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THE EFFECT OF WOUND CARE WITH OLIVE OIL ON PRESSURE ULCER HEALING IN OLDER ADULTS: A SYSTEMATIC REVIEW

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Abstract

Background: Pressure ulcers are a significant concern commonly encountered by the elderly, both in medical institutions and domestic settings. The worldwide incidence of pressure ulcers in the elderly varies from 3.3% to 11.1%. In Indonesia, 95% of the elderly are autonomous, although 5% exhibit varied degrees of reliance, ranging from mild to complete. Preventive interventions include wound care, adequate nutrition, regular position changes, and the use of moisturizers such as olive oil. Aim : To determine the effect of using olive oil in the care of pressure ulcers in the elderly. MethodThe researcher used a systematic literature review method with five databases: Clinical Key, PubMed, Garuda, SAGE, and ProQuest, focusing on publications from 2015 to 2024. The included studies were Randomized Controlled Trials and Case-Control Studies that involved elderly > 60 years old participants as samplesResults: Based on the literature review, three RCT and quasi-experimental articles indicated that olive oil is effective in reducing the severity of pressure ulcers and the risk of worsening. Conclusion: Based on the research articles reviewed and analyzed, olive oil has been proven effective in preventing and accelerating the healing of stage 1 and 2 pressure ulcers, with a large effect size (Cohen's d ≈ 0.97–1.5). Olive oil can be considered as a treatment option for pressure ulcers in the elderly due to its accessibility and affordability.

Keywords: *Pressure Ulcer, Older adults, olives oils*

1. Introduction

Pressure ulcers (PUs) are a major concern for elderly patients, especially those who are bedridden. These ulcers frequently develop in healthcare facilities and during home care provided by families. While PUs can occur in all age groups, they pose complex challenges for the elderly (Darmojo & Martono, 2006). The prevalence of PUs among the elderly has been reported as 3.3% in Sweden, 3.5% in Indonesia, 7.4% in New England (USA), 11.1% in Malaysia, and 10.2% in Ethiopia(Beriso et al., 2024; Sari et al., 2019). Among the elderly, PUs are categorized as a geriatric syndrome, leading to complex health problems, pain, infection risks, surgical interventions, and increased healthcare costs (Levine et al., 2024).

Hospitalized elderly patients are often assessed for dependency levels. In Indonesia, 95% of elderly individuals are categorized as independent, while the rest are classified as having mild (2.1%), moderate (1.1%), severe (0.7%), or total (1%) dependency (Munira, 2023). Those with severe or total dependency often suffer from chronic non-communicable diseases such as stroke, diabetes, kidney failure, cancer, or hypertension. These conditions significantly limit physical mobility, reducing their ability to reposition themselves, which results in prolonged pressure and is a primary cause of PUs (Bhoki et al., 2017).

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The low incidence of PUs in hospitals can be attributed to advancements in technology and

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improved awareness and skills among nurses in PU prevention. However, many elderly individuals who are bedridden at home present with Grade 1 or 2 PUs upon hospital admission, with 44% already experiencing PUs before hospitalization (Yusharyahya et al., 2023).

The care of patients with pressure ulcers entails many evidence-based approaches. Wound care may involve the application of contemporary dressings, including foam dressings, clear film, hydrocolloid, hydrogel, alginate, and medical-grade honey to facilitate optimal healing. Moreover, comprehensive care encompasses preserving skin integrity via regular cleansing, providing sufficient nutritional support, executing frequent patient repositioning, and employing suitable support surfaces to mitigate pressure and shear forces (European Pressure Ulcer Advisory Panel, 2019; Gould et al., 2024; Krishnan et al., 2022).. Another intervention that can be utilized is complementary therapy, which may include the use ofessential oils, coconut oil, and olive oil, have also been utilized. Olive oil, in particular, is beneficial for maintaining skin moisture and is safe for elderly use, showing better results than moisturizers containing hyperoxygenated fatty acid compounds(Díaz-Valenzuela et al., 2019).

This systematic review aims to explore the effects of olive oil on pressure ulcer healing among the elderly, focusing on prevalence, effectiveness, and healing processes.

2. Method

This systematic literature review involved article searches using five databases: Clinical Key, PubMed, Garuda, SAGE, and ProQuest. The inclusion criteria for article selection were: publications from 2015 to 2024, studies in which the majority of subjects were aged over 60 years, research designs including Randomized Controlled Trials and Case-Control Studies, written in either Indonesian or English, and available in full-text format. The preferred method of reporting for systematic review assessed journal articles as scientific evidence and adhered to PRISMA guidelines for its conduct and guide the review article.

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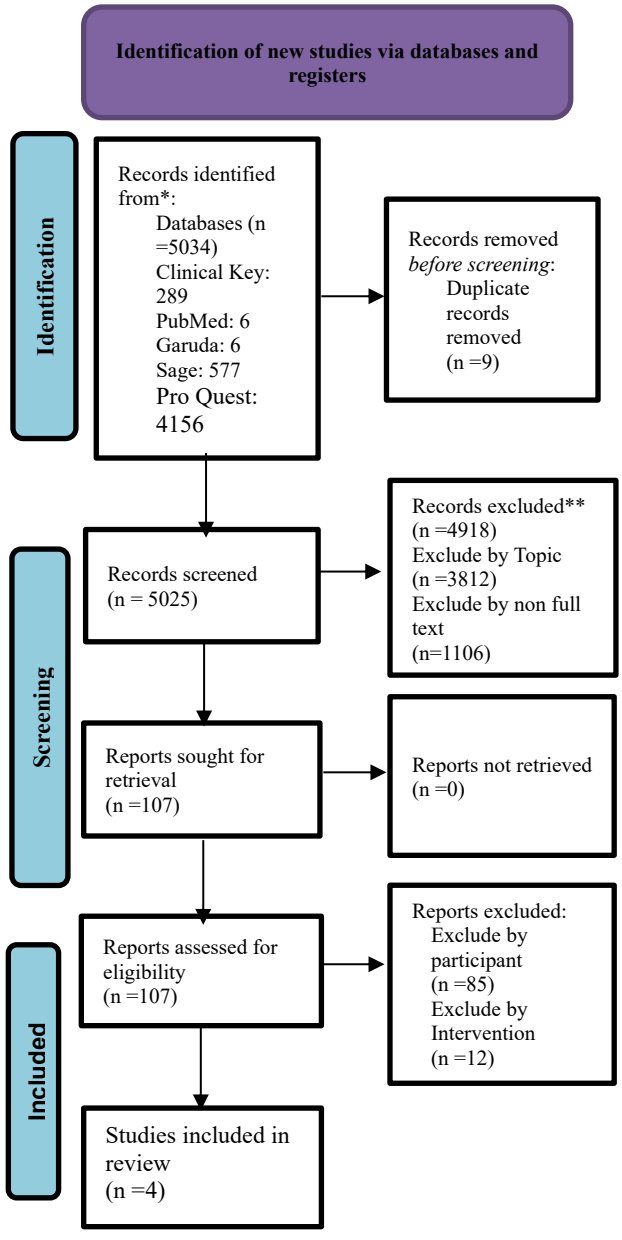

***Picture 1**. Prisma Diagram*

3. Search Strategy

The researcher conducted a literature search using predefined keyword combinations based on Medical Subject Headings (MeSH). The keywords included ('Pressure Ulcers' OR 'Decubitus Ulcer' OR 'Pressure Injury') AND ('Elderly' OR 'Older Adult') AND' ('Olives Oil') AND ('Wound Healing' OR 'Wound Care'). Searches were conducted across databases including PubMed, Garuda, Wiley, Clinical Key, Sage Journals, and ProQuest, covering publications from 2015 to 2024 in both Indonesian and English. All search results were reviewed, with independent selection of studies based on titles, abstracts, and full text.

This study involved a literature search utilizing specific keyword combinations in accordance with Medical Subject Headings (MeSH) to ensure thorough coverage of pertinent topics. The employed keywords were:

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a. 'Pressure Ulcers' OR 'Decubitus Ulcer' OR 'Pressure Injury': This category examines the various terminologies associated with pressure ulcers, including diverse classifications and terminologies utilized in the literature.
b. "Elderly" or "Older Adult": This group is for research that focus on older people because they are more likely to have pressure ulcers.
c. "Olive Oil": This keyword stresses the use of olive oil as a therapeutic option, bringing attention to its possible benefits for wound care.
d. "Wound Healing" OR "Wound Care": This part talks about the bigger picture of how wounds heal and the best ways to take care of them.

After the search of the database After getting the search results, the researchers looked through the titles, abstracts, and full texts on their own to find the papers that were most relevant and of the highest quality. The researchers carefully looked over the studies and chose the best ones based on their titles, abstracts, and complete texts. They made sure that only the most relevant and high-quality publications were included in their review.

4. Result

Based on the results of the journal search conducted by the researcher, data extraction was performed on the obtained articles, resulting in 4 articles that will be discussed by the researcher, as follows:

Tabel 1. Article Review The Effect of Wound Care with Olive Oil on the Healing of Pressure Ulcers in the Elderly : Systematic Review

Author (Year)	Methods	Title and aim	Population and sample	Intervention	Results
(Poursadra et al., 2019)	Quasi-eksperimenta, Three group	Comparing the Effect of Henna Oil and Olive Oil on Pressure Ulcer Grade One Aim : To compare the effects of henna oil and olive oil on grade one pressure ulcers in ICU patients.	Total Population: 108 ICU patients with grade one pressure ulcers. Age Criteria: Patients aged over 18 years. Mean Age: 60.19 years	Application of 15 ml of olive oil and the other group with henna oil once daily on the wound. Repositioning will be carried out every 2 hours, while maintaining nutrition and standard skin care.	Olive oil is effective in reducing the size of pressure ulcers. The estimated effect size was Cohen's $d \approx 0.97$ and is categorized as a large effect.
(Juliana et al., 2024)	Quasi-eksperimental, pre-test post-test one group	Effectiveness Of Using Extra Virgin Olive Oil In Preventing The Development Of Grade II Pressure Ulcers In Patients In The Intensive Care Ward At Dr. Zainoel Abidin Hospital Banda Aceh Aim: Assess the effectiveness of using extra virgin olive oil (EVOO) in preventing the	The population consists of inpatients in the ICU who have grade II pressure ulcers. Age ≥ 17 years. The largest sample is in the early to late elderly age group (40%), followed by the elderly (30%), early to late adults (23.3%), and late adolescents (6.67%). Sample: A total of 30 subjects were selected according to the inclusion and exclusion criteria.	Before the intervention, the pressure ulcer area was assessed using the Bates-Jensen Wound Assessment Tool (BWAT). The wound area was cleaned using mineral water and gauze. Olive oil (10-15 cc) was applied without massaging the pressure ulcer area twice a day for 5 consecutive days. After 5 days, the condition of the	Olive oil prevents the progression of grade II pressure ulcers in ICU patients within five days of intervention Based on the magnitude of the difference observed and the moderate sample size (n = 30), this intervention is likely to have a clinically significant medium to large effect size. (p =< 0.001)

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Author (Year)	Methods	Title and aim	Population and sample	Intervention	Results
		progression of grade II pressure ulcers (PU) in patients in the intensive care unit (ICU) of RSUD dr. Zainoel Abidin Banda Aceh		pressure ulcer was reassessed using BWAT.	
(Miraj et al., 2020),	Randomized Control trial,	Effect of Olive Oil in Preventing the Development of Pressure Ulcer Grade One Aim: Investigating the effects of olive oil in preventing the progression of grade one pressure ulcers in ICU patients.	A total of 72 patients met the inclusion criteria. They were randomly divided into two groups (intervention with olive oil and control group). The age was over 18 years, with a mean age of 57.53 ± 16.32 years. They experienced grade one pressure ulcers (located on the sacrum, shoulder, heel, or other areas). They had no history of skin diseases or allergies to food/drugs and were not dependent on medication	The intervention involved cleaning the wound with warm water, drying it, and applying olive oil (15 ml) topically to the wound area every day for 30 minutes without massaging	The olive oil group showed a significant reduction in the size of the pressure ulcer area. The estimated effect size was Cohen's $d \approx 1.02$ and is categorized as a large effect.
(Vitsos et al., 2019)	Quasy Eksperimental; Studi pilot observasional	Efficacy of a Ceratothoa oestroides Olive Oil Extract in Patients With Chronic Ulcers: A Pilot Study Aim : To assess the effectiveness of olive oil extract containing Ceratothoa oestroides in promoting the healing of chronic wounds such as pressure ulcers and venous ulcers that do not respond to conventional treatment.	It consisted of 14 patients aged 40–97 years (mean age 72 years), with a total of 19 wounds evaluated. The majority of the patients were female (11 females, 3 males). The types of wounds included pressure ulcers (12 wounds), venous ulcers (6 wounds), and mixed venous-arterial ulcers (1 wound)	Intervention with Olive Oil Extract: Olive oil was mixed with Ceratothoa oestroides homogen at a concentration of 10%, and treatment was administered daily, including wound cleaning with saline solution or acetic acid (for infections with Pseudomonas aeruginosa), followed by the application of ointments containing antibiotics and/or antiseptics based on microbiological analysis results. The wound was dressed with sterile dressing after treatment.	Wound healing was observed after 3 months of treatment, with significant improvement noted from the first month of olive oil usage. The estimated effect size was Cohen's $d \approx 1.2$-1.5 and is categorized as a very large effect. ($p < 0.0001$)

Based on the reviewed research articles in this systematic literature review, olive oil, both in its regular form and as extra virgin olive oil (EVOO), has been shown to be effective in preventing and

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accelerating the healing of grade 1 and 2 pressure ulcers, with some samples including elderly individuals. A study by Miraj et al. (2020)(2020) demonstrated that the daily application of olive oil over seven days significantly diminished PUSH ratings and ulcer dimensions in ICU patients with grade 1 pressure ulcers. Juliana et al. (2024) observed a notable reduction in BWAT scores following the administration of EVOO twice daily for five days to individuals with grade 2 pressure ulcers. Poursadra et al. (2019) conducted a study comparing olive oil with henna oil, revealing that both oils effectively treated pressure ulcers, with henna oil demonstrating more rapid efficacy in diminishing the size of grade 1 ulcers.

The research conducted by Vitsos et al. (2019) indicated that the application of olive oil in conjunction with Ceratothoa oestroides was helpful in treating chronic wounds, particularly pressure ulcers, resulting in an average reduction of 36% in BWAT scores ($p < 0.0001$). The application of olive oil for the treatment of pressure ulcers is safe, straightforward, and pertinent for the care of immobilized patients, particularly in intensive care units and among the senior demographic.xxThis systematic review determined that olive oil, particularly extra virgin olive oil (EVOO), is efficacious in the prevention and treatment of grade 1 and 2 pressure ulcers, with several trials focusing on older patients. Miraj et al. (2020) indicated that a daily application over seven days markedly diminished PUSH ratings and ulcer dimensions in ICU patients with grade 1 ulcers.

Juliana et al. (2024) noted a substantial reduction in BWAT scores following the administration of EVOO twice daily for five days in individuals with grade 2 ulcers. Poursadra et al. (2019) determined that both olive oil and henna oil were helpful, with henna oil demonstrating a more rapid decrease in ulcer size. Vitsos et al. (2019) exhibited a 36% mean decrease in BWAT scores ($p < 0.0001$) with the application of olive oil in conjunction with Ceratothoa oestroides for chronic wounds, predominantly pressure ulcers. In summary, olive oil is a secure, readily available, and effective remedy, particularly for immobile and elderly patients in the ICU.

5. Discussion

Pressure ulcers (PU) are lesions affecting the skin and underlying soft tissue, typically arising over bony prominences and associated with the utilization of medical devices or other apparatus (Sönmez & Güneş Yapucu, 2020). PU is a medical disorder that exacerbates health issues, prolongs hospitalizations, escalates treatment expenses, and may ultimately result in mortality (Juliana et al., 2024). A 2016 survey revealed that 91 of 1,132 respondents in various Indonesian hospitals developed pressure ulcers (Juliana et al., 2024).

The aging process of the skin makes it vulnerable to numerous dermatological conditions, including dryness, generalized itching, infections, autoimmune diseases, vascular problems, and a heightened risk of cancers. Studies show that the majority of individuals aged 65 and older experience at least one dermatological condition (Surber et al., 2015). The physiological changes associated with aging significantly increase the risk of pressure ulcers in the elderly, as aging skin undergoes structural and functional alterations that compromise its resilience and repair mechanisms (Miller, 2012).

The systematic review conducted primarily focused on the elderly population. The sample taken from the olive oil group included 16 males (44.4%) and 20 females (55.6%) with an average age of 65.39 ± 19.21 years (Poursadra et al., 2019). In the second article, 70% of the research sample was over 60 years old (Juliana et al., 2024). Similarly, the third article used a sample from the olive oil group with an average age of 57.67 ± 17.25 years (Miraj et al., 2020). In the fourth article, 78.5% of the research sample were patients aged over 60 years (Vitsos et al., 2019).

The articles obtained in the systematic literature review indicate that the variables in the intervention for pressure ulcer care with olive oil or materials containing extra virgin olive oil (EVOO) will be discussed in several components of the research. The first component relates to the type of olive oil applied in the pressure ulcer care intervention; the second involves variations in the amount of material used; the third addresses the duration of the intervention; and the fourth concerns the time required for pressure ulcer care using materials containing olive oil.

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a. Type of oil used

From the literature obtained, the types of oil used varied: two studies utilized olive oil, one study used extra virgin olive oil (EVOO), and another study used olive oil mixed with Ceratothoa oestroides extract in the form of an ointment. Extra virgin olive oil (EVOO) or olive oil has significant potential benefits, being rich in oleic acid, containing important natural antioxidants (such as hydroxytyrosol and tyrosol), and having high resistance to oxidative processes. Compounds like polyphenols and oleocanthal found in it are believed to support wound healing through their anti-inflammatory properties and ability to enhance blood flow (Lupiañez-Perez et al., 2015; Taheri & Amiri-Farahani, 2021).

b. Amount of Olive oil

The amount of olive oil applied in pressure ulcer care varies significantly. One study describes the use of materials based on the condition of the wound area, while three studies utilized olive oil in amounts ranging from 10 to 15 ml per single intervention for pressure ulcer care. In several studies, this amount was used to maintain moisture and support the wound healing process (Alifah et al., 2022).

c. Time of intervention

The intervention in pressure ulcer care ranges from 1 to 2 times each day. Juliana et al. (2024) and Miraj et al. (2020) reported that applying EVOO twice a day, in the morning and evening, is most ideal and showed a significant reduction in BWAT scores and wound size. Wound care should consider the area and depth of the wound and optimize the use of active ingredients to accelerate the healing process (Lichterfeld-Kottner et al., 2020).

d. Duration of intervention

The duration set for pressure ulcer care interventions varies significantly. An average application duration of 5 to 7 days has shown significant improvement, especially when combined with patient repositioning. Interventions can be extended for more optimal results. For chronic pressure ulcers, effective intervention can be performed over a period of 3 months (Vitsos et al., 2019)

Nursing interventions for the prevention of pressure ulcers include first, skin care, which involves hygiene maintenance and topical applications; second, mechanical prevention and support surfaces consisting of the use of beds, positioning, and therapeutic mattresses; and third, education (European Pressure Ulcer Advisory Panel, 2019). Skin care interventions to prevent pressure ulcers involve the topical application of plant and mineral oils (Gallard, 2022; Surber et al., 2015). Several types of oils can be used in pressure ulcer care, including olive oil, known for its anti-inflammatory properties and ability to retain skin moisture; coconut oil, which has antimicrobial effects and aids in healing; jojoba oil, rich in vitamin E and anti-inflammatory benefits; tea tree oil, recognized for its antiseptic properties; lavender oil, which accelerates healing and provides a calming aroma; and sunflower oil, which is high in essential fatty acids and vitamin E to support skin hydration. These oils contribute to wound healing by maintaining moisture, preventing infection, and enhancing skin regeneration. The selection of these oils is also effective in general pressure ulcer care. ((Prastiwi & Lestari, 2021; Sönmez & Güneş Yapucu, 2020; Supriyanti et al., 2019; Taheri & Amiri-Farahani, 2021)

6. Conclusion and Suggestion

Based on the research articles reviewed and analyzed, olive oil has been proven effective in preventing and accelerating the healing of stage 1 and 2 pressure ulcers, with a large effect size (Cohen's $d \approx 0.97–1.5$). The olive oil used may be in the form of regular olive oil or extra virgin olive oil (EVOO), applied once or twice daily in pressure ulcer care. No adverse effects were reported during the interventions involving olive oil. It is also widely available in the market at an affordable price, and its application in wound care is simple, making it a viable alternative option for pressure ulcer management,

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particularly in the elderly. The studies also mention henna oil as an alternative that is similarly effective in treating pressure ulcers

This systematic review provides valuable insights for healthcare providers in adopting olive oil as a viable intervention for pressure ulcer care, particularly in elderly patients. Healthcare professionals are encouraged to integrate olive oil into routine care protocols in hospital settings and community-based care, complemented by supportive measures such as regular repositioning, nutritional optimization, and meticulous hygiene practices. Additionally, family members caring for patients with pressure ulcers at home should be educated on the appropriate application of olive oil as part of a holistic care plan. Future research should focus on expanding the scope of studies to include larger sample sizes, diverse age groups, and comparisons with other pressure ulcer interventions to strengthen the evidence base for clinical practice.

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