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# Paper 3

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## The effect of lavender essential oil aromatherapy on sleep quality in hemodialysis patients

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### ABSTRACT

Hemodialysis is a long-term therapy that must be undertaken by patients with chronic kidney disease. Patients who undergoing therapy for a very long time will have an impact on the patient's psychology. One of the psychological effects that arise is sleep disorder. Poor sleep quality can lead to physiological changes, the endocrine system, the cardiovascular system, the immune and nervous systems. To overcome sleep disorder in hemodialysis patients, non-pharmacological options can be used, namely Lavender Essential Oil Aromatherapy via inhalation. The purpose of this study was to determine the effect of Lavender Essential Oil Aromatherapy on Sleep Quality in Hemodialysis Patients. The study was conducted on 32 hemodialysis patients, divided into two groups, there are 16 intervention groups and 16 control groups. The intervention was carried out for 3 times of administration during intra hemodialysis. The instrument used is the Pittsburgh Sleep Quality Index (PSQI) applied pre and posttest. Test data analysis using the independent samples test showed that there was a different in the average score for sleep quality with a p value of 0,000, it means that there was an increase in sleep quality in patients undergoing hemodialysis for intervention groups. Lavender Essential Oil Aromatherapy can be applied as an effective nursing intervention to overcome sleep quality disorder in patients undergoing hemodialysis.

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#### Kata kunci:

Aromaterapi  
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### ABSTRAK

Hemodialisis merupakan terapi jangka panjang yang harus dilakukan oleh pasien dengan penyakit ginjal kronik. Pasien yang menjalani terapi dalam waktu yang sangat lama akan berdampak pada psikologi pasien. Salah satu dampak psikologis yang muncul adalah gangguan tidur. Kualitas tidur yang buruk dapat menyebabkan perubahan fisiologis, sistem endokrin, sistem kardiovaskular, sistem kekebalan dan saraf. Untuk mengatasi gangguan tidur pada pasien hemodialisa dapat digunakan pilihan nonfarmakologi yaitu Aromaterapi Minyak Atsiri Lavender melalui inhalasi. Tujuan penelitian ini adalah untuk mengetahui pengaruh Aromaterapi Minyak Atsiri Lavender terhadap Kualitas Tidur pada Pasien Hemodialisis. Penelitian dilakukan pada 32 pasien hemodialisa yang terbagi menjadi dua kelompok yaitu 16 kelompok intervensi dan 16 kelompok kontrol. Intervensi dilakukan selama 3 kali pemberian selama intra hemodialisis. Instrumen yang digunakan adalah Pittsburgh Sleep Quality Index (PSQI) yang diterapkan sebelum dan sesudah intervensi. Analisis data uji dengan menggunakan independent sample test menunjukkan bahwa terdapat perbedaan rata-rata skor kualitas tidur dengan nilai p value 0,000 artinya terjadi peningkatan kualitas tidur pada pasien yang menjalani hemodialisis kelompok intervensi. Aromaterapi Minyak Atsiri Lavender dapat diterapkan sebagai intervensi keperawatan yang efektif untuk mengatasi gangguan kualitas tidur pada pasien yang menjalani hemodialisis.

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## INTRODUCTION

Chronic kidney disease (CKD) as one of the diseases that cause the most deaths in the 21st century (Kovesdy, 2022). Currently chronic disease failure is a common health problem with more than 500 million people suffering from chronic kidney disease (Bouya et al., 2018). Based on a study from the Global Burden of Disease CKD emerged as the leading cause death all over the world. Chronic kidney disease is a disease that is a global burden of mortality and morbidity (Cockwell & Fisher, 2020). This disease contributes greatly to the burden of health costs in a country. Based on Riskedas 2018 data, cases of chronic kidney disease have increased by 3.8%. Treatment methods for patients with kidney disease can be hemodialysis, peritoneal dialysis and kidney transplantation. In Indonesia, hemodialysis is the method most widely used by patients with a decrease in the glomerular filtration rate of less than 15 mL/min/1.73 m<sup>2</sup>, namely chronic kidney failure stage 5.

Hemodialysis is the process of separating and cleaning blood through a semipermeable membrane which is carried out on patients using a dialysis machine (Varaei et al., 2021). Hemodialysis therapy can be done 2-3 times in one week with a duration of 4-5 hours each time the hemodialysis process. Hemodialysis is carried out for life by patients with chronic kidney disease, aims to get rid of the remnants of protein metabolism and improve fluid and electrolyte balance disorders in the body (Oshvandi et al., 2021).

Hemodialysis is a lifelong therapy and prolongs the patient's life, it causes many side effects including physical, mental and social disorders. A review of the literature shows that fatigue, nutritional deficiencies, non-compliance with fluid restrictions, sleep disorder, changes in body image, impaired sexual function and anxiety occur as a result of complications of hemodialysis treatment.

Sleep disorder is one of the complications of hemodialysis, if it does not get proper therapy, it will affect the patient's physical and psychological (Faydali & Çetinkaya, 2018). Sleep disturbances include difficulty initiating sleep, frequent awakenings at night, waking up too early or taking excessive naps during the day. These sleep disturbances will cause fatigue, immunosuppression, depression, anxiety, mood disorders, increased sensitivity to pain, decreased mental function and functional status to affect the quality of life (Faydali & Çetinkaya, 2018; (Oshvandi et al., 2021).

Complications of hemodialysis can be treated by using drugs that are associated with side effects. If the long-term effects of these drugs can lead to dependence and exacerbation of complications of the disease (Afshar et al., 2018). Currently CAM (Complementary Alternative Medicine) has a lot of good effects for patients with chronic conditions (Abdelghfar, 2017). This therapy naturally treats the mind, body and soul of the individual. One of the CAM therapies is to use aromatherapy, this method is cheap and can be used independently by patients. Methods using aromatherapy can be in the form of inhalation, this method can be used to treat sleep disorders, reduce anxiety levels and reduce stress levels (Bouya et al., 2018).

Aromatherapy can trigger the release of endorphins and noradrenaline hormones by affecting the nervous system, causing positive psychological and physical effects in the body (Setyawan & Oktavianto, 2020; Aliasgharpour et al., 2016; Kao et al., 2017). Lavender aromatherapy is commonly used and based on the literature lavender has a low toxic and allergic effect, has antibacterial, antifungal, antidepressant characteristics, besides that it also has a sedative effect

(Şentürk & Tekinsoy Kartın, 2018) (Karadag & Samancioglu Baglama, 2019).

Nurses have an important role in dealing with hemodialysis side effects. Aromatherapy method as an option that can be applied by nurses to reduce psychological side effects in patients undergoing hemodialysis, especially in sleep disorders. Based on this, this study aims to determine the effectiveness of lavender essential oil aromatherapy via inhalation on sleep quality in patients undergoing hemodialysis.

## METHOD

This research used quasi-experimental carried out with pretest and posttest applied to both groups. The population in this research there are 60 patients on hemodialysis patients at Nur Hidayah Hospital with an age range of 36 to 70 years old, who underwent hemodialysis 2 times a week. The patient underwent hemodialysis for more than 6 months. The sample of this study with a sample of 32 respondents. Consisting of 16 intervention groups and 16 control groups. The sampling technique used was simple random sampling.

The instrument used is the Pittsburgh Sleep Quality Index (PSQI) questionnaire developed by (Buysse et al., 1989). The PSQI scale consist of 19 items, 9 questions and 7 components to assess sleep quality. A score of 5 or less indicates "good sleep quality", while greater than 5 indicates "poor sleep quality". The components of the PSQI questionnaire consist of 7 components, namely: overall sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, need for medication for sleep and day dysfunction due to sleepiness.

The intervention stages for respondents with the control and intervention group, the first were the respondents filling out the consent form. After that, both groups were given a pretest to fill out the PSQI questionnaire. The intervention group received lavender aromatherapy by inhalation given 3 times when the hemodialysis patient schedule was carried out during intra hemodialysis. The aromatherapy inhalation process, where essential oil is dripped 3 times on a cotton bud, then asks the respondent to place it approximately 1 cm under the nose, the respondent is asked to take a breath and breathe normally for 15 minutes. The patient was then asked to rest for 10 minutes. After administering the third aromatherapy, the patients were asked to fill out the PSQI questionnaire for the posttest. The control group did not receive aromatherapy inhalation therapy but still received routine services from existing health services.

This study uses a frequency distribution for the characteristics of the respondents, the Kolmogorov-Smirnov test was conducted to test the normality of the PSQI variable. After that the posttest PSQI was compared using the Independent Sample t Test.

## RESULT AND DISCUSSION

Based on table 1 illustrates that the data on the characteristics of respondents in both groups. The majority of the intervention group was female, while the control group had the same number of males and females. For the age category of the two groups, the majority are in the age range of 46 – 59 years, while for the level of education in the

two groups, the majority are in the category of elementary and junior high school graduates.

**Table 1. Demographic characteristic of patients on hemodialysis (n=32)**

Characteristic	Variables	Intervention		Control	
		n	%	n	%
Gender	Male	2	12,5	8	50,0
	Female	14	87,5	8	50,0
Age	36 – 45	5	31,2	2	12,5
	46 – 59	8	50,0	8	50,0
	60 – 70	3	18,8	6	37,5
Education (school)	Elementary	6	37,5	7	43,8
	Junior High	6	37,5	7	43,8
	Senior High	4	25,0	2	12,5
	College	0	0	0	0

**Table 2. Frequency distribution PSQI (n=32)**

PSQI score	Intervention			Control		
	f	%	PSQI score	f	%	
3	2	12,5	3	0	0	
4	6	37,5	4	1	6,2	
5	6	37,5	5	0	0	
6	0	0	6	2	12,5	
7	2	12,5	7	3	18,8	
8	0	0	8	3	18,8	
9	0	0	9	2	12,5	
10	0	0	10	1	6,2	
11	0	0	11	2	12,5	
12	0	0	12	1	6,2	
12	0	0	12	1	6,2	

The PSQI score will be better if it goes to a smaller number, from the results of the frequency distribution table for the two groups, the comparison of the majority of the posttest questionnaires in the intervention group with scores of 4 and 5 with each number of respondents being 6. The results of the control group varied with the majority distribution result value more than 5.

**Table 3. The results of the difference in the mean PSQI scores of the intervention group and the control group**

Group	Posttest PSQI (M±SD)	P value
Intervention	(4,62 ± 1,147)	0,000
Control	( 8,50 ± 2,422 )	

The results of the PSQI questionnaire in the two groups have an average difference, for the intervention group below 5, the quality of sleep is getting better, for the control group the result is above 5, the majority of sleep quality is poor.

The majority of respondents undergoing hemodialysis are women, the prevalence of chronic kidney disease has been reported to be higher in female than male (Kovesdy, 2022). The majority age category is more than 46 years, this is supported by the results of CKD surveillance that after the age of 40 years, kidney filtration begins to decrease by about 1% per year. In addition to the natural aging of the kidneys, there are many conditions that damage the kidneys more quickly, namely diabetes, hypertension and heart disease (CDC, 2021). Based on the results of the study of PSQI scores between the intervention group and the control group, the

majority of the control group scores more than 5, it proves that the side effects of hemodialysis greatly affect the patient's sleep quality,

In patients with chronic kidney disease undergoing hemodialysis, abnormal cell interleukin production can cause increased drowsiness, but because there is a disposal of this substance from the body through the dialysis process, it can cause insomnia or sleep disorder (Unal & Balci Akpinar, 2016).

Cytokines have an important role as a humoral link in the interaction between the immune system and the central nervous system in health and illness. Cytokines play an important role in the regulation of sleep under physiological and pathological conditions. When the body is in a state of acute or chronic infection, disease with inflammation can induce symptoms of sleep disorders such as decreased sleep quality (Rohleder et al., 2012). Microglia are cytokines that are actively produced by brain cells, equivalent to microphages in the brain. Microglia can be activated by stress and become the most important substrate of the inflammatory response (Frank et al., 2007)

Sleep disorders are indeed a common health problem in patients undergoing hemodialysis (Menekli & Çevik, 2021). One of the best solutions is to use complementary therapy, namely lavender oil aromatherapy, difference in the mean score of sleep quality between the control and intervention groups with a significant value of 0.000, it is said that lavender aromatherapy can affect the sleep quality in patients with chronic kidney disease undergoing hemodialysis. This study is in line with previous research, namely lavender oil has been proven to improve the quality of sleep of patients (Ahmady et al., 2019). Other findings say

that after one week of lavender aromatherapy, the patient's sleep quality can improve (Şentürk & Tekinsoy Kartın, 2018). Another study stated that comparing the control group with the intervention group with the results of the lavender aromatherapy intervention group being an effective intervention to improve sleep quality (Muz & Taşcı, 2017). The aromatherapy inhalation process in this study was carried out during intra hemodialysis, the hemodialysis process which takes between 4-5 hours makes the patient feel bored so that when the previous observation process was carried out, many patients did excessive eating and drinking activities. The inhalation process carried out during intra hemodialysis helps the relaxation process in patients,

Aromatherapy inhalation using lavender is the simplest 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. Inhalation is similar to smell, which can easily stimulate the olfactory with each breath and will not interfere with normal breathing. The inhalation results can increase endorphins, where these hormones are produced naturally when there is an aromatherapy stimulus to reduce pain and stress.

A professional nurse has an important role in managing complications of hemodialysis patients and giving them a sense of comfort (Hassanzadeh et al., 2018) Therapies based on pharmacology and non-pharmacology are used by nurses to treat complications from hemodialysis, lavender aromatherapy complementary therapy, namely simple, safe and cost-effective therapy, can be applied so that nursing care is increasing in its interventions (Rao et al., 2016).

#### LIMITATION OF THIS STUDY

The limitation of this study is that it does not control the drugs consumed by respondents and the surrounding environment that can affect sleep quality.

#### CONCLUSIONS AND SUGGESTIONS

Based on the analysis and discussion of the data in this study, lavender essential oil aromatherapy can improve sleep quality in patients undergoing hemodialysis. The hope is that this can be done independently by patients at bedtime and can be applied by nurses to improve nursing care.

#### ETHICAL CONSIDERATION

This research has been conducted an ethical test in STIKES Surya Global Yogyakarta with No.5.12/KEPK/SSG/III/2022.

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#### Conflict of Interest Statement

There are no competing interests in this study.

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