

## Mitigating Uremic Pruritus and Improving Family Coping in Stage 5 Chronic Kidney Disease: A Dual-Intervention Case Study Using Topical Petrolatum

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### Abstract:

Chronic Kidney Disease (CKD) imposes severe physical and psychosocial burdens, frequently precipitating a measurable decline in family coping mechanisms. This study explores the clinical efficacy of a dual intervention combining structured family coping support and topical petroleum jelly therapy for managing uremic pruritus and caregiver strain. Employing a descriptive case study design, researchers intervened with the family of a 55-year-old male diagnosed with stage 5 CKD who presented with severe pruritus, xerosis, and skin discoloration. The family initially exhibited care neglect, limited communication, and inadequate health literacy regarding appropriate symptom management. The protocol entailed targeted coping support education, along with twice-daily petroleum jelly application over eight consecutive days. Outcome measurements utilized the validated 5D Pruritus Scale and standardized nursing criteria to evaluate family coping. Post-intervention data revealed a significant reduction in the 5D Pruritus Scale score from 10 to 6, indicating a clear transition to mild pruritus. Family assessments concurrently demonstrated substantial improvements in health knowledge, active caregiving engagement, and interpersonal communication, effectively eliminating previous neglectful behaviors. These findings establish that integrating low-cost topical emollient therapy with targeted psychosocial education constitutes a highly effective, holistic nursing strategy. This comprehensive approach successfully mitigates dermatological distress while simultaneously restoring family coping capacity, offering a highly replicable model for advanced CKD management in community health settings.

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## INTRODUCTION

The family unit serves as the foundational pillar of health management, playing a critical role in shaping patient identity, self-esteem, and overall well-being during chronic illness (Bañez, 2026). Globally, Chronic Kidney Disease (CKD) represents a significant and growing public health burden, affecting millions of individuals and fundamentally altering family dynamics and healthcare utilization worldwide (Francis et al., 2024). As kidney function declines, the resulting physiological disruptions necessitate complex, long-term care that heavily relies on the family as the primary support system (Romagnani et al., 2025).

A severe decline in glomerular filtration rate directly triggers dermatological complications, most notably uremic pruritus, due to the systemic accumulation of unmetabolized toxins (Wang et al., 2022). When the kidneys fail to maintain fluid and electrolyte homeostasis, metabolic waste

products are paradoxically reabsorbed and excreted through the skin (Ahmed et al., 2025). This pathological process manifests as decreased skin turgor, pallor, yellowish or brownish discoloration, and severe dryness, commonly referred to as uremic frostbite in advanced stages of renal failure (Muhaxheri et al., 2023). The persistent irritation initiates a vicious cycle of scratching reflexes, leading to localized cell inflammation, histamine release at nerve endings, and subsequent skin lesions (Ahmed et al., 2025).

The relentless physical discomfort experienced by the patient inevitably cascades into profound psychosocial strain, severely threatening the family's coping capacity (Rao et al., 2025). Families managing Stage 5 CKD confront compounding emotional, physical, and economic pressures inherent to long-term caregiving (Wee et al., 2022). Persistent patient complaints of itching and discomfort frequently disrupt household harmony, increasing the risk of interpersonal conflict and caregiver burnout (Menzaghi et al., 2023). Unaddressed, these stressors precipitate a measurable decline in family coping, characterized by care neglect, limited communication, and inadequate health literacy regarding the patient's complex medical needs (Jha et al., 2022).

Contemporary dermatological management of uremic pruritus emphasizes restoring the skin barrier by consistently applying occlusive moisturizers, such as petroleum jelly (Verma et al., 2023). Petroleum jelly is a highly effective semi-solid mixture of wax and mineral oil that acts as a protective sealant for compromised skin. Clinical evidence demonstrates that such emollients significantly increase the skin's water-retention capacity while drastically reducing Transepidermal Water Loss (TEWL), the passive, continuous loss of water molecules through the epidermis (Fluhr et al., 2025). Regular application directly mitigates dryness, thereby interrupting the itch-scratch cycle and improving overall dermatological integrity (Zeng et al., 2026).

In parallel with physical interventions, modern nursing science advocates for structured family coping support to empower caregivers and optimize chronic disease management (Araújo et al., 2026). Effective psychosocial interventions equip families with the necessary knowledge, communication strategies, and emotional resilience to navigate the complexities of chronic illness (Jiakponna et al., 2024). Educating families on practical care techniques transforms passive observers into active, competent care partners (Frandsen et al., 2023). This educational empowerment directly counteracts feelings of ignorance and helplessness, fostering a more supportive and cohesive home care environment (Faldu & Knicely, 2025).

Existing literature predominantly examines physical symptom management and psychosocial family support as isolated interventions, leaving a critical gap in integrated care models for CKD (Davison et al., 2023). Previous research validates the efficacy of topical emollients for pruritus, and separate studies highlight the importance of caregiver support (Roy et al., 2022). Few investigations combine these approaches into a unified care model. This fragmentation overlooks the intrinsic, bidirectional link between a patient's physical comfort and the family's psychological bandwidth to provide adequate care (Ania-González et al., 2022). Addressing both domains simultaneously represents a novel, holistic nursing strategy that has not been sufficiently explored in current CKD literature.

This study urgently aims to evaluate the synergistic effects of combined family coping support and petroleum jelly therapy on pruritus severity and family adaptation in CKD patients. Implementing this dual-intervention model is critical to preventing deterioration in care and mitigating the severe consequences of declining family coping. Providing a replicable, cost-effective, and holistic nursing protocol will establish a new standard of care. This approach will enhance patient comfort, restore family functionality, and improve the overall quality of life for individuals navigating the profound, lifelong challenges of end-stage renal disease (Shaabna et al., 2025).

## STUDY DESIGN

### Study setting and Timeline

This research was conducted in the Working Area of Sukodono Health Center, specifically in Selokbesuki Village. This study involves families with one family member suffering from CKD. The intervention consisted of coping support and petroleum jelly therapy, administered twice a day (morning and evening after bathing) for 8 consecutive days, from April 10 to April 17, 2026. During this period, participants underwent petroleum jelly therapy, and families received education on family coping support. Every morning, the family's coping status was measured according to the outcome criteria, and the 5D pruritus scale was measured on the first, fourth, and eighth days.

### Data Collection Procedures

Data were collected by interviewing, observing, and documenting the family's coping status and the patient's pruritus level on the first and eighth days. The assessment used the 5D pruritus scale to measure changes in participants' pruritus scores after 8 days of petroleum jelly therapy. Family coping status was evaluated using the Indonesian Nursing Outcomes Standards to assess the development of family coping following family coping support education. All data were systematically collected and analyzed to evaluate the effectiveness of the therapy on pruritus and on family coping.

### Ethical Considerations

This research has received ethical approval from the Faculty of Nursing at the University of Jember. This research was conducted in accordance with ethical guidelines for studies involving human participants. This study involved one elderly patient suffering from insomnia, who provided consent after receiving a complete explanation of the purpose, procedures, benefits, and potential risks of the therapy. The confidentiality of the patient's personal data is strictly maintained, and the research results are used solely for scientific purposes. Patients are free to withdraw from participation without any consequences. During therapy, the researchers ensure patient safety and comfort and monitor any side effects or discomfort that may arise. This study was approved by the health research ethics committee of the Faculty of Nursing, Universitas Jember, with ethical approval number 072/UN25.1.14/KEPK/2026.

## CLINICAL FINDINGS

The researchers conducted interviews and direct observations of one family, with one family member suffering from CKD, a 55-year-old man with CKD. The patient complained of itching, dry skin, and discoloration. These complaints persist, leaving the family exhausted because they do not know how to handle the patient. When the patient itches, they scratch with a hair comb. The family assisted by fanning the patient when the patient complained of itching, but this did not yield satisfactory results.

In this case, Mr. H also does not maintain his nutritional intake; he still consumes prohibited fruits and other foods. So, one day before dialysis, Mr. H usually complains of swelling, shortness of breath, and itching. This is also done because Mr. H feels that on Mondays and Thursdays, when he undergoes dialysis, his complaints will decrease. The family said that Mr. H's complaints did decrease after undergoing dialysis, but his itching complaints remained the same. Mr. H's behavior above did not receive strong support from the family, as the family allowed Mr. H's failure to maintain his nutritional intake.

Physical examination shows that Mr. H has hypertension with a blood pressure of 200/110 mmHg, RR 20x/minute, and a pulse of 98x/minute, and is conscious and alert. The 5D pruritus scale yielded a score of 10, indicating mild pruritus.

### **THERAPEUTIC INTERVENTION**

Nursing interventions include non-pharmacological therapy and complementary therapy, such as family coping support, education, and petroleum jelly therapy. The dosage for petroleum jelly therapy is to apply a thin layer twice a day (morning and evening, after bathing) to the itchy area. Moreover, with educational support for family coping, the metrics provided include the definition of pruritus, why pruritus can occur in CKD patients, the definition of petroleum jelly, the advantages and disadvantages of petroleum jelly, the role of the family in the application of petroleum jelly therapy, the dosage, recommendations, and prohibitions during the use of petroleum jelly, and how to calculate the pruritus score independently.

### **DISCUSSION**

The primary findings of this case study demonstrate a significant, concurrent improvement in both the physical symptom of uremic pruritus and the psychosocial metric of family coping following an 8-day dual-intervention protocol. Prior to the intervention, the patient exhibited severe distress from dry, rough, and hyperpigmented skin, resorting to damaging behaviors such as scratching with a hair comb due to a lack of adequate family support. The family initially displayed signs of caregiver fatigue, manifested as neglect, ignorance regarding proper skin care, and ineffective coping mechanisms like mere fanning. Following the implementation of structured family coping support and twice-daily petroleum jelly application, the patient's 5D Pruritus Scale score decreased to 6, indicating a transition to mild pruritus. Simultaneously with this physical improvement, the family demonstrated a marked behavioral shift, actively participating in care, discouraging harmful scratching, promoting nutritional adherence, and providing consistent emotional motivation (Sousa et al., 2023). This dual improvement underscores the intrinsic connection between effective physical symptom management and the restoration of family caregiving capacity.

The physiological mechanism underlying the observed reduction in pruritus is directly linked to petroleum jelly's restorative effects on the compromised epidermal barrier in patients with chronic kidney disease. In advanced CKD, a decline in glomerular filtration rate leads to systemic accumulation of uremic toxins, including creatinine and urea, which are subsequently excreted through the skin. This pathological process severely disrupts the stratum corneum, resulting in profound xerosis, hyperpigmentation, and intense itching. Petroleum jelly acts as a highly effective occlusive agent, forming a hydrophobic lipid barrier that prevents transepidermal water loss. Scientific literature confirms that petrolatum can reduce transepidermal water loss by up to 99 percent, thereby maximizing the skin's intrinsic capacity to retain moisture (Fluhr et al., 2025). Halting this excessive moisture evaporation directly interrupts the itch-scratch cycle, reduces localized histamine release at nerve endings, and promotes the healing of existing micro-lesions caused by the patient's prior scratching.

These physical outcomes align closely with existing dermatological and nephrological research, emphasizing the foundational role of emollient therapy in managing uremic pruritus. Previous randomized controlled trials have established that regular application of thick, fragrance-free emollients significantly reduces pruritus severity scores in hemodialysis populations compared to no treatment or lightweight lotions. Studies utilizing the 5D Pruritus Scale have similarly

documented that consistent barrier repair leads to measurable decreases in pruritus intensity, duration, and the associated disability (Kljajić et al., 2025). The current case study reinforces these established findings, demonstrating that even a brief, 8-day regimen of petroleum jelly can yield clinically meaningful improvements in pruritus metrics. The reduction from a higher baseline score to 6 mirrors the trajectory observed in broader clinical cohorts, validating the efficacy of this low-cost topical intervention in a real-world community setting.

The transformation in family dynamics highlights the critical role of structured educational support in mitigating caregiver burden and preventing care neglect in chronic illness management. Caregiver fatigue in CKD often stems from a profound lack of health literacy regarding disease complications, leading to feelings of helplessness and subsequent withdrawal from active caregiving duties. The family's initial reliance on ineffective methods, such as fanning, and their tolerance of the patient scratching with a hair comb, reflected a state of depleted coping resources rather than intentional malice. Providing targeted education aligned with the Indonesian Nursing Intervention Standards equipped the family with actionable knowledge and practical skills. This empowerment shifted the family's role from passive, overwhelmed observers to active, competent care partners. The resulting increase in the family's ability to meet the patient's needs and promote healthy behaviors illustrates the direct psychosocial benefits of integrating nursing education into home-based care plans (Polner et al., 2022).

The current literature on chronic disease management strongly supports integrating psychosocial family interventions alongside physical treatments to achieve optimal patient outcomes. Research indicates that family coping support interventions significantly reduce caregiver strain and improve patient adherence to complex medical regimens, including dietary restrictions and skin care protocols. Previous studies focusing solely on the medical management of uremic pruritus often fail to address the environmental and relational factors that exacerbate patient distress. This case study bridges that gap by demonstrating that addressing the family's knowledge deficit directly enhances the execution of the physical therapy. The observed decrease in neglectful behavior and the increase in supportive communication mirror the positive outcomes reported in broader family-centered care models for chronic conditions, confirming that holistic nursing interventions yield superior results compared to isolated physical treatments (Yusuf et al., 2024; Nadya et al., 2025).

The findings of this study have substantial implications for community health nursing practice and for the development of cost-effective care protocols for patients with chronic kidney disease. Petroleum jelly is an inexpensive, widely accessible, and safe therapeutic agent, making it an ideal first-line intervention for resource-limited settings where advanced dermatological treatments may be unavailable or unaffordable. Integrating this simple topical therapy with structured family coping support provides a highly replicable model for community health centers. Nurses can use this dual approach to empower families, reduce preventable complications such as skin infections from scratching, and alleviate the emotional burden on caregivers. Implementing such standardized, holistic protocols can significantly enhance the quality of life for CKD patients and their families, ultimately reducing the need for acute healthcare interventions driven by unmanaged symptoms or caregiver burnout (Chu et al., 2023; Sitorus et al., 2026).

Several inherent limitations must be acknowledged when interpreting the results of this case study. The single-case design inherently restricts the generalizability of the findings to the broader population of chronic kidney disease patients, as individual responses to therapy can vary significantly based on comorbidities and baseline disease severity. The 8-day intervention period, while sufficient to demonstrate initial symptomatic relief and behavioral shifts, is too brief to evaluate the long-term sustainability of these improvements or the prevention of future caregiver burnout. The

study also lacked concurrent biochemical monitoring, including serum phosphorus, calcium, and parathyroid hormone levels, which are critical systemic drivers of uremic pruritus. Future research should employ longitudinal designs with larger sample sizes and incorporate biochemical markers to comprehensively evaluate the sustained efficacy of this integrated nursing intervention.

## CONCLUSION

This case study demonstrates that a dual intervention of family coping support education and topical petroleum jelly therapy effectively addresses both the physical burden of uremic pruritus and the psychosocial challenge of declining family coping in chronic kidney disease management. Prior to the intervention, the patient suffered from severe itching, dry and rough skin, and hyperpigmentation, exacerbated by the family's lack of knowledge and subsequent care neglect. Following eight consecutive days of twice-daily petroleum jelly application and structured coping education, the patient's pruritus severity significantly decreased, with the five-dimensional pruritus scale score improving from 10 to 6, indicating mild symptoms. The family successfully achieved the targeted outcome criteria for improved coping status, transitioning from passive neglect to active, informed caregiving. These findings establish this integrated, non-pharmacological approach as a highly viable, cost-effective nursing strategy to simultaneously alleviate dermatological distress and empower families in the long-term management of chronic kidney disease.

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