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The Relationship between Knowledge and Chronic Kidney Failure Prevention Behavior in Hypertensive Patients at Limboto Health Center

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ABSTRACT

Uncontrolled hypertension can cause various serious complications, one of which is chronic kidney failure (CKD). Hypertensive patients' knowledge of their disease plays an important role in the prevention behavior of complications such as chronic kidney failure. Good knowledge is characterized by an understanding of risk factors, the importance of blood pressure control, adherence to taking medications, as well as a healthy lifestyle such as a low-salt diet and regular exercise that can prevent complications, one of which is chronic kidney failure. This study aims to analyze the relationship between knowledge and chronic kidney failure prevention behavior in hypertensive patients at the Limboto Health Center. The method used is a quantitative research with a cross-sectional design. The research sample amounted to 95 patients who were selected using the purposive sampling technique. Data collection was conducted using a structured questionnaire that measured the level of knowledge about hypertension and chronic kidney failure prevention behaviors. The data were analyzed univariate and bivariate using the spearman rank test with a significance level of 5%. The results showed that most of the respondents were at a good level of knowledge and the majority had good kidney failure prevention behaviors. Bivariate analysis showed that there was a weak level of relationship strength (0.333) between knowledge and GGK prevention behavior in hypertensive patients at the Limboto Health Center ($p < 0.05$) with the direction of positive relationship. In conclusion, the higher the knowledge, the better the behavior to prevent chronic kidney failure, even though the strength of the relationship is relatively weak. This suggests that knowledge plays a role in the formation of preventive behaviors, but is not the only factor that influences them.

INTRODUCTION

Hypertension is a condition of persistently increased blood pressure that can cause organ damage if not controlled. The disease often does not cause obvious signs or symptoms, so many sufferers are unaware of the condition. This makes hypertension known as *Silent Killer* Because it is capable of causing serious complications without warning, including disorders of the cardiovascular system, kidneys, brain, and other important organs. With its increasing prevalence worldwide, hypertension is one of the major global health problems that has a major impact on the number of illnesses and deaths (Unger et al., 2020)

Uncontrolled hypertension can cause various serious complications, one of which is chronic kidney failure (CKD). Hypertension is one of the dominant factors that cause chronic kidney disease. Chronic kidney failure is a serious condition with an increasing prevalence, especially in developing countries. When a person has hypertension, the kidneys have to work harder so that the cells in the kidneys will be damaged (Novitasari et al., 2023).

Uncontrolled hypertension can damage small blood vessels in the kidneys (glomerulus) gradually, leading to thickening of the blood vessel walls and glomerular sclerosis that reduces the kidneys' filtration

ability. High blood pressure also causes renal ischemia due to narrowing of blood vessels, so that the kidney tissue lacks the oxygen and nutrients needed to function normally. This process takes place progressively and is not reversible, so in the long term it can lead to a decline in kidney function that ends in chronic kidney failure (Gultom et al., 2023). Early detection and comprehensive management are essential to prevent further complications such as cardiovascular disease or dialysis needs (Momuat et al., 2023).

Although hypertension is known to be one of the leading causes of chronic kidney disease, studies that specifically examine the relationship between hypertension patients' knowledge and chronic kidney failure prevention behaviors are rare. Most studies focus more on cardiovascular complications, while kidney complications are often overlooked despite their high prevalence. In addition, existing research generally only assesses medication adherence, without comprehensively looking at how patient knowledge can affect preventive behaviors such as blood pressure control, kidney function checks, diet, and healthy lifestyles.

Based on the latest report from the *World Health Organization* (WHO), hypertension is one of the global health problems whose prevalence continues to increase significantly over time. Data shows that the number of people with hypertension in the world has almost doubled in the last three decades, from about 650 million people in 1990 to 1.3 billion people in 2019.

Based on **Indonesian Health Survey (SKI) 2023,** The prevalence of hypertension in the population aged ≥18 years in Indonesia was recorded as **30,8%.** If it is associated with the number of Indonesia's population which reaches around **273 million people,** then it is estimated that more than **84 million People** suffering from hypertension. This figure shows that hypertension is still a major public health problem in Indonesia and risks causing serious complications if optimal prevention and control efforts are not carried out (Ministry of Health, 2023).

Based on the results of hypertension screening conducted by the Gorontalo Provincial Health Office in 2024, there are 92,229 individuals in Gorontalo Province who suffer from hypertension. This figure shows the high prevalence of hypertension in the region. The screening results show that Gorontalo Regency is the area with the highest number of sufferers, namely 42,607 people (Gorontalo Provincial Health Office, 2024).

According to data obtained from the Gorontalo Regency Health Office, as many as 86,623 hypertension patients spread across various health centers in the region have been officially diagnosed. The health center with the highest number of hypertension patients in Gorontalo Regency is the Limboto Health Center, which recorded 10,670 hypertensive patients. Of that number, as many as 7,885 people have received health services as a form of treatment for hypertension (Gorontalo Regency Health Office, 2024)

Based on initial observations at the Limboto Health Center in 2025, in the last three months there were 1,872 hypertensive patients. Interviews with 11 patients showed that some patients did not have an adequate understanding of hypertension and the prevention of its complications, particularly chronic kidney failure, which is reflected in health control behaviors that have not been routinely performed and tend only when symptoms appear.

Based on these conditions, research on the relationship between knowledge and behavior to prevent chronic kidney failure in hypertensive patients at the Limboto Health Center is important to be carried out, as a basis for the development of more effective educational interventions and prevention strategies in reducing the risk of kidney complications in hypertensive patients.

RESEARCH METHODS

This study applied a quantitative-based *cross-sectional* design held at the Limboto Health Center in the period of November 5 - December 13, 2025. Population In this study are Hypertension Patients who visit the Limboto Health Center in 2025. The sample was determined by the Slovin formula for 95 respondents and the sampling was determined by *the purposive sampling technique.* Data collection was carried out through a measured questionnaire on knowledge about hypertension and chronic kidney failure prevention behaviors. Data collection was carried out after obtaining ethical permission and *informed consent,* with questionnaires distributed and filled out by respondents under the supervision of researchers. The collected data was then processed and analyzed using *Excel* for *coding* and SPSS with *a spearman rank correlation test* to determine the relationship between the two variables.

RESEARCH RESULTS

Table 1. Respondent Characteristics

Respondent Characteristics	Frequency (n)	Percentage (%)
Age		
17-25 years old	7	7,4
26-35 years old	9	9,5
36-45 years old	11	11,6
46-55 years old	24	25,3
56-65 years old	44	46,3
Gender		

Male	37	38,9
Women	58	61,1
Final Education		
Not finished elementary school	2	2,1
SD	21	22,1
Junior High School	8	8,4
High School	34	35,8
College	30	31,6
Jobs		
Work	41	43,2
Not working	54	56,8
Income		
No income	36	37,9
≤ 3.2 million	48	50,5
>3.2 million	11	11,6
Marital Status		
Married	66	69,5
Unmarried	8	8,4
Divorce	21	22,1
Long suffering from Hypertension		
< 1 year	18	18,9
1-5 years	46	48,4
6-10 years	20	21,1
> 10 years	11	11,6
Family history of hypertension		
There	69	72,6
None	26	27,4
GGK family history		
There	11	11,6
None	84	88,4

Based on table 1, the majority of respondents were in the age group **of 56-65 years**, which was 44 **people (46.3%).** The respondents were mostly **female** as many as **58 people (61.1%).** The last education with the most is **high school** with **34 respondents (35.8%).** In terms of employment, most of the respondents **were not working**, namely **54 people (56.8%),** with the highest income in the **group ≤ 3.2 million rupiah** as many as **48 people (50.5%).** The majority of respondents were **married** as many as **66 people (69.5%).** Based on the length of time they had hypertension, the largest group was **1–5 years** old with **46 respondents (48.4%).** In addition, most respondents had a **family history of hypertension**, namely **69 people (72.6%),** while for **a family history of chronic kidney failure, the** majority of respondents **did not have such a history** as many as **84 people (88.4%).**

Table 2. Overview of the distribution of knowledge levels in hypertensive patients at the Limboto Health Center

No.	**Patient Knowledge Related to Hypertension**	**requency (n)**	**ercentage (%)**
1.	od	72	75,8
2.	ough	18	18,9
3.	s	5	5,3
Total		95	100

Based on table 2, the distribution of knowledge levels shows that most of the respondents have good knowledge, namely 72 respondents (75.8%), 18 respondents (18.9) have sufficient knowledge, and a small number of respondents have less knowledge, namely 5 respondents (5.3%)

Table 3. Overview of the distribution of GGK prevention behaviors in hypertensive patients at the Limboto Health Center

No.	GGK Prevention Behavior	requency (n)	rcentage (%)
1.	od	62	65,3
2.	ough	31	32,6
3.	s	2	2,1
Total		95	100

Based on table 3. The distribution of GGK prevention behaviors showed that most of the respondents had good GGK prevention behavior, namely 62 respondents (65.3%), sufficient GGK prevention behavior as many as 31 respondents (32.6%) and a small percentage had poor GGK prevention behavior, namely as many as 2 respondents (2.1%).

Table 4. Analysis of the Relationship between Knowledge and Behavior for Preventing Chronic Kidney Failure in Hypertensive Patients at Limboto Health Center

Variable X	Variable Y	r_s*(Spearman rho)*	*P-value*	Direction of Contact	The Power of Relationships
Hypertension Patient Knowledge	GGK Prevention Behavior	0.333	0.001	Positive	Weak

Based on table 4 above, it shows that the results of the statistical test use the *Spearman Rank correlation test* of 0.333 where the value of the correlation coefficient is in the value range of 0.20-0.39 which means that there is a weak level of relationship between knowledge and GGK prevention behavior in hypertensive patients at the Limboto Health Center with a positive relationship direction and a significance *p-value* of 0.001 was obtainedwith a significant level of 0.05.

Table 5. *Crosstabs* the Relationship of Knowledge with Chronic Kidney Failure Prevention Behavior in Hypertensive Patients at the Limboto Health Center

No.	Hypertension-Related Knowledge	BehaviorPrevention of GGK						Quantity		*P-value*
		Good		Enough		Less				
		n	%	n	%	n	%	n	%	
1.	Good	53	55,8	19	20,0	0	0,0	72	75,8	0.001
2.	Enough	7	7,4	11	11,6	0	0,0	18	18,9	
3.	Less	2	2,1	1	1,1	2	2,1	5	5,3	
Quantity		62	65,3	31	32,6	2	2,1	95	100	

Table 5 shows that respondents with **good knowledge of hypertension** mostly had **good GGK prevention behaviors,** namely **53 people (55.8%),** and there were still **19 people (20.0%)** with adequate preventive behaviors. In the **sufficient knowledge** group, the most preventive behavior was in the **sufficient** category of **11 people (11.6%),** followed by good behavior **by 7 people (7.4%).** Meanwhile, in respondents with **less knowledge,** most showed **less preventive behavior,** namely **2 people (2.1%),** although there were a small percentage who had good and sufficient behavior.

The results of the statistical test showed a value **of p = 0.001 (p < 0.05),** which indicates a **significant relationship** between hypertension-related knowledge level and chronic kidney failure prevention behavior, where the tendency for better preventive behavior is in line with higher knowledge levels.

DISCUSSION

The Relationship between Knowledge and Chronic Kidney Failure Prevention Behavior in Hypertensive Patients at Limboto Health Center

Based on the results of the analysis using *the Spearman Rank* test, it was found that there was a relationship between the knowledge of hypertension patients and chronic kidney failure prevention behavior, with the direction of a positive (unidirectional) **relationship.** This means that the better the level of knowledge of the patient, the better the preventive behavior carried out. Based on the value of *the Spearman correlation coefficient* (ρ), the strength of the relationship is in the weak category, which suggests that knowledge plays a role in shaping preventive behavior, but is not the only factor that influences it.

This result is reinforced by the distribution of data on a cross-table, where the majority of respondents with Good knowledge also has Good preventive behavior**,** namely 53 respondents (55.8%) and those who have sufficient preventive behavior amounted to 19 respondents (20%). And there were no respondents with good knowledge who had less preventive behavior. These findings suggest that adequate knowledge allows patients

to understand the risk of complications of hypertension, including chronic kidney failure, thus encouraging patients to take preventive measures such as controlling blood pressure, adhering to taking medications, maintaining a diet, and having regular health checkups. These findings are in line with research Susanita et al (2025) which shows that patients who have good knowledge have good complication prevention behavior, including good GGK as well.

In theory, these results are in line with *the Health Belief Model* (HBM) which states that health behaviors are influenced by an individual's perception of the susceptibility and severity of a disease, which is highly dependent on the level of knowledge possessed. Hypertensive patients with good knowledge tend to have a higher perception of the risk of complications including kidney damage due to uncontrolled hypertension, so they are more motivated to implement preventive behaviors.

In the group of respondents with sufficient knowledge, most of them had preventive behavior in the category of sufficient, namely 11 respondents (11.6%) and those who had good preventive behavior, namely 7 respondents (7.4%) and there were no respondents who had less preventive behavior. This condition shows that in-depth knowledge can lead to partial understanding, so the preventive behavior carried out is still inconsistent. Some patients may already know the importance of prevention, but are not yet fully able to apply it in their daily lives.

This is in accordance with the theory Notoatmodjo (2014) which states that knowledge at the level of "knowing" and "understanding" does not necessarily directly result in a permanent change in behavior. Good behavior is only formed when knowledge has reached the level of "application" and "evaluation", and is reinforced by experience and repetition. Research by Oktavia et al (2023) It also mentions that knowledge that is classified as sufficient can affect behavior such as inconsistency in carrying out behavior to prevent disease complications.

Meanwhile, in respondents with less knowledge, good preventive behavior was still found, amounting to 2 respondents (2.1%). This condition is seen from the questionnaire of good behavior of the respondents, namely always participating in prolanis activities, taking hypertension medication according to the doctor's recommendations, not smoking, consuming healthy foods and drinks such as vegetables, fruits, fresh fish and tempeh tofu, not drinking alcohol and regularly drinking approximately 1.2-2 liters of water per day. This condition is assumed to be related to the age factor. The respondents had an age of 52 years where respondents with an older age tended to be more careful in maintaining their health and more obedient to the recommendations of health workers. Although respondents were newly diagnosed with hypertension for ±4 years and had no family history of hypertension, age factors can influence attitudes of vigilance towards health risks, thus encouraging the application of good preventive behaviors despite the relatively low level of knowledge.

This is in line with research Liu et al (2020) which in his research explains that compliance and prevention behavior in hypertensive patients is not only influenced by the level of knowledge, but also by individual characteristics, one of which is age. The study showed that in the middle to older age group (≥45 years), there was a tendency for better adherence behaviors in the management of hypertension, including adherence to medication and health monitoring. This indicates that individuals at the age of about 50 can show good preventive behavior even though the level of knowledge they have is relatively low.

In addition, in respondents with less knowledge, there were respondents who had less GGK prevention behavior, namely 2 respondents (2.1%). It can be assumed that limited knowledge causes patients to not fully understand the relationship between hypertension and the risk of chronic kidney failure. As a result, patients tend to neglect preventive behaviors, such as limiting salt intake, regular blood pressure control, and adherence to therapy. Theory *Green* in *Precede-Proceed Model* states that knowledge is Predisposing factors which influences the formation of health behaviors (Green & Kreuter, 2005). Low knowledge will hinder the emergence of awareness and positive attitudes towards disease prevention, so the behavior displayed tends to be less supportive of health. Research by Sulastri et al (2021) It also shows that patients with low knowledge have a higher tendency to non-comply with complication prevention efforts.

The results of this study show that there is a relationship between knowledge level and chronic kidney failure prevention behavior in hypertensive patients, although the strength of the relationship obtained is relatively weak. These findings are in line with research Seme et al (2025) The results of the study show that knowledge and behavior of GGK prevention have a positive relationship where the higher the knowledge, the better the behavior of GGK prevention, in addition to research from Sulastri et al (2021) In his research, there is a significant relationship between knowledge and behavior to prevent complications in hypertensive patients.

However, the weak strength of these relationships indicates that knowledge enhancement is not always followed by optimal behavior change. This condition is reflected in the fact that respondents are still found with a sufficient to good level of knowledge, but the preventive behavior shown is not consistent, allowing the role of other factors such as age, length of suffering from hypertension, lifestyle habits, motivation level, family support, and access to health services and continuous education.

This is in line with research Shirley (2025) shows that knowledge is not the only main factor that affects the behavior of hypertension patients in taking preventive measures for complications including CKD, there

are still other factors such as motivation, family support and adequate access to health services. In addition, in the research Wibrata et al (2023) Identifying factors that affect the compliance behavior of hypertension patients shows that in addition to knowledge, support from good families and sufficient infrastructure will further strengthen compliance behavior in hypertension patients.

According to WHO (2019), changes in health behavior are a complex process influenced by the interaction between individual, social, and environmental factors. Good knowledge needs to be supported by reinforcing *factors* such as the support of health workers and families, as well as enabling factors such as the availability of health facilities. Without such support, knowledge improvement is not necessarily followed by significant behavioral change.

Based on the results of the analysis using *the Spearman Rank* test, it can be concluded that there is a relationship between the knowledge of hypertension patients and chronic kidney failure prevention behavior. The relationship formed is positive or unidirectional, which shows that the better the level of knowledge of hypertension patients, the better the preventive behavior carried out to prevent the occurrence of complications of chronic kidney failure. However, based on the value of *the Spearman correlation coefficient*, the strength of the relationship obtained is in the weak category, which indicates that knowledge has a role in shaping preventive behavior, but is not the only determining factor of a person's behavior.

CONCLUSION

Based on the results of a study on 95 hypertensive patients at the Limboto Health Center, it can be concluded that most of the respondents have a good level of knowledge (75.8%) and good behavior to prevent chronic kidney failure (65.3%). The results of statistical analysis showed a significant association between knowledge and chronic kidney failure prevention behaviors in hypertensive patients ($p < 0.05$) and positive relationship direction and weak relationship strength ($r = 0.333$), indicating that the better the patient's knowledge, the better the preventive behavior shown, although knowledge was not the only factor influencing this behavior.

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