# COMPARISON OF CONVENTIONAL PYODINE DRESSING WITH HONEY DRESSING FOR THE TREATMENT OF DIABETIC FOOT ULCERS

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## *ABSTRACT*

***Objective:*** *To compare the conventional pyodine dressing with honey dressing in terms of recovery time and outcome (healed or ended up with amputation) in diabetic foot ulcers.*

***Methodology:*** *This quasi-experimental study was performed in surgical "C" ward, Lady Reading Hospital Peshawar from November 2007 to November 2008. All Wegner's grade I-IV, unilateral diabetic foot ulcer patients were admitted and their blood sugar profile, cardiac and renal status were investigated. Patients were assigned to group A and B with simple convenience method. After ample wound debridement group A and B were treated with daily conventional Pyodine dressing and Honey dressing respectively and their recovery time, outcome were recorded during the 10 weeks follow up period.*

***Results:*** *A total of 100 patients with 50 patients in each group A and B were enrolled in the study with mean age 56±8.0 years and male to female ratio of 1.7:1. Recovery time was significantly quicker in the Group B (Honey Dressing) as compared with the group A (conventional Pyodine dressing) with a p-valve of <0.0001. Healing rate was 69% and amputation rate was 31% as a whole. Healing rate was 66% in the Group A in comparison with 72% in the group B while amputation rates were 34% and 28% in the group A and B respectively with no statistical significance with a p-value of 0.6658.*

***Conclusion:*** *Honey dressing is more effective than conventional Pyodine dressing in terms of recovery time in the treatment of diabetic foot ulcer.*


***Key Words:*** *Diabetic foot ulcer, Wegner's classification, amputation*

This article may be cited as: Jan WA, Shah H, Khan M, Fayaz M, Ullah N. Comparison of Conventional Pyodine Dressing with honey dressing for the treatment of Diabetic Foot Ulcers. J Postgrad Med Inst 2012; 26(4): 402-7.

## INTRODUCTION

Diabetes mellitus is one of the most common chronic diseases and is a major health resources consumer worldwide. The prevalence of diabetic patients older than 20 years is expected to reach 300,000,000 in the world by the year 2025[1].

The diabetic foot ulcer is one of the common chronic complications of diabetes mellitus causing non-traumatic amputations leading to morbidity and mortality[2]. It affects about 10% of the population having diabetes with a life time risk of diabetic foot ulcer as 15%. The risk of lower extremity amputation is 15-40 times higher as compared to their non-diabetic couterparts[3]. About 1/100 diabetic patients require an amputation per year[4]. Biomechanical dysfunction and deformities, limited joint mobility, trauma, high planter pressures, peripheral vascular disease, duration of diabetes and glycosylated hemoglobinemia are the risk factors for the diabetic foot disease[5]. Diabetic foot disease is classified according to Wegner's on the basis of grade of the disease as grade 0; Skin intact but bony deformities produce a "foot at risk", grade I; Localized superficial ulcer, grade II; Deep ulcer involving ligament, tendon, joint capsule or fascia, grade III; Deep ulcer with abscess and/or osteomyelitis, grade IV; Gangrene of the toes or fore-foot, grade V; Gangrene of entire foot[6].

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Date Received: February 17, 2011
Date Revised: August 07, 2012
Date Accepted: August 21, 2012

Studies are lacking to provide ample evidence that honey is more effective dressing for diabetic foot ulcers. This study is aimed to determine the effectiveness of honey dressing in diabetic foot ulcers.

## METHODOLOGY

This quasi-experimental study was performed in surgical "C" ward, Lady Reading Hospital Peshawar from November 2007 to November 2008. All the patients with Wegener's Grade I to IV unilateral, diabetic foot ulcers were included in the study and patients not willing for the study after counseling, age more than 70 years and those who were already on other treatments were excluded from the study population. Patients were admitted from out-patients, emergency departments and referrals from Medical units and assigned to group A (pyodine dressing) or group B (honey dressing) through simple convenience method. Patients' detailed history, general clinical examination, local examination was documented and diabetic foot ulcers were classified according to Wegener's classification. Investigations for diabetic control, cardiac and renal status were performed. After proper surgical debridement group A was treated with conventional daily pyodine dressing ( Pyodine soaked surgical gauze was placed on the wound followed by dry gauze on the top of it and then confounding crepe bandage was applied in Pyodine dressing) and group B with daily honey application. Proper blood sugar control was ensured in both groups by daily sugar charting. Recovery time (2-4, 5-7, 8-10 weeks), outcome (Healed, amputated) were noted for each patient. Amputation type (Ray, trans-metatarsal, digital, below knee, above knee) were also documented in those who underwent amputation. Data were organized and analyzed with the help of Statistical Package for Social Sciences (SPSS 17) and GraphPad InStat. Results were expressed in the form of tables and graphs.

## RESULTS

Total of 100 patients were included in the study with age ranging from 38 to 70 years with mean age of 56±8.0 years consisting of 63 male and 37 female patients with male to female ratio

**Table 1: Type of Amputations Performed**

| Amputation Type | Frequency | Percent | Valid Percent |
|---|---|---|---|
| No amputation | 69 | 69.0 | 69.0 |
| Trans-metatarsal | 7 | 7.0 | 7.0 |
| Ray | 7 | 7.0 | 7.0 |
| Digital | 16 | 16.0 | 16.0 |
| Below Kneel | 1 | 1.0 | 1.0 |
| Total | 100 | 100.0 | 100.0 |

**Table 2: Treatment Type, Recovery Time, Grade Cross Tabulation**

| Grade | | | Recovery Time | | | Total |
|---|---|---|---|---|---|---|
| | | | 2-4 weeks | 5-7 weeks | 8-10 weeks | |
| I | Treatment Type | Honey Dressing | 11 | 0 | - | 11 |
| | | Pyodine Dressing | 12 | 1 | - | 13 |
| | Total | | 23 | 1 | - | 24 |
| II | Treatment Type | Honey Dressing | 13 | 0 | - | 13 |
| | | Pyodine Dressing | 3 | 11 | - | 14 |
| | Total | | 16 | 11 | - | 27 |
| III | Treatment Type | Honey Dressing | 5 | 3 | 0 | 8 |
| | | Pyodine Dressing | 0 | 1 | 7 | 8 |
| | Total | | 5 | 4 | 7 | 16 |
| IV | Treatment Type | Honey Dressing | 1 | 14 | 3 | 18 |
| | | Pyodine Dressing | 0 | 0 | 15 | 15 |
| | Total | | 1 | 14 | 18 | 33 |

of 1.7:1. Out the total (N=100), 50 patients were included in group A and B by simple convenience method. Wegener's grade I, II, III and IV had 24%, 27%, 16%, and 33% patients respectively. As a whole healing rate was sixty nine percent and amputation rate was thirty one percent. Two percent patients required split thickness skin graft.

**Recovery time:**

In group A (Conventional Pyodine Dressing), 30% patients healed in 2-4 weeks, 26% in 5-7 weeks while 44% in 8-10 weeks while in group B (Honey Dressing), 60 % patients healed in 2-4 weeks, 34% in 5-7 weeks and 6% patients in 8-10 weeks. So the recovery time was significantly quicker in the group B than group A with a p-valve of <0.0001 ($X^2$ test) at 95% confidence interval (Table 2, 3).

**Outcome:**

In Group A (Conventional Pyodine Dressing), healing rate was 66% and amputation rate was 34%. In contrast group B had healing and amputation rates of 72% and 28% respectively

**Table 3: Treatment Type, Recovery Time (Cross Tabulation)**

| Treatment Type | Recovery Time | | | Total |
|---|---|---|---|---|
| | 2-4 weeks | 5-7 weeks | 8-10 weeks | |
| Honey Dressing | 30 (60%) | 17 (34%) | 3 (6%) | 50 |
| Pyodine Dressing | 15 (30%) | 13 (26%) | 22 (44%) | 50 |
| Total | 45 (45%) | 30 (30%) | 25 (25%) | 100 |

**Table 4: Treatment type, outcome (Cross Tabulation)**

| Treatment Type | Outcome | | Total |
|---|---|---|---|
| | Healed | Amputated | |
| Honey Dressing | 36% | 14% | 50 |
| Pyodine Dressing | 33% | 17% | 50 |
| Total | 69% | 31% | 100 |

**Figure 1: Bar chart of Gender and Wegener's grades**

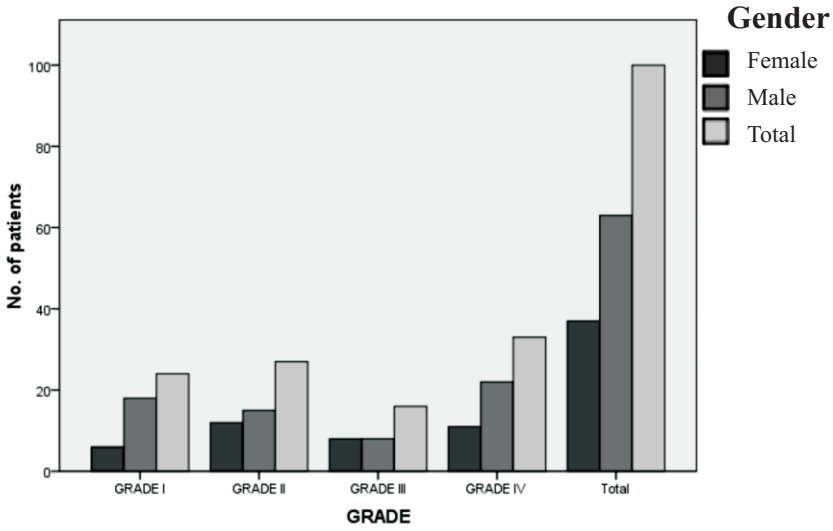
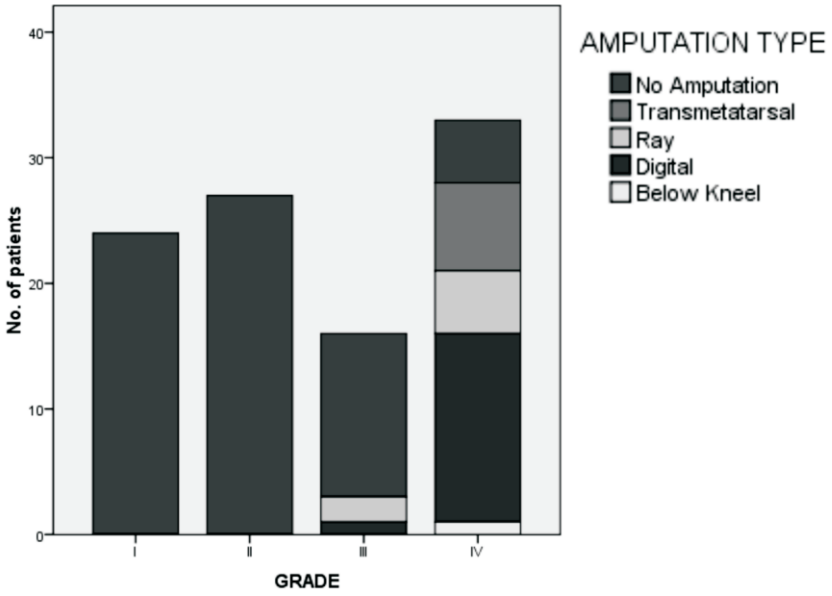


**Figure 2: Bar chart of Amputation type and Wegner's grades**




which was statistically not significant with the p-valve of 0.6658 (Fisher's Exact test) with confidence interval of 95% (Table: 4). Different type of amputations performed are given in Table 1.

## DISCUSSION

Diabetic foot ulcer is one of the major complications of Diabetes mellitus. Major increase in morbidity and mortality among diabetic patients is considered to be due to the development of macro and micro vascular complications, including failure of the wound healing process.

The use of honey as a dressing can be traced back to Roman civilization and "Tib-e-Nabvi". Due to its hyperosmotic sugar contents, honey is sterile and thus inhibits bacterial growth. Honey has a thermolabile inhibin which due to its low pH and hygroscopic qualities acts as an antimicrobial agent. After the discovery of inhibin, honey use was started widely for chronic wounds, burns, chronic leg ulcers, decubitus ulcers and radiation necrosis. Honey has catalase enzyme which helps in the healing process and promotes epithelialization[7]. Pyodine is a bactericidal substance which is believed to provide relatively bacteria free environment for the healing. It is a common belief that stronger the bactericide effect of an antiseptic agent, the more deleterious is its effect on living tissue. Probably because of this belief, many surgeons and general practitioners have long been convinced that iodine preparations, because of their extreme bactericidal effect, did not really promote good wound healing[8].

In current study the age of the study population ranged from 37-70 years with mean age of 56 years which is consistent with observations of Jan WA et al[9] and Makhdoom A et al[10]. in their study.

Male to female ratio was 1.7:1 in this study which is comparable with other studies by Makhdoom A et al[10], Jan WA et al[9] and Tavares DMST et al[11] In another study from Peshawar, Shabbier G et al[12] also observed the higher rates of diabetic foot disease in male patients than female patients.

In this study Wegener's grade I, II, III and IV had 24%, 27%, 16%, and 33% patients respectively. In-contrast to our study Makhdoom A et al[10] observed 28.57%, 42.85% and 28.57% in grade II, III and IV respectively.

As compared to our results of 34% and 28% amputation rates in pyodine dressing and honey dressing group respectively, Jan WA et al[9] and Zaffar A et al[5] showed amputation rates of 38.77% and 36% respectively.

On the basis of medical evidence and focus on clinical aspects, honey has been recently reviewed in literature for treating wounds.[13, 14]. Various studies have shown the effectiveness of

honey for the treatment of diabetic foot ulcers[15], abrasions[16], abscesses[17], amputations[18] and other diabetic ulcers[19]. in the current study, honey group shown quicker recovery time and reduced rates of amputations as compared to conventional pyodine dressing. Seventeen randomized controlled trials involving a total of 1965 participants have shown positive results on honey in wound care. Sixteen trials on experimental animals have also shown the effectiveness of honey in wounds healing. A large amount of evidence in the form of case studies also favors the effectiveness of honey in wound care[20].

Shukrimi A et al[21] also showed Honey to be a safe alternative dressing in diabetic foot ulcers. In contrary Majtan J[22] reported that Manuka honey impairs wound healing in diabetic patients.

## CONCLUSION

Honey dressing is an alternative dressing to the conventional Pyodine dressing with significantly improved recovery time in Wegener's grades I-IV of diabetic of diabetic foot ulcers and further large multicenter studies are suggested to establish its usefulness in the treatment of diabetic foot disease.

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## CONTRIBUTORS

WAJ conceived the idea and planned the study. HS, MK, MF & NU did the data collection and analyzed the study. All the authors contributed significantly to the research that resulted in the submitted manuscript.