

## **THE EFFECT OF COMBINATION FOOT MASSAGE AND LEMON AROMATHERAPY ON FATIGUE LEVELS IN CHRONIC KIDNEY DISEASE PATIENTS UNDERGOING HEMODIALYSIS**

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### **ABSTRACT**

Chronic kidney disease is a gradual decline in kidney function over more than 3 months, characterized by a decrease in glomerular filtration rate and an increase in blood creatinine levels. One of the management strategies is hemodialysis, which can cause side effects such as fatigue. Fatigue can interfere with daily activities and is characterized by feelings of weakness, tiredness, lethargy, decreased concentration, emotional disturbances, and sleep disorders. One non-pharmacological therapy to address fatigue is foot massage and lemon aromatherapy, which can provide relaxation effects and influence endorphin hormones, thus reducing fatigue. Objective to determine the effect of the combination of foot massage and lemon aromatherapy on fatigue in patients with chronic kidney failure undergoing hemodialysis at Sultan Imanuddin Regional General Hospital, Pangkalan Bun. This study used a quasi-experimental design with a one-group pretest and posttest approach. The sampling technique was purposive sampling, with 30 respondents participating in the study. The treatment was administered for 10 minutes after the respondents underwent hemodialysis. The research instrument used was the FSS (Fatigue Severity Scale) questionnaire. Before receiving foot massage and lemon aromatherapy, all 30 respondents (100%) experienced fatigue. After the intervention, 27 respondents (90%) no longer experienced fatigue. Statistical analysis using the Wilcoxon test revealed a p-value of 0.000, indicating that p-value < 0.05. The combination of foot massage and lemon aromatherapy has an effect on reducing fatigue in patients with chronic kidney disease undergoing hemodialysis at Sultan Imanuddin Regional General Hospital, Pangkalan Bun.

Keywords: chronic kidney disease; fatigue; foot massage; hemodialysis; lemon aromatherapy

### **INTRODUCTION**

Chronic kidney disease occurs due to decreased kidney function which is characterized by a decrease in the glomerular filtration rate and an increase in creatinine levels in the blood. Decreased kidney function occurs over a period of more than 3 months (Wijayanti, Bara,s and Riton 2022). In patients with end-stage kidney disease, hemodialysis is given in the hope that it can improve the quality of life and prolong the patient's life (Kevin and Wihardja 2022). One of the side effects of hemodialysis therapy is fatigue. Fatigue occurs due to muscle fatigue, inflammation, electrolyte imbalance, and abnormal energy consumption (Nurdina et al. 2023).

Based on WHO data (2018) around 1 in 10 people in the world suffer from chronic kidney disease, and around 65% or 2.3 to 7.1 million people in the world die. Of all chronic kidney disease sufferers, 1.5 million people undergo hemodialysis, this number increases every year by 8% (WHO 2018). Based on Riskesdas data (2018), 3.8% or around 713,783 people suffer from chronic kidney disease and 2,850 of them undergo hemodialysis (Riskesdas 2018). Based on data from the Central Statistics Agency (BPS) (2018), 10,147 people suffer from chronic kidney disease in Central Kalimantan, and this makes chronic kidney disease the first non-communicable disease in Central Kalimantan (BPS 2018). Based on the results of the Sultan Imanuddin Hospital Medical Records, Pangkalan Bun, West Kotawaringin Regency in 2021, there were 2,702 patients. In 2022, from

September to November 2022, there will be 91 patients undergoing hemodialysis. In January 2024 there were 100 patients undergoing hemodialysis (Sultan Imanuddin Hospital Medical Records 2024).

The high prevalence of fatigue in chronic kidney failure patients undergoing hemodialysis has given rise to alternatives for treating fatigue in patients undergoing hemodialysis. There are two types of treatment for chronic kidney failure patients experiencing fatigue, namely pharmacological and non-pharmacological treatment. In pharmacological treatment, Erythropoiesis-Stimulating Agents (ESA), iron supplements, fluid and electrolyte monitoring, anti-anemia drugs, and blood sugar and blood pressure management are given. While for non-pharmacological treatment, namely by carrying out nutritional therapy, exercise, acupressure, relaxation, aromatherapy, foot massage, hand massage and hypnosis ( Maesaroh, Waluyo, and Jumaiyah 2020).

Foot massage can manipulate connective tissue through massage techniques to provide the effect of increasing circulation, improving muscle properties and providing relaxation. The relaxation effect provided can reduce pain, reduce physical discomfort, and improve the patient's sleep patterns ( Habibzadeh et al. 2020). This is in accordance with research (Nurdina et al. 2023) providing foot massage intervention with olive oil in the intervention group can reduce fatigue. Before the intervention, the results obtained were 26 respondents experiencing severe fatigue with a percentage of 100%. After the intervention was given to the treatment group, the results were 11 respondents in the mild category and 15 respondents in the moderate category. In the control group after the intervention, the results were 9 respondents in the moderate category and 17 respondents in the severe category. This shows a significant decrease in the level of fatigue of respondents in the treatment group.

In addition to giving foot massage, other non-pharmacological therapies to reduce fatigue are aromatherapy, one of the effective aromatherapy is lemon aromatherapy. Therapy aims to reduce anxiety and become a sedative, improve mood, sleep quality reduce fatigue. The content in lemon, namely linalool, linalyl acetate and limonene can change psychological stress and can help the body to maintain its homeostasis (Klimek-Szczykutowicz 2020). This is in accordance with Indriyani's research (2023) providing Lemon aromatherapy intervention and Benson therapy showed a significant decrease in fatigue in respondents. The results obtained before being given a combination of lemon and Benson aromatherapy therapy, the majority of respondents experienced fatigue as many as 17 respondents with a percentage of 94.4%. After being given aromatherapy, the majority of respondents did not experience fatigue as many as 17 respondents with a percentage of 94.4%. Based on the results of the problem description, it shows that the high prevalence of chronic kidney failure patients undergoing hemodialysis experience fatigue and do not yet understand how to overcome fatigue. So researchers are interested in conducting research on “The Effect Of Combination Foot Massage And Lemon Aromatherapy On Fatigue Levels In Chronic Kidney Disease Patients Undergoing Hemodialysis”.

## **METHOD**

This research design uses Quasi Experimental with one group pre-test and post-test approach. Researchers measure the level of fatigue in patients using the FSS (Fatigue Severity Scale) questionnaire before and after the action. The Foot Massage intervention, lemon aromatherapy was

given twice after undergoing hemodialysis for a duration of 10 minutes. The number of respondents in the study was 30 respondents with a sample of 30 using a minimum sample. The sampling technique used in this study was purposive sampling. The analysis of this study used the Wilcoxon test.

## RESULT AND DISCUSSION

Table 1.  
 Respondent characteristics based on gender (n= 30)

Gender	f	%
Male	7	23.3
Female	23	76.7

Based on the data in table 1, it shows that the majority of respondents were female, as many as 23 respondents (76.7%).

Table 1.  
 Respondent characteristics based on age (n= 30)

Age	f	%
17-25	1	3.3
26-45	9	30.0
46-65	20	66.7

Based on the data in table 1.2, it shows that almost half of the respondents are in the early elderly age, as many as 20 respondents with a percentage (66.7%).

Table 2.  
 Respondent characteristics based on education (n= 30)

Education	f	%
Elementary school	6	20.0
Junior high school	9	30.0
Senior high school	13	43.3
College	2	6.7

Based on the data in table 1.3, it shows that the level of education of respondents is almost half, namely senior high school as many as 13 respondents with a percentage of (43.3%).

Table 3.  
 Respondent characteristics based on job (n= 30)

Job	f	%
No work	22	73.3
Farmer	3	10.0
Civil servants	2	6.7
Employees	3	10.0

Based on the data in table 4, it shows that almost half of the respondents' are no work, as many as 22 respondents with a percentage of (73.3%).

Table 5.  
 Respondent characteristics based on fatigue level pretest (n=30)

Fatigue Level	f	%
Fatigue	30	100.0
Not Fatigue	0	0.0

Based on the data in table 5, it shows all respondents experienced fatigue before being given Foot Massage and lemon aromatherapy, as many as 30 respondents with a percentage of (100%).

Table 6.

Respondent characteristics based on fatigue level posttest (n=30)

Fatigue Level	f	%
Fatigue	3	10.0
Not Fatigue	27	90.0

Based on the data in table 1.6, it shows almost all respondents experienced not fatigue after being given Foot Massage and lemon aromatherapy, as many as 27 respondents with a percentage of (90%).

Table 1. 7 Respondent characteristics based on fatigue level pre-test and post-test (n= 30)

	F		p value	N
	Fatigue	Not Fatigue		
<i>Pre-test</i>	30	0	0,000	30
<i>Post-test</i>	3	27		

Based on the data in table 1.7, the results of the Wilcoxon test show that the p value = 0.000, so the p value  $\leq \alpha$  (0.05), so it was decided that H1 was accepted and H0 was rejected, which means that there is an effect of combination foot massage and lemon aromatherapy on fatigue levels in chronic kidney disease patients undergoing hemodialysis.

### **Fatigue levels in chronic kidney disease patients undergoing hemodialysis before foot massage and lemon aromatherapy treatment**

Based on the data in table 5, it shows that the level of fatigue before being given Foot Massage and lemon aromatherapy was that all respondents experienced fatigue, as many as 30 respondents (100%). This is in accordance with the research of Khamid and Arifah Rakhmawati (2022) the percentage of chronic kidney failure patients undergoing Hemodialysis experiencing fatigue reaches 71% -92.2%, this percentage can increase if the patient undergoes hemodialysis for a long period of time and the percentage increase reaches 82% -90%. Fatigue is one of the side effects in chronic kidney failure patients undergoing hemodialysis. Fatigue occurs due to stress on the body during the blood filtration process (Kinanthi Sukma Yekti, Ni Ketut Mendri 2015). According to Darmawan, Nurhesti, and Suardana (2019) fatigue can affect the function of daily life in patients, this is due to dependence on dialysis machines for life, malnutrition and anemia that occur in patients undergoing hemodialysis due to increased levels of urea and creatinine. As a result, the production of the hormone erythropoietin is disrupted, resulting in patients experiencing anemia because the number of red blood cells decreases. Anemia that occurs in patients will result in patients experiencing fatigue, tiredness, which are symptoms of fatigue.

Based on the research results, there are several factors that influence fatigue in chronic kidney failure patients undergoing hemodialysis, namely gender and age. Based on table 1.1, almost all respondents were female, as many as 23 respondents (76.7%). The difference explains that women have the hormone estrogen which plays a role in maintaining the balance of calcium levels. This hormone can prevent oxalate consumption which contributes to the development of kidney stones, which is one of the causes of chronic kidney failure (Natashia, Irawati, and Hidayat 2020). Table 2 shows that most respondents in the early elderly age range amounted to 20 respondents (66.7%). Researchers analyzed that age is one of the factors that influence the occurrence of chronic kidney disease. As age increases, body cells will weaken and kidney function will also begin to decline. At the age of 40 years, the number of functioning nephrons will decrease by 10% every 10 years. The occurrence of a degenerative process in a person when their age reaches more than 30 years

will cause changes in biochemical physiology in the body, one of which is the kidney organ which also decreases in function by about 1% every year. Then at the age of 40-70 years, the glomerular filtration rate will decrease progressively to 50% of its initial function (Natashia, Irawati, and Hidayat 2020). Therefore, researchers assume that hemodialysis in chronic kidney disease patients can experience fatigue due to the influence of the dialysis process. Hemodialysis therapy can cause physical and mental stress. So that chronic kidney disease patients experience fatigue after the dialysis session is complete. The hemodialysis process which is carried out repeatedly for 2 times a week can affect the mental health of chronic kidney disease patients which can affect feelings of fatigue in the physical, psychological and cognitive aspects of the patient.

### **Fatigue levels in chronic kidney disease patients undergoing hemodialysis after foot massage and lemon aromatherapy treatment**

Based on the data in table 6, it shows that almost all respondents were not tired after being given Foot Massage and lemon aromatherapy as many as 27 respondents (90%). The results of this study are also in line with Indriyani's (2023) study which showed that after being given the intervention, the majority of respondents did not experience fatigue as many as 17 respondents with a percentage of 94.4%. This shows a significant decrease in fatigue in respondents who experienced fatigue. Providing Foot Massage can provide a deep relaxation effect through its massage technique. The relaxation effect can reduce pain, physical discomfort, improve sleep quality and overcome fatigue. Foot massage can manipulate connective tissue through massage techniques to provide the effect of increasing circulation, improving muscle properties and providing relaxation (Shady and Ali 2019).

The relaxation effect provided can reduce pain, reduce physical discomfort, improve patient sleep patterns and overcome fatigue in patients. Lemon aromatherapy has a direct effect on the human brain because essential oils are versatile substances that contain linalool, linalyl acetate and limonene with a molecular mechanism that is released in the air as vapor carried by water vapor, when water vapor containing chemical components is inhaled it will be absorbed by the body through the nose and lungs which then enter the bloodstream, integration and expression of feelings, memories, emotions and physical stimulation (Nisaurrohmah 2023). This therapy has benefits that can reduce anxiety and be a sedative, improve mood, sleep quality reduces fatigue. The content in lemon, namely linalool, linalyl acetate and limonene can change psychological stress and can help the body to maintain its homeostasis (Klimek-Szczykutowicz 2020). Therefore, researchers assume that doing foot massage and lemon aromatherapy for 10 minutes twice a week after the patient undergoes hemodialysis can provide a relaxing effect because this foot massage and lemon aromatherapy can increase endorphin hormones. Endorphin hormones can dilate blood vessels and increase blood circulation so that oxygen supply can increase the process of removing metabolic waste in patients can be faster so that it can reduce fatigue in patients.

### **The effect of giving a combination of foot massage and lemon aromatherapy on fatigue in chronic kidney disease patients undergoing hemodialysis**

Based on the research data in table 7, it shows that all respondents experienced fatigue before being given Foot Massage and lemon aromatherapy, as many as 30 respondents (100%). Respondent fatigue after being given Foot Massage treatment, most of them were not fatigue as many as 27 respondents (90%). The results of the Wilcoxon test show that the p value = 0.000, so the p value

$\leq \alpha (0.05)$ , so it was decided that H1 was accepted and H0 was rejected, which means that there is an effect of combination foot massage and lemon aromatherapy on fatigue levels in chronic kidney disease patients undergoing hemodialysis.

Based on the researcher's analysis, there are 3 indicators of fatigue in the FSS (Fatigue Severity Scale) questionnaire, namely physical fatigue, psychological fatigue and cognitive fatigue. In the physical fatigue indicator, statement items number 3 and 4 are statement items that experienced a decrease in the average respondent's answers. Before giving foot massage and lemon aromatherapy, the average respondent answered "strongly agree" then after giving foot massage and lemon aromatherapy, the average respondent's answer was "agree". Another statement item that experienced a decrease in the physical fatigue indicator is statement item number 6 with the average respondent's answer before giving foot massage and lemon aromatherapy was "agree" then after giving foot massage and lemon aromatherapy, the average respondent's answer was "neutral". In the psychological fatigue indicator, the two statement items, namely items number 5 and 9, the average respondent before giving foot massage and lemon aromatherapy for statement item number 5 was "agree" then after giving foot massage and lemon aromatherapy, the average respondent answered "neutral". While in statement item number 9, before giving foot massage and lemon aromatherapy, the average respondent's answer was "strongly agree" then after giving foot massage and lemon aromatherapy, the average respondent's answer was "agree". In the cognitive fatigue indicator, only 1 statement item experienced a decrease, namely statement item number 7. The average respondent's answer before giving foot massage and lemon aromatherapy was "strongly agree" then after giving foot massage and lemon aromatherapy the average respondent's answer was "agree".

Aromatherapy from lemon has benefits that can overcome fatigue because the content of lemon contains linalool, linalyl acetate and limonene which can change mental stress, help the body maintain its homeostasis and provide a positive effect in reducing fatigue in patients. This study is also in line with the results of a study conducted by Abdul Khamid, Agus Suradika, and Diana Irawati (2020) providing foot reflexology and back massage interventions obtained an average result before the intervention was 26.83. After the intervention, an average result was 13.08. This shows a significant decrease in the fatigue scale value of 1.32. Foot massage can manipulate connective tissue with massage techniques that can stimulate the limbic system to produce corticotropin-releasing factor (CRF) then CRF stimulates the pituitary gland so that endocrine and proopiomelanocortin can be secreted then the effect is that the productivity of enkephalin by the adrenal medulla increases, and affects a person's mood. Endorphins and serotonin that increase in the brain can also increase feelings of physical relaxation. Endorphins can prevent cortisol secretion and make patients relax psychologically and physically. Increased endorphins can dilate blood vessels due to decreased sympathetic nerve function. This condition can improve blood circulation and lymph nodes and increase the supply of oxygen and energy to the body and accelerate the process of removing metabolic waste from the body and then fatigue in patients can be reduced. From the results of the study, giving Foot Massage and lemon aromatherapy has a significant effect on reducing fatigue, because it provides a deep relaxation effect because of the massage technique and also the content in lemon, namely linalool, linalyl acetate and limonene can stimulate the limbic system so that an increase in endorphin hormones can occur and can affect mood changes and provide a feeling of physical relaxation. The content in lemon also provides positive changes

to health, not only physical but also psychological changes, because its content lemon can help in changing mental stress and help the body to overcome fatigue, both physical and psychological.

## CONCLUSION

The level of fatigue before foot massage and lemon aromatherapy was performed chronic kidney failure patients undergoing Hemodialysis was almost entirely at a fatigue level. The level of fatigue post treatment foot massage and lemon aromatherapy was performed chronic kidney failure patients undergoing Hemodialysis is mostly non fatigue. There is an the combination of Foot Massage, lemon aromatherapy on fatigue in chronic kidney failure patients undergoing Hemodialysis at Sultan Imanuddin Hospital, Pangkalan Bun.

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