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# LAVENDER AROMATHERAPY FOR FATIGUE AND ANXIETY IN CKD PATIENTS UNDERGOING HEMODIALYSIS: A CASE STUDY

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**Case Study**

***ABSTRACT***

***Introduction**: Patients with Chronic Kidney Disease (CKD) on hemodialysis can experience various problems, both physical and psychological due to their disease and hemodialysis therapy. Some of the problems that arise as a result of the most common complications of hemodialysis are fatigue and anxiety. Lavender aromatherapy is used as a non-pharmacological intervention given to hemodialysis patients with fatigue and anxiety, to control and maintain quality of life. This nurse's final scientific work aims to determine whether there is a decrease in patient fatigue and anxiety by administering lavender aromatherapy. **Methods:** The case study uses a descriptive method with a nursing process approach. The case study was carried out in January 2023, in the Hemodialysis Room of RSUP Dr. Kariadi Semarang. The inclusion criteria for study subjects were patients undergoing hemodialysis for no more than 3 months with fatigue and anxiety problems. Giving lavender aromatherapy was carried out for 4 hemodialysis periods, carried out every intradialytic. The instruments used in this case study were the Fatigue Severity Scale and the Beck Anxiety Inventory to measure fatigue and anxiety scores. **Results:** The results of the study showed that the intensity of fatigue and anxiety before the intervention was moderate and the intensity after the intervention was mild. **Conclusions**: Lavender aromatherapy has a positive effect on reducing fatigue and anxiety scores in CKD patients undergoing hemodialysis. It is hoped that lavender aromatherapy can become a recommendation in services at health facilities to improve the quality of life of patients undergoing hemodialysis.*

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## INTRODUCTION

Chronic Kidney Disease (CKD) is the inability of the kidneys to perform their functions progressively and irreversibly where the body is unable to maintain metabolism and fluid-electrolyte balance (Nijpels et al. 2019; Wang et al. 2019). The function of the kidney as a blood filter from metabolic remnants makes its existence irreplaceable by other organs of the body. Abnormalities in the structure of the kidney that occurs for more than 3 months cause kidney function damage which is often characterized by abnormalities in urine sediment, albuminuria, electrolytes, histology, a history of kidney transplantation and accompanied by a decreased glomerular filtration rate (Agustin, Hudiyawati, and Purnama 2020). Damage to the kidneys causes problems in the strength and ability of the body. As a result, daily activities are disrupted and the body feels weak quickly (Pratama, Pragholapati, and Nurrohman 2020). According to the Kidney Disease Outcomes Quality Initiative (KDOQI), a glomerular filtration rate of less than 60 ml/minute is a condition for patients with chronic kidney failure (Ikizler and Cuppari 2021).

About 10% of the world's population or around 800 million people suffer from CKD or Chronic Kidney Disease (CKD). Generally, CKD occurs in the elderly, women, racial minorities, and people with diabetes mellitus and hypertension. CKD is a big burden for countries with low-middle income percentages, because the consequences of chronic kidney failure are quite large. The prevalence percentage of CKD in Southeast Asia is 12%, while in Indonesia the average incidence of chronic kidney failure is 7.5% of the entire population in Indonesia (Suriyong et al. 2022). The prevalence of CKD in Indonesia increased by 0.38% compared to 2013 data. Increasing sufferers of hypertension and diabetes mellitus are the main causes of CKD (Kementrian Kesehatan Republik Indonesia 2018). The prevalence of CKD in Central Java Province appears to be lower than the national prevalence. Data in 2019, there were 1,243 people who died due to CKD (Sari 2022).

Patients with End-stage Renal disease (ESRD) are patients with CKD who can be treated with dialysis (Saha and Allon 2017). Dialysis as a routine treatment therapy is considered safe and effective enough to improve the quality of life of patients with CKD (Armiyati et al. 2021). The results of a preliminary study conducted at the Hemodialysis Unit of RSUP Dr. Kariadi Semarang, there are 37 patients undergoing hemodialysis in one shift, or around 220 patients undergoing hemodialysis every week. Hemodialysis is a therapy that uses a dialyzer as a filter and removes metabolic waste products from the body that cannot be removed by the kidneys (Darmawan, Nurhesti, and Suardana 2019). The purpose of hemodialysis therapy using a machine is to replace the role of the kidneys in cleaning and regulating blood plasma levels. Patients must routinely carry out dialysis 1-3 times a week, which is considered effective enough to maintain the patient's body homeostasis (Damanik 2020). Hemodialysis is the main form of therapy for treating patients with CKD, but that does not mean it is without side effects. Various complications can occur when patients undergo hemodialysis, one of which is related to biopsychosocial (Raja and Seyoum 2020). Hemodialysis patients can experience physical problems in the form of fatigue and psychological problems in the form of anxiety (Dsouza et al. 2023; McAdams et al. 2021).

Anxiety is also a major psychological problem in hemodialysis patients, in the form of feelings of anxiety, discomfort, and worry accompanied by other symptoms such as cold sweats, dizziness, anxiety, and palpitations. Factors causing anxiety include lack of knowledge regarding treatment programs and the amount of costs that must be incurred. Anxiety problems not only affect psychologically but also have an effect on physical changes such as dizziness, increased pressure and palpitations. Feelings of anxiety can also have a negative impact on work, difficulty concentrating and being disturbed in relationships with other people (Agustin et al. 2020). Anxiety that doesn't get fast treatment and is left alone can have a negative impact on CKD sufferers, including sufferers tend to have negative thoughts about their lives, long-term depression, decreased quality of life to psychological disorders (Puspanegara 2019).

Physical and psychological problems due to hemodialysis which are handled using pharmacological therapy in the long term can cause side effects, one of which is dependence. Pharmacological management of hemodialysis complications is often associated with high expenditures that must be incurred for medical expenses. Instead, you can use Complementary and Alternative Medicine (CAM) or better known as non-pharmacological therapy which has gained popularity over the last decade and is important for health as a companion to pharmacological therapy (Dehghan et al. 2020). Complementary therapies include providing religious relaxation therapy interventions, sleep hygiene training, foot massage therapy and aromatherapy (Darmareja, Kosasih, and Priambodo 2020; Metin et al. 2017). Handling the problem of fatigue and anxiety in hemodialysis patients can also use complementary nursing therapy, including using aromatherapy. Lavender aromatherapy is a treatment with natural substances that have sedative, antidepressant, low allergic effects to reduce fatigue and anxiety levels, besides that it is also affordable and can be used by patients independently (Setyaningrum and Setyawan 2023).

Based on the data and articles that serve as references, the authors would like to conduct a case study regarding administering lavender aromatherapy to fatigue and anxiety in CKD patients undergoing hemodialysis because this technique is easy to perform, has no side effects and is proven to have a positive effect on complaints felt by patients. Patients undergoing hemodialysis. Giving lavender aromatherapy to reduce fatigue and anxiety scores were chosen to be applied to study subjects because it is a safe non-pharmacological intervention and is also easy to teach to families so that it can be done independently. This case study aims to determine the decrease in fatigue and anxiety scores in CKD patients after being given aromatherapy during hemodialysis.

## MATERIALS AND METHODS

This case study uses a descriptive method which is carried out through a series of nursing care processes starting from assessment, formulation of nursing problems, planning nursing interventions, implementing interventions, and conducting nursing evaluations at the end. The study subjects in this case study were 2 patients with inclusion criteria, namely CKD patients who had hemodialysis for less than 3 months with a frequency of hemodialysis twice a week (4.5-5 hours per dialysis session), experienced hemodialysis complications in the form of fatigue and anxiety, willing to be the subject of the case study according to the rules and time that has been determined. The study subjects in the case study were patients in the Hemodialysis Room of RSUP Dr. Kariadi Semarang. The case study was carried out in the Hemodialysis Room of RSUP Dr. Kariadi Semarang in January 2023. The instruments used to measure fatigue

and anxiety scales use the Fatigue Severity Scale and the Beck Anxiety Inventory (Karadag and Samancioglu Baglama 2019). Patients are said to experience fatigue if they have an FSS score > 36 (Schwartz, Jandorf, and Krupp 1993). Meanwhile, the anxiety assessment was categorized into 3 parts, ranging from 0-7 in the normal category, 8-15 in the mild anxiety category, 16-25 in the moderate anxiety category, and 26-63 in the severe anxiety category (Liang, Wang, and Zhu 2018).

The application of this case study was carried out by giving gauze measuring 2x2cm which had been given 2 drops of lavender aromatherapy drops, placed on the patient's chest area. Giving lavender aromatherapy was carried out on both study subjects for 2 weeks with 4 hemodialysis periods every week with a frequency of 20 minutes in the first hour of intradialytic. Fatigue and anxiety scores were measured before and after the 2-week intervention using the Fatigue Severity Scale (FSS) to measure fatigue scores and the Beck Anxiety Inventory (BAI) to measure anxiety scores.

Research ethics is still considered in applying applications to patients. The research has received ethical approval from the Muhammadiyah University of Semarang (Number: 651/KEPK-FKM/UNIMUS/2022). Study subjects were given an explanation regarding standard operating procedures and signed informed consent before being given the intervention. Interventions were carried out according to procedures on study subjects who met the inclusion criteria. The patient's identity is kept confidential by only writing the patient's initials in reports and scientific publication articles. The results of case study data analysis are presented in the form of tables and graphs to determine whether there is a decrease in fatigue and anxiety scores in CKD patients undergoing hemodialysis.

## RESULTS

The study subjects were patients who underwent hemodialysis for less than 3 months in the Hemodialysis Room of RSUP Dr. Kariadi Semarang. The subject of the study was case 1, a 51-year-old woman with a medical diagnosis of Chronic Kidney Disease and uncontrolled hypertension. The results of the pre test assessment using FSS and BAI. The Fatigue Severity Scale study consists of 9 questions, 3 of which are the most prominent, namely the patient experiences fatigue that interferes with my family, work, and life with a score of 7, fatigue interferes with my physical appearance with a score of 7, fatigue interferes with me in carrying out my obligations and responsibilities with a score of 6. Based on the findings of the assessment data, it was concluded that the patient experienced changes in physical, psychological, and family support. The results of the assessment of anxiety with the Beck Anxiety Inventory showed a total of 19 with moderate anxiety. Obtained the patient's hemodynamic status during intradialysis, blood pressure 153/98 mmHg. Laboratory data showed Hemoglobin 9.8 g/dL, Albumin 2.5, Ureum 71 mg/dL, Creatinine 5.97 mg/dL, Calcium 2.3 mmol/L.

The subject of the second study was a 48-year-old woman with a medical diagnosis of Chronic Kidney Disease. The results of the pre-test using the FSS consisted of 9 questions, 3 of which were found to be the most prominent, namely the patient experiencing fatigue that interferes with work, family, work and social life with score 7, fatigue interferes physically with a score of 7, fatigue impedes physical function continuously (long term) with a score of 6. Based on the findings of the study data, it was concluded that the patient experienced changes in physical, psychological, and family support. The results of the Beck Anxiety Inventory anxiety assessment showed a total of 24 with moderate anxiety. Obtained the patient's hemodynamic status during intradialysis, blood pressure 147/94 mmHg. Laboratory data showed Hemoglobin 8.3 g/dL, Erythrocytes 2.85 10'6/uL, Ureum 62 mg/dL, Creatinine 3.1 mg/dL, Calcium 1.9 mmol/L.

The nursing diagnoses formulated by the researchers in the 2 cases were fatigue related to physiological conditions (D.0057) and anxiety related to situational crises (D.0080). The formulation of a nursing diagnosis of fatigue is supported by major data, namely complaining of tiredness and feeling that energy does not return even after sleeping. Also supported by minor data, namely feelings of guilt for not being able to fulfil responsibilities. The formulation of nursing diagnoses of anxiety is supported by major characteristic data, namely feeling confused and worried as a result of the conditions encountered. And also supported by minor data as evidenced by patients complaining of dizziness with increased blood pressure (SDKI DPP PPNI Pokja Team, 2018). The expected results are expected after giving lavender aromatherapy for 4x5 hours, namely it is hoped that complaints of dizziness will decrease, blood pressure will decrease, lethargy decrease, feelings of guilt will decrease, and rest patterns will improve (PPNI, 2018).

The nursing intervention given to the two study subjects was the intervention of giving aromatherapy (I.08233), (PPNI, 2018a). Provision of planned aromatherapy includes Observations: Identifying preferred aroma choices, identifying

anxiety scales, fatigue before and after giving aromatherapy, monitoring discomfort such as dizziness or nausea, checking vital signs before and after being given aromatherapy. Therapeutic: Choose the right essential oil according to the purpose of use, give essential oil with the right method, one of which is inhalation. Education : Teach essential oil storage properly and keep essential oil packaging out of reach of children.

Implementation was carried out by researchers at the first meeting until day 4, and then the application was carried out independently by the patient's family because aromatherapy can be administered at any time. Giving lavender aromatherapy is done 2x a week with a frequency of 20 minutes while undergoing dialysis. The procedure for administering aromatherapy begins with assessing the fatigue and anxiety scale using a questionnaire, washing hands, using gloves, giving drops of aromatherapy to the 2x2 gauze that has been prepared, placing the gauze that has been given aromatherapy to the chest area, educating the application to be carried out every 20 minutes during dialysis. for 2 weeks (as a monitoring period).

The fatigue scores of the two study subjects using the Fatigue Severity Scale were classified as High Risk, because both study subjects had scores above 36. Meanwhile, the anxiety scores of the two study subjects using the Beck Anxiety Inventory were classified as moderate anxiety because both study subjects had scores in the range of 16-25. Assessing the anxiety score for the first study subject, a score of 19 was obtained. Meanwhile, for the second study subject, it had a score of 23. The administration of lavender aromatherapy resulted in changes in the fatigue and anxiety scores of the two study subjects. Changes in fatigue and anxiety scores obtained by each study subject are attached as follows:

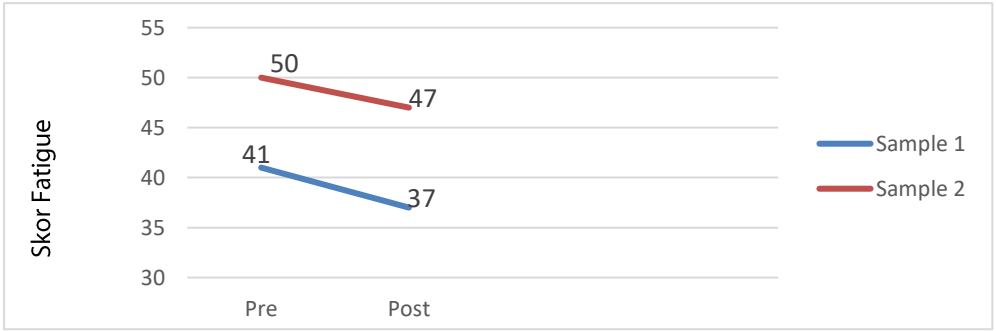
**Table 1.** Evaluation of Fatigue and Anxiety of Hemodialysis Patients, pre and post intervention of Lavender Aromatherapy.

| | **Subject 1th** | | | **Subject 2nd** | | |
|---|---|---|---|---|---|---|
| **Variables** | **HD-1 (Pre)** | **HD-4 (Post)** | **MDPP*** | **HD-1 (Pre)** | **HD -4 (Post)** | **MDPP*** |
| Fatigue | 41 | 37 | 4 | 50 | 47 | 3 |
| Anxiety | 19 | 15 | 4 | 25 | 20 | 5 |
| **Total Score** | **60** | **52** | **8** | **75** | **67** | **8** |

MDPP=Mean difference pre-post intervention*

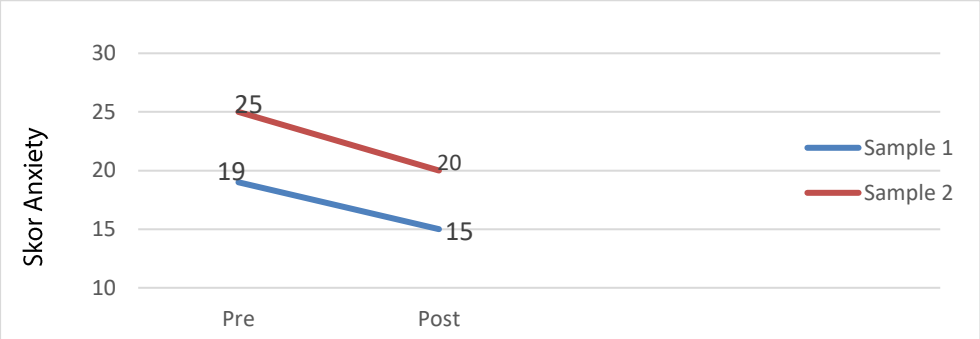
The evaluation results in Table 1 show that the subject of study 1 experienced a decrease in the Fatigue Severity Scale score by 4 points and a decrease in the Beck Anxiety Inventory score by 4 points. Meanwhile, the subject of study 2 experienced a decrease in the Fatigue Severity Scale score by 3 points and a decrease in the Beck Anxiety Inventory score by 5 points. Evaluation of the presence of fatigue and anxiety can be seen from several signs, such as headaches, paleness, increased blood pressure and often patients complain of worry about the condition they are facing.

**Figure 1.** Evaluation of Hemodialysis Patient Fatigue, pre and post intervention Aromatherapy administration.




Based on Figure 1, shows that there was a decrease in fatigue scores in both study subjects, pre and post-administration of lavender aromatherapy for 4 days in 2 weeks (Monday and Thursday every week). The mean reduction in fatigue scores in the two study subjects was 43.75.

**Figure 2.** Evaluation of Hemodialysis Patient Fatigue, pre and post intervention Aromatherapy administration.




Based on Figure 2, shows that there was a decrease in anxiety scores in both study subjects, pre and post-giving lavender aromatherapy for 4 days in 2 weeks. The average reduction in anxiety scores in the two study subjects was 19.75.

Figure 3: (Primary Sources, 2023).

## DISCUSSION

Both study subjects were women, study subject 1 was 51 years old and study subject 2 was 48 years old. The results of the study based on the FSS instrument obtained fatigue data on both case study subjects often feeling tired easily, fatigue hinders their physical functions continuously (long term), moving the body makes it tired, fatigue interferes with carrying out certain tasks and responsibilities, fatigue interferes with work, family, or my social life. While the results of the study based on the BAI instrument obtained anxiety data on the two case study subjects, they often experienced fear, tingling, unable to relax, headaches, and palpitations. Both study subjects were patients undergoing hemodialysis for less than 3 months. This is in line with previous research that experience is another factor that influences anxiety. Patients who have undergone a treatment program will be calmer because they understand how to deal with problems naturally (Suciana, Agustina, and Zakiatul 2020).

The results of laboratory tests on the two case study respondents showed that they belonged to the anemia category, study subject 1 had a hemoglobin level of 9.8 g/dL and study subject 2 had a hemoglobin level of 8.3 g/dL. Anemia is said if the amount of hemoglobin is insufficient and the production of red blood cells decreases, then there is a decrease in the capacity of the blood to carry oxygen throughout the body, resulting in complaints such as fatigue (Santoso et al. 2022). Apart from the factors of hypertension and anemia, drinks containing neurotoxic substances can also damage the condition of kidney function. As happened to the subject of case study 2, this patient has a history of consuming energy drinks as a substitute for energy intake so that he doesn't get tired easily. Drinks containing amphetamines have been shown to constrict the arteries to the kidneys, resulting in a shortage of oxygen and food for the kidneys. This situation can cause kidney cells to experience ischemia and decrease the ability of the kidneys to filter blood, thus causing CKD because the tubules and glomeruli in the kidneys are damaged (Wahdi et al. 2022).

The nursing diagnoses formulated for the two research subjects were fatigue related to physiological conditions (D.0057) and anxiety related to situational crises (D.0080), (SDKI DPP PPNI Working Group Team, 2018). Fatigue is a change in body function that affects psychological and physiological aspects, so hemodialysis patients must get support, especially from the family as the patient's motivation in dealing with their illness (Musniati and Kusumawati 2019). Fatigue is an unavoidable complication of hemodialysis and CKD patients often experience high fatigue. This is supported by previous

research which revealed that a third of patients undergoing hemodialysis reported feeling worse in the first hour of dialysis and a quarter of them experienced severe fatigue after dialysis. Several factors cause fatigue in hemodialysis patients including malnutrition, physiological changes, disturbed sleep patterns, abnormal hemoglobin and urea levels (Nesami et al. 2018).

Anxiety in patients undergoing hemodialysis is a psychosocial and physiological problem characterized by negative effects, both physical and emotional, on the mental state and behavior of patients with CKD (Lai et al. 2021). Anxiety is one of the most common complications of hemodialysis, which is 38%. Anxiety can activate the hypothalamus, which then secretes Corticotrophin Releasing Hormone (CRH) to stimulate the secretion of Adrenocorticotropin Hormone (ACTH) and the hormone cortisol, which causes an increase in blood pressure. Other factors that can increase anxiety scores include sleep disturbances and fatigue. An increase in anxiety scores in patients undergoing hemodialysis can cause complications such as heart problems and death (Karadag and Samancioglu Baglama 2019). CKD has a negative impact on the patient's psychosocial problems. Therefore, health workers, especially nurses, need to take appropriate action to reduce the risk of mental disorders. Giving aromatherapy is one effort that can be done to reduce hemodialysis complications.

Aromatherapy is a non-pharmacological therapy that produces endorphin and norepinephrine secretion by influencing the nervous system to create positive psychological effects so that it can treat the mind, body and soul of the individual (Bouya et al. 2018). Aromatherapy is a complementary therapy that uses liquid ingredients made from herbs and volatiles, known as essential oils (essential oils) and other aromatic compounds that can affect one's mental, emotional, and cognitive function and health. One method of using aromatherapy is by inhalation. Lavender aromatherapy is effective in reducing the anxiety level of patients undergoing hemodialysis because it has anxiolytic properties and stimulates sleep. The advantage of using lavender aromatherapy compared to other aromatherapy is that it contains the main ingredients of lavender, namely linalyl acetate and linalool. Linalyl acetate has a narcotic effect and linalool has a sedative effect. The use of lavender aromatherapy by inhalation will increase the inhibitory effect of Monoamines Oxide which plays a role in restoring the balance of neurotransmitters (serotonin, dopamine and norepinephrine) so that it can increase feelings of happiness in patients (Bouya et al. 2018; Metin et al. 2017).

Giving lavender aromatherapy aims to reduce fatigue and anxiety scores so that it can improve the patient's quality of life. Giving lavender aromatherapy using the inhalation method has a significant effect on reducing fatigue scores in CKD patients (Ahmady, Rezaei, and Khatony 2019). In addition, the inhalation method is also the simplest method of therapy because the process of entering from outside the body into the body is in one easy step, passing through the lungs and flowing into the blood vessels through the alveoli. Inhaling aromatherapy can easily stimulate the sense of smell without interfering with normal breathing. The results of inhalation can increase endorphins, which are hormones that are produced naturally when there is an aromatherapy stimulus to reduce pain (Setyaningrum and Setyawan 2023). Giving aromatherapy in this case study is relatively affordable, safe, does not cause side effects and is easy to apply independently. Several case studies using lavender aromatherapy to treat hemodialysis complications explain that aromatherapy particles can stimulate the limbic system as the nervous system in the brain which plays a role in regulating one's emotions so that feelings become more relaxed. These feelings can make patients think calmly to be able to deal with stressors, so that adaptive coping will be created (Agustin et al. 2020).

Before being given the intervention, the study subjects were assessed for their level of fatigue and anxiety in facing the initial phase of undergoing hemodialysis, so it was found that both subjects were in the early stages of hemodialysis with a span of less than 3 months. The initial assessment of the physiological and psychological aspects was accompanied by a nurse using the Fatigue Severity Scale and the Beck Anxiety Inventory. The procedure was carried out after administering lavender aromatherapy for 20 minutes during intra dialysis, then the researchers waited 15 minutes to evaluate it. Evaluation was carried out before the intervention and after giving the intervention for one-week 2-time implementations. The results of giving lavender aromatherapy to patients who have hemodialysis complications are in line with previous researchers that lavender aromatherapy interventions are effective in reducing the incidence of hemodialysis complications (Karadag and Samancioglu Baglama 2019).

This case study was carried out based on reference articles that had intervened in giving lavender aromatherapy to patients with fatigue and anxiety undergoing hemodialysis and

obtained patient evaluation results that were comparable to previous reference articles. Previous researchers stated that there was an effect of giving lavender aromatherapy to the fatigue and anxiety scores of patients undergoing hemodialysis because lavender aromatherapy is calming, effective in reducing sleep pattern disturbances, and reducing anxiety (Salsabilla 2020). This is in line with study which mention that inhalation aromatherapy can stimulate and control anxiety, fatigue, negative thoughts and fear (Bouya et al. 2018).

## CONCLUSIONS

Lavender aromatherapy during hemodialysis for 2 weeks provides a positive stimulus effect. The positive effects of aromatherapy are proven to reduce fatigue and anxiety scores as well as affordability. The use of this method can be used in the practice of nursing interventions to reduce fatigue and anxiety scores in patients undergoing hemodialysis.

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