Examining the Association of Hemodialysis Adherence with Blood Pressure in Chronic Renal Failure

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Article Info	ABSTRACT
Article history: Received: May 16, 2023 Revised: Jul 21, 2023 Accepted: Jul 28, 2023 DOI: 10.58418/Ijni.V2i1.52 **How to cite this article:** Yulianti, Y., & Nallappan, D. (2023). Examining the Association of Hemodialysis Adherence with Blood Pressure in Chronic Renal Failure. *International Journal of Nursing Information*, 2(1), 13–18.	Medication adherence is important for people with chronic renal failure (CRF) undergoing hemodialysis. Lowering blood pressure can reduce symptoms and improve the long-term health of hemodialysis patients. Hypertension is more prevalent and more complex to control in patients with chronic kidney disease and can also be a cause or result of the condition. This study aimed to investigate the association between blood pressure and hemodialysis therapy adherence in patients with renal failure. This study employed a descriptive correlation method to examine patients with CRF who are currently undergoing hemodialysis therapy and have a history of hypertension. In this study, 31 respondents were selected using purposive sampling. Data on medication adherence were collected by questionnaire, while blood pressure readings were used to examine the prevalence of hypertension. The research location is the government hospital in Sukabumi, Indonesia. A chi-square statistical test was used for data analysis. The result showed a relationship between hemodialysis therapy compliance and the incidence of hypertension in patients with chronic renal failure who are undergoing hemodialysis therapy. In patients with chronic renal failure receiving hemodialysis, there is a significant positive correlation between blood pressure and treatment adherence. Research contributes that adherence to the prescribed hemodialysis regimen may play a crucial role in the management and prevention of hypertension in this patient population.

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1. INTRODUCTION

Among the nations with the greatest number of chronic renal failure (CRF) sufferers is Indonesia. According to information gathered from the Indonesian Renal Registry Report, there were 132,142 patients with active CRF between 2007 and 2018, and 66,433 new patients were added in 2018 (Afiatin et al., 2020). According to the Riskesdas 2018 report, the prevalence of CRF in Indonesia was around 0.38% in 2018, with the prevalence of the 65-74 age group being 0.84% higher than other groups. The number of people with CRFF is first in North Kalimantan with a prevalence of 0.6%, followed by Gorontalo, Maluku, Nusa Tenggara Barat and North Sumatra with a prevalence of 0.5%, while West Java has a prevalence of 0.4% (Kemenkes, 2019).

Chronic renal failure, also known as chronic kidney disease, is a progressive condition that affects the function of the kidneys. The kidneys play a crucial role in maintaining balance in the body by filtering waste products and excess fluids from the blood. Chronic renal failure occurs when the kidneys are unable to perform their functions effectively. This can result in the accumulation of toxins and fluid imbalances in the body, leading to various complications and symptoms. Hemodialysis is a treatment

option for individuals with chronic renal failure (Fraser & Blakeman, 2016). Hemodialysis is a commonly used treatment for End-Stage Renal Disease patients, but it can come with its share of complications. These complications include nausea, vomiting, muscle cramps, and changes in blood pressure levels (Habas, 2019)

Patients undergoing hemodialysis are at higher risk of cardiovascular issues such as hypertension, left ventricular hypertrophy (LVH), and ultimately, higher mortality rates. Fluid overload is very common among patients receiving hemodialysis three times a week, leading to hypertension, elevated arterial stiffness, LVH, heart failure, and increased morbidity and mortality rates (Bansal et al., 2023). Hypertension is a common issue among dialysis patients, and the optimal diagnosis and treatment targets are still unclear. However, it is now known that hypertension increases the risk of cardiovascular disease, and using antihypertensive drugs can help reduce mortality in dialysis patients. It's essential to restrict dietary sodium and maintain euvolemic status to manage hypertension effectively. All antihypertensive drugs can be used to reduce mortality (Kim et al., 2023). Treatment adherence, also known as medication adherence, refers to how well a person follows a healthcare provider's recommendations regarding medication, diet, and lifestyle changes (Murali et al., 2019). Non-adherence to medication in hemodialysis patients can negatively impact treatment effectiveness, increase morbidity and mortality rates, result in hospitalizations, and impose a significant economic burden on the healthcare system (Mirzaei-Alavijeh et al., 2023). Previous studies on medication adherence in hemodialysis patients only examined hemodialysis regularity and did not assess medication adherence regularity. The study's novelty lies in its specific selection criteria, which includes patients undergoing hemodialysis with a history of hypertension and receiving identical drug therapy. Furthermore, this study incorporates treatment compliance as a variable of interest, which is a novel aspect. By considering treatment compliance alongside the specified population, the study aims to provide insights into the impact of adherence to the prescribed therapy on hypertensive patients undergoing hemodialysis. This approach allows for a targeted examination of factors that influence treatment outcomes and may contribute to developing tailored interventions to optimize patient care in this particular context. This study aimed to investigate the association between blood pressure and hemodialysis therapy adherence in patients with renal failure.

2. METHOD

This study was conducted at a hospital in Sukabumi Regency, West Java, Indonesia, during August 2022. It followed a cross-sectional research design and was an observational study. The study sample included 31 respondents who were selected through a purposive sampling technique. Of the 36 patients who were recorded as performing hemodialysis at Jampang Hospital, 31 respondents were selected who met the inclusion criteria. The inclusion criteria were hemodialysis patients who had a history of hypertension and were willing to participate in the study. These patients were receiving antihypertensive medications including amlodipine, candesartan, furosemide, sodium bicarbonate, CaCO (Nacid), and folic acid. The exclusion criteria were CRF patients who had comorbidities other than hypertension, such as diabetes mellitus, cognitive impairment, or were in a weak state and unable to communicate well.

Data was collected using a research instrument in the form of a data collection sheet. This sheet contained various entries such as age, gender, education, employment status, income, and family history of hypertension. To assess treatment compliance, respondents were given a Medication adherence questionnaire containing 7 questions. The researcher designed a self-medication adherence questionnaire so that its validity and reliability were tested using pearson product moment and cronbach, patients were considered compliant if they answered yes to all questions on the treatment compliance questionnaire. The results of the validity test obtained all items of the hemodialysis schedule adherence variable hemodialysis schedule adherence variable are valid because the p-value is less than 0.05 The results of the reliability test show a Cronbach's alpha value of 0.65. Blood pressure values were observed using an observation sheet, and results were categorized as hypertensive if blood pressure was greater than 140/90 mmHg, and not hypertensive if blood pressure was less than or equal to 140/90 mmHg (Bucharles et al., 2019).

The questionnaire was given to the participants before the hemodialysis process, and they were provided with 15 minutes to complete it. If any question was not understood, the respondents could ask for clarification. Blood pressure was measured at the start of the hemodialysis using Sphygmomamoneter, ABN. Data processing techniques were used to test the variable of hemodialysis compliance with blood pressure. Univariate and bivariate tests along with Chi-Square were used for this purpose.

3. RESULTS AND DISCUSSION

3.1. Results

Table 1 below is the result of univariate analysis based on age, gender, education level, employment status, income and hereditary history of hypertension which were analyzed descriptively statistically through percentages.

Table 1

Results of Univariate Analysis of Respondents' Characteristics

Categories	F	%
Age:		
45- 55 Years	27	87.1
≥ 56 Years	4	12.9
Gender:		
Male	14	45.2
Women	17	54.8
Education:		
Elementary School	9	29.4
Junior High School	10	32.2
Senior High School	10	32.2
University	2	6.4
Employment Status		
Work	15	48.4
Not Working	16	51.6
Income		
< IDR 1,000,000	18	58.1
≥ IDR 1,000,000	13	41.9
Hereditary History of Hypertension		
Available	9	29
None	22	71

According to Table 1, it is evident that the majority of respondents (54.8%) aged between 51-52 years are females. They have completed their education up to junior or senior high school level (32.2% each) and are not employed (51.6%). Additionally, more than half of them earn less than 1,000,000 and have no family history of hypertension (71%).

Table 2

Results of Univariate Analysis of Variables

Variables	F	%
Compliance:		
Compliant	22	71
Non-compliant	9	29
Blood Pressure:		
Hypertension	14	45.2
No Hypertension	17	54.8

Based on Table 2, it can be seen that most respondents were compliant in undergoing hemodialysis therapy, namely 22 (71%) respondents and respondents did not experience hypertension, namely 17 (54.8%) respondents.

Table 3

Results of Bivariate Analysis of Adherence and Hypertension Variables

Compliance	Blood Pressure				Total		P-Value
	Hypertension		No Hypertension				
	F	%	F	%	F	%	
Compliant	7	31.8	15	68.2	22	100	
Non-compliant	7	77.8	2	22.2	9	100	0.044
Total	14		17		31	100	

Based on Table 3, there is a positive correlation observed between compliance with hemodialysis therapy and the absence of hypertension; specifically, 68.2% of compliant respondents did not experience hypertension, while 77.8% of non-compliant respondents did experience hypertension.

3.2. Discussion

According to the results, 22 (71%) of the respondents were compliant with hemodialysis therapy while 9 (29%) were non-compliant. The respondents had an average age of 51-52 years, which is considered as late adulthood and thus, their memory or recall of the treatment schedule is better than in

elderly patients. Consistent with the study by Wahyudi et al. (2018), there is a significant relationship between age and medication compliance.

It has been found that compliance with medical instructions is influenced not only by age but also by education level and economic status. Patients with lower levels of education may have difficulty understanding medical instructions, leading to non-compliance (Yuliawati et al., 2022). Research has shown that disease perception and treatment compliance are also influenced by education level (Yildirim & Baykal, 2020). However, education level is not the only factor affecting compliance. According to a study by (Uchmanowicz et al., 2018), age and living with family are also statistically significant variables. Therefore, healthcare providers should focus on older hypertensive patients with low levels of education and inadequate social support. Tailored education programs may help these patients better understand and adhere to their treatment. The economic status of most respondents was poor. However, adherence was not affected by cost since hemodialysis is now covered as health insurance by BPJS (Social Security Administrator) for Indonesian citizens. In addition to the need for dialysis, hemodialysis patients also face an economic burden related to the cost of medication. Commonly used drugs and supplements in hemodialysis patients include folic acid, calcium, vitamin D, antihypertensive drugs, antidiabetic drugs, erythropoietic agents, iron supplements, and other drugs (Wang et al., 2022).

Non-compliance with hemodialysis treatment can be caused by irregular dialysis and non-adherence to prescribed medication. Out of the nine patients who did not comply with their hemodialysis treatment, five did not have regular dialysis. This suggests that they were not taking their prescribed medication as directed. Patients with a history of hypertension during hemodialysis are prescribed 6 types of medication, which include candesartan, furosemide, amlodipine, sodium bicarbonate, CaCO, and folic acid. Among the 9 patients who did not have regular hemodialysis treatment, some missed doses of folic acid, CaCO, and amlodipine. Non-compliance with amlodipine was due to the schedule of the drug, which is taken at night before bedtime, while folic acid and CaCO had side effects, namely nausea. According to Parmier et al. (2016), the average therapeutic adherence rate decreased from 1.75 to 1.50, with forgetting or neglecting to take doses and too many units to be administered being identified as the main barriers. Compliance of hemodialysis patients is mainly manifested in four aspects including diet, fluid intake, medication therapy, and dialysis schedule (Wu et al., 2022).

Patient compliance is crucial for the success of hemodialysis therapy (Alikari et al., 2021; Yangöz et al., 2021). Compliance refers to an individual's behaviour of following instructions or guidelines provided by their healthcare provider, whether it pertains to a medication regimen, diet, or lifestyle change (Bergen, 2020; Chen et al., 2022). Unfortunately, poor adherence is common among patients with chronic diseases, which increases the risk of morbidity and healthcare costs. Patients undergoing chronic hemodialysis often struggle with medication adherence, as per a study conducted by Mhammedi et al. (2019). Furthermore, a study conducted in the United States found that non-adherence to hemodialysis increased the risk of mortality by 20% to 25% and the risk of hospitalisation by 16% (Mohamedi & Mosha, 2022).

Present data revealed that out of the respondents, 17 (54.8%) did not have hypertension while 14 (45.2%) had hypertension. Hemodialysis patients may experience hypertension due to various physiological changes caused by their condition. The primary cause of overload in hemodialysis patients is the inability of their kidneys to eliminate excess sodium and water, leading to high extracellular volume and increased cardiac output, which in turn affects blood pressure. Volume overload in hemodialysis patients associate with hypertension and cardiac dysfunction and is a major risk factor for all-cause and cardiovascular mortality in this population (Loutradis et al., 2021).

Chronic renal failure is a common complication resulting from uncontrolled hypertension, and it can also cause hypertension. The relationship between these two conditions is complex and can increase the risk of negative cardiovascular and cerebrovascular outcomes. To manage hypertension in patients with CRF, a combination of antihypertensive drugs, including a diuretic chosen based on the estimated glomerular filtration rate is essential(Hamrahian & Falkner, 2017).

Cardiovascular disease is the primary cause of death among patients with CRF who undergo chronic dialysis. As the kidney function deteriorates, the prevalence of hypertension also increases. At the start of dialysis, roughly 80-90% of patients show signs of hypertension. Studies indicate a U-shaped phenomenon due to the high mortality rates of both hypertensive and hypotensive patients. Numerous studies have been conducted to investigate the association between adherence to hemodialysis therapy and the incidence of hypertension in patients with chronic renal failure undergoing hemodialysis therapy. Despite the high prevalence of hypertension among hemodialysis patients, its management remains at a rudimentary stage. Significant efforts are being made to enhance understanding of the intricacies involved in effectively managing hypertension in this population (Iseki, 2015).

According to a recent study, none of the respondents who were compliant with hemodialysis therapy had hypertension out of a total of 15 respondents, representing 68.2% of the total. However, out of the respondents who were non-compliant, 77.8% or 7 respondents had hypertension. Statistical tests were conducted using the Chi-square correlation formula with the Exact Fisher test, yielding a p-value of 0.044 that there is a correlation between compliance with hemodialysis therapy and blood pressure conditions in

CRF patients undergoing hemodialysis therapy. In a study conducted by Bucharles et al., 2019, it was found that patients undergoing hemodialysis therapy show better cardiovascular outcomes when antihypertensive drugs are used to control blood pressure.

Chronic renal failure (CRF) is a global health problem affecting many people around the world (LI et al., 2021; Winarti et al., 2021). It is often associated with hypertension, the prevalence of which increases as kidney function declines. Both CRF and hypertension are strongly associated with cardiovascular disease (Hernández-Garduño, 2020). Control of hypertension is very important for people with CRF as it can slow disease progression and reduce the risk of cardiovascular disease (Chaudhuri et al., 2022). Many people with CRF require a combination of antihypertensive medications to achieve the desired blood pressure goal. The effectiveness of antihypertensive treatment in CRF patients, particularly those undergoing hemodialysis, has been shown to reduce the risk of death. Achieving optimal blood pressure targets through a combination of medication and lifestyle changes is therefore crucial to the management of CRF (Burnier & Damianaki, 2023; Pugh et al., 2019).

4. CONCLUSION

The study findings demonstrate a significant relationship between adherence to hemodialysis therapy and the occurrence of hypertension in individuals suffering from chronic renal failure and undergoing hemodialysis therapy. This implies that adherence to the prescribed hemodialysis regimen may play a crucial role in the management and prevention of hypertension in this patient population. Further investigations and interventions aimed at enhancing adherence to hemodialysis therapy could potentially yield positive outcomes in mitigating the incidence of hypertension among these patients.

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