


A LITERATURE REVIEW: THE EFFECT OF HONEY IN PRESSURE ULCER WOUND HEALING ACCELERATION

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ABSTRACT

Introduction: Pressure ulcers occur due to prolonged pressure and friction in areas of bony prominences that result in tissue injury with varying depths. To date, there is no standardized wound dressing for these ulcers. From the review of the availability and affordability aspects, honey can be used as a wound dressing because it contains anti-oxidants, anti-inflammatory, and anti-bacterial properties. This article investigates the advantages of honey dressing over other modern dressings.

Methods: Literature search from online databases using relevant keywords. A total of three articles were discussed in this review article.

Results: All articles agreed that giving honey to pressure ulcer wounds reduced wound size and pain. Honey-soaked gauze provided quicker pain relief during treatment and reduced discomfort with each dressing change. Wound healing was proven to be four times faster with honey compared to other topical dressings. The anti-bacterial effect of honey could not be significantly confirmed in this study. Nonetheless, honey dressings succeeded in accelerating wound healing in patients with pressure ulcers.

Conclusion: Honey can be a promising alternative to topical dressings in patients with pressure ulcers.

Highlights:

1. Honey dressings can accelerate wound healing in patients with pressure ulcers.
2. Honey-soaked gauze can provide quicker pain relief and reduce discomfort during dressing changes compared to other topical dressings.

INTRODUCTION

Pressure ulcers (PU) are localized sores due to prolonged pressure and tears on bony prominences, causing tissue injury of varying depths¹. Constant pressure put over

a long period may cause tissue ischemia, cessation of oxygen supply and nutrition, and eventually tissue necrosis, leading to distortion, deformation, and damage². Pressure ulcer develops over time in

patients with immobility and activity limitation, bedridden or chair-bound, accompanied by predisposing factors such as loss of movement, sensation, and failure of reactive hyperemia³.

Various methods for treating pressure ulcers have been religiously studied, such as pressure redistribution, nutritional support, and local wound care. Dressings should possess three essential properties: facilitate autolytic debridement, provide moisture, and control the bacterial load⁴. Most common dressings, namely polyurethane, foam, alginate, and nano-crystalline silver dressing, can aid effective wound reduction, prevent secondary infection, and suppress exudate production⁵. However, no gold standard has been established for the type of dressing suitable for pressure wounds. The choices are usually tailored for specific wound staging, the site of the ulcer, availability, personal preference, and cost.

Honey was first recognized as a topical antimicrobial agent in 1892 and has been widely used as a wound dressing due to its anti-oxidant, anti-bacterial, and anti-inflammatory properties⁶. Honey may inhibit biofilm production, reduce malodor, provide autolytic debridement, and induce anti-inflammatory effects^{4,5}. Anti-bacterial property of honey comes from the hyperosmotic sugar content, the production of hydrogen peroxide from the honey enzyme, and its acidic pH. Honey also possesses strong osmotic activity, which can pull out fluid from the wound surface, creating a layer of fluid preventing honey from adhering to the wound bed^{6,7}. This will alleviate pain and destruction of granulation tissue during the removal of the dressings⁵.

Manuka honey has undergone thorough reevaluation and extensive research as a potential substitute for antibiotics. This is because of its powerful antimicrobial properties that cover a wide range of

microorganisms. Additionally, it has been noted that there is a challenge in isolating strains of *Staphylococcus aureus* that are resistant to the effects of honey²⁴. Manuka honey was proven to have broad-spectrum antimicrobial properties towards *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and methicillin-resistant *Staphylococcus aureus* (MRSA). One study compared the use of honey and silver sulfadiazine dressing in burn patients, only to show that honey dressings sterilized wounds faster, enhanced granulation and epithelization, also reduced hypertrophic scar and burn contractures⁸. Honey was proven superior to povidone-iodine in reducing wound size and pain score and increasing comfort when applied to chronic wounds. This study aimed to explore and analyze the efficacy of honey-impregnated dressings on wound healing in PU through a compilation of pre-existing research studies^{6,7}.

METHODS

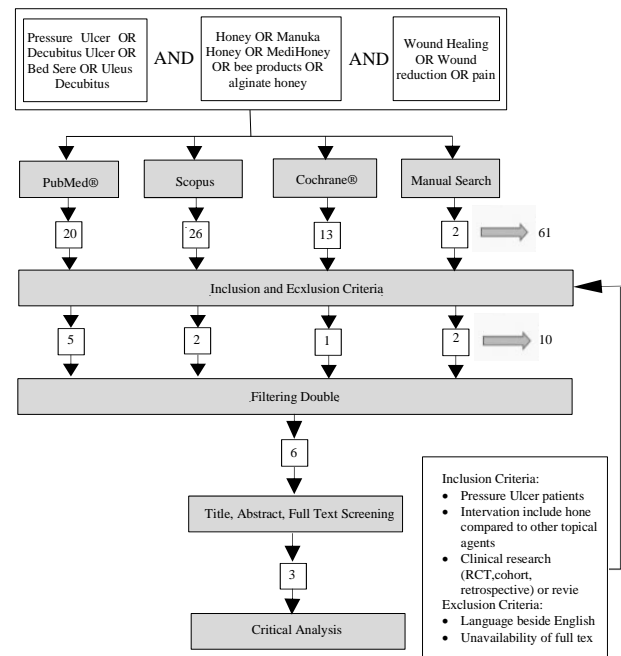


Figure 1. Flowchart of the literature selection process

The search of literature sources used three databases, namely Pubmed, Cochrane, and Scopus, on November 29, 2021. The keywords were “honey” and “pressure ulcer”. Articles were obtained from different databases. The selection was carried out carefully based on title and abstract screening, research study categories, and full-text screening. Inclusion criteria included studies comparing honey and other topical agents for UD with various outcomes: reduced wound size, reduced pain score, or bacteriological profile.

RESULTS

After a thorough search of all the electronic databases, ten articles were retrieved from the title and abstract screening. There were four duplicates out of ten articles, leaving only six articles selected for full-text screening. After a thorough read, three articles were excluded: one non-English literature, one case report of only two patients, and one observational clinical trial without comparison with other conventional treatments. In the end, three articles were selected for appraisal.

Table 1. Critical Appraisal-Validity

Article	Importance				Applicability		
	CER	EER	ARR	NNT	Avail Treat	Similar Patient	Clinical Importance outcome
Khadanga et al.	NR	NR	NR	NR	YES	YES	YES
Saha et al.	NR	NR	NR	NR	YES	YES	YES
Günes	NR	NR	NR	NR	YES	YES	YES

Table 2. Critical Appraisal-Applicability

Article	Design	NoP	Random	Similarity	Blinding	Equal Treat
Khadanga et al.	Case Control	40	Yes	Yes	Single-blind	Yes
Saha et al.	Cohort	40	Yes	Yes	No	Yes
Günes	RCT	26	Yes	Yes	No	Yes

The literature search is summarized in Figure 1. Three articles were appraised for validity (V), importance (I), and applicability (A). The appraisal was

processed with standard therapeutic validity criteria provided by the Oxford Center of Evidence-Based Medicine (CEBM) 2011¹³. The results are presented in Table 1 and 2.

Articles by Khadanga et al., Saha et al., and Günes et al. were appraised using the CEBM appraisal list. The study designs are case-control (IIIB), cohort (IIB), and randomized clinical trial (RCT) (IB), respectively. The number of participants involved in the study is insufficient to replicate the native population. But results are significant and deemed necessary. All papers were randomized, shared similar baseline demography, and treated the participants equally throughout the study. They were measured and analyzed in the group in which they were randomized. Only one study by Khadanga applied single blind randomization. Günes and colleagues¹² did not perform blinding to the examiners because, to do blinding, they needed to clean the wound after dressing removal. This would annul the initially-intended examinations because they needed to identify the slough and the exudates on the wound bed.

The importance of the study is described by Günes and colleagues, who showed a four-time increased rate of wound healing after being treated with honey. The results were reported in the Pressure Ulcer Scale of Healing (PUSH) tool as the standardized measurement of PU. All the results were displayed in numerical data, thus cannot be translated into a dichotomous two-times-two table to be analyzed for control event rate (CER), experimental event rate (EER), absolute risk reduction (ARR), and number needed to treat (NNT). Khadanga’s paper analyzed bacteriological profiling, pain score, and wound size reduction presented in numerical differences before and after application. Saha and colleagues described pain relief score and wound assessment using the Bates-Jensen



scale. Mean scores, standard deviation, and standard error were provided to describe the chance variation.

After appraising the validity and benefit of the study, it is necessary to analyze its applicability to local patient care. The literature's inclusion and exclusion criteria and the patients' similar baseline characteristics indicated that the results were likely applicable to patients in Indonesia. However, there may be some differences in the composition of the honey and the various underlying diseases of each patient.

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DISCUSSION

A case report confirmed the efficacy of honey dressings to accelerate healing in pressure ulcers compared to other established topical agents⁸. All three articles agreed upon the superiority of honey as a promising alternative for PU dressings. However, the case-control study by Khadanga et al. was unable to prove its significance due to the lack of participants. Nonetheless, all findings agreed with the results of former publications stating that the topical application of honey can accelerate wound healing in chronic wounds⁹.

Khadanga's study had the most ideal outcomes, which included the bacteriological profiling of the wound bed, pain score decrement, and wound size

reduction. The only downfall was that the author did not specify the PU grading, patients' comorbidities, and the type of honey used for the research¹⁰. Saha and colleagues researched honey with metronidazole versus metronidazole alone. The pain score relief and wound score reduction were observed and assessed using the Bates-Jensen scale¹¹. However, honey combined with antibiotic metronidazole could mask the anti-bacterial properties of honey. The RCT study by Günes et al. was an ideal reference for this report. They used a standardized PUSH tool and compared the subjects periodically to record the wound healing rate. The only drawback was that the participants' wounds were limited to PU grade II or III^{12,13}.

The use of honey has evolved and become a natural therapeutic alternative for various medicinal purposes⁷. This ancient remedy is superior in promoting wound healing by promoting granulation and epithelization when compared to polyurethane film, silver sulfadiazine, and amniotic membrane⁶. It also possesses a hygroscopic feature that draws moisture out and dehydrates bacteria, while its high sugar content blocks bacterial penetration into the wound. Furthermore, its low pH prevents microbial growth^{14,15}. The use of honey as wound dressing should not be limited to pressure ulcers^{16,17,18,19,20}.

There are two types of honey commonly used in research: natural honey and non-peroxide honey, known as medicinal manuka honey. Table honey possessed lower anti-bacterial activity and contained various microbial species compared to sterile medical-grade honey. Medical grade honey was proven potent in-vitro against antibiotic-resistance bacteria due to the presence of catalase, methyl syringate, and methylglyoxal^{14,21}. More importantly, honey targets different parts of bacteria, unlike

antibiotics, which makes bacteria more unlikely to develop resistance against honey²². The Anti-bacterial property of manuka honey is associated with its Unique Manuka Factor (UMF), possessing various medicinal potency of interest²². A combination of medical-grade honey and antibiotics may reduce the needed dose for antibiotics, minimize the risk of resistance, and increase the potency against antibiotic-resistance bacteria (e.g., MRSA)²³, which will be suitable for our patients with infectious wound sites; post-operation, diabetic, pressure, or open tear wounds.

This is undeniably a promising field to explore. More RCT on a larger scale should be conducted to achieve statistically significant outcomes. Further studies should observe the benefit of honey for advanced PU in comparison with other common dressings such as hydrocolloid, foam, hydrogel, or crystalline-silver dressings. Different outcomes should include scar reduction in burns or large surgical incisions. It is crucial to standardize the type of honey for less variable and more comparable results. Choices range from medicinal manuka (*Leptospermum*) honey to medical-grade Revamil or MediHoney. As honey is cost-friendly and readily available, it should be widely utilized as wound dressing for preventing and treating PU.

CONCLUSION

Honey has the potential to accelerate healing in chronic PU. It is proven safe and efficacious in all sorts of chronic wounds, including PU, as shown in this study. Considering all the superior features of honey, the use of honey is highly applicable in hospital settings that have limited cost and availability. The easily accessible source with no long-term adverse effects will make honey a perfect choice of dressing for patients during their

outpatient visits. The convenient application of honey also has an advantage for caregivers.

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CONFLICT OF INTEREST

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AUTHOR CONTRIBUTION

All authors made the same contribution All authors made the same contribution

REFERENCES

1. Harrison T, et al. Principles of Internal Medicine. New York: McGraw-Hill Medical Publ. Division; 2015.
2. Bhattacharya S, Mishra RK. Pressure Ulcers: Current Understanding and Newer Modalities of Treatment. Indian J Plast Surg. 2015; 48 (1):4-16.
3. Edsberg LE, Black JM, Goldberg M, et al. Revised National Pressure Ulcer Advisory Panel Pressure Injury Staging System: Revised Pressure Injury Staging System. J Wound Ostomy Continence Nurs. 2016; 43 (6): 585-97.
4. Sood A, Granick MS, et al. Wound Dressings and Comparative Effectiveness Data. Adv Wound Care (New Rochelle). United States. 2014. p.511-29.

5. Volakakis E, Papadakis M, Manios A, et al. Platelet-rich Plasma Improves Healing of Pressure Ulcers as Objectively Assessed by Digital Planimetry. *Wounds*. 2019; 31 (10): 252-6.
6. Yaghoobi R, Kazerouni A, Kazerouni O. Evidence for Clinical Use of Honey in Wound Healing as an Anti-bacterial, Anti-inflammatory Anti-oxidant and Anti-viral Agent: A Review. *Jundishapur J Nat Pharm Prod*. 2013; 8 (3): 100-4.
7. Samarghandian S, Farkhondeh T, Samini F. Honey and Health: A Review of Recent Clinical Research. *Pharmacognosy Res*. 2017; 9 (2): 121-7.
8. Gupta SS, Singh O, Bhagel PS, et al. Honey Dressing Versus Silver Sulfadiazene Dressing for Wound Healing in Burn Patients: a Retrospective Study. *J Cutan Aesthet Surg*. 2011; 4 (3): 183-7.
9. Gulati S, Qureshi A, Srivastava A, et al. A Prospective Randomized Study to Compare the Effectiveness of Honey Dressing vs. Povidone Iodine Dressing in Chronic Wound Healing. *Indian J Surg*. 2014; 76 (3): 193-8
10. Khadanga S, Dugar D, Karuna T, et al. Effects of Topical Honey Dressing in Decubitus Ulcer. *Asian Journal of Medical Sciences*. 2015; 6 (4): 99-101.
11. Saha A, Chattopadhyay S, Azam M, et al. The Role of Honey in Healing of Bedsores in Cancer Patients. *South Asian J Cancer*. 2012. p.66-71.
12. Yapucu Gunes U, Eser I. Effectiveness of a Honey Dressing for Healing Pressure Ulcers. *J Wound Ostomy Continence Nurs*. 2007; 34 (2): 184-90.
13. CEBM. Therapy Study - Critical Appraisal University of Oxford: Center of Evidence-Based Medicine; 2011 [December 1, 2019]. Available from: <https://www.cebm.net/wp-content/uploads/2018/11/RCT.pdf>
14. Mandal MD, Mandal S. Honey: Its Medicinal Property and Antibacterial Activity. *Asian Pac J Trop Biomed*. 2011; 1 (2): 154-60.
15. Vyhlídalová D, Kozáková R, Zeleníková R. Management of Non-Healing Wounds with Honey Dressings: A literature Review *Central European Journal of Nursing and Midwifery*. 2018; 9 (3): 880-8.
16. Jull AB, Cullum N, Dumville JC, et al. Honey as a Topical Treatment for Wounds. *Cochrane Database Syst Rev*. 2015 (3): Cd005083.
17. Biglari B, vd Linden PH, Simon A, et al. Use of Medihoney as A Non-Surgical Therapy for Chronic Pressure Ulcers in Patients with Spinal Cord Injury. 2012; 50 (2): 165-9.
18. Dunford CE, Hanano R. Acceptability to Patients of AHoney Dressing for Non-Healing Venous Leg Ulcers. *J Wound Care*. 2004; 13 (5): 193-7.
19. Wijesinghe M, Weatherall M, Perrin K, et al. Honey in The Treatment of Burns: A Systematic Review and Meta-Analysis of Its Efficacy. *NZ Med J*. 2009; 122 (1295): 47-60.
20. Gilligan AM, Waycaster CR, Bizier R, et al. Comparative Effectiveness of Clostridial Collagenase Ointment to Medicinal Honey for Treatment of Pressure Ulcers. *Adv Wound Care (New Rochelle)*. 2017; 6 (4): 125- 34.
21. Albaridi NA. Anti-bacterial Potency of Honey. *International Journal of Microbiology*. 2019; 2019: 1-10.
22. Johnston M, McBride M, Dahiya D, et al. Anti-bacterial Activity of Manuka Honey and Its Components: An overview. *AIMS Microbiol*. 42018. p.655-64.
23. Jenkins R, Cooper R. Improving Antibiotic Activity against Wound Pathogens with Manuka Honey In Vitro. *Plos One*. 2012; 7 (9): e45600.