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Analysis Of The Application Of Lavender Aromatherapy To Reduce Fatigue In Patients With Chronic Kidney Disease (CKD) Undergoing Hemodialysis: A Case Study

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A B S T R A C T

Introduction: Chronic kidney disease is a progressive and irreversible condition that leads to a decline in kidney function, requiring renal replacement therapy. The intensive and prolonged treatment process often results in fatigue, which is one of the most common problems in CKD patients undergoing hemodialysis. Elevated urea levels affect erythropoietin production, resulting in decreased red blood cell count or anemia (low hemoglobin levels), leading to energy and protein loss, decreased appetite, nausea, vomiting, and reduced creatinine production—contributing to decreased skeletal energy production, fatigue, and weakness. Despite the frequent pharmacological interventions, fatigue management is often inadequate due to lack of energy, limiting patients' ability to perform therapeutic activities. One of the easiest and most efficient complementary therapies is lavender aromatherapy, which does not interfere with pharmacological treatments. However, it remains underutilized. In 2022, 143 CKD patients in one hospital presented with fatigue complaints, often leading to repeated care episodes. This case study aims to analyze the application of lavender aromatherapy in reducing fatigue levels in CKD patients undergoing hemodialysis.Methods**:** This study used a case study design with a pre-post test approach involving 3 patients selected through simple random sampling based on inclusion and exclusion criteria. Data were collected through direct observation using the FACIT-Fatigue Scale.Results**:** The results showed a reduction in fatigue levels in all three patients. Initially, they exhibited severe fatigue. After three days of lavender aromatherapy, fatigue levels decreased to mild. Conclusion**:** The application of lavender aromatherapy led to a decrease in fatigue levels, suggesting that it can be an effective supportive intervention.

INTRODUCTION

Chronic Kidney Disease (CKD) has become a major medical concern worldwide due to the increasing mortality rates and high treatment costs (1) . This is partly due to suboptimal management, as the disease is often detected only in its advanced stages because it is asymptomatic in the early stages (2). It is noted that less than 10% of people with CKD are aware of their condition (1). CKD is a progressive and irreversible disease, with the main risk factors being hypertension (34.1%), obesity (21.8%), and diabetes mellitus (8.5%) (3). The progressive decline in kidney function results in the kidney's inability to maintain fluid and electrolyte balance and eliminate toxins, characterized by a decrease in glomerular filtration rate and increased urea and creatinine levels—thus requiring renal replacement therapy (4).

Hemodialysis is the main supportive therapy in CKD management. It is a process where metabolic waste (fluids, electrolytes, and toxins) is filtered using a dialysis machine (5). This lifelong therapy is essential for maintaining quality of life and is performed intensively and over long durations. One of the main side effects of hemodialysis is fatigue. Fatigue is a subjective, unpleasant sensation of tiredness, weakness, and lack of energy that persists over time and does not resolve with rest (6). Elevated urea levels affect erythropoietin production, which leads to anemia, energy and protein depletion, appetite loss, nausea, vomiting, and reduced creatinine production, all of which contribute to skeletal energy deficiency, fatigue, and weakness (7).

According to the WHO, approximately 1 in 10 people worldwide are affected by CKD, resulting in an estimated 5 to 10 million deaths annually, with about 1.7 million deaths specifically linked to CKD. Based on data

from the Indonesian Ministry of Health (Kemenkes, 2018), the prevalence of chronic kidney failure was 499,800 people (3.8%), with the highest rates in West Java (131,846 cases). The number of CKD patients undergoing dialysis in Indonesia reached 198,275, doubling compared to the previous year, and continues to rise yearly. In 2018, CKD accounted for 42% of all deaths. According to Bicer (8), fatigue has a high prevalence among patients undergoing dialysis. Between 82% and 90% of long-term hemodialysis patients experience fatigue. Darmawan et al. (9) found that patients who had undergone hemodialysis had an average fatigue score of 62.75 ± 9.37, categorized as moderate. Another study by Hasanah & Rachmadi (10) found that out of 60 respondents, 20 experienced severe fatigue, 25 experienced moderate fatigue, and 15 reported no fatigue ($p = 0.002 < \alpha = 0.005$).

Fatigue is a nursing problem that requires prompt management, as it can lead to physiological and psychological changes, such as impaired problem-solving ability, cardiovascular disorders, reduced daily activity performance, and lower survival rates in hemodialysis patients (9).

Nurses play a vital role in providing comprehensive care, including meeting basic needs and applying evidence-based interventions. Non-pharmacological interventions such as Complementary Alternative Medicine (CAM) have emerged to reduce fatigue and improve quality of life. Muscle relaxation is an effective method but is often underutilized due to patients' low energy levels and fatigue, making it difficult to implement. Similar results are seen with Benson relaxation techniques (11). Lavender aromatherapy, another CAM intervention, is considered simple, efficient, and non-intrusive to pharmacological treatments (8). Evidence-based studies have shown that lavender aromatherapy can effectively reduce fatigue (12–16).

Based on 2022 case data in NS.C inpatient ward, 143 chronic kidney disease patients on hemodialysis reported fatigue as the primary complaint, leading to repeated hospitalizations. Thus, this study focuses on analyzing the application of lavender aromatherapy in reducing fatigue in CKD patients undergoing hemodialysis at Mitra Keluarga Pratama Jatiasih Hospital.

To analyze the application of lavender aromatherapy in reducing fatigue in patients with chronic kidney disease undergoing hemodialysis at X Hospital.

METHODS

This study used a case study design. The sample consisted of 3 patients with chronic kidney disease undergoing hemodialysis at X Hospital. The intervention used was lavender aromatherapy aimed at reducing fatigue levels. The instrument used was the Functional Assessment of Chronic Illness Therapy-Fatigue Scale (FACIT-Fatigue Scale).

RESULT AND DISCUSSION

RESULT

Nursing Assessment

1. Mr. A**:** Reported body weakness and tiredness, difficulty sleeping at night, reduced shortness of breath post-hemodialysis, decreased appetite, nausea triggered by the smell of hospital food, and vomiting (approximately 3 times).
2. Mrs. N: Complained of weakness, fatigue, insomnia, lack of energy, difficulty breathing while sleeping, and swelling in the hands, feet, and face.
3. Mrs. L**:** Reported similar complaints as Mrs. N—weakness, fatigue, insomnia, lack of energy, shortness of breath during sleep, and swelling in limbs and face.

Nursing Diagnoses

1. Mr. A**:** Fatigue, Hypervolemia, Risk for Nutritional Deficit
2. Mrs. N**:** Fatigue, Hypervolemia, Ineffective Breathing Pattern
3. Mrs. L**:** Fatigue, Hypervolemia, Ineffective Breathing Pattern

Nursing Interventions

The planned intervention for all three patients focused on addressing fatigue with the following goals after 3 × 24 hours of nursing actions: increased energy, improved ability to perform daily activities, higher motivation, reduced verbalization of tiredness and weakness, decreased feelings of guilt, and improved sleep patterns. The intervention used was lavender aromatherapy.

Nursing Implementation and Evaluation

Mr. A**:**

1. Day 1**:** Patient reported persistent fatigue and weakness despite resting all day.
2. Day 2**:** Improved sleep, reduced tiredness, and less physical weakness.
3. Day 3**:** Reported feeling more energetic, reduced fatigue, and improved sleep with fewer night awakenings.

Mrs. N**:**

1. Day 1**:** Reported extreme fatigue, insomnia, and reliance on family for daily activities.
2. Day 2**:** Improved sleep, less weakness, able to sit, stand, and use the toilet with assistance.
3. Day 3**:** Reported increased energy, reduced fatigue, restful sleep, and no more nighttime breathlessness.

Mrs. L**:**

1. Day 1: Complained of severe weakness and insomnia.
2. Day 2**:** Experienced better sleep and less physical tiredness, able to engage in assisted self-care.
3. Day 3**:** Felt more energetic, slept well, and was not frequently awakened by shortness of breath.

Evaluation Results:

Table 1. FACIT-Fatigue Score Before and After Lavender Aromatherapy

No	Patient Initials	Day 1		Day 2		Day 3	
		Pre	Post	Pre	Post	Pre	Post
1.	Mr. A	11 (Severe)	17 (Severe)	21 (Moderate)	24 (Moderate)	28 (Moderate)	31 (Mild)
2.	Mrs. N	12 (Severe)	21 (Moderate)	23 (Moderate)	29 (Moderate)	28 (Moderate)	37 (Mild)
3.	Mrs. L	17 (Severe)	21 (Moderate)	21 (Moderate)	28 (Moderate)	30 (Moderate)	42 (Mild)

DISCUSSION

This case study observed the application of lavender aromatherapy over a 3-day period to reduce fatigue in patients with chronic kidney disease undergoing hemodialysis. The results are consistent with the study by Hassanzadeh et al. (16), which found that applying lavender aromatherapy three times per week significantly reduced fatigue levels. Similarly, Wibowo & Yulanda (12) reported a significant effect of lavender aromatherapy in lowering fatigue scores among hemodialysis patients.

However, contrasting findings were reported by Wijayanti et al. (17), who found that lavender aromatherapy was less effective in reducing fatigue symptoms in CKD patients on hemodialysis. Despite this, they noted other benefits, such as reducing anxiety, joint pain, hypertension, metabolic rate, and improving sleep quality.

Ahmady et al. (13), compared the effects of orange and lavender aromatherapy, finding that lavender had a greater impact on reducing fatigue in hemodialysis patients. This is further supported by Karadag & Baglam (15), who confirmed that lavender aromatherapy significantly reduced fatigue, anxiety, and improved sleep quality.

The major health problem identified in this study was fatigue, a common symptom among CKD patients undergoing hemodialysis. All three participants reported similar symptoms of fatigue. Fatigue is defined as a subjective, unpleasant sensation of exhaustion, weakness, and decreased energy that does not improve with rest (6). It results from elevated urea levels, decreased erythropoietin production, anemia, energy and protein depletion, appetite loss, nausea, vomiting, and reduced creatinine—all contributing to skeletal energy deficiency and fatigue (7).Maintaining the health and quality of life of CKD patients requires continuous supportive therapy through hemodialysis. Hemodialysis uses a semipermeable membrane (dialyzer) to remove excess waste, such as sodium, water, urea, creatinine, potassium, and uric acid. Typically, treatment is performed twice a week, lasting 4–5 hours per session (18). The intensity and duration of the therapy often result in fatigue, with 60–97% of patients experiencing tiredness after each session (8).

Yulianti et al. (19). noted that fatigue is also caused by uremic syndrome, which leads to peripheral fatigue due to nerve damage (uremic neuropathy) affecting motor and sensory nerves, especially in the extremities. This condition is often worsened by comorbidities such as diabetes mellitus and hypertension.

CONCLUSION

This case study showed that the application of lavender aromatherapy, in conjunction with ongoing hemodialysis treatment, had a positive effect in reducing fatigue levels among CKD patients. Fatigue scores decreased from a severe to a mild range (from below 17 to above 30), and patients reported improved comfort. These results align with previous studies suggesting that lavender aromatherapy is a viable complementary intervention to enhance patient well-being, particularly in alleviating fatigue in CKD patients undergoing hemodialysis.

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