study match recent literature trends showing a dominance of female patients in the CKD population, and suggest the need for gender-tailored management approaches to enhance effectiveness and meet individual patient needs.

Characteristics Based on Occupation

Occupation is a socioeconomic factor that can influence the risk of chronic illnesses like chronic kidney disease through lifestyle10, stress levels, and access to healthcare services. The results of the study on 82 chronic kidney disease patients at the Universitas Kristen Indonesia General Hospital show that the majority of patients hold housewife status, totaling 29 patients or 35.4% of the respondents.

Apart from social factors, occupation also influences lifestyle and psychosocial stress, which have direct and indirect effects on renal health. Occupational conditions inducing chronic stress and financial uncertainty can elevate the risk of hypertension and diabetes, which biologically accelerate renal damage in CKD patients.

Thus, occupational characteristics found in this study show that interventions for CKD patients must consider socioeconomic factors as an integral part of disease management to improve clinical outcomes. Health education directed at vulnerable occupational groups and the provision of adequate healthcare access can help reduce health disparities and improve CKD prognosis.

Characteristics Based on Highest Educational Level

Highest educational level is an important factor playing a role in the level of knowledge, comprehension, and patient compliance regarding chronic kidney disease (CKD) treatment. Based on data processing results from 82 CKD patients at the Universitas Kristen Indonesia General Hospital for the July 2023 period, the majority of respondents completed Senior High School (SMA) as their highest education, totaling 45 individuals (54.9%).

Evidence supports the importance of educational level, showing that patients with higher education levels are more proactive in seeking information and adapting to chronic disease management. However, this does not mean that patients with secondary or low education cannot achieve optimal health statuses if given continuous education. Therefore, patient education interventions for CKD need to be comprehensive and tiered according to educational levels so that all patients can understand disease management optimally.

Overall, the results of this study confirm that the highest educational level factor is highly important in the clinical context of CKD, making structured health education necessary across all educational levels.

Characteristics Based on Residential Origin

Residential origin is an important factor influencing patient access to healthcare services, and it can reflect environmental and socioeconomic conditions

associated with CKD incidence23. In this study, the majority of CKD inpatients at the Universitas Kristen Indonesia General Hospital for the 2023 period came from the administrative region of East Jakarta (Cawang, Jatinegara, Kebon Pala, Kramat Jati, etc.), recording 63 patients (76.8%).

Overall, the finding showing a dominance of patients from the East Jakarta region in this study aligns with the referral patterns of RSU UKI, supporting the importance of equitable healthcare services and community-based healthy lifestyle promotions in urban environments with high CKD risks.

Characteristics Based on Hypertension History

Hypertension is a primary risk factor in the development of chronic kidney disease (CKD), where chronically uncontrolled high blood pressure can cause renal vascular damage and accelerate the decline of renal function5. The results of this study show that out of 82 CKD inpatients at the Universitas Kristen Indonesia General Hospital for the July 2023 period, 36 patients (43.9%) presented with this condition.

Research in Indonesia consistently concludes that CKD patients with a history of hypertension carry a higher risk of experiencing disease progression and cardiovascular complications compared to those without a history of hypertension24. Based on these findings, screening efforts and blood pressure control education in at-risk populations are vital to slow kidney disease progression and reduce complication and mortality rates from CKD.

Characteristics Based on Diabetes Mellitus History

Diabetes Mellitus (DM) is a leading cause of chronic kidney disease globally and contributes significantly to the burden of kidney disease in Indonesia5. In this study, out of 82 CKD inpatients at the Universitas Kristen Indonesia General Hospital for the July 2023 period, 11 patients (13.4%) had a history of diabetes mellitus. Although the proportion of patients with a DM history in this study is relatively smaller than national reports, it confirms that DM remains a comorbidity affecting CKD development. In this context, even though the proportion of patients with a history of DM in this study does not constitute a majority, it remains vital to provide special attention to patients with DM comorbidities due to their higher risk of complications and disease progression. Integrated interdisciplinary education and management between nephrology and endocrinology are highly recommended to minimize the burden of CKD caused by DM.

V. KESIMPULAN

Based on the results of the study conducted on chronic kidney disease inpatients at RSU UKI for the 2023 period, the conclusions are as follows:

1. Based on Age: The majority of patients fall into the late elderly age group of 56 to 65 years, reflecting a high age-related risk of CKD at RSU UKI in 2023.

2. Based on Gender: Female patients outnumber male patients, indicating a relatively high prevalence of CKD among women at RSU UKI in 2023.
3. Based on Occupation: Patients with housewife status constitute the largest group, which relates directly to socioeconomic factors and healthcare service access.
4. Based on Highest Educational Level: The majority of patients completed senior high school, demonstrating that most CKD patients at RSU UKI in 2023 come from a secondary education background.
5. Based on Residential Origin: The majority of patients reside within East Jakarta or around the RSU UKI area, indicating easier access to healthcare services in that region.
6. Based on Hypertension History: Most patients present with a history of hypertension, making it the most dominant risk factor in this study.
7. Based on Diabetes Mellitus History: Only a small proportion of patients have a history of diabetes mellitus, showing a unique characteristic in the patient population at RSU UKI during the 2023 period.

REFERENCES

[1]. Jager KJ, Kovesdy C, Langham R, et al. A single number for advocacy and communication – worldwide more than 850 million individuals have kidney diseases. Kidney Int. 2019;96(5):1048–50.

[2]. International Society of Nephrology. Global Kidney Health Atlas 2023. Brussels: ISN; 2023.

[3]. Bikbov B, Purcell CA, Levey AS, et al. Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2020;395(10225):709–33.

[4]. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan Republik Indonesia. Riset Kesehatan Dasar (Riskesdas) 2018. Jakarta: Kementerian Kesehatan RI; 2018.

[5]. Perhimpunan Nefrologi Indonesia (PERNEFRI). Konsensus Nasional Pengelolaan Penyakit Ginjal Kronik. Jakarta: PERNEFRI; 2021.

[6]. Hall ME, do Carmo JM, da Silva AA, et al. Obesity, hypertension, and chronic kidney disease. ***Int J Nephrol Renovasc Dis***. 2014;7:75–88.

[7]. KDIGO. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int Suppl. 2013;3(1):1–150.

[8]. Delima LF, Basri S, Gani A, et al. Karakteristik pasien gagal ginjal kronik di RSUP Dr. Wahidin Sudirohusodo Makassar. ***J Nephrol***. 2021;24(2):175–82.

[9]. Mariani LH, Berns JS. The renal manifestations of systemic disease. ***Clin J Am Soc Nephrol***. 2015;10(12):2233–40.

[10]. Kamus Besar Bahasa Indonesia (KBBI). Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia [Internet]. 2024 [diakses 17 April 2024]. Tersedia di: https://kbbi.kemdikbud.go.id/

[11]. Guyton AC, Hall JE. Textbook of Medical Physiology. 13th ed. Philadelphia: Elsevier

Saunders; 2015.
[12]. Gansevoort RT, Correa-Rotter R, Hemmelgarn BR, et al. Chronic kidney disease and cardiovascular risk: epidemiology, mechanisms, and prevention. Lancet. 2013;382(9889):339–52.
[13]. Tonelli M, Wiebe N, Knoll G, et al. Systematic review: ***kidney transplantation compared with dialysis in clinically relevant outcomes. Am J Transplant***. 2011;11(10):2093–109.
[14]. Creswell JW. Research design: qualitative, quantitative, and mixed methods approaches. 4th ed. Los Angeles: Sage Publications; 2014.
[15]. Kementerian Kesehatan Republik Indonesia. Profil Rumah Sakit Indonesia 2022. Jakarta: Kemenkes RI; 2022.
[16]. Sastroasmoro S, Ismael S. Dasar-Dasar Metodologi Penelitian Klinis. Jakarta: Sagung Seto; 2013.
[17]. Global Kidney Health Atlas. The global burden of chronic kidney disease and inequalities in care. Kidney Int Suppl (2011). 2022;12(1):1-85.
[18]. Li MZ, Wu Y, Chan ST, et al. Environmental and socioeconomic determinants of chronic kidney disease: A community-based cross-sectional study in China. ***Int J Environ Res Public Health.*** 2020;17(21):7724.
[19]. Sukanto S. Hubungan antara karakteristik individu dengan kualitas hidup pasien gagal ginjal. ***J Kesehatan Masyarakat Perkotaan***. 2024;4(1):1-12.
[20]. Sharma S, Sharma N, Kumar N, et al. Geographical disparities and access to chronic kidney disease care in urban and rural India. Nephrol Dial Transplant. 2021;36(2):379-386.
[21]. Bakris GL, Agarwal R, Chan JC, Cooper ME, Gansevoort RT, Haller H, et al. Effect of finerenone on chronic kidney disease outcomes in type 2 diabetes. ***N Engl J Med***. 2020;383(23):2219–29.
[22]. Wanner C, Tonelli M. KDIGO Clinical Practice Guideline for Lipid Management in CKD: Summary of Recommendation Statements and Clinical Approach. Kidney Int. 2014;85(6):1303–9.
[23]. Widya W, Puspitasari CE, Saputra YD. Profil karakteristik pasien penyakit ginjal kronik yang menjalani terapi hemodialisis di RSUD Praya. ***J Farmasi Kesehatan***. 2022;6(1):110-7.
[24]. Lestari A, Setyowati D, Puspitasari I. Karakteristik pasien gagal ginjal kronik di RSUD Dr. H. Soewondo Kendal. ***J Kesehatan Masyarakat***. 2018;13(2):123-30.
[25]. Simbolon RD, Pomarida U. Hubungan tingkat pendidikan dengan kepatuhan pengobatan pada pasien gagal ginjal kronik. ***J Kesehatan Masyarakat***. 2019;14(1):55-60.
[26]. Paath J, Smith L, Johnson T. Age-related changes in kidney function: mechanisms and clinical implications. ***J Nephrol***. 2020;33(4):567–74.
[27]. Supriadi H. Komplikasi penyakit ginjal pada populasi lansia. ***J Kesehatan Masyarakat***. 2019;14(1):45–53.
[28]. Soeharso AY. Profil klinis gagal ginjal kronik pada pasien lansia. Media Med Indones. 2020;54(3):150–6.
[29]. Anaggi DS. Epidemiologi gagal ginjal kronik global dan nasional. ***J Epidemiol Glob Health***. 2022;12(2):112–9.

[30]. GBD Chronic Kidney Disease Collaboration. Global burden of chronic kidney disease, 2024. Lancet Glob Health. 2024;12(1):e45–56.

[31]. Neugarten J, Golestaneh L. Influence of sex on the progression of chronic kidney disease. Mayo Clin Proc. 2020;95(2):457–68.

[32]. Ricardo AC, Anderson CA, Yang W, Hsu CY, Lin F, Lash JP, et al. Sex and racial differences in chronic kidney disease progression. J Am Soc Nephrol. 2020;31(1):103–12.

[33]. Ritte R, Otton G, Wolfe R, Johnson DW, Mcelduff P, Cass A. Employment status, socioeconomic status and kidney function decline: evidence from indigenous Australian populations. BMC Nephrol. 2017;18(1):176.

[34]. Zeng X, McMahon GM, Brunelli SM, Batlle D. Association of socioeconomic status with progression of chronic kidney disease: a systematic review and meta-analysis. ***JAMA Netw Open***. 2018;1(2):e180412.