Pubsains

OPEN ACCESS

Journal of Pubnursing Sciences, 2025, 03 (02): 71-77
eISSN 2988-4330; pISSN 3025-3330; https://doi.org/10.69606/jps.v3i02.259

[Original Research]

Journal of Pubnursing Sciences

The Effect of Olive Oil Administration on the Pruritus Scale in Chronic Kidney Disease Patients: A Quasi-Experimental Approach

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Article Info:

Received: (2025-05-04)

Revised: (2025-06-13)

Approved: (2025-06-25)

Published: (2025-06-29)

Abstract

Background: The kidneys are essential organs that regulate fluid and acid-base balance, metabolism, and the removal of toxins and waste from the body. If damaged, kidney function can be disrupted, and if this condition persists, it can develop into Chronic Kidney Disease (CKD). One of the therapies for chronic kidney failure patients is hemodialysis. **Aims:** To determine the effect of administering olive oil to CKD patients who experience pruritus. **Method:** This method uses a quantitative research method with a quasi-experimental approach, especially using the one-group pretest-posttest *design*. Sampling in this study used non-random sampling techniques, with purposive *sampling*, with a sample size of 60 people. The instrument used to measure the pruritus scale is the Numerical *Rating Scale* (NRS). The statistical test used is the Paired *Sample t-test*. **Results:** There is a difference in the average effect of the pruritus scale before and after administration of olive oil, with a *Value of* 0,000. Olive oil affects the pruritus scale in patients with chronic kidney failure. **Conclusion:** This study serves as a basis for implementing olive oil administration in chronic kidney disease patients experiencing pruritus.

Keywords: Chronic Kidney Disease, Olive Oil, Pruritus

Introduction

The kidneys are important organs that regulate fluid and acid-base balance, metabolism, and the removal of toxins and waste from the body. If damage occurs, kidney function can be disrupted, and if this condition continues, it can develop into Chronic Kidney Disease (CKD). This disease results in the inability of the kidneys to maintain metabolism and fluid and electrolyte balance, which ultimately causes uremia (Black, J.M., & Hawks 2014).

Chronic kidney failure is a condition of impaired kidney function at the end stage that is progressive and irreversible, where the body is unable to maintain metabolic balance as well as fluid and electrolyte levels, ultimately leading to uremia. Several factors that cause kidney failure include diabetes mellitus and chronic glomerulonephritis (Aji 2018).

One of the therapies for chronic kidney failure patients is hemodialysis. Hemodialysis is a treatmentmethod patients use for both short-term and long-term. Short-term hemodialysis is usually given to treat acute conditions such as poisoning, heart problems, or excess fluid without any damage to kidney function. This therapy is generally carried out for several days to several weeks. Meanwhile, long-term hemodialysis is intended for patients with end-stage kidney disease, known as End *Stage Renal Disease* (ESRD) (Siregar 2020).

One of the common complications in CKD patients undergoing hemodialysis is uremic pruritus, which is characterised by dry and itchy skin. Uremic pruritus usually appears with itching symptoms that occur daily and often affect the back, face, and arms (Simonsen et al. 2017).

Research of Simonsen et al., 2017 suggests several therapeutic options to treat this complaint, including

creams with Gamma-Linolenic *Acid* (GLA), *topical capsaicin*, and emollients. Olive oil is an increasingly highlighted ingredient choice due to its emollient properties and ability to maintain skin moisture by filling cavities in the keratin layer (Muliani, Lestari, and HHK 2021). Based on previous studies, there are differing results regarding the effectiveness of olive oil in reducing pruritus. Several studies, such as those conducted by Muliani et al. (2021), Kinanti (2023), Kurniawati et al. (2024), Pandu Srijaya & Maliya (2024), Rosyada & Mustofa (2023), and Pramudyta & Retnaningsih (2023), have shown that olive oil is effective in reducing pruritus. However, a recent study by Muliani, Vitniawati, et al. (2021) stated that the effectiveness of olive oil is lower compared to Virgin Coconut Oil (VCO), which is considered more effective. Therefore, the researcher will determine whether or not olive oil has an effect on the pruritus scale.

Methods

The research design used is quantitative with a quasi-experimental approach. This study was conducted in the hemodialysis room of Dr. Soekardjo Hospital in Tasikmalaya. Based on the results of field studies on patients with chronic kidney disease (CKD) in the Hemodialysis Room of Dr. Soekardjo Hospital, 7 out of 10 CKD patients experienced pruritus. The population of this study consists of all hemodialysis patients at Dr. Soekardjo Hospital in Tasikmalaya, totaling 120 individuals. The researcher calculated the sample size using the Slovin formula with a confidence level of 0.1. The calculation results showed a sample size of 60 individuals.

The sampling technique used was purposive sampling. In purposive sampling, samples are selected based on inclusion and exclusion criteria. The inclusion criteria are patients who are willing to be respondents, patients with compos mentis awareness, patients who undergo routine hemodialysis 2 times a week, patients who complain of pruritus, and patients experiencing pruritus with moderate, severe, and very severe itching scales. The exclusion criteria include patients who experience decreased consciousness during the intervention and those who withdraw during the research process.

The research instruments used are:

1. Respondent characteristics questionnaire: age, gender, and duration of hemodialysis.
2. NRS (Numerical Rating Scale) questionnaire: The NRS scale questionnaire includes values from 1 to 10, where 0 indicates no itching and 10 indicates extreme itching. The validity test results showed a correlation coefficient (r) of more than 0.70, indicating that the NRS has good capability in measuring the intensity of pruritus. The reliability test using Cronbach's Alpha yielded a value of > 0.80, indicating that each item in the NRS has a strong relationship with one another.

The data was descriptive parameters such as mean, median, and standard deviation were used, and the kurtosis/standard error calculation test was used to test the data's normality. Furthermore, the test was carried out using the paired t-test because the data is usually distributed. The kurtosis/std.error calculation test value is from -2 to 2. The confidence interval used is 95%. This research has been approved by the Health Research Ethics Commission (KEPK) at the Poltekkes Kemenkes Tasikmalaya with an Ethical Eligibility decision with No.DP.04.03/F.XVIII.20/KEPK/35/2025.

Results

The study of respondent characteristics examines the characteristics of hemodialysis patients who are the research sample. Data obtained from 60 respondents are expected to provide a comprehensive and accurate picture of the population studied. The purpose of this data analysis is to understand the distribution of respondents' gender, age, and duration of hemodialysis. The description of the respondent characteristics is explained in Table 1.

Table 1 Respondent Characteristics (n=60)

Variable	N	%
Gender		
Man	31	51,7
Woman	29	48,3
Age		
Young adults	20	33,3
Middle adulthood	40	66,7
Duration of hemodialysis		
<2 years	21	35,0
≥2 years	39	65,0

In this study, the majority of the respondents were male 51%, 66.7% were in the middle adulthood age range (45-64 years), and 65.0% had undergone hemodialysis for >2 years.

Table 2 Respondent Characteristics Based on Pruritus Scale Before and After Intervention

Scale Pruritus	n	Mean	Min	Max	95% CI
Before Intervention	60	6,27	4	10	(5,90-6,63)
After Intervention	60	0,65	0	3	(0,71-1,19)

Table 2 presents the characteristics of respondents based on the patient's pruritus scale before and after administration of olive oil. Before the intervention, the minimum pruritus scale was 4, the maximum scale was 10, and the average pruritus scale was 6.27. While after intervention with olive oil, the smallest pruritus scale was 0, the largest pruritus scale was 3, and the average pruritus scale was 0.65.

Table 3 Differences in Average Pruritus Scale Before and After Intervention

Scale Pruritus	Mean	SD	SD	*p Value*	n
Before Intervention	6,27	1,686	0,309	0,000	60
After Intervention	0,65	0,971			

Table 3 above shows the characteristics of the pruritus scale before and after the intervention. The pruritus scale before the intervention was 6.27, while the average pruritus scale after the intervention was 0.65. The statistical test results obtained *a value of* 0.000, which indicates that Ha is accepted, meaning that there is a significant difference between the average pruritus scale before and after the olive oil intervention.

Discussion

1. Respondent Characteristics (Age, Gender, duration of hemodialysis)

In this study, the majority of respondents were middle-aged adults (45-65 years), dominated by men, and had undergone hemodialysis for an average of more than 2 years. The pruritus scale in chronic kidney failure patients changed before and after the intervention. Advancing age is directly proportional to the decline in internal organ function. This is supported by previous research which states that the highest proportion of cases were found in the age group of 52 years and above (Saadah and Hartanti 2021). It is strengthened by research showing that the prevalence of chronic kidney disease increases with age (Hervinda, Novadian, & Tjekyan 2014).

The study conducted by Siwi & Budiman found that patients begin to experience fatigue more quickly and are more vulnerable to illness after the age of 45. Patients also expressed an inability to perform heavy physical activities, such as lifting weights, and feel that their physical strength has decreased compared to previously (Siwi & Budiman 2022).

After the age of 30, the kidneys begin to experience atrophy, and the thickness of the renal cortex decreases by about 20% every ten years. Additionally, as age increases, there is also thickening of the glomerular basement membrane, which can trigger glomerulosclerosis (Siwi & Budiman 2022). In general, within this age range, physiological changes begin to occur, indicating a gradual decline in bodily functions. Furthermore, hormonal changes can also affect an individual's physcal health and psychological condition, ultimately increasing the risk of depression (Joses, Eka, & Nirapambudi 2020).

The risk of chronic kidney failure in men is known to be twice as high as in women. This is due to the tendency of men to experience systemic diseases such as diabetes mellitus, hypertension, glomerulonephritis, polycystic kidney disease, and lupus, as well as hereditary health disorders in the family (Saadah & Hartanti 2021).

Chronic kidney disease patients are generally more from the male group, due to the role of the estrogen hormone which is more in women. Estrogen functions to inhibit the production of certain cytokines that play a

role in keeping the body balanced. Calcium itself has a protective effect by preventing the absorption of oxalate, a compound that can form kidney stones, one of the factors causing chronic kidney failure (Sufiana Puspita Dewi, Diyah Candra Anita 2022).

2. Pruritus in CKD Patients

Uremic pruritus is a complication that often occurs in patients undergoing hemodialysis. It is characterised by an itchy feeling that is disturbing and causes discomfort, affecting the quality of rest and sleep (Kinanti 2023). Cheng and Wong shows that the longer a person undergoes hemodialysis therapy, the higher the possibility of various complications and complaints, such as dry skin and itching, that patients often experience (Cheng & Wong 2022). This occurs due to the hemodialysis process, where patients are exposed to hot temperatures and experience dilation of blood vessels in the kidneys. After the hemodialysis procedure, there is an exchange of temperature and heat release through the dialyser, which causes an increase in body temperature. In response, the body experiences vasodilation and increased sweat production, causing itching in patients during hemodialysis (Perwiraningtyas & Sutriningsih 2021).

From the interviews with hemodialysis patients, those who have complained of pruritus for more than 2 years reported various issues, including itching. The longer patients undergo hemodialysis, the greater the likelihood of experiencing complications. Among these, patients reported itching caused by dry skin and the accumulation of uremic toxins in the blood. The skin texture of hemodialysis patients appears dry, which is caused by fluid and electrolyte imbalances. Hemodialysis patients also experience an accumulation of iron in the skin, leading to a darkening of their skin color.

Several factors that increase the risk of pruritus include age over 45, male gender, and the presence of diseases such as diabetes mellitus, hypertension, and anaemia (Fauziah & Soelistyowati 2018).

3. Effectiveness of Olive Oil Application

Olive oil, which is commonly used for cooking, also has uses in the cosmetic industry, especially for facial and skin care, due to its ability to maintain moisture. Its oleic acid content of around 80% makes olives effective as an emollient. In addition, olives contain various vitamins such as A, D, and E, as well as some minerals. Vitamin E in olives plays a vital role in repairing skin damage because it contains tocopherol compounds that function as antioxidants so that they can protect the skin from the adverse effects of free radicals. In addition, vitamin E also helps maintain water levels in the skin, which contributes to skin moisture (Fadilah 2022).

One way to reduce the risk of itching due to dryness is to apply an ointment made from olive oil (Zasra, Harun, and Azmi 2018). This study's findings support previous studies' results, indicating changes in the level of pruritus in chronic kidney disease patients undergoing hemodialysis after being treated with olive oil (Ariyani, Hilmawan, and Baharudin 2020). Other studies have also shown that olive oil can reduce the risk of impaired skin integrity in patients with chronic diseases (Pele and Waluyo 2019).

According to Utami, the frequency of topical use on a regular basis (for example, 1–2 times a day) increases the effectiveness of olive oil. Additionally, applying it to damp skin after bathing also helps with better absorption into the skin layers (Utami, 2023). Based on direct interviews with chronic kidney disease patients, they reported a significant improvement in their skin condition. The effect experienced by patients from the application of olive oil averages moisturizing the skin for 5-6 hours.

4. Research Limitations

This study has several limitations, including respondents who did not come during the hemodialysis schedule during the study. So the researcher had to find other respondents to conduct the study.

Conclusion

This study involved respondents who were predominantly male, in the middle adulthood age group (45–65 years), and had been undergoing hemodialysis for more than two years. The average pruritus score before the administration of olive oil was 6.27, which decreased significantly to 0.65 after the intervention. Statistical analysis showed a significant difference in the pruritus scale before and after the intervention, with a p-value of 0.000 ($< \alpha$ 0.05). These results indicate that the administration of olive oil effectively reduces pruritus severity in chronic kidney disease patients undergoing hemodialysis.

The findings of this study suggest that olive oil can be considered a simple, non-pharmacological nursing intervention to alleviate pruritus in CKD patients. Future studies are recommended to include larger sample sizes and a control group to strengthen the validity of the findings and allow for comparative analysis between intervention and non-intervention groups.

Declaration of Conflicting Interest

No conflict of interest to declare.

Funding

No Funding

Acknowledgment:

The authors would like to express their sincere gratitude to the management and staff of Dr. Soekardjo Hospital Tasikmalaya, especially the Hemodialysis Room team, for their support and cooperation during the research process. Special thanks are extended to all the patients who participated in this study for their willingness and valuable contributions.

Author's Contribution

AMQ was responsible for the conception and design of the study, data collection, data analysis, and interpretation of the results. YC drafted and revised the manuscript. YT and AS have read and approved the final version of the manuscript

Data Availability Statement

The dataset generated during and analyzed during the current study is available from the corresponding author upon reasonable request.

Declaration of Use of AI in Academic Writing

Nothing to declare

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