



## IMPLEMENTATION OF GUIDED IMAGERY AND INTRADIALYTIC EXERCISE REGULAR FLEXIBILITY ON FATIGUE OF HEMODIALYSIS PATIENTS

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### ABSTRACT

Fatigue is a common symptom in dialysis patients, with a significant prevalence rate. In overcoming the problem of fatigue, therapeutic management is done through the application of guided imagery and intradialytic exercise. Objective: Objective is assess the effect of guided imagery and intradialytic exercise regular flexibility on fatigue in patients with chronic kidney disease who are undergoing hemodialysis process. Methods: The research method used a quasi-experiment with a one group pretest-posttest design without control group approach. The population was 23 respondents with a sample size of 22 respondents using total sampling technique. Measurement of fatigue using Functional Assessment Chronic Illness Therapy (FACIT). Data analysis was performed using paired t-test and Repeated Measures ANOVA. Results: The results showed that the mean value of fatigue before intervention in the first measurement was 24.00 ( $\pm 3.911$ ). The value increased in the second measurement to 25.22 ( $\pm 4.095$ ), in the third measurement to 28.11 ( $\pm 3.411$ ), in the fourth measurement to 33.89 ( $\pm 2.908$ ), and in the last measurement to 39.67 ( $\pm 3.106$ ). This finding explained that both interventions had a significant impact on reducing fatigue ( $t = -18.561$ ,  $p = 0.000$ ). Time effect analysis confirmed the significant impact of the interventions on fatigue reduction scores ( $F(1, 473) = 187.798$ ,  $p < 0.000$ , partial eta squared = 0.917). Conclusion: This study can be used as a non-pharmacological treatment to reduce fatigue symptoms that can be done independently during the hemodialysis process, and is expected as an independent nursing intervention for a nurse in providing nursing care.

Keywords: chronic kidney disease; fatigue; guided imagery; hemodialysis; intradialytic exercise regular flexibility

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### INTRODUCTION

Hemodialysis is the main choice for the treatment of end-stage chronic kidney disease in Indonesia (Indonesian Renal Registry, 2018; Kementerian Kesehatan RI, 2019). According to WHO (2020) hemodialysis (HD) therapy as a kidney replacement therapy and makes HD the main therapy chosen by patients (Saglimbene et al., 2017). Hemodialysis therapy is an action to replace damaged kidney function (Sitopu et al., 2023). Hemodialysis management is

carried out regularly 1 to 3 times a week, each meeting can take about 4 - 5 hours (Baransano & Tambunan, 2023). Long-term hemodialysis treatment causes various impacts including physical and psychological disorders. Physical complaints include hypotension, cramps, nausea and vomiting, headache, chest pain, back pain, fever, psychological impact in the form of anxiety, stress and depression, The most dominant impact of hemodialysis felt by chronic kidney disease patients undergoing hemodialysis is extreme fatigue (Santoso et al., 2022; Triyono et al., 2023).

Fatigue is a state of an individual experiencing a continuous feeling of excessive fatigue and a decrease in physical and mental work capacity (Nanda et al., 2023). Fatigue is a symptom that has a high prevalence in the dialysis patient population, in patients who receive renal replacement therapy for a long time, symptom fatigue is experienced by 60-97% of patients, and 82-90% are patients undergoing hemodialysis (Sulisiyini, 2020). According to Agustina (2016) in Wibowo et al., (2020) that fatigue that is not resolved immediately will have an impact on physiological and psychological changes including patients will experience a process of loss due to changes experienced, feel like a failure, feel excessive sadness, decreased sexual desire, do not have a job, dashed hopes, feel themselves to be a burden to the family, have a sense of disappointment, low self-esteem and guilt on themselves. The management of fatigue involves both pharmacological and non-pharmacological approaches. Given the condition of suboptimal kidney function, long-term pharmacological treatment is not recommended, so non-pharmacological interventions are needed as support. Non-pharmacological interventions to help patients overcome fatigue include psychotherapeutic strategies in the form of guided imagery and intradialytic exercise regular flexibility (Andoko & Ermawati, 2020; Cahyanti et al., 2023; Wahida et al., 2023).

Both of these techniques have advantages, namely that they do not cause side effects, are easily carried out by room nurses without incurring additional costs, can be done anywhere and are easily understood and applied independently by hemodialysis patients (Cahyanti et al., 2023). Intradialytic exercise with a type of flexibility exercise has an effectiveness of 95% so that it has the potential to reduce fatigue in hemodialysis patients. Another therapy that can help reduce fatigue in hemodialysis patients is the guided imagery technique (Muliani et al., 2021). Guided imagery relaxation will affect the parasympathetic nervous system, a calm feeling will relax tense nerves by controlling heart rate function, thus relaxing the body. The general purpose of this study was to determine the effect of guided imagery and intradialytic exercise regular flexibility on fatigue in chronic kidney disease patients undergoing hemodialysis.

## **METHOD**

The research method used in this study is a quasi experiment with a one group pretest-posttest design without control group approach. The population in this study were all chronic kidney disease patients undergoing hemodialysis at Bhayangkara Setukpa Lemdiklat Polri Hospital, Sukabumi City as many as 23 respondents and 1 respondent was used as an intervention test patient so that the remaining respondents in this study were 22 respondents with a total sample of 22 respondents using the sampling technique, namely total sampling. Measurement of fatigue variables using the standardized Functional Assessment Chronic Illness Therapy (FACIT) instrument. The intervention was given 2 sessions per week according to the respondent's hemodialysis schedule of 8 sessions for 4 weeks with a duration of 15 minutes for 1 intervention so that the total intervention was 30 minutes which was carried out in the first 2 hours after hemodialysis began. Fatigue measurements were taken once a week for 4 weeks on the last day of the hemodialysis schedule for that week. Analysis used paired t-test

and Repeated Measures ANOVA. This study has received Institutional Review Board (IRB) approval with ethical test number 175.1/F.9-UMJ/XII/2023.

## RESULTS

### Descriptive of Respondents

The majority of respondents were > 45 years old (n=17, 94.4%), male (n=11, 61%), had high school education (n=11, 61.1%), were unemployed (n=15, 83.3%), had hemodialysis duration ≤ 24 months (n=13, 72.2%), had hemoglobin levels ≤ 8 g/dL (n=14, 83.3%), had comorbidities ≤ 4 lower risk and > higher risk respectively (n=9, 50.0%) (Table 1).

Table 1.  
Frequency Distribution of Characteristics of Chronic Kidney Disease Patients Undergoing Hemodialysis Based on Age, Duration of Hemodialysis, HB Level, Gender, Education, Occupation, Comorbidities (n=18)

Variables	f	%
Age		
≤ 45 Years	1	5,6
> 45 Years	17	94,4
Gender		
Male	11	61,1
Female	7	38,9
Education		
Elementary School	4	22,2
Junior High	1	5,6
High School	11	61,1
College	2	11,1
Jobs		
Unemployed	15	83,3
Employed	3	16,7
Length of Hemodialysis		
≤ 24 Month	13	72,2
> 24 Month	5	27,8
Hemoglobin Levels		
≤ 8 g/dL	4	22,2
> 8 g/dL	14	77,8
Comorbid Diseases		
≤ 4 <i>Lower Risk</i>	9	50,0
> 4 <i>Higher Risk</i>	9	50,0

### Fatigue In Renal Failure Patients Undergoing HD Before and After Intervention

Table 2.  
Mean Fatigue Score Before and After Guided Imagery and Intradialytic Exercise Regular Flexibility (n=18)

Intervention	Mean	SD	Min	Max
Pre (T <sub>0</sub> )	24,00	3,911	17	32
Post I (T <sub>1</sub> )	25,22	4,095	18	32
Post II (T <sub>2</sub> )	28,11	3,411	22	34
Post III (T <sub>3</sub> )	33,89	2,908	29	39
Post IV (T <sub>4</sub> )	39,67	3,106	34	45

The results showed that the average fatigue value before being given the intervention of guided imagery and intradialytic exercise regular flexibility in the 1st measurement was obtained at 24.00 (±3.911) with a minimum value of 17 and a maximum of 32. The average value of fatigue after being given the intervention in the 2nd measurement obtained an average of 25.22 (±4.095) with a minimum value of 18 and a maximum value of 32, in the 3rd measurement obtained an average fatigue of 28.11 (±3.411) with a minimum value of 22 and

a maximum value of 34, in the 4th measurement obtained an average fatigue of 33.89 ( $\pm 2.908$ ) with a minimum value of 29 and a maximum value of 39, and in the last measurement obtained an average fatigue value of 39.67 ( $\pm 3.106$ ) with a minimum value of 34 and a maximum value of 45 (Table 2).

**Effectiveness of Guided Imagery and Intradialytic Exercise Regular Flexibility Intervention on reducing fatigue levels after being given for one month**

Table 3.

Difference in Average Fatigue Score Before and After Guided Imagery and Intradialytic Exercise Regular Flexibility Intervention

Intervention	Mean	SD	MD	t	df	Sig
Pre (T <sub>0</sub> )	24,00	3,911				
Post IV (T <sub>4</sub> )	39,67	3,106	-15,667	-18,561	17	0,000

The results of the paired t-test analysis show that the fatigue score value has increased, where an increase in score indicates a decrease in fatigue. Therefore, in this study, the decrease in fatigue scores was indicated by an increase in the score value of the instrument where before the intervention the average score was 24.00 ( $\pm 3.911$ ) and after being given intervention for 1 month the average score was 39.67 ( $\pm 3.106$ ). This finding explains that guided imagery and intradialytic exercise regular flexibility have a significant impact on reducing fatigue ( $t = 18.561, p = 0.000$ ) (Table 3).

**Time Effect in Intervention Delivery**

Table 4.

Time Effect Analysis on Fatigue Reduction Score

Intervention	Sum Of Square	df	Mean Square	F	P-Value	Partial Eta Square
Time	3074,489	1,473	2087,934	187,798	0,000	0,917
Error (Time)	278.311	25,033	11,118	-	-	-

The analysis showed that the time effect on fatigue reduction scores was statistically significant ( $F(1, 473) = 187.798, p < 0.000, \text{partial eta squared} = 0.917$ ). This study identified significant variation in fatigue reduction scores across five measurements, namely pre-test (T<sub>0</sub>), first post-week (T<sub>1</sub>), second post-week (T<sub>2</sub>), third post-week (T<sub>3</sub>), and fourth post-week (T<sub>4</sub>). The high partial eta squared value (0.917) indicates that most of the observed variation in fatigue reduction scores can be attributed to the time effect. These findings support that the guided imagery intervention and regular intradialytic flexibility exercises have a significant impact in improving fatigue scores (Table 4).

**DISCUSSION**

The results showed that the average fatigue value before being given the intervention of guided imagery and intradialytic exercise regular flexibility in the 1st measurement was obtained at 24.00 ( $\pm 3.911$ ) with a minimum value of 17 and a maximum of 32. Fatigue is a condition when someone is tired and has no energy to carry out their daily activities (Santoso et al., 2022). In individuals undergoing hemodialysis, fatigue is one of the symptoms that is difficult to manage. The 5-hour hemodialysis therapy process causes physical stress due to the prolonged effects of hemodialysis. Poor nutritional status, and various other conditions such as anemia, will cause the body to experience extreme fatigue. This condition can affect the patient's physical, and social health status where HD patients who experience severe fatigue tend to be unable to work because they feel physical weakness (Natashia et al., 2020).

Fatigue in chronic kidney disease patients undergoing hemodialysis can be influenced by factors of length of hemodialysis, and hemoglobin levels. The characteristics of respondents

in this study were mostly  $\leq 24$  months ( $n = 13$ , 72.2%). The length of hemodialysis will result in a decrease in body function and the onset of hemodialysis complications which result in reduced physical activity. In addition, malnutrition and anemia occur in dialysis patients. High levels of ureum and creatinine are present in patients with CKD who have been undergoing hemodialysis for a long time. As a result, the production of erythropoietin hormone is disrupted due to high ureum levels. As a result, the patient will experience anemia because the number of red blood cells decreases. Anemia that occurs in patients will result in patients experiencing fatigue, fatigue, lethargy which are symptoms of fatigue (Santoso et al., 2022). Another factor that affects the incidence of fatigue in CKD patients undergoing hemodialysis is hemoglobin levels. The results of the analysis of the characteristics of respondents show that hemoglobin levels are  $\leq 8$  g/dL. The secretion of the hormone erythropoietin is controlled by the kidneys and when there is a disturbance / problem in the kidneys, it can be concluded that anemia occurs because the production of red blood cells which is the task of the bone marrow has decreased. In addition, the production of red blood cells becomes more vulnerable and the life span is shortened due to the amount of toxins in the blood. In addition, low HB levels will have an impact on reducing the capacity of the blood to carry oxygen to body tissues, so that it can cause fatigue in patients (Ibrahim et al., 2017).

The results showed the average fatigue value at the last measurement after the intervention was given a mean fatigue value of 39.67 ( $\pm 3.106$ ), with a minimum value of 34 and a maximum value of 45. This study shows the results of the average value of fatigue in the intervention group have increased. This is because in addition to carrying out routine treatment therapy, getting support from family and health workers, and being supported by various activities that can be done by respondents at home based on the observations obtained such as multiplying worship through prayer and prayer, doing light physical activities such as sunbathing and if the patient is in good condition generally the patient goes on vacation with family to the place the patient wants to visit, and applying guided imagery techniques and intradialytic exercise regular flexibility every day while at home. Guided imagery is an attempt to create an impression in the client's mind, then concentrate on a pleasant impression so that it can gradually eliminate discomfort (Zees & Lapradja, 2021). The application of guided imagery-based interventions also makes patients communicate more with both the nurse and the patient's family in finding solutions and problems related to the patient's illness so that it can make the patient feel not alone and there is support from both the family and the nurse so that it can reduce the patient's anxiety level and reduce fatigue (Tobing et al., 2021).

The benefit of doing guided imagery relaxation is that it can reduce sympathetic nerve activity which can cause the breathing rhythm to slow down, blood pressure to drop, so that it can reduce heart oxygen consumption. The state of guided imagery relaxation also affects the patient's mental state and reduces muscle tension due to the interaction of psycho neuro endocrine hormones and can reduce catecholamine production, thus creating a comfortable atmosphere and reducing feelings of anxiety and fatigue (Nurjanah et al., 2018). Another intervention that is also given is intradialytic exercise regular flexibility. Regular flexibility shows improvements in body fitness, physiological function, dexterity, reduces fatigue levels, and increases lower extremity muscle strength (Prihati & Pangesti, 2018). According to Takhreem (2008) that regular flexibility in kidney failure patients undergoing hemodialysis will help reduce fatigue. Patients undergoing hemodialysis are basically limited in doing physical activities due to disease conditions and repeated hemodialysis visits, but by providing regular flexibility intradialytic exercise interventions can increase the physical activity of patients undergoing hemodialysis (Nurmansyah & Arofiati, 2019).

Regular flexibility during hemodialysis will increase muscle work on Regular physical exercise during intrahemodialysis can increase blood flow in muscles, increase the number of capillaries and increase the area and surface of capillaries so as to increase the transfer of urea and toxins from tissues to vascular which are then flowed into the dializer or HD machine (Djamaludin et al., 2020). Regular flexibility which is carried out regularly and planned can overcome fatigue complaints positively. In addition, exercise during hemodialysis also does not require additional costs (Nurmansyah & Arofiati, 2019). The results showed that the effect of the intervention on fatigue reduction scores showed statistically significant results  $df = 4$ ,  $p = 0.000 < 0.05$ , partial eta square of 0.917. The results showed significant variability in fatigue reduction scores. In general, guided imagery and intradialytic exercise regular flexibility will show positive results if done regularly (Andoko & Ermawati, 2020).. Karagozoglu et al stated that guided imagery has an indirect effect on fatigue with an increased sense of comfort in a state of relaxation during the exercise given. GI therapy guides patients to think about beautiful things and can make patients feel comfortable and happy. This will stimulate the release of endorphins throughout the body. The effect of releasing endorphins will increase feelings of peace, reduce stress, and ultimately will make muscles more relaxed (Anisa et al., 2021).

Changes when given the intradialytic exercise regular flexibility intervention or after being given the intervention can stimulate the growth of small blood vessels (capillaries) in the muscles. This will help the body to deliver oxygen to the muscles efficiently, can improve overall circulation and lower blood pressure and release irritating metabolic waste products such as lactic acid from the muscles. (Amilia et al., 2019). In line with research conducted by Djamaludin et al (2020), it was found that there was an effect of regular flexibility physical exercise on reducing fatigue in CKD patients undergoing hemodialysis. In line with research conducted by Prihati & Pangesti (2018) also stated that there was a decrease in the level of fatigue in patients undergoing hemodialysis before and after being given regular flexibility. Supported by the results of Sakitri et al., (2017) research, with the results of regular flexibility can reduce fatigue in patients undergoing hemodialysis.

## CONCLUSION

These findings explain that guided imagery and intradialytic exercise regular flexibility have a significant impact on reducing fatigue levels with the results of the time effect analysis confirming the significant impact of the intervention on fatigue reduction scores. This study can be used as a non-pharmacological treatment to reduce fatigue symptoms that can be done independently during the hemodialysis process, and it is hoped that this intervention can be used as a form of independent nursing intervention by a nurse in providing nursing care, and further research can focus more on other problems that can arise in chronic kidney disease patients undergoing hemodialysis such as anxiety, stress and sleep quality, by developing a research design using two groups, and considering objective measurements to assess fatigue.

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