Quality of Life Aspects Associated with Diabetic Foot Ulcer Patients at Alzomra Medical Center, Shendi Teaching Hospital, and Almak Nimir Hospitals (March to August 2024

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Abstract

Background: Diabetic foot ulcers (DFUs) are a serious complication of diabetes mellitus, leading to high morbidity, frequent hospitalizations, and a significant decline in quality of life (QoL). This issue is particularly pronounced in resource-limited settings like Sudan, where underdeveloped healthcare infrastructure complicates effective management.

Objectives: This study aims to evaluate the QoL of patients with DFUs and identify factors influencing QoL in the physical, psychological, social, and environmental domains among patients treated at Alzomra Medical Center, Almak-Nimir Hospital, and Shendi Teaching Hospital.

Methods: A cross-sectional study was conducted from March to August 2024 at Alzomra Medical Center, Almak-Nimir, and Shendi Teaching Hospital, involving 102 diabetic foot ulcer patients. Data were gathered using validated QoL assessment tools, including the Diabetes Foot Ulcer Scale (DFS) and the Short Form Health Survey (SF-36). Additional data on demographics, duration of diabetes, wound characteristics, and treatment regimens were collected. Statistical analysis explored correlations between QoL outcomes and factors such as gender, age, wound severity, and the hospital of treatment.

Results: Most patients were male (71%) and aged between 41–60 years, with Type 2 diabetes being the predominant form (81%). A majority of patients had lived with diabetes for less than 10 years. Pain interference, activity limitations, and frustration were the primary factors negatively impacting QoL. The domains most affected were physical functioning and psychological well-being, with mobility limitations and pain playing significant roles. Despite these challenges, no statistically significant differences were observed in QoL outcomes based on gender, age, or hospital of treatment, indicating consistent care across facilities.

Conclusion: Diabetic foot ulcers significantly impair quality of life, particularly in physical and psychological domains. Pain management, improved mobility support, and psychological counseling are essential to enhancing patient outcomes. The consistent quality of care provided at Alzomra Medical Center, Almak-Nimir, and Shendi Teaching Hospital highlights the importance of a multidisciplinary approach in managing DFUs in resource-limited settings. Future research should concentrate on long-term strategies for recurrence prevention and overall patient well-being improvement.

Research questions

What is the overall quality of life (QoL) of diabetic foot ulcer patients treated at Alzomra Medical Center, Almak Nimir Hospital, and Shendi Teaching Hospital?

How do diabetic foot ulcers impact the physical, psychological, social, and environmental domains of quality of life among patients?

Research Justification

In Africa, an estimated 14 million individuals currently have diabetes mellitus (DM), with projections suggesting this figure will double to 28 million by 2030. In Sudan, recent data on the incidence and prevalence of DM and its complications, as well as patients' awareness and lifestyle practices, is lacking. Previous studies have indicated that DM in Sudan is often associated with poor glycemic control, a high prevalence of complications, reduced quality of life, and increased morbidity.

Among Sudanese adults, diabetic foot is reported as the leading diabetes-related cause of hospitalization, with major lower limb amputations and mortality rates of 19.2% and 6.7%, respectively. These complications highlight significant gaps in the management and lifestyle adaptation of diabetic patients, particularly those suffering from diabetic foot ulcers (DFUs).

Given the severe impact of DFUs on morbidity and quality of life, this study aims to explore the quality-of-life aspects in DFU patients, assessing the factors that contribute to poor outcomes and identifying potential interventions. Understanding the challenges faced by patients with DFUs is crucial to improving clinical management, promoting diabetes-friendly lifestyles, and ultimately enhancing the quality of life in this vulnerable population.

Objectives

General Objective:

To assess the quality-of-life aspects associated with diabetic foot ulcer patients at Alzomra Medical Center, Shendi Teaching Hospital, and Almak Nimir Hospitals from March to August 2024.

Specific Objectives:

1- To assess the overall QoL of DFU patients using validated QoL assessment tools.
2- To identify specific domains of QoL (physical, psychological, social, and environmental) most affected by DFUs.
3- To explore the factors influencing QoL in DFU patients, such as wound characteristics, comorbidities, and socio-demographic factors.
4- To compare the QoL outcomes between patients treated at Alzomra Medical Center, Almak Nimir Hospital, and Shendi Teaching Hospital.

Literature Review

Diabetic foot ulcers (DFUs) represent a significant health burden globally, particularly in regions with limited healthcare resources. In Africa, approximately 14 million individuals have diabetes mellitus (DM), and this number is expected to double by 2030 [1]. DFUs are among the most severe complications of DM, often leading to prolonged hospitalizations, amputations, and increased mortality. In Sudan

diabetic foot ulcers are a leading cause of diabetes-related hospital admissions, contributing to major lower limb amputations and high mortality rates [2,3]. These complications underscore the substantial impact of DFUs on patient quality of life (QoL).

Quality of life is considerably reduced in patients with DFUs due to chronic pain, mobility restrictions, and emotional stress. Studies in various settings have consistently reported that the physical and psychological domains of QoL are particularly affected [4,5]. In a cross-sectional study conducted in Egypt, patients with DFUs reported lower QoL scores compared to diabetic patients without foot complications, with physical limitations and psychological distress being the most significantly impacted domains [6]. This trend aligns with global observations, suggesting that DFUs profoundly impair both physical functioning and mental well-being [7].

The severity and duration of DFUs, along with patient demographics, play crucial roles in determining the QoL outcomes for diabetic patients. Research from Nigeria has highlighted that factors such as age, ulcer severity, duration of diabetes, and the presence of comorbidities (e.g., hypertension, neuropathy) significantly influence QoL [8]. Socioeconomic status, education level, and access to healthcare are also key determinants that affect the overall well-being of DFU patients [9,10]. Effective management of these factors is essential to improve QoL and reduce the complications associated with DFUs.

Multidisciplinary care approaches are critical in managing DFUs, as they involve coordinated efforts from healthcare professionals, including podiatrists, endocrinologists, nurses, and mental health specialists. Evidence suggests that multidisciplinary management, which includes wound care, pain control, psychological counseling, and regular monitoring, improves QoL among DFU patients [11,12]. A systematic review by Goodridge et al. emphasized the benefits of early and comprehensive intervention in preventing DFU complications and enhancing QoL [13].

Managing DFUs in resource-limited settings like Sudan presents unique challenges, including inadequate access to specialized care, limited availability of advanced diagnostic tools, and insufficient patient education. The International Diabetes Federation has highlighted the need for strengthening primary healthcare systems, promoting diabetes-friendly lifestyles, and increasing awareness of foot care to address the high burden of DFUs in low-income regions [14]. Effective preventive strategies are crucial to mitigating the impact of DFUs and improving long-term outcomes in resource-constrained environments [15].

Patient education is a pivotal component in the management of diabetes and the prevention of DFUs. Studies indicate that a lack of knowledge about foot care, poor glycemic control, and non-compliance with treatment regimens are prevalent among diabetic patients in Sudan and other low-resource countries [16,17]. Educational programs that emphasize proper foot hygiene, regular monitoring, and adherence to treatment plans have been shown to significantly reduce the risk of DFUs and improve QoL

Methodology

Study Design

This study adopts a cross-sectional design to assess the quality of life (QoL) of diabetic foot ulcer (DFU) patients. Data will be collected at a single point in time within the study period to capture a comprehensive snapshot of the QoL of DFU patients in the selected healthcare facilities. A quantitative approach will be utilized, employing standardized QoL assessments and structured questionnaires to gather quantifiable data.

Study Area

The research will be carried out in three key healthcare settings in Shendi, Sudan:

Shendi Teaching Hospital: A large and comprehensive healthcare institution offering a wide spectrum of medical services, including specialized diabetes care.

Almak Nimir Hospital: Another major hospital in Shendi, offering similar healthcare services as Shendi Teaching Hospital, with the potential to serve a different patient demographic.

Alzomra Medical Center: A newer medical facility with a dedicated foot care clinic, allowing for the inclusion of patients with potentially more specialized needs or complex DFU cases.

Study Duration

The study will span a period of six months, from March 2024 to August 2024. This timeframe is designed to allow for the recruitment and assessment of a representative sample of DFU patients in the targeted healthcare facilities.

Study Population

The study population will consist of adult patients (18 years and above) diagnosed with DFUs, attending any of the three selected healthcare facilities. This targeted population allows the study to specifically focus on the QoL aspects of DFU patients in the region.

Sample Size

A total of 100 DFU patients will be recruited from the three healthcare facilities. This sample size is deemed sufficient to provide meaningful insights into the QoL of DFU patients in Shendi and to enable a preliminary analysis of the factors impacting their QoL.

Sampling Technique

A convenience sampling technique will be employed, meaning that all DFU patients encountered at the three facilities during the study period will be included. Although this approach is not random, it is practical given the study's time constraints and aims to capture a representative sample of the population.

Tools of Data Collection

Data collection will rely on a structured questionnaire administered through personal interviews. This approach ensures consistent data collection and minimizes bias or misinterpretation during the data gathering process.

Data Collection Technique

Two primary data collection techniques will be used:

Quality of Life Assessment:

Diabetes Foot Ulcer Scale (DFS): A specialized tool to assess the impact of DFUs on a patient's physical functioning, pain, social activities, and emotional well-being.

Short Form Health Survey (SF-36): A widely used survey that measures overall health-related QoL across eight dimensions: physical functioning, role limitations due to physical problems, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and mental health.

Clinical Data Collection:

Medical Records: Relevant clinical data will be extracted, including demographics (age, gender, etc.), diabetes history (duration, blood sugar control, complications), wound characteristics (location, size, depth, presence of infection), and treatment regimens.

Patient Interviews: Direct questions will be asked to participants to collect information on their wound care experiences, satisfaction with treatment, and perspectives on the impact of DFU on their daily lives.

Data Analysis

Data will be compiled from a master sheet and analyzed using the Statistical Package for the Social Sciences (SPSS). Analysis will include descriptive and inferential statistics to examine the relationships between QoL outcomes and variables such as demographic factors, clinical features, and wound characteristics. Results will be presented in the form of tables, graphs, and figures.

Data Management

The data will be presented in a clear and organized manner, using tables and figures to illustrate key findings.

Ethical Considerations

Ethical approval for the study will be obtained from the Research Ethics Committee of Shendi University. All participants will provide informed consent, and confidentiality will be maintained throughout the study. The ethical guidelines set by the committee will be strictly adhered to, ensuring the protection of participants' rights and well-being.

Results:

Results

The primary objectives of this study were to assess the overall Quality of Life (QoL) of diabetic foot ulcer (DFU) patients using validated QoL assessment tools, identify specific domains of QoL (physical, psychological, social, and environmental) most affected by DFUs, explore factors influencing QoL such as wound characteristics,

comorbidities, and socio-demographic factors, and compare QoL outcomes between patients treated at different hospitals. This chapter presents the comprehensive data analysis conducted to achieve these objectives, including exploratory data analysis

(EDA), hypothesis testing, multivariate analysis, and visualizations.

Data Overview and Descriptive Statistics

The dataset comprised demographic information, health conditions, and various QoL measures for DFU patients. The analysis included 102 patients with data on age, gender, education level, occupation, type and duration of diabetes, and history of

diabetic ulcers.

• Demographics: Most patients were middle-aged, with the highest counts in the 41-50 and 51-60 age groups. The gender distribution showed a predominance of male patients (71 males vs. 30 females). The majority of patients had secondary education or lower, with a significant portion unemployed.

• Education Level: Most patients had secondary education (31) or primary education (28). A notable number of patients were illiterate (14), which may impact their ability to manage diabetes effectively.

• Occupation: A significant portion of patients were unemployed (42), followed by those engaged in free work (41), and a smaller number in sedentary jobs 18). The occupational distribution suggests potential socioeconomic challenges impacting diabetes management.

Diabetes Characteristics:

• Type of Diabetes: Type 2 diabetes was the most prevalent, with 83 patients, followed by Type 1 diabetes (13 patients). A few patients (5) had other types

of diabetes.

• Duration of Diabetes: Most patients had been living with diabetes for less than 10 years (44 patients), while 38 patients had diabetes for 10-20 years. A smaller group had diabetes for more than 20 years (6 patients), and 13 patients

were not diagnosed with diabetes before presenting with foot ulcers.

• Diabetes Management: Insulin therapy was the most common management method (56 patients), followed by oral medications (42 patients). Only a few patients managed diabetes through diet and exercise (3 patients).

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Ulcer Characteristics:

• History of Diabetic Ulcers: A majority of patients (57) had a history of diabetic ulcers, indicating recurring issues.

• Number of Ulcers: The number of ulcers varied, with 25 patients reporting a single ulcer, 14 reporting two ulcers, 11 reporting three ulcers, and 7 having more than four ulcers.

• Wound Site and Depth: The forefoot was the most common wound site (59 patients), followed by the midfoot (22 patients) and hindfoot (20 patients). Deep wounds were most prevalent (54 patients), with a smaller number having superficial wounds (26) or wounds involving bone (21).

• Previous Treatments: Treatment approaches commonly included dressing changes, antibiotics, surgical debridement, and, in some cases, amputation. A combination of all these treatments was reported by 48 patients, indicating severe ulcer cases

Discussion

The results of this study underscore the significant impact of diabetic foot ulcers (DFUs) on patients' Quality of Life (QoL), aligning with findings from previous research that demonstrated the debilitating effects of DFUs on multiple aspects of well-being. This section interprets the study's key findings, discusses their implications in the context of existing literature, and offers recommendations for clinical practice and future research.

The analysis identified pain interference as the most substantial predictor of QoL impact among DFU patients. This finding is consistent with previous studies, which noted that pain is a major factor influencing physical and emotional well-being in patients with chronic wounds like DFUs【19,21】. Pain not only limits daily activities but also exacerbates emotional distress, leading to frustration and diminished overall QoL. These results emphasize the necessity for targeted pain management strategies, such as multimodal analgesia and advanced wound care, to improve QoL outcomes in DFU patients【20】.

Frustration levels also significantly affected QoL, indicating that psychological factors play a crucial role in the lived experience of DFU patients. Similar findings have been reported in the literature, highlighting that the emotional burden of chronic diabetic complications often contributes to lower QoL【22,23】. Psychological distress can stem from the chronic nature of DFUs, frequent medical visits, and the impact on personal and social life. This stresses the need for comprehensive care approaches that include psychological support and counseling as part of the DFU management protocol, which could help in mitigating the emotional challenges faced by these patients【24】.

Activity limitation emerged as a significant contributor to QoL impact, underlining the importance of maintaining physical functionality for DFU patients. The literature supports this finding, suggesting that physical limitations due to pain and wound severity often lead to decreased independence and mobility, further affecting social engagement and mental health【19,25】. Rehabilitation services, including physical therapy and tailored exercise programs, could enhance mobility and reduce activity-related restrictions, thereby improving the QoL for DFU patients【26】.

Contrary to some previous studies, gender, type of diabetes, and treatment location did not show statistically significant differences in QoL outcomes among the DFU patients studied. These results suggest that the burden of DFUs is largely independent of these demographic and treatment factors, possibly indicating that the core impact on QoL is more related to the severity of the condition itself rather than these individual variables【27,28】. This could be a reflection of the consistent quality of care provided across the different healthcare settings studied, as well as the similarities in the progression and management of DFUs across genders and diabetes types.

Conclusion

In conclusion, DFUs have a profound impact on the QoL of affected individuals, with pain, frustration, and physical limitations being the primary drivers of this burden. Addressing these factors through comprehensive, multidisciplinary care approaches—encompassing physical, emotional, and social dimensions—could significantly enhance the overall well-being of DFU patients. Clinicians should adopt an integrated model of care that prioritizes pain management, psychological support, and rehabilitation,

Recommendations

1. Integrated Care Model: Develop a comprehensive care pathway that combines medical, psychological, and social support services. Coordination among healthcare providers, mental health professionals, and social workers is essential to address the multifaceted needs of patients.

2. Patient Education: Create educational programs focusing on diabetes management, psychological resilience, and effective use of social support networks. These programs should be delivered through various formats (e.g., workshops, pamphlets, videos) to cater to different learning preferences.

3. Continuous Monitoring and Feedback: Establish a system for ongoing monitoring of patient well-being, using digital health tools to track progress, provide reminders for healthcare visits, and offer resources for support. Regular feedback from patients can help refine intervention strategies.

4.Early detection of wound and intervention. Patients should schedule regular visits and learn the need for medical intervention in early detection of wound infection with urgency to avoid further complications and burden procedure in a long-term chronic disease.

5.spreading awareness about occupational hazards. In diabetic patients in regards of the equipment and man labor in demanding jobs, handling sharp objects or operating heavy machinery. attentive fields security as well as providing safety gears for them.

6.finacial aid and charity association support. providing the diabetic patients with financial high struggles funding programs in health care based on their current socioeconomic status, especially the population left unemployed after the displacement due to the war and political stance of unfortunate events unfolding in Sudan.

Limitation

Some of the patients refused to participate in our study due to exhaustion from the treatment, few patients were suffering from hypoglycemia. A large sum of the patients were elderly with a low understanding of survey set of questions and rating of their emotions as well as feeling complied to agree with certain question due to lack of privacy and relative surrounding the nsuring a holistic approach to improving outcomes for this vulnerable patient population.

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