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The impact of hospital admissions for infected diabetic foot ulcers at Hayatabad Medical Complex

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Abstract

.**Objective**: Diabetic foot ulcers (DFUs) are a major complication of diabetes, with significant variations in outcomes based on age and comorbidities. This study aimed to compare clinical characteristics and treatment outcomes between younger (≤60 years) and older (>60 years) DFU patients at a tertiary care center.

Method: A retrospective cohort study was conducted at Hayatabad Medical Complex's Orthopedic Ward from June 2024 to March 2025. We included 100 patients with DFUs (Wagner Grade 1-3), excluding those with non-diabetic ulcers or incomplete follow-up. Data on demographics, clinical parameters, and outcomes (healing rates, complications, mortality) were analyzed using SPSS v26, with $p<0.05$ considered significant.

Result: The cohort (mean age 65±9.5 years, 60% male) showed significant differences between age groups. Older patients had higher BMI (31.4 vs 26.7 kg/m², $p<0.01$) and mortality (7.5% vs 1.7%, $p=0.05$). While overall healing rates were high (90%), older adults had numerically higher complications (7.5% vs 3.3%, $p=0.23$) and rehospitalization rates (10% vs 6.7%, $p=0.55$).

Conclusion: Despite similar ulcer healing rates, older DFU patients exhibited worse outcomes, emphasizing the need for age-specific management strategies. These findings highlight the importance of tailored care for elderly diabetic patients to reduce complications and mortality.

Keywords: Diabetic foot ulcer, Age-related outcomes, Ulcer healing, Diabetes complications, Mortality, Pakistan

Introduction: Bone metabolism and calcium homeostasis depend on vitamin D, a fat-soluble vitamin. It affects many biological processes, including as immunological modulation, inflammatory regulation, and muscular function. Up to 77% of people worldwide suffer from vitamin D deficiency, and athletes are especially vulnerable because of their demanding physical schedules and maybe insufficient sun exposure. Muscle weakness, reduced neuromuscular function, and an increased risk of injury

have all been associated with inadequate vitamin D levels, which are essential for maintaining musculoskeletal health[1-4].

Both biomolecular and clinical studies have confirmed the roles of vitamin D in calcium homeostasis, bone health, and the risk of stress fractures. Compared to people with adequate vitamin D levels, athletes and physically active people who have clinically low vitamin D levels have a much higher risk of stress fractures. Vitamin D insufficiency is linked to both high-energy and low-energy traumatic fractures. Given the significance of vitamin D for skeletal health, identifying and treating deficiencies is essential to improving patient outcomes[5-6].

Vitamin D insufficiency can affect the healing process by causing problems with muscular function and performance. Additionally, studies have clarified vitamin D's role in pain pathway processes. Patients with orthopaedic trauma had a 66% prevalence of low vitamin D levels, whereas athletes had a 52% prevalence of the same deficit, according to a retrospective examination of orthopaedic surgery cases. Only one in six patients with elective foot and ankle surgery showed normal vitamin D levels, and one in five patients showed a severe vitamin D shortage, according to a study that included other remaining consecutive patients[7-8].

However more research work is needed to help understand how vitamin D affects these diseases and to confirm the effectiveness of this vitamin in starvation, prevention and control of these diseases.Sufficient vitamin D levels can lower the risk of problems, increase the effectiveness of rehabilitation, and improve surgical results. We aim to provide more precise clinical practice guidelines and suggest future research areas by compiling and critically evaluating the available data. It is crucial to monitor and treat vitamin D deficiency in individuals undergoing ACL surgery because sufficient vitamin D levels may reduce muscle atrophy and improve rehabilitation.

Although vitamin D seems to affect muscle recovery, it is unclear how it affects more general functional outcomes like return to sport and quality of life. Other factors, like following rehabilitation instructions, having pre-existing muscle strength, or genetics, might be more important in determining long-term functional outcomes than vitamin D levels alone[9-10].

Material and Methods: This retrospective cohort study was conducted at the Orthopedic Ward of Hayatabad Medical Complex, Peshawar, from June 2024 to March 2025. The study included 100 patients diagnosed with diabetic foot ulcers (DFUs) who were admitted for management and follow-up. Data were extracted from electronic medical records, including demographic details (age, sex), clinical characteristics (BMI, comorbidities, smoking status), and treatment outcomes (ulcer

healing, complications, mortality, and rehospitalization rates). Patients were stratified into two age groups (≤60 years and >60 years) to compare differences in clinical presentation and outcomes. Statistical analysis was performed using SPSS version 26, with independent t-tests for continuous variables and chi-square tests for categorical variables, with a p-value <0.05 considered significant.

Patients were included if they were ≥18 years old, had a confirmed diagnosis of diabetes mellitus (Type 1 or 2), and presented with a diabetic foot ulcer (Wagner Grade 1–3). Those with non-diabetic ulcers, severe peripheral arterial disease requiring immediate vascular intervention, or malignant ulcers were excluded. Additionally, patients lost to follow-up before the 30-day assessment period were omitted to ensure complete outcome data. This selection criteria ensured a homogeneous cohort for evaluating age-related differences in DFU outcomes while minimizing confounding factors.

Ethical approval was obtained from the Institutional Review Board of Hayatabad Medical Complex. Patient confidentiality was maintained by anonymizing all data. Variables analyzed included age, BMI, comorbidities (hypertension, diabetes duration), smoking status, ulcer healing success, major complications (amputations, infections), 30-day mortality, and rehospitalization rates. The study adhered to STROBE guidelines for observational research. Limitations included its single-center design and potential selection bias, but the findings contribute valuable insights into DFU management in a resource-constrained setting.

Result: Following results were analyed.

TABLE 1: PATIENT DEMOGRAPHICS AND CLINICAL CHARACTERISTICS

Characteristic	Total (N = 100)	Age ≤ 60 (N = 60)	Age > 60 (N = 40)	P-value
Age (years)				

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Characteristic	Total (N = 100)	Age ≤ 60 (N = 60)	Age > 60 (N = 40)	P-value
Mean (SD)	65 (9.5)	55 (4.8)	75 (6.2)	<0.001
BMI (kg/m²)				
Mean (SD)	28.5 (4.3)	26.7 (3.9)	31.4 (4.6)	<0.01
Sex				
Male	60 (60%)	40 (67%)	20 (50%)	0.08
Female	40 (40%)	20 (33%)	20 (50%)	
Comorbidities				
Hypertension	70 (70%)	40 (67%)	30 (75%)	0.45
Diabetes Mellitus	50 (50%)	30 (50%)	20 (50%)	1.00
Smoking Status				
Current Smoker	30 (30%)	15 (25%)	15 (37.5%)	0.25
Ex-Smoker	25 (25%)	15 (25%)	10 (25%)	1.00

TABLE 2: OUTCOMES BY AGE AND BMI

Outcome	Total (N = 100)	Age ≤ 60 (N = 60)	Age > 60 (N = 40)	P-value
Successful daibetic ulcer	90 (90%)	55 (92%)	35 (87.5%)	0.35
Major Complications				
Years of daibetes	5 (5%)	2 (3.3%)	3 (7.5%)	0.23

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Outcome	Total (N = 100)	Age ≤ 60 (N = 60)	Age > 60 (N = 40)	P-value
HB1AC	3 (3%)	1 (1.7%)	2 (5%)	0.15
Daibetic ulcer	2 (2%)	1 (1.7%)	1 (2.5%)	0.60
30-Day Mortality	4 (4%)	1 (1.7%)	3 (7.5%)	0.05
30-Day Rehospitalization	8 (8%)	4 (6.7%)	4 (10%)	0.55

Disscusion: The study examined demographic and clinical differences between younger (≤60 years) and older (>60 years) patients with diabetic ulcers. The cohort had a mean age of 65, with older patients exhibiting a significantly higher BMI (31.4 vs. 26.7, $p < 0.01$), aligning with evidence that obesity worsens diabetic complications (IDF, 2019; Armstrong & Boulton, 2017). Males predominated (60%), particularly in the younger group (67% vs. 50%), consistent with studies showing higher diabetic foot ulcer (DFU) incidence in men (Zhang & Lazzarini, 2020). Comorbidities like hypertension (70%) and diabetes (50%) were common but did not differ significantly by age, suggesting that diabetes management remains critical across all age groups.

Despite high overall healing rates (90%), older patients had a non-significant trend toward lower healing (87.5% vs. 92%, $p = 0.35$), contrasting with some studies that report worse outcomes in elderly populations (Huang et al., 2018). This discrepancy may reflect standardized care protocols in this cohort. However, major complications, though rare, were numerically higher in older patients (7.5% vs. 3.3%, $p = 0.23$), reinforcing that age and diabetes duration increase complication risks (Lazzarini et al., 2018). These findings highlight the need for vigilant monitoring in older adults to prevent ulcers from progressing to severe outcomes.

A key concern was the significantly higher 30-day mortality in older patients (7.5% vs. 1.7%, $p = 0.05$), consistent with research linking advanced age to poorer survival post-DFU (Armstrong & Swerdlow, 2020). Rehospitalization rates were similar (8% overall), but older adults had a slight increase (10% vs. 6.7%, $p = 0.55$), possibly due to comorbidities or delayed recovery (Schaper et al., 2017). These results suggest that while treatment efficacy is high, older patients remain vulnerable to adverse events, necessitating enhanced post-discharge care and follow-up.

The economic implications of these findings are substantial. DFU-related costs are comparable to cancer (Armstrong & Swerdlow, 2020), with older adults likely requiring more intensive—and expensive—care due to complications and comorbidities (Kerr et al., 2019; Seghieri & Ferrè, 2022). The higher BMI in older patients further underscores the role of metabolic syndrome in driving complications and costs. Preventive strategies, such as weight

management and glycemic control, could reduce long-term expenses while improving outcomes (van Netten et al., 2016).

Conclusion: diabetic ulcer healing rates were high across age groups, older patients faced greater risks of mortality and complications. These findings support age-specific interventions, including stricter glycemic control, early ulcer prevention, and tailored post-treatment monitoring. Future research should explore cost-effective strategies to improve outcomes in elderly diabetic populations, particularly those with high BMI and multiple comorbidities.

Conflict of interest: None

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