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Analysis of Factor Associated with the Incidence of Chronic Kidney Disease Among Internal Medicine Inpatients at Anutapura Regional General Hospital, Palu, in 2024

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ABSTRACT

Background*: Chronic Kidney Disease (CKD) continues to increase and is the cause of global death with various risk factors. Data from RSUD Anutapura Palu shows an increase in cases every year, but there is no comprehensive analysis that evaluates the influence of risk factors on the incidence and changes in kidney function.*

Objective: This study aims to determine the factors that affect the incidence of CKD in inpatients with internal diseases at RSUD Anutapura Palu Hospital in 2024.

Methods*: This study used an analytical observational design with a case-control approach. Data was obtained from the medical records of inpatients in 2024. The analysis used the Chi-Square test and the calculation of the Odds Ratio (OR) to assess the relationship between risk factors and the incidence of CKD.*

Result*: Adult-elderly age (OR=0.421; p<0.001), domicile (OR=1.640; p=0.034), hypertension (OR=5.821; p<0.001) and diabetes mellitus (OR=3.320; p<0.001) were significantly associated with the incidence of CKD. Meanwhile, gender, education, occupation and heart failure did not show a meaningful relationship. The majority of CKD patients were >45 years old, male, highly educated, working and domiciled in Palu City.*

Conclusion*: Age, domicile, hypertension and diabetes mellitus are significantly related to the incidence of CKD in inpatients with diseases in RSUD Anutapura Palu in 2024. Hypertension and diabetes mellitus are the clinical risk factors that play the most role in the incidence of CKD.*

INTRODUCTION

Chronic Kidney Disease (CKD) is a condition characterized by progressive and irreversible kidney damage and has become one of the leading causes of global mortality, with multiple contributing risk factors. According to the World Health Organization (WHO), end-stage kidney disease accounts for approximately 40%–50% of all kidney disease cases in Asia.[1]

Furthermore, data from the Indonesian Basic Health Research (Riset Kesehatan Dasar, Riskesdas) indicate that the prevalence of CKD in Indonesia is approximately 3.8 per 1,000 population, with nearly 60% of affected individuals requiring dialysis treatment.[2] Central Sulawesi Province ranks fourth highest in Indonesia, with a CKD prevalence of 0.52% of its population.[1]

According to the Indonesian Renal Registry (2018), the leading causes of CKD in Indonesia are hypertension, accounting for 36% of cases, followed by diabetic nephropathy (29%) and primary glomerulopathy (12%).[6] Data from Anutapura Regional General Hospital, Palu, showed an increasing number of hospitalized CKD cases over the past three years, with 119 cases reported in 2022, 129 cases in 2023, and 155 cases in 2024.[2]

Previous studies have consistently identified hypertension and diabetes mellitus as the principal risk factors contributing to the development of CKD. Hypertension can increase intraglomerular pressure, resulting in progressive structural damage to the kidneys. Meanwhile, diabetes mellitus may lead to diabetic nephropathy through chronic hyperglycemia, which induces oxidative stress and inflammatory processes within renal tissues.[3]

A study conducted in Egypt reported that hypertension was the leading cause of CKD, accounting for 45.8% of cases, followed by diabetes mellitus at 33.6%.[3] Similarly, a study from India found that uncontrolled hyperglycemia, hypertension, and obesity were the predominant factors contributing to the development and progression of CKD, particularly among populations with limited access to early kidney disease detection.[4]

Based on the evidence presented above, this study is warranted to analyze the factors associated with the occurrence of CKD among internal medicine inpatients at Anutapura Regional General Hospital, Palu, in 2024. The findings are expected to provide scientific evidence to support strategies for the prevention, early detection, and control of risk factors for chronic kidney disease within healthcare settings.

MATERIAL AND METHOD

This study employed an analytical observational design using a case–control approach to analyze the factors associated with the occurrence of chronic kidney disease (CKD) among internal medicine inpatients at Anutapura Regional General Hospital, Palu, during the 2024 study period. The research data were obtained from patients' medical records at Anutapura Regional General Hospital, Palu.

The study population consisted of all internal medicine inpatients admitted during the study period. Samples were selected using a quota sampling technique, whereby a predetermined number of medical records meeting the inclusion and exclusion criteria were enrolled. A total of 332 participants were included in the study, comprising 124 cases and 208 controls. The data collected included respondents' demographic characteristics and medical histories, specifically hypertension, diabetes mellitus, and heart failure.

RESULTS & DISCUSSION

Table 1. Association Between Risk Factors and the Occurence of Chronic Kidney Disease Among Internal Medicine Inpatients at Anutapura Regional General Hospital, Palu, 2024

Risk Factors	Group				*P value*	OR	CI(95%)
	Cases		Controls				
	n	%	N	%			
Male	63	50.8	94	45.2			
Female	61				.322	1.252	0.783-2.004
Total	124						
Adult	23	18.5	73	35.1	.001	0.422	0.235-0.737
Late Adult	101	81.5	135	64.9			

Total	124	100	208	100			
Low Education	35	28.2	53	25.5			
High Education	89	71.8	155	74.5	.584	1.150	0.673-1949
Total	124	100	208	100			
Employed	68	54.8	100	48.1			
Unemployment	56	45.2	108	51.9	.233	1.310	0.819-2.101
Total	124	100	208	100			
Residing in Palu	71	57.3	143	68.8			
Residing Outside Palu	53	42.7	65	31.3	.034	1.640	1.007-2.670
Total	124	100	208	100			
Hypertension							
Yes	82	66.1	52	25.0	<.001	5.281	3.501-9.818
No	42	33.9	156	75.0			
Total	124	100	208	100			
Diabetes Mellitus							
Yes	40	32.3	26	12.5	<.001	3.320	1.842-6.073
No	84	67.7	182	87.5			
Total	124	100	208	100			
Heart Failure							
Yes	12	9.7	14	6.7	.334	1.483	0.603-3.591
No	112	90.3	194	93.3			
Total	124	100	208	100			

Based on Table 1, the bivariate analysis demonstrated that older age (late adulthood–elderly) and place of residence were significantly associated with the occurrence of chronic kidney disease (CKD). Older age was significantly associated with CKD (p = 0.001; OR = 0.422; 95% CI: 0.235–0.737), while residence was also significantly associated with CKD (p = 0.034; OR = 1.640; 95% CI: 1.007–2.670).

These findings are consistent with the KDIGO 2024 guidelines and the Global Burden of Disease (GBD) 2022 study, which reported that aging is accompanied by a progressive decline in nephron number and glomerular filtration rate (GFR), resulting in a substantially higher prevalence of CKD among individuals aged over 60 years. Similarly, Vaidya and Aeddula (2024) reported that advanced age is a major determinant of CKD risk, particularly when combined with long-term exposure to chronic metabolic risk factors.[5,6,7]

The significant association between place of residence and CKD is also supported by previous studies. Wang et al. (2021) and Bikbov et al. (2023) suggested that residential location may reflect differences in environmental quality, access to primary healthcare services, and exposure to environmental hazards such as air pollution and poor water quality, all of which contribute to CKD risk. These findings indicate that certain geographical areas may have a higher prevalence of CKD due to local environmental and healthcare-related factors.[8,9]

Sex was not significantly associated with the occurrence of chronic kidney disease (CKD) in this study. Nevertheless, several clinical studies have reported that men tend to experience a more rapid progression of CKD than women, which has been attributed to the effects of androgen hormones, differences in body fat distribution, and lifestyle-related factors.[10]

Educational level was also not significantly associated with CKD. Pecoits-Filho et al. (2023) reported that individuals with higher educational attainment are not necessarily protected from CKD, as they may be more frequently exposed to unhealthy modern lifestyle behaviors, including the consumption of fast food, sedentary habits, and irregular sleep patterns. These findings suggest that improved health knowledge alone may not be sufficient to reduce CKD risk unless it is accompanied by the consistent adoption of healthy lifestyle practices.[11]

Regarding employment status, a greater proportion of patients in the case group were employed compared with those in the control group, whereas unemployment was more common among the controls. This finding may indicate that many patients in the case group

were still in the earlier stages of chronic kidney disease (CKD), allowing them to remain economically active and maintain their work capacity. However, previous studies have demonstrated that the long-term progression of CKD gradually reduces physical functioning and work capacity, leading to an increased risk of work-related disability as renal function deteriorates.[3]

Therefore, although educational level and employment status were not significantly associated with CKD in the present bivariate analysis, both variables remain important social determinants of health that may influence disease management, access to healthcare, treatment adherence, and long-term clinical outcomes among patients with CKD.

The bivariate analysis demonstrated a significant association between hypertension and diabetes mellitus and the occurrence of chronic kidney disease (CKD), confirming that these conditions are the principal determinants of CKD. Based on the distribution of the study data, the majority of patients with CKD had a history of hypertension, while a smaller proportion had diabetes mellitus. These findings indicate that hypertension was the most prevalent and influential risk factor associated with CKD among internal medicine inpatients at Anutapura Regional General Hospital, Palu, in 2024.

These results are consistent with the findings of Mark et al. (2025), who reported that hypertension and diabetes mellitus remain the two leading risk factors for CKD, with their burden continuing to increase worldwide. Similarly, Cahyadi and Iryaningrum (2025) found a significant association between hypertension, diabetes mellitus, and CKD in East Kalimantan, demonstrating that patients with hypertension and diabetes had approximately 6.5-fold higher odds of developing CKD compared with those without these comorbidities.[12,4]

No significant association was found between heart failure and chronic kidney disease (CKD) in this study, as indicated by the Chi-square test ($p = 0.334$; OR = 1.483; 95% CI: 0.603–3.591). These findings are consistent with those reported by Lee et al. (2025), who suggested that patients with heart failure and preserved or mildly reduced left ventricular ejection fraction (EF >40%) may not experience a substantial decline in renal perfusion sufficient to significantly influence CKD risk.[13]

Furthermore, the relatively small number of patients with heart failure in the present study may have limited the statistical power to detect a significant association. Nevertheless, from a clinical perspective, heart failure remains an important condition that warrants careful monitoring because it can contribute to progressive renal dysfunction, particularly through reduced renal perfusion resulting from impaired cardiac pump function. This observation is consistent with the cardiorenal syndrome concept, which proposes that reduced cardiac output decreases renal blood flow, accelerates the decline in glomerular filtration rate (GFR), and ultimately contributes to the progression of CKD.[1]

Overall, the findings of this study indicate that hypertension and diabetes mellitus are independent risk factors for the development of chronic kidney disease (CKD). These results are consistent with the Indonesian Renal Registry (2018), which reported that the pattern of CKD risk factors observed at Anutapura Regional General Hospital, Palu, reflects the national epidemiological profile. The present findings further emphasize the critical importance of effective blood pressure and blood glucose control in preventing the progression of renal dysfunction among high-risk populations, as recommended by the KDIGO 2024 Clinical Practice Guideline.[14,5]

From a public health perspective, these findings support the implementation of routine screening for hypertension and blood glucose levels among individuals at high risk of CKD. Early identification and appropriate management of these modifiable risk factors may contribute substantially to reducing the future burden and incidence of chronic kidney disease.

CONCLUSION AND RECOMMENDATION

Based on the findings of this study, age, place of residence, hypertension, and diabetes mellitus were significantly associated with the occurrence of chronic kidney disease (CKD) among internal medicine inpatients at Anutapura Regional General Hospital, Palu, in 2024. Among these factors, hypertension and diabetes mellitus emerged as the principal risk factors most strongly associated with the development of CKD. In contrast, sex, educational level, employment status, and heart failure were not significantly associated with CKD in this study.

These findings highlight the importance of comprehensive management of chronic diseases, particularly hypertension and diabetes mellitus, as a key strategy for preventing the development and progression of chronic kidney disease. Early detection, routine screening, and optimal control of blood pressure and blood glucose levels should therefore be prioritized to reduce the burden of CKD among high-risk populations.

AUTHOR CONTRIBUTIONS

Conceptualization, C.A.P.O, M.I.R., N.M.; Methodology, C.A.P.O.; Validation, M.I.R., N.M.; Formal Analysis, C.A.P.O.; Investigation, C.A.P.O., Resources, C.A.P.O.; Data Curation, C.A.P.O.; Writing-Original Draft Preparation, C.A.P.O., M.I.R. and N.M.; Visualization, C.A.P.O All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The Author declares no Conflicts of Interest

REFERENCES

1. Riset Kesehatan Dasar (RIKESDAS)., 2018 *Laporan Nasional Hasil Riset Kesehatan Dasar 2018', Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia*
2. *Profil RSUD Anutapura Palu*., 2023
3. Alma A. M., Mei D.V.F.S., Brouwer S., Hilbrands B.L., Boog D.V.M.J.P., Uiterwik H., Waanders F., Hengst M., Gansevoort T.R., Visser A., 2023., Sustained Employment, Work Disability and Work Functioning in CKD Patients: a cross-sectional survey study. J Nephrol. doi : 10.1007/s40620-022-01476-w.
4. Cahyadi, A. & Iryaningrum, M.R., 2025 Status Nutrisi pada Pasien Penyakit Ginjal Kronik yang Menjalani Hemodialisis dan Non-dialisis di RS Atma Jaya Tahun 2021–2024. Jurnal Sains dan Kesehatan, Universitas Mulawarman.
5. KDIGO., 2024' KDIGO 2024 *clinical practice gudeline for the evaluation and management of chronic kidney disease' ,Official journal of the international society of nephrology*
6. GBD Chronic Kidney Disease Collaboration., 2022., *Global Prevalence and Burden of Chronic Kidney Disease* in 2019 and Trends by age and sex, *The Lancet Healthy Longevity*, 3(6), pp. e372–e382.
7. Vaidya S.R., Aeddula N.R., 2024 *Chronic Kidney Disease.* [Updated 2024 Jul 31]. In:StatPearls [Internet]. Treasure Island (FL): Available from: https://www.ncbi.nlm.nih.gov/books/NBK535404/
8. Wang Y.L., Lee Y.H., Hsu Y.H., Chiu I.J., Huang C.C.Y., Huang C.C., Chia Z.C., Lee C.P., Lin Y.F., Chiu H.W., 2021. The Kidney-Related effects of polystyrene Microplastics on Human Kidney Proximal Tubular epithelial cells HK-2 and male, Environmental Health Perspectives, 129(5), p. 057003.
9. Bikbov B., Purcell C.A., Levey A.S., Smith M., 2023., *Geographical Variation in the Burden of Chronic Kidney Disease and its risk factors*, *Kidney International*, 104(2), pp. 250–262.
10. Abeysekera A.R., Healy G.H., Samita S., Tennakoon S., Jayasinghe S., Wickramasinghe D.N., Gawarammana I., Gamage N., Hemakeerthi V., Rafsanjani F.,

Tennakoon V.W.M.T., Palliyaguru N.S., Hoy E.W., 2025., CKD in Sri Lanka - A Prevalance Study. Elsevier. https://doi.org/10.1016/j.ekir.2025.11.03 4Bikbov B., Purcell C.A., Levey A.S., Smith M., 2023., *Geographical Variation in the Burden of Chronic Kidney Disease and its risk factors*, *Kidney International*, 104(2), pp. 250–262.

11. Pecoits-Filho, R., Jimenez, B.Y. & Ashuntantang, G.E., 2023. *Renewing the fight: a call to action for diabetes and chronic kidney disease. Diabetes Research and Clinical Practice*, 205, 110050.
12. Mark B.P., Ong L., Coresh J., 2025. *Global, Regional, And National Burden Of Chronic Kidney Disease In Adult, 1990-2023, And Its Attributable Risk Factors: a systematic analysis for the Global Burden Of Disease Study 2023*. Lancet
13. Lee, S.H., Kim, D.H., Cho, J.Y., Lee, Y.J. & Kim, M.S., 2025. *Cardiorenal interactions and modern therapy in heart failure patients with kidney impairment. European Heart Journal Open*.
14. Indonesian Renal Registry (IRR)., 2018. Report Of Indonesian Renal Registry 2018. Indonesian Renal Registry (IRR).