

Literature Review: The Efficacy of Olive Oil for Pressure Ulcer Prevention in Critical Care

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Article Info	Abstract
Article History Submitted, 2026-05-11 Accepted, 2026-06-25 Published, 2026-06-30	Pressure ulcers represent a substantial clinical burden in critical care, where patient immobility and hemodynamic instability facilitate rapid tissue breakdown. The prevalence of these injuries can reach 92% in long-term care settings, highlighting a vital urgency for effective prevention. This literature review evaluates the efficacy of topical olive oil as a prophylactic agent for pressure ulcer prevention among critically ill populations, spanning adult, pediatric, and specialized stroke units. The methodology involved a systematic synthesis of eight primary research articles published between 2015 and 2025. These studies, conducted in diverse global intensive care settings, utilized varied designs including randomized clinical trials and quasi-experimental methods to compare topical olive oil administration against routine nursing care or alternative lipid-based therapies. Results consistently indicate that olive oil significantly reduces the incidence and severity of pressure ulcers. Statistical analyses from the reviewed literature demonstrate that intervention groups frequently maintained a 0% incidence rate compared to significantly higher rates in control groups. For instance, specific studies reported a 100% incidence rate in control groups versus total prevention in intervention groups. Physiologically, the high concentration of oleic acid and phenolic compounds in olive oil reinforces the skin’s hydro-lipid barrier, mitigates transepidermal water loss, and provides essential anti-inflammatory protection. Furthermore, studies highlighted its effectiveness in managing Grade 1 ulcers by reducing oxidative stress and enhancing dermal resilience. In conclusion, topical olive oil is an efficacious, cost-effective, and safe intervention for pressure ulcer prophylaxis in critical care.
Keywords: Olive oil, pressure ulcer, critical care, prevention	

Introduction

The prevalence of pressure ulcers among immobilized patients represents a substantial challenge for global healthcare systems, with Indonesia exhibiting a particularly high incidence rate of 33.3% (Alzamani et al., 2022). This figure notably exceeds the reported ranges in both the United States (2.7%–29.0%) and the broader ASEAN region (2.1%–31.3%) (Zaidi & Sharma, 2024). Beyond the clinical implications, these injuries impose a heavy economic burden; for instance, stage II ulcers typically necessitate an eight-day extension of hospitalization on average, thereby escalating medical expenditures and significantly hindering the rehabilitative trajectory (Miraj et al., 2020).

The development of pressure ulcers is primarily driven by sustained mechanical pressure on the integument and underlying soft tissues, which compromises tissue viability and leads to necrosis (Trizolla et al., 2020). Pathologically, tissue necrosis is precipitated by sustained mechanical compression of the integument and subcutaneous layers situated between osseous prominences and external support surfaces, such as mattresses or medical apparatus. When external pressure surpasses the physiological thresholds of arterial capillary perfusion (approximately 32 mmHg) and venous outflow (8–12 mmHg), vascular occlusion ensues. This hemodynamic disruption leads to localized tissue hypoxia, ultimately culminating in the formation of an ulcer. (Sumara et al., 2019).

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The etiology of pressure injuries extends beyond mere compression to include compromised mobility, sensory deficits, and diminished tissue tolerance (Laily et al., 2019). The latter is governed by an interplay of intrinsic variables—such as advanced age and nutritional deficiencies that attenuate dermal thickness—and extrinsic forces, specifically friction and shear stress (Bhattacharya & Mishra, 2015; Laily et al., 2019). In clinical practice, these vulnerabilities are quantified using the Braden Scale, a standardized screening instrument where scores range from 6 to 23; in this metric, lower numerical values correlate with an increased risk of tissue breakdown.

In accordance with the 2014 National Pressure Ulcer Advisory Panel (NPUAP) guidelines, prophylactic skin care is a primary strategy for ulcer prevention, with olive oil emerging as a prominent topical intervention (Haesler, 2014). Favored for its accessibility and cost-efficiency relative to commercial moisturizers, olive oil preserves skin hydration and elasticity, thereby mitigating friction between the patient's skin and external surfaces. However, empirical evidence regarding its efficacy remains inconsistent (Sumara et al., 2019). While (Laily et al., 2019) observed a marked reduction in ulcer risk (Fallahi et al., 2022) reported that one-third of their study population still manifested Grade I ulcers despite treatment. Such contradictory findings underscore the necessity for a systematic review to determine the definitive role of olive oil in risk mitigation and the prevention of pressure injuries in bedridden populations.

The objective of this literature review is to systematically evaluate and synthesize the clinical efficacy of topical olive oil in preventing pressure ulcers among patients in critical care settings.

Methods

This study was conducted using a literature review methodology. Data collection involved the use of secondary sources derived from previous research articles. Relevant articles were identified and selected based on their alignment with the research topic. The literature search was performed across three search engines, namely Google Scholar, PubMed, and ScienceDirect. The keywords used for literature search were ("pressure ulcer" OR "decubitus ulcer" OR "bedsore") AND "olive oil" AND (prevention OR "preventive") AND (bedridden OR immobile OR "intensive care" OR "critical care").

The selection of research articles for this systematic review was strictly guided by predefined inclusion and exclusion criteria to ensure the methodological rigor and relevance of the synthesized data. These eligibility parameters were systematically structured according to the PICOS framework, specifically targeting the population, intervention, comparison, outcomes, and study designs pertinent to pressure ulcer prophylaxis in critical care settings. This standardized approach facilitates a focused and objective evaluation of the literature, ensuring that the included studies provide a robust assessment of the efficacy of topical olive oil within intensive care environments.

Table 1. Inclusion and exclusion criteria with PICOS Format

Criteria	Inclusion	Exclusion
P (Population / Problems)	Bedridden patients at risk of developing pressure ulcers.	Patients with pre-existing pressure ulcers; hospitalization duration of less than 2 days.
I (Interventions / Indicators)	The use of olive oil as a preventive measure; risk assessment utilizing the Braden Scale	Use of risk assessment tools other than the Braden Scale.
C (Comparison)	There is no comparison factor	There is no comparison factor
O (Outcomes)	Prevention of pressure ulcers; Braden Scale risk scores.	Studies not reporting on the preventive efficacy of olive oil.
S (Study Design)	Randomized Controlled Trials (RCT), cross-sectional, and experimental studies with available full-text access.	Literature reviews, systematic reviews, and meta-analyses.
Publication Year	Published between 2015 and 2026.	Published prior to March 2015 or after March 2026.
Language	Articles written in English and/or Indonesian.	Articles written in languages other than English or Indonesian.

Study Selection and Quality Assessment

The identification and selection of relevant literature followed a rigorous, multi-stage screening process to ensure that each included study aligned precisely with the predefined eligibility criteria for clinical relevance and methodological consistency. Following the initial screening, a comprehensive quality assessment was conducted to evaluate the methodological

integrity, potential risk of bias, and evidential strength of each study, ensuring a robust foundation for the subsequent data synthesis.

This systematic approach of selective screening and qualitative appraisal was implemented to enhance the credibility of the findings and to ensure that the final evidence base provides a reliable assessment of olive oil's efficacy in pressure ulcer prevention. Scheme 1 illustrates the systematic progression of the literature search and study selection process, strictly adhering to the PRISMA 2020 guidelines to ensure transparency and reproducibility.

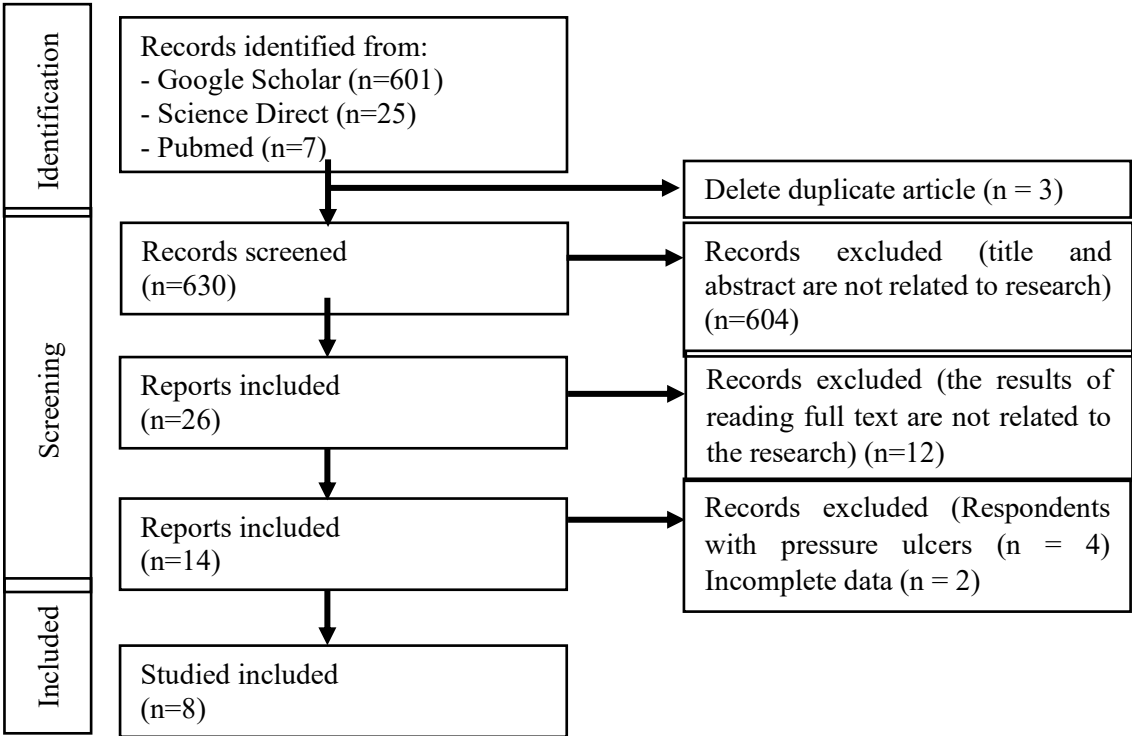


Figure 1. Identification of studies via databases and registers

Results and Discussion

Biochemical Resilience via Fatty Acid Integration

The consistent efficacy of olive oil in preventing pressure ulcers (PUs) across diverse critical care populations. Madadi et al. (2015) and Saragih (2020) is primarily driven by its high concentration of oleic acid (C18:1). Physiologically, topical application allows these monounsaturated fatty acids (MUFAs) to penetrate the stratum corneum and integrate into the phospholipid bilayer of the cell membranes. This absorption enhances dermal elasticity and fluidity, effectively increasing "cellular resilience" against the mechanical deformation common in immobilized ICU patients. While Madadi et al. (2015) and Yuliana et al., (2023) both emphasize this preventative success in adult ICU settings, their findings align with the pediatric observations of Syabansyah et al. (2025), who identifies olive oil as a critical agent for maintaining the delicate hydro-lipid barrier in PICU patients.

Comparative Analysis of Efficacy and Methodology

A cross-comparison of the literature reveals a strong consensus on olive oil's superiority over routine care. Saragih (2020) and Madadi et al. (2015) both reported statistically significant reductions in PU incidence, suggesting a commonality in the oil's ability to act as a potent moisture barrier. However, methodological differences emerge regarding the mode of delivery. Hawaibam et al. (2016) utilized circular motion massage (effleurage), which may provide synergistic benefits by promoting local microcirculation alongside fatty acid absorption. In contrast, Karimi et al. (2020) utilized oil-soaked prophylactic dressings, finding them as effective as fish oil. This suggests that sustained lipid saturation of high-risk areas, such as the heels, may be as physiologically beneficial as manual stimulation.

Table 2. Characteristic of participants of the included study

No	Author, Year	Location	Design	Sample	Number of Samples	Intervention Duration
1	Madadi et al., 2015	ICU patients at Qazvin City, Iran	Randomized Clinical Trial (RCT)	Non-traumatic patients admitted to Intensive Care Units (ICU)	Intervention: 30 Control: 30	21 days
2	Hawaibam et al., 2016	Pune City, India	Quasi-experimental (pretest-	Bedridden patients	Intervention: 20 Control: 20	7 days (administered twice daily)

			posttest control group) design			
3	Karimi et al., 2020	Intensive Care Unit (ICU) of Shahid Beheshti Hospital, Yasuj, Iran	Randomized Clinical Trial	Critically ill patients (medical, surgical, and trauma) at moderate to high risk of pressure injuries	50 participants (25 in the Olive Oil group and 25 in the Fish Oil group)	7 days
4	Miraj et al., 2020	ICU patient at in hospitals of Isfahan University of Medical Sciences, Iran	Randomized Clinical Trial (RCT)	Patients admitted to Intensive Care Units (ICU) at hospitals affiliated with Isfahan University of Medical Sciences.	Intervention: 36 Control: 36	7 days
5	Saragih, 2020	ICU of Murni Teguh Memorial Hospital, Medan, Indonesia	Quasi-experimental design	Stroke patients undergoing bed rest	30 participants (15 in the intervention group and 15 in the control group)	5 consecutive days
6	Yuliana et al., 2023	Intensive Care Unit (ICU), RSUD Sumbawa, Indonesia	Quasi-experimental design with a pre- and post-test control group approach	Long-term bedridden patients	Intervention: 20 Control: 20	5 days
7	Hidayati & Madinati, 2024	ICU of Mitra Siaga Tegal Hospital, Indonesia	Descriptive research with a case study approach	Non-hemorrhagic stroke patients at risk of pressure injuries	2 participants	2 days
8	Syabansyah et al., 2025	PICU (Pediatric Intensive Care Unit), RSUP Persahabatan, Jakarta, Indonesia	Quantitative quasi-experimental with a one-group pre-post test design	Bedridden pediatric patients at high risk of skin integrity damage	13 participants	5 days (based on the observation period H1–H5)

Therapeutic Progression in Grade 1 Ulcers

The literature also suggests that olive oil's role extends beyond prevention into early-stage management. Miraj et al. (2020) identified a significant improvement in PUSH scores and a reduction in ulcer surface area over seven days, a finding that complements. Hidayati & Madinati (2024) case study where olive oil was used to manage early signs of redness. These results imply that the phenolic compounds in olive oil, such as oleocanthal and vitamin E, likely exert an anti-inflammatory effect by inhibiting pro-inflammatory cytokines at the site of pressure, thereby preventing the progression from Stage I redness to Stage II tissue loss.

Critical Identification of Limitations and Shortcomings

Despite the positive outcomes, several shortcomings in previous research must be addressed. Many of the reviewed studies, such as Hidayati & Madinati (2024) and Syabansyah et al. (2025) are limited by very small sample sizes or case-study designs, which constrains the generalizability of the findings. Furthermore, the duration of intervention varies significantly—ranging from just 2 days (Hidayati & Madinati (2024)) to 21 days (Madadi et al. (2015)) making it difficult to establish a standardized protocol for long-term critical care. Additionally, with the exception of Karimi et al. (2020), there is a lack of head-to-head comparisons between olive oil and other established lipid-based therapies like Virgin Coconut Oil (VCO), which limits the ability to conclude if olive oil is the most efficacious choice among herbal alternatives.

Analytical Synthesis and Clinical Conclusion

Synthesizing these findings leads to the conclusion that olive oil functions as a topical pharmacological intervention that modulates skin integrity through fatty acid replenishment and antioxidant protection. The integration of olive oil into critical care protocols is supported by its ability to mitigate Transepidermal Water Loss (TEWL) and bolster the skin’s defenses against shear and pressure. However, as noted by Syabansyah et al. (2025), topical efficacy is inherently linked to the patient’s systemic health, including albumin and hemoglobin levels. Therefore, olive oil should be implemented not as a standalone solution, but as a core component of a holistic pressure injury prevention bundle that includes frequent repositioning, nutritional optimization, and evidence-based topical lipid therapy.

Table 3. Characteristics of intervention and outcome of the included study

No	Title	Pressure Ulcers Intervention Method	Outcome	Conclusion
1	The effect of topical olive oil on prevention of bedsore in intensive care units patients Madadi et al., 2015	Topical application of 10–15 drops of pure olive oil to at-risk anatomical sites (sacrum, heels, and back), followed by a 15-minute gentle massage to facilitate absorption, administered twice daily (morning and evening).	The study demonstrated a significant reduction in pressure ulcer incidence, with only 3.3% of the intervention group developing Grade I ulcers compared to 36.7% in the control group (p = 0.002). Topical olive oil application was found to be a highly effective prophylactic measure for maintaining skin integrity in critically ill patients.	The study concludes that the prophylactic topical application of olive oil is significantly effective in reducing the incidence of pressure ulcers and maintaining skin integrity among critically ill patients in the ICU.
2	Effectiveness of Olive Oil Massage on Prevention of Decubitus Ulcer Among Bedridden Patients Hawaibam et al., 2016	Circular motion massage using olive oil for approximately 10–15 seconds on each pressure point, performed twice daily	Significant reduction in decubitus ulcer signs in the experimental group (mean score 1.0 to 0.6) , while the control group showed a significant increase in risk (mean score 0.6 to 2.0).	Olive oil massage is a significantly effective intervention for preventing decubitus ulcers among bedridden patients.
3	The Effect of Using Olive Oil and Fish Oil Prophylactic Dressings on Heel Pressure Injury Development in Critically Ill Patients Karimi et al., 2020	Prophylactic dressings using simple gauze soaked in 4 cc of either olive oil or fish oil applied to both heels; dressings were changed 3 times a day	The incidence rate of pressure injury development was zero in both groups, with no adverse reactions observed	Both olive oil and fish oil prophylactic dressings are effective in preventing heel pressure injuries among ICU patients, with no significant difference in efficacy between the two oils
4	Effect of Olive Oil in Preventing the Development of Pressure Ulcer Grade One in Intensive Care Unit Patients Miraj et al., 2020	Both groups received standard skincare (positioning every 2 hours and keeping skin dry). The intervention group received additional topical application of olive oil on pressure-prone areas, applied twice daily with gentle massage until fully absorbed.	The investigation demonstrated the therapeutic and preventive efficacy of olive oil through the measurement of the Pressure Ulcer Scale for Healing (PUSH) scores. The results indicated that on the fourth and seventh days of the intervention, the olive oil group exhibited significantly lower PUSH scores compared to the control group (7.50 ± 2.823) and (5.44 ± 3.806) vs. (9.50 ±1.732) and (8.83±2.864),	The study concluded that topical olive oil significantly reduced PUSH (Pressure Ulcer Scale for Healing) scores and prevented the progression of Stage I pressure ulcers. It is recommended as an effective, safe, and cost-efficient prophylactic intervention for ICU patients.

			respectively). These findings suggest that topical olive oil application not only mitigates the risk of new pressure injury development but also effectively manages early-stage skin degradation, offering a cost-efficient and safe alternative to conventional moisturizers	
5	Pengaruh Pemberian Minyak Zaitun dalam Pencegahan Dekubitus pada Pasien Stroke di Ruang ICU di Murni Teguh Memorial Hospital Tahun 2025 Saragih, 2020	Topical application of 10–15 ml of olive oil to the back and sacral areas twice daily (morning and evening) after bathing for 5 consecutive days	No decubitus ulcers occurred in the intervention group (0% incidence) , while all participants in the control group developed Grade I decubitus ulcers (100% incidence) , showing a statistically significant difference (p = 0.000)	Regular administration of olive oil is highly effective in preventing decubitus ulcers among immobilized stroke patients
6	Pengaruh Pemberian Minyak Zaitun Terhadap Pencegahan Dekubitus di Ruang ICU RSUD Sumbawa Yuliana et al., 2023	Topical application of olive oil combined with effleurage massage alongside standard repositioning protocols	The experimental group showed a significantly lower incidence of pressure ulcers (10%) compared to the control group (40%), with a p-value of 0.031	Olive oil administration is a significantly effective intervention for preventing decubitus ulcers among bedridden patients in intensive care settings
7	Pengaruh Pemberian Minyak Zaitun dalam Pencegahan Dekubitus pada Pasien Stroke Non Hemoragik di Ruang ICU RS Mitra Siaga Hidayati & Madinati, 2024	Topical application of 10–15 ml of olive oil twice daily after morning and evening baths, applied specifically to pressure-prone areas such as the back, joints, and heels	After 2 days, Patient 1 showed a score of 1 (signs of redness/Stage I decubitus) due to age and pre-admission bedrest, while Patient 2 remained at a score of 0 (no signs of decubitus)	Administration of olive oil for 2 days is effective in preventing the development of actual pressure ulcer problems in at-risk stroke patients
8	Effectiveness of Olive Oil Use in Preventing Skin Integrity Damage in Bedridden Patients in the PICU Syabansyah et al., 2025	Topical application of olive oil to the skin to maintain hydration, moisture, and prevent damage to skin integrity.	Statistical analysis using the Wilcoxon test yielded a p-value of 0.194 (> 0.05), indicating no statistically significant difference in skin integrity before and after the intervention. However, 5 participants maintained their skin condition.	The application of olive oil serves as a preventive impact in maintaining skin integrity and moisture for bedridden pediatric patients in the PICU, despite the lack of statistical significance in this study

Conclusion

In conclusion, this literature review successfully achieves its primary objective by providing a comprehensive synthesis of empirical evidence that confirms the high efficacy of topical olive oil in preventing pressure ulcers among critically ill patients. The reviewed studies consistently demonstrate a significant reduction in the incidence and severity of decubitus

ulcers, marking a successful achievement in identifying a viable non-pharmacological prophylactic strategy for intensive care settings.

For future research and clinical activities, it is recommended that large-scale randomized controlled trials (RCTs) be conducted to establish standardized application protocols, including precise dosage and frequency. Furthermore, future studies should investigate the comparative efficacy of olive oil against other emerging lipid-based therapies, such as Virgin Coconut Oil (VCO), to further optimize pressure injury prevention bundles in global critical care practice.

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