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Pencegahan Luka Tekan dengan Minyak Topikal: Scoping Review

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ABSTRAK

Luka tekan merupakan masalah umum pada pasien dengan keterbatasan mobilitas. Minyak topikal telah digunakan sebagai intervensi preventif karena manfaatnya dalam menjaga kelembapan kulit dan mengurangi gesekan. Namun, bukti ilmiah mengenai praktik ini masih tersebar dan belum terpetakan secara sistematis. Tinjauan ini bertujuan untuk mengeksplorasi dan memetakan jenis minyak, metode aplikasi, serta konteks penggunaannya dalam pencegahan luka tekan. Scoping review ini mengikuti pedoman PRISMA-ScR dengan pendekatan PCC (Population: pasien berisiko luka tekan; Concept: penggunaan minyak topikal; Context: layanan perawatan). Pencarian dilakukan melalui PubMed, Wiley, dan Garuda tahun 2015–2025. Sebanyak 11 artikel memenuhi kriteria inklusi. Jenis minyak yang ditemukan meliputi sweet almond oil, peppermint oil gel, virgin coconut oil, nigella sativa oil, olive oil, dan hyperoxygenated fatty acids. Prosedur aplikasi dilakukan dengan perawatan standar rutin ditambah aplikasi minyak (langsung atau kombinasi pemijatan), dengan frekuensi satu hingga tiga kali per hari selama empat hingga empat puluh hari. Area tubuh yang menjadi sasaran meliputi regio dorsalis, regio sacralis, dan regio calcanea dengan setting ICU, ruang rawat inap, dan nursing home. Scoping review ini berhasil memetakan praktik penggunaan minyak topikal dalam pencegahan luka tekan dan dapat menjadi dasar untuk praktik berbasis bukti.

Pressure Ulcer Prevention with Topical Oils: Scoping Review

ABSTRACT

Pressure ulcers (PUs) are a common problem among patients with limited mobility. Topical oils have been used as preventive intervention due to their ability to maintain skin moisture and reduce friction. However, scientific evidence related to this practice remains scattered and has not yet been systematically mapped. This review aimed to explore and map the types of oils, application methods, and contexts of use for PU prevention. A scoping review was conducted following the PRISMA-ScR guidelines using the PCC framework (Population: patients at risk of PUs; Concept: topical oil application; Context: healthcare settings). Literature searches were conducted through PubMed, Wiley, and Garuda from 2015 to 2025. 11 articles met the inclusion criteria. Identified oils type included sweet almond oil, peppermint oil gel, virgin coconut oil, Nigella sativa oil, olive oil, and hyperoxygenated fatty acids. The interventions involved standard care with oil application (directly or combined with massage), from one to three times daily over four to forty days. Target areas included the dorsal, sacral, and calcaneal regions, in ICU, inpatient wards, and nursing homes. This scoping review successfully mapped the use of topical oils for PU prevention and offers evidence to support future clinical nursing practice.

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Introduction

Pressure ulcers (PUs) are a common problem among individuals with limited mobility, such as elderly patients, intensive care unit (ICU) patients, and nursing home residents. This condition can increase morbidity, healthcare costs, burden on families and healthcare providers, and significantly reduce patients' quality of life. In 2021, the global number of PU cases was recorded at 645,588, with Southeast Asia contributing 8,579 cases, and Indonesia reporting 1,719 cases (Zhang et al., 2025). However, these numbers are believed to underestimate the actual situation due to limitations in infrastructure, access to services, and inadequate documentation practices (Kammuang-lue et al., 2024).

Among the reported cases, the elderly population (age > 60 years) made up the majority (Zhang et al., 2025) and are considered a high-risk group, along with critically ill patients and those with spinal cord injuries or diseases (Gould et al., 2024). Despite various prevention strategies that have been implemented in healthcare facilities, the incidence rate has not decreased significantly in recent decades (Gould et al., 2024).

One preventive approach that has gained attention is the use of topical oils, including plant-based oils and fatty-acid preparations. This method is believed to have moisturizing, anti-inflammatory effects and help maintain skin integrity. However, the scientific evidence related to this approach is still scattered and not well synthesized. Two previous reviews discussed the effectiveness of herbal oils in ICU settings (Suciati et al., 2023) and the use of dressings and topical agents such as creams and fatty acids (Patton et al., 2024). Both studies primarily focused on intervention effectiveness using a systematic review approach. Based on a literature search, no scoping review has been found that maps evidence on the use of oils for PU prevention. Therefore, this review aims to explore and map the types of oils, methods of application, and contexts in which topical oils are used for PU prevention.

Method

This scoping review followed the PRISMA-ScR guidelines (Tricco et al., 2018). Study selection and screening processes were conducted using Rayyan (Ouzzani et al., 2016). The PCC framework was applied: Population (patients at risk of PUs); Concept (use of topical oils); and Context (care settings). Literature searches were conducted through PubMed, Wiley, and Garuda databases up to June 5, 2025, using keywords and filters described in Table 1.

Table 1. Search Strategy for Each Database

Database		Search strategy
PubMed	#1	((((("skin ulcer"[MeSH Terms]) OR ("pressure ulcer"[MeSH Terms])) OR ("pressure injury"[All Fields])) OR ("decubitus ulcer"[All Fields])) AND ("oils"[MeSH Terms])
	#2	PUBLICATION DATE: 10 years (2015-2025)
	#3	TEXT AVAILABILITY: Abstract; Full text
	#4	ARTICLE TYPE: Case Reports; Clinical Study; Clinical Trial; Randomized Controlled Trial
Wiley	#1	"pressur* ulcer* AND bed sore* AND decubitus AND injur* AND oil*" anywhere
	#2	Publication Type: Journals
	#3	From: 2015-2025
Garuda	#1	luka tekan AND oil
	#2	Search By: Abstract
	#3	Filter By Year: 2015-2024

Articles were included if they met the following criteria: (1) participants with limited mobility who were at risk of PUs (without existing PUs) in any care setting (ICU, inpatient wards, community, etc.); (2) interventions focused on oil application (natural or processed products); (3) published in peer-reviewed journals, in English or Indonesian between 2015 and 2025; and (4) used quantitative, qualitative, or mixed-method designs. Articles were excluded if participants already had PUs at baseline and oil uses were solely for wound treatment, not prevention. Editorials, opinion pieces, or conference abstracts without full texts were also excluded.

Data extraction covered: authors and year, country, study design, population and sample size, intervention and control, procedures, duration and frequency, and outcomes. Eligible studies were systematically extracted and presented in narrative form, tables, and visual representations. Risk of bias was assessed using the JBI critical appraisal tools for randomized controlled trials (RCTs), quasi-experimental designs (QEDs), case series, and case reports to provide an overview of the methodological quality of the included studies and support interpretation of the mapped evidence (Barker et al., 2023, 2024; Munn et al., 2020; S. Moola et al., 2020). Each item was rated as "yes", "no", "unclear", or "not applicable". Studies were classified as low quality (< 50%), moderate (50-75%), or high quality (>75%).

Results

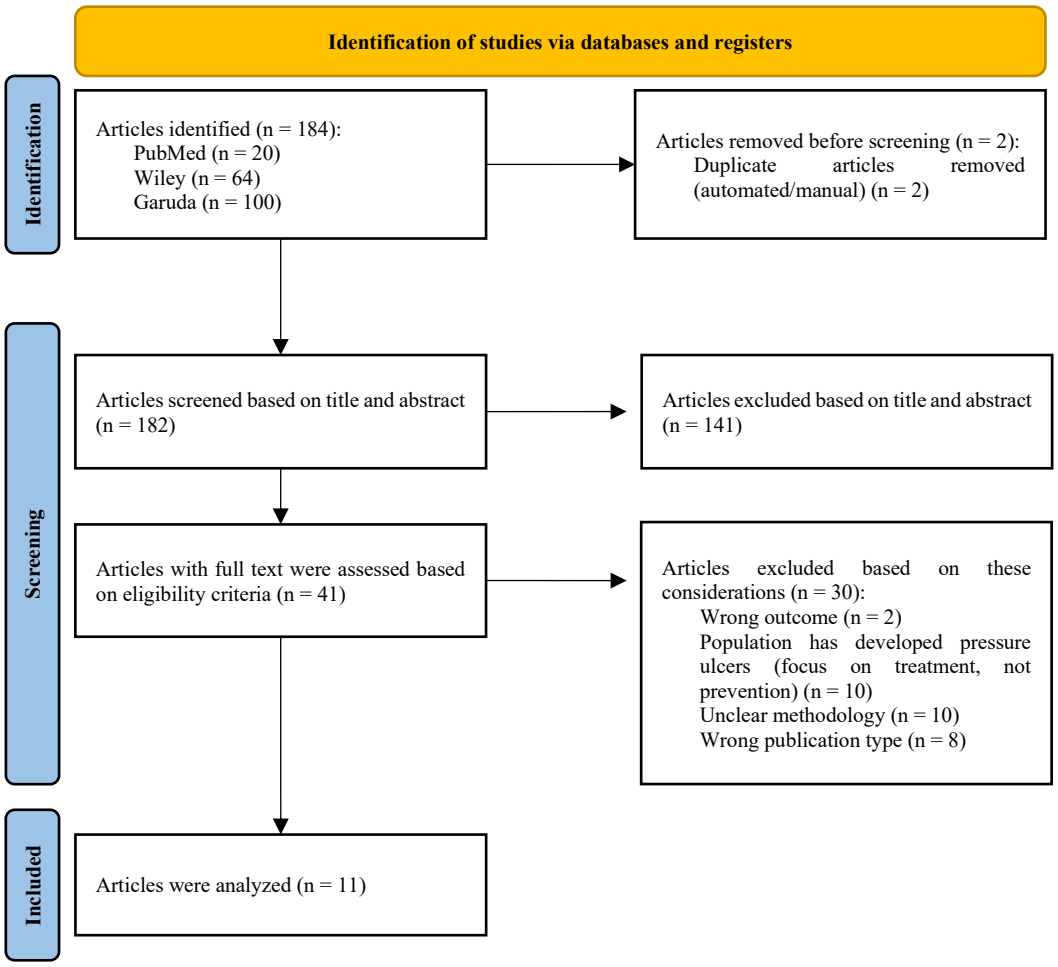


Figure 1. Flowchart of the study selection

The research settings identified in this scoping review encompass various locations. Most of the included studies were conducted in ICUs (Babamohamadi et al., 2019; Borzou et al., 2020; Diah Setiani, 2015; Purnawaty et al., 2025; Sönmez & Güneş, 2020), nursing homes (Díaz-Valenzuela et al., 2019), and inpatient wards (Aryani et al., 2022; Syapitri et al., 2017). Three studies did not specify settings beyond general hospital environments (Fernanda & Yanto, 2023; Sugiarto & Jihad, 2022; Sumah, 2020).

The countries of the included studies originated from Iran (Babamohamadi et al., 2019; Borzou et al., 2020), Turkey (Sönmez & Güneş, 2020), Spain (Díaz-Valenzuela et al., 2019), and Indonesia (Aryani et al., 2022; Diah Setiani, 2015; Fernanda & Yanto, 2023; Purnawaty et al., 2025; Sugiarto & Jihad, 2022; Sumah, 2020; Syapitri et al., 2017). Study designs comprised four RCTs (Babamohamadi et al., 2019; Borzou et al., 2020; Díaz-Valenzuela et al., 2019; Sönmez & Güneş, 2020), four QEDs (Aryani et al., 2022; Diah Setiani, 2015; Sumah, 2020; Syapitri et al., 2017), two case series (Fernanda & Yanto, 2023; Sugiarto & Jihad, 2022), and one case reports (Purnawaty et al., 2025).

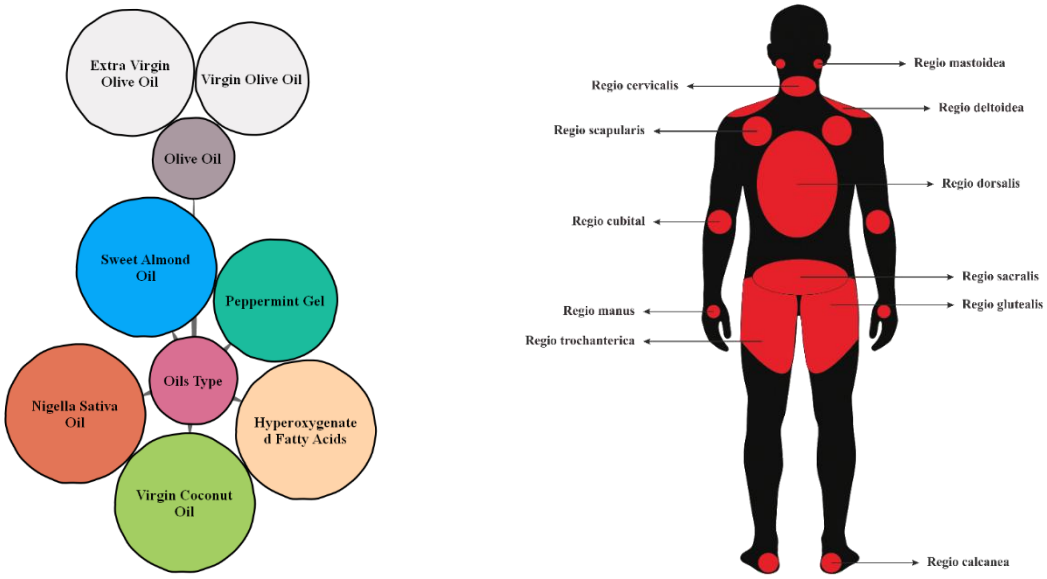
Table 2. Critical Appraisal Results of Included Studies

Studies	Questions													Score
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Borzou et al. (2020)	Y	U	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	77%
Sönmez and Güneş (2020)	Y	U	Y	U	N	Y	Y	Y	Y	Y	Y	Y	Y	77%
Babamohamadi et al. (2019)	U	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	92%
Díaz-Valenzuela et al. (2019)	Y	U	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	92%
Diah Setiani (2015)	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	100%
Syapitri et al. (2017)	Y	Y	Y	N	Y	Y	Y	Y	Y	-	-	-	-	89%
Aryani et al. (2022)	Y	N	Y	Y	Y	Y	Y	U	Y	-	-	-	-	78%
Sumah (2020)	Y	N	Y	Y	Y	Y	U	Y	Y	-	-	-	-	78%
Fernanda and Yanto (2023)	Y	Y	Y	U	U	Y	Y	Y	Y	N	-	-	-	70%
Sugiarto and Jihad (2022)	Y	Y	Y	U	U	Y	Y	Y	Y	N	-	-	-	70%
Purnawaty et al. (2025)	Y	Y	Y	Y	Y	Y	U	Y	-	-	-	-	-	88%

Abbreviations: Y, yes; U, unclear; N, no.

The risk-of-bias assessment for included studies is presented in Table 2. Four studies showed moderate quality (Borzou et al., 2020; Fernanda & Yanto, 2023; Sönmez & Güneş, 2020; Sugiarto & Jihad, 2022), while the remaining seven showed high quality (Aryani et al., 2022; Babamohamadi et al., 2019; Diah Setiani, 2015; Díaz-Valenzuela et al., 2019; Purnawaty et al., 2025; Sumah, 2020; Syapitri et al., 2017).

Summary of Interventions



(a) (b)

Figure 2. (a) Oil Type for PU Prevention; (b) A Posterior View of The Human Body

Table 3. Characteristics of Included Studies

Studies	Country	Study Design	Population, Sample Size	Sample Size	Intervention Treatment	Control Treatment	Procedure	Duration, Frequency	Results
Borzou et al. (2020)	Iran	RCT, single-blinded	ICU patients aged 18–85 y.o with Braden Scale ≤18	IG: 36 PG: 36 CG: 36	Standard care + sweet almond oil	PG: Standard care + placebo (paraffin) CG: Standard care	Oil applied in circular motion without pressure to posterior shoulder, sacrum, and heel for ± 5 second	1×/day for 7 days	Significant effect
Sönmez and Güneş (2020)	Turkey	RCT	ICU patients aged ≥18 y.o with Braden Scale ≤12		Standard care + extra virgin olive oil (EVOO)	Standard care	Oil poured into hand and applied gently in circular motion to sacrum, trochanteric areas, and heels for 1 minute	2×/day for 5–28 days	Significant effect
Babamohamadi et al. (2019)	Iran	RCT, parallel, double-blinded	ICU patients with head trauma with moderate–severe Braden Scale category	IG: 70 CG: 70	Standard care + peppermint gel	Standard care + placebo gel	Oil applied to hips and bony prominences (elbow, knee, heel, shoulder)	3×/day for 14 days	Significant effect
Díaz-Valenzuela et al. (2019)	Spain	RCT, double-blinded	Nursing home residents with Braden Scale <14	IG: 263 CG: 274	Standard care + EVOO	Standard care + hyperoxygenated fatty acids (HOFA)	Oil sprayed twice on risk areas and gently rubbed	2×/day for 30 days	Significant effect
Diah Setiani (2015)	Indonesia	QED, two-group	ICU patients aged >56 y.o with high risk of PUs	IG: 17 CG: 17	Effleurage massage with virgin coconut oil (VCO)	Standard care	Oil applied with massage to scapula, sacrum, and heels for 4–5 minutes	2×/day for 12 days	Significant effect
Syapitri et al. (2017)	Indonesia	QED, two-group	Bed rest inpatients ward patient aged 20–73 y.o with Norton Score <14	IG: 22 CG: 22	Nigella sativa oil	Standard care	Oil applied to bony prominences	1×/day for 7 days	Significant effect

Aryani et al. (2022)	Indonesia	QED, one-group	Stroke inpatients ward aged 20–68 y.o with Braden Scale <18	30	30° repositioning + virgin olive oil	No control	30° repositioning every 2 hours + oil applied to risk areas	1×/day for 7 days	Significant effect
Sumah (2020)	Indonesia	QED, one-group	Stroke patients aged 43–70 y.o	15	Effleurage massage with VCO + repositioning	No control	Oil applied for 20 min + massage 4–5 min + repositioning every 2 hours	2×/day for 7 days	Significant effect
Fernanda and Yanto (2023)	Indonesia	Case-series	Non-hemorrhagic stroke patients aged >45 y.o with Braden Scale 10 and 11	2	Pencegahan Luka Tekan [I.14543] + effleurage massage with VCO	No control	Massage with oil to mastoid, neck, back, gluteal, sacrum, arms, and legs for 20 min	2×/day for 4 days	Significant effect
Sugiarto and Jihad (2022)	Indonesia	Case series	Stroke patients aged >50 y.o with Braden Scale ≤15	2	Effleurage massage with VCO + repositioning	No control	Massage with oil on back to sacrum for 4–5 min + 2-hourly repositioning	2×/day for 5 days	Significant effect
Purnawaty et al. (2025)	Indonesia	Case report	ICU patient (suspected metabolic encephalopathy, hyperuricemia, stage 5 CKD, type 2 DM), aged 54 y.o, Braden Scale 9	1	Effleurage massage with VCO	No control	Oil applied after bathing with massage to sacrum, back, heel, and elbow for 4–5 min	2×/day for 18 days	Significant effect

Abbreviations: RCT, randomized control trial; ICU, intensive care unit; y.o, years old; IG, intervention group; PG, placebo group; CG, control group; QED, quasi-experimental design; PU, pressure ulcer; COPD, chronic obstructive pulmonary disease; CKD, chronic kidney disease; DM, diabetes mellitus.

This scoping review identified various types of oils, including sweet almond oil, peppermint gel, virgin coconut oil, nigella sativa oil, olive oil, and hyperoxygenated fatty acids (HOFA) (Figure 1). The Interventions were conducted in ICUs, inpatient wards (general and specialized stroke patient units), and nursing homes. Application frequencies varied between one to three times daily, with durations ranging from four to forty days. Furthermore, no studies reported adverse events during oil use.

A consistent pattern was also identified regarding the application locations, including the mastoid region (behind the ear), cervical region (neck), deltoid region (shoulder), scapular region (shoulder blade), dorsal region (back), cubital region (elbow), manus region (hand), sacral region (sacrum), gluteal region (buttocks), trochanteric region (lateral pelvis), and calcaneal region (heel) (Figure 2). Regarding application procedures, the intervention followed skin area cleansing (with normal saline or post-bathing), followed by topical application—with light circular massage without pressure for 4 to 20 minutes. After completion, the treated skin area could be covered with sterile gauze or left open, depending on care needs and patient condition.

Discussion

This scoping review maps the available evidence regarding the use of topical oils for PU prevention based on 11 studies published between 2015 and 2025. The review successfully identified variations in oil types, frequency and duration of use, target body areas, and procedures of application across various healthcare settings. These findings are in line with the main objective of this review, which was to explore and map the types of oils, application methods, and contexts in which they are used.

These findings also reflect a growing global trend in nursing practice that favors the use of natural ingredients, including herbal oils, in PU prevention. Two previous systematic reviews reported the use of topical oils in clinical settings. Similar findings regarding hyperoxygenated fatty acids (HOFA) were mentioned in the comprehensive and periodically updated Cochrane review (Patton et al., 2024). Additionally, sweet almond oil, olive oil, and peppermint oil gel were also mentioned in another systematic review (Lin et al., 2itu d025). However, other substances found in their reviews, such as aloe vera (in both gel and oil form) (Patton et al., 2024) and henna paste (Lin et al., 2025), were not identified in the current review.

Another review by Ouchi et al. (2023), although similar in context, focused on treatment rather than prevention. Their findings included thai herbal oil, honey, and aloe vera. Two other systematic reviews covered both prevention and treatment, reporting the use of virgin coconut oil, olive oil, and sweet almond oil (Özkan et al., 2025; Safdari et al., 2021). However, some oils mentioned in Özkan et al. (2025)—such as fish oil, aloe vera gel, honey, and soybean oil—and Safdari et al. (2021)—such as sunflower seed oil, tea tree oil, sesame oil, and honey—were not identified in this review.

Most of the prior reviews were systematic or combined with meta-analyses focusing on intervention effectiveness. While some of them mentioned oil types, frequency, duration, and application methods, this information was generally presented in descriptive tables and was not the main focus of exploration. Through a mapping approach, this scoping review fills gaps by mapping diverse information on oil types, clinical settings, frequency and duration, body locations, and application procedures.

From a practical perspective, the findings provide a comprehensive and applicable reference for healthcare professionals, particularly nurses, to consider topical oils as a complementary strategy in PU prevention. Given the simplicity and relative safety of oil application, these interventions may also be implemented outside hospital settings, such as in nursing homes or home care environments. Furthermore, several types of topical oils may provide specific-skin protective benefits relying on the area of skin cared for.

Oils applied to prominent bone areas, such as the sacrum, heels, hips, and elbows can reduce dryness, promote moisture balance, enhance skin resilience, and minimize friction associated with prolonged pressure and limited mobility. In addition, light circular massage helps improve regional blood circulation, reduce friction, enhance relaxation, and facilitate distribution and absorption of topical

oils on vulnerable skin areas. Excessive massage duration or pressure may lead to increased skin irritation, discomfort, or tissue stress, mainly among patients with fragile skin and impaired blood flow. Therefore, applying light techniques and careful monitoring remains essential during topical oil application

Moreover, olive oil and sweet almond oil contain essential fatty acids and antioxidants supporting skin integrity, whereas virgin coconut oil provides moisturizing and antimicrobial features contributing to the protection of vulnerable skin areas. In addition, hyperoxygenated fatty acids may enhance local microcirculation and tissue oxygenation, particularly in areas exposed to prolonged pressure. Light massage during oil application may also promote circulation and facilitate topical agent absorption. Nevertheless, potential risks associated with topical oil application may include allergic skin reactions, skin irritation, excessive moisture, discomfort, or friction-related tissue damage when performed improperly.

However, this review also has several limitations, including: (1) most of the included studies used small sample sizes and limited designs, such as case series and case report; (2) few studies compared the effectiveness between different types of oil or evaluated long-term outcomes and patient acceptability; (3) the number of databases was limited and predominantly MeSH-based search strategies, potentially missing relevant articles—supported by the fact that some oils found in other reviews were not identified in this study.

Conclusion

This scoping review has mapped the available evidence on the use of topical oils for PU prevention. The review identified variations in the types of oils used, such as sweet almond oil, peppermint oil gel, virgin coconut oil, Nigella sativa oil, olive oil and hyperoxygenated fatty acids, as well as in application methods, including direct application, gentle massage, and combination with dressings. Application frequency ranged from one to three times daily, with durations between four to forty days. The commonly targeted areas were the dorsal, sacral, and calcaneal regions, including patients in ICUs, inpatient wards, and nursing homes.

These findings consolidate previously scattered information into a structured overview that can be used as a basis for developing preventive strategies in PU management. However, further experimental research using more rigorous methodologies and standardized reporting is needed. Systematic reviews may also be conducted in the future if sufficient high-quality literature becomes available. Comparative evaluations of oil effectiveness, patient acceptability, and cost-efficiency should be examined to produce more convincing and applicable results. For healthcare policymakers and administrators, these results may serve as an early foundation for developing evidence-based, adaptive, and context-appropriate preventive protocols for PU prevention.

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