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ABSTRACT

Chronic Kidney Disease (CKD) is one of the global health issues. In 2017, there were 697,5 million people diagnosed with CKD globally. In 2020, kidney diseases account for the greatest number of outpatients with 13.350 cases at dr. Doris Sylvanus Hospital Regional Public Hospital. In End-Stage Renal Disease (ESRD), the kidneys are not working properly. Therefore, dialysis or transplantation is needed to maintain life. Dialysis is a form of renal replacement therapy and one of the forms of dialysis is hemodialysis. Hemodialysis requires a long treatment time and routine schedule which can make patients experience difficulties confronting the disease, ultimately affecting their quality of life. This study aims to prove the correlation between the duration of hemodialysis and the quality of life at dr. Doris Sylvanus Regional Public Hospital. This is an analytic observational study using a cross-sectional design. The total sample of this study is 100 using purposive sampling. The statistical test used in this study is Spearman's Correlation. There is a significant and positive correlation between the duration of hemodialysis and the quality of life of CKD patients undergoing hemodialysis in dr. Doris Sylvanus Regional Public Hospital with <math><0,05</math> p-value and low correlation ($r = 0,258$). There is a low correlation between the duration of hemodialysis and quality of life.

Keywords- Duration of Hemodialysis, Chronic Kidney Disease, Quality of Life

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I. INTRODUCTION

Chronic Kidney Disease (CKD) is a global public health problem.^[1] CKD itself is defined as a kidney disorder characterized by structural or functional abnormalities of the kidneys for ≥ 3 months with or without a decrease in glomerular filtrate rate (GFR) and a decrease in GFR < 60 mL/min/1.73 m² for ≥ 3 months with or without kidney damage or known as Chronic Renal Failure (CRF).^[2] The prevalence and incidence of CKD continue to increase, in 2017 as many as 697.5 million people worldwide were diagnosed with CKD.^{[1],[3]} The results of the 2018 Riskesdas showed an increase in the prevalence of CRF in the Indonesian population aged ≥ 15 years to 0.38% from the previous 0.2% in the 2013 Riskesdas.^[4] The 2018 Riskesdas also showed an increase in the prevalence of CRF in Central Kalimantan Province by 0.2% in the 2013 Riskesdas to 0.31% or a total of 15,281 people.^[5] The data in 2020 revealed that kidney diseases account for the greatest number of outpatients with 13,350 cases at dr. Doris Sylvanus Hospital Regional Public Hospital.^[6] Patients with CKD gradually lose kidney function until they reach End-Stage Renal Disease. In end-stage CKD, the kidneys cannot work as supposed to, so a kidney transplant or dialysis is needed to maintain life.^[7]

Dialysis is one of the kidney replacement therapies for filtering blood which is equipped with artificial equipment to remove excess water, solutes, and toxins. Hemodialysis itself is a method in which toxins or metabolic waste substances are removed from the body when the kidneys cannot perform their normal functions.^[8] The Indonesian Renal Registry (IRR) recorded that in 2018 as many as 132,142 people underwent hemodialysis.^[9] Hemodialysis therapy requires a long time and a regular hemodialysis schedule which lasts 4-5 hours for 2-3 times per week which makes hemodialysis patients experience difficulties confronting the burden of this disease.^[10]

Quality of life according to WHO is defined as an individual's perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns.^[11] In contrast to the past when the only attention was on prolonging the patient's survival, nowadays the quality of life of the patients is of equal importance.^[12] Improved patients' adjustments to CKD and hemodialysis will result in better performance and quality of life. longer duration of hemodialysis will improve uremic symptoms which can help improve quality of life.^[13]

The increasing number of CKD patients has the potential in the rise of the number of patients with poor quality of life. Time elapsed since the start of hemodialysis can affect quality of life.^[13] Therefore,

this study was designed to measure the correlation between duration of hemodialysis and quality of life.

II. MATERIALS AND METHODS

Study design and population

This is an analytical observational study using a cross-sectional design. This study uses primary datasets for analysis obtained through interviews with patients at the hemodialysis unit of Dr. Doris Sylvanus Regional Public Hospital Palangka Raya. The KDQOL-SF™ 1.3 questionnaire was used for the assessment of the quality of life. The sample of this study consisted of 100 samples and were selected using purposive sampling. The inclusion criteria were as follows:

1) patients that have undergone hemodialysis for at least 3 months; and 2) patients that have 2 times per week hemodialysis schedule. The exclusion criteria include: 1) patients that have impaired consciousness; and 2) patients that have communication disorders.

Dependent and independent factors

The dependent variable in this study was quality of life. The independent variable was the duration of hemodialysis.

Ethical approval

This study has been approved for ethical clearance by the Committee of Medical Research Ethics of Faculty of Medicine Palangka Raya University.

III. STATISTICAL ANALYSIS

The statistical analyses were performed using an Excel spreadsheet to score KDQOL-SF™ 1.3 and IBM® SPSS® Statistics Version 26. Descriptive statistics such as frequency and percentage were used; however, for continuous data, mean was used. Spearman's correlation was used to measure the association between variables.

IV. RESULTS

Table 1: General Characteristics of Participants

Characteristics	N	%
Sex		
Male	60	60
Female	40	40
Age (Year)		
26-35	8	8
36-45	25	25
46-55	40	40
56-65	23	23
>65	3	3

Based on the table above, the gender distribution is greater for males (60%) and the average age of the respondents is 53 years.

Table 2: Duration of Hemodialysis

Duration of Haemodialysis (month)	Frequency of Patients
3	10
4	7
5	4
6	5
7	6
8	6
9	3
10	6
12	10
13	2
14	4
15	1
16	1
18	7
20	1
21	1
23	2
24	7
36	4
48	5
57	1
60	4
70	1
84	1
96	1
Mean	18 months

Based on the table above, the average length of time a patient who undergoes hemodialysis is 18 months.

Table 3 : Quality of Life of Hemodialysis Patients

No	Quality of Life Mean per patients	Frequency (n)
1	41.48	1
2	46.14	1
3	46.59	1
4	46.71	1
5	48.03	1
6	48.05	1
7	48.23	1
8	48.42	1
9	48.50	1
10	48.69	1
11	49.02	1
12	49.47	1
13	49.57	1
14	50.33	1
15	50.66	1
16	50.77	1
17	51.12	1
18	51.39	1
19	53.46	1
20	53.65	1
21	53.82	1
22	53.92	1
23	54.51	1
24	55.56	1
25	56.26	1
26	56.35	1
27	57.02	1
28	57.03	1
29	57.10	1
30	57.19	1

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No	Quality of Life Mean per patients	Frequency (n)
31	57.21	1
32	57.34	1
33	57.67	1
34	57.79	1
35	57.99	1
36	58.07	1
37	58.08	1
38	58.09	1
39	58.10	1
40	58.25	1
41	58.50	1
42	58.61	1
43	59.46	1
56	61.72	1
57	61.74	1
58	61.78	1
59	62.19	1
60	62.51	1
61	62.61	1
62	62.93	1
63	63.10	1
64	63.34	1
65	63.50	2
66	63.55	1
67	63.60	1
68	64.02	1
69	64.08	1
70	64.45	1
71	64.51	1
72	65.33	1
73	66.39	1
74	66.90	1
75	67.40	1
76	67.44	1
77	68.08	1
78	68.45	1
79	68.84	1
80	68.90	1
81	68.98	1
82	69.91	1
83	69.93	1
84	69.95	1
85	70.19	1
86	70.28	1
87	70.29	1
88	71.37	1
89	71.64	1
90	71.68	1
91	71.94	1
92	72.34	1
93	74.42	1
94	76.39	1
95	76.67	1
96	81.13	1
97	82.50	1
98	84.25	1
99	89.76	1
Overall QoL mean=61,13		

In the table above, the interpretation of the quality of life scales is measured by categories of bad (score range = 0-24), moderate (score range = 25-60), good (score range = 61-83), very good (score range = 84-99) and excellent with a score of 100. The Average quality of life score using the KDQOL-SF 1.3 questionnaire are 61.13 or the average quality of life for HD patients at dr. Doris Sylvanus Regional Public Hospital is good.^[14]

Table 4 : Summary of Scores of QoL in Different Items

Items	n	Mean	Interpretation
Symptoms/problem list	100	80.23	Good
Effects of kidney disease	100	79.97	Good
Burden of kidney disease	100	52.08	Moderate
Work status	100	24.83	Poor
Cognitive function	100	91.74	Very Good
Quality of social interaction	100	80.15	Good
Sexual function	100	36.39	Moderate
Sleep	100	59.20	Moderate
Social support	100	97.53	Very Good
Dialysis staff	100	85.80	Very Good
Overall Health	100	70.54	Good
Patient satisfaction	100	80.81	Good
Physical functioning	100	62.75	Good
Role--physical	100	09.96	Poor
Pain	100	64.18	Good
General health	100	57.76	Moderate
Emotional well-being	100	32.10	Moderate
Role--emotional	100	11.12	Poor
Social function	100	74.79	Good

Based on the table above, there are 3 scales that show very good results (score 84-99), namely cognitive function, social support, and dialysis staff encouragement. Then, there are 8 indicators that show good results (61-83), namely symptoms/problems, effects of kidney disease, quality of social interaction, overall health, patient satisfaction, physical function, perception of pain, and social function. After that, there are 6 indicators that show moderate results (25-60), which are the burden of kidney disease, sleep quality, general health, sexual function, emotional well-being, and energy/fatigue. Finally, there are 3 indicators that show poor results (0-24), which are work status, physical role, and emotional role.

Table 5 : Correlations Duration of hemodialysis between quality of life

Correlations			
Independent Variable	Dependent Variable	p-value	r
Duration of hemodialysis	Quality Of Life	0,009	0,258

Based on the table above, the results of the Spearman correlation test on the variable duration of HD and quality of life are p-value = 0.009 (<0.05), which means that there is a significant correlation between the two variables and the correlation coefficient value or r = 0.258, which means the level of relationship between the two the variables is weak with a positive correlation.

V. DISCUSSION

Based on the study of HD patients at dr. Doris Sylvanus Regional Public Hospital, namely 11 quality of life scales showing very good to good results and 9 other scales showing moderate to poor results. Burden of kidney disease, work status, and physical roles show results below the good category. This happens because patients with CKD who undergo HD experience symptoms of tingling sensation, fatigue, and disability to perform certain activities. The decline in physical quality is shown by the patient becoming sick and undergoing hemodialysis due to physical weakness which leads to patient's activities becoming reduced and limited. Long-term HD therapy places a heavy burden on the patient. Several factors such as fatigue and decreased physical ability, disruption of social and mental functions affect the patient's condition. Lakshmi *et al.*¹⁵ in their study said that patients who are on HD therapy and have a steady job is a challenge in itself so the frequency of patients who are still working is low (10-30%).^[15]

The cognitive function scale is a scale regarding the ability to carry out activities such as thinking, doing things that require concentration, confusion, doing various activities at once, and responding slowly to things other people say or do. One of the causes of low cognitive function is uremia syndrome. Research by Cukor, et al. showed that there was an increase in neuropsychological function after undergoing hemodialysis.¹⁶ In addition, pain in HD patients shows good results. Pain in HD patients has a relationship with uremia symptoms such as peripheral polyneuropathy, vascular disease, calciphylaxis. This can happen because hemodialysis can improve uremia symptoms.¹⁷

Sexual function of HD patients at dr. Doris Sylvanus Regional Public Hospital shows moderate results, there are several mechanisms why this can happen. The main factors causing impotence in uremia patients are hormonal imbalances, vascular/neurogenic disorders, pharmacological therapy, and psychological problems.¹⁸

The results of the sleep quality scale for CKD patients undergoing HD show moderate results. This can occur due to discomfort, stress, cramps, anxiety, and not knowing what thoughts are causing the patient to be unable to sleep.¹⁹

Patients' satisfaction and service quality of dialysis staff are good because there is a collaboration between health teams that provide effective services to HD patients thereby increasing the patient satisfaction score.²⁰

The results of emotional well-being and emotional role scales are moderate and poor. Problems that may be encountered on this scale are problems with work or daily activities due to depression and anxiety because a lot of time is reduced for activities. Patients' responses to CKD vary, ranging from sadness, fear, feeling down, tense, and feeling alone.²¹

The results of the energy/fatigue scale show poor results. The most common psychological factors that cause fatigue are depression and anxiety. In general, depression and anxiety are associated with peripheral activation of immune-inflammatory pathways resulting in neurological inflammation and neuroprogressive changes including reduced neuroplasticity, neurogenesis, increased neuronal degradation, and reduced release of neurotransmitters such as noradrenaline which can result in fatigue.²²

The average score of the patient's quality of life assessed from various aspects showed good results (61.13). The good quality of life of end-stage CKD patients is partly due to the role of the dopamine, serotonin and oxytocin. Dopamine plays a role in a person's adaptive behavior. The dopaminergic system is activated by happy stimuli, such as the support of a spouse, children, family, and friends. Patients undergoing HD are required to be able to adapt to new habits, routines, lifestyles and strict food and drink arrangements. This adaptation process goes well when the patient gets pleasant stimulation in the form of support from those closest to him and a feeling of being wanted. Dopamine helps HD patients to adapt to these changes and learn new situations so that the patient's quality of life increases.²³

Oxytocin and Endorphin also play a role in the quality of life of HD patients, these two hormones play a role in encouraging happiness and reducing pain. Oxytocin production increases when a person has sexual intercourse, sexual intercourse will increase happiness and create a feeling of happiness.²⁴ Endorphins also play a role in the quality of life of HD patients, for example when the patient has to feel pain due to the insertion of a needle during the HD process which induces pain. The pain that arises makes the pituitary gland secrete endorphins with the aim of calming HD patients. The music played during the HD process at dr. Doris Sylvanus Hospital also plays a role in endorphins secretion. Listening and enjoying music fosters a feeling of happiness. Morhenn *et al.*²⁵ and Murdingsih *et. al*²⁶ stated that massage can trigger the secretion of oxytocin and endorphins. This can also be associated with one of the symptoms of CKD, namely muscle pain which can be reduced by giving massage.^{25,26}

Based on the test results using SPSS Statistics, it was found that the duration of hemodialysis and quality of life had a significant relationship and the correlation was weak and positive. The duration of hemodialysis has a significant correlation with quality of life because there is an improvement in uremia symptoms and the patient is already in the acceptance phase which makes patients more able to adapt to changes due to CKD and ultimately makes the quality of life better.

VI. CONCLUSION

- 1) The results of the study taken in the hemodialysis unit at dr. Doris Sylvanus Regional Public Hospital showed that the average duration hemodialysis was 18 months.
- 2) The results of the study show the average quality of life of patients is 61.13 (good)
- 3) The results showed that there was a significant relationship ($p\text{-value} = <0.05$) between the duration of hemodialysis and the quality of life of CKD patients undergoing hemodialysis in dr. Doris Sylvanus Regional Public Hospital Palangka Raya with a positive correlation and a weak relationship (correlation coefficient value or $r = 0.258$)

VII. CONFLICT OF INTEREST

The authors declare no conflicts of interest

VIII. LIMITATIONS

The limitation in this study was during the interviews, the KDQOL-SF 1.3 questionnaire instrument was using the Indonesian version which makes some respondents experience difficulties understanding the intent of the questions on the questionnaire sheet because the language in the questionnaire used standard language so the researcher had to repeatedly explain the questions on the questionnaire sheet. In addition, medical conditions such as the adequacy of the hemodialysis, as well as functional status such as anemia may affect the patient's quality of life

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