



USE OF STINGLESS BEE HONEY (TRIGONA ITAMA) AS A WOUND DRESSES FOR PATIENTS WITH DIABETIC FOOT ULCERS: A LITERATURE REVIEW

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Abstract

Diabetic foot ulcers often cause severe complications such as infection and lower extremity amputation. To prevent death, comprehensive interventions combined with CAM are needed. Studies have been well done on this topic; However, we rarely discuss the benefits of stingless bee honey (Trigona Itama) for diabetic foot ulcers. Therefore, this study intends to evaluate the use of Stingless Bee Honey (Trigona Itama) before implementation in human subjects. A literature review search was conducted to achieve the research objectives. Several online databases are involved in research assessment. The search criteria were determined by considering the topic, research design, type of article, and year of publication. The findings show that Stingless Bee Honey (Trigona Itama) has the potential for diabetic foot ulcers for a certain period. Future studies should focus on the long-term results of this honey when used in patients with chronic wounds.

Keywords: diabetic foot ulcers; complementary therapy; amputation; nursing care; topical therapy; Stingless Bee Honey

Introduction

The International Working Group on Diabetic Foot (IWGDF) describes diabetic foot ulcers (DFU) as full-thickness wounds on the foot with infection, and skin tissue damage due to neuropathy and/or peripheral arterial disease in patients with diabetes (van Netten et al., 2020). The International Diabetes Federation also estimates that 9.1 to 26.1 million people with diabetes will have a DFU (Armstrong, Boulton, & Bus, 2017). In addition, the prevalence of DFU was found to be between 7.3% and 24% in Indonesia (Ayundini, Astrella, Tahapary, & Soewondo, 2019). DFU is associated with several complications, such as limb amputation and death (Muduli, Panda, & Behera, 2015). Studies have documented that DFU complications have a significant impact on wound healing progress (Spampinato, Caruso, De Pasquale, Sortino, & Merlo, 2020). In addition, wound complications contribute to impaired wound closure by developing atherosclerosis, disrupting the function of skin cells along with peripheral neuropathy (Burgess, Wyant, Abdo Abujamra, Kirsner, & Jozic, 2021).

Standard care for DFU includes wound unloading, surgical debridement, dressing, vascular assessment, infection management, and glycemic control (Everett & Mathioudakis, 2018). Although this approach is comprehensive, there is still a wide opportunity to improve outcomes by integrating Complementary and Alternative Medicine (CAM) such as honey. Honey dressing effectively shortens wound healing time, bacterial clearance time, and wound debridement time during the first one to two weeks of use (Wang, Guo, Zhang, & Wang, 2019). Honey can be used as a faster, safer, and more effective healing agent for DFU compared to pharmacological approaches (Alam, Islam, Gan, & Khalil, 2014). Honey significantly reduces the rate of amputation and improves wound healing when used for wound dressing in patients with DFU (Surahio, Khan, Farooq, & Fatima, 2014). A review study showed that honey dressing is safe for DFU for the period (Kateel, Adhikari, Augustine, & Ullal, 2016). Manuka honey has been shown to be an effective treatment for DFU by reducing wound healing rates and infection rates (Kamaratos et al., 2014).

The above studies underline that honey intervention is an important intervention for DFU as it promotes wound healing and prevents complications. However, none of them explains the use of Stingless Bee Honey for DFU. Furthermore, there are still questions to be answered. How does Stingless Bee Honey provide wound healing? As widely acknowledged, DFU is not like ordinary wounds as they are slower to heal, intervening with topical medications as a tedious process. Among several different alternative therapies, honey is known to be an effective option as it provides a relatively fast wound healing rate. Also, honey types from different geographical regions have considerable effects on chronic wounds, burns and leg ulcers as well. The use of honey in practice as a natural and safe adjunct therapy is recommended. Therefore, this review aims to evaluate the effectiveness of Stingless Bee Honey for patients with DFU. We hope that the findings of this study can contribute to the practice of wound care nursing in hospitals.

Research methods

This study used a literature review design to achieve the research objectives. An extensive literature search was completed from online databases such as PubMed, ScienceDirect, EBSCO, Springer, Google, and Google Scholar. The search criteria were studies using honey on DFU, English, and Indonesian languages, experimental studies were prioritized, complete study design, laboratory studies on Honey Bee Stings, studies on wound healing progress, and publication dates from 2000 to 2022. The keywords were as follows: 'stingless bee honey for diabetic foot ulcers', 'stingless bee honey for foot ulcers', 'stingless bee honey for diabetic foot ulcers', 'stingless bee honey for chronic diabetic foot ulcers', and 'stingless bee honey for diabetic foot ulcer wound dressing'.

A total of 254 articles were obtained and presented in the data process analysis using the PRISMA flow diagram (Figure 1). The data selected from the study were assessed according to the article details (title, journal, year of publication) and research details. The search process was focused on considering the criteria to minimize duplication. The researcher conducted the screening process by following four phases as

follows: first, relevant titles and abstracts were identified using a computerized search for the main purpose of the study. All studies focusing on Stingless Bee Honey and DFU wound healing were collected (n = 254). In the first phase, some articles were due to duplication, irrelevant to the topic, did not discuss the topic in detail, and editorial and book chapters (n = 123). Second, the remaining articles (n = 131) were also screened and then ignored after considering the title and abstract (n = 92). Third, filtering the full text by considering the criteria (n = 39), then articles were excluded because they did not meet the criteria (n = 31). Fourth, 8 articles discussing Stingless Bee Honey were included, compared and then analyzed (Table 1).

Results and Discussion

Honey is an important natural food since ancient times that has nutritional and therapeutic value. It is produced from liquid plant exudates collected, modified, and stored by various species of bees in nature (Namias, 2003). This product has benefits including in wound healing as it is effective in inhibiting bacterial growth and treating various types of wounds including diabetic foot ulcers (Tashkandi, 2021) ; (Mendes & Duarte, 2021). With the emergence of drug-resistant microorganisms, many antimicrobial agents have become ineffective and failed in current wound treatment methods. Honey can be a complementary method for DFU treatment. For example, stingless bee honey enhances wound healing (Esa et al., 2022); (Guerrini et al., 2009). It is important to note that Stingless bees are grown in rural areas to meet the high demand for raw honey and honey-based products. This type of honey reveals various therapeutic functions for wound healing such as anti-inflammatory, antioxidant, antibacterial, and moisturizing. The antibacterial properties of stingless bee honey inhibit organisms and accelerate epithelialization (Mama, Teshome, & Detamo, 2019) ; (Bahari, Hashim, Md Akim, & Maringgal, 2022). Stingless bee honey-based hydrogels have significant benefits such as providing an excellent moisturizing environment and then promoting cell survival (Gopal et al., 2021) ; (Bakhrushina, Shumkova, Sergienko, Novozhilova, & Demina, 2023).

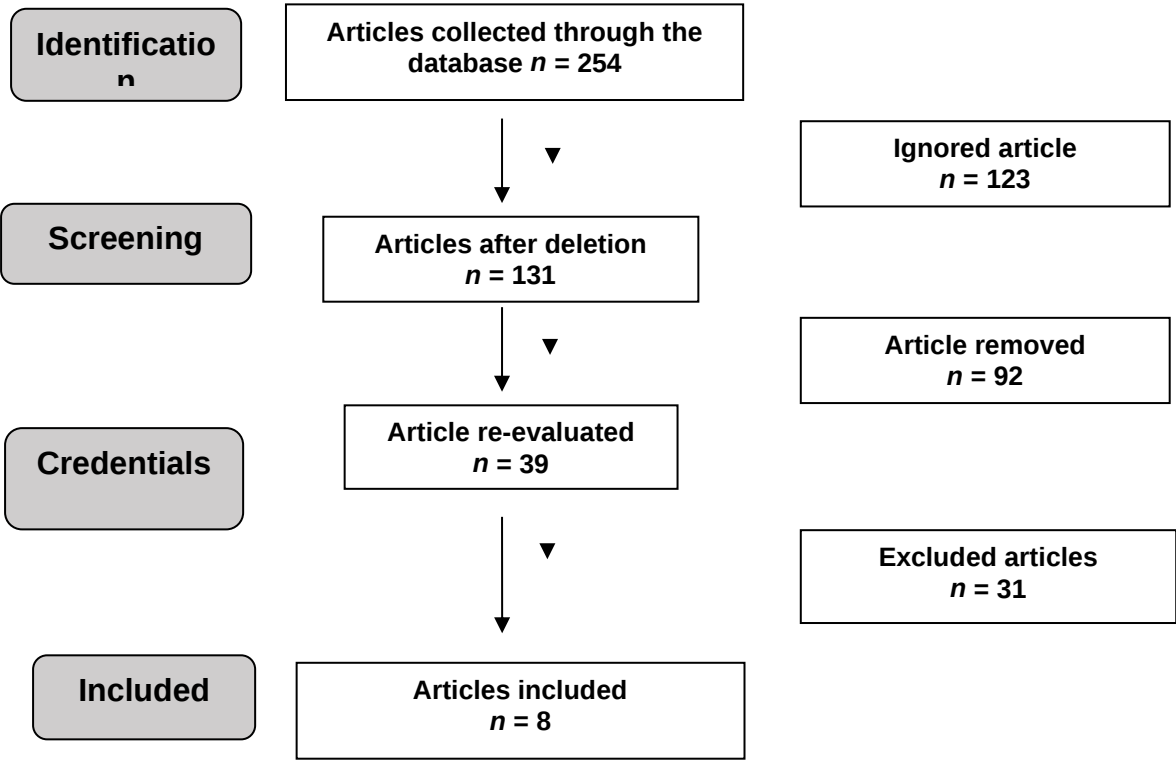


Figure 1. Article selection process

This study showed that honey is a clinical and cost-effective dressing for diabetic wounds in developing countries (Moghazy et al., 2010). Therefore, health care decision-making should not base decisions on the cost of dressings alone but consider the cost of continued wound therapy use. Also, clinical-economic assessments should be performed on multiple therapies to assess long-term cost-effectiveness (Browning, 2014). The outcomes of cost-effective wound care are good prognosis, improved quality of life, lower economic burden on patients, and the health care system along with cost savings. Using cost-effectiveness considerations will help standardize wound care among nurses in hospitals, clinics, and community settings (Al-Gharibi, Sharstha, & Al-Faras, 2018). Physicians and nurse managers should have an understanding that clinical decision-making is related to the financial budget of stakeholders, including patients and health services. Consequently, nurses should consider ways to reduce the cost of care when providing wound care to optimize outcomes. Support from families will also help reduce the economic burden and financial problems. Using stingless bee honey in DFU care may help prevent constraint finance among patient .

Stingless bee honey increases healing rates although this statement needs further investigation (Abd Jalil, Kasmuri, & Hadi, 2017). A study supports that using honey in the treatment of diabetic foot ulcers significantly improves the wound healing rate process (Surahio et al., 2014). In addition, disabled patients with DFU minimized limb amputation

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after using honey for topical therapy (Makhdoom et al., 2009). Honey is an effective dressing against conventional dressings and the healing rate is 18 days for class 1 to 2 patients with DFU (Imran, Hussain, & Baig, 2015). It is important for nurses to integrate honey into wound care nursing because the nursing profession has a long history of holistic care and with conventional care (Trail-Mahan, Mao, & Bawel-Brinkley, 2013). Florence Nightingale emphasized the importance of caring for the whole person and encouraged interventions that enhance healing power. Integrating CAM not only enables clinical nurses to provide holistic care but also improves the nurse-patient relationship and patient-centeredness.

Satisfaction (Booth-LaForce et al., 2010). Therefore, professional nursing associations should recommend CAM therapies in maintenance nursing, especially in DFU management.

Table 1. Study findings

No	Author and year of publication	Participant	Method	Comparison therapy (If there are)	Results
1	One et al ., 2022	Patients with chronic wounds (eg, DFU)	Stingless Bee Honey and Its Hydrogel-Based Compounds	No	Stingless bee honey improves wound healing
2	Moghazy et al ., 2010	Patients with DFU	Honey Bee	Regular care	Honey is a clinical and cost-effective dressing for DFUs.
3	Avi, Jacob, Rajab, Kota, & Sharif, 2021	Human Cells	Stingless Bee Honey	No	Stingless bee honey may be useful for inflammation
4	Zulkhairi Amin et al ., 2018	No	Study review	European Bees	The potential of stingless bee honey for use in modern medicine
5	Bahari, Hashim , Akim , & Maringgal , 2022	No	Study review	No	Stingless bee honey is a potential DFU treatment
6	Hwanbuta , Citykijyotin , & Sangnim , 2020	No	Laboratory studies	No	Stingless bee honey has the potential to be antibacterial
7	Guerrini et al., 2009	No	Laboratory studies	No	Stingless bee honey has antioxidant potential (e.g., wound healing)

8	Abd Jalil , Kasmuri , No & Hadi , 2017	Study review	No	Stingless bee honey increases the healing rate
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Conclusion

This discrepancy in findings is concerning considering that DFU management takes CAM into account. Stingless bee honey has the potential to treat DFU although research in this area is limited. Wound care nurses should initiate to increase research on Stingless bee honey. Collaboration with other healthcare professionals such as surgeons, pharmacists, and dermatologists is also recommended. Further studies are needed to evaluate the use of stingless bee honey in all stages of DFU.

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