# TRENDS IN THE USE OF NATURAL AGENTS FOR CHRONIC WOUND CARE IN DEVELOPING COUNTRIES: A SCOPING REVIEW

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## ABSTRACT

**Background:** Chronic wounds remain a major healthcare challenge in developing countries due to limited access to advanced wound care technologies and the high cost of treatment. These limitations have encouraged the use of natural agents as affordable alternatives for chronic wound management. Natural agents such as honey, *Aloe vera*, propolis, virgin coconut oil, *Centella asiatica*, and herbal extracts have demonstrated antimicrobial, anti-inflammatory, and tissue-regenerative properties.

**Purpose:** This scoping review aimed to map trends in the clinical use of natural agents for chronic wound care in developing countries from 2010 to 2024, including the types of agents used, therapeutic outcomes, safety, cost-effectiveness, and emerging clinical applications.

**Methods:** This review followed the Arksey and O'Malley methodological framework and the PRISMA-ScR guidelines. A systematic search of PubMed, ScienceDirect, Scopus, and Google Scholar identified studies published between January 2010 and October 2024. Eligible studies were screened, selected, and synthesized.

**Results:** Of 2,876 records identified, 15 studies met the inclusion criteria. The findings showed a gradual evolution in the clinical use of natural agents. Honey and *Aloe vera* predominated in earlier studies, while more recent research explored propolis, virgin coconut oil, olive oil–honey combinations, *Centella asiatica*, and plant-based hydrogels. Most studies focused on diabetic foot ulcers. Overall, natural agents accelerated wound healing, enhanced granulation tissue formation, reduced wound size and infection, and provided cost-effective alternatives to conventional wound care.

**Conclusion:** Natural agents have evolved from conventional single-agent therapies to diverse bioactive formulations integrated with modern wound care. Current evidence supports their effectiveness, affordability, and potential role in improving chronic wound management, particularly in developing countries and other resource-limited healthcare settings.

**Keywords:** Chronic Wounds; Natural Agents; Nursing; Wound Healing.

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## BACKGROUND

A wound is defined as a break or disruption in the continuity of the skin which serves as the body's first line of defense. When this process of repair is delayed beyond the expected period of healing the condition is known as a chronic wound. Chronic wounds remain a significant global health problem that affects millions of people, causing prolonged suffering, disability, and a financial burden on individuals and healthcare systems. These wounds include diabetic foot ulcers (DFUs), venous leg ulcers, arterial ulcers, and pressure ulcers, which often require long-term management and specialized care (Gonzalez et al., 2021).

The prevalence of chronic wounds is steadily increasing, especially in low- and middle-income countries, due to the rising incidence of diabetes mellitus, peripheral vascular disease, malnutrition, and limited access to modern healthcare. According to the World Health Organization (2022), the global prevalence of diabetic foot ulcers ranges from 4% to 10%, with developing nations contributing to a major proportion of these cases. Chronic wounds are associated with a high risk of infection, amputation, prolonged hospitalization, and decreased quality of life (Abdulrahim et al., 2023). These outcomes highlight the need for effective and accessible wound management strategies, particularly in resource-constrained healthcare systems.

Conventional treatments for chronic wounds, including debridement, antiseptic dressings, and synthetic wound healing agents, often come with limitations such as high cost, antibiotic resistance, and restricted availability in rural settings. These challenges have encouraged researchers and clinicians to explore natural-based alternatives that are more affordable, sustainable, and locally sourced (Sung et al., 2021). Natural agents such as honey, aloe vera, propolis, virgin coconut oil, and Centella asiatica have demonstrated promising effects in enhancing wound healing through their antimicrobial, anti-inflammatory, and antioxidant activities (Karadeniz et al., 2023; Witkowska et al., 2024).

Honey, one of the most studied natural substances, promotes autolytic debridement, reduces bacterial colonization, and accelerates granulation tissue formation (Moghazy et al., 2010; Kamaratos et al., 2014). Aloe vera gel contains polysaccharides and glycoproteins that stimulate fibroblast proliferation and collagen synthesis, which are essential for tissue regeneration (Hekmatpou et al., 2019). Similarly, propolis and virgin coconut oil have been recognized for their potent antimicrobial and moisturizing properties that facilitate epithelial repair (Afkhamizadeh et al., 2018; Sya'bani et al., 2020). In recent years, the advancement of nanotechnology and biopolymer hydrogels has further expanded the potential of natural products in chronic wound management, allowing improved stability, delivery, and bioavailability (Lopes et al., 2024).

In developing countries, the use of natural agents is not only a matter of tradition but also a practical response to limited resources and high medical costs. Many of these substances are easily accessible, culturally accepted, and have minimal side effects. Therefore, mapping the research trends and clinical evidence related to their use is

crucial for integrating these therapies into evidence-based nursing and wound care practices.

This scoping review aims to explore the trends and patterns of research on the use of natural agents for chronic wound care in developing countries from 2010 to 2024. The objectives are to identify the types of natural agents used, summarize their therapeutic outcomes, analyze their cost-effectiveness and safety, and highlight emerging innovations in their applications. Understanding these trends will help guide future nursing practices, promote affordable wound care interventions, and support global health equity through the utilization of locally available natural products.

## OBJECTIVE

This scoping review aims to identify and map trends in the use of natural agents for chronic wound care in developing countries from 2010 to 2024. Specifically, it aims to identify the types of natural agents used, summarize their therapeutic outcomes, evaluate their safety and cost-effectiveness, and highlight emerging innovations in their clinical applications.

## METHODS

### Design

This study employed a scoping review design to comprehensively explore and map the trends in the use of natural agents for chronic wound management in developing countries between 2010 and 2024. The scoping review was conducted based on the framework proposed by Arksey and O'Malley (2005), which is a structured and systematic process to summarize the breadth of evidence in a particular research area. The approach begins with the identification of a clear and objective research question, followed by an extensive search for relevant studies, selection of eligible literature, organization, and analysis of the findings. This design was chosen because it enables the exploration of various forms of evidence from multiple study designs, providing an overview of how natural-based therapies have been utilized and investigated for chronic wound healing, particularly in resource-limited settings. The review aims not only to map the existing evidence but also to highlight research gaps and potential directions for future nursing and clinical practice.

### Search Methods

The literature search was carried out using the PICO framework to define key concepts and formulate focused research questions on the use of natural agents for chronic wound care in developing countries. Boolean operators “AND” and “OR” were used to refine and connect search terms such as “natural agents,” “chronic wounds,” “developing countries,” “honey,” “aloe vera,” “propolis,” and “virgin coconut oil.” Relevant studies were identified through major databases, including PubMed, ScienceDirect, Scopus, and Google Scholar. The inclusion criteria consisted of full-text articles published between January 2010 and October 2024, written in English, and discussing the application of

natural-based products in wound management. Titles, abstracts, and keywords were screened to ensure alignment with the study's objectives.

**Table 1. PICO Search Strategy**

| P | I | C | O |
|---|---|---|---|
| Patients with chronic wounds (diabetic foot ulcers, pressure ulcers, non-healing wounds) in developing countries | Application of natural agents (honey, aloe vera, propolis, virgin coconut oil, Centella asiatica, plant-based hydrogel) | Compared with conventional or synthetic wound dressings | Outcomes related to wound healing rate, granulation tissue formation, infection control, and cost-effectiveness |

## Search Outcome

A total of 2,876 articles were identified from databases including Google Scholar, PubMed, ScienceDirect, and Scopus, as well as manual searches. Fifteen articles underwent extraction after screening and eligibility assessment. Several articles were excluded because they were only abstracts, not full text, focused on animal studies, or were unrelated to the use of natural agents in chronic wound care. Articles were limited to English and Indonesian publications from 2010 to 2024.

The results of article filtering obtained ten randomized controlled trials (RCTs), two systematic reviews, two narrative reviews, and one pilot clinical trial. Of the 15 studies reviewed (Table 2), research originated from several countries including Egypt, Greece, Vietnam, Belgium, Pakistan, Hong Kong, Iran, Indonesia, Poland, the Czech Republic, Turkey, and Portugal.

These studies focused on the application of natural agents such as honey, aloe vera, propolis, virgin coconut oil, Centella asiatica, and plant-based hydrogels in the management of chronic wounds, particularly diabetic foot ulcers and pressure ulcers. Most studies reported that natural-based dressings accelerated wound healing, improved granulation tissue formation, and reduced infection compared to conventional dressings.

Overall, the findings demonstrate a growing trend toward the use of evidence-based natural products that are effective, biocompatible, and affordable, making them suitable for implementation in developing countries and resource-limited healthcare settings.

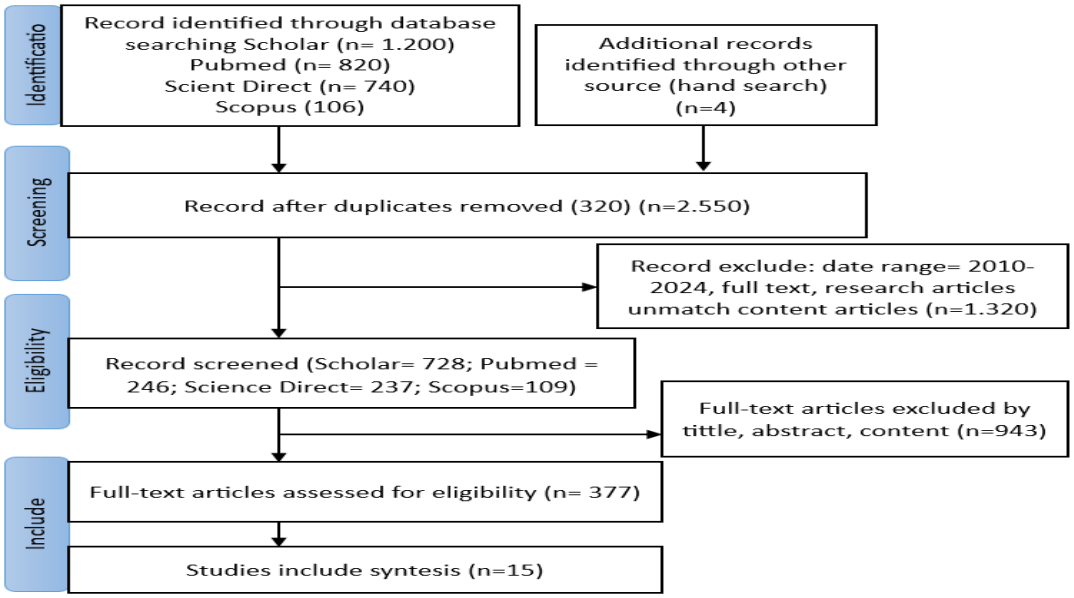


Figure 1: Prism Flow Diagram (Moher, 2009)

## Data Abstraction

Data abstraction was carried out for all articles that met the inclusion criteria. Each selected study was thoroughly reviewed, and essential information was extracted and organized in a structured matrix using Microsoft Word. The extracted data covered details such as the author's name, publication year, country of origin, article title, and methodological components. In addition, the main outcomes and key findings of each study were identified to capture similarities, variations, and overall trends in the use of natural agents for chronic

## RESULTS

A total of 2,876 records were initially identified through database and manual searches. Following screening and eligibility assessment, 15 studies met the inclusion criteria and were included in this scoping review (Figure 1). The characteristics and main findings of the included studies are summarized in Table 2.

The included studies comprised ten randomized controlled trials (RCTs), two systematic reviews, two narrative reviews, and one pilot clinical trial. The studies were conducted across several developing countries, including Egypt, Vietnam, Pakistan, Iran, Indonesia, and Turkey, as well as several developed countries such as Greece, Belgium, Hong Kong, Poland, the Czech Republic, and Portugal.

The findings indicate a clear research trend toward the increasing use of natural agents for chronic wound management. Honey was the most frequently investigated natural product, followed by aloe vera, propolis, virgin coconut oil, *Centella asiatica*, and plant-based hydrogels. The majority of studies focused on diabetic foot ulcers and pressure ulcers, reflecting the growing research interest in chronic wound conditions associated with diabetes and prolonged immobility.

Across the included studies, natural-based wound therapies consistently demonstrated positive clinical outcomes, including accelerated wound healing, enhanced granulation tissue formation, reduced infection, and improved healing compared with conventional dressings. Several studies also reported that these interventions were cost-effective, biocompatible, and feasible for implementation in resource-limited healthcare settings.

Overall, the evidence demonstrates an increasing trend in research on natural agents for chronic wound care, with expanding diversity in the types of natural products investigated and growing evidence supporting their effectiveness, safety, and potential integration into evidence-based wound management practices in developing countries.

**Table 2 Synthesis of Review Articles**

| No. | Writer,Year | Title | Findings |
|---|---|---|---|
| 1 | Moghazy, AM, Shams, ME, Adly, OA, Abbas, AH, El-Badawy, MA, Elsakka, DM, Hassan, SA, Abdelmohsen, WS, Ali, OS, Mohamed, BA (2010) | The clinical and cost effectiveness of bee honey dressing in the treatment of diabetic foot ulcers. | Honey dressing significantly accelerates the healing of infected diabetic foot wounds compared to conventional dressings, reducing wound size, bacterial load, hospitalization time, and treatment costs. |
| 2 | Kamaratos, AV, Tzirogiannis, KN, Iraklianou, SA, Panoutsopoulos, GI, Kanellos, IE, Melidonis, A. (2012 / 2014) | Manuka honey-impregnated dressings in the treatment of neuropathic diabetic foot ulcers: a randomized controlled trial. | Manuka honey dressing accelerated healing time and increased the percentage of sterile wounds in patients with neuropathic DFUs; more effective than standard care. |
| 3 | Vandamme, L., Heyneman, A., Hoeksema, H., Verbelen, J., Monstrey, S. (2013) | Honey in modern wound care: a systematic review. | Reviews show that honey has broad antibacterial effects, accelerates granulation, epithelialization, |

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| | | | and reduces inflammation in various types of wounds. |
| 4 | Dat, A.D., Poon, F., Pham, K.B., Doust, J. (2012) | Aloe vera for treating acute and chronic wounds. | Evidence for the effectiveness of Aloe vera on acute/chronic wounds is limited and the quality of research is low, although some studies have shown potential to accelerate healing. |
| 5 | Imran, M., Hussain, M., Baig, M.A., Mueen, M., Aslam, S., Iqbal, T. (2015) | Give honey-impregnated dressing: an effective treatment for diabetic foot ulcers. | Applying honey dressing accelerates wound shrinkage and shortens healing time compared to saline dressing on DFU. |
| 6 | Tsang, KK, Kwong, EWY, To, TS, Chung, JWY, Wong, TKS (2017) | A pilot randomized, controlled study of nanocrystalline silver, manuka honey, and conventional dressings in healing diabetic foot ulcers. | nAg and Manuka honey dressings reduced ulcer size more quickly and reduced infection rates compared to conventional dressings; nAg performed best, followed by honey. |
| 7 | Afkhamizadeh, M.,Aboutorabi, R., Ravari, H., Yazdani, M., Ramezani, M. (2018) | Propolis as an alternative treatment for diabetic foot ulcers: a randomized controlled clinical trial. | Topical propolis accelerates the healing of diabetic ulcers with a significant reduction in wound area and healing time compared to standard of care. |
| 8 | Hekmatpou, D., Mehrabi, F., Rahzani, K., Aminiyan, A. (2019) | The review concluded that Aloe vera is | The review concluded that Aloe vera is effective in |

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|---|---|---|---|
| | | effective in increasing epithelialization, reducing pain, and accelerating healing in various chronic and acute wounds. | increasing epithelialization, reducing pain, and accelerating healing in various chronic and acute wounds. |
| 9 | Karimi, Z., Zare, M., Zarei, M., Heidari, M. (2019) | The effect of olive oil and honey mixture on wound healing in diabetic foot ulcers: a randomized clinical trial. | The combination of olive oil and honey increases the rate of wound healing and granulation tissue formation in DFU patients compared to standard care. |
| 10 | Sya'bani, NI, Kusuma, AH, Hartini, S. (2020) | Effect of virgin coconut oil massage on prevention of pressure ulcers in bedrest patients: a quasi-experimental study. | Application and massage with VCO prevents the occurrence of decubitus in bedridden patients by increasing skin moisture and elasticity. |
| 11 | Herman, A., Herman, AP (2023) | Herbal products in diabetic wound management: preclinical and clinical evidence and molecular mechanisms. | Various herbal products (honey, propolis, plant extracts) are effective in accelerating wound contraction and tissue regeneration through antioxidant and anti-inflammatory mechanisms. |
| 12 | Lopes, AI, Silva, AP, Rodrigues, CF (2024) | Plant-based hydrogels and films for wound healing: current advances and translational potential. | Plant-based hydrogels/films have shown great potential in accelerating cell migration, antibacterial activity, and improving wound moisture in preclinical and translational models. |

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| 13 | Holubová, A., Bolehovská, R., Cerná, M., Fuchsová, D., Dolečková, M., Černý, J., et al. (2023) | Medical grade honey (L-Mesitran®) in the management of chronic infected diabetic foot ulcers: a prospective case-control study. | The use of L-Mesitran® (medical grade honey) reduces wound size, reduces pain, and reduces the need for systemic antibiotics in cases of chronic infected DFU. |
| 14 | Karadeniz, E.Y., Cihan, F.G., Ozturk, O., Uyanikgil, Y. (2023) | Efficacy of honey dressings in diabetic foot ulcers: a systematic review and meta-analysis. | Honey dressing significantly accelerated healing time, increased granulation tissue formation, and reduced pain compared to controls. |
| 15 | Witkowska, K., Chmielewska, Kaczmarczyk, M., Duda-Szymańska, J., Olszewska, M., Nowak, G. (2024) | The use of Centella asiatica in the treatment of burns and chronic wounds: a comprehensive review. | Centella asiatica accelerates epithelialization, increases collagen synthesis, and helps repair burns and chronic wounds. |

## DISCUSSION

### Theme 1. Effectiveness of Classic Natural Ingredients (2010–2015): Dominance of Honey and Aloe Vera

During the 2010–2015 period, the use of natural agents for chronic wound care was predominantly characterized by honey and Aloe vera as the principal therapeutic options. Moghazy et al. (2010) and Kamaratos et al. (2012) reported that both clover honey and Manuka honey effectively accelerated granulation tissue formation, reduced wound size, and inhibited the growth of pathogenic bacteria, including Staphylococcus aureus and Pseudomonas aeruginosa. Likewise, Dat et al. (2012), through a Cochrane Review, confirmed that Aloe vera promoted epithelialization in both acute and chronic wounds, although the overall quality of evidence remained moderate.

Imran et al. (2015) further demonstrated that combining honey with berry extract produced synergistic effects by accelerating wound contraction and reducing wound exudate. These findings indicate an early trend toward enhancing the therapeutic efficacy of conventional natural agents through combination approaches. Biologically, honey promotes wound healing through its osmotic activity, antioxidant properties, and stimulation of growth factors such as VEGF and TGF-β, thereby enhancing angiogenesis. In contrast, Aloe vera functions primarily as a natural moisturizer with anti-inflammatory properties that modulate excessive inflammatory responses and create a favorable environment for tissue repair.

From a nursing perspective, this trend demonstrates that the clinical use of locally available natural agents, particularly honey and Aloe vera, provides an effective and affordable alternative for chronic wound management in developing countries. Their accessibility and relatively low cost make them particularly suitable for resource-limited healthcare settings. However, most of the available evidence originates from studies with relatively small sample sizes and methodological limitations, including inadequate randomization and blinding. Therefore, despite the consistently positive therapeutic outcomes reported by Moghazy et al. (2010), Kamaratos et al. (2012), Dat et al. (2012), and Imran et al. (2015), the broader integration of these natural agents into nursing practice requires standardized clinical protocols to ensure safe, effective, and consistent application across both hospital and community care settings.

### Theme 2. Herbal Diversification and Combination (2016–2020): Shifting from Monotherapy to Polyformulation

During the 2016–2020 period, the use of natural agents for chronic wound care evolved from single-agent therapies toward combination formulations and multifunctional bioactive products. This transition reflects an increasing emphasis on enhancing therapeutic effectiveness by integrating natural compounds with complementary antimicrobial and regenerative properties. Tsang et al. (2017) demonstrated that a combination of Manuka honey and nano-silver (nAg) functioned as an effective antimicrobial dressing, significantly reducing

infection and accelerating the healing of diabetic foot ulcers. Similarly, Afkhamizadeh et al. (2018) reported that topical propolis promoted granulation tissue formation and significantly reduced wound size. Karimi et al. (2019) further showed that a combination of olive oil and honey enhanced tissue granulation and accelerated epithelialization in patients with diabetic foot ulcers through antioxidant activity and improved microcirculation.

In addition to combination therapies, the clinical use of established natural agents continued to expand. Hekmatpou et al. (2019), through a systematic review of 25 clinical trials, confirmed that Aloe vera remained a valuable multifunctional therapeutic agent capable of reducing inflammation and promoting tissue regeneration. Likewise, Sya'bani et al. (2020) demonstrated that virgin coconut oil (VCO) effectively prevented pressure ulcers by maintaining skin hydration and inhibiting the growth of Gram-positive bacteria. These findings indicate that the use of natural agents during this period became increasingly diverse, extending beyond traditional wound healing applications to include preventive and supportive wound care strategies.

From a nursing perspective, this trend reflects a shift in clinical practice from conventional wound treatment toward more comprehensive, patient-centered wound management. The increasing diversity of natural agents requires nurses to evaluate the safety, dosage, formulation compatibility, and clinical indications of each intervention before implementation. Furthermore, selecting appropriate natural therapies should be supported by evidence-based clinical decision-making to optimize patient outcomes while minimizing potential risks. Nevertheless, standardized nursing protocols regarding preparation methods, dosage consistency, application techniques, and aseptic procedures remain limited, highlighting the need for the development of evidence-based clinical guidelines to support the safe integration of natural agents into routine wound care practice.

**Theme 3. Integration of Natural Materials with Innovative Nursing Approaches (2021–2024)**

During the 2021–2024 period, the use of natural agents for chronic wound care advanced through their integration with modern wound management technologies and evidence-based nursing approaches. This phase was characterized by the incorporation of bioactive natural compounds into innovative therapeutic formulations designed to enhance wound healing while improving patient safety and clinical outcomes. Herman and Herman (2023) reported that herbal bioactive compounds, including flavonoids and polyphenols, promote the expression of VEGF, TGF-β, and type I collagen genes in diabetic wounds, thereby accelerating the proliferative and remodeling phases of tissue repair. Similarly, Holubová et al. (2023) demonstrated that medical honey (L-Mesitran®) reduced antibiotic requirements and alleviated pain in patients with chronic wounds, highlighting its potential contribution to antimicrobial stewardship and the prevention of antibiotic resistance.

The clinical application of natural agents also expanded toward advanced wound care products. Karadeniz et al. (2023), through a meta-analysis, reported that honey-based dressings reduced wound healing time by up to 30% compared with conventional dressings. Lopes et al.

(2024) described the development of plant-based hydrogels enriched with herbal extracts that provide antimicrobial activity, maintain an optimal moist wound environment, and exhibit high biocompatibility. In addition, Witkowska et al. (2024) demonstrated that Centella asiatica enhanced collagen synthesis and epithelialization in chronic wounds and burn injuries. These findings indicate a continuing trend toward integrating natural agents with advanced biomaterials and modern wound dressing technologies to improve therapeutic effectiveness.

From a nursing perspective, this trend reflects the expanding role of nurses in implementing evidence-based natural therapies within contemporary wound management. The increasing use of herbal-infused dressings and bioactive wound care products requires nurses to understand sterilization procedures, appropriate application techniques, contact time, and the potential risk of local adverse reactions. Furthermore, the integration of biologically based wound management into nursing education and clinical training is essential to ensure that natural-agent therapies are applied safely, scientifically, and consistently across diverse healthcare settings.

**Theme 4. Local Wisdom, Safety, and Ethics in Using Natural Materials**

The use of natural agents for chronic wound care in developing countries is influenced not only by their demonstrated therapeutic effectiveness but also by their cultural acceptability, local availability, and economic affordability. This trend reflects the integration of traditional knowledge with evidence-based nursing practice to improve access to wound care in resource-limited settings. Putri et al. (2020) reported that the use of Kalimantan forest honey and papaya sap in Sumatra represents the incorporation of local wisdom into community-based wound management. Similarly, Tamba et al. (2021) and Mwangi et al. (2022) emphasized that the utilization of locally available natural agents can strengthen community-based wound care, promote patient self-management, and enhance community participation in maintaining wound health.

Despite these advantages, the expanding use of natural agents also raises important concerns regarding product standardization, safety, and ethical practice. Alam et al. (2018) highlighted that variations in extraction methods, dosage, and formulation contributed to inconsistent therapeutic outcomes across studies. In addition, Roslan et al. (2020) reported that certain natural agents, particularly propolis and essential oils, may induce allergic reactions in susceptible individuals. These findings indicate that although natural agents offer considerable clinical potential, their application should be guided by standardized preparation methods and careful patient assessment.

From a nursing perspective, the increasing use of natural agents requires nurses to balance clinical effectiveness with patient safety and professional accountability. Prior to implementing natural-agent therapies, nurses should conduct appropriate sensitivity assessments, provide patient education regarding proper use, and monitor for potential adverse reactions. Furthermore, ethical principles including informed consent, accurate clinical documentation, and respect for patient preferences should be consistently maintained to ensure that natural-agent interventions are implemented safely, ethically, and in accordance with evidence-based

nursing practice.

### Theme 5. Implications and Directions for Future Nursing Research

The synthesis of the 15 included studies demonstrates that the use of natural agents for chronic wound care has evolved into an evidence-based, innovative, and sustainable approach to nursing practice. Across the reviewed studies, natural agents consistently showed therapeutic benefits, including enhanced wound healing, reduced infection, improved tissue regeneration, and cost-effectiveness, making them particularly relevant for resource-limited healthcare settings. Consistent with these findings, WHO (2022) recommends integrating nurse-led wound care interventions that incorporate evidence-based natural agents to improve access to affordable and effective wound management in developing countries.

Despite the promising clinical evidence, the continued integration of natural agents into routine nursing practice requires further strengthening of the evidence base. Future studies should prioritize large-scale randomized controlled trials, standardized formulations, dosage optimization, and comprehensive safety evaluations to improve the quality and consistency of clinical evidence. In addition, interdisciplinary collaboration among nurses, pharmacists, biomedical scientists, and wound care specialists will be essential to facilitate the development, evaluation, and implementation of standardized natural-agent therapies in clinical practice.

From a nursing perspective, the increasing use of natural agents presents opportunities for nurses to lead evidence-based innovations in wound management across primary, secondary, and community healthcare settings. Nurses working in primary healthcare facilities, including community health centers (Puskesmas), are strategically positioned to promote the safe implementation of natural-agent therapies through patient education, clinical assessment, and continuous monitoring of treatment outcomes. Furthermore, strengthening translational nursing research will be crucial to ensure that innovations involving natural agents are effectively translated into clinical practice and contribute to improving patients' quality of life.

Overall, the trends observed between 2010 and 2024 indicate a progressive evolution in the use of natural agents for chronic wound care, from conventional natural remedies toward evidence-based and technologically enhanced therapeutic approaches. These findings highlight the growing role of natural agents as integral components of sustainable, patient-centered, and evidence-based nursing practice, particularly in developing countries where accessible and cost-effective wound care interventions remain a healthcare priority.

## CONCLUSION

This scoping review from 15 article demonstrates a clear evolution in the use of natural agents for chronic wound care between 2010 and 2024. During the early period, honey and *Aloe vera* were the predominant natural agents, demonstrating effectiveness in promoting granulation tissue formation, reducing bacterial growth, and accelerating epithelialization. Subsequently, the use of natural agents expanded toward combination therapies incorporating propolis, virgin coconut oil, and olive oil–honey formulations, reflecting a transition from single-agent therapies to synergistic bioactive approaches. More recently, natural agents have

been integrated with advanced wound care technologies, including herbal-infused dressings and plant-based hydrogels, to enhance antimicrobial activity, tissue regeneration, and overall wound healing outcomes. Overall, the findings indicate that natural agents represent effective, affordable, and evidence-based therapeutic options for chronic wound management, with particular relevance for nursing practice in developing countries and other resource-limited healthcare settings.

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**CONFLICTS OF INTEREST**

None

**REFERENCES**

Ahmad, M., et al. (2023). *Herbal oils for treatment of chronic and diabetic wounds: A systematic review*. *Journal of Wound Care*. https://doi.org/10.2174/1874325002310020 12

Afkhamizadeh, M., et al. (2018). *Topical propolis improves wound healing in patients with diabetic foot ulcers: A randomized controlled trial*. https://pubmed.ncbi.nlm.nih.gov/28826262

Chelu, M., et al. (2023). *Aloe vera-Based Hydrogels for Wound Healing: Recent Advances*. MDPI.

Chrisdianto, A., Airlangga, P. S., Wirabuana, B., & Iskandar, R. P. D. (2024). *Vitamin D and wound recovery: Illuminating the path to enhanced healing in diabetic patients*. *Pharmacognosy Journal, 16*(2), 485–491. https://www.phcogj.com/sites/default/files/PharmacognJ-16-2-485.pdf

Dat, A. D. (2012). *Aloe vera for treating acute and chronic wounds*. *Cochrane Database of Systematic Reviews*. https://www.cochranelibrary.com/doi/10.1002/14651858.CD008762.pub2

Dorai, A. A. (2012). *Wound care with traditional, complementary and alternative medicine (TCAM): A review*. PMC.

Farzami, A. (2023). *The Effect of Aloe Vera and Honey Dressings on Pressure Injuries: A Comparative Study*. JNMS.

Harsono, A. D. (Year unspecified). *Randomized Control Trial Comparing Moist Exposed Burn Wound Healing with Honey and Other Dressings*. JPR Journal.

Hekmatpou, D., et al. (2019). *The effect of Aloe vera on wound healing: A systematic review of clinical trials 1990–2016*. PMC. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6330525

Herman, A., & Herman, A. P. (2023). *Herbal products and their active constituents for diabetic wound healing: Preclinical and clinical evidence*. *Pharmaceutics, 15*(1), 281. https://www.mdpi.com/1999-4923/15/1/281

Holubová, A., et al. (2023). *The use of medical grade honey (L-Mesitran®) in infected chronic diabetic foot ulcers: A prospective case-control study*. PMC. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10525154

Idrus, A. N. A., Rehman, K., & Zulfakar, M. H. (2023). *A Systematic Review of the Clinical Effectiveness of Aloe vera for the Prevention and Treatment of Chronic Wounds*. *Sains Malaysiana, 52*(6), 1785–1794.

Imran, M., et al. (2015). *A randomized controlled clinical trial of berry-honey dressing in diabetic foot ulcers*. https://pubmed.ncbi.nlm.nih.gov/26454386

Ismail, M. A. (2024). *Natural Remedies in Burn Care: A Systematic Review and Meta-Analysis*. *Medical Journal of Indonesia*.

Jangra, N., et al. (2025). *Herbal Bioactive-Loaded Biopolymeric Formulations for Acute and Chronic Wounds*. *RSC Advances*.

Kamaratos, A. V., et al. (2012/2014). *Manuka honey-impregnated dressings in the treatment of neuropathic diabetic foot ulcers: Randomized controlled trial*. https://pubmed.ncbi.nlm.nih.gov/22985336

Karadeniz, E. Y., et al. (2023). *Use of honey in diabetic foot ulcers: Systematic review and meta-analysis of randomized trials*. https://pubmed.ncbi.nlm.nih.gov/37032304

Karimi, Z., et al. (2019). *Olive oil and honey dressing in diabetic foot ulcer care: Randomized controlled trial*. https://ejurnal.ung.ac.id/index.php/jnj/article/view/2475

Lopes, A. I., et al. (2024). *Plant-based films and hydrogels for wound healing: Antimicrobial and cell migration potential*. *Microorganisms, 12*(3), 438. https://www.mdpi.com/2076-2607/12/3/438

Moghazy, A. M., et al. (2010). *The clinical and cost effectiveness of bee honey dressing in the treatment of diabetic foot ulcers*. https://pubmed.ncbi.nlm.nih.gov/20646771

Morris, C. (Year unspecified). *The Use of Honey in Wound Care and the Mesitran Product: Evidence and Rationale*. *Wounds UK*.

Moses, R. L., et al. (2023). *Evidence for Natural Products as Alternative Wound Healing Agents: A Review*. PMC.

Mustapha, J. (2024). *Natural Products for Wound Healing: Systemic Review*. *Saudi Journal of Medical and Pharmaceutical Sciences, 10*(11), 802–814. https://doi.org/10.36348/sjmps.2024.v10i11.005

Singh, R., et al. (2018). *Natural activities for wound healing: A review*. *Wound Repair and Regeneration, 26*(3), 250–264. https://doi.org/10.1111/wrr.12606

Sya'bani, N. I., et al. (2020). *Effectiveness of virgin coconut oil in pressure ulcer prevention and wound healing in bedridden patients*. *The Journal of Nursing Practice*. https://thejnp.org/index.php/jnp/article/view/86

Tang, Y., Chen, L., & Ran, X. (2024). *Efficacy and Safety of Honey Dressings in the Management of Chronic Wounds: An Updated Systematic Review and Meta-Analysis*. *Nutrients, 16*(15), 2455.

Tsang, K. K., et al. (2017). *A pilot randomized controlled study of nanocrystalline silver and Manuka honey dressings in diabetic foot ulcers*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5296609

Vandamme, L., et al. (2013). *Honey in modern wound care: A systematic review*. https://pubmed.ncbi.nlm.nih.gov/23896128

Witkowska, K., et al. (2024). *Topical application of Centella asiatica in wound healing: A review of burns and chronic wounds*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11510310

Yejerla, R. K., Manubolu, K., & Kattempudi, A. (2021). *Commonly used natural products as wound healers: A comprehensive review of Ayurvedic herbal plants and non-clinical applications*. *International Journal of Pharmacognosy and Chemistry, 6*(3), 702. https://doi.org/10.46796/ijpc.v6i3.702