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THE EFFECT OF *DEEP BREATHING EXERCISE* THERAPY COMBINATION OF AROMATHERAPY BASED ON OREM'S SELF CARE THEORY ON FATIGUE AND SLEEP QUALITY IN CHRONIC KIDNEY DISEASE PATIENTS HEMODIALYSIS

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ABSTRACT
Patients hemodialysis with experience complaints of anemia, fatigue, sleep disturbances, and increased urea levels. Fatigue and sleep disorders are still a high problem in Indonesia. Increased urea levels can cause decreased appetite, poor nutritional intake and complaints of fatigue. The aim of the research was to analyze the effect of deep breathing exercise therapy combined with Orem self-care based aromatherapy on fatigue levels and sleep quality. The design in this research is quasi-experimental. Population of all hemodialysis patients at RSI Jemursari Surabaya. The sample size was 40 people, divided into 2 groups, namely the intervention group and the control group. The sampling technique was taken using a total sampling technique. Data were analyzed using the independent t-test a < 0.05 and looking at the difference in values using the delta test. The results of research conducted at RSI Jemursari Surabaya, showed that the average fatigue score in the intervention group before giving deep breathing exercise therapy, a combination of aromatherapy based on self-care Orem, was 36.90 and after being given the intervention, it was found to decrease by 15.90, while the control group did not. given any therapy, according to hospital standards of 34.65 and experienced a decrease of 19.65. Based on the independent t - test, it shows p = 0.003 and sleep quality shows p = 0.001, which means that deep breathing exercise therapy combined with aromatherapy based on Orem self-care has an effect on fatigue and sleep quality. Deep breathing exercise therapy a combination of aromatherapy based on Self-Care Orem according to standards, can reduce fatigue levels and improve sleep quality.

Keywords: aromatherapy; deep breathing exercise therapy; fatigue; sleep quality

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INTRODUCTION

Chronic kidney disease (CKD) is a disease that disrupts kidney function which is caused by a decrease in kidney function which is characterized by a glomerular filtration rate (GFR) < 60 ml/min/1.73 m2 that occurs for more than 3 months. CKD is a progressive and irreversible disorder of kidney function, where the body is unable to maintain metabolism, fluid balance and electrolytes, which results in an increase in urea. Chronic renal failure patients have the characteristics of being persistent, incurable, and requiring treatment in the form of kidney transplantation, peritoneal dialysis, hemodialysis, and long-term outpatient care (Lisa Lolowang *et al*., 2021). Hemodialysis is a process used in patients with acute kidney failure or irreversible kidney failure with fluid and electrolyte imbalances and is a long-term or permanent therapy that is carried out 3 times a week with a duration of 3-4 hours per session (Mait *et al*., 2021).

Complaints that often arise in hemodialysis patients are nausea, vomiting, anemia, fatigue, sleep disorders, and increased urea levels. High urea levels will interfere with the production of the hormone erythropoietin which causes decreased appetite and anemia. Anemia in patients with chronic renal failure if hemoglobin is <12 gr/dl for women, while <13 gr/dl for men (Yuniarti, 2021). Increased urea levels can cause a decrease in appetite, and poor nutritional intake can cause sufferers to complain of malaise and fatigue. Fatigue and sleep disorders are still high problems in Indonesia. Fatigue and sleep disorders are caused by anemia and hypertension in hemodialysis patients (Damayanti, 2021). Sleep disorders in hemodialysis patients affect the quality of sleep in terms of the length of sleep achieved so that satisfaction in sleep can be determined by how a person prepares sleep patterns at night, such as the ability to stay asleep, and sleep without medical assistant (Song *et al*., 2020).

Data from the World Health Organization (WHO) in 2018, the global incidence of CKD reached 10% of the population, while CKD patients undergoing hemodialysis (HD) were estimated to reach 1.5 million people worldwide. The incidence rate is estimated to increase by 8% every year. CKD is a chronic disease with the 20th highest mortality rate in the world (Kemenkes RI, 2020). Riskesdas data in 2018, the population aged ≥ 15 years diagnosed with CKD was 0.38%. Riskesdas data in 2018, the prevalence of CKD based on doctor's diagnosis in residents aged ≥15 years in East Java was 0.29%. Meanwhile, the proportion of hemodialysis in the population aged >15 years with CKD based on a doctor's diagnosis in East Java Province is 23.14% from the national figure (Indonesia) of 19.33% (Kemenkes RI, 2018).

Fatigue in hemodialysis patients is caused by anemia, there is a decrease in erythroprotein secretion, decreased hemoglobin levels, malaise occurs, frequent yawning, hemoglobin levels < 11.5 gr/dl and fatigue occurs. Fatigue that occurs in CKD patients undergoing hemodialysis if left untreated has an impact on their quality of life. Sleep disorders are caused by a decrease in oxygen levels to the brain, hypoxia occurs, dizziness occurs, cerebral perfusion disorders occur, tension or frustration occurs, frequent waking at night and insomnia occur. Sleep disorders also occur due to an increase in high levels of urea or creatinine, which can disrupt the production of the hormone erythropotheinsen, causing the number of red blood cells to decrease. All the conditions that occur during hemodialysis can cause stress which can lead to sleep disorders. Sleep disorders that occur in CKD patients undergoing hemodialysis if left untreated have an impact on their quality of life.

Fatigue and sleep disorders can be managed using pharmacological and non-pharmacological administration. Non-pharmacological fatigue management that can be used is acupuncture, autogenic relaxation, physical exercise, and Benson relaxation. (Utami *et al*., 2023). *Deep breathing exercise* is a natural healing technique and is part of a holistic self-care strategy to overcome various complaints such as fatigue, pain, sleep disorders, stress and anxiety. Breathing exercise allows our bodies to get adequate oxygen input, where oxygen plays an important role in the body's respiratory and circulatory systems (Moussa *et al*., 2022).

Aromatherapy combinations, a type of essential oil that directly uses plant spices or indirectly extracts essence from spices, are often used in the beauty industry and then gradually expanded to the medical field where they are ultimately used to prevent, relieve or treat certain diseases. The HD room at RSI Jemursari Surabaya does not yet have an SOP for *deep breathing exercise* and aroma therapy, so researchers are interested in researching the effect of *deep breathing exercise*, a combination of aroma therapy based on Orem's Self Care theory, on fatigue and sleep quality in chronic kidney disease sufferers undergoing

hemodialysis at RSI Jemursari Surabaya. This study aims to analyze the effect of *deep breathing exercise* and Orem Self Care Based Aroma Therapy on Fatigue and Sleep Quality in Chronic Kidney Disease Patients undergoing Hemodialysis at RSI Jemursari Surabaya.

METHOD

This research is a *Quasy experiment design* with *a pretest - posttest control* design approach. The population used was CKD patients undergoing hemodialysis in the HD room at RSI Jemursari Surabaya. This design involved two groups, namely the *deep breathing exercise* intervention group combined with aromatherapy and the control group. The samples in this study were all CKD patients undergoing hemodialysis in the HD room at RSI Jemusari Surabaya fulfilling the inclusion and exclusion criteria. Inclusion Criteria : CKD patients who are willing to become respondents, Aged 30-60 years, Undergoing hemodialysis > 3 months, Undergo hemodialysis 2 times per week, Able to participate in activities from start to finish, CKD patients who take medication Exclusion Criteria : Experiencing shortness of breath and asthma, Experiencing decreased consciousness, Experiencing stroke complications, Patients with heart disease *Drop Out* Criteria : Respondent refuses further intervention and Outpatient respondents did not come during the procedure

The sampling carried out in this research used non-probability sampling with a total sampling technique so that all samples that met the inclusion and exclusion criteria had the same opportunity to become respondents in the research. The minimum sample size in this study was calculated using the large formula for testing the hypothesis of an independent difference of 2 means. The sample results obtained were 18 respondents, so that the sample in the intervention group was 18 respondents and in the control group was 18 respondents. Researchers estimate that 10% of the sample dropped out. The drop out estimation results show that the minimum sample required is 20 respondents in each group. So, the sample size required is 40 respondents. This research was carried out for 1 month at RSI Jemursari Surabaya (November-December 2023) and was carried out in stages including: First meeting, Starting with the intervention and control groups, fatigue was measured with FACIT and sleep quality with the PSQI questionnaire. The intervention group was given a *deep breathing exercise* and aromatherapy training module book and each step was explained. In this explanation, each respondent was accompanied by family. In the control group, no intervention was given and it was only explained that respondents in the control group carried out intervention in the form of activities/routines that were usually carried out before bed for 3 weeks. During 1 week, respondents were met by researchers twice during pre-hemodialysis with a duration of ± 5 minutes by providing education in the form of treatment carried out in the intervention group, namely *deep breathing exercise* therapy and aromatherapy to observe whether actions were carried out or not at home. Second meeting, The intervention group and control group underwent repeated measurements of fatigue and sleep quality and the results of the questionnaire became the final results of the respondents' fatigue and sleep quality and were used as material for research results.

The data collection instrument used by researchers for the independent variable was the implementation of *deep breathing exercise* and aromatherapy using a training module containing the steps for *deep breathing exercise* and aroma therapy given to hemodialysis ward nurses and leaflets given to patients containing the steps for *deep breathing exercise* and aroma therapy to measure the dependent variable fatigue and sleep quality using an observation sheet in the form of a questionnaire that is available based on the Facit and PSQI *(The Pittsburgh Sleep Quality Index)* measuring instruments which consist of 7 (seven) components. The tools used in the HD room are using a Humadifier and using 10ml lavender

essential oil, with the lavender essential oil remaining for 1 month. Then at home the patient was given aromatherapy by the researchers in the form of candles and one candle lasted for 1 week. This research has met the ethical requirements of the Health Research Ethics Committee of RSI Jemursari Surabaya with No. 016/KEPK-RSISJS/II/2024.

RESULTS

Table 1.
Demographic Characteristics of Respondents

Variable	Intervention		Control		Equality Test
	f	%	f	%	
Age					
26-35 Th	0	0	1	5.0	
36-45 Th	6	30.0	4	20.0	.234
46-55 Th	6	30.0	6	30.0	
56-65 Th	8	40.0	9	45.0	
Gender					
Female	8	40.0	7	35.0	.744
Male	12	60.0	13	65.0	
Education Level					
Elementary	3	15.0	4	20.0	
Middle	6	30.0	4	20.0	.749
High/Degree	11	55.0	12	60.0	
Work					
Private	10	50.0	4	20.0	
PNS	2	10.0	1	5.0	.081
Doesn't work	8	40.0	15	75.0	

Based on the table 1, it shows that in the intervention group almost half (40.0%) were in the age range 56-65 years, while in the control group almost half (45.0%) were in the vulnerable age range 56-65 years. The majority of gender in the intervention group (60.0%) was male, and in the control group the majority (65.0%) was male. The level of education found that in the intervention group most (55.0%) had a high education, while in the control group the majority (60.0%) had a high education. Based on the Pearson chi-square test of equality, $p > 0.05$ was obtained, namely there was no difference between the intervention group and the control group (equivalent).

Table 2.
Normality and Homogeneity Test

Variable		Group	Normality Test	Explanation	Homogeneity Test	Explanation
Fatigue	Pre	Intervention	0.112	Normal	0.515	Homogeneous
		Control	0.171	Normal		
	Post	Intervention	0.200	Normal	0.314	Homogeneous
		Control	0.200	Normal		
Sleep Quality	Pre	Intervention	0.200	Normal	0.482	Homogeneous
		Control	0.154	Normal		
	Post	Intervention	.200*	Normal	0.248	Homogeneous
		Control	.200*	Normal		

Based on the table 2 showing the results of the normality test using Kolmogorov, it was found that the significance value for the dependent variable was that the fatigue level of the intervention and control groups showed data that was normally distributed with a p value > 0.05. Another homogeneity test result showed that the significance value of the dependent variable for sleep quality in the pre-test and post-test groups showed that the data was homogeneous with a p value > 0.05 before and after the intervention, which means that the data for both intervention and control groups and the results were homogeneous.

Table 3.
Test the effect of deep breathing exercise therapy combined with aromatherapy on fatigue levels

Variable	N	Group	Pre	Post	*P*
			Mean ± SD	Mean ± SD	*Value*
Fatigue	20	Intervention	36.90 ± 5.411	15.90 ± 5.964	0.003
	20	Control	34.65 ± 6.192	19.65 + 4.694	0.430
		P value	0.001	0.001	

Table 3, the results of the independent T-test showed that the group that was given the *Deep breathing exercise* intervention combined with Aroma Therapy had significant results, P = 0.003 < (α = 0.05), which means there was a significant difference in the pre and post data of the intervention group, compared to the control group with significant results p = 0.430 < (α=0.05) which means there is a significant difference in the pre and post data of the control group. It can be concluded that there is a difference in *deep breathing exercise* therapy, a combination of Aromatherapy based on self-care Orem for fatigue in the two groups, because there are differences between the two groups, so it is necessary to continue with the delta test to find out which of the intervention group and control group is more effective in providing therapy.

Table 4.
Test the effect of deep breathing exercise therapy combined with aromatherapy on sleep quality

Variable	N	Group	Pre	Post	*P*
			Mean ± SD	Mean ± SD	*Value*
Sleep Quality	20	Intervention	29.90 ± 3.323	4.90 ± 1.021	0.001
	20	Control	27.75 + 4.655	4.30 + 0.733	0.324
		P value	0.001	0.001	

The results of the independent T-test show that the group that was given the *Deep breathing exercise* intervention combined with Aroma Therapy obtained significant results P = 0.001 < (α = 0.05), which means there was a significant difference in the pre and post data of the intervention group, compared to the control group with the results significant p = 0.324 < (α=0.05) which means there is a significant difference in the pre and post data of the control group. The conclusion is that there is a difference between *Deep breathing exercise* therapy, a combination of Aromatherapy based on self-care Orem on sleep quality in the two groups, because there are differences between the two groups, so it is necessary to continue with the delta test to find out which of the intervention group and control group is more effective in providing therapy.

Table 5.
Comparative test of deep breathing exercise therapy combination of aromatherapy on fatigue levels and sleep quality

Variable	Group	Delta Test	
		N-gain Score	N-gain Percent
Fatigue	Intervention	76.1324	76.13%
	Control	17.4210	17.42%
Sleep Quality	Intervention	57.000	57.00 %
	Control	8.1636	8.16 %

Based on the results of the delta test on fatigue, the N-gain Percent value in the intervention group was 76.13%, which means that *Deep breathing exercise* therapy combined with aroma therapy was effective in treating fatigue. Meanwhile, based on the results of the delta test on sleep quality, the N-gain Percent value in the intervention group was 57.00%, which means

that *Deep breathing exercise* therapy combined with Aromatherapy is quite effective in treating sleep quality.

DISCUSSION

Fatigue experienced by chronic kidney failure patients undergoing hemodialysis often occurs due to biological warnings due to the longtime undergoing hemodialysis. Non-pharmacological therapies that can overcome fatigue are lemon therapy and Benson aromatherapy, which have a significant effect with a *p value* of 0.000 < 0.05 (Putri *et al*., 2023). CKD is a clinical condition that is progressive and irreversible. This disorder of kidney function occurs when the body fails to maintain metabolism and fluid and electrolyte balance, causing retention of urea and other nitrogen waste in the blood. Non-pharmacological therapy that can overcome fatigue is an innovative warm water foot soak therapy with warm compresses on the feet so that the patient feels relaxed (Suandika *et al*., 2024)

Fatigue can also be triggered by the side effects of chemotherapy and hemodialysis therapy, fatigue that persists and does not improve can even be a sign of fatigue. Fatigue is one of the causes of a person's fatigue in carrying out activities, fatigue experienced by hemodialysis patients is a symptom that is often complained of by patients undergoing hemodialysis therapy, so that patients with chronic kidney disease need hemodialysis therapy to maintain their lives, the appearance of fatigue is the most common condition in patients undergoing hemodialysis. this will affect rest. The aim of sleep quality in hemodialysis patients is to improve the fulfillment of individual needs with adequate rest and good quality sleep will make hemodialysis patients have a good quality of life. Because good quality sleep can increase growth hormone which will build, repair and maintain muscles and bones and maintain heart function. Because hemodialysis patients often experience sleep disorders which refer to poor sleep quality. Poor sleep quality can have a negative physical and mental impact. Poor sleep quality is also considered a potential predictor of death and reduced quality of life in hemodialysis patients, therefore there is a need for more effective treatment.

Sleep quality in hemodialysis patients can have an impact on changes in psychological factors, the endocrine system, the respiratory system and the cardiovascular system and can also be influenced by other factors, so it is necessary to create safe and comfortable conditions during hemodialysis. Ways to improve sleep quality in hemodialysis patients by using the *deep breathing exercise* technique include arranging the patient in a half-sitting lying position and placing one hand on the abdomen or under the ribs to feel the movement of the chest and abdomen when breathing. After that, Orem's self-care-based aromatherapy has sedative compounds. and anti-neudepressive which can provide a relaxing effect and can overcome sleep difficulties experienced by hemodialysis patients.

The results of the delta test showed that the N Gain score in the intervention group was 76.13%, and in the control group it was 17.42%, which means that in the intervention group with *deep breathing exercise* therapy combined with aromatherapy, it was effective in treating fatigue. CKD sufferers generally experience gradual changes in health status caused by the course of the disease they experience and the consequences of hemodialysis therapy. So that these two things result in sleep disturbances which cause CKD patients' sleep quality to not be met properly. The intervention of lavender aromatherapy using a diffuser is given from a score of 15 with poor sleep quality to a score of 9 with light sleep quality. Providing lavender aromatherapy intervention to chronic kidney failure patients with sleep quality disorders for 7 days every night using a diffuser, it was found that there was a change in sleep quality from the PSQI score assessment before and after the intervention (Martuti *et al*., 2024).

Use and influence of complementary therapies in CKD patients with sleep disorder. Demonstrates the role of providing aromatherapy interventions, foot massage and acupressure in improving sleep quality in patients. This complementary therapy can improve the sleep quality of CKD patients with hemodialysis. So this research is a very effective complementary therapy in CKD patients (Aini & Maliya, 2020). Use and influence of complementary therapies in CKD patients with sleep disorder. Additional treatment is needed using *deep breathing exercise* therapy and aroma therapy based on self-care Orem so that hemodialysis patients feel relaxed and comfortable in good quality sleep, including arranging the patient in a half-sitting lying position and placing one hand on the abdomen or under the ribs to feel chest movements. and the abdomen when breathing after that, Orem's self-care-based aromatherapy has sedative and anti-neudepressive compounds which can provide a relaxing effect and can overcome sleep difficulties experienced by hemodialysis patients. This complementary therapy can improve the sleep quality of CKD patients with hemodialysis. So this research is a very effective complementary therapy in CKD patients (Aini & Maliya, 2020).

The results of the delta test showed that the n gain score in the intervention group was 57.00%, and in the control group it was 8.16%, which means that in the intervention group with *deep breathing exercise* therapy in combination with aromatherapy, it was quite effective in treating sleep quality. Poor sleep quality will have an impact on an individual's daily activities, such as decreasing performance (Handoko & Rambe, 2018). Physical and mental components of life, decreased ability to make decisions and concentrate in daily activities and increased irritability. cognitive and memory dysfunction (Yulia Setia Ningrum *et al*., 2022)

A person's sleep quality is good if they do not show signs of lack of sleep and do not experience problems in sleeping. Signs of lack of sleep are divided into two (Wang *et al*., 2021). Physical signs, which are characterized by facial expressions such as (eyes that look sunken, swelling in the eyelids, dark areas around the eyes), excessive sleepiness (frequent yawning), difficulty concentrating, visible signs of fatigue such as blurred vision, nausea and dizziness (Wardani *et al*., 2019). Psychological signs, which are characterized by apathy, decreased response, withdrawal, feeling unwell, reduced memory, lazy to speak, confusion, illusions, hallucinations, unable to make decisions and considerations (Mollaoglu, 2009).

The problem of sleep quality, it is necessary to treat it by using the influence of *deep breathing exercise*, a combination of aroma therapy based on Orem's self-care theory, given twice a week for 3 weeks with a duration of 10 seconds to provide good quality sleep. One way to improve body health is to get used to it. Good sleep patterns, sound sleep play a role in supporting heart health and overall body health because good sleep patterns and sleep quality can reduce the risk of disease, so *deep breathing exercise*, a combination of aroma therapy based on Orem's self-care theory, can have an effect on good sleep quality. Because it has a relaxing effect and brings the brain into a resting wave (Song *et al*., 2020).

CONCLUSION

Deep breathing exercise therapy, a combination of aromatherapy based on Self-Care Orem according to standards, can reduce fatigue levels and improve sleep quality. Nurses can provide *deep breathing exercise* therapy, a combination of aromatherapy based on self-care Orem to hemodialysis patients as a therapy program.

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