ANXIETY LEVEL AND DIALYSIS ADEQUACY OF PATIENTS CHRONIC KIDNEY DISEASES DURING COVID-19 PANDEMIC IN INDONESIA

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ABSTRAK

There was a conflicting result of previous studies about the correlation between anxiety and dialysis adequacy. The aim of this study was to evaluate the association of anxiety level with dialysis adequacy and uncover the association of age, leucocyte, and hemoglobin with anxiety and dialysis adequacy in chronic kidney disease patients undergoing hemodialysis during the Covid-19 pandemic. A cross-sectional study was conducted on 139 patients with chronic kidney disease at a hospital in Semarang, Indonesia. The anxiety was measured by Hamilton Rating Scale for Anxiety. Urea reduction rate (URR) was calculated using a standard formula to measure dialysis adequacy. Hemoglobin and leucocyte were analyzed in the laboratory. The Pearson correlation test was used in the study. There was no significant correlation between age, hemoglobin, and leucocyte with anxiety (p>0.005) and dialysis adequacy (P>0.005). There was a significant correlation between anxiety and dialysis adequacy (r= -0.207; p=0.014).

Kata kunci: anxiety; chronic kidney disease; dialysis adequacy; hemodialysis

INTRODUCTION

Chronic kidney disease (CKD) is a condition of decreased kidney function that occurs for more than 3 months and has implications for the patient's health (Levin et al., 2013). Globally, about 13.4% of CKD patients are in stage 5, while about 10.6% are in the range of stages 3-5 (Hill et al., 2016). The prevalence of CKD stage 3-5 in Asia is comparable to the global prevalence, while Indonesia as one of the countries in Southeast Asia has a prevalence of 7.5%. (Suriyong et al., 2022) An increase in the stage of CKD in patients has an impact on increasing the cost of therapy that must be incurred by each patient, where the highest costs that must be incurred are in the stage of terminal CKD of $20,110 to $100,593 (Elshahat et al., 2020). Death can occur in all stages of CKD if not treated properly (Bikbov et al., 2020).

About 78% of CKD patients receive dialysis therapy to prolong their life and about 98% of them are hemodialysis (HD) therapy (Pecoits-Filho et al., 2020). Patients with terminal CKD will not survive if they do not receive dialysis therapy (Somji et al., 2020). Dialysis can be performed by patients at a dialysis center in a hospital (T. Lee et al., 2021). Dialysis adequacy is one of the most important indicators for measuring the quality of care provided in HD wards (Ebadi et al., 2021). Adequate dialysis provides information about the adequacy of the dialysis dose received by the patient to obtain adequate results, namely the removal of toxins and waste products from the patient (Dehvan et al., 2018; Somji et al., 2020). Patients who have a low level of dialysis adequacy have a higher risk of death (Aghsaeifard et al., 2022; Hong & Lee, 2019).

Dialysis adequacy can be determined from the dialysis urea reduction ratio (URR) value or the ratio of urea clearance or clearance (Kt/V) (Liang et al., 2019). Patients with URR values <65%

or Kt/V values <1.2 have a greater risk of death (Hong & Lee, 2019). Therefore, HD must be carried out regularly so that the adequacy of dialysis is well maintained. Previous study has shown that there was a significant decrease in the number of patients undergoing dialysis during the COVID-19 pandemic compared to before the Covid-19 pandemic, which was influenced by psychological disorders in patients (Sultan et al., 2022). About 30% of CKD patients undergoing dialysis experience anxiety during the Covid-19 pandemic (Hao et al., 2021). Patients with the highest anxiety levels are in patients with the highest stages of CKD (K.-M. Lee et al., 2022). Therefore, anxiety can indirectly affect the adequacy of dialysis.

A meta-analysis study in the Eastern Mediterranean region in 2020 found that less than 50% of patients had good dialysis adequacy rates with a mean of URR below the standard 63% and Kt/V is still within the normal standard of 1.23 (Ebadi et al., 2021). Only one-third of patients undergo dialysis adequacy regularly (Somji et al., 2020). A cross-sectional study on 30 patients with kidney failure in Indonesia during the Covid-19 pandemic found an average result of Kt/V 2.04 (Utomo et al., 2021). There was no information on the UUR value in that study (Utomo et al., 2021). Two recent cross-sectional studies showed conflicting results with a cross-sectional study regarding the relationship between anxiety and dialysis adequacy, so further research is needed (Hasani et al., 2020; Najafi et al., 2016; Xi et al., 2016). This study will evaluate the relationship between anxiety and dialysis adequacy using the URR formula and evaluate the relationship between age, leukocyte and hemoglobin levels with anxiety levels and dialysis adequacy in CKD patients undergoing hemodialysis during the Covid-19 pandemic.

METHODS
This study used a descriptive design with a cross-sectional approach. A total of 139 chronic kidney disease patients were included in the study. Patients were recruited purposively from a government hospital in Semarang, Indonesia. The inclusion criteria were age ≥18 years and routine HD twice a week. The exclusion criteria were a history of psychiatric disorder, intra-dialysis complications that caused dialysis to be stopped, recirculating blood during data collection, history of recent hospitalization, and consciousness disturbances.

To assess the severity of anxiety, the Hamilton Rating Scale for Anxiety (HARS) was utilized. This scale includes 14 items, each of which comprises a set of symptoms. These symptom groups are scored on a scale ranging from zero to four, where four represents the most severe symptoms. Urea reduction rate (URR) was calculated using a standard formula to measure dialysis adequacy. Hemoglobin, leucocyte, and urea were analyzed in the clinical laboratory. A small needle was utilized to draw blood samples from a vein in the patient's arm. A small quantity of blood was collected in a test tube and forwarded to a clinical laboratory for analysis of hemoglobin, leukocyte, and urea levels. All measurements were carried out one and a half months before dialysis on the same day. The blood sample was taken again one and a half months after dialysis to measure urea after dialysis.

The data was processed using the Statistical Package for The Social Science program. (SPSS) 24.0. The mean and standard deviation (SD) were utilized to report continuous variables, whereas frequency and percentage were used to report categorical variables. The normal distribution of all continuous variables was verified using the Kolmogorov-Smirnov test. The Pearson correlation test was used to analyze the correlation of age, hemoglobin, leucocyte, anxiety, and dialysis adequacy, with a significant level of $p<0.05$. The research procedure was sanctioned by the ethics committee of the Medicine Faculty at Diponegoro University, Indonesia and was conducted in adherence to the principles laid out in the Declaration of Helsinki. All study participants provided written consent after being informed about the study.

We received an ethical clearance letter with number 221/EC/KEPK/FK-UNDIP/IX/2020, with this letter we received full support for research in the field.

RESULT

The majority of patients were male (66.18%), graduated from senior high school (35.91%), and working as a private employee (54.67%). All of the patients had health insurance (Table 1). The mean for patients' age, leucocyte, anxiety score, and URR were 52.5 years old, 9.4 g/dl, 6800 µg/l, 19, and 65.50% respectively (Table.2). Table 3 showed that there was a significant relationship between the level of anxiety and the adequacy value in chronic renal failure patients undergoing HD ($p = 0.014$) with a weak correlation strength ($r=-0.207$). The correlation direction shows a negative direction, which means the higher the anxiety score, the lower the value of dialysis adequacy, and vice versa. The age, hemoglobin, and leucocyte level didn't correlate with anxiety and dialysis adequacy ($p>0.05$).

Table 1.
Categorical values of respondent characteristics (n=139)

Characteristics	f	%
Gender		
Male	92	66.18
Female	47	33.82
Educational Level		
Junior high school	47	33.82
Senior High school	50	35.91
University	42	30.27
Occupation		
Private employee	76	54.67
Government employee	63	45.33
Payment by health insurance	139	100

Table 2.
Numerical values of respondent characteristics (n=139)

Characteristics	Mean	SD	Min	Max
Age (year)	52.5	11.4	25	80
Hemoglobin (g/dl)	9.4	1.4	6,6	13,9
Leucocyte (µg/l)	6.8	1.6	3,7	13,9
Anxiety	19	6.4	3	40
Dialysis Adequacy (%)	65.5	12.05	19.4	90.5

Table 3.
Correlational analysis of numerical values of the characteristics (n=139)

Characteristics	Anxiety		Dialysis adequacy	
	r	p	r	p
Age	-0.009	0.274	0.048	0.574
Hemoglobin	-0.076	0.376	0.150	0.078
Leucocyte	-0.002	0.977	-0.031	0.718
Anxiety			-0.207	0.014

DISCUSSION

This study found a significant relationship between anxiety levels and dialysis adequacy. Anxiety is an emotional response in which a person feels fearful towards an unidentified or unclear source of threat. Anxiety can manifest in physical, psychological, and behavioral reactions. It is an affective disorder characterized by deep and persistent feelings of fear or worry. The person's personality remains intact (without a split personality) and their ability to evaluate reality (Reality Testing Ability/RTA) is still good. Although their behavior may be disrupted, it is still within normal limits (Solehati & Kosasih, 2015). Based on several theories, the causes of anxiety can be described as follows (Strongman, 1995). The Psychoanalytic theory suggests that anxiety is caused by the ego's unacceptable drive towards perceived pressure, resulting in symptoms such as hysteria and phobia. The Behavioral theory suggests that anxiety is caused by specific environmental stimuli, incorrect thought patterns, isolation, and emotional and maladaptive behavioral disturbances. The ability to face threats is very low. The Biological theory suggests that anxiety can be caused by biological events that may precede psychological conflicts or result from psychological conflicts. In contrast to the two previous cross-sectional studies which found that the level of anxiety was not related to dialysis adequacy (Najafi et al., 2016; Xi et al., 2016), on the contrary, this study was in line with the research of Hasani, et al which stated that the level of anxiety was related to with adequate dialysis in hemodialysis patients (Najafi et al., 2016). However, the three previous studies were conducted on hemodialysis patients before the Covid-19 pandemic, while this study was conducted during the Covid-19 pandemic (Hasani et al., 2020; Najafi et al., 2016; Xi et al., 2016).

It was found that the mean anxiety score of the patients was at a moderate level of anxiety, with a fairly high range of anxiety scores. In accordance with the results of previous studies that some CKD patients undergoing hemodialysis during the Covid-19 pandemic experienced anxiety (Hao et al., 2021). Anxiety is a common in patients undergoing HD. This study found that age, hemoglobin levels, and leukocyte levels were not associated with anxiety that occurred in patients. Previous studies have found that younger age and high leukocyte levels tend to experience anxiety (Najafi et al., 2016; Shafiee et al., 2017), but hemoglobin levels are not associated with anxiety in patients (Najafi et al., 2016).

High anxiety in CKD patients undergoing HD reduces dialysis adequacy. The results showed that the mean dialysis adequacy was still in good condition. CKD patients in this study received good service from the dialysis center as indicated by the URR value of 65%, where the standard for dialysis adequacy using the URR formula was 65% even during the COVID-19 pandemic. The mean URR in Indonesia is better than the country in Eastern Mediterranean region (Ebadi et al., 2021). The not to high anxiety level allows good dialysis adequacy condition. It seems that the implementation of dialysis in a government hospital, the existence of insurance facilities in dialysis payments, and the good scheduling of dialysis service providers allow patients to do dialysis on a regular basis even though during the Covid-19 pandemic. That condition is very supportive for the patient's psychology.

However, some patients found inadequate dialysis as indicated by a minimum URR value below 65%. The existence of anxiety that is not handled properly during this Covid-19 pandemic reduces the production of urea from the patient's body even though they have been doing dialysis regularly with a frequency of once every 2 weeks at the hospital. This condition needs to be a concern for health workers to carry out psychological management of anxiety in patients undergoing dialysis so as not to make the results of dialysis inadequate. This needs to be a concern for health workers who provide dialysis center services because of toxins in the body are not removed through the dialysis process, they can threaten the patient's life (Hong & Lee,

2019). In addition, with decreased dialysis adequacy, the quality of life of patients will decrease (Hasan et al., 2021).

In addition, the results showed that younger or older age had no impact on dialysis adequacy. In contrast to previous studies showing that dialysis adequacy can decrease with increasing age (Barzegar et al., 2016). In accordance with previous studies which showed that hemoglobin levels <10g/dl were not associated with inadequate dialysis, where dialysis adequacy used the URR formula (Somji et al., 2020). However, in this study it was found that there was a relationship between hemoglobin levels and dialysis adequacy when the indicator used was Kt/V (Somji et al., 2020). It showed that the results of dialysis adequacy assessment with different formulas would get different conclusions. The study also found that leukocyte levels were not associated with the adequacy of dialysis, where the patient's mean leukocyte level was still within normal limits. However, the results of previous studies found that elevated leukocyte levels in CKD patients can increase the risk of death by 2.6-fold (Ferreira et al., 2020), where an increase in leukocytes indicates inflammation that may affect the adequacy of dialysis.

CONCLUTION
Increased anxiety will reduce the dialysis adequacy of the patient undergoing hemodialysis during the covid-19 pandemic.

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