

Relationship between Hemodialysis Duration and Fatigue in Chronic Kidney Disease (CKD) Patients During Hemodialysis

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Abstract

Introduction: Chronic Kidney Disease (CKD) is a progressive and irreversible kidney function disorder in which the body fails to maintain metabolism and fluid-electrolyte balance, and causes retention of urine and other nitrogenous wastes in the body. The causes of CKD vary in the form of structural or functional abnormalities with a decrease in the Glomerular Filtration Rate (GFR) of less than 60 ml/minute/1.73. **Methods:** This study used a correlation descriptive design with a cross sectional approach. The research sample was 59 respondents who were taken using a purposive sampling technique. The Functional Assessment of Chronic Illness Therapy (FACIT) Fatigue Scale is used to measure fatigue. This study was analyzed using the Spearman Rank test. **Results:** Shows that the majority of CKD patients underwent hemodialysis with a duration of 4 hours (91.5%). The majority of respondents are women (52.5%). The majority of respondents are in the age group of 56-65 years (25.4%). The results of the analysis showed that the majority of respondents experienced mild fatigue (45.8%) with a p value = 0.936 > 0.154. **Conclusion:** There is no relationship between the duration of hemodialysis and the fatigue of Chronic Kidney Disease (CKD) patients while undergoing hemodialysis at Arifin Achmad Hospital.

Keywords: Chronic Kidney Disease, Fatigue, Hemodialysis.



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INTRODUCTION

Chronic Kidney Disease (CKD) or chronic kidney failure is a progressive and irreversible kidney function disorder in which the body fails to maintain metabolism and fluid-electrolyte balance, and causes retention of urine and other nitrogenous waste in the blood. When the kidneys are no longer able to carry out all their functions properly, therapy is needed to replace kidney function (Nuari 2017). Without renal replacement therapy, death from metabolic disorders can occur quickly (Pasaribu et al., 2021). According to WHO, 2019, CKD is the 12th cause of death in the world, killing 850,000 people each year. According to End Stage Renal Disease (ESRD), there were 2,241,998 cases of CKD worldwide in 2017, 2,303,354 cases in 2018, and 2,372,697 cases in 2019. These findings lead to the conclusion that the morbidity rate of individuals with the disease Chronic kidney disease increased by 3% year. CKD causes 3.0% of deaths in countries in Asia, the prevalence of CKD in Asia varies from 10-18%, which is not much different from other parts of the world (Khan et al., 2018). In Indonesia alone, the results show that the number of patients suffering from CKD has increased from 2% to 3.8% in 2018 (Basic Health Research (RISKESDAS), 2018).

According to information from Arifin Achmad Hospital in the Riau region, the number of patients with chronic kidney disease has increased in the last two years. In 2018 there were 1,986 patients, 2,572 patients in 2019, and 576 patients during the last two months of 2020. Even though there was a decrease in hemodialysis patients over the previous two years (Medical Records of Arifin Achmad Hospital, 2020). Hemodialysis or kidney replacement treatment is often needed for patients with Chronic Kidney Disease (CKD) and decreased kidney function. Hemodialysis is a type of treatment that replaces the dialyzer machine for

kidney function (Kusuma et al., 2020). Hemodialysis is carried out 2-3 times a week, with the time span of each hemodialysis action being 4-5 hours for each therapy (Relawati et al., 2016). Hemodialysis cannot cure kidney disorders in patients, therefore complications often occur, namely hypotension, chest pain, dialysis balance disorders, muscle cramps, nausea, vomiting, sleep disturbances, heart disease, malnutrition, hypertension, anemia, renal osteodystrophy, neuropathy, dysfunction. reproduction, access complications, bleeding disorders, infections, amyloidosis, acquired cystic kidney disease, and fatigue. Based on the studies that have been conducted, patient dependence on dialysis machines, malnutrition and anemia result in fatigue which can affect daily life functions (Bennett et al., 2018).

Fatigue is a subjective feeling of exhaustion experienced by a person, caused by physiological factors, including loss of appetite. Fatigue is also caused by emotional distress. Fatigue in chronic kidney failure patients undergoing hemodialysis therapy is a problem in nursing that requires appropriate nursing care and intervention, if fatigue is not treated immediately it will have an impact on physiological and psychological changes (Putri, S.I., Dewi, T.K., & Ludiana, L. , (2023) Fatigue is an unpleasant subjective feeling in the form of tiredness, weakness and decreased energy. This condition can cause decreased concentration, malaise, sleep quality disturbances, emotional disturbances, and decreased patient ability to carry out daily activities (activity daily living), so that it can reduce or reduce the quality of life of CKD patients. Fatigue in HD patients has a higher rate than other symptoms and the prevalence such as anxiety, sadness, difficulty concentrating, and lack of sexual desire significantly increases when the patient feels tired than when not feeling tired (Bossola et al., 2018).

There are several factors that cause the body to experience fatigue. The first factor is low hemoglobin levels causing patient complaints including shortness of breath, physical weakness and fatigue. (Pitoyo and Supriyitno, 2018). The second factor is the length of time undergoing hemodialysis. Hemodialysis therapy which takes 4 to 5 hours, this will cause physical stress in patients after hemodialysis (Sulaiman et al, 2015). The third factor is changes in blood pressure, according to Black and Ing (2015), intradialysis hypotension is the most common complication found in hemodialysis patients whose incidence reaches 20 to 33%, this condition results in symptoms such as feeling uncomfortable in the stomach, muscle cramps, yawning nausea, vomiting, anxiety, dizziness, fatigue, and anxiety (Sahran, 2018). The fourth factor of fatigue is Inter Dialysis Weight Gain (IDWG), IDWG is an increase in fluid volume which makes weight gain to determine the amount of fluid entered during the interdialytic period (Bayhakki and Hasneli, 2017).

On January 2, 2023 researchers conducted pre-research at the Arifin Achmad Hospital in Pekanbaru. Based on the pre-research data, it was found that from the beginning of January to December 2022 there were a total of 1,582 patients undergoing repeated hemodialysis every week. The average patient who undergoes hemodialysis therapy every month ranges from 121-141 patients and the average patient performs hemodialysis 2-3 times a week (Medical Records of Arifin Achmad Hospital, 2022). From the results of interviews with ten patients who were active on hemodialysis, six of them said their bodies felt very tired after completing hemodialysis making it difficult to carry out their daily activities, and four patients said they were tired but still able to carry out their daily activities.

RESEARCH METHODS

This type of research is a quantitative research with a correlation description design with a cross sectional approach. The population of this study were all CKD patients undergoing hemodialysis therapy at Arifin Achmad Hospital and the number of samples was 59 people with purposive sampling. This study uses univariate and bivariate analysis.

Bivariate analysis was used to determine the relationship between the duration of hemodialysis and fatigue. This study used the Spearman rank test with a value of $\alpha = 0.05$.

RESEARCH RESULTS AND DISCUSSION

Univariate Analysis

Characteristics of Respondents

Table 1. Frequency Distribution of Respondent Characteristics Based on Gender, Age, Education and Type of Occupation (N=59)

| Characteristics of Respondents | Frequency (F) | Percentage (%) |
|--------------------------------|---------------|----------------|
| Gender | | |
| Male | 28 | 47,4% |
| Female | 31 | 52,5% |
| Total | 59 | 100% |
| Age | | |
| 17-25 Year | 1 | 1,7% |
| 26-45 Year | 23 | 39% |
| 46-71 Year | 35 | 59,3% |
| Total | 59 | 100% |
| Education | | |
| Not School | 2 | 3,4% |
| Elementary School | 10 | 16,9% |
| Junior High School | 10 | 16,9% |
| Senior High School | 20 | 33,9% |
| College | 17 | 28,8% |
| Total | 59 | 100% |
| Work | | |
| Not Work | 34 | 57,6% |
| Self-employed | 16 | 27,1% |
| Retired | 4 | 6,8% |
| Farmer | 2 | 3,4% |
| Civil Servant | 3 | 5,1% |
| Total | 59 | 100% |

Based on table 1 above, it is known that the majority of respondents were female, as many as 31 people (52.5%), while 28 people (47.5%) were male. Most of the respondents aged from 46-71 years as many as 35 people (59.3%). Most of the respondents with high school education were 20 people (33.9%). As for the type of work most of the respondents were not working as many as 34 people (57.6%).

Table 2. Frequency Distribution of Respondent Characteristics Based on Length of HD, Duration of HD, Frequency of HD and Fatigue Levels

| Characteristics of Respondents | Frequency (F) | Percentage (%) |
|--------------------------------|---------------|----------------|
| old HD | | |
| 1-2 Year | 24 | 40,7% |
| 3-15 Year | 35 | 59,3% |
| Total | 59 | 100% |
| Duration HD | | |
| 4 | 54 | 91,5% |
| 5 | 5 | 8,5% |
| Total | 59 | 100% |
| Frequency HD (Per Week) | | |
| 2 | 59 | 100% |
| Fatigue level | | |
| There isn't any | 20 | 33,9% |

| | | |
|-----------|----|-------|
| Light | 27 | 45,8% |
| Currently | 12 | 20,3% |
| Total | 59 | 100% |

Based on table 2 above, it is known that most of the respondents had undergone HD for 3-15 years as many as 35 people (59.3%). For the duration of HD, most of the respondents were 4 hours, there were 54 people (91.5%). Overall, respondents underwent HD 2 times a week, and for the degree of fatigue, the majority were mild fatigue, as many as 27 people (45.8%).

Bivariate Analysis

The Relationship Between Hemodialysis Duration and Fatigue in CKD Patients

Table 3. Spearman Rank Correlation Results

| | Mean | Median | Modus | P Value |
|-------------|------|--------|-------|--------------|
| Duration HD | 4.08 | 4.00 | 4 | 0,154 |
| Fatigue | 35,8 | 35.00 | 35 | |

Based on the results of the Spearman Rank test, it is known that the p value is $0.154 > 0.05$, so there is no significant relationship between the variable duration of hemodialysis and the variable fatigue.

Discussion

Univariate Analysis

Characteristics of Respondents

Based on the results of the study, the average sex in the two groups was not much different. The female sex is 31 people (52.5%) more dominant than the male sex is 28 people (47.5). The results of this study are inversely proportional to the statement of Ganong (2003) in Suryaningrum (2011), that men are far more at risk of developing CKD than women, because women have more estrogen hormone. Judging from the frequency distribution based on age, the majority of respondents aged 46-71 years were 35 people (59.3%). The results of this study are also in line with research conducted by Mailani and Andriani (2017) based on the results of a study of 78 respondents at the Hemodialysis Installation of RSUD Dr. H. Abdul Moeloek found that 48 people (61.5%) were in the range of 41-60 years.

Judging from the education of the respondents, most of them were high school graduates. This research is in line with research conducted by Sari (2009) at Fatmawati Hospital, Jakarta, where the majority of the respondents' education level was high school, namely 32 out of 62 respondents. This shows that the respondent's education is quite good so that the respondent is expected to have good compliance and understanding regarding his own disease (Istanti, 2014). Based on the type of work the respondents obtained, the majority of respondents did not work, namely 34 people (57.6%). Of the various impacts due to dialysis, it will certainly interfere with productivity which can result in a person losing his job. In addition, the HD schedule which is carried out 2-3 times a week makes it difficult for most respondents to adjust their time at work and in the end decide not to work.

Judging from the length of time the patients underwent HD, the results showed that 35 people (59.3%) had HD for >2 years. This is in accordance with the research of Astiti (2014) and Dewi (2015) which states that most patients undergoing hemodialysis are >2 years. According to Nurcahyati's research (2010) which revealed that hemodialysis is a kidney replacement therapy used in patients with CKD. A person who has been declared CKD must

undergo kidney replacement therapy for life and one of the options is hemodialysis. Hemodialysis is a way to remove metabolic waste products through a semi-permeable membrane or what is called a dialyzer.

Judging from the frequency of doing HD, the research results showed that all respondents 59 people (100%) did routine HD 2 times a week. This is supported by Fitri's research (2018). From the results of his research, it was found that almost all respondents, namely 58 people (86.6%) had HD 2 times a week. This is because CKD patients who undergo HD have had kidney function damaged and decreased kidney function, so that patients can no longer survive without having HD 2-3 times per week (Brunner & Suddart, 2002). This research is also in line with research conducted by Dwi (2010). In general, in Indonesia, most hemodialysis therapy is carried out 2 times a week with a long dialysis time of 4 hours.

Bivariate Analysis

The Relationship between Hemodialysis Duration and Fatigue in CKD Patients

Based on the Spearman Rank test about the relationship between the duration of hemodialysis and the fatigue of CKD patients, the respondent produced a p value of $0.154 > 0.05$, so H_0 was accepted and this means that there is no relationship between the duration of hemodialysis and fatigue in patients with Chronic Kidney Disease (CKD) while undergoing hemodialysis, indicating that the duration Hemodialysis does not significantly influence fatigue in CKD patients undergoing hemodialysis therapy.

Research conducted (Han and Kim, 2015) fatigue after hemodialysis is related to post-dialysis blood pressure, weight changes, and hemoglobin. The results of the study (Sulistini, 2012) also showed that the level of fatigue would decrease by 0.44 if there was an increase in hemoglobin of 1 mg/dl. It can be concluded that the lower the hemoglobin level, the higher the fatigue felt by the patient. This research is in accordance with research conducted by Armiyati (2012). Which states fatigue is more often felt when the patient experiences intradialytic hypotension. Intradialysis hypotension will cause tissue perfusion disorders (cerebral, renal, myocardial, parier). When the flow of blood pressure is too low, the delivery of nutrients and oxygen throughout the body is reduced, causing fatigue, organ damage, and even death. The most common occurrence of intradialytic hypotension is the first 2 hours of a hemodialysis session.

Another factor that affects fatigue is excess fluid after hemodialysis therapy. After hemodialysis, patients are at risk of experiencing fluid overload which can cause further complications, such as hypertension, arrhythmias, cardiomyopathy, uremic percarditis, pericardial effusion, uremic lung and shortness of breath (Prabowo and Pranata, 2014). Research conducted by Bayhakki and Hasneli (2017). said Dialysis Weight Gain (IDWG) is an increase in fluid volume which is manifested by an increase in body weight as a basis for knowing the amount of fluid entered during the interdialytic period. In accordance with research conducted by Moissl et al, (2013). Which states that the addition of an IDWG value that is too high can have negative effects on the body including hypotension, muscle cramps, shortness of breath, nausea and vomiting, and fatigue (fatigue).

The process of hemodialysis therapy which takes 4-5 hours will generally cause physical stress to the patient after hemodialysis. Patients will feel tired, have headaches and break out in cold sweat due to decreased blood pressure, due to the effects of hemodialysis (Septiwi, 2013) in (Muna, 2022). In general, hemodialysis patients who have just undergone HD will experience fatigue. In line with research conducted by Ossareh (2014) stated that fatigue begins to be experienced by patients undergoing hemodialysis on average the first 6 to 8 months and fatigue will decrease at the end of the hemodialysis visit. severe fatigue

experienced in the first month undergoing hemodialysis. These conditions illustrate that the initial phase of undergoing hemodialysis patients will experience fatigue. This means that the longer the patient undergoes hemodialysis, the lower the level of fatigue because they are already experiencing an adjustment phase.

CONCLUSION

The results of the univariate study found that most of the respondents who underwent HD were 46-71 years old, with 35 people (59.3%). Most of the respondents were female, 31 people (52.5%). Most of the respondents' last education was high school, 20 people (28.8%). Most of the respondents did not work 34 people (57.6%). Most of the respondents had undergone HD therapy for 3-15 years as many as 35 people (59.3%). Most of the respondents underwent the duration of HD, namely 4 hours, 54 people (91.5%). Overall, 59 people (100%) underwent HD therapy twice a week. Most of the respondents experienced mild fatigue as many as 27 people (45.8%). Based on the Spearman Rank test regarding the relationship between the duration of hemodialysis and the fatigue of CKD patients, the respondents produced a p value = 0.154 > 0.05, so H₀ was accepted so that there was no relationship between the duration of hemodialysis and fatigue in Chronic Kidney Disease (CKD) patients.

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