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AN AUDIT OF DIABETIC FOOT CARE SERVICES AT A TERTIARY CARE HOSPITAL- A TIMELY INITIATIVE

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ABSTRACT

Objectives: The aim of the following study is to determine the pooled prevalence of complications related to diabetes mellites at a tertiary care hospital and to create awareness among junior doctors to further improve the diabetic foot care services in the form of a standards audit.

Materials and Methods: This clinical audit was conducted in a cross-sectional pattern and data pertaining to all admitted patients related to diabetes mellites and its complications from the surgical department was collected from July 2024 to December 2024. A total of 125 patients were enrolled, either admitted through OPD or emergency. The variables that were included in the study are the following: name, age, gender, contact number, date of admission, medical record number (MR number), characteristics of diabetic foot ulcer (if present), the treatment given, and the

outcome. Data was collected in a pre-designed proforma, added to Microsoft excel sheet and analyzed through SPSS software version 23.0. The data is described in the form of description, charts, and tables.
Results: The mean duration of diabetes mellites in years was 4.81 ± 0.132 with most patients falling in the range of 5 years (36%). The mean HbA1c and RBS levels on admission were 7.01 ± 0.44 and 227.8 ± 5.3 respectively. In terms of duration of ulcer formation, 22.4% patients had the ulcer for 5 months, which was the longest. As far as management and outcomes are concerned, just17.6% patients showed compliance with medication, but only 19.2% progressed towards an amputation.
Conclusion: The audit has given us a further clue that the prevalence of diabetic foot ulcers in our province is still high. However, effective and timely steps can reduce this complication.

INTRODUCTION

One of the chronic sequalae and long-term complications of uncontrolled type 2 diabetes melilites in adults is the formation of a diabetic foot ulcer (DFU). The pathogenesis of DFU lies within a complex interplay between peripheral vascular disease and compromised neurological sensations due to T2DM[1]. While severely affecting the quality of life of diabetic patients, most of them ultimately requiring a lifesaving amputation, this complication also puts a significant burden on the hospital financial resources[2]. Consequences of foot ulcers include decline in functional status, infection, hospitalization, lower-extremity amputation, and death. Currently, over an estimated 500 million people worldwide have diabetes[3], up to 34% of patients will ultimately develop DFU at any stage during their lifetime[4]. Approximately 20% of people who develop DFU will require lower-extremity amputation, either minor (below the ankle), major (above the ankle), or both, and 10% will die within 1 year of their first DFU diagnosis[5].

Particularly in low-income regions, diabetic foot ulcers can have a significant economic, social, and public health impact without an appropriate educational program among patients and an awareness program among clinicians in the form of a standards audit. Quality improvement depends on data collection and audit of clinical services to inform clinical improvements. Various steps in the care of the diabetic foot can be used to audit a service but need defined audit standards[6]. All patients with DFU should be properly identified and classified into low risk and high risk. The low-risk patients can be dealt with more conservative approaches while major hospital resources can be directed towards the high-risk group of patients [7]. One such scoring system is the Scottish foot risk stratification scheme[8]. Regular national and international audits have proved time again that improvement in diabetic foot care can be successfully achieved by enhancing the quality of services[9]. Auditing diabetes-related outcomes might be seen as even more challenging because of the diversity of adverse outcomes and their causation.

The prevalence of diabetes and associated complications is steadily rising, especially in the younger population. Unfortunately, as a developing country, our health system is still deficient and ill equipped with meagre specialized units to coup with such complications. One study has depicted the prevalence of DFU in Pakistan to be almost 51%[10]. Therefore, the purpose of this

audit is to describe the presentation of DFU and its associated complications, including identification of patients with DFU along with their respective outcomes.

Materials and Methods

After attaining approval from the hospital ethical and audit review committee, the following clinical audit began with a sample size of 125 patients (both genders) selected through a nonprobability consecutive sampling technique at surgical C unit Khyber Teaching Hospital Peshawar. The study duration was 6 months (from 1st July 2023 to 31st December 2024). Medical case records were sought, and the following demographic parameters were recorded: name, age, gender, address, education, date of admission, date of discharge, medical record number, and contact number. A detailed chart review was undertaken to assess several characteristics and outcomes, including demographics, type and duration of diabetes, type of diabetic foot complication and duration, primary reason for admission and follow-up, inpatient and outpatient diabetic treatment, and diabetes control. We also specifically evaluated surgical treatment, if required, including debridement and/or amputation, and duration of the surgical intervention to assess if there was any significant finding or outcome. All the data collected through fulfilling proformas was added to Microsoft excel sheet and transferred to SPSS version 23.0. for data analysis and verification. The data obtained were analyzed, and the results were compared with those of similar studies done elsewhere. The results are illustrated in the form of a description, tables, and charts.

RESULTS

Out of 125 patients, 31 (24.8%) patients were females and 94 (75.2%) of them were males with a mean age of 57.8 ± 0.67. The mean duration of diabetes mellites in years was 4.81 ± 0.132 with most patients falling in the range of 5 years (36%) and the least number had DM for 8 years (4.8%). The mean HbA1c and RBS levels on admission were 7.01 ± 0.44 and 227.8 ± 5.3 respectively. In terms of duration of ulcer formation, 22.4% patients had the ulcer for 5 months, 20.8% for 3 months, 16.8% for 2 months, and 10.4% for 4 months. As far as management and outcomes are concerned, just17.6% patients showed compliance with medication, but only 19.2% progressed towards an amputation. Details of demographic and biological factors with their mean and standard deviations are mentioned in table 1, characteristics of the ulcer are described in table 2, and outcomes following DFU management are mentioned in table 3.

Table 1: Demographic and biological factors

Variable	Mean	Standard Deviation
Age	57.8	0.617
Duration of DM (years)	4.81	0.132
HbA1c	7.01	0.44
RBS	227.8	5.3
Duration of ulcer (months)	4.71	0.204

Table 2: Characteristics of the ulcer

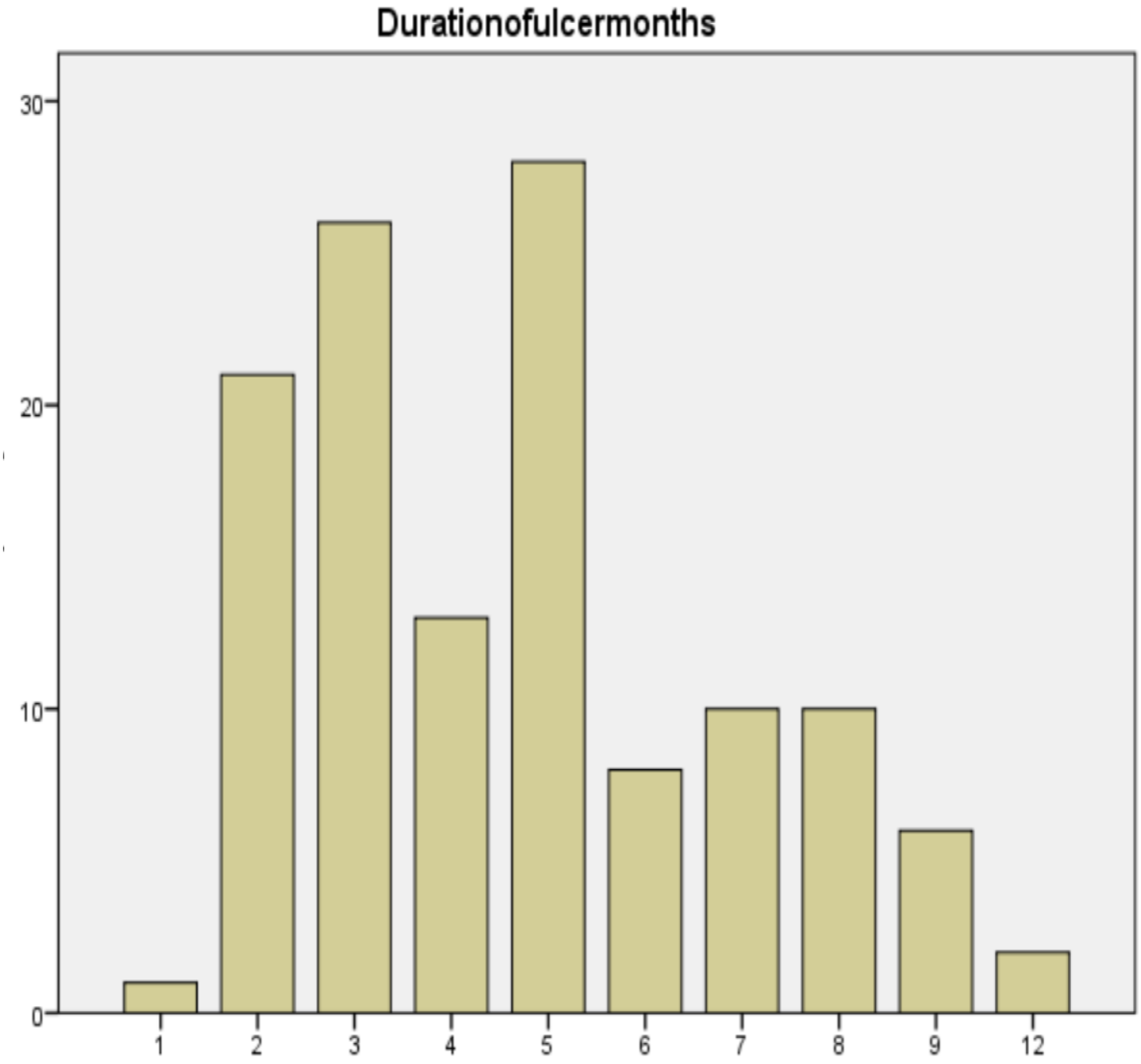
Feature	Frequency	Percentage
1. Site		
Dorsum	21	16.8
Sole	89	71.2
Toes	15	12
2. Margins		
Ill defined	39	31.2
Well defined	86	68.8
3. Color		
Black	11	8.8
Pale	20	16
Red	94	75.2
4. Discharge		
Bloody	8	6.4
Purulent	87	69.6
Serous	30	24
5. Depth (mm)		
0-3 mm	54	43.2
4-6 mm	63	50.4
7-9mm	8	6.4
6. Oduor		
Foul smelling	25	20
Oduor less	100	80
7. Size cm2		
1-3	96	76.8
4-6	29	23.2

Table 3: Treatment and outcomes.

Variable	Frequency	Percentage
1. Antidiabetic		
Injectable	37	29.6
Oral	88	70.4
2. Antibiotic use		
No	103	82.4

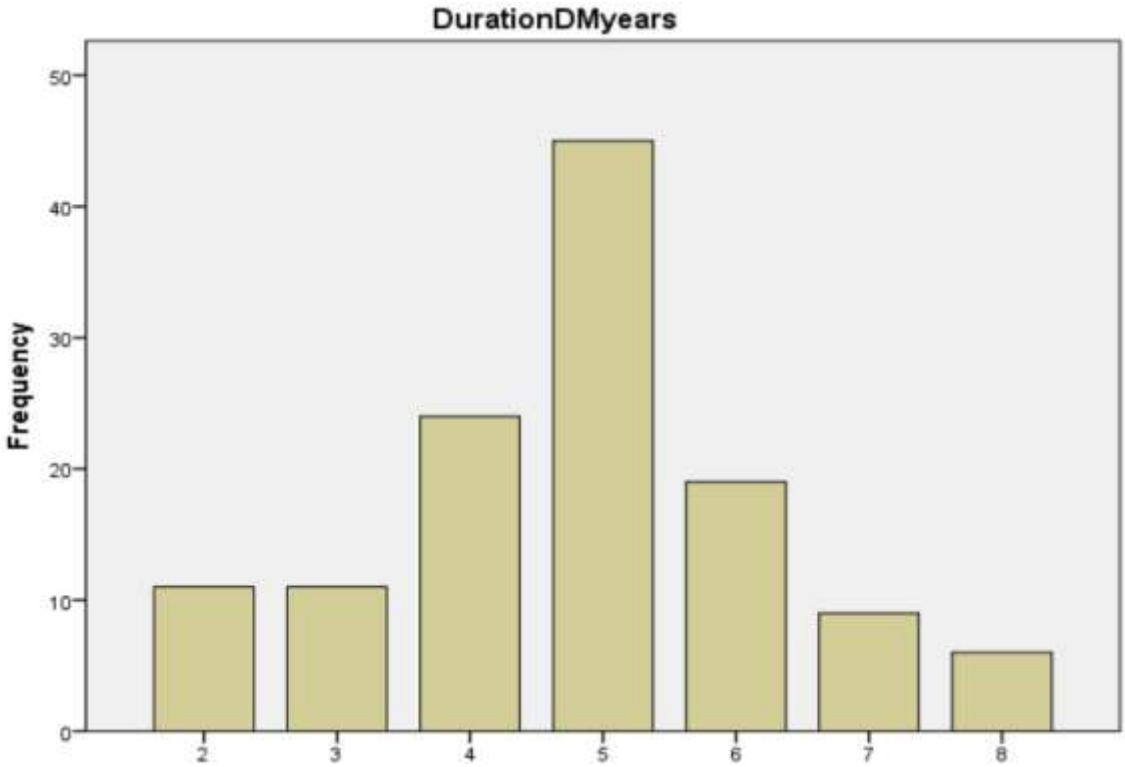
Yes	22	17.6
3. Previous Amputation **No** **Yes**	 112 13	 89.6 10.4
4. Outcome **Healing/DD** **Limb Amputation** **Toe Amputation**	 101 7 17	 80.8 5.6 13.6

Bar chart 1: Duration of ulcer formation in months



Bar chart 2: Distribution according to Wagner grade

Bar chart 3: Duration of diabetes mellites in years



DISCUSSION

A diabetic foot ulcer usually occurs below the ankle, and it is basically a full thickness wound across all the layers of the skin and reaching the underlying bone[11]. With a lifetime incidence of almost 25%, numerous risk factors have been implicated leading towards this dreadful complication[12]. The three most common pathologies leading to the formation of a foot ulcer are diabetes mellites, peripheral arterial disease, and peripheral neuropathy[13]. While the general knowledge of diabetes control was good the specific details of foot disease complications are poor, thus suggesting that 'at risk' individuals may present too late to specialist services either due to a lack of knowledge or by a lack of behavior. However, it has been postulated that the relative prevalence of diabetic foot disease can be reduced with proper interventions[14].

In recent years, diabetes and its associated complications have increased and the major impact on the rate of hospitalization is significantly affected by diabetic foot ulcers, hence making it the one most the most common diseases to escalate patient mortality and morbidity[15]. Over half of diabetic foot ulcer patients die within a few years of mismanagement, therefore, such studies and audits are essential in contributing to develop public health policies that will create awareness among the patients and clinicians to work together in further lowering the rates of DFU.

In our analysis, the mean age for DFU was 57.8 which is comparable to the work done by Yao Y et.al[16] as majority of patients with DFU were found to be in the age group of 50–59 years (n = 272, 29.6%), while the other age groups, showed relatively lesser count. A study in Pakistan revealed that Most of the patients (65%) were above 50 years of age while only 5 patients (3.3%) were below 30 years of age. The mean age was 55 years[17]. This highlights the importance of age as a significant risk factor in DFU, and elderly patients need to be thoroughly counseled regarding diabetic foot care. HbA1c is a good biomarker for foot ulcer outcomes (wound healing time), and it has a linear relationship with the grades of Wagner classification of diabetic foot. The mean HbA1c in our study was 7.01 which is encouraging because studies have illustrated higher average values leading towards the formation of diabetic foot ulcer: 9.04[18], 10.1[19] and 14.4[20]. There is evidence that good glycemic control effectively reduces the rates of DFU and the need for limb amputation.

In our audit, DFUs of 80.8% patients healed following one or two sessions of debridement and wash which is a positive outcome because studies have found that amputation can lead to many negative consequences, including anxiety, depression, reduced quality of life, and family distress, as well as increased healthcare costs[21]. As far as previous history is concerned, 89.6% of patients had no evidence of any sort of amputation done in the past, which is noticeable since a previous history of amputation is regarded as a non-modifiable risk factor for future amputations[16]. It is estimated that the mortality rate following amputation is alarmingly high with approximately 33% in 1 year[22].

Therefore, we suggest that intervention measures such as behavioral modification to reduce current smoking, exercise and a comprehensive therapeutic patient education program can prevent lower limb amputation in diabetic patients and that should be the target for both clinicians and patients in our tertiary care hospitals. The audit further revealed that only 17.6% of patients showed compliance with their medications. The use of antibiotics in diabetic foot ulcers is still debated, one view is to administer these drugs only in the presence of a clinical infection[23] while others argue that empirical treatment should begin in the initial stages to prevent the spread of infection, reduce morbidity and control antibiotic resistance[24].

CONCLUSION

The audit concludes with convincing evidence that diabetic foot ulcer is still one of the most dreadful complications of diabetes mellites and the prevalence of this condition is still relatively high among patients in Pakistan. Some of the risk factors identified include male gender, age, uncontrolled diabetes mellites, duration of diabetes and non-compliance with medication. This study provides a theoretical basis for reducing the probability of amputation in clinical practice and highlights to the relevant authorities, the care takers and the affected themselves to take some corrective measures to avoid lower limb amputation, including timely treatment of complications, adequate care from podiatrists, proper nutrition, and regular diabetes education. We recommend the establishment of diabetic foot clinical centers for foot ulcer screening, identification, and management in urban and rural areas.

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There are no conflicts of interest.

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The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI.

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