

## Study of Comparison between Honey Dressing and Betadine Dressing in Diabetic Foot Patient

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### Abstract:

**Background:** Wounds and their management are fundamental in the practice of surgery. Honey dressing is new concept in management of diabetic foot patients. Very few studies conducted to compare the efficacy of Honey dressing and betadine dressing. Hence, this study is conducted as diabetic foot ulcers are a great burden on the Healthcare system.

**Aim & objectives:** To Compare the Efficacy of Honey dressing versus betadine dressing in the Management of diabetic foot Ulcers.

**Materials and Methods:** After getting ethical clearance certificate from ethical committee of SMIMER-Surat, 60 Patients with diabetic foot admitted in Department of Surgery at Surat Municipal Institute Of Medical Education and Research-Surat (SMIMER-SURAT) were screened and selected for study during July 2018 to October 2019.

According to inclusion criteria, They were randomized into two equal group of 30 patients: group-A, honey dressing (HONEY) and group-B, betadine dressing (BETADINE), Various Assessment Tools were used to compare wound healing between honey and betadine groups, assessments were done on day 1,3,5,7,9,12,15,18,21. Data analysis was done by appropriate statistical tests (descriptive analysis, Two sample independent t- test).

**Results:** The findings shows that, in the group-A, 18(60.0%) patients were in the age group of 60-65 years and 20(66.7%) were males; 27(90.0%) were from low socio-economical status; 12(40%) patients had habit of smoking and 8(26.7%) had habit of alcoholism; 10(33.3%) had habit of tobacco chewing, 22(73.33%) were vegetarians and 27(90%) had habit of wearing foot wear. All patients having type-2 DM. in group-A, 17(56.7%) patients were on irregular anti-diabetic treatment, 15(50.0%) patients were on regular diabetic diet. In group-A, 13(43.3%) patients were having grade-2 slough present in ulcer, 18(60.0%) patients were having grade-2 diabetic ulcer according to Wagner classification. There was earlier appearance of granulation and epithelialization in HONEY group. Resolution of periwound erythema and periwound edema was earlier in HONEY group compared to BETADINE Group. There was shorter duration of hospital stay, earlier wound disinfection and more number of patients who underwent skin grafting in HONEY group compared to BETADINE group. Which shows that honey dressing was effective in improving the diabetic wound status compare to conventional betadine dressing of patients with diabetic foot ulcer at  $p < 0.05$  level.

**Conclusion:** This study shows more favorable results for HONEY as compared to BETADINE in healing of diabetic foot ulcers which are highly statistically significant. Honey dressing, has faster response in wound healing and gives better efficacy as compared to the traditional betadine solution for use in wound care in management of diabetic foot ulcer.

**Key Word:** Diabetic foot, Honey dressing, Betadine dressing.

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### I. Introduction

The word diabetes is a Greek word meaning a siphon i.e., a tap. As patients with diabetes had polyuria and passed water like a siphon, the 2nd century A.D. Greek physician, Aretus named the condition so. The word mellitus is a Latin word, which means honey and also refers to a bee. Diabetes is previously known as the disease of the rich people. But now there is no partiality between the rich and poor and it has become the third leading cause of death. According to the American Diabetes Association (ADA) expert committee on 'the diagnosis and classification of diabetes mellitus', 2003, diabetes mellitus is a group of metabolic disease characterized by elevated levels of glucose in the blood (hyperglycaemia) resulting from defects in insulin secretion, insulin action, or both<sup>1</sup>.

The prevalence of diabetes in the urban areas of India have increased in the last 2 decades and in the urbanizing rural population, it was found to be midway between the rural and urban population<sup>2</sup>.

The chronic diabetic complications are macro-vascular complications (coronary artery disease, cerebrovascular disease, and peripheral vascular disease), micro-vascular complications (kidney and eye disease) and neuropathic complications (disease of the nerves). The most common complication of diabetes in the lower extremity is the diabetic foot ulcer<sup>1</sup>. It is estimated that reductions in amputations rates between 45% and 85% can be achieved through the adoption and implementation of well organized diabetic foot care. During the last years, new trends and initiatives have been launched. Many studies have demonstrated that honey has better antibacterial, anti-inflammatory and healing effects<sup>3</sup>. So the investigator studied about the benefits of honey in detail.

We discovered that even up to the Second World War, honey was being used for its antibacterial properties in treating wounds. Medicinal qualities of honey have taken a back seat with the advent of penicillin and other antibiotic drugs in the twentieth century. But this has to be changed. Honey has a wide range of amino acids, vitamins and trace elements. All these also have direct nutrient effect on regenerating tissues. Dirt and debris from the wound bed is lifted by the osmotic outflow after the application of honey. Thus, the dressing is non-sticky and enables dressing change pain free<sup>4</sup>.

We selected this honey as the intervention admired by its numerous actions on the wound healing. So We selected natural honey for dressing which has improved outcome, economic advantages and decrease antibiotic use and resistance. Domiciliary care is possible along with rapid return to work with its use. Honey has been shown to give good results on a very wide range of wounds and it is therefore mystifying that there appears to be a lack of universal acceptance of honey as a wound dressing<sup>5</sup>.

## **II. Aim & Objectives**

The present prospective study was undertaken to compare the Efficacy of honey dressing versus betadine dressing in the Management of diabetic foot ulcer to observe:

1. Appearance of Granulation tissue
2. Appearance of Epithelialization
3. Periwound edema resolution
4. Periwound Erythema resolution
5. Wound disinfection
6. Duration of Hospital stay

The objective of this study is to determine whether or not honey could be used as an effective wound dressing option in the treatment of diabetic foot ulcers

## **III. Material And Methods**

After getting ethical clearance certificate from ethical committee of SMIMER-Surat, 60 Patients with diabetic foot admitted in Department of Surgery at Surat Municipal Institute Of Medical Education and Research-Surat (SMIMER-SURAT) were screened and selected for study during July 2018 to October 2019.

According to inclusion criteria, they were randomized into two equal groups of 30 patients: group-A, honey dressing (HONEY) and group-B, betadine dressing (BETADINE), Data analysis was done by appropriate statistical tests (descriptive analysis, Two sample independent t- test).

Assessments were done on day 1,3,5,7,9,12,15,18,21. Various Assessment Tools were used to compare wound healing between honey and betadine groups based on:

- appearance of Granulation tissue
- appearance of Epithelialization
- resolution of Periwound Erythema
- resolution of Periwound Edema
- Organisms Isolated/Growth on Culture sensitivity
- procedures done (skin grafting/Debridement/Fasciotomy/no procedure)
- duration of hospitalization
- Day of wound disinfection.

Antibiotic coverage was given for all patients, in some patients intravenous antibiotics was followed by oral antibiotics Pain during dressing was recorded according to pain scale.

### **Inclusion Criteria:**

1. Age: >18years
2. Diabetic Ulcers
3. Who are willing to participate in study

**Exclusion Criteria:**

1. Age: <18yrs
2. Ischemic Ulcers
3. Venous Ulcers
4. Malignant Ulcers
5. Decubitus Ulcers
6. Trophic Ulcers
7. Osteomyelitis
8. Sinuses
9. Patients with Chronic Renal Failure
10. Autoimmune Disorders
11. Patients on long term use of Cytotoxic Drugs /Corticosteroids
12. Immunosuppression
13. Pending amputation
14. Patient with septicemia
15. patient with co-morbid systemic condition
16. patients lost to follow up

**IV. Result**

Details of the data analyzed and the findings under the following section:

**Section- A:** This section deals with comparison of the demographic variables (biographic , personal , illness related variables) in both groups

**TABLE 1 Frequency and percentage distribution of patients according to their biographic variables in group-A and group-B**

Sl. No.	Biographic Variables		Group=A (n=30)		Group=B (n=30)	
			F	%	F	%
1.	Age	30-39 years	3	10	3	10
		40-49 years	3	10	3	10
		50-59 years	6	20	7	23.3
		60 years and above	18	60	17	56.7
2.	Sex	Male	20	66.7	20	66.7
		Female	10	33.3	10	33.3
3.	Socio-economical Status	Lower class	27	90	27	90
		Middle class	3	10	3	10
		High class	0	0	0	0

The above table shows that, in group-A, 18(60.0%) patients were in the age group of 60-65 years and 20(66.7%) were males; 27(90.0%) were from low socio-economical status. In group-B, 17(56.7%) patients were in the age group of 60-65 years and 20(66.7%) were males; 27(90.0%) were from low socio-economical status.

**TABLE 2** Frequency and percentage distribution of patients according to their personal variables in group-A and group-B

Sl. No.	Personal Variables		Group=A (n=30)		Group=B (n=30)	
			F	%	F	%
1.	<b>Habit of Smoking</b>	Yes	12	40	10	33.3
		No	18	60	20	66.7
2.	<b>If yes, duration of smoking</b>	Less than 1 year	0	0	0	0
		1-3 years	0	0	0	0
		4-6 years	0	0	0	0
		7-9 years	3	25	2	20
		Above 10 years	9	75	8	80
3.	<b>Habit of Alcoholism</b>	Yes	8	26.7	9	30
		No	22	73.3	21	70
4.	<b>If yes, duration of alcoholism</b>	Less than 1 year	0	0	0	0
		1-3 years	0	0	0	0
		4-6 years	0	0	0	0
		7-9 years	2	25	2	22.2
		Above 10 years	6	75	7	77.8
5.	<b>Habit of Tobacco</b>	Yes	10	33.3	11	36.7
		No	20	66.7	19	63.3
6.	<b>If yes, duration of tobacco</b>	Less than 1 year	0	0	0	0
		1-3 years	0	0	0	0
		4-6 years	0	0	0	0
		7-9 years	5	50%	6	54.5
		Above 10 years	5	50%	5	45.5
7.	<b>Dietary pattern</b>	Vegetarian	22	73.3	25	83.3
		Non-vegetarian	8	26.7	5	16.7
8.	<b>Habit of wearing foot wear</b>	Yes	27	90	27	90
		No	3	10	3	10
9.	<b>If yes, type of foot wear</b>	Slippers	19	70.4	20	74
		Shoes	8	29.6	7	26
		Special chappals	0	0	0	0

The above table shows that, in group-A, 12(40%) patients had habit of smoking and 9(75%) among them had smoking for above 10 years; 8(26.7%) patients had the habit of alcoholism and 6(75%) among them, were alcoholic for more than 10 years;10(33.3%) patients had the habit of tobacco chewing and 5(50.0%) among them, were chewing tobacco for more than 10 years, majority, i.e., 22(73.3%) of the patients were vegetarians and most of them, i.e., 27(90%) have the habit of wearing foot wear and 19(70.4%) among them wear slippers. In group-B, 10(33.3%) patients had habit of smoking and 8(80%) among them had smoking for above 10 years; 9(30%) patients had the habit of alcoholism and 7(77.8%) among them,were alcoholic for more than 10 years;11(36.7%) patients had the habit of tobacco chewing and 5(4.5%) among them, were chewing tobacco for more than 10 years, majority, i.e., 25(83.3%) of the patients were vegetarians and most of them, i.e., 27(90%) have the habit of wearing foot wear and 20(74%) among them wear slippers.

**TABLE 3 Frequency and percentage distribution of patients according to their illness related variables in group-A and group-B**

Sl. No.	Illness related Variables	Group=A (n=30)		Group=B (n=30)		
		F	%	F	%	
1.	Type of Diabetes Mellitus	Type I DM	0	0	0	0
		Type II DM	30	100	30	100
2.	Whether on anti diabetic treatment	Regular treatment	12	40	11	36.7
		Irregular treatment	17	56.7	18	60
		No treatment	1	3.3	1	3.3
3.	Duration of illness	Less than 1 year	0	0	0	0
		1-3 years	1	3.3	1	3.3
		4-6 years	4	13.3	1	3.3
		7-9 years	5	16.7	3	10
		Above 10 years	20	66.7	25	83.4
4.	Duration of diabetic foot ulcer	Less than 1 year	20	66.7	25	83.4
		1-3 years	5	16.7	3	10
		4-6 years	4	13.3	1	3.3
		7-9 years	1	3.3	1	3.3
		Above 10 years	0	0	0	0
5.	Whether on diabetic diet	Regular diabetic diet	10	33.3	8	26.6
		Irregular diabetic diet	15	50	18	60
		No	5	16.7	4	13.4

The above table shows that in group-A, all, i.e., 30(100%) of the patients were of type II diabetes and 17(56.7%) were on irregular anti-diabetic treatment; 20(66.7%) of the patients had diabetes for more than 10 years and majority i.e., 20(66.7%) of them had diabetic foot ulcer for less than 1 year; 15(50%) were on irregular diabetic diet.

In group-B, all 30(100%) of the patients were of type II diabetes and 18(60%) were on irregular anti-diabetic treatment; majority, i.e., 25(83.4%) of the patients had diabetes for more than 10 years and almost all, i.e., 25(83.4%) of them had diabetic foot ulcer for less than 1 year; 18(66%) were on irregular diabetic diet.

**Section- B:** Assessment of the diabetic wound status in both groups

**TABLE 4** Frequency and percentage distribution of Patients According to their diabetic foot ulcer related Variables in group-A and group-B

Sl. No.	Illness related Variables		Group-A (n=30)		Group-B (n=30)	
			F	%	F	%
1.	Affected Limb	Right lower limb	18	60	11	36.7
		Left lower limb	9	30	18	60
		Both limb	3	10	1	3.3
2.	Position of ulcer	Dorsum	15	50	18	60
		Medial malleolus	2	6.6	1	3.3
		lateral malleolus	2	6.6	1	3.3
		Toes	5	16.7	6	20
		Leg	5	16.7	3	10
		Thigh	1	3.3	1	3.3
3.	Slough present in ulcer	GRADE-1	3	10.0	4	13.3
		GRADE-2	13	43.3	11	36.7
		GRADE-3	10	33.3	11	36.7
		GRADE-4	4	13.3	4	13.3
4.	Grading of ulcer (Wagner classification.)	GRADE-1	9	30%	9	30%
		GRADE-2	18	60%	18	60%
		GRADE-3	3	10%	3	10%
		GRADE-4	0	0	0	0
		GRADE-5	0	0	0	0

The above table shows that in group-A, majority 18(60%) of them having right lower limb diabetic foot and majority of ulcer 15(50%) of them having ulcer over dorsum of foot. In group-B, majority 18(60%) of them having left lower limb diabetic foot and majority of ulcer 18(60%) of them having ulcer over dorsum of foot.

**SECTION-C:** This section deals with the Comparison of mean, standard deviation and mean difference of different variant for diabetic wound status among patients with diabetic foot ulcer in group-A (honey dressing) and group-B (betadine dressing) to check effectiveness of honey dressing in diabetic foot.

**TABLE 5** comparison of wound healing in diabetic foot patients using different variables in Group-A and Group-B.

Observation of variables	Mean ± SD of various groups	
	Group A (HONEY)	Group B (BETADINE)
1.Appearance of Granulation tissue (days)	4.0± 1.34	7.4 ± 1.2
2. Appearance of Epithelialization (days)	9.06± 2.36	12.36± 2.68
3.Days of Resolution of	4.93± 1.65	7.13 2.04

<b>Peri wound Erythema (days)</b>		
<b>4.Days of Resolution of Peri wound Edema (days)</b>	<b>8.83 ± 2.4</b>	<b>11.6 ± 2.93</b>
<b>5.Days of Wound Disinfection (days)</b>	<b>8.96 ± 2.93</b>	<b>12.6± 3.63</b>
<b>6.Mean duration of hospitalization (days)</b>	<b>15.5 ± 2.8</b>	<b>18.5 ± 2.8</b>
<b>7.Pain during dressing Pain rating scale (0-10)</b>	<b>Group A (HONEY)</b>	<b>Group B (BETADINE)</b>
<b>Mild</b>	<b>14(46.7%)</b>	<b>7(23.3%)</b>
<b>Moderate</b>	<b>12(40%)</b>	<b>15(50%)</b>
<b>Severe</b>	<b>4(13.3%)</b>	<b>8(26.7%)</b>

The above table shows comparison between honey dressing and betadine dressing in patients of diabetic foot with the use of different variables. There was earlier appearance of granulation and epithelialization in HONEY group. Resolution of peri wound erythema and peri wound edema was earlier in HONEY group compared to BETADINE Group. There was shorter duration of hospital stay, less or no pain during dressing, earlier wound disinfection and more number of patients who underwent skin grafting in HONEY group compared to BETADINE group. Which shows that honey dressing was effective in improving the diabetic wound status compare to conventional betadine dressing of patients with diabetic foot ulcer at p<0.05 level.

### V. Discussion

We found that, in group-A(honey),18(60.0%) patients were in the age group of 60-65 years and in group-B(betadine),17(56.7%) patients were in the age group of 60-65 years. This study was supported by Widatalla, A. H., et. al., (2009)<sup>6</sup>, who did a study on implementation of diabetic foot ulcer classification system. In his study, 2,321 patients were studied and about 70% of them were in the age group between 60-65years. Guo et al.(2013)<sup>7</sup>, who did study of honey dressing on diabetic foot. study having mean age of 55.72±29.14. siavash et al.(2015)<sup>8</sup>, who did study of honey dressing on diabetic foot. study having mean age of 60±7. Tsang et al. (2017)<sup>9</sup>, who did comparative study of honey dressing and betadine dressing in diabetic foot. Study having mean age of 65.6±11.42.

In a study conducted by V.Kapur et al<sup>10</sup> diabetic foot ulcer and chronic leg ulcers patients and acute abscesses treated with honey also showed early granulation and Epithelialization and earlier resolution of Peri wound Erythema and Peri wound edema when compared to betadine group at a mean follow up of 21 days.

Our study is supported by, Naeem-ullah et al. (2013)<sup>11</sup>, did study of comparison of conventional betadine dressing with honey dressing for the treatment of wounds concluded that Honey dressing is better alternative compare to betadine dressing as dressing changes were painless and cost of therapy was low.

Hence, in the current study there was faster healing rate of ulcers treated with honey compared to betadine, proving honey to be safe, efficient and superior as a wound care product compared to betadine in the management of lower limb ulcers.

This study was supported by Medhi, B., et. al., (2005)<sup>12</sup>, who conducted a meta-analysis on topical application of honey in the treatment of wound healing. The aim of the study was to evaluate the efficacy of topical application honey in observational studies as well as in controlled clinical trials in the treatment of wound healing. A systematic literature search was carried out from 1966 to2005 in Pubmed, Medline, Embase, Cochrane database using the appropriate search key words. They found 5 observational studies with 160 patients while 963 cases in 10 controlled clinical trials where 511 patients were treated with honey. Efficacy was found highly efficacious in observational studies and in controlled clinical trials. Most of the patients reported with complete healing of 99% within 2-9 weeks. So based on the above trials it was concluded that topical application of honey is useful for the treatment for wound healing, but to fully establish its efficacy, larger prospective double blind study is required in near future.



**FIGURE 15** Day 1:  
Slough present with Gangrene 4<sup>th</sup> toe



**FIGURE 16** Day 12: Post Disarticulation, ulcer completely covered by granulation; Pt underwent SSG in honey dressing

## VI. Conclusion

This prospective study was done to compare the Efficacy of honey dressing with betadine dressing in the management of diabetic foot ulcers.

This study shows more favorable results for honey dressing as compared to betadine dressing in healing of diabetic foot ulcers which are highly statistically significant.

In patients treated with honey dressing, comparatively we found that there was:

- Earlier appearance of granulation
- Earlier appearance Epithelialization
- Earlier resolution of Periwound Erythema
- Earlier resolution of Periwound edema
- Early wound disinfection
- Shorter duration of hospitalization

This study confirms that honey dressing with its moistening effects and cost effectiveness is safe, has faster response in wound healing and gives better efficacy as compared to the traditional betadine dressing in wound care in diabetic foot ulcers. Hence it is a good choice for management of diabetic foot ulcers

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