



Original Research Article

## A Comparative Study on the Effect of Honey and Povidone Iodine Ointment on Pain, Wound Healing and Quality of Life of Patients with Diabetic Ulcer

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### ABSTRACT

**Objective:** To compare the effect of honey and Povidone –Iodine ointment on pain, wound healing and quality of life of patients with diabetic ulcer. **Study Design:** An evaluative approach, non-experimental comparative study was conducted from February – 2013 to August – 2013 among the 100 patients with diabetic ulcer admitted in the Shanthi Hospital, located in Tisayanvilai, Tirunelveli District of Tamil nadu, South India. Purposive sampling was done to choose the study population. **Methods:** The total study population was divided in to two groups of 50 members each. Group – 1 received honey treatment. Group – 2 received Povidone – Iodine ointment 10% w/w (Betadine ointment) treatment. A pre-designed and pre-tested questionnaire was used as a study tool. Initially the demographic data was collected. The details of pain, quality of life and wound were collected before and after treatment. The collected data was analyzed by using statistical package for the social sciences (SPSS) software. **Results:** Majority of patients (56%) were male and aged between 45 – 54 years (37%). All the patients were literate. Majority of patients (58%) were married. 47 of 100 patients had smoking habits and 37 of 100 patients had alcohol usage habits. 53 patients having the ulcer for more than five years and 47 patients having the ulcer duration below 5 years. Pain was significantly reduced and the quality of life was significantly improved by honey followed by Povidone –Iodine ointment. In the 15<sup>th</sup> day follow up the net wound healing score of honey was  $13.5 \pm 3.3$ . The net wound healing score of Povidone – Iodine ointment in the 15<sup>th</sup> day follow up was  $19.8 \pm 4.1$ . **Conclusion:** Povidone – Iodine ointment showed a significant wound healing effect and the honey showed a significant effect on pain and quality of life. In the future a similar study with larger sample size and longer duration may give more valuable results.

**Key words:** Honey, Povidone – Iodine ointment, Diabetic ulcer.

### INTRODUCTION

Ever since his creation, man has been getting wounded and has been devising methods and medications for managing these wounds. Honey is one such natural product which is mentioned in various ancient books as panacea for wide range of

ailments, the wound management being one such indication. <sup>[1]</sup> It was used in Ayurvedic medicine since 2500 BC and other old culture as well. <sup>[2]</sup> However researchers started to document the wound healing properties of honey in the early 20<sup>th</sup> century, but the introduction of antibiotics in 1940

temporarily halted its use. Now concerns about antibiotic resistance and a renewed interest in natural remedies have prompted resurgence in the antimicrobial and wound healing properties of honey. [3,4] In recent years honey has enjoyed a renaissance with considerable amounts of research being performed. [5,6] Honey provides a moist healing environment yet prevents bacterial growth even when wounds are heavily infected. It is a very effective means of quickly rendering heavily infected wounds sterile, without the side effects of antibiotics, and it is effective against antibiotic-resistant strains of bacteria. Its antibacterial properties and its viscosity also provide a barrier to cross- infection of wounds. It also provides a supply of glucose for leucocytes, essential for the 'respiratory burst' that produces hydrogen peroxide, the dominant component of the antibacterial activity of macrophages. [7] To supplement healing, various ointments are used in clinical practice. [8] Povidone – iodine preparations are widely used and highly effective antiseptics. [9]

Although many previous studies with the aim of studying the effectiveness of honey in the treatment and control of both acute and chronic wounds in both human and animals have been undertaken, we take a decision that compare the effectiveness of honey and Povidone – iodine ointment on pain, wound healing and quality of life in patients with diabetic ulcers.

## **MATERIALS AND METHODS**

An evaluative approach, non-experimental comparative study was conducted from February – 2013 to August – 2013 in the Shanthi Hospital, located in Tisayanvilai, Tirunelveli District, Tamil nadu, South India. It is a 150 bedded hospital having the departments such as Medicine, Maternity, Surgery and

Paediatrics and facilities like Operation theatre, ICU and CCU.

One hundred patients with diabetic ulcer, admitted in the Shanthi Hospital were enrolled for the study. Purposive sampling was done to choose the study population. The inclusion criteria consist of: Patients of both sexes in the age group of 30 – 70 years with diabetic ulcer, wound size less than 15cm<sup>2</sup> and willing to participate in the study, they must available for 2 weeks in the hospital. The exclusion criteria were: Patients with malignant disease, HIV infection, pressure ulcers, undergone amputation and wound debridement. All the selected patients agreed to participate in the study. A pre-designed and pre-tested questionnaire was used as a study tool. The reliability of the tool was established by inter rater method.

The demographic data such as age, sex, education, marital status, occupation, smoking and alcohol usage were collected from the participants. The total study population was divided in to two groups of 50 members each. Group – 1 received honey treatment. Commercially purchased honey, produced from the mountainous area of Kanyakumari District, Tamil nadu, South India was used. Group – 2 received Povidone – Iodine ointment 10% w/w (Betadine ointment) treatment.

After cleaning the wound with normal saline, for Group – 1 patients, a layer of honey and for Group – 2 patients, Povidone – Iodine ointment was applied and covered with sterile gauze on daily basis. Wound healing and quality of life scores for both the groups were assessed on 5<sup>th</sup>, 10<sup>th</sup> and 15<sup>th</sup> day. The wound assessment scale includes the information such as size and depth of the wound, nature of wound edges, undermining or tunneling, necrotic tissue and its amount, exudate type and its amount, odour, skin colour, tissue edema and induration of treatment zone. Intensity of

pain also assessed. The quality of life assessment scale includes various information such as difficulties in attending the social functions, walking difficulties, strain on personal relationship, problems in washing and dressing, worry about ulcer healing, difficulty in cooking, cleaning, travelling and gardening due to ulcers, usage of chapels or shoes, difficulties related with sleeping and mobility. Approximately 20 minutes was taken for assessment on each participant. The data obtained was analyzed by using statistical package for the social sciences (SPSS) software.

## RESULTS

The present study was conducted in one hundred in-patients with diabetic ulcer, admitted in Shanthi Hospital, located in Tisayanvilai, Tirunelveli District, Tamil nadu. Regarding with demographic data about the sample subjects, the results showed that 56 of 100 sample subjects were male. Rests, 44 members were female. According to age, 37 participants were aged between 45 to 54 years. 34 participants were aged between 55 to 64 years. 20 participants were aged between 35 to 44 years and 9 participants were aged between 65 to 70 years. Analysis of educational status revealed that all participants were literate. 16 participants had education up to primary school level. 70 participants were studied up to high school level and 14 participants were graduates. Among the study population, 58 candidates were married, 31 candidates were unmarried, 6 candidates were widow and 5 candidates were divorcee. Regarding with occupation, 50 participants were unskilled, 36 participants were semi skilled, 3 participants were skilled and 11 participants were unemployed. The results showed that 47 of 100 sample subjects having smoking habits and remaining 53 candidates did not having this habit. Regarding with alcohol usage, 37 candidates said 'yes' and 63

candidates said 'no'. Analysis of ulcer duration revealed that, majority of study population, 53 participants having the ulcer for more than five years and 47 participants having the ulcer duration below 5 years. The total study population was divided in to two groups of 50 members each. Group – 1 received honey treatment. Group – 2 received Povidone – Iodine ointment 10% w/w (Betadine ointment) treatment. In Group – 1, majority of patients, 28 of 50 (56%) were male. Rests, 22 patients (44%) were female. Among them, 24 candidates (48%) had smoking and 19 candidates (38%) had alcohol usage habit. In case of Group – 2, the distribution of gender is same with Group – 1. But here 23 candidates (46%) had smoking and 18 candidates (36%) had alcohol usage habit. From these results, it was found that the distribution of gender was equal in both groups and the percentage of smokers and alcohol users were not significantly differed ( $P > 0.05$ ). The results showed that there was no statistically significant association between the age, sex, education, marital status, occupation, smoking, alcohol usage and ulcer duration with the quality of life of patients.

The table – 1 showed the details of pain experienced by Group – 1 patients received honey treatment. In the baseline 49 out of 50 candidates (98%) had severe pain and remaining one candidate's (2%) experience was moderate pain. After starting treatment with honey, in the 5<sup>th</sup> day follow up, 23 candidates (46%) reported that they had moderate pain and 27 candidates (54%) reported that they had severe pain. The results after 10 days of treatment showed that 13 candidates (26%) had mild pain, 30 candidates (60%) had moderate pain and only 7 candidates (14%) had severe pain. In the 15<sup>th</sup> day follow up results showed that, 36 out of 50 candidates (72%) had mild pain and remaining 13 candidates (26%) had

moderate pain. Results of Group – 2 patients received Povidone – Iodine ointment treatment showed that, before starting the treatment 49 candidates (98%) had severe pain and remaining 1 candidate (2%) had moderate pain. After treatment, in the 5<sup>th</sup> day follow up, 9 candidates (18%) had moderate pain and 41 candidates (82%) had

severe pain. In the 10<sup>th</sup> day follow up, 42 candidates (84%) had moderate pain and 8 candidates (16%) had severe pain. In the 15<sup>th</sup> day follow up, 4 candidates (8%) had mild pain and remaining 46 candidates (92%) had moderate pain. In both groups none of the patients had severe pain in the 15<sup>th</sup> day follow up (Table 2).

Table 1: Assessment of pain in Group -1 patients received honey treatment.

Pain	Before treatment		During treatment					
			5 <sup>th</sup> day follow up		10 <sup>th</sup> day follow up		15 <sup>th</sup> day follow up	
	No	%	No	%	No	%	No	%
Nil	—	—	—	—	—	—	1	2
Mild	—	—	—	—	13	26	36	72
Moderate	1	2	23	46	30	60	13	26
Severe	49	98	27	54	7	14	—	—
Total	50	100	50	100	50	100	50	100

No – Number of patients

Table 2: Assessment of pain in Group -2 patients received Povidone – Iodine ointment treatment

Pain	Before treatment		During treatment					
			5 <sup>th</sup> day follow up		10 <sup>th</sup> day follow up		15 <sup>th</sup> day follow up	
	No	%	No	%	No	%	No	%
Nil	—	—	—	—	—	—	—	—
Mild	—	—	—	—	—	—	4	8
Moderate	1	2	9	18	42	84	46	92
Severe	49	98	41	82	8	16	—	—
Total	50	100	50	100	50	100	50	100

No – Number of patients

Table 3: Assessment of quality of life in Group -1 patients received honey treatment

Quality of life	Before treatment		After treatment	
	No	%	No	%
Poor	41	82.0	Nil	0.0
Fair	9	18.0	43	86.0
Good	Nil	0.0	7	14.0
Total	50	100	50	100

No - Number of patients

Table 4: Assessment of quality of life in Group -2 patients received Povidone – Iodine ointment treatment

Quality of life	Before treatment		After treatment	
	No	%	No	%
Poor	33	66.0	1	2.0
Fair	17	34.0	43	86.0
Good	Nil	0.0	6	12.0
Total	50	100.0	50	100.0

No - Number of patients

Regarding with quality of life score in Group – 1 patient, the results showed that initially the quality of life was poor for 41 candidates (82%) and for the remaining 9 candidates (18%) it was fair. After treatment with honey, the quality of life was fair for 43

candidates (86%) and it was good for the remaining 7 candidates (Table 3). In case of Group – 2, before treatment, the quality of life of 33 patients (66%) was poor. Rests, 17 patients (34%) said their quality of life was fair. After treatment with Povidone – Iodine ointment, the quality of life was poor for one patient (2%) and it was fair for 43 patients (86%) and good for 6 patients (Table 4).

Analysis of the effect of honey on wound healing showed that, before starting the treatment the mean wound score was  $42.5 \pm 4.4$  and during treatment, in the 5<sup>th</sup> day follow up it was  $38.0 \pm 2.9$ , in the 10<sup>th</sup> day follow up the mean wound score was  $33.5 \pm 3.0$  and finally in the 15<sup>th</sup> day follow up it was  $29.0 \pm 2.1$ . The results were statistically significant (Table 5). In Group – 2, the results showed that the mean wound score before starting the Povidone – Iodine ointment treatment was  $41.4 \pm 4.1$ . After

starting the treatment, in the 5<sup>th</sup> day follow up it was 33.2 ± 3.1. 10<sup>th</sup> day follow up showed 26.2 ± 2.6 and 15<sup>th</sup> day follow up

showed 21.6 ± 2.4 mean wound scores (Table 6). These results were statistically significant.

Table 5: Effect of honey on mean wound scores in Group -1 patients

Before treatment	I	N W S	t	df	significance
42.5 ± 4.4	38.0 ± 2.9	4.5 ± 2.9	11.048	49	P<0.001
Before treatment	II	N W S	t	df	significance
42.5 ± 4.4	33.5 ± 3.0	9.0 ± 3.4	18.676	49	P<0.001
Before treatment	III	N W S	t	df	significance
42.5 ± 4.4	29.0 ± 2.1	13.5 ± 3.3	28.656	49	P<0.001
I	II	N W S	t	df	significance
38.0 ± 2.9	33.5 ± 3.0	4.5 ± 1.5	21.201	49	P<0.001
I	III	N W S	t	df	significance
38.0 ± 2.9	29.0 ± 2.1	9.0 ± 1.8	34.640	49	P<0.001
II	III	N W S	t	df	significance
33.5 ± 3.0	29.0 ± 2.1	4.5 ± 1.5	21.789	49	P<0.001

I – 5<sup>th</sup> day follow up during treatment; II – 10<sup>th</sup> day follow up during treatment.  
III – 15<sup>th</sup> day follow up during treatment; NWS – net wound healing score

Table 6: Effect of Povidone – Iodine ointment on mean wound scores in Group -2 patients

Before treatment	I	N W S	t	df	significance
41.4 ± 4.1	33.2 ± 3.1	8.2 ± 3.3	17.767	49	P<0.001
Before treatment	II	N W S	t	df	significance
41.4 ± 4.1	26.2 ± 2.6	15.2 ± 3.8	28.355	49	P<0.001
Before treatment	III	N W S	t	df	significance
41.4 ± 4.1	21.6 ± 2.4	19.8 ± 4.1	34.047	49	P<0.001
I	II	N W S	t	df	significance
33.2 ± 3.1	26.2 ± 2.6	7.0 ± 2.2	22.443	49	P<0.001
I	III	N W S	t	df	significance
33.2 ± 3.1	21.6 ± 2.4	11.6 ± 2.8	28.781	49	P<0.001
II	III	N W S	t	df	significance
26.2 ± 2.6	21.6 ± 2.4	4.6 ± 1.8	18.091	49	P<0.001

I – 5<sup>th</sup> day follow up during treatment; II – 10<sup>th</sup> day follow up during treatment.  
III – 15<sup>th</sup> day follow up during treatment; NWS – net wound healing score

Comparison of mean wound scores of Group – 1 and 2 patients revealed that, in Group – 1 the initial mean wound score was 42.5 ± 4.4. In the 5<sup>th</sup> day follow up, the results showed that the net wound healing score was 4.5 ± 2.9; it was increased to 9.0 ± 3.4 in the 10<sup>th</sup> day follow up and finally reached 13.5 ± 3.3 in the 15<sup>th</sup> day follow up. In case of Group – 2, the initial score was 41.4 ± 4.1. In the 5<sup>th</sup> day follow up, the net wound healing score was 8.2 ± 3.3; it was increased to 15.2 ± 3.8 in the 10<sup>th</sup> day follow up and finally reached 19.8 ± 4.1 in the 15<sup>th</sup> day follow up. From these results, it was found that the net wound healing score of

Povidone – Iodine ointment was significantly greater than honey.

## DISCUSSION

The present study was aimed to assess the effect of honey and Povidone – Iodine ointment on the chronic diabetic ulcer. The study was conducted among the 100 in-patients of Shanthi Hospital, located in Tisayanvilai, Tirunelveli District of Tamil nadu, South India. The total study population was divided in to two groups of 50 members each. Group – 1 received honey treatment. Group – 2 received Povidone –

Iodine ointment 10% w/w (Betadine ointment) treatment.

Regarding with pain in Group – 1 patient, before treatment, 98% of them had severe pain and 2% had moderate pain. After treatment, in the 15<sup>th</sup> day follow up, none of the patient had severe pain. 72 and 26% of them had mild and moderate pain respectively and 2% had no pain. In case of Group – 2, before treatment 98% had severe pain and 2% had moderate pain. After treatment, in the 15<sup>th</sup> day follow up, none of the patient had severe pain. 92% had moderate and 8% had mild pain level. Regarding with the quality of life of Group – 1 patient, before treatment 82 and 18% of patients had a poor and fair quality of life respectively. After treatment 86% of patients had a fair and 14% of patients had a good quality of life. In case of Group – 2, before treatment, 66 and 34% of patients had a poor and fair quality of life respectively. After treatment 86% of patients had a fair and 12% of patients had a good and 2% patients had a poor quality of life. There was no statistically significant association between the age, sex, education, marital status, occupation, smoking, alcohol usage and ulcer duration with the quality of life of patients. Before treatment, the mean wound score of Group -1 patient was  $42.5 \pm 4.4$  and the same was  $38.0 \pm 2.9$  in the 5<sup>th</sup> day follow up. Further in 10<sup>th</sup> and 15<sup>th</sup> day follow up it was  $33.5 \pm 3.0$  and  $29.0 \pm 2.1$  respectively. The net wound healing score of honey was  $4.5 \pm 2.9$  in the 5<sup>th</sup> day follow up, it was increased to  $9.0 \pm 3.4$  in the 10<sup>th</sup> day follow up and finally reached  $13.5 \pm 3.3$  in the 15<sup>th</sup> day follow up. In case of Group – 2, before treatment, the mean wound score was  $41.4 \pm 4.1$  and the same was  $33.2 \pm 3.1$  in the 5<sup>th</sup> day follow up. Further in 10<sup>th</sup> and 15<sup>th</sup> day follow up it was  $26.2 \pm 2.6$  and  $21.6 \pm 2.4$  respectively. The net wound healing score of Povidone – Iodine ointment was  $8.2 \pm 3.3$  in the 5<sup>th</sup> day follow up, it was increased to

$15.2 \pm 3.8$  in the 10<sup>th</sup> day follow up and finally reached  $19.8 \pm 4.1$  in the 15<sup>th</sup> day follow up. Thus the Povidone – Iodine ointment had a significant wound healing effect comparing with honey.

## CONCLUSION

The present study revealed the effectiveness of honey and Povidone – Iodine ointment in chronic diabetic ulcers. From this study it was clear that the Povidone – Iodine ointment showed a significant wound healing effect comparing with honey. However the honey showed a significant effect on pain and quality of life. Of course the level of wound healing will differ from one individual to other. Moreover honey is a natural source but the ointment used was prepared artificially. A similar study with larger sample size and longer duration in the future may give more valuable results.

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