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The Relationship Between Antihypertensive Drug Compliance and the Incidence of Intradialytic Hypertension in Hemodialysis Patients at RSD dr. Soebandi Jember

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Abstract

Chronic renal failure is a global health problem with the number of sufferers increasing every year. This disease is classified into five stages based on glomerular filtration rate values with or without evidence of kidney damage. In the end stage of chronic renal failure, patients require renal replacement therapy, namely kidney transplantation or hemodialysis. Having hemodialysis therapy is capable cause various complications, one of them is intradialytic hypertension. One of the important things to do to prevent intradialytic hypertension in hemodialysis patent is consuming antihypertensive drugs. The antihypertensive drug is capable of controlling blood pressure, but the usage must be accompanied by patient compliance in consuming the drug to provide long-term treatment effects. If the patient does not obey consuming the drug and their blood pressure cannot be controlled complications will exist, such as organ damage. Therefore, this study aims to determine the relationship between adherence to consuming antihypertensive drugs and intradialytic hypertension in hemodialysis patients. This study used an analytic observational method with a cross-sectional approach. The sample in this study used 88 eligible respondents. The level of drug compliance was measured by using the MMAS-8 (Modified Morisky Adherence Scale) questionnaire, while the blood pressure was measured by using a sphygmomanometer from pre-dialysis to post-dialysis. The data will be processed and analyzed by using the chi-square test. Based on the result of the study obtained a p-value is <0.05 (p-value = <0.001), it can be concluded that there is a relationship between compliance with antihypertensive drug consumption with intradialytic hypertension in hemodialysis patients. These results indicate that medication adherence can reduce the incidence of intradialytic hypertension, thereby improving the quality of life and prognosis of patients undergoing hemodialysis.

Keywords*: intradialytic hypertension, medication adherence, MMAS-8 questionnaire.*

Introduction

Chronic kidney disease is a global health problem with the number of patients increasing every year and potentially causing death. According to the Kidney Disease Outcomes Quality Initiative (KDOQI) chronic renal failure is classified into five stages based on glomerular filtration rate values with or without evidence of kidney damage (Lok et al., 2019). In the final stage of chronic renal failure, patients require kidney replacement therapy, namely kidney transplantation or hemodialysis (Dewi, 2023). Hemodialysis is most commonly performed, especially in Indonesia with a prevalence in 2018 reaching 132, 142 people (PERNEFRI, 2018).

Hemodialysis can cause various complications, one of which is hypertension which commonly happens. One of the well-known cardiovascular complications in patients who are undergoing hemodialysis routine is intradialytic hypertension, with

prevalence of around 13.2% to 33.9% (Dewi, 2023). Intradialytic hypertension is an increase in systolic blood pressure >10 mmHg from pre-dialysis to post-dialysis. According to Inrig (2010), 213 (12.2%) of 1718 patients had intradialytic hypertension with systolic blood pressure increasing >10 mmHg from pre-dialysis to post-dialysis (Inrig, 2010). There are several factors for intradialytic hypertension such as age, duration of comorbid hemodialysis, inter-dialytic weight gain (IDWG), and taking hypertension drugs (Tajili et al, 2020).

Intradialytic hypertension can be prevented by administering antihypertensive drugs that aim to lower and maintain normal blood pressure. Antihypertensive drugs are given in combination and the administration requires adjustment because some drugs are easily dialyzed by seeing an abnormal body response to hemodialysis, dialyzed drug levels can occur under dose or decrease drug effectiveness and cause uncontrolled pressure, thus increasing the risk of heart and vessel disease (Supadmi, 2011). Drug administration will provide optimal results if the dose given follows the patient's condition and compliance with treatment (Handayani D. 2015). If the patient is not compliant and blood pressure is uncontrolled, it can cause complications such as organ damage, namely the heart, kidneys, and brain, and increase the risk of stroke. If it hits the eyes, hypertensive retinopathy will occur, and if it hits the heart, it will increase the risk of acute myocardial infraction and heart failure (Serafina R.N., 2023).

Data on adherence to taking antihypertensive drugs in hemodialysis patients in Jember has not been widely studied so far, therefore it is necessary to conduct further research on the relationship between adherence to taking antihypertensive drugs and the incidence of intradialytic hypertension in hemodialysis patients at RSD dr. Soebandi Jember to provide appropriate management for patients.

Methods

Research Design

The research design used an analytical observational method with a cross-sectional approach.

Population

The population used in this study where all patients with stage 5 chronic renal failure who underwent hemodialysis in May-June 2024 at RSD dr. Soebandi Jember.

Sample

The research sample was a stage 5 chronic renal failure patient who underwent hemodialysis and met the inclusion and exclusion criteria. The sample obtained was 88 people using the total sampling technique. The study inclusion criteria were >18 years old, routinely undergoing hemodialysis at least 2 times per week with a duration of 4-5 hours, having undergone routine hemodialysis for at least 4 weeks, and taking antihypertensive drugs during intradialytic and inter-dialytic. The exclusion criteria were incompletely measured blood pressure from pre-dialytic to post-dialytic, stopped taking antihypertensive drugs, the patient was hospitalized and it was not possible to conduct an interview had a worsening condition, and was not willing to be a research sample.

Implementation

The study was conducted in the hemodialysis room of RSD dr. Soebandi Jember in May-June 2024. The data used consisted of primary and secondary data. Primary data included MMAS-8 questionnaire interviews to measure medication adherence and blood pressure measurements using a calibrated digital sphygmomanometer. Blood pressure measurement in hemodialysis patients can be done during predialysis, intradialytic hour 3, hour 4, and post-dialysis. If blood pressure increases at one of these hours it can be said to be intradialytic hypertension. This monitoring is done to minimize the risk of cardiovascular complications and mortality rates in hemodialysis patients (Inrig, 2010).

The MMAS-8 questionnaire was developed with 8 items that include statements regarding deliberately stopping taking the medication without the doctor's consent, the frequency of forgetting to take medication as recommended and has been tested for validity and reliability (Pratiwi W., 2020; Setiyana N., 2021; Korb-Savoldelli et al., 2012). The MMAS-8 questionnaire consists of one Likert scale question and seven with yes/no answers. If the respondent answers "yes" to questions number 1-4 and 6-7, they will get a score of 1, and if the answer "no" they will get a score of 0. As for question number 5, if you answer "yes" you will get a score of 0, and if you answer "no" you will get a score of 1. The total score will be classified as low category (>2), medium category (1 or 2), and high maintenance category (0) (Rahmad D. D., 2022). Secondary data in the form of medical records of hemodialysis patients at RSD dr. Soebandi Jember, namely age, gender, inter-dialytic weight gain (IDWG), length of hemodialysis, duration of hemodialysis, number of antihypertensive drugs, and comorbidities.

Statistical Analysis

The software used for data analysis was IBM SPSS Statistic 27.0 to perform the chi-square test.

Ethical Approval

This study has obtained ethical approval from the Ethics Commission of the Faculty of Medicine, University of Jember with letter number 1.752/UN25.1.10.2/KE/2024.

RESULT

Based on the data presented in Table 1, the characteristics of antihypertensive drug consumption compliance mostly had a low level of compliance (54.5%), and as many as 55 people (62,5%) had intradialytic hypertension.

Table 2 shows the data on the characteristics of hemodialysis patients at RSD dr. Soebandi Jember based on age, gender, Inter-dialytic Weight Gain (IDWG), length of hemodialysis, hemodialysis duration, number of antihypertensive drugs, and combination that are suspected as confounding variables. The data obtained were mostly <60 years old and female. Most hemodialysis patients had IDWG >3%, There are 47 people, with a duration of hemodialysis, the average is around 5 hours and

most have comorbidities such as hypertension, heart failure, diabetes mellitus, anemia, and so on. The number of antihypertensive drugs consumed by most patients was >2 classes of drugs. The most consumed drugs are amlodipine Candesartan, and Valsartan.

The result of bivariate analysis with the chi-square test regarding medication compliance with intradialytic hypertension can be seen in Table 3. The data showed that there was a statistically significant relationship between medication compliance and intradialytic hypertension in hemodialysis patients (p-value <0.001). These results indicate that medication adherence can reduce the incidence of intradialytic hypertension, thereby improving the quality of life and prognosis of patients undergoing hemodialysis.

Based on Table 4 with the chi-square test performed on variables suspected as confounding variables, they are gender, age, inter-dialytic weight gain, length of hemodialysis, duration of hemodialysis, number of antihypertensive drugs, and comorbidities, showed that there was no significant association with intradialytic hypertension in hemodialysis patients.

Table 1. Characteristics of the Study Sample

No	Characteristic	Category	Total	Percentage
1.	Medication adherence	High compliance (0)	14	15,9%
		Medium compliance (1-2)	26	29,5%
		Low compliance (>3)	48	54,5%
2.	Intradialytic Hypertension	No intradialytic hypertension	33	37,5%
		Intradialytic hypertension	55	62,5%

Table 2. Characteristics of the Study Sample

No	Characteristics	Category	Total	Percentage
1.	Age	< 60 years old	77	87,5%
		≥ 60 years old	11	12,5%
2.	Gender	Male	40	45,5%
		Female	48	54,5%
3.	*Interdialytic Weight Gain* (IDWG)	≤ 3% IDWG	41	46,6%
		> 3% IDWG	47	53,4%
4.	Length of hemodialysis	< 12 months	19	21,6%
		≥ 12 months	69	78,4%
5.	Duration of hemodialysis	4 hours	11	12,5%
		5 hours	77	87,5%
6.	Number of antihypertensive drugs	< 2 groups	26	29,5%
		≥ 2 groups	62	70,5%
7.	Comorbid	No comorbidities	36	40,9%
		Comorbidities present	52	59,1%

Table 3. Bivariate analysis between medication adherence and intradialytic hypertension

Characteristics	Category	Intradialytic Hypertension				*p-Value*
		Yes		No		
		n	%	N	%	
Medication adherence	High compliance	3	21,4	11	78,6	<0,001
	Medium compliance	10	38,5	16	61,5	
	Low compliance	42	87,5	6	12,5	

Table 4. Bivariate analysis for confounding variables

Factors	*p*
Gender	0,122
Age	0,741
Interdialytic Weight Gain	0,956
Duration of hemodialysis	0,738
Hemodialysis duration	0,526
Number of antihypertensive drugs	0,904
Comorbid	0,654

Table 5. MMAS Adherence Questionnaire (Morisky Medication Adherence Scale)

Question	Patient Answers		Score (Yes= 1 / No = 0)
	Yes	No	
1. Do you sometimes forget to take your antihypertensive pills?			
2. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your antihypertensive medicine?			
3. Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?			
4. When you travel or leave home, do you sometimes forget to bring along your antihypertensive medication?			
5. Did you take your antihypertensive medicine yesterday?			
6. When you feel like your antihypertensive is under control, do you sometimes stop taking your medicine?			
7. Taking medication every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your antihypertensive treatment plan?			
8. How often do you have difficulty remembering to take all your medications? a. Never b. Once in a while c. Sometimes d. Usually e. Always Note: Always : 7 times a week Usually : 4-6 times a week Occasionally : 2-3 times a week Occasionally : 1 time a week Never : Never forget	A= 0 BE= 1		
	Total Score		

DISCUSSION

The result showed that the prevalence of intradialytic hypertension in dr. Soebandi Jember was quite high at 62.5%, the results obtained were different from previous studies. The research that searched by Naysilla (2012), reported that the prevalence of intradialytic hypertension was 53.6%. Another study by Inrig (2010) that the prevalence of intradialytic hypertension ranged from 5-15% of hemodialysis patients, and research by Diakite et al (2020) with the prevalence of intradialytic hypertension was around 13.2% to 33.9%.

Some factors that allow for an increase in blood pressure during hemodialysis are hemodialysis therapy factors, patient factors, fluid or volume factors, and endothelial dysfunction. These factors can cause cardiac output and vasoconstriction of blood vessels, then cause an increase in intradialytic blood pressure (Omega, 2023). A study conducted by Suryansyah (2019), stated that an increase in blood pressure during the hemodialysis process can be caused by several factors, namely excess fluid. Activation of RAAS, excessive activity of the sympathetic nervous system, medical factors in the form of discontinuation of antihypertensive drugs, while for hemodialysis factors, namely hypokalemia, calcium and sodium intake (Inrig, 2010: Suryansyah. 2019).

Based on the result of bivariate analysis using the chi-square test, it shows that there is a relationship between compliance with antihypertensive drug consumption and intradialytic hypertension in hemodialysis patients at RSD dr. Soebandi Jember. This finding supports the hypothesis and theory that the main factor determining the success of hypertensive treatment is patient compliance (Serafina R.N., 2023). However, there has been no research on adherence to taking antihypertensive medication with intradialytic hypertension. However, there is research by Mulida (2019) regarding adherence to taking antihypertensive drugs in hemodialysis patients which is associated with the patient's life quality, the more obedient taking medication, the better their life quality. The odds ratio value obtained was 13.92, indicating that patients who were obedient in taking antihypertensive drugs had a 13.92 times higher chance of having a better life quality compared to patients who were not obedient (Maulida F., 2019).

The result of therapy can be optimal if patients have full awareness to comply with treatment, therefore it is necessary to measure the level of compliance to achieve efficiency and effectiveness of treatment, as well as monitor the success of hypertension therapy (Sumasih, 2020). One of the important things to do to prevent intradialytic hypertension in hemodialysis patients is to be obedient in taking antihypertensive drugs (Handayani D., 2015). Antihypertensive drugs can control blood pressure but the use must be accompanied by patient compliance in taking drugs to provide long-term treatment effects reduce the risk of cardiovascular complications, and prevent damage to organs such as the kidneys, brain, and heart (Serafina R. N., 2023; Harahap, 2019). One of the factors to reduce the incidence of intradialytic hypertension is compliance with antihypertensive therapy. Patients who routinely take medication will have stable blood pressure, control fluid volume, reduce sympathetic nerve activity, control electrolyte levels, and prevent the risk of dangerous increases in blood pressure during dialysis (Georgianos & Agarwal, 2023).

The results of the study on drug compliance were obtained for the low compliance category as much as 54.5% moderate compliance obtained at 29.5% and high compliance at 15.9%. This is because some patients think that the treatment is carried out if they feel there are complaints and if they feel better then the medicine is no longer consumed, besides that the patient thinks that with hemodialysis they feel better so they don't need to take medicine regularly, the patient feels bored of having to take medicine continuously for a long time and the number of drugs that must be consumed (Fajriansyah., 2017). In addition, medication adherence is influenced by two factors, they are unintentional factors such as forgetting to take medication or nut understanding the schedule of taking medication and the dose given, as well as intentional factors such as the patient's decision to stop taking medication, drug side effects, and so on (Al Farisi M., 2020).

CONCLUSION

Based on the research that has been conducted, it can be concluded that there is a significant relationship ($p<0.05$) between compliance with antihypertension drug consumption and intradialytic hypertension in hemodialysis patients.

Conflict of Interest

The authors declare no conflict of interest in this publication.

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Research Contribution

Authors 1 and 2 played a role in selecting research ideas, conducting research, processing data and results, and playing a role in the process of preparing research paper reports. Authors 3, 4, and 5 play a role in providing input to authors 1 and 2 in the research process as well as in the process of processing data and preparing research reports.

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