



RESEARCH ARTICLE

HEALING EFFECT OF TOPICAL HONEY IN DIABETIC WOUND INFECTION: A PROSPECTIVE ANALYSIS

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ABSTRACT

Introduction: Honey dressings are a cost-effective method of wound care as compare to other topical wound care therapies. **Aim:** to study the healing effect of topical honey in diabetic wound infection. **Methods:** The study was conducted after getting approval from Protocol Review Committee of Dr RPGMC Tanda and obtaining informed consent. The study was carried out on all patients of both sex in age group of 18 to 60 years. The data were collected based on the above-mentioned assessment tool and also size of the wound was taken on a two weekly interval starting from week 0 and then week-2, 4 and 6. The patients were followed-up on basis of inpatient department and after discharge were followed on OPD visits. They were contacted telephonically at the scheduled time of their OPD visit. **Results:** Mean age of the patients, mean age of the patients was 56.90±8.71 years. 63% of the patients were males. For 77% of the patients, duration of diabetes was up to 10 years. 77% of the patients were smokers. Dorsal and plantar site of left foot was the most common site of ulcer (37%). Our study observed a significant improvement in wound size in at week-4 (P<0.0001) and week-6 (P<0.0001). Our study observed a significant improvement in necrotic tissue amount at week-4 (P<0.05) and week-6 (P<0.05). Our study observed a significant improvement in exudate amount at week-4 (P<0.05) and week-6 (P<0.05). **Conclusion:** In conclusion, topical honey was effective in wound healing of diabetic foot in a longer period of time.

INTRODUCTION

Honey is produced by honey bees after collecting and processing nectar from various plants. It is well-known for its high nutritional and prophylactic medicinal value. Honey is also known to have role in wound healing since very long time. It has been used as a wound care product for treating venous leg ulcers, burns, chronic leg ulcers, pressure ulcers etc (Yaghoobi, 2013). Honey has several natural substances and qualities that contribute to its antimicrobial activity including an osmotic effect, a naturally low pH, and the production of hydrogen peroxide etc. Recently, it has been found that honey has good role against various drug resistant strains and it do not give rise to development of resistance in various microbes (Mandal, 2011). Many topical and systemic agents have been used either solely or in combination but most of them have been eliminated because of resistance. With increasing trend towards the abuse of antibiotic therapy many of the diabetic wound infections are increasingly caused by drug-resistant organisms and they show resistance to commonly used antibiotics, ultimately leading to increased costs, morbidity, and mortality (Davies, 2010).

Honey dressings are also a cost-effective method of wound care as compare to other topical wound care therapies. A lot of studies have been done evaluating role of honey in wound healing. We aimed to study the healing effect of topical honey in diabetic wound infection.

METHODS

The study was conducted after getting approval from Protocol Review Committee of Dr RPGMC Tanda and obtaining informed consent. The study was carried out on all patients of both sex in age group of 18 to 60 years. Inclusion criteria were adults of any race and either sex between age 18-60 years, ulcer duration of at least 1-month, willing and able to perform dressing changes daily at home, adequate nutrition (albumin >2.0 g/dL), target wound could not be on heel or over a Charcot deformity, and hemodynamically stable patients. Patients having any skin diseases, multiple comorbidities associated with diabetes, known allergy to honey, acute or chronic osteomyelitis, epilepsy, neurological or psychiatric disorders, bleeding or coagulation disorders, and refusal to participate were excluded. Wound assessment was done based on standardized wound assessment tool (Bates-Jensen Wound

Assessment Tool). The data were collected based on the above-mentioned assessment tool and also size of the wound was taken on a two weekly interval starting from week 0 and then week-2, 4 and 6. The patients were followed-up on basis of inpatient department and after discharge were followed on OPD visits. They were contacted telephonically at the scheduled time of their OPD visit.

Statistical Analysis: Data were recorded into Microsoft® Excel 2019 and exported into SPSS v21.0 (IBM, USA) for statistical analysis. Categorical data were expressed as frequency and percentage, and compared using Chi square test. Quantitative data were expressed as mean and standard deviation, and compared using paired t-test. P value <0.05 was considered significant.

RESULTS

Baseline characteristics: In this study, mean age of the patients, mean age of the patients was 56.90±8.71 years. 63% of the patients were males. For 77% of the patients, duration of diabetes was up to 10 years. 77% of the patients were smokers. Dorsal and plantar site of left foot was the most common site of ulcer (37%) (Table 1).

Table 1. Baseline characteristics (n=30)

	Frequency	Percentage
Sex		
Male	19	63.3
Female	11	36.7
Duration of diabetes (Years)		
<10	23	76.7
≥10	7	23.3
Duration of diabetic ulcer		
<1 month	9	30
≥1 month	21	70
Smokers	23	76.7
Site of ulcers		
Left foot dorsal	11	36.7
Left foot plantar	11	36.7
Left foot toes	2	6.7
Right foot dorsal	3	10
Right Foot involving little finger	2	6.7
Right foot plantar	1	3.3

Effect on wound size: Our study observed a significant improvement in wound size in at week-4 (P<0.0001) and week-6 (P<0.0001) (Figure 1).

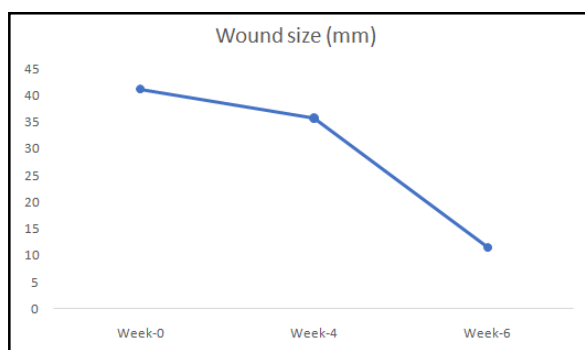


Figure 1. Change in wound size with time

Necrosis tissue amount: Our study observed a significant improvement in necrotic tissue amount at week-4 (P<0.05) and week-6 (P<0.05) (Table 2).

Table 2: Effect of topical honey of necrotic tissue amount

Necrotic tissue amount	Frequency
Week-0	1 0 2 5 3 6 4 8 5 11
Week 4	1 3 2 7 3 9 4 7 5 4
Week 6	1 8 2 14 3 8 4 0 5 0

Exudate amount: Our study observed a significant improvement in exudate amount at week-4 (P<0.05) and week-6 (P<0.05)(Table 3).

Table 3. Effect of topical honey of exudate amount

Exudate amount	Frequency
Week-0	1 0 2 3 3 8 4 12 5 7
Week 4	1 0 2 6 3 13 4 6 5 5
Week 6	1 1 2 13 3 12 4 4 5 0

Table 4. Effect of topical honey of granulation tissue

Granulation tissue	Frequency
Week-0	1 0 2 3 3 4 4 7 5 16
Week 4	1 1 2 4 3 7 4 16 5 2
Week 6	1 3 2 2 3 14 4 10 5 1

DISCUSSION

Among several different alternative therapies, honey is an effective choice because it provides rapid wound healing along with cost-effectiveness. Although honey has been used as an alternative medicine for wound healing since ancient times, the application of honey to diabetic wounds has only recently been revived. Honey is known as an “all in one” remedy for diabetic wound healing because it can combat many microorganisms that are involved in the wound process and because it possesses antioxidant activity and controls inflammation. Approximately 63% of our patients were males. It has been reported that gender makes the difference in the prevalence of

DM. Women and men with DM may differ in the way they face the disease and the way they adhere to the care necessary to keep the disease under control. Men, for example, care less for their feet, resulting in a higher proportion of amputations among them. On the other hand, women have higher difficulty in maintaining glycemic and lipid control due to the difficulty of change in lifestyle, especially the adoption of an eating plan and regular physical activity. The other reason could be as women have a lower risk than men for foot ulceration, because of the result of less severe neuropathy, increased joint mobility, and lower foot pressures. Seth et al reported male preponderance with 83% (Seth, 2019). In our study, mean duration of diabetes was 6.21 years. In a study by Sahi et al, the mean duration of diabetes was higher in DFU cases (11.5 ± 5.74 years) than patients having no sign of DFUs (7.59 ± 4.86 years, $p = 0.00$) (Shahi, 2012). Seth et al reported in their study that the mean duration of diabetes mellitus in their patients was 12.03 ± 6.96 years. In our study, mean duration of diabetic ulcer was 1.49 months (Seth, 2019). In our study, use of topical honey significantly improved necrotic tissue type, amount, exudate type, and amount of exudate. Surahio et al reported that use of honey significantly reduced rate of amputation and improve wound healing when used for wound dressing in chronic diabetic foot ulcers (Surahio, 2014).

CONCLUSION

In conclusion, topical honey was effective in wound healing of diabetic foot in a longer period of time.

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