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THE EFFECT OF INTRADIALYTIC EXERCISE AND SLOW DEEP BREATHING ON FATIGUE IN PATIENTS WITH CHRONIC KIDNEY DISEASE WHO ARE ON HEMODIALYSIS AT HOPE AND PRAYER HOSPITAL BENGKULU CITY

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Abstract

Fatigue is one of the problems that occurs in Chronic kidney disease (CKD) patients undergoing hemodialysis the side effects caused in CKD patients undergoing hemodialysis therapy experience fatigue as much as 44.7% - 97%. Fatigue is a subjective feeling of discomfort in the form of fatigue, weakness and decreased energy. Therefore it is important to overcome this fatigue. One way to overcome fatigue is to provide a combination therapy of intradialitic exercise and slow deep breathing. This is to examine whether the combination of intradialytic exercise and slow deep breathing has an influence on fatigue in CKD patients who are being hemodialyzed at RSHD, Bengkulu city. This type of research will be conducted using quantitative research with a quasi-experimental design with a total sample of 33 people. The sample was selected using purposive sampling technique. The questionnaire used was Functional Assessment of Chronic Illness Therapy (FACIT) to assess the level of fatigue. Statistical tests obtained the average value of fatigue before 24.52 and after 27.42. Using the Wilcoxon test shows a p value of 0.000 (p value ≤ α 0.05) which indicates that there is an effect of intradialytic exercise and slow deep breathing on fatigue in CKD patients who are on hemodialysis. Thus intradialytic exercise and slow deep breathing provide benefits in overcoming fatigue in CKD patients. There is an effect of intradialytic exercise and slow deep breathing on fatigue. It is strongly recommended that patients with fatigue problems do intradialytic exercise and slow deep breathing interventions during hemodialysis.

Keywords : Intradialytic Exercise, Slow Deep Breathing, CKD, Fatigue, Hemodialysis

INTRODUCTION

The number of non-communicable disease (NCD) cases seems to be increasing both in the country and worldwide. Non-communicable diseases kill 41 million people each year, equivalent to 74% of all deaths globally. (World Heath organizatio, 2023) One of several non-communicable diseases that have become a global health problem is CKD. CKD is a condition of kidney damage, both

functional and structural, which can be indicated by pathology abnormalities and by the appearance of signs of kidney damage such as urine composition abnormalities, with or without a decrease in the Glomerular Filtration Rate (GFR) for 3 months. In addition, CKD can also be defined as a decrease of <60 ml/min/1.73 m2 for 3 months without kidney damage. (J. P. Sihombing, 2016)

According to the World Health Organization (WHO), in 2019 CKD patients in the world amounted to 15% of the population and had caused 1.2 million cases of death. Data in 2020, the number of death cases due to CKD was 254,028 cases. In 2021, as many as 843.6 million. The number of deaths from CKD is expected to increase to 41.5% by 2040. This high number indicates that CKD ranks 12th in all causes of death. According to Indonesian health profil date (2021), there were 1,417,104 cases of CKD that occurred in that year. According to riskesdas date (2018), the prevalence of CKD was 0.43% or 12,322 cases and ranked 13th.

When the kidneys experience a decrease in function, the removal of metabolic waste is inhibited, which begins with inadequate exchange in the blood vessels, due to the inability of the kidneys as a filter, causing an increase in serum levels and levels of ureum nitrogen, creatinine, uric acid, phosphorus in the body and disrupting other body functions and organs (Wilson, 2006). The end products of protein metabolism are deposited in the blood, resulting in uremia and affecting all body systems. The therapy of choice for patients with CKD is hemodialysis. (D. J. Kalengkongan *et al*, 2016)

Hemodialysis is a renal replacement therapy in patients with kidney failure that aims to remove toxic waste, excess fluid, and correct electrolyte imbalances using the principles of osmosis and diffusion through external and internal blood filtration systems. (D. Irawati *et al, 2023)* Side effects caused in CKD patients undergoing hemodialysis therapy experienced fatigue as much as 44.7% - 97%. Fatigue is a subjective feeling of discomfort in the form of fatigue, weakness and decreased energy. Fatigue is influenced by various factors depending on the condition of uremia, anemia, malnutrition, depression and physical activity deficiency. Patients who have been undergoing hemodialysis for a long time have high ureum and creatinine levels. High ureum will interfere with the production of the hormone erythropoietin which results in a decreased number of red blood cells which will cause the body to experience fatigue, fatigue, lethargy which is a symptom of extreme fatigue and will force the heart to work harder to supply oxygen. (W. A. Wibowo *et al* 2020) Fatigue is also caused by an increase in the amount of metabolic waste in the body which can cause uremia. Uremia in CKD patients can cause patients to lose their appetite, nausea, vomiting, loss of energy and protein, and a decrease in keratinin production which causes a decrease in energy production for skeletal muscles resulting in fatigue. (D. Djamaludin *et al* , 2021)

Assessment and management of fatigue is very important to improve clinical outcomes and quality of life for patients undergoing hemodialysis. One of the interventions that can be done in reducing fatigue conditions in CKD patients is through intradialytic exercise management and slow deep breathing therapy.

The results of the researcher's study Harapan and Doa Hospital, Bengkulu City, is one of the hospitals that serves hemodialysis for patients with chronic kidney disease in Bengkulu City. Based on medical record data for the last four years, it was found that the number of CKD patients undergoing hemodialysis in 2020 was 50 people, in 2021 there were 89 people, in 2022 there were 105 people and in 2023 there were 87 people (Medical Record of Bengkulu City Hospital, 2023). This fatigue problem must be a concern for nurses because it can anticipate risks, take preventive measures and reduce the impact on the survival of patients by providing a combination of several interventions expected to reduce fatigue. Based on the background of the problem, the researcher is interested in conducting a scientific study on "The Effect of Intradialytic Exercise and Slow Deep Breathing Techniques on Fatique in Chronic Kidney Disease Patients undergoing Hemodialysis at Harapan and Doa Hospital, Bengkulu City".

MATERIAL AND METHODS

This study belongs to the category of quantitative research, especially experimental research using a quasy-experimental approach with a "one group pre-test, post-test" design. The application of intradialytic exercise and slow deep breahing is the independent variable of this study, and the decrease in fatigue is the dependent variable. the difference in measurement results is considered as the treatment effect. The population in this study were chronic kidney disease patients undergoing routine hemodialysis. Selection of research samples using purposive sampling technique where the researcher determines the sampling by setting several inclusion criteria in accordance with the research objectives so as to answer the research problem. The sample in this study were hemodialysis patients who experienced fatigue complaints.

RESULT AND DISCUSSION

Univariate analysis in this study to see the characteristics of respondents, the characteristics of fatigue values before and after the intervention.

Table 1 : Frequency distribution of respondent characteristics of age, gender, education and duration of hemodialysis in 2024

No	Variables	Percentage
1	Age	
	Mean	47,70
	Median	52,00

	SD	11,345
	Min	23
	Max	65
	CI 95%	43,67-51,72
2	Gender	
	Female	19(57,6%)
	Male	14(42,4%)
3	Education	
	Not in school	
	SD	8(24,2%)
	SMP	3(9,1%)
	SMA	11(33,3%)
	PT	11(33,3%)
4	Length of hemodialysis	
	Mean	2,27
	Median	2,00
	SD	761
	Min	1
	Max	4
	CI 95%	2,00-2,54

Based on table 1 above, the results of the analysis obtained the average age of the respondents, namely 47.70 years with a standard deviation of 11.345 with the minimum age of 23 years and the maximum age of 65 years. The results also showed that half of the respondents as many as 19 people (57.6%) were female. The level of education in this study shows that half of the respondents have a middle to upper education, namely (33.3% high school education and 33.3% college). And from the results of the study the average respondent who underwent hemodialysis was for 2.27 years 63% 21 people.

Table 2 : Distribution of average fatigue scores before and after the intervention intradialytic exercise and slow deep breathing in 2024

	***Fatigue*_pre**	***Fatigue*_post**
Mean	24.52	27,42
Median	26.00	30,00
Std. Deviation	6.610	7,207
Minimum	15	16
Maximum	37	39
CI 95%	22,17-26,86	24,87-29,98

Table 2 shows that the average fatigue value of respondents before the intervention was 24.52 with SD 6.610, with a minimum value of 15 and a maximum value of 37. After the intervention, it shows that the average fatigue value of respondents is 27.42 with SD 7.207 and the distribution of data shows a minimum value of 16 and a maximum value of 39.

Bivariate analysis was conducted to determine the effect of intradialytic exercise and slow deep breathing on fatigue. Before the bivariate analysis was carried out, the researchers conducted a normality test using Shapiro Wilk, where the data and analysis results showed that the data were not normally distributed with a value of 0.013 so that for the next analysis a non-parametric test was used,

namely the Wilcoxon Signed Rank Test to see the effect of intradialytic exercise and slow deep breathing on fatigue in patients hemodialysis.

Tabel 3 : The effect of intradialytic exercise and slow seep breathing on fatigue in chronic kidney disease patients on hemodialysis at RSHD Bengkulu city in 2024

		N	Mean rank	Sum of rank	p-value	Z
Variabel *pre post fatigue*	Negative rank	0	.00	.00	.001	-4.804
	Positive ranks	30	15.50	465.00		
	Ties	3				

In table 3 above, based on the calculation method carried out in the Wilcoxon Signed Rank Test formula, 30 respondents experienced a positive rank or decreased fatigue score and 3 respondents who did not experience a change in fatigue score and obtained a p-value of 0.001 which means less than 0.05, thus H0 is rejected and Ha is accepted, meaning that it can be concluded that there is an effect of giving intradialytic exercise and slow deep breathing on fatigue in CKD patients at RSHD Bengkulu city.

RESULT AND DISCUSSION

Age

The results showed patients undergoing hemodialysis with an average age of 47.70 years. The results of Darmawan's research (2019) also state that the average patient with chronic kidney disease is 41-60 years old. Age is a factor that can describe the condition and affect a person's health. (I. P. E. Darmawan, P. O. *et al*, 2019) According to the results of research by Alshammari et al (2024), there is a significant relationship between age and the total score of the multidimensional fatigue assessment scale where older patients score higher than younger patients. Older people often have more comorbid conditions (e.g. cardiovascular disease, diabetes) that are common in CKD patients, which can increase fatigue. (B. Alshammari *et al,* 2024*).* According to Debnath et al (2021) muscle atrophy, weakness, and decreased oxidative capacity can make elderly dialysis patients prone to fatigue so that in this study the average age of respondents was 54.8 years (B. Alshammari *et al,* 2024*).* The older a person gets, the more his/her body system declines in function. Renal and urinary tract function will change with age. After the age of 40 years, there will be a progressive decrease in glomerular filtration rate until the age of 70 years, approximately 50% of normal. Tubular function including the ability to reabsorb and concentrate also decreases with age.

Gender

Based on the results of patient research, half of the respondents were female with 19 (57%) respondents. This is in line with Mollaoglu's research (2009) which states that most patients who

experience fatigue are women, as well as research by Nijrolder, et al 2009, found that more women (73.9%) experience fatigue and have a higher level of fatigue. Fatigue in women is easier to detect because women are easier to talk about illnesses and problems experienced so it is easy to detect fatigue.

Education

Based on the results of the study, half of the respondents had secondary education, namely high school education as much as (33.3%) and college, namely 13 (33.3%). In line with research Jangkup (2015) The results showed that the highest education level among CKD respondents who underwent hemodialysis at BLU RSUP Prof.DR.R.D.Kandou Manado was the Bachelor level of education as many as 17 respondents (42.5%). In addition, according to J. P. Sihombing *et al* (2016) patients with higher education levels experienced more fatigue. In contrast to research Zyga *et al* (2015) hemodialysis patients with lower education levels reported higher levels of fatigue. patients with lower education levels seem to experience greater fatigue. From the results of the above study, it can be concluded that fatigue in CKD patients with hemodialysis can affect anyone regardless of educational background.

Duration Of HD

The results showed that the average length of hemodialysis in respondents was 2.27 years. This is in line with research Darmawan (2019) where the length of hemodialysis with fatigue has a significant relationship ($p=0.00$; $<\alpha=0.05$). The results showed a moderate relationship between the variable length of hemodialysis and fatigue. The positive r value (+) means that the relationship between the variables is unidirectional, that is, the longer the hemodialysis, the more the incidence of fatigue increases. According to research Roifah (2019) It is concluded that together the variable length of hemodialysis affects the variable degree of fatigue. The coefficient of determination test result is 0.072, meaning that 7.2% of the fatigue level is influenced by the length of hemodialysis. According to Debnath *et al* (2021) patients undergoing dialysis often experience fatigue, which can have a major impact on their quality of life.

Average fatigue value before and after the effect of intradialytic exercise and slow deep breathing on CKD patients undergoing hemodialysis.

The results showed that the average fatigue level before intradialytic exercise and slow deep breathing was 24.52 with SD 6.610. After being given a combination of intradialytic exercise and slow deep breathing, the average fatigue level increased to 27.42 with SD 7.207, so that the difference between before and after giving intradialytic exercise and slow deep breathing therapy obtained an average difference in fatigue value of 2.9.

In line with Merline's research (2018) which shows the average level of fatigue before and after doing intradialytic exercise in getting a pre test value of 38.5 and post test 30.95 so that the average difference is 0.20 which means there is an effect of intradialytic exercise on fatigue. (M. Merline, *et al,* 2018*).* According to research by Muliani, et al (2021), it shows that the treatment in the form of physical exercise obtained a mean pre-test value of 25.70 and post-test 30.75 which shows an increase in fatigue scores (R. Mulianiand, *et al*, 2021) a p value <0.001 which means that there is an effect of intradialytic exercise on fatigue scores. According to research by Maniam et al. (2014) obtained the results of improving the level of fatigue in the experimental group before intervention 30.0 and after 40.5.respondents.

The effect of intradialytic exercise and slow deep breathing on CKD patients undergoing hemodialysis

In this study, it was found that there was an effect of intradialytic exercise and slow deep breathing on reducing fatigue levels in hemodialysis patients by showing a p value of 0.001 which indicates less than 0.05 or (p < a).This research is in line with the research of Amilia et al (2019) which shows the results of a paired t test with a p value of 0.000 which means that there is a significant difference in the average decrease in fatigue values before and after the intervention. According to research by Muliani, et al (2021), it shows an increase in fatigue scores and a p value <0.001, which means that there is an effect of intradialytic exercise on fatigue scores in CKD patients undergoing hemodialysis (R. Mulianiand, *et al*, 2021). The results of Hasanah and Livina's research (2021) show that there is a significant difference in fatigue scores before and after slow deep breathing (pvalue 0.000), where there is a change in fatigue level score from 25.79 (severe fatigue) to 35.00 (mild fatigue). (U. Hasanah *et al*, 2021)

Limitations of the Study

In his study there are several research weaknesses, including

1. The type of research used is a pre-experiment using a one group test design, where the research intervention is given only to one intervention group without a comparison group so that it is not known whether the decrease in fatigue levels is really caused by the provision of interventions or other factors. It should use a pre test post test design with control group, so that it can compare the results of research and those given other treatments.
2. The sample of this study amounted to 33 respondents. should be to get better results, the research was conducted on a larger sample.
3. No control of other factors that can affect intradialytic exercise and slow deep breathing on fatigue reduction.

CONCLUSION

Based on the findings and discussion regarding the effect of intradialytic ecercise and slow deep breathing on fatigue in patients suffering from kidney failure and undergoing hemodialysis, the following conclusions can be made:

1. The average age of respondents was 47.70 years, half of the respondents were female as much as 57.6% with the highest level of education of respondents, namely those with high school level education, 33.3% of people and for the D3 / bachelor level, 33.3% and had an average length of hemodialysis 2.27 years.
2. The average fatigue value of respondents before being given treatment was 24.52 and after being given treatment the average fatigue of respondents was 27.42.
3. There is an effect of a combination of intradialytic ecercise and slow deep breathing on improving fatigue values in CKD patients undergoing hemodialysis at RSHD Bengkulu City in 2024 ($p < 0.05$).

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