ISSN:xxxx-xxxx

Proceedings of the 1st International Conference on Education, Science Technology, And Health (ICONESTH 2023 Universitas Bina Bangsa Getsempena, Sept 25-27, 2023, Banda Aceh, Indonesia

FACTORS THAT INFLUENCE THE ADEQUACY OF DIALYSIS IN PATIENTS UNDERGOING DIALYSIS THERAPY AT THE HEMODIALISIS INSTALLATION OF HOSPITAL

dr. ZAINOEL ABIDIN IN 2023

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ABSTRACT

Chronic kidney failure is a disease that requires hemodialysis. Long-term hemodialysis therapy will affect various aspects of life and have an impact on reducing the patient's quality of life. To improve the patient's quality of life, this can be done by increasing the patient's adequacy in each hemodialysis session. The study aimed to identify factors that influence dialysis adequacy in patients undergoing dialysis therapy in the hemodialysis installation at RSUD dr. Zainoel Abidin. This type of research is descriptive correlative with a cross-sectional study design. The population in this study were chronic kidney failure patients undergoing hemodialysis. Sampling used the Slovin formula purposive sampling technique, namely 85 respondents. The data collection tool is a standard table with the Cronin scale. Univariate and bivariate analysis data. The results of the bivariate analysis show that there is a relationship between Quick of Blood (QB) and hemodialysis adequacy with a p-value = 0.001 (P < 0.005), there is a relationship between time of dialysis and hemodialysis adequacy with a p-value = 0.001 (p < 0.001), there is the relationship between vascular access and hemodialysis adequacy with P-value=0.004 (p<0.005).

Keywords: *Hemodialysis, Chronic Kidney Failure, Dialysis adequacy*

INTRODUCTION

Chronic kidney disease (CKD) is one of the causes of death in the world. The results of a systematic review and meta-analysis conducted by Hillet al, (2016) in Infodatin (2017) found that the global prevalence of chronic kidney disease was 13.4%. Based on 2019 Global Burden of Disease data, chronic kidney disease was the 27th leading cause of death in the world in 1990 and increased to 18th in 2019. As many as 30 million people or 15% of adults in the United States suffer from kidney

disease. chronic kidney disease, 48% of them had decreased kidney function but did not undergo dialysis because they did not know they had chronic kidney disease. The majority (96%) of people with kidney damage or slightly reduced kidney function are unaware they have chronic kidney disease. Besides that, Chronic kidney disease is estimated to occur more frequently in women than men, 16% and 13% respectively. Chronic kidney disease is also estimated to be more common in non-Hispanic black people than non-Hispanic white people at 18% and 13% and 15% of Hispanics are estimated to have chronic kidney disease (CDC, 2020).

In Indonesia, in 2018, patients with chronic kidney disease increased by 19.3%. In Bali province, in 2018 patients with chronic kidney disease increased by 38.7%. In 2016 21050 new patients were patients undergoing dialysis for the first time and 30554 active patients undergoing dialysis regularly. In the province of Bali, chronic kidney disease sufferers are 0.2% or 78,000 patients (Rikesdas, 2018).

Chronic kidney disease is a progressive decline in kidney tissue function so that the remaining kidney mass is no longer able to maintain the body's internal environment. The definition of chronic kidney disease is that it is a pathophysiological process with diverse etiologies, resulting in a progressive decline in kidney function, and generally ending in kidney failure. Hemodialysis is a way to remove metabolic waste products in the form of solutions (urea and creatinine) and water in the blood through a semipermeable membrane or what is called a dialyzer (Thomas, 2017).

Hemodialysis adequacy is the adequacy of the recommended hemodialysis dose to obtain adequate results in chronic kidney disease patients undergoing hemodialysis therapy (NKF-K/DOQI, 2000). Achieving hemodialysis adequacy is necessary to assess the effectiveness of the hemodialysis procedures performed. Adequate hemodialysis will provide great benefits and enable kidney failure patients to continue carrying out their activities as usual.The results of this research are in line with research by Dewi (2010).

The same results were also obtained by Borzou's (2019) research on 42 hemodialysis patients who were divided into 2 groups with different Qb settings, namely 200 ml/minute and 250 ml/minute. The results were that in patients with Qb 200 ml/minute, 16.7% of patients achieved Kt/v > 1.3, while in patients with Qb 250 ml/minute, 26.2% of patients achieved Kt/v > 1.3. This shows that increasing Qb can increase the achievement of hemodialysis adequacy.

Based on the researcher's observations when conducting research and the final results of the research, those using Cimino access had no obstacles in increasing Qb, so that the process of achieving dialysis adequacy was achieved well. The obstacle that hinders the increase in Qb is those who use CDL access because the blood speed to the dialyzer is not enough blood volume if we increase the Qb high so that the machine sounds an alarm at the arterial pressure. However, all patients who had CDL access installed had all had Cimino access surgery, so for three months the average patient Qb only reached 200ml/m. After a healing period of 3 months, we can plan an increase in Qb according to the chest weight, Qb 4 times the patient's

body weight. Constrained by vascular access facilities that are not supported by optimal QB settings,

METHODS

This research was conducted at the Dialysis Installation at RSUD Dr. Zainoel ABidin Banda Aceh from 1 to 12 July 2023. The population in this study was 85 patients with chronic kidney failure who underwent hemodialysis in this unit. The technique uses purposive sampling using the Slovin formula.

RESULTS AND DISCUSSION

Results

a. Univariate analysis

Dialysis Adequacy

Table 5.1 Frequency Distribution of Dialysis Adequacy in Patients Undergoing Dialysis Therapy in Regional Hospital Hemodialysis Installations dr. Zainal Abidin

No	Dialysis Adequacy	Frequency	Percentage
1.	Adequate (kt/v 1.2 – 2.5)	64	75.2
2.	Inadequate (kt/v 0.50 – 1.19)	21	24.8
	Total	85	100

Based on table 5.1 above, it can be seen that dialysis adequacy in patients undergoing dialysis therapy in the regional hospital hemodialysis installationDr. Zainal AbidinThose who met the adequate category were 64 respondents (75.2%), inadequate were 21 respondents (24.8%).

Time of dialysis

Table 5.2. Frequency Distribution of Length of Dialysis Time in Patients Undergoing Dialysis Therapy at the Regional Hospital Hemodialysis Installation dr. Zainal Abidin

No	Long HD Duration	Frequency	Percentage
1.	Adequate (4 Hours – 5 hours)	80	94.1
2.	Inadequate (2 hours – 3.5 hours)	5	5.9
	Total	85	100

Based on table 5.2 above, it can be seen that the duration of dialysis time in patients undergoing dialysis therapy in the regional hospital hemodialysis

installationDr. Zainal AbidinThose with a long duration of dialysis were in the adequate category, 80 respondents (94.1%), those in the inadequate category were 5 respondents (5.9%).

Quick of blood

Table 5.3. Frequency Distribution of Quick of Blood (QB) in Patients Undergoing Dialysis Therapy at the Regional Hospital Hemodialysis Installation dr. Zainal Abidin

No	QB	Frequency	Percentage
1.	Adequate (Qb 200 – 400)	82	96.5
2.	Inadequate (Qb 100 – 195)	3	3.5
	Total	85	100

Based on table 5.4 above, it can be seen in patients undergoing dialysis therapy at the regional hospital hemodialysis installationDr. Zainal AbidinThose with adequate QB were 82 respondents (96.5%), those with inadequate QB were 3 respondents (3.5%).

Vascular Access

Table 5.4. Frequency Distribution of Vascular Access in Patients Undergoing Dialysis Therapy at the Regional Hospital Hemodialysis Installation dr. Zainal Abidin

No	Vascular Access	Frequency	Percentage
1.	Cimino	71	83.5
2.	CDL	14	16.5
3.	Femoral	0	0
	Total	85	100

Based on table 5.5 above, it can be seen that vascular access in patients undergoing dialysis therapy in the regional hospital hemodialysis installationDr. Zainal AbidinThose with cimino access were 71 respondents (83.5%), those with CDL access were 14 respondents (16.5%) and those with femoral access were 0 respondents (0%).

b. Bivariate Analysis

Table 5.5. Influence*Quick of Blood (QB)*Against Dialysis Adequacy In PatientsThose Undergoing Dialysis Therapy at the Regional Hospital's Hemodialysis Installation dr. Zainal Abidin

No	HD Adequacy	QB				Total		P value
		200ml/m-300ml/m		100ml/m-195ml/m				
		F	%	F	%	F	%	
1.	Adequate	65	76.5	0	1.0	82	96.5	0.001
2.	Inadequate	19	23.4	3	3.5	3	3.3	
	Amount	84	99.9	3	3.5	85	100	

Based on table 5.5, it can be seen that, of the 101 respondents undergoing hemodialysis therapy who met the dialysis adequacy category, 65 respondents (76.5%) who did not have adequate Qb, 19 respondents (23.4%) whose Qb was inadequate reached the respondent's adequacy (0%) whose Qb was inadequate did not reach adequacy 3 respondents (3.5%). Based on statistical tests, the p value was 0.001, which means the p value was <0.005, so Ho was rejected and Ha was accepted, namely that there was a significant influence of dialysis adequacy on blood flow velocity (QB) in patients undergoing hemodialysis therapy at the regional hospital's hemodialysis installation.Dr. Zainal Abidin.

Table 5.6. Influence*Time of Dialysis*Regarding Dialysis Adequacy in PatientsThose Undergoing Dialysis Therapy at the Regional Hospital's Hemodialysis Installation dr. Zainal Abidin

No	HD Adequacy	*Time Of Dialysis*				Total		P value
		4 hours – 5 hours		2 hours – 3.5 hours				
		F	%	F	%	F	%	
1.	Adequate	65	76.5	0	0.0	80	94.1	0.001
2.	Inadequate	15	17.7	5	5.9	5	5.9	
	Amount	80	94.2	5	5.9	85	100	

Based on table 5.6, it can be seen that, of the 85 respondents undergoing hemodialysis therapy who met the adequate dialysis time duration category, 65 respondents (76.5%) had inadequate time of dialysis, 15 respondents (17.7) had inadequate time of dialysis. who achieved adequate adequacy were 0 respondents (0) whose time of dialysis was inadequate who did not achieve adequacy were 5 respondents (5.9%). Based on statistical tests, the p-value is 0.001, which means the P value is <0.005, so Ho is rejected and Ha is accepted, that is, there is a significant influence on dialysis adequacy and time of dialysis in patients undergoing hemodialysis therapy at the regional hospital's hemodialysis installation. dr. Zainal Abidin**.**

Table 5.7. InfluenceVascular AccessRegarding Dialysis Adequacy in PatientsThose Undergoing Dialysis Therapy at the Regional Hospital's Hemodialysis Installation dr. Zainal Abidin

No	HD Adequacy	Vascular Access						Total		P value
		Cimino		CDL		Femoral				
		F	%	F	%	F	%	F	%	
1.	Adequate	58	68.3	8	9.5	0	0 %	71	83.5	0.004
2.	Inadequate	15	17.7	6	7.1	0	0 %	14	16.5	
	Amount	73	86	14	16.6	0	0 %	85	100	

Based on table 5.7, it can be seen that, of the 85 respondents undergoing hemodialysis therapy who met the category of dialysis adequacy with Cimino access, 58 respondents (68.3%) were not adequacy with Cimino access, 15 respondents (17.7%) were adequacy with CDL access. 8 respondents (9.5%) who did not have dialysis adequacy with CDL access 6 respondents (7.1%) who had adequate dialysis with femoral access 0 respondents (0%) who did not have adequate dialysis with femoral access 0 respondents (0%). Based on statistical tests, the p value is 0.004, which means the p value is <0.005, so Ho is rejected and Ha is accepted, namely that there is an influence of adequate dialysis with vascular access in patients undergoing hemodialysis therapy at the regional hospital's hemodialysis installation. dr. Zainal Abidin.

Discussion

Influence*Quick Of Blood (QB)*Regarding Dialysis Adequacy in PatientsThose Undergoing Dialysis Therapy

The research results showed that of the 85 respondents undergoing hemodialysis therapy who met the dialysis adequacy category, 65 respondents (76.5%) were not adequacy, 19 respondents (23.4%). Based on statistical tests, the p value was 0.001, which means the p value was <0.005, so Ho was rejected and Ha was accepted, namely that there was a significant influence of Dialysis Adequacy on blood flow velocity (QB) in patients undergoing hemodialysis therapy at the Regional Hospital Hemodialysis Installation.Dr. Zainal Abidin.

The Qb value setting is determined based on the patient's body weight which is at least 4 times the body weight in kilograms. This is in accordance with Kim's (2018) research on 36 hemodialysis patients. Patients with a body weight of <65 kg had their Qb increased by 15% and patients with a body weight of >65 kg had an increase of 20%. The results show that a gradual increase in Qb of 15-20% can increase hemodialysis adequacy (Gatot, 2019).

The same results were also obtained by Borzou's (2019) research on 42 hemodialysis patients who were divided into 2 groups with different Qb settings, namely 200 ml/minute and 250 ml/minute. The results were that in patients with Qb 200 ml/minute, 16.7% of patients achieved Kt/v > 1.3, while in patients with Qb 250

ml/minute, 26.2% of patients achieved Kt/v > 1.3. This shows that increasing Qb can increase the achievement of hemodialysis adequacy.

Influence*Time Of Dialysis*Regarding Dialysis Adequacy in PatientsThose Undergoing Dialysis Therapy

The results showed that of the 85 respondents who underwent hemodialysis therapy, 65 respondents (76.5%) met the dialysis adequacy category and 15 respondents (17.7%) did not have dialysis adequacy..Based on statistical tests, the p value is 0.001, which means the p value is <0.005, so Ho is rejected and Ha is accepted, that is, there is an influence of dialysis adequacy and time of dialysis in patients undergoing hemodialysis therapy at the regional hospital's hemodialysis installation.Dr. Zainal Abidin.

The results of Borzou's research stated that the longer the duration or hemodialysis session, the more urea clearance would be optimized so that adequacy could be achieved and the patient's quality of life would increase. Inadequate duration of hemodialysis, namely <4 hours for hemodialysis 3 times per week and <5 hours for hemodialysis 2 times per week will result in achieving suboptimal adequacy (Borzou, 2019).

Based on the researchers' observations when conducting the research and the final results of the research, all respondents in this study underwent hemodialysis with a frequency of 2 times per week, a duration of 4 hours for 80 respondents (94.1%), and a duration of 3 hours for 5 respondents (5.9%) . The hemodialysis dose given only ranges from 8 to 10 hours per week, which is not in accordance with the hemodialysis dose determined by Pernefri's regulations. So the duration of hemodialysis has not reached the ideal dose of 10 to 15 hours per week. Of course, this has an impact on the patient's achievement of hemodialysis adequacy. The longer the duration of dialysis, the greater the urea clearance during the hemodialysis process. So the duration of hemodialysis quite influences the adequacy of hemodialysis.

InfluenceVascular AccessRegarding Dialysis Adequacy in PatientsThose Undergoing Dialysis Therapy at the Regional Hospital's Hemodialysis InstallationDr. Zainal Abidin.

The results of the study showed that of the 85 respondents who underwent hemodialysis therapy, it could be seen that 71 respondents (83.5%) used Cimino access, 14 respondents (16.5%) used CDL access and 0 respondents (0%) had adequate femoral access. with cimino access 58 respondents (68.3%), with adequacy with CDL access 8 respondents (9.5). Based on statistical tests, the P value is 0.004, which means the P value is <0.005, so Ho is rejected and Ha is accepted, that is, there is an influence on adequate dialysis with vascular access in patients undergoing hemodialysis therapy at the hemodialysis installation.Dr. Zainal Abidin.

Vascular access is an action taken to facilitate hemodialysis access and aims to increase venous flow to the hemodialysis machine. The requirements for good vascular access are easy repeated access to the circulation, blood flow can be closed

easily and quickly, long lasting, free from complications, and resistant to infection. Therefore Cimino vascular access (Arterio Venousa Shunt) is the most recommended access for hemodialysis patients (Sukentro, 2019).

Based on the researcher's observations when conducting research and the final results of the research, those using Cimino access had no obstacles in increasing Qb, so that the process of achieving dialysis adequacy was achieved well. The obstacle that hinders the increase in Qb is those who use CDL access because the blood speed to the dialyzer is not enough blood volume if we increase the Qb high so that the machine sounds an alarm at the arterial pressure. However, all patients who had CDL access installed had all had Cimino access surgery, so for three months the average patient Qb only reached 200ml/m. After a healing period of 3 months, we can plan an increase in Qb according to the chest weight, Qb 4 times the patient's body weight. Constrained by vascular access facilities that are not supported by optimal QB settings.

CONCLUSION

Based on the results of research conducted thatThe p value obtained was 0.001, which means the p value was <0.005, so Ho was rejected and Ha was accepted, namely that there was a significant influence of Dialysis Adequacy on blood flow velocity (QB) in patients undergoing hemodialysis therapy at the Hemodialysis Installation at Dr. RSUD. Zainal Abidin.

ACKNOWLEDGEMENT

Based on the results of this research, it is recommended for further research todevelop research on the dominant factors that influence the achievement of hemodialysis adequacy to further increase knowledge about hemodialysis.

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