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Hemodialysis (HD) Duration is Associated with The Quality of Life of Patients with Kidney Failure Undergoing Hemodialysis

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ABSTRACT

Hemodialysis is an early procedure that can quickly save the lives of patients with end-stage renal disease. Various studies show inconsistent results for several factors related to sociodemographics, such as age, gender, education, occupation, and income. Hemoglobin levels and hemodialysis access are rarely discussed, and the length of undergoing hemodialysis is rarely discussed. Therefore, this study investigates the variables related to the quality of life of chronic renal failure patients receiving hemodialysis. This study is a descriptive correlational study using a cross-sectional design. Purposive sampling was conducted with 60 chronic renal failure patients undergoing hemodialysis from July to October 2023 at Abdul Wahab Sjahranie Regional General Hospital, Samarinda. This research instrument uses a questionnaire; the first part is a fill-in sheet that includes (age, gender, education, occupation, income, length of hemodialysis, hemoglobin (HB) level, and hemodialysis access (HD). The second component is an instrument used by researchers to assess the patient's quality of life, the WHOQoL instrument. The logistic regression test was utilized in the statistical analysis. The length of hemodialysis is the most dominant factor in the quality of life of patients with kidney failure undergoing hemodialysis (p-value=0.029, with Odd-Ratio (OR)=10.86, 95%CI=1.282-92.036). The results of this study indicate that the length of hemodialysis is the most dominant factor in the patient's quality of life. Thus, it is important to make educational efforts and provide assistance to family and peer nurses during hemodialysis to prevent the emergence of negative thoughts that worsen the quality of life for patients.

INTRODUCTION

Chronic renal failure is an incurable, progressive disease with high morbidity and mortality. The Centers for Disease Control (CDC) also reports that kidney failure is a major health problem where 1 in 7 or 15% (37 million) of the United States population has kidney failure. The mortality rate is estimated to touch 6,953-10,316 from 1 February to 31 August 2021 (CDC, 2021). Patients with kidney failure in Indonesia in 2018 were estimated to be 2 per 1000 population or 499,800 experiencing kidney failure. North Kalimantan is first with 6.4 percent of kidney failure cases, while East Kalimantan is 16th (Ministry of Health Republic Indonesia, 2018).

Hemodialysis is an early procedure that can quickly save the lives of patients with end-stage renal disease (Janice et al., 2022). However, this therapy cannot restore renal function, which is why numerous indications of physical pain occur. Fatigue is the most prevalent complaint, and dialysis imbalance syndrome is a typical symptom at the start of hemodialysis (Thenmozhi, 2018). Nausea, vomiting, dialysis hypotension, high blood pressure, chest discomfort, palpitations, shortness of breath, malnutrition, dry mouth, pruritus, and electrolyte imbalance are some of the other symptoms (Al Naamani et al., 2021; King et al., 2023). Furthermore, weariness after 3-4 hours of hemodialysis two to three times per week makes regular living difficult and leads to role limitations or social isolation (Pan et al., 2019). Patients repeated hospitalizations and trips to multiple outpatient clinics may lead to feelings of invincibility, decreasing their quality of life (Visweswaran et al., 2020). On the other hand, hemodialysis patients must deal with both physical

problems and dialysis life. They frequently feel powerless and as if they have lost control of their lives and illnesses since they passively consume information and health education that may not fit their unique health requirements (Pan et al., 2019).

Research conducted by Pretto et al. (2020) reported that several predictors affect the quality of life of chronic renal failure patients undergoing hemodialysis, such as sociodemographic, clinical (anemia, hypertension), depression, and compliance with treatment. Problems caused by anemia are related to the body's physiology in the form of decreased oxygen supply, impaired immune response, and fatigue and impact the patient's quality of life.

Other factors associated with the quality of life of chronic renal failure patients undergoing hemodialysis are age, gender, dialysis model, diabetes, and functional status (Field et al., 2019; Gebrie et al., 2023; Nordyke et al., 2020; Sung et al., 2018; Szu et al., 2023). Another study stated that vascular access is associated with patients' quality of life undergoing hemodialysis. Vascular access is a path made in the form of a channel or cannula inserted into the lumen of a vein connected to an artery that facilitates blood release (Field et al., 2019). Often, chronic renal failure patients who experience hemodialysis are very vulnerable to worsening quality of life, where hemodialysis is given for life, expensive costs, loss of work, family divisions, activity restrictions, and so on.

The literature shows inconsistent results for several factors related to sociodemographics, such as age, gender, education, occupation, and income (Al Naamani et al., 2021; Pretto et al., 2020) Hemoglobin (HB) level, hemodialysis access (HD) are rarely discussed, and the length of hemodialysis is also rarely discussed. Therefore, this study examines the factors associated with the quality of life of chronic renal failure patients undergoing hemodialysis at Abdul Wahab Sjahranie Samarinda Regional General Hospital. The results of this study are expected to be a reference for medical personnel to provide the best care for patients with kidney failure who undergo hemodialysis, especially in the hemodialysis room of Abdul Wahab Sjahranie Samarinda Regional General Hospital.

METHOD

This descriptive correlation study uses a cross-sectional approach conducted in the Hemodialisa room of the Abdoel Wahab Sjahranie Samarinda Regional General Hospital from July to October 2023 with No. 180/KEPK-AWS/VII/2023. The timeframe from July to October 2023 was chosen to collect data consistently, in line with the cross-sectional study design. Despite spanning several months, patient characteristics remained stable, minimizing variability. This period also ensured an adequate sample size without major external changes. Minor fluctuations could introduce slight biases, but these are considered minimal, preserving the study's cross-sectional nature. This study aims to see whether there is a relationship between the dependent and independent variables. The dependent variable of this study is quality of life, while the independent variables are age, gender, education, occupation, income, length of hemodialysis, hemoglobin (HB) level, and hemodialysis access (HD).

The classification of the respondent's quality of life was based on a standardized assessment tool, which divides quality of life into two categories: "Lack of quality" and "Good" These categories were determined by evaluating specific criteria, including physical well-being, emotional well-being, social functioning, and daily activities. A predetermined cutoff score was applied to classify respondents into these two groups. Respondents who scored above the cutoff were categorized as having a high quality of life, while those who scored below the cutoff were classified as having a low quality of life. This classification allowed for a clear distinction between individuals based on their perceived quality of life.

The sample in this study were all chronic renal failure patients undergoing hemodialysis. Inclusion criteria are chronic renal failure patients undergoing hemodialysis, doing regular hemodialysis 2 times a week, and not having mental disorders. Exclusion criteria are patients who are not cooperative to continue the research. The sampling technique used in this study was purposive sampling, which obtained 60 respondents. This research instrument uses a questionnaire; the first part is a fill-in sheet that includes (age, gender, education, occupation,

income, length of hemodialysis, hemoglobin (HB) level, and hemodialysis access (HD). The second part is an instrument to measure the patient's quality of life; researchers use the WHOQoL instrument, which has been tested for validity and reliability. This instrument includes four domains: physical, psychological, social relations, and environment. The measurement scale in this study is categorical, and statistical analysis used a logistic regression test. Ethical approval from the Ethics Committee for Health Research at the Abdoel Wahab Sjahrani Samarinda Regional General Hospital with No. 180/kepk-aws/VII/2023.

RESULTS

Table 1. Characteristics of Respondents

Variables	f	%
Age		
Young (<45 Years)	20	33,3
Old (≥ 45 Years)	40	66,7
Gender		
Male	27	45
Female	33	55
Education		
Low	21	35
High	39	65
Jobs		
Not working	42	70
Work	18	30
Income		
Low	36	60
High	24	40
Duration of Hemodialysis		
Not long ago	19	31,7
Long time ago	41	68,3
Hemoglobin levels		
Anemia	41	68,3
Not anemic	19	31,7
Hemodialysis Access		
Vistula AV (Cimino)	24	40
Catheter Double Lumen (CDL)	36	60
Quality of life		
Lack of quality	19	31,7
Good quality	41	68,3

Table 1 shows the characteristics of respondents based on age, gender, education, occupation, income, length of hemodialysis, hemoglobin (HB) levels, hemodialysis access (HD), and quality of life of kidney failure patients undergoing hemodialysis. Characteristics of respondents based on age, most of them were old (≥45 Years) 40 respondents (66.7%), while at a young age (<45 Years) 20 respondents (33.3%). Respondents who were female were 33 respondents (55%), while the rest were male 27 respondents (45%).

A greater proportion of respondents had a higher level of education, totaling 39 individuals (65%), compared to 21 respondents (35%) with a lower level of education. Regarding employment status, the majority of respondents, 42 individuals (70%), were unemployed, while 18 (30%) were employed. Regarding income, 36 respondents (60%) were classified as having low income, whereas 24 respondents (40%) had high income. Judging from the length of hemodialysis, it was found that 41 respondents (68.3%) had undergone hemodialysis for a long time, while 19 respondents (31.7%) had not. After the hemoglobin examination, it was found that most were anemic, namely 41 respondents (68.3%), and those who were not anemic were 19 respondents (31.7%). Based on the hemodialysis access used, the most respondents used Catheter Double Lumen as many as 36 respondents (60%), and those who used AV Fistula (cimino) were 24 respondents (40%). The results also showed that patients' quality of life mostly had a good quality

of life, namely 41 respondents (68.3%), while those with poor quality were 19 respondents (31.7%).

Table 2. Factors associated with the quality of life of patients with renal failure who are undergoing hemodialysis

Variables	Quality of life				p-value	OR (95% CI)
	Lack of quality		Good			
	f	%	f	%		
Age					0.844	0.891 (0.278-2.848)
Young	6	30	14	70		
Old	13	32.5	27	67.5		
Gender					0.155*	0.440 (0.140-1.381)
Male	6	22.22	21	77.78		
Female	13	39.40	20	60.60		
Education					0.432	1.566 (0.509-4.817)
Low	8	38.10	13	61.90		
High	11	28.20	28	71.80		
Jobs					0.431	0.629 (0.197-2.006)
Not working	12	28.57	30	71.43		
Work	7	38.88	11	61.12		
Income					0.734	1.214 (0.396-3.722)
Low	12	33.33	24	66.67		
High	7	29.14	17	70.83		
Length of time on HD					0.003*	0.071 (0.009-0.583)
Not long ago	1	5.26	18	94.74		
Long	18	43.90	23	56.10		
Hemoglobin level					0.017*	6.021 (1.226-29.568)
Anemia	17	41.46	24	58.54		
Not anemic	2	10.53	17	89.47		
HD Access					0.428	1.560 (0.518-4.697)
AV Fistula (Cimno)	9	37.50	15	62.50		
Catheter Double Lumen (CDL)	10	27.78	26	72.22		

*** entered into logistic regression modeling**

The results of bivariate analysis using the chi-square test to see the relationship between age, gender, education, occupation, income, length of hemodialysis, hemoglobin (HB) levels, hemodialysis access (HD) with the quality of life of patients with kidney failure undergoing hemodialysis can be seen in table 2. Based on the analysis, two variables were found to be statistically related to these variables, namely the length of hemodialysis (p=0.003, OR=0.071, 95%CI=1.282-92.036) and hemoglobin levels (p=0.017, OR=6.021, 95%CI=0,053-1.690).

Table 3. The most dominant factor associated with the quality of life of patients with kidney failure who are undergoing hemodialysis

	Variables	Coefficient	P value	OR (95% CI)
Step 1	Gender	0.617	0.353	1.850 (0.504-6.820)
	Length of time on HD	2.413	0.028	11.160 (1.302-95.75)
	Hemoglobin levels	1.209	0.172	0.299 (0,053-1.690)
	Constant	0.965	<0.292	2.626
Step 2	Length of HD	2.385	0.029	10.861 (1.282-92.036)
	Hemoglobin levels	1.429	0.094	0.240 (0.045-1.273)
	Constant	1.401	<0.077	4.061

The most dominant factor in this study, using a logistic regression test, can be seen in Table 3. With the backward method, there are two steps to arrive at the final result; step 1: The variables included in the logistic regression analysis were variables that had a p-value<0.25 in the bivariate analysis. These variables are gender, duration of HD, and hemoglobin levels. Step 2 From the analysis, the results of the logistic regression test showed that the length of hemodialysis was the most related factor, with a p-value of 0.029. The analysis results also obtained OR=10.86, which

means that respondents who have undergone hemodialysis for a long time are at risk of 10.86 times less quality of life compared to respondents who have not undergone hemodialysis for a long time.

DISCUSSION

Hemodialysis is a renal replacement therapy used in stage 4 and end-stage renal failure patients where there is a decrease in Glomerular Filtration Rate (GFR) 15-29mL/min1.73m2 or <15mL/min/1.73m2 (Janice et al., 2022; Rasyid et al., 2022). A person who has been diagnosed with stage 4 and end-stage chronic renal failure must undergo renal replacement therapy for life, one of the options is hemodilaisa therapy (LeMone et al., 2017). The results of this study showed that respondents who had undergone hemodialysis for a long time were 41 respondents (68.3%), the results of multivariate analysis showed that the dominant factor associated with the quality of life of patients with kidney failure undergoing hemodialysis at Abdoel Wahab Sjahrani Samarinda Regional General Hospital was the length of time undergoing hemodialysis with an OR value=10.86, this indicates that respondents who have been undergoing hemodialysis for a long time have a risk of 10.86 times less quality of life than respondents who have not been undergoing hemodialysis for a long time.

The results of this study are in line with research conducted by Gebrie et al. (2023) that there is a relationship between the length of hemodialysis with quality of life where the negative impact experienced by patients undergoing hemodialysis is a monotonous life, in this case, hemodialysis must be carried out 2 or 3 times every week, the inability to overcome hemodialysis symptoms and feelings of fatigue and boredom. These findings also reinforce research conducted by Al Kasanah et al. (2021) and Szu et al. (2023), which state that the adverse impact of someone undergoing hemodialysis is that hemodialysis treatment is carried out for life. The longer a person undergoes hemodialysis, the more fatigue, boredom, and monotony will always appear, making the patient's quality of life less qualified. The results of this study are also similar to research conducted by Alhajim (2017) and Barzegar et al. (2017), which found that the duration of dialysis has an adverse effect on the quality of life of dialysis patients. Quality of life was better in patients with hemodialysis duration of less than 1 year compared to patients with 1-3 years (Al Salmi et al., 2021). When patients initially start hemodialysis, they assume that their kidneys will heal and hemodialysis will be stopped. This is different from the reality, over time as they try to maintain life with hemodialysis, their worries increase and affect their quality of life (Thenmozhi, 2018; Wantonoro & Rahmawati, 2020). The findings of this study are in contrast to the study conducted by Paneerselvam et al. (2023), which states that patients who have been undergoing hemodialysis for a long time have accepted, adjusted, and adapted to the disease, psychologically ready and accepting the adverse effects of the disease, on the other hand patients who are still in the early stages or have not been undergoing hemodialysis for a long time are still trying to adapt, adjust to the conditions of the disease being suffered.

The length of hemodialysis therapy is known to have a relationship with the patient's quality of life. The author assumes that the longer undergoing hemodialysis, the perception or feelings of boredom, fatigue, and saturation always overshadow the need for appropriate action, be it a nurse or a patient's family, to support and prevent the appearance of feelings of boredom, fatigue, and saturation in patients. This study's findings may be limited due to purposive sampling exclusively from the hemodialysis unit of Abdul Wahab Sjahranie Samarinda Regional General Hospital. This sampling strategy restricts the applicability of the results to a broader population and introduces the possibility of selection bias.

CONCLUSION

This study identifies the factors associated with the quality of life of patients with kidney failure undergoing hemodialysis at Abdoel Wahab Sjahranie Samarinda Regional General Hospital. The results indicate that the length of hemodialysis is the most dominant factor in

patients' quality of life. Thus, it is important to make educational efforts and provide assistance by both family and peer nurses during hemodialysis to prevent the emergence of negative thoughts that result in worsening patients' quality of life.

AUTHOR'S DECLARATION

Authors' contributions and responsibilities

AH: Wrote the original draft, created visualizations, developed the research concept, and secured funding; **FH:** Supported the writing of the original draft, assisted with methodology, and secured funding; **DPE:** Led the research, validated the results, collaborated on visualizations, and funded and edited the manuscript; **HPW:** Wrote the methods and results sections, performed statistical analysis, and contributed to the literature review.

Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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