A comparative study to assess the effectiveness of Topical Insulin Dressing vs Normal Saline Dressing on wound healing of Diabetic Foot Ulcer

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**Abstract**

Diabetic foot ulcer (diabetic foot ulcer) is an injury entering through the profound vascular and collagenous (dermis) layers of the skin in diabetic patients. Helpless information by walking care and helpless foot care rehearses were distinguish as significant danger factors for foot issues in diabetes. The principle target of the investigation was to survey the effectiveness of topical insulin dressing versus saline dressing and analyze the degree of diabetic injury healing. Quasi-experimental with comparative research design was embraced for the investigation. Convenience sampling technique was utilized to choose 60 examples. Structured interview was used to collect background variable and Wagner diabetic wound assessment scale for assessing diabetic wound. The diabetic wound was dressed with topical insulin dressing and normal saline dressing for 6 days. The calculated paired ‘t’ test value of \( t = 15.703 \) was found to be statistically highly significant at \( p<0.001 \) level whereas the calculated paired ‘t’ test value of \( t = 3.247 \) was found to be statistically highly significant at \( p<0.01 \) level. There was significant that the topical insulin dressing is the more effective and improving the level of wound healing than normal saline dressing.

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microangiopathy and macroangiopathy causing diabetic neuropathy considered of admission. Despite proper topical insulin treatment and a strict diabetic diet 15% of diabetic populations develop non-healing ulcers which lead to amputations of the lower limb significantly (Shen et al., 2020). The major complications of diabetic wound are poor circulation, skin changes, infections, gangrene, sepsis and amputation. The untreated wound becomes infected that may spread to muscle and bone, it’s known as Osteomyelitis (Sarinnapakorn et al., 2016). Poor knowledge by walking care and helpless foot care rehearses were recognized as significant danger factors for foot issues in diabetes. Proof recommends that predictable patient’s instruction with prophylactic foot care for those decided to be at most noteworthy danger may diminish foot ulceration amputation (Bhittani et al., 2020). Despite skin insulin treatment and a carefully controlled eating routine, roughly 15% of all patients with diabetes will, eventually, have non-recuperating wounds and this is the main sources of lower limit amputation (Ramarao and Ramu, 2017). The essential strides in the treatment of diabetes foot ulcer is wound conclusion height of the influenced foot and help of weight are fundamental segment of treatment and ought to be started from the outset introduction sick fitting footwear ought to be supplanted with a post employable shoe or another sort of weight remembering footwear Foot issues in diabetic patients represent more medical clinic confirmations than some other long haul confusions of diabetes and furthermore bring about expanding dismalness and mortality. The diabetic foot disorder envelops various pathologies, including diabetic neuropathy, fringe vascular illness, Charcot neuroarthropathy, foot ulceration, osteomyelitis, and the possibly preventable end point amputation (Praveen and Kumar, 2017).

In the present day, there are various types of dressing available and these form a pivotal part in the healing of foot ulcers. Wound healing in complex process involving cell adhesion, migration, proliferation, differentiation and apoptosis at both cellular and molecular levels (Ghatage et al., 2017). In choosing a dressing for a contaminated diabetic foot ulcer, a few elements must be considered. Tainted injuries will in general have weighty exudate that should be controlled to forestall maceration of encompassing tissue. There might be extensive scent related with disease that might be undesirable and troubling for the patient and family (Athavale et al., 2014). A dressing must be agreeable and satisfactory for the patient and should help mitigate or at any rate, not decline torment, partic-ularly at dressing changes. Preferably the dressing ought to likewise help in the administration of the disease itself (Martínez-Jiménez et al., 2018). Topical dressing comprises as one of the modalities of care for diabetic foot ulcers. Different types of moist dressing and topical agents are used in the modern day for wound healing (Prasad et al., 2018). Saline is isotonic and as it dissipates from the dressing, it gets hypertonic and liquid from the injury tissues is brought into the dressing, advancing parching of the injury (Sanjay et al., 2018). Topical insulin has proved to be efficacious in promoting wound healing by activating serin-threonine kinase and extra cellular signal regulated protein kinase pathway (Lima et al., 2012). The purpose of this study (1) to assess the level of wound healing among patients with diabetic foot ulcer in the Topical insulin dressing and Normal Saline dressing group. (2) to assess the effectiveness of topical insulin dressing VS normal saline dressing on diabetic wound healing among patients with diabetic foot ulcer. (3) to compare the effectiveness of topical insulin dressing VS normal saline dressing on diabetic wound healing among patients with diabetic foot ulcer. (4) to associate the selected demographic variables with topical insulin dressing VS normal saline dressing on diabetic wound healing among patients with diabetic foot ulcer.

MATERIALS AND METHODS

Quasi-experimental with comparative research design was adopted for the study to assess the effectiveness of topical insulin dressing versus normal saline dressing on wound healing of Diabetic Foot Ulcer at Gajapathi Health Center, Tiruvallur. The 60 samples who met the inclusion criteria were selected by convenience sampling technique and written informed consent was obtained. Structured interview was used to collect background variable and Wagner diabetic wound assessment scale for assessing diabetic wound. The diabetic wound was dressed with topical insulin dressing and normal saline dressing for 6 days. The results of the study were compared with the pre and post test and effectiveness of insulin and normal saline dressing among patients with diabetic foot ulcer were analyzed.

RESULTS AND DISCUSSION

Description of the demographic variables

The present study shows that in the topical insulin dressing group, most of them 15(50%) were in the age group of 50–60 years, 17(56.7%) were male, 29
Table 1: Effectiveness of Topical Insulin Dressing Vs Normal Saline Dressing among Patients with Diabetic Foot Ulcer N = 60(30+30).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Test</th>
<th>Mean</th>
<th>S.D</th>
<th>Paired 't' Test Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topical insulin</td>
<td>Pretest</td>
<td>2.67</td>
<td>0.66</td>
<td>t = 15.703</td>
</tr>
<tr>
<td>dressing</td>
<td>Post Test</td>
<td>1.43</td>
<td>0.57</td>
<td>S***</td>
</tr>
<tr>
<td>Normal Saline</td>
<td>Pretest</td>
<td>2.70</td>
<td>0.65</td>
<td>t = 3.247</td>
</tr>
<tr>
<td></td>
<td>Post Test</td>
<td>2.43</td>
<td>0.73</td>
<td>S**</td>
</tr>
</tbody>
</table>

***p<0.001, **p<0.01, S - Significant.

(96.7%) were married, 15(50%) had primary level of education, 11(36.7%) were not working or housewives, 12(40%) had no monthly income, 16(53.3%) were Hindus, 27(90%) had Tamil as mother tongue, 24(80%) belonged to a nuclear family, 30(100%) were non-vegetarian, 26(86.7%) were attending the diabetic center monthly once and 26(86.7%) were under anti-diabetic drugs treatment. Whereas in the normal saline dressing group, most of them 16(53.3%) were in the age group of 50–60 years, 19(63.3%) were male, 28(93.3%) were married, 17 (56.6%) had primary education, 12(40%) were not working or housewives, 12(40%) had no monthly income, 21(70%) were Hindus, 30(100%) had Tamil as mother tongue, 15(53.3%) belonged to a nuclear family, 30(100%) were non-vegetarian, 28(93.3%) were attending the diabetic center monthly once and 28(93.3%) were under anti-diabetic drugs treatment.

Figure 1: Effectiveness of Topical Insulin Dressing Vs Normal Saline Dressing among Patients with Diabetic Foot Ulcer.

Assessment of level of wound healing among patients with diabetic foot ulcer.

The present study shows that in the pretest of saline dressing group, 14(46.7%) had abscess with bone involvement, 13(43.3%) had deep ulcer, no abscess and bone involvement and 3(10%) had localized gangrene. Whereas in the post-test 18 (60%) had superficial ulcer, 11(36.7%) had deep ulcer, no abscess and bone involvement and 1(3.3%) had abscess with bone involvement. Also, depicts that in the pretest of normal saline dressing group, 15(50%) had abscess with bone involvement, 12(40%) had deep ulcer, no abscess and bone involvement and 3(10%) had localized gangrene. Whereas in the post-test 15(50%) had deep ulcer, no abscess and bone involvement, 11(36.6%) had abscess with bone involvement and 2 (6.7%) had superficial ulcer and localized gangrene respectively Figure 1.

The current investigation shows that the pretest mean score of twisted mending among patients with diabetic foot ulcer in the effective insulin dressing bunch was 2.67±0.66 and the post-test mean score was 1.43±0.57. The determined combined 't' test estimation of t = 15.703 was discovered to be factually profoundly huge at p<0.001 level. It additionally depicts that the pretest mean score of twisted recuperating among patients with diabetic foot ulcer in the ordinary saline dressing bunch was 2.70±0.65 and the post-test mean score was 2.43±0.73. The determined combined 't' test estimation of t = 3.247 was discovered to be measurably profoundly huge at p<0.01 level. The above finding plainly induces that effective insulin dressing and typical saline dressing controlled to patients with diabetic foot ulcer had critical impact which brought about the improvement in the degree of twisted recuperating among patients with diabetic foot ulcer in both the gatherings Table 1.

(Kanase et al., 2020) Conducted an investigation to a near investigation of effective insulin and ordinary saline dressing in twisted mending in diabetic foot ulcer. The investigation demonstrated that effective insulin is proficient in patients with diabetic foot ulcer when contrasted with ordinary saline. There was the quickest recuperation and decrease in size of ulcer with insulin.
Comparison of the effectiveness of topical insulin dressing vs normal saline dressing on diabetic wound healing among patients with diabetic foot ulcer.

The present study shows that the pretest mean score of wound healing among patients with diabetic foot ulcer in the topical insulin dressing group was 2.67±0.66 and the mean score in the normal saline dressing group was 2.70±0.65. The calculated student independent 't' test value of t = 0.197 was not found to be statistically significant. It also portrays that the post-test mean score of wound healing among patients with diabetic foot ulcer in the topical insulin dressing group was 1.43±0.57 and the post-test mean score in the normal saline group was 2.43±0.73. The calculated student independent 't' test value of t = 5.931 was found to be statistically significant at p<0.001 level. The above finding shows that there was significant difference in the post level of wound healing between the topical insulin dressing group and normal saline dressing group which clearly infers that topical insulin dressing was found to be effective in improving the level of wound healing considerably than the normal saline dressing in the post-test.

Associate the selected demographic variables with topical insulin dressing vs normal saline dressing on diabetic wound healing among patients with diabetic

The current examination shows that the segment factors sex and occupation had demonstrated factually critical relationship with post-test level of twisted mending among patients with diabetic foot ulcer at p<0.05 level and the other segment factors had not indicated measurably huge relationship with post-test level of twisted recuperating among patients with diabetic foot ulcer in the effective insulin dressing gathering. Furthermore shows that none of the segment factors had indicated factually huge relationship with post-test level of twisted recuperating among patients with diabetic foot ulcer in the typical saline dressing gathering. (Kamat and Sunil, 2019) directed A near report between effective insulin versus ordinary saline dressings in twisted mending in diabetic foot ulcers. There was measurably huge decrease in the zone of ulcer at end of day 15 (p esteem <0.001).

CONCLUSIONS

The investigator analyzed the data has come to a conclusion that, the present study showed the effectiveness of topical insulin dressing vs normal saline dressing. There was significant that the topical insulin dressing is the more effective and improving the level of wound healing than normal saline dressing.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

REFERENCES


