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## An Overview Of Urea And Creatinine Levels In Patients With Chronic Kidney Disease And A History Of Hypertension Following Hemodialysis Therapy

Maichel Dwi Saputra<sup>1)</sup>, Oksita Asri Widyayanti<sup>2)</sup>, Suci Indah Budiarti<sup>3)</sup>  
<sup>1,2,3)</sup> D-IV Teknologi Laboratorium Medis / Politeknik Yakpermas Banyumas

\*Corresponding Author  
Email : [oksitaasri19@gmail.com](mailto:oksitaasri19@gmail.com)

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### Abstract

Hypertension is both a cause and a consequence of Chronic Kidney Disease (CKD) and can contribute to the progression of kidney damage. Along with the decline in GFR, the incidence and severity of hypertension increase. When the kidneys are unable to perform the dialysis process, a treatment called hemodialysis (HD) is required to remove waste fluid accumulated in the toxic blood. A machine equipped with a semi-permeable filter (artificial kidney) is used to perform this therapy. The purpose of this study was to determine the profile of urea and creatinine levels in patients with chronic kidney disease (CKD) who had a history of hypertension, before and after undergoing hemodialysis at Level III Hospital 04.06.01 Wijaya Kusuma Purwokerto. Data analysis was performed using SPSS with a paired sample test. The urea levels before undergoing hemodialysis therapy ranged from a minimum of 70 mg/dL to a maximum of 288 mg/dL. After hemodialysis therapy, the urea levels ranged from a minimum of 53 mg/dL to a maximum of 277 mg/dL. Creatinine levels before undergoing hemodialysis therapy ranged from a minimum of 4.33 mg/dL to a maximum of 25.71 mg/dL. After hemodialysis, creatinine levels ranged from a minimum of 2.32 mg/dL to a maximum of 23.76 mg/dL. The statistical test results showed that the differences in urea and creatinine levels before and after hemodialysis were significant, with a p-value = 0.001.

**Keywords:** Acute Renal Failure, Chronic Renal Failure, Hemodialysis, Creatinine, Urine.

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## INTRODUCTION

High blood pressure, or hypertension, can cause endothelial damage and accelerate atherosclerosis. Hypertension is considered a major risk factor for cerebrovascular diseases such as stroke and transient ischemic attacks. In addition, hypertension increases the risk of coronary artery diseases such as myocardial infarction and angina, as well as kidney failure, dementia, and atrial fibrillation. When other cardiovascular risk factors are present in a patient, the risk associated with hypertension increases, leading to higher rates of mortality and morbidity (Rikmasari & Noprizon, 2020).

Based on a report from the Ministry of Health of the Republic of Indonesia in 2023, it is known that the number of individuals identified as having moderate to high risk of hypertension—based on health history screening—reached 2,419,226 people. Among them, 1,875,568 individuals underwent blood pressure examination through healthcare screening services. This indicates that the coverage of screening among individuals at moderate to high risk of hypertension reached 77.53% (Ministry of Health, 2023).

Hypertension is both a cause and a consequence of Chronic Kidney Disease (CKD) and contributes to the progression of kidney disease. As the glomerular filtration rate (GFR) declines, both the incidence and severity of hypertension increase (Pugh et al., 2019).

## RESEARCH METHODS

The study on the overview of serum urea and creatinine levels in patients with Chronic Kidney Disease (CKD) with a history of hypertension after hemodialysis (HD) therapy is a descriptive qualitative research. Data were obtained from the medical records at TK III 04.06.01 Wijaya Kusuma Hospital, Purwokerto.

The research procedure included the following steps:

- a. Determination of the study population, namely CKD patients undergoing HD therapy at TK III 04.06.01 Wijaya Kusuma Hospital, Purwokerto.
- b. Determination of the research sample taken from the population, specifically CKD patients with a history of hypertension.
- c. Blood pressure assessment of all CKD patients undergoing HD therapy as the basis for sample selection.
- d. Collection of data on urea and creatinine levels prior to HD therapy.
- e. Data recapitulation and analysis.

This study employed a qualitative descriptive approach, similar to case study, phenomenological, and ethnographic research designs. The study was conducted over a period of six months, from November 2024 to April 2025. Data collection was carried out in May 2025 at TK III 04.06.01 Wijaya Kusuma Hospital, Purwokerto.

The study utilized data from CKD patients undergoing hemodialysis at TK III 04.06.01 Wijaya Kusuma Hospital, Purwokerto, with a total population of 100 patients during the period from November 2024 to April 2025. The research sample consisted of CKD patients with a history of hypertension who were undergoing hemodialysis at the same hospital. For the purpose of this study, samples were selected using a descriptive qualitative sampling technique with a purposive sampling method.

## RESULTS AND DISCUSSION

This study was conducted to determine the levels of urea and creatinine in patients with Chronic Kidney Disease (CKD) who have hypertension prior to hemodialysis, as well as to assess the differences in urea and creatinine levels in CKD patients with a history of hypertension before and after hemodialysis.

The data used in this study consisted of 80 patient respondents, with an average of more than three hemodialysis sessions.

**Table 1 “the majority of individuals with CKD”**

No	Sex	Total	Persentase%
1	Men	37	47%
2	Woman	43	53%
	Total	80	100%

It was found that the majority of CKD patients were female, totaling 43 patients (53%). Chronic kidney disease and sex characteristics do not have a significant influence (Herowati et al., 2025). The sex of patients with CKD undergoing hemodialysis, whether male or female, does not have an effect (Rajagukguk et al., 2021). There is no correlation between CKD and sex, as sex is not considered a major risk factor; instead, CKD is more strongly influenced by genetic, environmental, and racial factors (Yuniar et al., 2023).

This descriptive analysis was conducted to determine the results of urea and creatinine level examinations before and after hemodialysis. From a total of 80 respondents, the minimum, maximum, and mean values were obtained as follows.

Category	N	Mean	Minimum	Maximum
Pre-hemodialysis urea level	80	146.57	70	288
Post-hemodialysis urea level	80	135.23	53	277

The results showed that before hemodialysis, the average urea level in patients was 146.57 mg/dL. The minimum and maximum values were also recorded, although not specified in detail. After hemodialysis, the average urea level decreased to 135.23 mg/dL, with a minimum value of 70 mg/dL and a maximum value of 53 mg/dL. It can be concluded that urea levels in CKD patients decreased after undergoing hemodialysis. The results showed that before hemodialysis, the average urea level in patients was 146.57 mg/dL.

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## CONCLUSION

1. The characteristics of patients showed that the most common age group was 35–54 years, with 53% being female.
2. The Kolmogorov–Smirnov statistical test showed a significance value of 0.200 for creatinine levels ( $p > 0.05$ ) and 0.001 for urea levels ( $p < 0.05$ ). Therefore, the null hypothesis ( $H_0$ ) was accepted for creatinine levels, while the alternative hypothesis ( $H_1$ ) was accepted for urea levels.

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