

Relationship Between Reuse Dialyzer With Adequacy of the Dialysis in Hemodialysis Patients at RSUD Pasar Minggu South of Jakarta

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ABSTRACT

Background: Dialyzer reuse is a type of dialyzer used in hemodialysis patients. Its use aims to reduce dialysis costs, reduce symptoms of first use syndrome on new dialyzers and improve biocompatibility. Dialysis adequacy is an indicator of determining the adequacy of the dose in hemodialysis patients. The purpose of this study was to determine the relationship between reuse dialyzer and dialysis adequacy in hemodialysis patients at Pasar Minggu Regional General Hospital. **Method:** This research was conducted at the Pasar Minggu Hospital with the policy of the hospital using reuse dialyzer 6 times. This study used analytical observation with a retrospective approach with a sample of 51 respondents who used reuse dialyzer. Univariate analysis was used to determine the frequency distribution and average. The bivariate analysis used the One Way Anova test with p value <0.05. **Results:** The results of the study the relationship between the use of the first dialyser tube with the first, second, third and fourth reuse is significant, but the use of the fifth and sixth reuse is not significant. **Conclusion:** This is possible because the subsequent reuse has decreased the total cell volume so that improper reuse will have an inadequate effect on the hemodialysis process.

Keywords: Dialysis Adequacy; Dialyzer Reuse; Hemodialysis

1. INTRODUCTION

Patients with chronic renal failure must use kidney replacement therapy as an option to maintain bodily functions (1). Renal replacement therapy can be performed in the form of kidney transplantation or dialysis which consists of peritoneal dialysis and hemodialysis. The most common therapy is hemodialysis (2). Hemodialysis aims to remove metabolic waste from the bloodstream such as water, hydrogen, sodium, potassium, urea, creatinine, uric acid, and other substances through a semi-permeable membrane as a separator of blood and dialysate fluid on the dialyzer where diffusion and osmosis occur. and ultrafiltration (3).

One of the hemodialysis actions is using a dialyzer, there is the use of a new dialyzer (non-reuse dialyzer) and reuse of a

dialyzer (reuse dialyzer). Reuse dialyzer is the procedure of using a dialyzer more than once in the same patient. After being used in the hemodialysis process, the dialyzer is cleaned and sterilized using either a machine or manually. The use of reuse dialyzer in Indonesia began around 1998 as a result of the monetary crisis, Perseroan Terbatas Asuransi Kesehatan (PT. ASKES), which is a funder for health insurance for civil servants, implemented a reuse system (3).

Adequacy of the recommended dosage to obtain adequate results as a benefit of the hemodialysis process undertaken by kidney failure patients is called dialysis adequacy. Adequacy of dialysis is the adequacy of the number of dialysis processes to maintain and ensure optimal and best conditions in uremic patients to prevent complications due to uremic toxin build up (4).

The main problem that occurs is whether there is a difference in the value of adequacy with the use of the first to sixth dialyzer reuse tubes. This is because the K is how much blood is flowed into the dialyzer and is expressed in milliliters / minute (mL / minute) or it is called Quick of Blood (QB), t is the length of the hemodialysis process which is calculated in minutes and the hemodialysis process generally takes 4 - 5 hours, and V is the volume of water in the patient's body and the volume of water in the body is 60% of body weight (6).

The results of the preliminary study in the hemodialysis room at the Pasar Minggu Hospital recorded an increase in the number of visits and hemodialysis actions from November 2018, which was 790 and in December 2018, it was 825. The number of hemodialysis patients using reuse dialyzer was 51 patients. Every day there are approximately 30 actions carried out and divided into two shifts, namely morning and afternoon using non-

Adequacy value is obtained through the urea kinetic model with the Kt / V formula (5).

reuse dialyzer tubes and reuse dialyzers. The frequency of visits to patients who received hemodialysis procedures per week was 2 times and the provision of using a dialyzer reuse tube at Pasar Minggu Hospital was a maximum of six times, and there were differences in the adequacy value of the first, second, and sixth use. The reuse tubes that have been used will be tested with the Renatron reuse machine for 57 stages before being used again for the next hemodialysis schedule. The type of dialyzer reuse tube used in Pasar Minggu Hospital is high flux.

Based on the formulation of the problem, the researcher's question "Is there a relationship between reuse dialyzer and dialysis adequacy in hemodialysis patients at the Pasar Minggu Regional General Hospital?".

2. RESEARCH METHODS

This study uses the analytical observation method, with a retrospective approach where data collection starts from the effects or consequences that have occurred or begins with the dependent variable and then looks for the independent variable (7).

The total population of patients with chronic kidney failure who underwent hemodialysis using reuse dialyzer was 51 people with a frequency of 2 visits of patients who received hemodialysis in the Hemodialysis Room at the Pasar Minggu Regional General Hospital, South Jakarta.

The sampling method used in this study is non-probability sampling with a purposive sampling approach. Samples were taken using total sampling of patients undergoing hemodialysis using reuse dialyzer as many as 51 patients at Pasar Minggu Hospital with due

observance of the inclusion and exclusion criteria that exist as a reference for the study. This study's inclusion criteria were chronic renal failure patients undergoing hemodialysis at Pasar Minggu Hospital, hemodialysis patients using reuse dialyzer, and patients who were willing to become respondents by signing informed consent.

In this study, the instrument used was the observation sheet. Research using the observation sheet is the collection of data by means of observation, without giving intervention to the variables studied (8). The assessment sheet for the characteristics of the respondents includes the initials name, age, gender, body weight, length of time undergoing hemodialysis and the frequency of hemodialysis per week. Observation sheet to record results including duration of hemodialysis, number of dialyzer reuses being used, quick of blood (QB), type of vascular access and Kt / V adequacy value (9)

3. RESULT AND DISCUSSION

The results of this study for the characteristics of the respondents are as follows:

Table 1. Age Distribution of Reuse Dialyzer Patients in the Hemodialysis at Pasar Minggu Hospital (n=51)

Variabel	Mean	SD	Min-Max
Age	53,41	10,530	27-76
Periode of time HD	2,598	1,135	1-5
Body wieght Post HD	56,08	10,182	31,33-76,60

Based on table 1, it is found that the average age of the respondents is 53.41 years. The patient underwent hemodialysis with a frequency of 2 times a week with a duration of 5 hours per meeting. The average periode of time HD in this study was 2,598 years. This contradicts research (10) which revealed that periode of times with an average time was 3.5 years. The average post

hemodialysis body weight of the respondents in this study was 56.08 kg. Hemodialysis patients who used reuse dialyzer had the lowest post hemodialysis body weight of 31.33 kg and the highest body weight of 76.60 kg. This is not much different from the results of research (11) which revealed that the average post hemodialysis body weight was 59.57 kg.

Table 2. Frequency Distribution of Gender of Reuse Dialyzer Patients in the Hemodialysis at Pasar Minggu Hospital (n=51)

Variabel	Frekuensi	%
Gender		
a. Male	28	54,9
b. Female	23	45,1
Vascular Access		
a. Cimino	45	88,2
b. CDL	6	11,8

Based on table 2, the results of using vascular access in hemodialysis patients who use reuse dialyzer with Cimino are 45 respondents with a percentage of 88.2% and 6 respondents using CDL vascular access with a

percentage of 11.8%. This is in line with the study (10) that hemodialysis patients use cimino more frequently than those who use CDL. Research [21] says 66.4% of patients use cimino.

Table 3. Distribution of Quick of Blood for Reuse Dialyzer Patients in the Hemodialysis at Pasar Minggu Hospital (n=51)

Characteristics	Mean	SD	Min-Max
<i>New Quick of Blood</i>	247,25	33,291	180-300
<i>Quick of Blood 1</i>	240,39	32,524	150-300
<i>Quick of Blood 2</i>	254,90	28,452	190-300
<i>Quick of Blood 3</i>	253,14	26,191	180-300
<i>Quick of Blood 4</i>	253,73	32,185	180-300
<i>Quick of Blood 5</i>	254,71	31,708	180-300
<i>Quick of Blood 6</i>	257,25	23,755	200-300

Based on table 3, the lowest value of the overall quick of blood reuse dialyzer is 180 mL/minute with the highest

value of 300 mL / minute. The results in this study are not much different from research (11) that the average quick of blood is 238.81 mL/minute(12).

Table 4. Distribution of Trans Membrane Pressure for Reuse Dialyzer Patients in the Hemodialysis at Pasar Minggu Hospital (n=51)

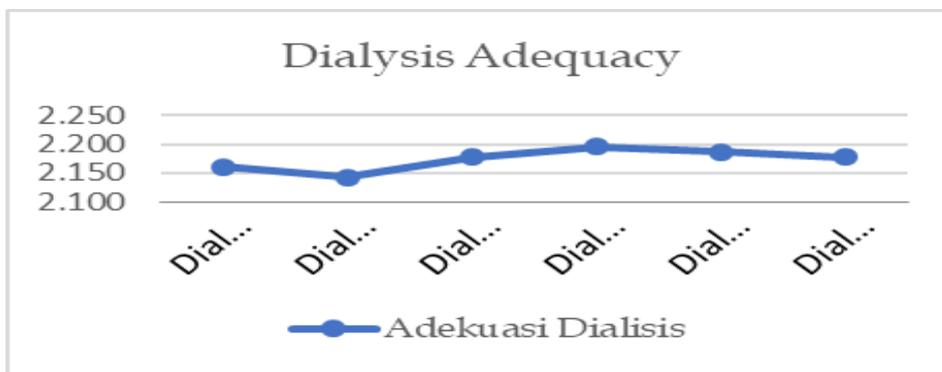
Characteristics	Mean	SD	Min-Max
<i>New Trans Membrane Pressure</i>	83,521	8,614	64,80-99,40
<i>Trans Membrane Pressure 1</i>	84,200	8,880	62,60-100,20
<i>Trans Membrane Pressure 2</i>	84,600	8,494	60,20-98,60
<i>Trans Membrane Pressure 3</i>	85,341	8,840	57,00-99,80
<i>Trans Membrane Pressure 4</i>	84,933	7,377	68,40-100,60
<i>Trans Membrane Pressure 5</i>	84,474	7,865	60,60-100,80
<i>Trans Membrane Pressure 6</i>	83,760	7,945	62,40-95,80

Based on table 4, the lowest trans membrane pressure reuse dialyzer value is 64.80mmHg and the highest is 99.40mmHg. The lowest trans value of the first dialyzer membrane pressure reuse was 62.60mmHg and the highest was 100.20mmHg. The second lowest trans membrane pressure reuse dialyzer value was 60.20mmHg and the highest was 98.60mmHg. The third lowest trans membrane pressure reuse dialyzer value was 57.00mmHg

and the highest was 99.80mmHg. The lowest trans value for membrane pressure reuse dialyzer was 68.40mmHg and the highest was 100.60mmHg. The lowest trans value for membrane pressure reuse dialyzer is 60.60mmHg and the highest is 100.80mmHg. The lowest trans membrane pressure reuse dialyzer value was 62.40mmHg and the highest was 95.80mmHg.

Table 5. Distribution of Dialysis Adequacy for Reuse Dialyzer Patients in the Hemodialysis at Pasar Minggu Hospital (n=51)

Characteristics	Mean	SD	Min-Max
<i>New Dialysis Adequacy</i>	2,16	0,359	1,46-3,19
<i>Dialysis Adequacy 1</i>	2,14	0,358	1,24-3,34
<i>Dialysis Adequacy 2</i>	2,18	0,392	1,30-3,19
<i>Dialysis Adequacy 3</i>	2,17	0,341	1,62-3,19
<i>Dialysis Adequacy 4</i>	2,19	0,355	1,54-3,28
<i>Dialysis Adequacy 5</i>	2,18	0,352	1,52-3,15
<i>Dialysis Adequacy 6</i>	2,17	0,338	1,72-2,97



Graph 1. Overview of Dialysis Adequation in Each Reuse Dialyzer

Table 6. The Relationship between Reuse Dialyzer and Adequacy of Dialysis in Hemodialysis Patients in Hemodialysis at Pasar Minggu Hospital (n=51)

Variabel Independen	Variabel Dependen	P value
New reuse dialysis adequacy	New reuse dialysis adequacy	0,000
	Reuse dialysis adequacy 2	0,045
	Reuse dialysis adequacy 3	0,044
	Reuse dialysis adequacy 4	0,002
	Reuse dialysis adequacy 5	0,109
	Reuse dialysis adequacy 6	0,081

Based on table 6, the results obtained from 51 respondents who used the reuse dialyzer starting from the new to the sixth were based on the results of the Anova one way test that there was an effectiveness in using the first reuse dialyzer (p value = 0,000), the second reuse dialyzer (p value = 0.045), reuse dialyzer third (p value = 0.044) and fourth reuse dialyzer (p value = 0.002) with dialysis adequacy value, but at the fifth reuse dialyzer (p value = 0.109) and sixth (p value = 0.081) there is no relationship with dialysis adequacy value. This is in line

with research (13) that it is recommended to use a proper dialyzer reuse for the fourth reuse because the subsequent reuse has decreased the total cell volume so that improper reuse will have an inadequate effect on the hemodialysis process. The results of this study do not agree with the research (11) that there is no effect of using the dialyzer reuse 7 times with the URR and Kt / V values. However (10) in her study revealed that reuse of artificial kidneys had no effect on dialysis adequacy.

The results of the study that the average dialysis adequacy of patients using the first dialysis tube, the first to sixth reuse were above 1.8. This means that the patient's dialysis adequacy is still normal. The results of the study the relationship between the use of the first dialyser tube with the first, second, third and fourth reuse is significant, but the use of the fifth and sixth reuse is not significant. This is possible because the subsequent reuse has decreased the total cell volume so that improper reuse will have an inadequate effect on the hemodialysis process

4. CONCLUSION

The conclusion from the results of this study is that the average age of the respondents is 53 years, periode of time HD is 2.5 years, body weight post HD is 56 kg, the gender of the respondents is 54.9% male, and the cimino vascular access is 88.2. %. The average value of the new quick blood dialysis up to the 6th quick blood dialysis is 240-257 ml / minute. The average value of the new Trans Membrane Pressure (TMP) up to the 6th TMP is 83-85 mmHg. The average value of new alkalisation adequacy until the 6th dialysis adequacy was 2.14 - 2.19. The results of this study are in line with the research that the dialysis adequacy value at the frequency of hemodialysis 2x a week for 4 - 5 hours, the result is > 1.8 (11).

However, the use of reuse dialyzer is an option for financing patients undergoing hemodialysis, because BPJS covers these costs. However, it is necessary to consider the recommendation to use the dialyze reuse how many times. The Indonesian Nephrology Board of Directors issued a regulation that the reuse dialyzer can only be used up to 7 times.

5. SUGGESTION

With this research, it is hoped that hemodialysis patients should know that achieving adequate dialysis can improve the patient's quality of life, good nutrition, normal blood pressure, no clinical symptoms related to anemia and uremia, and the achievement of acid-base balance in the body so that it becomes a reference for patients. Always comply with the liquid limits that have been determined. Nurses should know the factors that can affect the value of dialysis adequacy so that they can educate and implement optimal nursing care for hemodialysis patients. Hospitals should always pay attention to the adequacy of dialysis hemodialysis patients who use reuse dialyzer.

It is hoped that it can be used as basic information by future researchers related to the relationship of reuse dialyzer to the value of dialysis adequacy in hemodialysis patients and it is hoped that it can develop further research by expanding the discussion by changing or adding other variables.

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