Effectiveness of Topical Insulin Dressing in Healing of Diabetic Foot Ulcer among Diabetic Patients

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ABSTRACT

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. Diabetic Mellitus (DM) is a metabolic issue that is characteristics by chronic hyperglycemia; it is a typical and conceivably persistent disease. The aims of the present study to assess the effectiveness of insulin dressing of the diabetic foot ulcer among diabetic patients. A quasi-experimental research design with purposive sampling technique was adopted to conduct a study among 30 diabetic foot ulcer patients. Demography data was collected and wound was measured and insulin dressing was done. After one week the wound was measured. Confidentiality was maintained throughout the procedure. The collected data were analyzed using descriptive and inferential statistics. Among 30 samples pretest mean score of wound healing among patients with diabetic foot ulcer in the topical insulin dressing was 2.67±0.66 and the post test mean score was 1.43±0.57. The calculated paired ‘t’ test value of t = 15.703 was found to be statistically highly significant at p<0.001 level. The above finding clearly infers that topical insulin dressing to patients with diabetic foot ulcer had significant effect which resulted in the improvement in the level of wound healing among patients with diabetic foot ulcer.

INTRODUCTION

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. Diabetic Mellitus (DM) is a metabolic issue that is described by ongoing hyperglycemia; it is a conceivably persistent disease (Karthikeyaan et al., 2019) The condition is now upsetting from the beginning 194 million individuals worldwide and is increment to 333 million individuals in 2025 due to longer future, idle lifestyle and changing dietary patterns. (Iraj et al., 2013) About 60% of the helpless nation on the planet sub-Saharan Africa and this zone will experience the ascent in the inability of diabetes in the accompanying 20 years. (Shahbazian et al., 2013)

Diabetic Mellitus is a condition in the individual is either incapable for creating insulin or the body can't use the insulin present in the body. If untreated, diabetes can cause numerous complications, for example, intense diabetic ketoacidosis, non ketotich per molar, diabetic foot ulcer and coma. Diabetic foot is one of the main issues in the diabetes. (Cecyli and Thamupriyadharshini, 2020) It is described as a foot ulceration that is connected with neuropathy and decreased blood supply to lower limbs of the diabetic patients. It is evaluated
that about 5% of all patients with diabetes present with a foot ulceration. (Bhittani et al., 2020) The lifetime risk of diabetic patient’s giving this multifaceted nature is 15%. It has been found that 40-70% of all non-traumatic removals of the lower limbs happen in patients with diabetes. (Ramarao and Ramu, 2017)

India is known as the capital of diabetes in the world. Within excess of 40 million individuals with diabetes. Diabetes mellitus is a multifaceted disease and foot ulceration is of its most common complication. (Praveen and Kumar, 2017) The frequency of the foot ulcers among individuals with diabetes range from 8% to 17%. Foot ulcers can make serious problem and hospitalization to patients and economic burden to families and health system. About 85% of diabetes-related amputations and more than half of non-traumatic lower limb amputation are common. People who have developed foot ulcers have a decreased quality of life. (Ghatage et al., 2017)

78 million people in South East Asian region are affected by diabetes mellitus and are expected to attain 140 million by 2040. WHO reports that India had 69.2 million people living with diabetes (8.7%) as indicated by the 2015 data, among these more than 36 million people remained undiscovered. The number of diabetics is expected to increase to 109 million cases out of a total estimated population of 1.5 billion in India by 2035. (Athavale et al., 2014)

Neuropathy, mechanical pressure, and angioplasty are the major etiopathological factors in the development of foot ulcers in individuals with diabetes. (Martínez-Jiménez et al., 2018) Diabetic peripheral neuropathy is a heterogeneous problem that incorporates mononeuropathies, polyneuropathies, plexopathies, and radiculopathies. (Prasad et al., 2018) As diabetic neuropathy often prompts foot ulcers, it is suggested to screen all people with diabetes annually. (Swaminathan, 2014)

The basic reasons for diabetic foot ulcer development are injury, neuropathology and deformation. Moreover, the utilization of inappropriate footwear; for example, chapels which have an elastic soul and supported by a strap in the first interdigital space, yet as know back tie, opens the feet to injury. (Kamat and Sunil, 2019) The current examination to survey the adequacy of insulin dressing on diabetic foot ulcer among diabetic patients.

MATERIALS AND METHODS

A quasi-experimental research design was utilized to evaluate the effectiveness insulin dressing in healing of diabetic foot ulcer among diabetic patients at Saveetha Medical College and Hospital with purposive sampling technique was testing procedure was adopted to conduct a study among 30 diabetic foot ulcer patients those who fulfill the inclusion criteria. The inclusion criteria those who are in the below one year diagnosed, willing to participate, both genders and speak Tamil and English language. The exclusion criteria include allergic to insulin and not willing to participate. Demography data was collected and wound was measured and insulin dressing was done. After one week the wound was measured. Confidentiality was maintained throughout the procedure. Gathered information was investigated by descriptive and inferential statistics. The topic has been approved by the Ethics Committee of the Institution.

RESULTS AND DISCUSSION

Description of Sample Characteristics

Majority of them in the study 15(50%) were in the categories of 50 – 60 years, 17(56.7%) were male, 29(96.7%) were married, 15(50%) had primary level of education, 11(36.7%) were not working / housewives, 12(40%) had no monthly income, 16(53.3%) were Hindus, 27(90%) had Tamil as mother tongue, 24(80%) belonged to nuclear family, 30(100%) were non-vegetarian, 26(86.7%) were attending the diabetic centre monthly once and 26(86.7%) were under anti diabetic drugs treatment.

The Table 1 in the current investigation shows that the pretest mean score of wound healing among patients with diabetic foot ulcer in the effective insulin dressing was 2.67±0.66. The investigation was upheld by (Sanjay et al., 2018) conducted Efficacy of Topical Insulin Dressings V/S Normal Saline Dressing On Diabetic Foot Ulcer. The mean ulcer area at the time of admission in group A was 4.8 ± 0.6 cm2, 5.35±0.6cm2 in group B. The mean depth of ulcer at the time of admission was 8.6±0.9mm in group A, 8.4 ±0.7mm in group B.

To compare the effectiveness of insulin dressing among pre and post test between the diabetic foot ulcers among diabetic patients

The present study shows that the pretest mean score of wound healing among patients with diabetic foot ulcer in the insulin dressing was 2.67±0.66 and ‘t’ test value of t = 0.197 was not found to be statistically significant. The findings of the analysis revealed that the post test mean score of wound healing among patients with diabetic foot ulcer in the insulin dressing was 1.43±0.0 and ‘t’ test value.
Table 1: Frequency and percentage distribution of level of wound healing among pre and post test patients with diabetic foot ulcer in the effective insulin dressing N = 30

| Group          | Test         | No Ulcer (0) | Superficial Ulcer (1) | Deep Ulcer, No Abscess and bone involvement (2) | Abscess with bone involvement (3) | Localized Gangrene (4) | Extensive Gangrene involving whole foot (5) |
|----------------|--------------|--------------|------------------------|-----------------------------------------------|---------------------------------|------------------------|-------------------------------------------|
|                | No.          | %            | No.                    | %                                             | No. %                           | No. %                  | No. %                                      | No. %                                      |
| Topical insulin dressing | Pre-test | 0            | 0                      | 0                                             | 13 43.3                         | 14 46.7                | 3 10                                       | 0 0                                        |
|                | Post-test    | 0            | 18                     | 60                                            | 11 36.7                         | 1 3.3                  | 0 0                                        | 0 0                                        |

Table 2: Association of post test level of wound healing among patients with diabetic foot ulcer with their selected demographic variables in the topical insulin dressing N=30

| Demographic Variables | No Ulcer (0) | Superficial Ulcer (1) | Deep Ulcer, No Abscess and bone involvement (2) | Abscess with bone involvement (3) | Chi-Square Test Value |
|-----------------------|--------------|------------------------|-----------------------------------------------|---------------------------------|----------------------|
|                       | No.          | %                      | No.                                           | %                               | **\chi^2**:8.388, df=2 | p = 0.015           |
| Gender                | Male         | -                      | -                                             | 7 23.3                          | 10 33.3              | 1 3.3                   | S*                                        |
|                       | Female       | -                      | -                                             | 11 36.7                         | 1 3.3                | 0 0                     |                                            |
| Occupation            | None/Housewife | -                     | -                                             | 11 36.7                         | 1 3.3                | 0 0                     | **\chi^2**:13.243, df=6 | p = 0.039 |
|                       | Sedentar worker | -                    | -                                             | 3 10.0                          | 3 10.0              | 0 0                     |                                            |
|                       | Moderate worker | -                    | -                                             | 3 10.0                          | 4 1.3               | 0 0                     |                                            |
|                       | Heavy worker  | -                      | -                                             | 1 3.3                          | 3 10.0              | 1 3.3                   |                                            |

of \( t = 5.931 \) was found to be statistically significant at \( p<0.001 \) level. The above finding shows that the clearly infers that insulin dressing was found to be effective in improving the level of wound healing among diabetic patients.

The outcome was supported by comparable investigation directed by (Shafaatullah et al., 2019) Effectiveness of effective insulin in the administration of diabetic foot ulcers. To find the advantages of effective insulin in the administration of diabetic foot ulcers. Observational assessment was led by Plastic Surgery and General Surgery Department, Baqai Medical University Karachi. We had a sum of 65 individuals, among them there were 52 males and 13 females have diabetic foot ulcer. There was improvement after treatment of diabetic foot ulcers with skin insulin shower. The wound size and depth were deceased. This treatment had more reassuring results than regular treatment for diabetic foot ulcers.

The Table 2 shows that the segment factors sex and occupation had measurably tremendous relationship with post test level of twisted recuperating among patients with diabetic foot ulcer at \( p<0.05 \) level and the other segment factors had not shown factually critical relationship with post test level of twisted mending among patients with diabetic foot ulcer in the compelling insulin dressing. The examination was upheld by J. Rajesh Amal Praveen et al. (2017) effective use of topical application of insulin in the diabetic foot ulcer and its correlation with ordinary saline dressing. There was no qualification in age and length of diabetes of both the examination gathering. A gigantic portion of the patients in both Insulin and Saline classes are in age of 56 - 65 years (40%). In the current examina-
tion, right foot was more influenced than left foot in both Insulin and Saline gathering. Positive family ancestry for diabetes was higher among Insulin bunch when differentiated and commonplace saline gathering. Among other diabetic burdens, basically all the subjects influenced with fringe neuropathy in both the categories, while hypertension was found to be the second fundamental trouble. Factual huge-ness was seen in recuperated cases among both the Groups. (Praveen and Kumar, 2017)

CONCLUSIONS

The finding of the study that topical insulin dressing to patients with diabetic foot ulcer had significant effect which resulted in the improvement in the degree of wound healing among patients with diabetic foot ulcer.

Conflict of interest

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

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