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EFFECTIVENESS OF INTRADIALYTIC EXERCISE ON FATIGUE IN CHRONIC KIDNEY FAILURE PATIENTS UNDERGOING HEMODIALYSIS THERAPY

Safruddin*, Rizki Nugraha Agung, Dewi Anggraini, Wati Jumaiyah
Faculty of Nursing, Universitas Muhammadiyah Jakarta, Jl. Cemp. Putih Tengah I No.1, Cemp. Putih Timur, Cemp. Putih, Jakarta Pusat, Jakarta 10510, Indonesia
*safruddin.safruddin@umi.ac.id

ABSTRACT

Fatigue is one of the most common symptoms experienced by patients undergoing hemodialysis therapy. This condition can affect the quality of life of chronic patients, because reduced physical activity, such as sedentary habits, and emotional stress can also be the cause of fatigue. Intradialitic exercise has various benefits in reducing fatigue experienced by patients. This study aims to evaluate the effect of exercise training on the level of fatigue in patients undergoing hemodialysis therapy. The study used a design Quasi-experimental research using the pre-test and post test group design. The research population was all patients with end-stage renal failure with the sampling technique being accidental sampling, with amount sample of 22 patients. Intradialytic exercises were performed for six weeks at a frequency of twice a week, with each session lasting a maximum of 20 minutes. Fatigue levels were measured using the Functional Assessment of Chronic Illness Therapy (FACIT) questionnaire. Data analysis was performed using the dependent t-test. The results of the study showed that the average level of fatigue before the intervention is 26.36 (SD ± 3.580), while the average score is the fatigue level after intervention is 32.09 (SD ±4.116) with a p value of 0.001, the effect size is -3.378, then including in category effect tall based on Cohen'. There is significant difference between fatigue levels before and after interdialytic exercise in patients with chronic renal failure undergoing hemodialytic therapy.

Keywords: CKD; fatigue; hemodialysis; intradialytic exercise

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INTRODUCTION

Chronic kidney disease is a clinical condition characterized by a progressive and irreversible decline in kidney function . The disease is a major cause of morbidity and mortality globally. Results of the Global Burden study of Disease in 2019, chronic kidney failure is among the top ten risks associated with the highest number of deaths worldwide, with a death toll of 3.16 million deaths (Luyckx et al., 2018). The results of Riskesdas, (2018) showed that the prevalence of chronic kidney failure increased from 2.0% in 2013 to 3.8 people per 1000 population in 2018 (Riset Kesehatan Dasar, 2018).

Chronic kidney disease that is not treated properly will reach a critical stage known as end-stage renal disease (ESRD). ESRD patients require renal replacement therapy to survive, such as hemodialysis (HD), peritoneal dialysis, and kidney transplantation (Rivara & Mehrotra, 2018). Currently, renal replacement therapy or HD is the most common choice in the treatment of patients with end-stage renal failure and especially in saving the lives of patients in emergency conditions. Procedure Hemodialysis takes about 3 to 5 hours a day, 2 or 3 times a week. (Jung & Park, 2011). This process, besides disposing of waste materials, some important products are added to the blood (Wanek et al., 2012).

Patients undergoing hemodialysis therapy experience improvement, but patients still face many physical, mental, and social problems. Physical symptoms such as fatigue, cramps,

pain, sleep disturbances, dyspnea, pruritis, depression, nausea, vomiting, and constipation all affect an individual's daily life and quality of life (Kaplan Serin et al., 2020). In addition, unpleasant side effects of hemodialysis such as hypotension, muscle cramps, fatigue, nausea and vomiting can occur during the process (Hall et al., 2012).

Fatigue condition is one of the problems with a fairly high prevalence among the side effects of hemodialysis therapy in patients with chronic kidney failure. Several studies have shown that 60% to 90% of patients with fatigue are the most important to observe in patients with chronic kidney failure undergoing therapy hemodialysis (Safruddin & Asnaniar, 2019); (Eslami et al., 2016).

Reason fatigue in patients undergoing therapy hemodialysis Still multifactorial and not yet clear. However fatigue generally associated with the disturbance system energy in body, dysfunction mitochondria, and the lack of activity physique so that result in downsizing muscle and decline strength muscle. Symptoms This relate with rest in place long sleep at every HD phase and feelings weakness that makes the patient less active in activity (Abo, et al., 2016), (Locatelli & Canaud, 2012). fatigue occurs when the body's energy reserves decrease, causing disruptions in the electrical signals from the brain to the muscles which reduces energy production due to a lack of ATP (Adenosine Triphosphate) (Rizki Muliani, 2021). In addition, the condition of fatigue This is often the reason for patient reluctance to comply with the optimal dialysis prescription, especially if additional dialysis is required (Bossola & Tazza, 2016).

In general, interventions for fatigue aims to optimize the formation and use of energy, and adjust physical exercise to the condition of each patient. Physical exercise helps the body to use energy more efficiently, increase blood flow to muscles, increase oxygen supply and expand the capillary surface, thereby improving the transfer of urea and toxins from tissues to blood vessels (Amini et al., 2016). Mechanism This happen due to increased cardiac output and blood flow to the lower extremities, capillary vasodilation results in more solutes being transferred to the vascular compartment and reaching the dialyzer membrane for diffusion (Maheshwari et al., 2011).

Currently, additional therapy and without side effects such as interdialysis execise (IDE) has been shown to have a positive effect on HD patients . This is evident from the results of a previous systematic review where IDE increased dialysis efficiency , Vo2 Max and quality of life. life (Sheng et al., 2014). Intraradial exercise (IDE) in particular combination exercise resistance and aerobics, have reported increase a number of parameters in HD patients, including function physical, cleaning substance dissolved small dialysis, atmosphere heart, lust eat intake nutrition and quality life (Huang et al., 2019); (Lu et al., 2019). Previous research has done study Intradialytic Execution against fatigue, but generally only use One exercise exercise. Whereas in study done intradialytic exercise with combination exercise flexibility that is exercise stretching muscle Light and Strengthening Exercises.

Intradialytic Exercise (IDE) is defined as exercise training performed during hemodialysis (HD) sessions to improve patient strength and endurance, thus targeting a variety of physiological and psychosocial parameters. The nature of IDE varies from resistance to aerobic and stretching exercises, with different equipment used according to the type of exercise. IDE has shown positive effects on overall health and patient readmission rates. HD (Salhab et al., 2019).

Exercise helps the body efficiently deliver oxygen to the muscles, improves overall circulation, lowers blood pressure, and removes metabolic waste products that can inhibit energy production, such as lactic acid (Chang et al., 2010). Low to moderate intensity exercise for long durations can increase the number of mitochondria in the body, which is the main site of ATP formation. Thus, HD patients who experience decreased ATP will benefit greatly, as this type of exercise allows for greater production of ATP, facilitating the body's energy-generating process (Alemañy, 2017).

The results of Alvarez's research (2020) stated that that fatigue is the most common symptom experienced by patients undergoing HD (62%), followed by cramps (44%), and hypotension (42%) (Alvarez et al., 2020). Other studies have revealed that fatigue is most common symptoms occurred (87 %), and followed by pain (64%) (Cervantes et al., 2018). And research conducted by Bossola , et al, (2016) said that symptom prolonged fatigue impact negative in ESRD patients, for example through decline productivity, quality sleep, and quality life (Bossola & Tazza, 2016). Based on the results of observations and interviews with several patients undergoing hemodialysis therapy at Labuang Baji Regional Hospital, Makassar City It was found that many patients experienced fatigue Good before and after undergo hemodialysis. Most patients asleep moment enter 2nd hour session undergoing therapy hemodialysis. This study aims to determine the effect of intradialytic exercise on the level of fatigue in patients undergoing hemodialysis therapy.

METHOD

This type of research is study quantitative which uses design Quasi- experimental research using a pre-test design test and Post test. This study was conducted in the Hemodialysis Room of Labuang Baji Hospital, Makassar City. The tools and materials used in this study were intradialytic SOP leaflets Exercise as educational material, observation sheets to assess patient hemodynamics during intervention and questionnaires For see characteristics respondents and levels fatigue. The questionnaire used in this research is Functional questionnaire Assessment of Chronic Illness Therapy (FACIT) Fatigue Scale (Version 4), increasingly tall mark fatigue so quality life somebody the more good and a value <30 indicates fatigue heavy.

The population in this study were all patients undergoing hemodialysis therapy at Labuang Baji Regional Hospital. While the sampling technique in this study was non-probability sampling with accidental sampling. The sample size in the study was 22 people. Data analysis used in this study was univariate and bivariate analysis by conducting a dependent t- test because the distribution of the data used is normally distributed with a significance level of $\alpha=0.05$.

The research procedure was carried out on patients undergoing hemodialysis therapy twice a week who agreed to be research subjects by signing an informed consent form. After obtaining consent, data on fatigue levels were collected using the Functional Assessment of Chronic Illness Therapy (FACIT) Fatigue Scale questionnaire, and then the researcher provided an intervention in the form of intradialysis physical exercise. The intradialysis exercise was performed for 6 weeks at a frequency of 2 times per week, with a maximum duration of 20 minutes per session. The intervention consisted of flexibility training, which consisted of light muscle stretching exercises and strengthening exercises with the patient's body weight. Each session was preceded by a 5-minute warm-up. The arm affected by the fistula was kept still during the exercise session to avoid unwanted precautions. In addition, the exercise protocol was not performed on the arm affected by the fistula. This intradialysis exercise was adapted to the level of physical fitness of the participating patients with haemodynamic and cardiac instability. The flexibility exercises included neck stretching, arm

and hand stretching, waist stretching, chest and back stretching, and leg stretching. Meanwhile, strengthening exercises included strengthening the upper arm muscles, the front arm muscles, strengthening the thigh muscles 1, strengthening the thigh muscles 2 and strengthening the front, back and abdominal thigh muscles. The next step was to measure fatigue again in the second, fourth and sixth weeks using the same questionnaire.

RESULT

Results of implementation about intradialytic exercise on fatigue in heart failure patients kidney chronic undergoing hemodialysis therapy at Labuang Baji Hospital Makassar City. Respondents in study This is a failed patient kidney chronicles undergoing therapy hemodialysis routine as much as 22 patients.

Table 1.
Frequency Distribution of Respondents Based on Age and Length of Hemodialysis Therapy (n=22)

Variables	Mean (SD)	Min- Max	95% CI
Age (years)	46.68 (12,643)	19-64	41.08-52.29
HD duration (months)	31.86 (40.126)	9-180	14.07- 49.65

In table 1 , the average age of hemodialysis patients is 46. 68 years with (SD ± 12.643), the youngest age is 19 years and the oldest age is 64 years. From the interval estimation results, it can be concluded that 95% believe that the average age is between 4 1 . 08 years to 52.29 years. While the average length of hemodialysis in patients was 31.86 months with (SD ±40.126. The latest length of hemodialysis was 9 months and the longest was 180 months or 15 years. From the interval estimation results, it can be concluded that 95 % believe that the average length of hemodialysis therapy is between 14.07 and 49.65 .

Table 2.
Frequency Distribution of Respondents Based on Age and Length of Hemodialysis Therapy (n=22)

Gender	f	%
Age (years)	8	36.4
HD duration (months)	14	63.6

Table 2 shows that patients undergoing hemodialysis therapy are mostly female, as many as 14 patients (63.6%). While the male gender is only 8 patients (36.4%).

Table 3.
Fatigue Level Distribution Before and After Interdialytic Exercise in Chronic Kidney Failure Undergoing Hemodialysis Therapy (n=22)

Variable	Mean	SD	Min Mak	95% CI
Before Intervention	26.36	± 3,580	22-33	24.78 - 27.95
After				
Week 2	26.73	± 3,628	22-34	25.12 - 28.34
Week 4	30.23	± 3,939	24-36	28.48 - 31.97
Week 6	32.09	±4.116	25-38	30.27 - 30.27

In table 3, the average percentage of fatigue levels before the intervention was carried out was obtained. is 26.36 with (SD ± 3.580), the lowest score is 22 and the highest score is 33. From the interval estimation results, it can be concluded that 95% is believed that the fatigue score before treatment in the intervention group is between 24.78 % and 27.95 % . While the average level of fatigue after treatment in the second week was 26.73 with (SD ± 3.628), the lowest score was 22 and the highest score was 34. From the interval estimation results, it can be concluded that it is 95% certain that the fatigue score before treatment in the second week between 25.12 % to 28.34 % . The average score of fatigue level after treatment in the fourth week was 30.23 with (SD ± 3.939), the lowest score was 24 and the highest score was 36.

From the interval estimation results, it can be concluded that 95% believe that the fatigue score before treatment in the fourth week was between 28.48 % and 31.97 % . While the average fatigue level score after treatment in the sixth week was 32.09 with (SD ±4.116), the lowest score was 25 and the highest score was 38. From the interval estimation results, it can be concluded that it is 95% certain that the score Fatigue before treatment in the sixth week was between 30.27 % and 30.27 % .

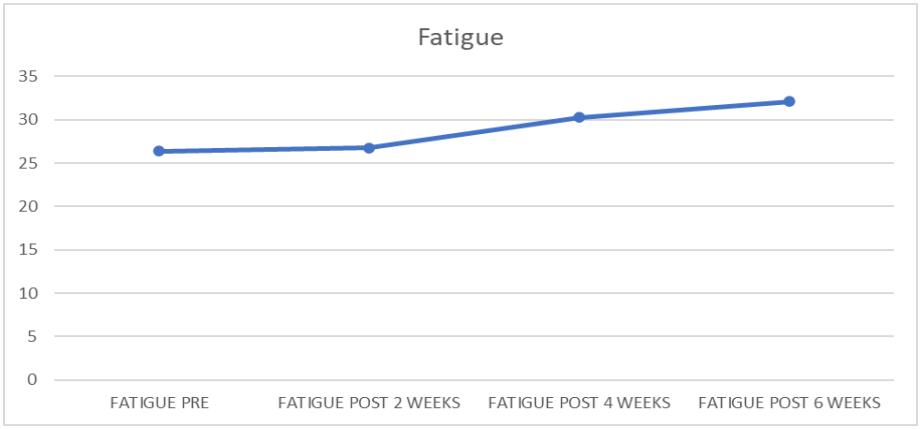

Figure 1. Changes score fatigue in HD patients

The results of the bivariate analysis are used to determine whether there is a difference or not between the initial measurement and the final measurement after the intervention. In the application of EBNP, the statistical test analysis used is the dependent t-test because it meets the requirements, namely the data is normally distributed with a p value ≥ 0.05. To determine whether there is a significant difference if the results of the analysis before and after the intervention are obtained p ≤ 0.05. The results of the normality test based on shviro Wilk obtained a p value >0.005, which shows that the distribution of patient data is normally distributed .

Table 4.
Average Level Difference Fatigue Before and after Interdialytic Exercise of patients undergoing hemodialysis therapy (n=22)

Variable	Mean	SD	SE (diff)	Effect Size	P Value
Fatigue Level					
Before	26.36	± 3,580	0.361	-3.378	0.001
After	32.09	± 4.116			

Table 4 shows the average fatigue level score . before interdialytic intervention exercise was 26.36 (SD ± 3.580), while the average score of fatigue level after treatment was 32.09 (SD ±4.116) , effect size is -3.378, then including in category effect tall based on Cohen's. The statistical test results obtained a p value of 0.001, so it can be concluded that there is a significant difference between the level of fatigue before and after interdialytic therapy. exercise in chronic renal failure patients undergoing hemodialytic therapy . Measurements were performed using the dependent t- test statistical test .

DISCUSSION

Based on results implementation about effectiveness intradialytic exercise on fatigue in heart failure patients kidney chronic undergoing hemodialysis therapy at UD. Labuang Baji Hospital, Makassar.

Characteristics Respondent

Based on results implementation intradialytic exercise on fatigue in chronic kidney failure patients undergoing hemodialysis therapy at RSUD. Labuang Baji shows that the characteristics Respondent based on the average age is 46.68 years , the average length of time patients undergo treatment therapy hemodialysis is 31.86 months , while type sex most

experienced fatigue is women 14 people (63.6%). Research results This in line with research conducted by Mohamed, 2015 which said that findings the show events and levels severity fatigue in women more Lots happen compared to men , while from aspect age No considered as a predictor of fatigue (Mohamed Soliman, 2015a). Chang, 2010 stated that score fatigue in a way overall No changed along with increase age (Chang et al., 2010). Research conducted by Saraswati, 2024, which states that Most patients suffering from fatigue complaints are patients who undergo hemodialysis therapy for more than six months. The study said that there is a relationship between the length of hemodialysis therapy and the level of fatigue. (Saraswati, 2024)Fatigue score conditions high rates are also experienced by patients undergoing hemodialysis therapy , especially patients who have undergone hemodialysis therapy for a long time, followed by old age.

The effect of intradialytic exercise on fatigue in patients with failure kidneys undergoing therapy hemodialysis

Implementation interdialytic exercise on the level of fatigue of failed patients kidney chronicles undergoing therapy hemodialysis show existence difference level fatigue before and after interdialytic exercise with p value 0.001. results our implementation , results show existence significant influence to decline level fatigue before and after intervention dive six weeks. Progress of change decline fatigue level begins after enter Sunday to four until Sunday sixth with mean value 26.73 (week second) increased to 30.23 (week) fourth), then 32.09 (sunday sixth). According to the study done by Abo et, al., (2016) in Egypt, training exercise during dialysis treatment represented improvement in all domain of the Multidimensional Fatigue Inventory (Abi, , et al., 2016). Research conducted by Mohammad, 2015 reported existence Fatigue Level Decrease after 5 months do intradialytic exercise (Mohamed Soliman, 2015).Implementation of the exercise program proved to be effective in improving the level of fatigue and depression among geriatric patients undergoing hemodialysis (Hassan Abd Elhameed & El Sayed Fadila, 2019).

A number of study has show that after do interdialytic exercise during dialysis No only reduce fatigue, but also increases trust self and efficacy self (Dashtidehkordi et al., 2019; Motedayen et al., 2014). A studies systematic meta- analysis show that intradialytic exercise helping patients who are undergo therapy hemodialysis For reduce level leg cramps , depression , and fatigue (Song et al., 2018).regular exercise helps body in a way efficient deliver oxygen to muscles, increase circulation in a way overall, decrease pressure blood, and release product remainder inhibiting metabolism form energy like sour lactate (Kulkarni & Dani, 2018). Profit exercise intradialytic in patients receiving HD compared with outdoor sports phase dialytic is a patient with fail kidney chronic get return function kidneys that are not will obtained without presence of HD. Risk accumulation product metabolic consequence exercise physique can minimized with the HD process, supported by research showing that intradialytic exercises increase urea cleaning and cleaning creatinine during dialysis (Rhee et al., 2019). Intradialytic exercise can increase flow blood in the muscles , enlarges amount capillary as well as enlarge area and surface capillary as well as increase urea and toxin transfer from network to vascular which then streamed to dialyzer so that emit results rubbish metabolic like sour lactate from in muscle (Rizki Muliani, 2021). Another theory says that sport increase sensitivity baroreceptors, so that produce arrangement pressure more blood effective by nerves and stabilizing pressure blood (Lemana, HS 2018).

Benefits implementation exercise in the form of flexibility and exercise strengthening in hemodialysis patients Because the method used No need time, cost and transportation additional. Intradialytic exercise improves acceptance of safe, feasible implementation. In addition, intradialytic exercise can improve solute removal, haemodialysis adequacy,

intradialytic protein synthesis, muscle strength, peak oxygen consumption, nutritional status and quality of life (Merline et al., 2018). However, still found some patients who do not significant experience decline level fatigue. This is happen Because existence a number of reason like the age of the patient who has enter elderly. This is in accordance with what was stated by Putu et al. who said that most patients experience fatigue because most patients are aged between 41 and 60 years, which is included in the elderly age group (Putu et al., 2019) . This result differs from that conducted by Soliman, who stated that overall fatigue scores did not change with increasing age (Mohamed, Soliman, 2015). The patient has been undergoing treatment for a long time therapy hemodialysis on seven years and patients who have activity after arrived at home reduced. This is due to the fact that most patients have been on hemodialysis for a long period of time (>24 months), which results in decreased body function and the emergence of hemodialysis complications, thereby reducing their physical activity (Putu et al., 2019). Intradialysis exercises given to patients were well received by patients and nurses, as patients were able to do activities in bed, making them feel more comfortable after haemodialysis. During intradialysis exercises, one patient found it difficult to do interdialysis exercises because he had stiffness in his lower extremities. However, after four weeks of routine use, the patient was able to perform intradialysis exercises with ease.

CONCLUSION

Implementation interdialytic exercise is proven effective lower fatigue level before and after treatment especially moment intervention done on sunday to four until Sunday to six. The results of the statistical test show existence influence significant between application of intradialytic exercise to patient fatigue level fails kidneys undergoing hemodialysis therapy . Intradialysis Exercise can recommended for patients undergoing hemodialysis therapy to reduce blood levels fatigue , so that it can become a standard operating procedure for nursing in providing care while patients are undergoing hemodialysis.

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