



TOPICAL BABY OIL THERAPY FOR CHRONIC KIDNEY DISEASE-ASSOCIATED PRURITUS DURING HEMODIALYSIS INITIATION: A CASE REPORT

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ABSTRACT

Hemodialysis initiation is a critical transitional period for patients with chronic kidney disease (CKD) and is frequently accompanied by CKD-associated pruritus (CKD-aP), one of the most distressing symptoms that can impair patient comfort, sleep quality, and adaptation to long-term dialysis. This case report aimed to evaluate the application of topical baby oil therapy for reducing CKD-associated pruritus in a patient with stage V CKD undergoing hemodialysis initiation. A descriptive case study using the nursing process approach was conducted in a 36-year-old man with stage V CKD undergoing hemodialysis initiation. The intervention consisted of once-daily topical application of baby oil in the evening for eight consecutive days. Pruritus intensity was evaluated daily using the Numeric Rating Scale (NRS), while the multidimensional impact of pruritus was assessed before and after the intervention using the 5-D Itch Scale. Pruritus intensity gradually decreased, with the NRS score improving from 9 on the first day to 6 on the final day of the intervention. The total 5-D Itch Scale score also decreased from 21 to 14, indicating improvements in pruritus duration, severity, direction, disability, and distribution.

Keywords: baby oil; chronic kidney disease; hemodialysis initiation; uremic pruritus

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INTRODUCTION

Chronic kidney disease (CKD) is a major global health problem affecting more than 10% of the world's population, equivalent to approximately 800 million people (Kovesdy, 2022). The number of patients requiring kidney replacement therapy, including hemodialysis, continues to rise worldwide, with an estimated four to seven million people expected to receive kidney replacement therapy by 2030 (Alsing et al., 2022). In Indonesia, the Ministry of Health reported 1,448,406 individuals living with CKD in 2024, while the National Health Insurance Agency (BPJS Kesehatan) recorded 134,057 patients actively undergoing hemodialysis (Ministry of Health of Indonesia, 2024). These figures highlight the growing burden of CKD and the increasing demand for hemodialysis services.

Hemodialysis initiation represents the transition from conservative kidney management to kidney replacement therapy in patients with end-stage kidney disease. Depending on the patient's clinical condition, dialysis may be initiated as an emergency within 48 hours of presentation or as a planned procedure after 48 hours (Chan et al., 2019; Stevens et al., 2024). In general, the decision to initiate dialysis is based on the presence of uremic symptoms and biochemical abnormalities indicating severe kidney dysfunction (Chouhan et al., 2025). A recent study reported that 99.2% of patients with CKD required emergency hemodialysis initiation because of uremic syndrome, hyperkalemia, or fluid overload (Mwango et al., 2023).

The initiation of hemodialysis represents one of the most critical transitions in the disease trajectory because it profoundly changes patients' lives, both physically and psychologically (Imbeault & Nadeau-Fredette, 2019; Schaeffner, 2022). During this period, patients must adapt to a new way of

life, which may challenge their coping mechanisms and lead them to re-evaluate their relationships with themselves, others, their disease, and its treatment (Dumaine et al., 2023). Many patients describe this transition as frightening and overwhelming because they must accept a new health condition while adjusting to lifelong therapy (Schaeffner, 2022). Consequently, this transition may substantially affect patients' daily activities, lifestyle, physical functioning, interpersonal relationships, and overall quality of life (Lateef, 2022).

Although hemodialysis improves several manifestations of uremia, such as dyspnea and edema, chronic kidney disease-associated pruritus (CKD-aP), previously referred to as uremic pruritus, often persists or may even emerge during the early phase of treatment (Schaeffner, 2022). CKD-aP may be more pronounced during hemodialysis initiation because metabolic disturbances have not yet stabilized and patients are still adapting to dialysis therapy. A meta-analysis demonstrated an inverse association between dialysis duration and the prevalence of CKD-aP, indicating that pruritus tends to decrease as dialysis duration increases (Agarwal et al., 2021). Similarly, Sukul et al. (2023) reported that 51% of patients experienced moderate disturbance from CKD-aP during the initial phase of hemodialysis, with symptom severity decreasing approximately one year later.

CKD-aP is one of the most distressing symptoms experienced by patients undergoing hemodialysis. Some patients report worsening symptoms during and after dialysis, whereas others experience itching even before dialysis is initiated (Osakwe & Rout, 2026). Persistent pruritus has been associated with impaired quality of life, sleep disturbances, anxiety, and depression, making it a clinically significant symptom that requires appropriate management (Hercz et al., 2020; Santos-Alonso et al., 2022). If left untreated during hemodialysis initiation, CKD-aP may reduce patient comfort and potentially hinder adaptation to and acceptance of long-term hemodialysis therapy (Ege et al., 2024).

Managing CKD-aP is therefore essential to reduce symptom burden and improve patients' quality of life. In nursing practice, comfort is recognized as an individual and subjective experience that represents a fundamental component of holistic care (Ege et al., 2024). Nevertheless, studies have shown that CKD-aP remains underreported and inadequately managed because of limited awareness and insufficient symptom assessment during routine clinical care, resulting in the underestimation of its clinical impact (Latus et al., 2025; van der Willik et al., 2022).

Patients undergoing hemodialysis are also at increased risk of drug-related toxicity because impaired kidney function alters drug metabolism and excretion. Consequently, non-pharmacological interventions, particularly topical therapies, have attracted increasing attention as safe and practical approaches for relieving CKD-aP. Several topical emollients, including olive oil, lavender oil, clove oil, virgin coconut oil, aloe vera, petroleum jelly, and baby oil, have been investigated for their potential to alleviate pruritus in patients with CKD (Hu et al., 2022; Sinawang et al., 2020). However, no consensus has been established regarding the optimal topical intervention, particularly during the initiation phase of hemodialysis.

Among these topical interventions, baby oil was selected because it functions as an emollient, is inexpensive, readily available, and can be self-applied by patients at home without assistance from healthcare professionals (Prasad et al., 2023). Despite these practical advantages, evidence regarding the use of topical baby oil for managing CKD-aP during the initiation phase of hemodialysis remains limited. Furthermore, nursing case reports describing individual patient responses to this intervention are still scarce. Therefore, this case report describes the application of topical baby oil therapy to reduce CKD-aP in a patient with stage V chronic kidney disease during hemodialysis initiation.

METHOD

This study employed a descriptive case study design using the nursing process approach, including assessment, nursing diagnosis, planning, implementation, and evaluation. The case study aimed to describe the application of topical baby oil therapy to reduce chronic kidney disease-associated pruritus (CKD-aP) in a patient with stage V chronic kidney disease undergoing hemodialysis initiation. The intervention was conducted over eight consecutive days, consisting of three days of supervised treatment during hospitalization at Dr. Slamet Regional General Hospital, Garut, Indonesia (5–7 November 2025), followed by five days of self-administered home care with remote monitoring. The participant was one patient admitted to the Safir Ward of the Internal Medicine Department. Data were collected through interviews, direct observation, physical examination, and review of the patient's medical records.

Pruritus intensity was assessed using the Numeric Rating Scale (NRS) to evaluate daily changes in symptom severity, while the multidimensional characteristics of pruritus were assessed using the 5-D Itch Scale before and after the intervention. Nursing diagnoses, expected outcomes, and nursing interventions were established according to the Indonesian Nursing Diagnosis Standards (SDKI), Indonesian Nursing Outcomes Standards (SLKI), and Indonesian Nursing Intervention Standards (SIKI). Prior to participation, the patient received a complete explanation regarding the study objectives and intervention procedures. Written informed consent was obtained from the patient and the patient's spouse, and all personal information was anonymized to maintain confidentiality.

The intervention consisted of topical application of baby oil containing approximately 99% mineral oil, primarily Paraffinum liquidum and Isopropyl palmitate. Before each application, hand hygiene was performed and the patient was positioned comfortably. The affected skin area was gently cleansed with sterile gauze moistened with 0.9% normal saline and carefully dried before approximately 3 mL of baby oil was applied with gentle massage for about 15 minutes (Singh & Vinayadev, 2021). The intervention was administered once daily in the evening for eight consecutive days, consisting of three days of supervised treatment during hospitalization followed by five days of self-administered home care. During the home-based intervention, the patient and family received instructions regarding the application procedure, and adherence was monitored through daily communication via WhatsApp. Outcome evaluation was performed throughout the intervention period. Pruritus intensity was measured daily using the NRS following each intervention session, whereas the 5-D Itch Scale was administered before the first intervention and on the final day to evaluate changes in the overall pruritus experience.

Case Presentation

A 36-year-old man presented to the emergency department on 3 November 2025 with bilateral lower-extremity edema, nausea, dyspnea, and generalized pruritus. Following his first hemodialysis session, a comprehensive nursing assessment was conducted on 5 November 2025. He continued to experience generalized itching accompanied by nausea after dialysis. The itching had begun approximately one week before hospital admission and primarily involved the arms, legs, and back. The symptoms became more severe at night, during perspiration, and after the first hemodialysis session, while scratching provided only temporary relief. He also reported sleep disturbance due to persistent itching, with a Numeric Rating Scale (NRS) score of 9/10.

The patient's past medical history revealed that he habitually delayed urination and reported a daily fluid intake of approximately 500-750 mL. He had been taking allopurinol for approximately six years. The patient also had a two-year history of hypertension, which was routinely managed with amlodipine and regular outpatient follow-up. In 2018, he was diagnosed with a kidney infection and received outpatient treatment for six months. In 2024, he developed nephrolithiasis and reported spontaneously passing 11 kidney stones during urination.

On physical examination, he was alert and fully conscious (*compos mentis*). Vital signs were as follows: blood pressure 165/104 mmHg, heart rate 89 x/minute, respiratory rate 20 x/minute, body temperature 36.6°C, and oxygen saturation 95% on room air. His body weight was 54 kg, height was 160 cm, and body mass index was 21 kg/m². Examination of the integumentary system revealed dry, slightly scaly skin on the arms and lower legs, accompanied by multiple excoriation lesions on the arms, back, and both upper and lower extremities (Figure 1). Skin turgor was normal, conjunctival pallor was present, and the patient reported normal urine output without urinary complaints.



Figure 1. Excoriation Lesions Associated with CKD-aP (5 November 2025)

Laboratory examination demonstrated hemoglobin of 7.7 g/dL, leukocyte 9,296/mm³, erythrocyte 2,89/mm³, hematocrit 24%, platelet 361,000/mm³, blood urea of 201 mg/dL, serum creatinine of 13.26 mg/dL, potassium of 6.1 mEq/L, and calcium of 3.89 mg/dL. During hospitalization, the patient received Omeprazole 1 x 40 mg IV, Ketorolac 1 x 30 mg IV, Kalsium Karbonat 3 x 500 mg Tab PO, Amlodipin 1 x 10 mg Tab PO, Furosemid 2 x 20 mg IV, Asam Folat 1 x 0,4 mg Tab PO, Ondansentron 2 x 4 mg IV and Asering intravenous fluid at 7 drops/minute.

Based on the Indonesian Nursing Diagnosis Standards (SDKI), the patient was diagnosed with impaired skin integrity related to the accumulation of uremic toxins, as evidenced by persistent generalized pruritus for one week before admission, worsening symptoms at night, during perspiration, and after the first hemodialysis session, severe pruritus (NRS score: 9/10), dry and slightly scaly skin, multiple excoriation lesions, and sleep disturbance. Expected outcomes were established according to the Indonesian Nursing Outcomes Standards (SLKI), focusing on improved skin integrity, reduced skin damage, improved skin texture, decreased scratching frequency, and improved sleep quality. Nursing interventions were implemented according to the Indonesian Nursing Intervention Standards (SIKI), with Skin Integrity Care as the primary intervention through topical application of baby oil to the affected dry and pruritic skin areas.

RESULT

During the intervention period, the patient reported gradual improvement in pruritus intensity. During the first few days of the intervention, itching was still experienced, particularly at night. Following regular application of topical baby oil, the patient reported that the skin felt more moisturized, the frequency of scratching decreased, and sleep quality gradually improved. Physical examination also showed that the skin appeared more hydrated and was no longer scaly. The evaluation of the eight-day topical baby oil therapy is presented below.

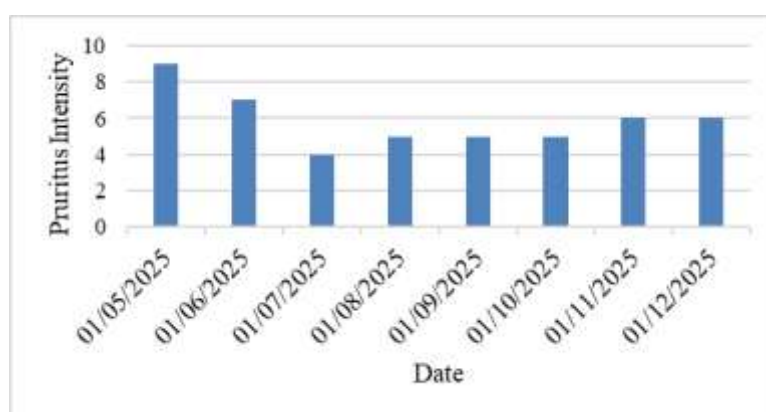


Diagram 1. Daily Changes in Pruritus Intensity Measured Using the Numeric Rating Scale (NRS)

As shown in Diagram 1, the pruritus intensity score after the first application of topical baby oil was 9. The score decreased to 7 on the second day and further decreased to 4 on the third day. From the fourth to the sixth day, the pruritus intensity remained relatively stable at a score of 5. On the seventh and eighth days, the score slightly increased and remained at 6 for two consecutive days.

Table 1.
Five-D Itch Scale Scores Before and After Eight Days of Topical Baby Oil Therapy

Dimension	Pre-Intervention Score	Post-Intervention Score
Duration	5	2
Degree	4	3
Direction	4	3
Disability	5	4
Distribution	3	2
Total Score	21	14

As presented in Table 1, the total 5-D Itch Scale score was 21 before the intervention. After eight days of topical baby oil therapy, the total score decreased to 14, representing a reduction of seven points.

DISCUSSION

CKD-associated pruritus (CKD-aP) in this patient persisted after the first hemodialysis session despite the initial application of topical baby oil. CKD-aP in patients with advanced chronic kidney disease is a multifactorial condition resulting from complex interactions among uremic toxin accumulation, immune dysregulation, mineral metabolism disorders, peripheral neuropathy, opioid receptor imbalance, and skin barrier dysfunction leading to xerosis (Kljajić et al., 2026; Schricker & Kimmel, 2021). Therefore, the persistence of severe pruritus observed in this patient during the early phase of hemodialysis is likely attributable to multiple underlying pathophysiological mechanisms rather than a single cause.

On the first day of intervention, the patient's pruritus remained severe (NRS = 9). This finding may be explained by the markedly elevated blood urea and serum creatinine levels before the initiation of hemodialysis (blood urea: 351 mg/dL; serum creatinine: 21.09 mg/dL), reflecting a substantial accumulation of uremic toxins. These toxins act as pruritogenic stimuli that activate peripheral pruriceptive C-fibers, generating neural impulses that are transmitted to the dorsal horn of the spinal cord and ascend through the spinothalamic tract, resulting in the perception of itching and the urge to scratch (Hu et al., 2022; Su et al., 2019). In addition, the therapeutic effect of baby oil was unlikely to be optimal after a single application, as repeated use is generally required to restore skin hydration and barrier function (Muliani, 2021).

Mineral metabolism disorders may also have contributed to the persistence of CKD-aP in this patient. Advanced CKD commonly results in hyperphosphatemia, hypocalcemia, and secondary hyperparathyroidism (SHPT) due to impaired phosphate excretion and reduced activation of vitamin D (Li et al., 2025; Muppidi et al., 2026). Chronic disturbances in calcium–phosphate homeostasis and elevated parathyroid hormone levels may promote ectopic calcium–phosphate deposition within the skin, triggering local inflammatory responses and the release of pruritogenic mediators such as histamine. Furthermore, disruption of the epidermal calcium gradient may impair keratinocyte differentiation and skin barrier integrity, thereby contributing to xerosis and the development of CKD-aP (Kljajić et al., 2026; Schricker & Kimmel, 2021).

A marked reduction in pruritus intensity was observed on the second and third days of intervention, which may be explained by two complementary mechanisms. First, the substantial reduction in blood urea (98 mg/dL) and serum creatinine (8.29 mg/dL) following hemodialysis likely decreased the accumulation of pruritogenic toxins and attenuated systemic inflammatory responses. This metabolic improvement reduced the activation of peripheral pruriceptive nerve fibers, thereby contributing to the significant decline in pruritus intensity observed during this period (Schricker & Kimmel, 2021).

Second, the emollient effect of baby oil may have further contributed to the improvement in pruritus. The baby oil used in this case contained mineral oil, primarily *Paraffinum liquidum* and *Isopropyl palmitate*. *Paraffinum liquidum* acts as an occlusive moisturizer by forming a protective film on the skin surface that reduces transepidermal water loss (TEWL), whereas *Isopropyl palmitate* functions as an emollient that softens the skin and enhances moisture retention. Together, these ingredients improve stratum corneum hydration, restore epidermal barrier integrity, reduce exposure of peripheral nerve endings to irritative stimuli, and interrupt the itch–scratch cycle (Asal et al., 2025).

Improved hydration of the stratum corneum also helps maintain the physiological balance of water, lipids, and skin surface pH, thereby preserving the protective function of the skin barrier. A well-hydrated skin barrier reduces the sensitivity of peripheral pruriceptive C-fibers, decreases the transmission of itch signals to the central nervous system, and limits the penetration of external irritants and inflammatory mediators (Hu et al., 2022; Su et al., 2019; Verma et al., 2023). These mechanisms are consistent with the patient's clinical improvement during the intervention, as the skin became more hydrated and less scaly, accompanied by a gradual reduction in scratching frequency and pruritus intensity.

Despite this early improvement, pruritus intensity showed mild fluctuations between the fourth and eighth days of intervention, with NRS scores ranging from 5 to 6. This pattern is consistent with the fluctuating nature of CKD-associated pruritus (CKD-aP), particularly during the early phase of hemodialysis (van Lieshout et al., 2025). Van Lieshout et al. (2025) reported that approximately 40% of patients experienced fluctuating pruritus during the first year of dialysis, whereas Verduzco & Shirazian (2020) described CKD-aP as a persistent symptom that may recur despite ongoing treatment. In addition to metabolic disturbances, fluctuations in pruritus severity may also be influenced by external factors such as environmental temperature, physical activity, psychological stress, and personal hygiene (Molina et al., 2023).

According to the patient's report, the slight increase in pruritus intensity during the later intervention period was likely related to the hot and humid conditions at home. Environmental heat is a well-recognized aggravating factor for CKD-aP. Menzaghi et al. (2023) reported that 78.3% of participants identified at least one factor that worsened their itching, with heat exposure being the most frequently reported trigger (30.4%). Physiologically, increased skin temperature promotes vasodilation, enhances the sensitivity of peripheral pruriceptive nerve endings, and may stimulate

the release of pruritogenic mediators such as histamine, thereby intensifying itch perception (Hu et al., 2019).

The reduction in the total 5-D Itch Scale score indicates that topical baby oil therapy was associated with improvements not only in pruritus intensity but also in the broader multidimensional experience of itching. After eight days of intervention, improvements were observed across all five domains of the instrument, including duration, degree, direction, disability, and distribution. This multidimensional improvement is relevant because CKD-associated pruritus can vary in severity and pattern and may affect multiple aspects of patients' daily lives. The use of both unidimensional and multidimensional assessment tools therefore provides a more comprehensive evaluation of changes in pruritus following intervention (Osakwe & Rout, 2026).

Lower scores in the duration and degree domains indicate that the itching became less severe and was experienced for shorter periods following the intervention. These improvements are consistent with enhanced skin hydration resulting from the emollient effect of baby oil, which helps restore skin barrier function and reduces the sensitivity of peripheral itch receptors (Verma et al., 2023). Meanwhile, the improvement observed in the direction domain suggests that the patient perceived an overall reduction in pruritus over time despite the mild day-to-day fluctuations, a finding consistent with the clinical course of CKD-aP during the early phase of hemodialysis (van Lieshout et al., 2025).

The reduction in the disability domain suggests improvements in sleep quality and daily activities, although pruritus was not completely resolved. This finding is consistent with previous studies demonstrating that CKD-aP substantially impairs patients' quality of life, particularly through sleep disturbance (Hercz et al., 2020). In addition, lower scores in the distribution domain indicate that fewer body areas were affected by itching after the intervention. Nevertheless, the patient continued to experience intermittent pruritus in several regions, including the scalp, back, buttocks, thighs, lower legs, upper and lower arms, areas in contact with clothing, and the groin. This observation is consistent with previous reports describing the heterogeneous distribution pattern of CKD-aP, which may range from generalized itching to localized symptoms affecting specific body regions (Santos-Alonso et al., 2022).

Overall, the findings of this case suggest that topical baby oil may serve as a supportive therapy for reducing CKD-associated pruritus in patients with stage V CKD during hemodialysis initiation. This observation is consistent with current recommendations that consider topical emollients as first-line supportive management for CKD-aP, particularly in patients with xerosis (Osakwe & Rout, 2026; Santos-Alonso et al., 2022). Although mild fluctuations in pruritus persisted throughout the intervention, symptom severity remained lower than at baseline, indicating a clinically meaningful improvement.

Topical baby oil therapy represents a simple, safe, inexpensive, and easily accessible non-pharmacological intervention that can be self-administered by patients and caregivers, making it particularly applicable in resource-limited settings. Beyond its therapeutic role, this intervention may also be incorporated into routine skin care education as part of long-term symptom management for patients undergoing hemodialysis. Therefore, nurses play an important role in promoting evidence-based complementary skin care strategies to improve patient comfort and quality of life (Singh & Vinayadev, 2021).

CONCLUSION

This case report suggests that topical baby oil therapy may serve as a beneficial non-pharmacological nursing intervention for alleviating CKD-associated pruritus (CKD-aP) in a patient with stage V chronic kidney disease during hemodialysis initiation. Over the eight-day intervention

period, improvements were observed in both daily pruritus intensity and multidimensional pruritus outcomes, indicating enhanced patient comfort.

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