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Slow deep breathing and acupressure massage on fatigue and oxygen saturation in patients with chronic renal failure undergoing hemodialysis

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Abstract

Background: Breathing exercise can provide a positive effect for patients with chronic renal failure (CRF), because it can increase development of lung and will increase the consentration of oxygen in the blood so that oxygen need it. Accupresure will stimulate and rebuild the cells in the body are weakened and imporve blood circulation the body, as to reduce tension and fatigue.
Purpose: To determine the effect of breathing exercises and acupressure on the level of fatigue and oxygen saturation of CRF patients.
Method: *Quasy experiment* with 20 participants, instrument is used to fatigue assesment scale (FAS), fatigue and saturation oxygen obsevation sheet. This research is implementated in hemodialysis room at Serang Hospital.
Results: *There was a* significant different of level fatigue before and after breathing exercise *(p=0.005)*, significant different of level fatigue before and after breathing exercise and acupresure *(p=0.014)*, and there significant different of oxygen saturation before and after breathing exercise and before and after breathing exercise and acupresure *(p=0.108)*.
Conclusion: Exercise breathing in people with chronic renal failure can alter how tired they feel, and as a result, there is a big difference in how tired they feel before and after exercising while taking deep breaths.

Keywords: Accupresure; Breathing Exercise; Hemodialysis; Level Fatigue; Oxygen Saturation.

INTRODUCTION

Today, chronic kidney disease is a significant global public health issue. The Global Burden of Disease (GDB) and WHO (2002) both list renal and urinary tract illnesses as the 17th or 12th leading cause of death or disability, respectively, with 850,000 fatalities annually. One million persons worldwide are currently receiving kidney replacement therapy, and as this number rises, it is projected that there were two million receiving kidney therapy in 2010 (Indraratna, 2016; Liyanage, Ninomiya, Jha, Neal, Patrice, Okpechi, & Perkovic, 2015).

Each year, there are more people with chronic kidney disease (CKD). According to the CDC (Centers for Disease Control), 16.8% of people over 20 had CKD (chronic kidney disease) between 1999 and 2004. When compared to statistics from the preceding six years, which is 14.5%, this percentage rises. The incidence in poor nations is thought to be between 40 and 60 cases per million people annually. The incidence of CKD in Indonesia is thought to be between 100 and 150 cases per million people, while the prevalence is between 200 and 250 cases per million people, according to data from many areas of nephrology (Indraratna, 2016).

Hemodialysis is a renal replacement therapy that lasts for 4-5 hours, is conducted 2-3 times per week,

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and is used to restore fluid and electrolyte balance as well as remove the byproducts of protein metabolism. Patients typically experience physical stress following hemodialysis, which lasts for 5 hours. In combination with the consequences of hemodialysis, the patient will experience weariness, headaches, and cold sweats due to low blood pressure. The patient may also express feelings of malaise and exhaustion if they have a poor nutritional status. Additionally, anemia will result in low oxygen levels that will wear the body out and make the heart work harder to provide the necessary oxygen (Tunizan, 2020).

The biggest complaint of dialysis patients is fatigue or exhaustion, which is an unpleasant subjective experience of weakness, diminished energy, and lethargy (prevalence ranges from 60 to 97 percent). The quality of life for hemodialysis patients can be negatively impacted by fatigue circumstances, which can lead to impaired focus, malaise, sleep disorders, mental disorders, and diminished ability to carry out daily activities (Septiwi, 2013; Guirguis, 2018).

Uremia, anemia, malnutrition, depression, and a lack of physical activity are a few of the variables that might contribute to weariness in hemodialysis (Ronica, Efendi, Novira, Idramsyah, & Septiyanti, 2019). Patients on hemodialysis who have uremia may experience protein restrictions, fatigue, nausea, and loss of appetite. Patients with exhaustion can be managed in a number of ways, including exercise breathing *(deep breath exercises) and acupressure (massage)*. These methods can be both pharmaceutical and non-pharmacological. Exercises that improve breathing are a natural therapeutic method that can be used to treat a variety of ailments, including exhaustion, discomfort, sleep difficulties, stress, and anxiety. Deep breathing exercises or breathing exercises will activate the parasympathetic nervous system, causing endorphin production to increase, heart rate to slow, lung expansion to expand to its full potential, and muscles to relax. Exercises that focus on deep breathing help our bodies receive enough oxygen, which is crucial for the body's respiratory and circulatory systems (Cahyana & Fitriani, 2017).

In order to affect changes in body physiology that will affect mental state, neurotransmitter secretion, and emotional state, acupressure (finger press technique) is a non-pharmacological therapy method that uses special techniques without needles to manipulate various acupuncture points (Ekajayanti, Parwati, Astiti, & Lindayani, 2021). Purpose this research is understanding and evaluating the impact of accupresure (massage) and deep breathing exercises on the level of weariness and oxygen saturation in patients with chronic renal failure receiving hemodialysis in the Serang hospital.

RESEARCH METHOD

Quasy experiment with the research design used is pretest-posttest without control group design. The population in this study were outpatients with chronic kidney failure who underwent hemodialysis at Serang General Hospital. Sampling was taken using a purposive sampling method, samples obtained were 20 participants divided into two groups. Group 1 was given deep breathing exercises while group 2 was given deep breathing exercises and massage (acupressure). Sample selection was carried out in consultation with the head of the room and the doctor in charge of the hemodialysis room at Serang Regional Hospital, with the following criteria: Patients with chronic kidney failure who undergo hemodialysis routinely twice a week, communicative and cooperative, patients with fatigue, patients without shortness of breath and a maximum blood Hb (hemoglobin) value of 10 gr%/dl.

This research has been ethically tested and declared passed by the Nursing Research Ethics Commission, Faculty of Nursing, Muhammadiyah University, Jakarta.

Data collection tools used the FAS (fatique assessment scale) questionnaire and fingertrip pulse oximeter. The FAS format contains 10 statements about the patient's subjective fatigue response to the fatigue they experience (Michielsen, De Vries, Van Heck, Van de Vijver, & Sijtsma, 2002). The FAS format in Indonesia has been tested on the development of a subjective fatigue assessment instrument in hospitals in Yogyakarta (Sawitri & Masruroh, 2012). The fingertrip pulse oximeter is

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used to measure the oxygen saturation capacity attached to the patient's fingertip.

The instruments used for data collection were observation sheets for patient fatigue levels and total oxygen saturation capacity as well as demographic data sheets for participants characteristics. Researchers carry out coordination and outreach according to the research plan. The researcher equated perceptions and explained the procedures for deep breathing exercises and massage to the room nurse.

Participants underwent hemodialysis twice a week. For the first meeting, researchers made observations by interviewing patients to determine the patient's level of fatigue by encouraging clients to fill out a fatigue level questionnaire using the FAS (fatigue assessment scale) questionnaire and measuring oxygen saturation capacity. with pulse oximetry. After that, the patients were immediately given deep breathing exercises for five cycles (10 minutes) in the first group, while in the second group deep breathing exercises and massage were carried out. The next step is that meetings 2 to 8 (4 weeks) will be held; for the first group deep breathing exercises according to the cycle with a frequency of administration 2x/day. For the second group, deep breathing exercises and massage were carried out.

Evaluation of fatigue levels and flow oximetry pre and post intervention is carried out serially, namely once a week (twice dialysis). Pre and post tests were carried out by researchers to find out; The client's level of fatigue is given a questionnaire consisting of 10 questions with a Likert scale. Apart from that, the client's oxygen saturation capacity is measured using a finger flow oximeter.

Univariate analysis was carried out on each data to provide a descriptive picture of the research results. Bivariate analysis was used to prove the research hypothesis, namely looking at the effect of deep breathing exercises on fatigue levels and oxygen saturation capacity. The results of the analysis say there is a significant influence if the p-value is smaller than 0.05 ($p < 0.05$). On the other hand, it is said that there is no significant effect if the p-value is greater than 0.05 ($p > 0.05$). Before the bivariate test, a data normality test was carried out using the Shapiro Wilk test. From the results of this test, the data was found to be abnormal, so the bivariate analysis used on the participants studied used the Wilcoxon test.

RESEARCH RESULT

Table 1. Characteristic of Participants (N=20)

Variabel	Group 1 (n=10)	Group 2 (n=10)
Age (Mean±SD)(Range)(Year)	(52.5±1.72)(46-59)	(57,7±2.04)(48-68)
Gender (n/%)		
Male	6/60	5/50
Female	4/40	5/50
Education (n/%)		
Elementary	1/10	1/10
Junior High	2/20	2/20
Senior High	4/40	3/30
Bachelor	3/30	4/40
Occupation (n/%)		
Employed	6/60	6/60
Unemployed	4/40	4/40
Hb (Mean±SD)(Range)(gr/dl)	(8.23±0.31)(6.50-9.80)	(8.75±0.29)(6.90-9.80)

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From table 1 it is known that the average and standard deviation of the age of participants in group 1 is (52.5 ± 1.72) with a range of 46-59 years. The majority are male (60%), have a high school education (40%), work (60%) and Hb levels with mean results and standard deviation (8.23 ± 0.31) range between 6.50-9.80 gr/dl. while in group 2 the age of the participants was (57.7 ± 2.04) ranging between 48-68 years. male and female gender are the same each (50%), the majority have tertiary education (40%), work (60%) and Hb levels with mean results and standard deviation (8.75 ± 0.29) range between 6.90-9.80 gr /dl.

Tabel 2. Differences in Levels of Fatigue with Oxygen Saturation Before and After Intervention (N=20)

Group	Week	Fatigue level		Oxygen saturation	
		(Mean±SD)	p-value	(Mean±SD)	p-value
1 (Deep breath exercises)	1				
	Before	(27.60±6.63)	0.004	(97.50±1.08)	0.023
	After	(23.30±5.33)		(98.30±0.67)	
	2				
	Before	(23.10±6.11)	0.020	(97.50±0.70)	0.000
	After	(21.70±5.94)		(98.30±0.63)	
	3				
	Before	(22.00±5.49)	0.010	(97.60±0.67)	0.010
	After	(20.80±5.45)		(98.20±1.63)	
	4				
	Before	(23.10±6.11)	0.010	(97.30±0.82)	0.030
	After	(21.70±5.94)		(98.00±1.94)	
2 (Deep breath exercises and massage)	1				
	Before	(25.40±6.99)	0.023	(96.70±1.49)	0.014
	After	(23.30±5.88)		(97.30±1.25)	
	2	(24.40±6.41)		(96.60±1.17)	
	Before	(22.80±5.97)	0.011	(97.50±1.08)	0.011
	After				
	3				
	Before	(23.90±5.66)	0.004	(96.80±1.47)	0.023
	After	(21.10±4.88)		(97.60±1.26)	
	4				
	Before	(23.10±4.13)	0.011	(96.90±0.99)	0.046
	After	(20.90±4.04)		(97.70±1.56)	

The average level of fatigue in patients who took part in deep breathing exercises was lower than patients before doing deep breathing exercises, according to the table above for intervention group 1 in the first week, with a p-value of 0.004. From the results of statistical tests it can be concluded that there is a significant difference in the level of fatigue in patients before deep breathing exercises and after deep breathing exercises, with a p value of 0.004 (p<0.05). The p value was 0.020, it was found after the second week that the patient's fatigue level after deep breathing exercises was on average lower than before. From the results of statistical tests it can be concluded that there is a significant difference between the fatigue experienced by patients before deep breathing exercises and after deep breathing exercises, with a p-velue value of 0.020 (p<0.05). The p-value is 0.01 in the third week, it is known that the average level of patient fatigue after deep breathing exercises is lower than the average level

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of patient fatigue before deep breathing exercises. From the results of statistical tests it can be concluded that there is a significant difference between the level of fatigue in patients before and after deep breathing exercises, with a p value of 0.01 (p<0.05). The p-value is 0.010 in the fourth week, it is known that the average level of fatigue in patients after deep breathing exercises is less than the average of patients before deep breathing exercises. From the results of statistical tests it can be concluded that there is a significant difference in the level of fatigue in patients before deep breathing exercises and after deep breathing exercises, with a p-value of 0.01 (p<0.05).

In the first week, it was discovered that the average oxygen saturation of patients before deep breathing exercises was greater than the average of patients before deep breathing exercises, with a p-value of 0.023. From the results of statistical tests it can be concluded that there is a significant difference in the patient's oxygen saturation before deep breathing exercises and after deep breathing exercises, with a p-value of 0.023 (p<0.05). In the second week, it was discovered that the average oxygen saturation of patients before deep breathing exercises was greater than the average of patients before deep breathing exercises, with a p-value of 0.000. From the results of statistical tests it can be concluded that there is a significant difference in the patient's oxygen saturation before deep breathing exercises and after deep breathing exercises, with a p-value of 0.000 (p<0.05). In the third week, it was discovered that the average oxygen saturation of patients before deep breathing exercises was greater than the average of patients before deep breathing exercises, with a p-value of 0.010. From the results of statistical tests it can be concluded that there is a significant difference in the patient's oxygen saturation before deep breathing exercises and after deep breathing exercises, with a p-value of 0.010 (p<0.05). In the fourth week, it was found that the average oxygen saturation of patients before deep breathing exercises was greater than the average of patients before deep breathing exercises, with a p-value of 0.030. From the results of statistical tests it can be concluded that there is a significant difference in the patient's oxygen saturation before deep breathing exercises and after deep breathing exercises, with a p-value of 0.030 (p<0.05).

Intervention group 2 In the first week, it was discovered that the average level of fatigue among patients after deep breathing exercises and massage was less than that of patients before deep breathing exercises and massage, with a p-value of 0.023. From the results of statistical tests it can be concluded that there is a significant difference in the level of fatigue in patients before and after breathing exercises and massage with a p-value of 0.023 (p<0.05). In the second week, it was discovered that the average level of fatigue among patients after deep breathing exercises and massage was less than that of patients before deep breathing exercises and massage, with a p-value of 0.011. From the results of statistical tests, it can be concluded that there is a significant difference in the level of fatigue in patients before and after breathing exercises and massage with a p-value of 0.011 (p<0.05). In the third week, it was discovered that the average level of fatigue among patients after deep breathing exercises and massage was less than that of patients before deep breathing exercises and massage, with a p-value of 0.004. From the results of statistical tests it can be concluded that there is a significant difference in the level of fatigue in patients before and after breathing exercises and massage with a p-value of 0.004 (p<0.05). In the fourth week, it was discovered that the average level of fatigue among patients after deep breathing exercises and massage was less than that of patients before deep breathing exercises and massage, with a p-value of 0.011. From the results of statistical tests, it can be concluded that there is a significant difference in the level of fatigue in patients before and after breathing exercises and massage with a p-value of 0.011 (p<0.05).

In the first week, it was discovered that the average patient's oxygen saturation before deep breathing exercises and massage was greater than the average of patients before deep breathing exercises and massage, with a p-value of 0.014. From the results of statistical tests it can be concluded that there is a significant difference in oxygen saturation in patients before and after deep breathing exercises and massage, with a p-value of

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0.014 (p<0.05). In the second week, it was discovered that the average patient's oxygen saturation before deep breathing exercises and massage was greater than the average of patients before deep breathing exercises and massage, with a p-value of 0.011. From the results of statistical tests, it can be concluded that there is a significant difference in oxygen saturation in patients before and after deep breathing exercises and massage, with a p-value of 0.011 (p<0.05). In the third week, it was discovered that the average patient's oxygen saturation before deep breathing exercises and massage was greater than the average of patients before deep breathing exercises and massage, with a p-value of 0.023. From the results of statistical tests, it can be concluded that there is a significant difference in oxygen saturation in patients before and after deep breathing exercises and massage, with a p-value of 0.023 (p<0.05). In the fourth week, it was discovered that the average patient's oxygen saturation before deep breathing exercises and massage was greater than the average of patients before deep breathing exercises and massage, with a p-value of 0.046. From the results of statistical tests it can be concluded that there is a significant difference in oxygen saturation in patients before and after deep breathing exercises and massage, with a p-value of 0.046 (p<0.05).

Table 3. Comparison of Fatigue Level With Oxygen Saturation Before The First Week and After The Fourth Week (N=20)

Week	Variabel	Ranks			Mean	Z	*p-value*
		-	+	Ties			
1	Fatigue level before breath training in week 1 compared to week 4's fatigue level	10	0	0	5,50 0,00	-2,82	0,005
2	Level of weariness before deep breathing and acupressure Week 1 Level of fatigue after deep breathing and acupressure Week 4	9	1	0	5,72 3,50	-2,45	0,014
3	Week 1: O2 saturation before breath practice; Week 4: O2 saturation following breath practice	2	5	3	3,50 4,20	-1,26	0,206
4	Week 1's O2 saturation came before deep breathing and acupressure, while Week 4's O2 saturation came after those two techniques.	2	8	0	6,00 5,38	-1,60	0,108

According to table 3, the level of fatigue in patients who performed deep breathing exercises was significantly lower after deep breathing exercises than before, with a p-value of 0.005 (p<0.05) obtained from the results of statistical tests. It is therefore clear that there is a significant difference in the level of fatigue before and after deep breathing exercises.The results of statistical tests showed that wilcoxon results obtained significant value of 0.014 (p<0.05), so it can be concluded that there is a significant difference in fatigue levels between before deep breath exercise and after deep breath exercises and massage. The level of fatigue in patients who performed deep breath exercises and massage in the results obtained that the level of fatigue after deep breath exercises and massage is lower than before deep

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breath exercises and massage with a p value of 0.014.

The results of statistical tests showed wilcoxon results obtained a significance value of 0.206 (p>0.05), so it can be concluded that deep breath exercises have a significant impact on oxygen saturation in 20.6 % patients who performed them but not in 5%. Oxygen saturation in patients who performed deep breath exercises obtained results of oxygen saturation after deep breath exercises better than before deep breath exercises, oxygen saturation is better than before deep breath exercises with a p value of 0.206.There were 2 patients with oxygen saturation results that were better after deep breath exercises and massage than before deep breath exercises, 8 patients remained, and 0 patients had better oxygen saturation than before deep breath exercises and massage with a P value of 0.108, according to the results of statistical tests. Wilcoxon significance value was 0.108 (p>0.05) for the results.Thus, it can be inferred that deep breathing exercises and massage have a considerable impact on oxygen saturation at 10.8% but not at 5%.

DISCUSSION

The average age of participants in this study was in the range of 47 – 63 years with an average of 55 years. This shows that participants with chronic renal failure (CRF) were in young adulthood in accordance with previous research which stated that the youngest age of sufferers with chronic kidney disease is 23 and the oldest age is 65 years (O'Hare, Choi, Bertenthal, Bacchetti, Garg, Kaufman, & Landefeld, 2007; Pratiwi, Untari, & Yuswar, 2019). This shows that CRF can be experienced by young and elderly people.

The results of this study show that males are 55% more numerous than females 45%, this shows that the incidence of patients with CRF is more male due to lifestyle factors, such as smoking and consuming alcohol, if over a long period of time. Consuming it for a long time will cause hypertension and diabetes mellitus. This disease can cause complications in the form of chronic kidney failure (Rivandi, & Yonata, 2015; Indonesian Renal Registry, 2018).

The study's findings on the degree of exhaustion prior to treatment show that there are different levels of weariness, including mild, moderate, and severe. The participants had anemia, with an average Hb, dl of 8.49, which affects cell metabolism and lowers energy levels, therefore there can be differences in the level of exhaustion between each group. In addition to low hemoglobin, psychological issues, sleep disturbances, and food deprivation brought on by uremia-related nausea and vomiting all contribute to weariness (Septiwi, 2013).

Studies on hemodialysis patients have shown that deep breathing exercises and kegel exercises increase physical strength, appetite, and sexual activity while decreasing constipation and free decreased insonmia. Exercises that include deep breathing help our bodies acquire enough oxygen, which is crucial for the body's respiratory and circulatory systems. When we engage in deep breathing exercises, oxygen enters the blood vessels and all bodily tissues, flushing out toxins and metabolic waste, revving up the metabolism, and generating energy (Agusti, Toibah, Septiyorini, Harianto, Khotimah, Waroka, & Bastari, 2022).

Prior to therapy, both groups 1 and 2 had normal results for the average oxygen saturation. The majority of participants (95%) did not report having a deep respiratory tract infection, which is characterized by no shortness of breath. However, there was one patient (5%) who had respiratory distress; during the anamnesis, participants reported coughing and shortness of breath, but these symptoms went away at the next meeting, allowing oxygen saturation the following day to return to normal.

According to the study's findings, there was no difference in group 1's oxygen saturation following treatment, but there was in group 2, where one patient initially experienced a rise in oxygen saturation from below 95% to above 95% (normal). This occurred because the patient was given collaborative management by the room doctor right away and was able to regularly engage in deep breathing exercises. After treatment, both groups 1 and 2's blood oxygen saturation levels increased. This is because patients regularly take deep breaths, which promote healthy lung development and make

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it easier for the blood to bind to oxygen and transport it throughout the body.

Differences in the level of fatigue before and after treatment, with the level of fatigue in group 1 being lower after deep breath training than before, with a p-value of 0.005, from the results of statistical tests showing wilcoxon results obtained significant value of 0.005 (p<0.05), it can be concluded that there is a significant difference in fatigue levels between before deep breath training and after.The results of statistical tests showed that wilcoxon results obtained significant value of 0.014 (p<0.05) and that there is a significant difference in the level of fatigue between before deep breath training and massage with after deep breath training. The level of fatigue in group 2 found that there were 9 people with fatigue level results after deep breath training and massage is lower than before deep breath training and massage with a p-value of 0.014. Which examined the impact of breathing exercises on patients receiving hemodialysis patients' degrees of weariness. The study involved 10 patients receiving hemodialysis at Gatot Soebroto Army Central Hospital Jakarta. A paired t-test was used to analyze the data. The results of the paired T test showed a p value of 0.000 (p<0.05), indicating a significant difference between the level of weariness before and after the breathing exercise (Septiwi, 2013).

Deep breathing exercises can benefit CFS patients receiving hemodialysis because they improve lung development, which increases alveolar ventilation, and they raise blood oxygen levels, which meets the body's need for oxygen. Deep breathing exercises ensure that the body receives an adequate amount of oxygen because oxygen is crucial for the body's respiratory and circulatory systems. Deep breathing exercises cause oxygen to flow into the blood vessels and all body tissues, eliminating toxins and metabolic waste, boosting metabolism, and producing energy, all of which can have an impact on how tired we feel. One intervention technique that is simple for patients to use is deep breathing exercises. Using this tactic, commercial therapy can be developed and given to patients at no cost.Because it can stimulate the sympathetic nervous system, deep breathing exercises can enhance lung expansion and relax the muscles, which helps to reduce levels of fatigue, pain, sleep difficulties, and anxiety.

Applying acupressure decreased fatigue, effect of acupressure on fatigue levels in hemodialysis patients that included 118 participants (Eglance, Karatas, & Tasci, 2013). Acupressure therapy considerably lessens fatigue in hemodialysis patients, according to research published in Iran under the title "effect of acupressure on fatigue in hemodialysis patients." The study, which had 32 participants, discovered a correlation between weariness and acupressure therapy that was statistically significant (Priyanto, Irawaty, & Sabri, 2011).

Differences in oxygen saturation before and after treatment, oxygen saturation in group 1 found that there are 2 people whose oxygen saturation results are better after deep breathing exercise than before deep breathing exercise, 3 people are still present, and 5 people have better oxygen saturation than before deep breathing exercise with a p-value of 0.206, from the outcomes of statistical tests show the results obtained wixocon significance value of 0.206 (p>0.05), so it can be concluded that. Oxygen saturation in group 2 revealed that 2 people had oxygen saturation results that were better than before deep breathing exercises and massage, 8 people were left, and 0 people had oxygen saturation that was better than before deep breathing exercises and massage with a p-value of 0.108 (p>0.05). Based on the results of statistical tests, it is possible to conclude that there is no significant difference between the groups.

When patients with pulmonary tuberculosis practice deep breathing, the diaphragm and external intercostal muscles contract more forcefully, resulting in a deeper inspiration (more air entering) that affects the increase in peripheral blood oxygen concentration. The additional inspiratory muscles also become more active, which causes the thoracic cavity to increase even more (Aminah, 2018). However, a supplementary study on the impact of deep breathing exercises on lung oxygenation and ventilation in mechanical ventilation post-clients found no statistically significant difference in oxygen saturation on days 2, 3, and 4 between the intervention group and the control group (oxygen

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saturation 95%) (p-value 0.670, P = 0.05) (Sabouhi, Kalani, Valiani, Mortazavi, & Bemanian, 2013).

This is because of research findings in chronic kidney failure sufferers. Even though all groups 1 and 2 who underwent hemodialysis had normal blood hemoglobin (Hb) levels (above 95%), the average Hb level of participants was 8.49 gr/dl. Even though the participants blood hemoglobin level was low, the optimization and affinity of hemoglobin for oxygen binding appeared to be good, as indicated by a blood oxygen saturation level of more than 95%. Mild anemia (8–10 gr/dl) is another factor that influences the participants health. In accordance with previous theory which states that anemia occurs in patients with chronic kidney disease as a result of reduced erythropoietin secretion which will affect the formation of blood cells in the bone marrow, erythropoietin is a hormone that stimulates the bone marrow to produce red blood cells (erythrocytes) (Smeltzer, & Bare, 2012). Low secretion of erythropoietin by the kidneys which has an impact on the production of red blood cells (erythrocytes) in the bone marrow is the cause of low hemoglobin in patients with chronic renal failure.

CONCLUSION

There is a substantial difference in the degree of fatigue between before and after deep breath training, indicating that exercise breathing in patients with chronic renal failure might change the level of exhaustion (level fatigue). There is a substantial change in the amount of exhaustion between before and after deep breathing exercises and massage in patients with chronic renal failure because exercise breathing and accupressure can alter fatigue. Based on the fact that deep breathing exercises have a substantial impact on oxygen saturation at 20.6% but not at 5% in patients with chronic renal failure, it can be said that these exercises have an impact on blood oxygen saturation in these patients. Based on the fact that deep breathing exercises and massage have a substantial impact on oxygen saturation at 10.8% but not at 5%, deep breathing exercises and massage can affect blood oxygen saturation in patients with chronic renal failure.

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