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Effect of honey impregnated dressing v/s silver sulfadiazine in healing of chronic ulcer and burns

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Abstract
Introduct209-21ion: The exact number of wound cases is difficult to determine; however, in a country like India, with a population of over 1 billion, there are around 700,000-800,000 burn admissions per year. With availability of various products for dressing this study intends to compare honey dressing v/s silver sulfadiazine at our institute.
Materials and Methods:
Type of study: Prospective Observational
Study design: Cross Sectional Study
Study population:
- **Age:** more than 18 years
- **Gender:** Both male & female

Study duration: 12 Months
Study centre: Department of Surgery, Dhiraj General Hospital
Study sample size: In present study, we have enrolled total 40 patients.
Results: Out of total 40 patients 57.50% were male and 42.50% were female and all the patients were divided into two groups i.e. Honey group and SSD group. Mean age of all the enrolled participants was 59.91 ± 9.89 years. Mean healing days required was significantly less in honey group compare to mean healing days required in SSD group, i.e. 12.47±4.15 vs. 15.78±5.78. We found p value was 0.000 which is highly significant.
Conclusion: Honey dressings is superior to Silver sulfadiazine (SSD) in chronic ulcer and burns, in terms of decreased morbidity, economy, patient well-being and speedy rehabilitation.

Keywords: Honey dressing, silver sulfadiazine, wound, burns

Introduction
The exact number of wound cases is difficult to determine; however, in a country like India, with a population of over 1 billion, there are around 700,000-800,000 burn admissions per year. [1] Wound injuries to the skin result in loss of its protective function as a barrier to micro-organisms leading to the high risk of infection. Thus, patients with wound face high morbidity than mortality because of the large uncovered skin surface getting infected, healing of which takes long periods of dressings, leading to deformities and contractures [2]. Unfortunately, the management of the wounds still remains a matter of debate and an ideal dressing for various wounds has not been discovered. [2] Moreover, in developing countries, wound management is riddled with difficulties.
The utilization of topical chemotherapy has been key in such manner and has enhanced the survival of patients with real consumes and to limit the frequency of consume wound sepsis, a main source of mortality and bleakness in these patients [2]. One of the methodologies that is increasing recharged consideration for fighting the danger of bacterial contamination and averting wound sepsis, is the utilization of honorable metal antimicrobials the most predominant of which is silver [3]. For a considerable length of time silver has been known to have bactericidal properties. As right on time as 1000 B.C., the antimicrobial properties of silver in rendering water consumable were acknowledged [4, 5]. Silver mixes have been abused for their restorative properties for quite a long time too [6]. They were mainstream solutions for lockjaw and stiffness in the nineteenth century and for colds and gonorrhea before the coming of anti-infection agents in the early piece of the twentieth century [7]. A definite verifiable survey about the early utilization of silver to treat different conditions has been as of late distributed [8].

Enthusiasm for silver salts or silver salt arrangements in the treatment of consume patients, be that as it may, totally vanished around the Second World War [9]. It took numerous years for enthusiasm for silver (nitrate) to restore, under the jolt of a production by Moyer *et al*. [10]. At present, silver has reemerged as a feasible treatment choice for diseases experienced in consumes, open injuries, and chronic ulcers.

Several Products have incorporate silver for use as a topical antibacterial specialist, for example, silver nitrate, silver sulphadiazine (SSD) (FlammazineTM, Smith and Nephew Healthcare Limited, Hull, Canada) [11], silver sulphadiazine/chlorhexidine (Silverex1, Motiff Laboratories Pvt. Ltd. Kare Health fortes, Verna, Goa), SSD with cerium nitrate (Flammacerium1, Solvay, Brussels, Belgium), and silver sulphadiazine impregnated lipidocolloid wound dressing Urgotul SSD1 (Laboratories Urgo, Chenove, France) [5, 11-13]. As opposed to these silver operators, recently created items, for example, ActicoatTM (Westaim Biomedical Inc., Fort Saskatchewan, Alberta, Canada) and Silverlon1 (Argentum Medical, L.L.C., Lakemont, Georgia) have a more controlled and delayed arrival of nanocrystalline silver to the injury region. This method of silver conveyance enables the dressings to be changed with less recurrence, along these lines diminishing danger of nosocomial contamination, cost of care, additionally tissue harm and patient distress [4, 14-16].

The best quality level in topical consume treatment is silver sulfadiazine (Ag-SD), a helpful antibacterial specialist for consume wound treatment. Late discoveries, notwithstanding, demonstrate that the compound postpones the injury recuperating process [17] and that silver may have genuine cytotoxic movement on different host cells [2, 17-22]. Then again, the useful impacts of silver on wound science because of its intense antimicrobial movement have been disregarded as a rule as of not long ago. The writing is getting to be plainly loaded with clinical trials implying to demonstrate the advantages of silver therapeutics and silver-discharge dressings on wound repair and recovery through its antimicrobial viability. Little is distributed, in any case, to demonstrate how the discharged silver particle impacts the injury bed, or to what degree it is utilized or saved in the tissue. Also, consequences of the broad writing audit we led neglected to uncover any clinical examinations in regards to the dangers and probabilities of wounds as a rule to end up noticeably tainted, about the impact of silver dressings on officially contaminated injuries, nor about investigations contrasting the impact of silver or other germicide dressings on aversion of wound disease.

Regardless of the source of silver, whether discharged from arrangements, creams and salves or nanocrystalline silver discharged from economically accessible new dressings, silver is profoundly harmful to both keratinocytes and fibroblasts [23]. Fibroblasts give off an impression of being more touchy to silver than keratinocytes. Thought of the cytotoxic impacts of silver and silver-based items ought to be taken when settling on dressings for particular injury mind procedures. This is especially vital when utilizing keratinocyte culture, in situ, which is assuming an expanding part in contemporary injury and consume mind [23, 24]. Also, certain current clinical investigations in significant consume focuses have exhibited the rise of bacterial safe strains basically Escherichia coli, to silver and to numerous anti-microbials following the delayed use of silver based dressings. The present survey goes for looking at all accessible confirmation about impacts, frequently conflicting, of silver on wound disease control and on wound recuperating attempting to decide the pragmatic helpful harmony between antimicrobial action and cell poisonous quality.

Honey has for some time been recorded as having recuperating properties [27-29]. Honey and sugar paste were related with scarless mending in cavity wounds [30]. It has been accounted for that rabbit wounds treated with a topical utilization of Honey indicated less edema, less polymorphonuclear and mononuclear cell penetrations, less rot, better wound constriction, enhanced epithelialization, and lower glycosaminoglycan and proteoglycan concentrations [31]. Besides, Honey causes essentially more noteworthy injury compression than controls, and it advances the development of granulation tissue and epithelialization of wounds [32-37]. Honey fortifies tissue development, combination of collagen, and improvement of fresh recruit's vessels in the bed of wounds [38-43]. Intraperitoneal Honey organization after a bond demonstrate in the cecum and terminal ileum of rats decreased postoperative adhesion [44].

For the most part, wound healing can be influenced by endogenous (pathophysiology) and exogenous (microorganisms) factors. The danger of wound contamination increments as neighborhood conditions support bacterial intrusion and development. Accordingly, microbial colonization of both intense and interminable injuries is inescapable. Numerous types of microbes have been recouped from wounds, yet Staphylococcus aureus is the most much of the time detached from wound pathogens [45]. What's more, Pseudomonas aeruginosa is a vital pathogen in perpetual injuries and consumes; its quality has been exhibited in various examinations and has been found in one third of unending leg ulcers [46-49]. Contamination with S. aureus and pseudomonads impedes ulcer recuperating rates and, with pseudomonads and B-hemolytic streptococcus, decreases the achievement of skin joins utilized for leg ulcers [50, 51]. The across the board improvement of anti-infection safe microscopic organisms is a testing issue.

This study intends to compare honey dressing v/s silver sulfadiazine at our institute.

Aims

- To review and study patients who presented with chronic ulcer and burns and to study the effect of honey dressing on such wounds.

Objectives

1. To study the effects of honey on wound with respect to its hygroscopic action, bactericidal action.
2. To study the effect of honey on wound healing time and compare with silver sulfadiazine.
3. To study complications of honey dressing.

Material and Methods

Type of study: Prospective Observational
Study design: Cross Sectional Study
Study population

- **Age:** more than 18 years
- **Gender:** Both male & female

Study duration: 12 Months
Study centre: Department of Surgery, Dhiraj General Hospital
Study sample size: In present study we have enrolled total 40 patients.
Inclusion criteria

- All the patients referred to or admitted under the departments of general Surgery and diagnosed to have chronic wound either infected or burns.

Exclusion criteria

- Patient not willing for study.
- Patient with immunocompromised status, comorbid factors like cardiac / respiratory diseases, organ failure and on chemotherapy were excluded.

Method of collection of data

All the patient presenting with chronic wound in surgery outpatient department or casualty were screened for the study and then study related procedure were explained to them by the investigator in presence of LAR and impartial witness if required and gave sufficient time to patient and relative to understand the procedure then after if patient and LAR gave consent to participate in the study then only we enrolled the patient in the study. After enrolling the patient in the study all details of them were taken. On admission history was collected and thorough physical examination done. Data collection on admission included age, sex, address and clinical presentation with respect to site /size/ onset duration and progress of wound. History of probable aetiology with respect to trauma, diabetes, tuberculosis, varicose veins will be noted.

History of previous episodes and co-morbidities was noted. Clinical examination of wound/ulcer was done as described in Proforma. Routine investigations like complete hemogram, Blood urea, and Random blood sugar were performed.

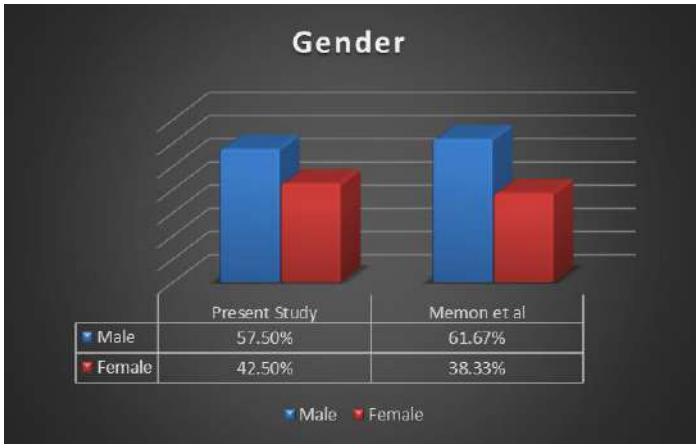
The treatment plan was focused on adequate control of infections and control of blood sugar. Wound debridement if required to be done followed by closed dressing with honey / Silver Sulfadiazine and gauze pad. Serial dressing of the wound was done and healing of the wound in the form of granulation tissue formation, reduction in the size of wound, contraction of the wound and time taken was noted every 2 weeks. Data like clinical symptoms and signs, results of investigations, complications, surgical procedures if any, duration of hospital stay was recorded.

Results and Discussion

1. Comparison of gender distribution

Table 1: Comparison of Gender Distribution

Gender	Present study	%	Memon *et al*	%
Male	23	57.50%	37	61.67%
Female	17	42.50%	23	38.33%
Total	40	100.00%	60	100.00%



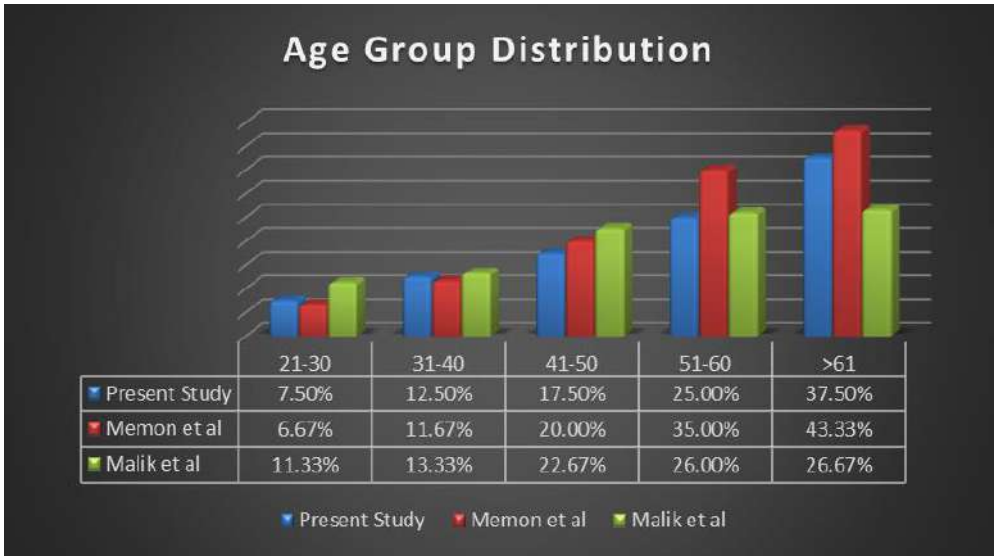
Graph 1: Comparison of Gender Distribution

- We have compared number of patients enrolled in present study with the study done by Memon *et al* and we have found that in Memon *et al* study there were total 60 patients enrolled and in the present study we have enrolled 40 patients.
- Furthermore, we also compared the gender distribution in both the study but we found the consistent results of present study with Memon et study. In Memon *et al* study percentage of male patients were higher compared to female patients but it was not statistically significant whereas in present study also percentage of male patients were higher but again it was not statistically significant.
- Male predominance was found in both studies may be attributed to those population working at risk areas more prone to trauma and other injuries.
- Female population in our country are mainly housewives and have to cook food mainly by burning traditional chulas as India is a developing country. Thus, making these population vulnerable to burn injury.

2. Comparison of age group distribution

Table 2: Comparison of Age Group Distribution

Age Distribution	Present Study	%	Memon *et al.*	%	Malik *et al.*	%
21-30	3	7.50%	4	6.67%	17	11.33%
31-40	5	12.50%	7	11.67%	20	13.33%
41-50	7	17.50%	12	20.00%	34	22.67%
51-60	10	25.00%	21	35.00%	39	26.00%
>61	15	37.50%	26	43.33%	40	26.67%
Total	40	100.00%	60	100.00%	150	100.00%



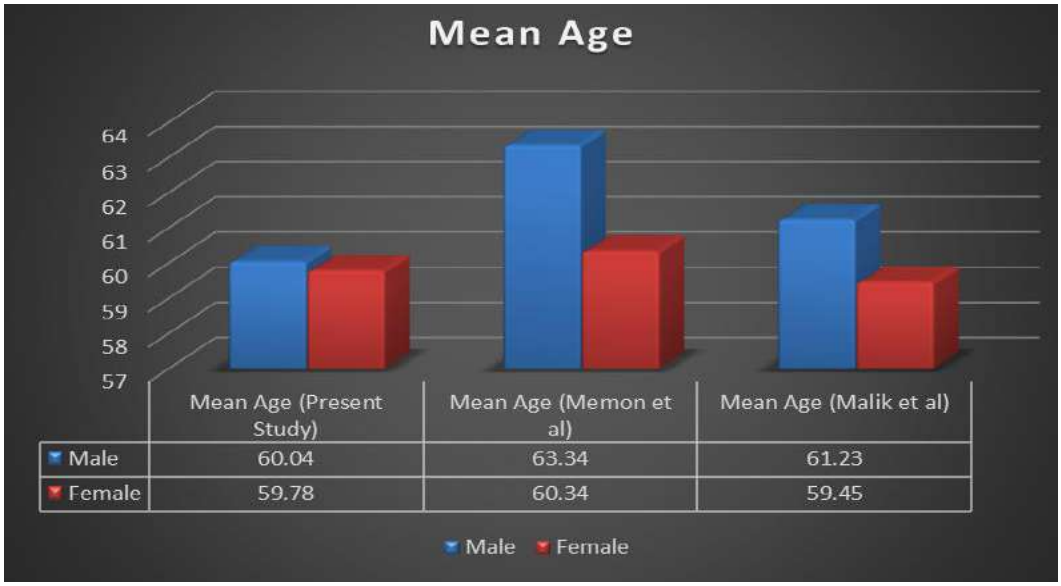
Graph 2: Comparison of age group distribution

- In above table and graph we have shown the comparison of different age groups of present study with two other studies, i.e. Memon *et al* and Malik *et al*.
- In Memon *et al* and Malik *et al* study they have majority of patients with age of more than 50 years which is similar to present study.
- In Memon *et al* study more than 75% of patients were falls in age group of more than 50 years.
- In Malik study, more than 50% of the patients were of more than 50 years.
- We observed that our results were similar with both the studies.
- In present study, majority patients (62.50%) who enrolled in the study were had age more than 50 years.
- Wound healing time is reduced as the age progresses and the population above the age of 50 years are having comorbid conditions like hypertension, diabetes, peripheral vascular disease like atherosclerosis, thus presents with chronic wound.
- In the modern world, these population are not taken care of by their children's and abandoned thus neglects early and small wound.

3. Comparison of mean age of the patients

Table 3: Comparison of mean age of the patients

Gender	Mean Age (Present Study)	SD	Mean Age (Memon *et al*)	SD	Mean Age (Malik *et al*)	SD
Male	60.04	9.45	63.34	10.56	61.34	12.45
Female	59.78	10.34	60.34	11.34	59.45	11.23
Total	59.91	9.89	61.84	10.95	60.40	11.84



Graph 3: Comparison of mean age of the patients

- In above table and graph we have shown the comparison of mean age of present study with two other studies, i.e. Memon *et al* and Malik *et al*. And we have found that our results were similar with both the studies.
- In Memon *et al* and Malik *et al* study they had patients with mean age 61.84±10.95 years and 60.40±11.84 which is

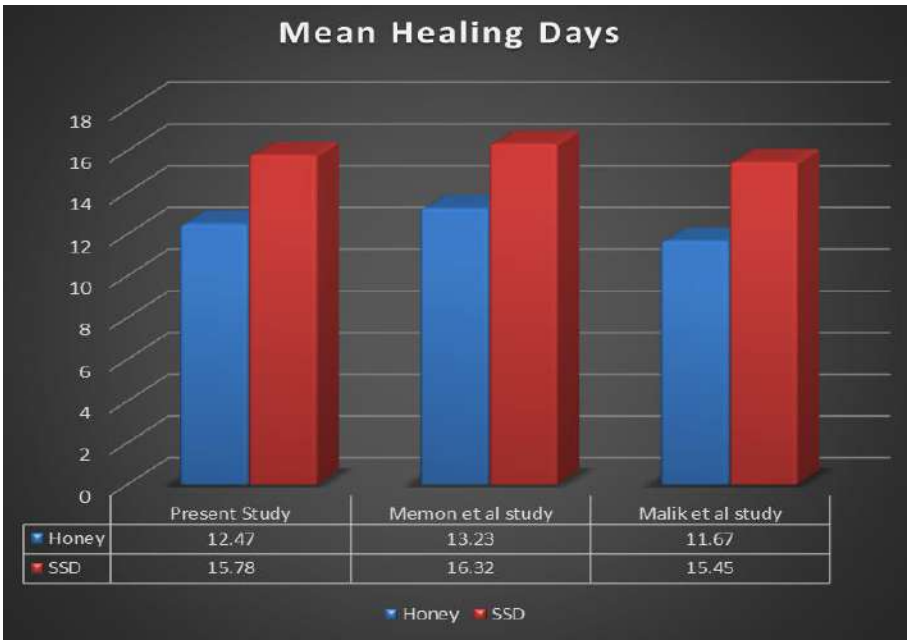
similar to present study, i.e. 59.91±9.89.

- Furthermore we have compared mean age of both gender of present study with Memon *et al* study and Malik *et al* study and we have found that in all three studies including present study age of male patients is slightly higher compare to female patients so, this results were also consistent with other studies.
- In Memon *et al* study mean age of male was 63.34±10.56 years and mean age of female patients was 60.34±11.34 years where as in Malik study mean age of male patients was 61.23±12.45 years and mean age of female patients was 59.45±11.23 years all these results we found similar in present study i.e. mean age of male patients of present study was 60.04±9.45 years and mean age of female patients was 59.78±10.34 years.

4. Comparison of average healing days

Table 4: Comparison of average healing days

Mean Healing Days						
Group	**Present Study**	**SD**	**Memon *et al* study**	**SD**	**Malik *et al* study**	**SD**
Honey	12.47	4.15	13.23	4.32	11.67	7.12
SSD	15.78	5.78	16.32	6.56	15.45	6.89
Total	14.12	4.96	14.72	5.23	13.45	7.03



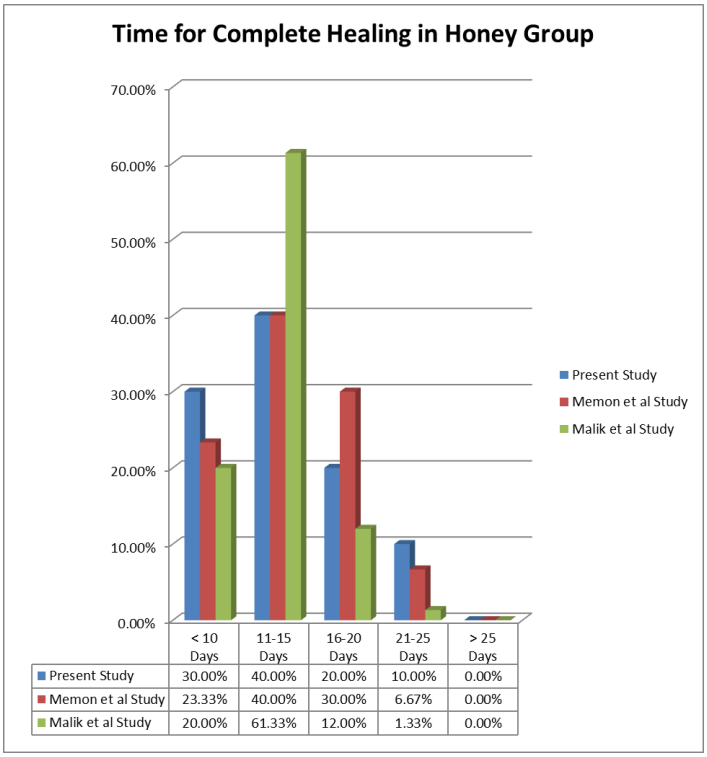
Graph 4: Comparison of average healing days

- In above table and graph we have shown the comparison of average healing days required in present study with two other studies and we have found similar results with both the studies.
- Mean healing days in Memon *et al* study was 14.72±5.23 days where as in Malik *et al* study they have noted mean healing day was 13.45±7.03 days and in present study we have found mean healing day was 14.12±4.96 days.
- Furthermore, we have compared our results of comparison of mean healing days required in Honey Group and SSD group with both the study and we found that in honey group significant fewer days are required for healing compare to SSD group in all three studies including present study.
- In Memon *et al* study Mean healing days required in honey group was 13.23±4.32 days and in SSD group 16.32±6.56 days.
- In Malik *et al* study Mean healing days required in honey group was 11.67±7.12 days and in SSD group 15.45±6.89 days.
- In Present Study Mean healing days required in honey group were 12.47±4.15 days and in SSD group 15.78±5.78 days.
- In all three-studies p value was 0.000.
- Thus, healing time with honey impregnated dressing is less than Silver Sulfadiazine (SSD).

5. Comparison of time for complete healing

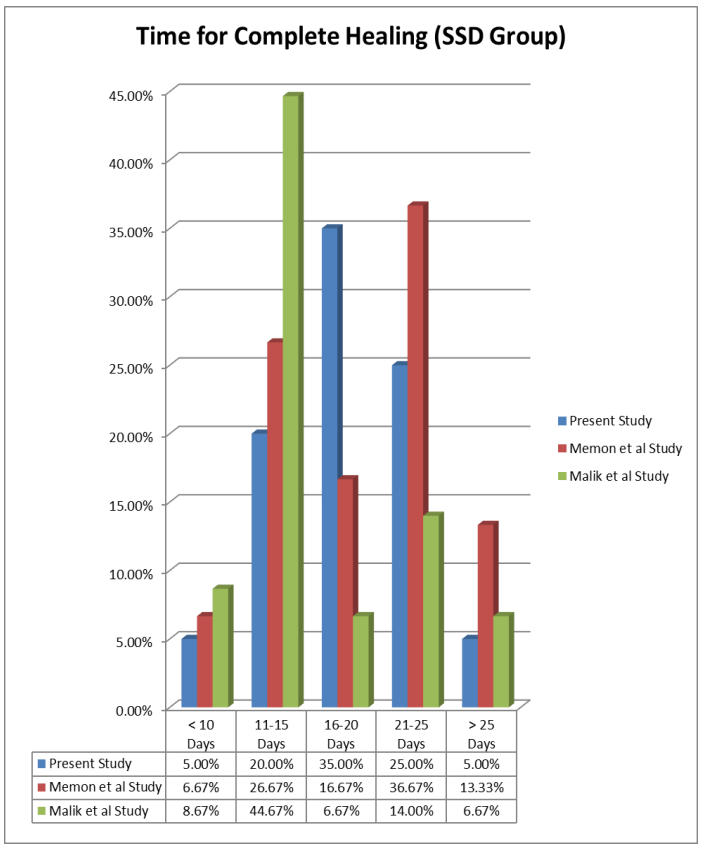
Table 5: Comparison of time for complete healing

Time for Compete Healing	Present Study				Memon *et al* Study				Malik *et al* Study			
	Honey	**%**	**SSD**	**%**	**Honey**	**%**	**SSD**	**%**	**Honey**	**%**	**SSD**	**%**
< 10 Days	6	30.00%	1	5.00%	7	23.33%	2	6.67%	30	20.00%	13	8.67%
11-15 Days	8	40.00%	4	20.00%	12	40.00%	8	26.67%	92	61.33%	67	44.67%
16-20 Days	4	20.00%	7	35.00%	9	30.00%	5	16.67%	18	12.00%	10	6.67%
21-25 Days	2	10.00%	5	25.00%	2	6.67%	11	36.67%	2	1.33%	21	14.00%
> 25 Days	0	0.00%	1	5.00%	0	0.00%	4	13.33%	0	0.00%	10	6.67%



	< 10 Days	11-15 Days	16-20 Days	21-25 Days	> 25 Days
Present Study	30.00%	40.00%	20.00%	10.00%	0.00%
Memon et al Study	23.33%	40.00%	30.00%	6.67%	0.00%
Malik et al Study	20.00%	61.33%	12.00%	1.33%	0.00%

Graph 5: Time for complete healing in honey group



	< 10 Days	11-15 Days	16-20 Days	21-25 Days	> 25 Days
Present Study	5.00%	20.00%	35.00%	25.00%	5.00%
Memon et al Study	6.67%	26.67%	16.67%	36.67%	13.33%
Malik et al Study	8.67%	44.67%	6.67%	14.00%	6.67%

Graph 6: Time for complete healing in SSD group

- In above table and graphs, we have shown the comparison of Time for complete healing in present study with other two studies and we have found that in all three studies including present study in SSD group comparatively higher number of days required for complete healing compare to Honey group.
- In Memon *et al* study it was found that majority if the patients required less than 20 days for complete healing where as in SSD group there were 40% of the patients required more than 20 days compare to Honey group which required only 6.67% of patients more than 20 days in complete healing. These results were statistically significant.
- In Malik *et al* study it was found that majority if the patients required less than 20 days for complete healing where as in SSD group there were 20.67% of the patients required more than 20 days compare to Honey group which required only 1.33% of patients more than 20 days in complete healing. These results were statistically significant.
- In Present study, it was found that majority if the patients required less than 20 days for complete healing where as in SSD group there were 30% of the patients required more than 20 days compare to Honey group which required only 10% of patients more than 20 days in complete healing. These results were statistically significant.
- In present study, we also do comparison time required for complete healing in both gender of the both groups and we have found that in male patients more time required for healing compare to female patients and these results are statistically significant.
- We also found diabetes mellitus was common in majority of our enrolled patients, i.e. 60.00%.

Conclusion

Honey dressings is superior to Silver sulfadiazine (SSD) in chronic ulcer and burns, in terms of decreased morbidity, economy, patient well-being and speedy rehabilitation.

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