

Evaluation of Diabetic Ulcer Severity Score (DUSS) In Predicting Outcome in Patients with Diabetic Foot Ulcer

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I. INTRODUCTION

Diabetes mellitus (DM) is the main factor in end-stage renal disease, adult-onset blindness, and non-traumatic lower extremity amputations brought on by artery atherosclerosis. According to the World Health Organization, diabetes mellitus is a metabolic disorder with multiple aetiologies that is characterised by chronic hyperglycaemia and disturbances of the metabolism of carbohydrates, fats, and proteins as a result of defects in insulin secretion, insulin action, or both. After China, India is the country with the second-highest global diabetes burden. According to the International Diabetes Federation's most recent projection, there were 463 million individuals worldwide with diabetes mellitus in 2019 and that proportion will rise to 700 million by 2045.(1-3)

Diabetic foot ulcers (DFUs) are among the several problems that patients with DM are susceptible to acquiring. The dermis—the deep vascular and collagenous inner layer of the skin—below the ankle of a diabetic patient is where a diabetic foot ulcer develops, according to the International Working Group on the Diabetic Foot (IWGDF). People with diabetes have a lifetime risk of up to 25% of acquiring a foot ulcer. DFU develops as a result of uncontrolled Hb1AC, foot injuries, mechanical stresses, obesity and overweight, cigarette use, prolonged diabetes, and ageing. Additionally, ischemia, vasculopathy, diabetic neuropathy, and neuropathy are recognised as causal factors.(4)

There are several classifications and grading methods for foot ulcers. These complicated grading methods do not predict the patients' long-term outcomes. The Diabetic Ulcer Severity Score (DUSS) corrects these flaws by being simple enough to use in routine clinical practise. It is novel in and of itself to classify diabetic foot ulcers as ulcers in the foot and ulcers in the toe. The use of this score system in patients from India has not been researched. This grading system will be a highly helpful tool for decision-making in patients who need amputations since it can forecast amputation rates.(5,6)

II. AIM AND OBJECTIVES

To evaluate Diabetic Ulcer Severity Score (DUSS) in predicting the outcome in patients with Diabetic foot ulcer.

III. MATERIALS AND METHODS

100 patients of diabetes mellitus with diabetic foot ulcer attending General Surgery outpatient or inpatient wards in Department of General Surgery, Maharajah's Institute of Medical Sciences, Nellimarla, Andhra Pradesh were included in this prospective, observational study. The study period was for one year i.e., from April 2021 to March 2022.

Other ulcers like venous stasis ulcers, non-diabetic ulcers, neuropathic ulcers and gangrene were excluded from the study. DUSS score was applied and the results were evaluated.

Diabetic Ulcer Severity Score (DUSS)-Ulcers were Scored by the below mentioned variables in Table -1 .

DUSS was calculated by adding these separate scored variables to a theoretical maximum of 4.

Table-1 (7)

Variables	Score 0	Score 1
Palpable Pedal pulses	Presence	Absence
Probing to bone	No	Yes
Ulcer site	Toes	Foot
Ulcer number	Single	Multiple

IV. RESULTS

The mean age of the study population was 43.25 ± 5.6 years. Most of the patients (43%) belonged to the age group 51-60. Males were 72 and females were 28. 45% patients had co-existing hypertension. 23% were alcoholics and 34% were smokers.

Management	% of patients
Above knee amputation	20
Below knee amputation	10
Death due to septicemia	8
Disarticulation	14
Wound debridement	45
SSG	3

Score distribution- 28 patients had score 0, 18 had score 1, 10 had score 2, 27 had score 3, 17 had score 4.

DUSS Score	Primary Healing	Amputation
0	20	0
1	14	2
2	8	5
3	5	15
4	1	22

Patients with DUSS score 0 and 1 had more of primary healing compared to amputation. Patients with DUSS score of 3 and 4 underwent amputations majorly.

V. DISCUSSION

One of the most frequent, costly, and serious consequences of diabetes is DFU, which is also the main reason for hospitalisation worldwide. DFU increases the risk of amputation, mental disorders, socioeconomic issues, a poor quality of life, and even death. If it affects younger patients, it has the potential to exclude them from the employment in their community.(4)

In 7 investigations, 25 variables were listed as influencing the severity of DFU. The variables that were most frequently cited were smoking, a high BMI, blood sugar, the kind of diabetic medication, additional patient issues, and an advanced age. The patient's lifestyle can have an impact on elements that increase a foot ulcer's severity, such smoking and a high BMI. Inadequate lifestyle, awareness, and self-care may also be reflected in the effect of uncontrolled diabetes as indicated by abnormal Hb1AC and the time lag between the occurrence of DFU and referral.(2,5)

In the present study, 100 patients of diabetes mellitus with DFU were included and the mean age was 43.25 ± 5.6 years. Males were most commonly affected(72%). These results correlated with literature. (4,8)

23% were alcoholics and 34% were smokers in this study. The review by Nan Xia et al. demonstrates that smoking has significant impact on diabetic foot ulcerations at all phases, including the development and healing processes. One of the main causes of foot ulcerations is diabetic peripheral sensory, autonomic, and motor neuropathy, which can be made worse by smoking.(9) 26% were smokers in Bekeleet. al.'s study which evaluated the risk factors for DFU.(3)

45% of patients in this study were treated with wound debridement and conservative management which correlated well with other studies in literature.(5-7) Amputation was done in 30% with 20% treated with above knee and 10% with below knee amputation. This rate correlated well with Bekeleet.al.'s study (30.43%) and also stated that in comparison to diabetic patients with normal body mass index, obese diabetic patients were three times more likely to incur an amputation.(3)similar amputation rates were also noted inAbhinav Sethet.al.'s study (38%).(1)Below knee amputations were done in 22% patients in Kumar et.al.'s study. (5) Split-thickness skin grafting (SSG) was done in 3% of the patients in present study.

The most common DUSS score among the study population was 0 (28%) followed by score 3 (27%). In Hari Kumaret.al.'s study, the most common score in diabetic ulcers was score 3 and it was score 0 as in the present study in Kumar ST et.al.'s study. (5,10)

Kumar ST et.al.'s analysis demonstrated that patients with a DUSS of 0 had a 100% chance of recovering. DUSS of 1 had a 16% chance of amputation, but DUSS of 2 had an 81% chance. Amputation was guaranteed in all cases for patients with DUSS 3 and 4.(10)

These observations correlated well with the present study wherein, patients with DUSS score 0 and 1 had more of primary healing (20% and 14% respectively) compared to amputation (0% and 2% respectively). Patients with DUSS score of 3 and 4 underwent amputations majorly (15% and 22% respectively).Beckert et.al. stated that an increase in the DUSS by one score point reduced the chance for healing by 35%.(11)

In the present study, in a small percentage of patients, management changed when the score rose from one higher level of therapy. Debridement was followed by disarticulation, below knee amputation, and finally above knee amputation in certain cases. In terms of amputation conversion, men outweigh women, and a higher score is linked to a higher probability of amputation. Septicaemia is the most prevalent cause of death in 8% of the cases. So, we observed that the frequency of amputation among individuals with diabetic foot ulcers rises as the score does. The DUSS score difference between the groups was shown to be statistically significant.

VI. CONCLUSION

The DUSS scoring system combines four clinically measurable wound-based characteristics to create a simple diagnostic tool for predicting the likelihood of healing or amputation. Study groups may be divided based on the severity of the ulcers, which enables a straightforward, simplified strategy to be used in clinical settings without the need for sophisticated investigative tools, but it does not change the process of managing wounds.

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