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Epidemiological analysis disease of chronic renal failure in patients CKD on HD

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Abstract

Chronic Kidney Disease (CKD) It is defined as a decrease in kidney function caused by various factors that cause disease. The purpose of the research was to analyze the epidemiology of chronic kidney failure in patients CKD on HD. This research was carried out at the Hemodialysis Installation of M.M. Dunda Limboto Hospital, Gorontalo Regency, Gorontalo Province, Indonesia. The type of research is observational research using a cross sectional design. The data used in this research are primary data and secondary data. Primary data was sourced from respondents based on interviews using questionnaires, which consisted of data: age, education, family history, urinary tract infections, heart disease, diabetes mellitus, hypertension, chronic kidney failure. Meanwhile, secondary data is research supporting data sourced from the health office and other stakeholders. In this research, the sample that became the object of the study was 40 patients with chronic kidney failure who underwent hemodialysis. Sampling uses the total sampling technique. The data of the research results were analyzed by bivariate analysis using the Chi-square test and multivariate analysis by the *Multinomial Logistic Regression* test. The results of the research showed that the results of epidemiological analysis with chronic kidney failure in patients CKD on HD, age (*p value* = 0.583), education (*p value* = 0.583), family history (*p value* = 0.003), urinary tract infection (*p value* = 0.024), cardiac history (*p value* = 0.024), history of diabetes mellitus (*p value* = 0.038), history of hypertension (*p value* = 0.022). There was a relationship between family history, urinary tract infection, heart history, history of diabetes mellitus, history of hypertension and chronic kidney failure in patients CKD On HD, and no relationship between age, education and chronic kidney failure in patients CKD on HD.

Keywords: Chronic Kidney Disease; Epidemiology; Patients CKD On HD

1. Introduction

Chronic Kidney Disease (CKD) or better known as Chronic Kidney Failure is a disease that is familiar to the Indonesian people as a disease that cannot be cured (Rima *et al.*, 2024). *Chronic Kidney Disease* (CKD) defined as a decrease in kidney function characterized by a Glomerular Filtration Rate (LFG) of < 60 ml/min/1.73 m^2 that occurs for more than 3 months or the presence of markers of kidney damage that can be seen through albuminuria, the presence of abnormalities in urinary sediments, electrolyte abnormalities, the detection of renal abnormalities by histological and imaging (imaging), and the presence of a history of renal transplantation (Yifeng *et al.,* 2023).

Fan *et al* (2024) explained that chronic kidney failure is a world health problem with an increase in incidence, prevalence and morbidity rates. Risk factors such as hypertension, diabetes, smoking, the use of analgesic drugs, and the use of energy drinks have an effect on the occurrence of chronic kidney failure. Health system planning requires an epidemiological assessment of chronic kidney disease, but data on morbidity and mortality from the disease are still rare or non-existent in many countries (Steven *et al*., 2024).

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Most of the burden of chronic kidney disease is concentrated in the three lowest quintiles of the Socio-demographic Index (Sofia, 2021). Kidney disease has a major impact on health globally, both as a direct cause of global pain and death and as an important risk factor for cardiovascular diseases of the heart and blood vessels (Priti & Vivekanand, 2023). Chronic kidney disease is largely preventable and treatable, so it deserves greater attention in decision-making for global health policy, especially in locations with low and intermediate socio-demographic indices (Jurgen et al., 2023).

Hemodialysis (HD) is interpreted as a form of therapy using a dialyzer machine as a form of replacement for kidney function (Pedro et al., 2023). The purpose of hemodialysis is to remove metabolic waste, proteins, water balance disturbances and electrolytes between the dialysate solution compartments through a semipermeable membrane (thin membrane) that functions as an artificial kidney or commonly called a dialyzer (Ubong et al., 2021).

The implementation of hemodialysis therapy will cause complaints of discomfort, feeling tired, feeling cold/hot, restless, nauseous, vomiting, unable to relax and even itching all over the body. Hemodialysis is better known as detoxification or dialysis by the general public, often becomes a very scary word for them, some are even unprepared and unsure of going through the Hemodialysis process until they finally have to give up halfway (Reda & Mohamed, 2024). Based on the various theoretical concepts that have been discussed, the purpose of this study is to analyze epidemiologically the determinants of factors related to chronic kidney failure disease and the distribution of the disease in patients CKD on HD.

2. Material and methods

2.1. Place and Time of Research

This research was carried out at the Hemodialysis Installation, M.M. Dunda Limboto Hospital, Gorontalo Regency, Gorontalo Province, Indonesia. The research period is from January to April 2024.

2.2. Research Methods and Design

This research uses an analytical observational method with a quantitative research type. According to Burak et al (2023), observational analytics is a type of research that looks at and tries to explore how and why health phenomena occur and then analyzes the dynamics of the correlation between phenomena or between risk factors and effect factors. The research design used is a cross sectional design because this research was carried out at the same time. Matheus et al (2021) explained that cross sectional is a type of observational research that analyzes variable data collected at a certain point in time in a predetermined sample population or object.

2.3. Population and Sample

A population is an object/entity that has certain dimensions and characteristics that are determined by the researcher to be studied and then drawn conclusions (Rene et al., 2023). The sample is part of the population that is the source of the research data, where the population is part of the characteristics of the population (Supriyo et al., 2024). The population in this study is 40 patients with chronic kidney failure who undergo hemodialysis at M.M. Dunda Limboto Hospital. Meanwhile, the research sample is the entire population of respondents who are the object of the research whose sampling technique is carried out with total sampling. The total respondents who were the research sample were 40 patients. According to Fatimah (2024), total sampling is a sampling technique where the number of samples is equal to the number of population.

2.4. Data Collection Techniques

The data used in this study are primary data and secondary data. Primary data is the main data of the study sourced from a sample of respondents, which consists of data: age, education, family history, urinary tract infections, heart disease, diabetes mellitus, hypertension, chronic kidney failure. Meanwhile, secondary data is research supporting data sourced from the health office and other stakeholders. The data collection technique was carried out through direct interviews with respondents using questionnaires for primary data. Meanwhile, secondary data is obtained through documents that have been available at the Health Office and other stakeholders.

2.5. Data Analysis Techniques

The data of the research results were analyzed by univariate analysis and bivariate analysis using the Chi-square test and multivariate analysis with a *multinomial logistic regression* test.

2.5.1. Univariate Analysis

The univariate analysis aims to explain the characteristics of each research variable research namely independent variables (age, education, family history, urinary tract infections, heart disease, diabetes mellitus, hypertension) and dependent variables (chronic kidney failure). Univariate analysis is analyzed with the formula:

$$P = \frac{F}{n}\ x\ 100\%$$

Captions:

P = Percentage
F = Number of correct answers
n = Total number of inquiries

2.5.2. Bivariate Analysis

Bivariate analysis was carried out on two variables that were suspected to be related, namely the independent variable (age, education, family history, urinary tract infectious diseases, heart disease, diabetes mellitus, hypertension) and the dependent variable (chronic kidney failure). The statistical test used in this analysis is *Chi Square* with a confidence level of 95% (α = 0.05). According to Nuran and Cemalettin (2021), the *Chi Square* test is a type of non-parametric comparative test conducted on two variables where the data scale of the two variables is nominal. Chi Square test formula:

$$X^2 = \frac{n\ (a.d - a.c) - 1/2n^2}{(a+b)(a+c)(b+d)\ (c+d)}$$

Captions:
X^2 : *Chi Square*
0 : Observed values
E : Expected value
df : Degree of freedom
k : Column
b : Lines

The results of the Chi Square test can show the probability of occurrence, where if the p-value (sig.) is >0.05 then H0 is accepted, meaning that statistically there is no meaningful relationship between the independent variable and the dependent variable. Conversely, if the p-value (sig.) < 0.05 then H0 is rejected, meaning that there is a meaningful relationship between the independent variable and the dependent variable.

The next step is to see the strength of the relationship between the independent variable and the dependent variable which can be seen from the Odds Ratio (OR) value, with the formula:

$$OR = \frac{AD}{BC}$$

The interpretation of the result is that if the OR value = 1, it means that there is no relationship between the independent variable and the dependent variable. If the OR < 1, it means that the independent variable reduces the risk of dependent variable events, while if the OR > 1, it means that the independent variable increases the risk of dependent variable events.

2.5.3. Multivariate Analysis

Multivariate analysis is a statistical method used to analyze more than one variable at a time, multivariate statistics is used to analyze the influence of several independent variables on several dependent variables simultaneously (Yunus and Songul, 2024). The multivariate analysis in this study uses the multinomial logistic regression method. Multinomial logistic regression analysis is used to analyze anemia status variables, which consist of two categories, namely anemia and non-anemia, because these variables are categorical.

Multivariate analysis begins by conducting a bivariate analysis of each independent variable with a dependent variable. If the results of bivariate analysis show a *p-value* (sig.) value ≤ 0.25, then the research variable can be included in the

modeling of multivariate analysis. On the other hand, if the results of the bivariate analysis show a *p-value* (sig.) ≥ 0.25, then the variable cannot be included in the multivariate modeling. After obtaining the variables that are candidates for modeling in the multivariate analysis, the next stage is to create a model to determine the independent variable that is most related to the dependent variable.

The creation of this determinant model was carried out using multiple logistic regression analysis. If the test results show that there is a variable that has a *p-value* (sig.) ≥ 0.05, then the variable must be excluded from modeling. The multiple logistic regression test was carried out again gradually until there were no variables that had a *p-value* (Sig.) > 0.05.

After the final modeling is obtained, the next stage is to check whether there is an interaction between independent variables through interaction tests. The interaction test was carried out on independent variables that were suspected to have a substantial interaction. If the *p-value* < 0.05, it means that there is an interaction between the independent variables and vice versa. If there is an interaction, then the last modeling used is multivariate modeling with interaction. If there is no interaction, then the last modeling used is a multivariate model without interaction.

2.6. Observed variables

The variables observed in this study are; independent variable (X) and dependent variable (Y). The independent variable (X), consists of; age, education, family history, urinary tract infections, heart disease, diabetes mellitus, hypertension. While the dependent variable (Y), namely: chronic kidney failure.

3. Results and Discussion

3.1. Univariate Analysis

After conducting univariate analysis research, epidemiological analysis factors of chronic kidney failure disease in patients CKD on HD , the results of frequency distribution were obtained, as explained in the following figure:

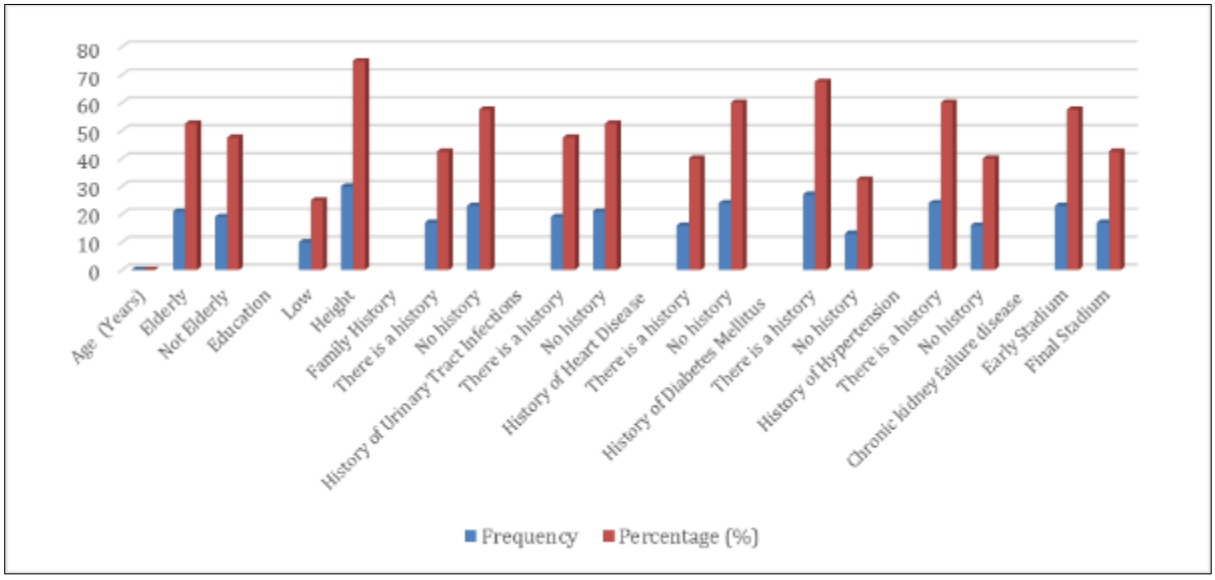

Figure 1 Univariate analysis of epidemiological analysis factors of chronic kidney failure disease in patients CKD On HD

The results of the study in the figure above show that, The results of the age analysis obtained the results of the age category of patients CKD on HD with more elderly people amounting to 21 people (55.2%) and the category of non-elderly patients CKD on HD amounting to 19 people (47.2%). Generally, the education of patients CKD on HD is 30 people (75.0%), and the number of low-educated patients is 10 people (25.0%). In the family history category of patients CKD on HD , there were 17 people (42.5%) who had a family history and 23 people (57.5%) who had no family history.

Patients CKD on HD who had a history of urinary tract infections amounted to 19 people (47.5%) and patients without a history of urinary tract infections amounted to 21 people (52.5%). Patients CKD on HD who had a history of heart disease amounted to 16 people (40.0%), while patients who did not have a history of heart disease amounted to 24 people (50.0%).

Patients CKD on HD who had a history of diabetes mellitus amounted to 27 people (67.5%), and patients who did not have a history of diabetes mellitus amounted to 13 people (32.5%). Generally, CKD on HD patients have a history of hypertension in 24 people (60.0%), and patients without a history of hypertension in 16 people (40.0%). The results of the analysis of chronic kidney failure showed that 23 patients with CKD on HD were in the early stage category (57.5%) and 17 patients (43.5%) were in the end-stage category.

The results of univariate analysis of epidemiological analysis factors for chronic kidney failure in patients CKD on HD can be explained that patients CKD on HD generally have a history of urinary tract infections, heart disease, and diabetes mellitus. This is influenced by the age of patients CKD on HD who are elderly and have an unhealthy lifestyle including a high-salt diet, lack of physical activity, and smoking habits. The results of the study also explained that the cause of chronic kidney failure experienced by patients CKD on HD is a genetic factor that experiences kidney problems, especially from family history.

The results of this research in line with the results of a research from Yurong et al (2024), which concluded that chronic kidney failure is caused by damage to kidney tissue triggered by long-term diseases, such as; diabetes, high blood pressure, heart disease, and gout.

3.2. Bivariate Analysis

Bivariate analysis was carried out to see the relationship between the two research variables using the chi-square test at a significant level of p-value (0.05). The results of bivariate analysis in this research are explained as follows:

3.2.1. Age Relationship with Kidney Failure Disease in Patients CKD on HD

The results of the bivariate analysis of the relationship between the influence of age and chronic kidney failure in patients CKD on HD showed that in the early stages as many as 52.2% were suffered by non-elderly patients, while in the late stages many 58.8% were suffered by elderly patients. This is explained in Table 1.

Tabel 1 The relationship between age and chronic kidney failure in patients CKD on HD

Age	**Chronic kidney failure**						**OR 95% *(CI)***	**Sig**
	Early Stadium		Final Stadium		Total			
	F	%	F	%	F	%		
Elderly	11	47.8	10	58.8	21	52.5	0.642	0.583
Not Elderly	12	52.2	7	41.2	19	47.5	(0.181-2.275)	
Amount	23	100	17	100	40	100		

Source: Primary data processing, 2024.

The results of the bivariate analysis in Table 1, obtained significant results (*p value* = 0.583 > α = 0.05) meaning that there was no relationship between age and kidney failure in patients CKD on HD. This shows that the symptoms of chronic kidney failure at a young age are more influenced by unhealthy lifestyle factors, such as smoking, alcoholic beverages, drinking less, consuming a lot of sugary foods, thus causing high blood pressure and diabetes mellitus. Meanwhile, in the late stages, chronic kidney failure is more experienced by elderly patients, because they experience organ function processes that begin to weaken and a decline in the functional structure of cells, tissues and organ systems as they age.

The results of this study are in line with the results of research from Katya et al (2023) which explains that chronic kidney failure can be experienced by those who are young and old. The existence of a lifestyle that does not pay attention to diet, sleep, and the aging process leads to a decline in various organ functions which is characterized by an increase in the body's susceptibility to diseases that can cause death, such as the cardiovascular system, diabetes, hypertension and kidney disease.

3.2.2. The relationship between the influence of education and kidney failure in patients CKD on HD

Results of bivariate analysis of the relationship between the influence of education and chronic kidney failure in patients CKD on HD It can be explained that 78.3% of patients with higher education experience chronic kidney failure in the early stages, and 70.6% experience it in the late stages. This is explained in Table 2.

Tabel 2 The relationship between the influence of education and chronic kidney failure in patients CKD on HD

Education	**Chronic kidney failure**						**OR 95% *(CI)***	**Sig**
	Early Stadium		Final Stadium		Total			
	F	%	F	%	F	%		
Low Height	5 18	21.7 78.3	5 12	29.4 70.6	10 30	25.0 75.0	0.667 (0.158-2.810)	0.717
Amount	23	100	17	100	40	100		

Source: Primary data processing, 2024.

The results of the bivariate analysis in Table 2 obtained significant results (*p value* = 0.717 > α = 0.05) meaning that there was no relationship between education and kidney failure in patients CKD on HD. This suggests that, the level of education of patients is not directly associated as a risk factor, the knowledge gained through education can affect the way individuals manage their health, which in turn can affect the risk of developing chronic diseases such as; chronic kidney failure, diabetes mellitus, and hypertension.

The results of this research are in line with the results of research from Anikka et al (2023) which concluded that knowledge of organ function health requires a high understanding in implementing a healthy lifestyle process to maintain healthy kidneys, heart, and lungs.

3.2.3. The relationship between family history and kidney failure in patients CKD on HD

Results of bivariate analysis of the relationship between family history and chronic kidney failure in patients CKD on HD It can be explained that 78.3% of patients with no family history experience chronic kidney failure in the early stages, while as many as 70.6% of patients with a family history experience chronic kidney failure in the late stages. This is as explained in Table 3.

Tabel 3 The relationship between family history and chronic kidney failure in patients CKD on HD

Family history	**Chronic kidney failure**						**OR 95% *(CI)***	**Sig**
	Early Stadium		Final Stadium		Total			
	F	%	F	%	F	%		
There is a history No history	5 18	21.7 78.3	12 5	70.6 29.4	10 30	25.0 75.0	0.16 (0.027-0.488)	0.003
Amount	23	100	17	100	40	100		

Source: Primary data processing, 2024.

The results of the bivariate analysis in Table 3 obtained significant results (*p value* = 0.003 < α = 0.05) meaning that the family history of kidney failure has a relationship with chronic kidney failure in patients CKD on HD. This suggests that chronic kidney failure has a strong genetic component, so patients with a family history of kidney failure have a high genetic susceptibility to this condition.

The results of this research are in line with the results of a research from Judy (2024) which explains that certain genetic factors can affect the risk of developing kidney failure, and when these genetic factors are inherited from family members suffering from kidney failure, the patient's risk can also increase.

3.2.4. The relationship between the influence of history of urinary tract infection and kidney failure disease in patients CKD on HD

Results of bivariate analysis of the relationship between the influence of urinary tract infection history and chronic kidney failure in patients CKD on HD It can be explained that patients with no history of urinary tract infections as many as 69.6% experience chronic kidney failure in the early stages, while 70.6% of patients with a history of urinary tract infections experience chronic kidney failure in the late stages. This is explained in Table 4.

Tabel 4 The relationship between the influence of urinary tract infection history and chronic kidney failure disease in patients CKD on HD

History of urinary tract infections	**Chronic kidney failure**						**OR 95% *(CI)***	**Sig**
	Early Stadium		Final Stadium		Total			
	F	%	F	%	F	%		
There is a history No history	7 16	30.4 69.6	12 5	70.6 29.4	19 21	47.5 52.5	0.182 (0.046-0.717)	0.024
Amount	23	100	17	100	40	100		

Source: Primary data processing, 2024.

The results of the bivariate analysis in Table 4 obtained significant results (p value = 0.024 > α = 0.05), meaning that the history of urinary tract infection has an influential relationship with chronic kidney failure in patients CKD on HD. This suggests that urinary tract infections are recurrent with an increased risk of developing CKD on HD. It is caused by several pathophysiological mechanisms, including chronic inflammation and damage to kidney tissue due to recurrent infections that are not treated properly.

This is in line with the results of a study from Sina et al (2024) which explained that repeated or chronic urinary tract infections can cause damage to kidney tissue. This infection can cause inflammation and the formation of scarring in the kidneys, resulting in a gradual and progressive decline in kidney function.

3.2.5. The relationship between the influence of heart disease and kidney failure in patients CKD on HD

Results of bivariate analysis of the relationship between the influence of heart disease history and chronic kidney failure in patients CKD on HD It can be explained that 78.3% of patients with no history of heart disease experience chronic kidney failure in the early stages, while 64.7% of patients with a history of heart disease experience chronic kidney failure in the late stages. This is explained in Table 5.

Tabel 5 The relationship between the influence of heart disease history and chronic kidney failure in patients CKD on HD

Heart disease history	**Chronic kidney failure**						**OR 95% *(CI)***	**Sig**
	Early Stadium		Final Stadium		Total			
	F	%	F	%	F	%		
There is a history No history	5 18	21.7 78.3	11 6	64.7 35.3	16 24	40.0 60.0	0.152 (0.037-0.617)	0.009
Amount	23	100	17	100	40	100		

Source: Primary data processing, 2024.

The results of bivariate analysis in Table 5 obtained significant results (*p value* = 0.024 > α = 0.05), meaning that there is an influence relationship between heart disease and kidney failure in patients CKD on HD. This suggests that heart disease and chronic kidney failure often affect each other. Heart disease can worsen the condition of the kidneys through several pathophysiology mechanisms.

The results of this research are in line with the results of a research from Carl (2024) which explains that heart disease causes a decrease in blood flow to the kidneys, which can cause kidney damage and worsen kidney function. Patients

with a history of heart disease who experience the early stages of chronic kidney failure tend to have a higher risk of progressing to the late stage.

3.2.6. The relationship between the influence of diabetes mellitus and kidney failure in patients CKD on HD

Results of bivariate analysis of the relationship between the influence of diabetes mellitus history and chronic kidney failure in patients CKD on HD It can be explained that 28.6% of patients with a history of diabetes mellitus experience chronic kidney failure in the early stages, while 52.9% of patients with no history of diabetes mellitus experience chronic kidney failure in the late stages. This is explained in Table 6.

Tabel 6 The relationship between the history of diabetes mellitus and chronic kidney failure in patients CKD on HD

History of diabetes mellitus	**Chronic kidney failure**						**OR 95% *(CI)***	**Sig**
	Early Stadium		Final Stadium		Total			
	F	%	F	%	F	%		
There is a history No history	19 4	82.6 17.4	8 9	47.1 52.9	27 13	67.5 32.5	5.344 (1.268-22.523)	0.038
Amount	23	100	17	100	40	100		

Source: Primary data processing, 2024.

The results of the bivariate analysis in Table 6 obtained significant results (*p value* = 0.038 > α = 0.05), meaning that there is an influence relationship between diabetes mellitus and kidney failure in patients CKD on HD. This suggests that patients with a history of diabetes mellitus have a 5.344 times greater chance of being in the early stages of chronic kidney failure compared to patients without a history of diabetes mellitus.

The results of this research are in line with the results of research from Olga & Dorota (2024) which explains that diabetes mellitus is the main cause of chronic kidney failure in many populations. Chronic hyperglycemia in diabetic patients causes damage to the small blood vessels in the kidneys (diabetic glomeruloscleroses), which interfere with the kidneys' ability to filter blood properly.

3.2.7. The relationship between the influence of hypertension and kidney failure in patients CKD on HD

The results of the bivariate analysis showed the relationship between the influence of hypertension history and chronic kidney failure in patients CKD on HD It can be explained that 56.5% of patients with no history of hypertension experience chronic kidney failure in the early stages, while 82.4% of patients with a history of hypertension experience chronic kidney failure in the late stages. This is explained in Table 7.

Tabel 7 The relationship between the history of hypertension and chronic kidney failure in patients CKD on HD

History of hypertension	**Chronic kidney failure**						**OR 95% *(CI)***	**Sig**
	Early Stadium		Final Stadium		Total			
	F	%	F	%	F	%		
There is a history No history	10 13	43,5 56,5	14 3	82,4 17,6	24 16	60,0 40,0	0,022 (0,037-0,735)	0,022
Amount	23	100	17	100	40	100		

Source: Primary data processing, 2024.

The results of the bivariate analysis in table 7 obtained significant results (p value = 0.022 > α = 0.05) which can be interpreted that there is a relationship between hypertension and kidney failure in patients CKD on HD. This shows that patients with early stages of hypertension contribute significantly to the occurrence of kidney failure in the early stages. This means that hypertension is a very significant risk factor in the progression of kidney failure to a more advanced stage.

The results of this study are in line with the results of a study from Maria (2022) which explains that high blood pressure triggers damage to the arteries and capillaries of the glomerulus, resulting in glomeruloscleroses, where scar tissue replaces healthy glomeruli. As a result, the ability of the kidneys to filter waste and fluids from the blood is impaired.

3.3. Multivariate Analysis

Multivariate analysis aims to determine the influence between many independent variables and a dependent variable. The multivariate analysis used in this study is a logistical multinominal regression analysis, this is based on the variable measurement scale there are more than two categories.

The variables included in the logistical Multinomial Logistic Regression analysis are the variables that have a significant value (p≤0.05) in the previous bivariate analysis. According to the results of the bivariate analysis, it is known that the variables carried out by the multivariate analysis are family history, history of urinary tract infections, history of heart disease, history of diabetes mellitus, history of hypertension. This is explained in Table 8.

Tabel 8 Mutivariate Analysis of Chronic Kidney Failure Disease in Patients CKD On HD

	B	**Sig.**	**Exp (B)**
Family history	1.090	.277	.336
Urinary tract infections	1.051	.288	.350
Heart disease	1.761	.080	.172
Diabetes mellitus	2.451	.015	4.266
Hypertension	1.985	.046	1.137

Source: Primary data processing, 2024.

From the results of the multivariate analysis in Table 8 in this research, the results of family history with a significant value (*p value* = 0.277 > α = 0.05) were obtained.This means that there is no significant relationship between the family history variable and the chronic kidney failure variable, the variable with a history of urinary tract infection with a significant value (*p value* = 0.288 > α = 0.05). This means that there was no significant relationship between the variable of history of urinary tract infection and the variable of chronic kidney failure, the variable of history of jatung disease with a significant value (*p value* = 0.80 > α = 0.05). This means that there is no meaningful relationship between the variable of history of heart disease and the variable of chronic kidney failure, the variable of history of diabetes mellitus with a significant value (*p value* = 0.015 < α = 0.05). This means that there is a meaningful relationship between the variable of history of diabetes mellitus with the variable of chronic kidney failure and the variable of history of hypertension with a significant value (*p value* = 0.046 < α = 0.05). This means that there is a meaningful relationship between the variable of hypertension history and the variable of chronic kidney failure.

The results of this research are in line with the results of research from Yasuhiro et al (2023) who concluded that chronic kidney failure is caused by damage to kidney tissue triggered by long-term disease. Some of the diseases that can cause kidney failure are diabetes mellitus, high blood pressure, and heart disease.

4. Conclusion

Based on the results of the study and discussion, this study can be concluded that there is no relationship between age and chronic kidney failure in patients CKD on HD, There was no relationship between education and chronic kidney failure in patients CKD on HD. There is a relationship between family history, urinary tract infections, heart disease history, diabetes mellitus history, and hypertension with chronic kidney failure in patients CKD on HD. Diabetes mellitus is the disease that most closely affects the risk of developing chronic kidney failure.

Compliance with ethical standards

Disclosure of conflict of interest

The author stated that there was no conflict of interest in this research.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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