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HEALTH RELATED QUALITY OF LIFE AND DEGREE OF ITS COMPLIANCE IN PATIENTS WITH DIABETIC PERIPHERAL NEUROPATHY

Original Research

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ABSTRACT

Background: Diabetes mellitus is a chronic metabolic disorder associated with long-term complications that significantly impair health-related quality of life (HRQOL). One of the most prevalent complications is diabetic peripheral neuropathy (DPN), characterized by sensory loss, numbness, and pain, commonly presenting in a glove and stocking pattern. This condition negatively affects physical, psychological, and social wellbeing, leading to decreased independence and increased disability in patients. Assessing HRQOL in diabetic individuals is essential for guiding comprehensive disease management.

Objective: To evaluate health-related quality of life and the extent of its impairment in patients with diabetic peripheral neuropathy.

Methods: A descriptive cross-sectional study was conducted using non-probability convenience sampling. A total of 100 patients previously diagnosed with DPN were recruited from Ghurki Trust Teaching Hospital and Jinnah Hospital, Lahore. The SF-36 questionnaire was used as the assessment tool to evaluate HRQOL across eight domains: physical functioning, role physical, bodily pain, general health, vitality, social functioning, emotional role, and mental health. Data were analyzed using SPSS version 21, and mean ± standard deviation was calculated for each domain.

Results: Participants had a mean age of 55.39 ± 8.08 years. Gender distribution included 57% males and 43% females. The SF-36 results showed mean scores below 50 in most subdomains, reflecting impaired quality of life. Physical functioning had a mean score of 37.3 ± 2.06, role physical 30.75 ± 2.45, bodily pain 40.78 ± 1.63, general health 35.5 ± 1.28, vitality 38.3 ± 15.57, social functioning 49.25 ± 20.85, emotional role 30.66 ± 2.86, and mental health 49.72 ± 12.57.

Conclusion: The study concludes that diabetic peripheral neuropathy significantly reduces HRQOL in affected patients. Early detection, preventive strategies, and integrated management approaches are critical in minimizing complications and improving overall quality of life.

Keywords: Diabetes Mellitus, Diabetic Neuropathies, Health Status Indicators, Pain, Quality of Life, SF-36, Social Support.

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INTRODUCTION

Diabetes mellitus is a chronic, progressive metabolic disorder that significantly compromises an individual's quality of life, particularly as the disease advances and complications emerge. Among the most common and debilitating complications is diabetic peripheral neuropathy (DPN), which affects nearly half of individuals with long-standing diabetes (1). The most frequent presentation of DPN is distal symmetrical sensorimotor polyneuropathy, primarily affecting the distal extremities in a characteristic "glove and stocking" pattern due to progressive sensory loss (1,2). This form of neuropathy evolves silently over time and often goes undetected in its early stages, contributing to substantial morbidity in the form of foot infections, ulcers, and even amputations (2). Peripheral neuropathy can manifest in various clinical forms depending on the specific type of nerve fibers affected—sensory, motor, or autonomic. Pain, paresthesia, and numbness are hallmark symptoms of painful diabetic neuropathy and significantly interfere with daily functioning. Patients with DPN are at an increased risk of foot trauma due to reduced protective sensations, leading to complications such as infections and delayed wound healing (3). Beyond physical consequences, DPN negatively influences health-related quality of life (HRQoL), diminishing not only physical capabilities but also mental wellbeing, emotional resilience, and social functioning. It disrupts personal independence, belief systems, and interpersonal relationships, highlighting its multidimensional impact on overall life satisfaction (4).

Given the chronicity and pervasive burden of diabetes, assessing quality of life in affected individuals has become a routine yet essential element in both clinical and public health frameworks. It allows for the evaluation of treatment effectiveness and patient-centered care outcomes (5). In Pakistan, the prevalence of diabetes is steadily rising, with current estimates indicating that nearly 5 million people are affected. This number is projected to increase substantially, reaching a prevalence of 13.9% in the near future (6). The burden of diabetic neuropathy, however, shows considerable variability across populations, ranging from 2.4% to as high as 61.8%, further complicating efforts to quantify and address this issue effectively (7). Notably, a meta-analysis has reported that up to 50% of diabetic patients develop some form of neuropathy during the course of the disease (8). Numerous modifiable risk factors—such as advanced age, longer duration of diabetes, poor glycemic control, hypertension, smoking, obesity, dyslipidemia, and insulin resistance—are implicated in the progression of diabetic neuropathy and deterioration in quality of life (9,10). Timely identification and management of these risk factors are essential in mitigating the long-term impact of DPN on patients' wellbeing.

To measure HRQoL in individuals with DPN, the SF-36 (36-item short-form health survey) has emerged as a valid, reliable, and widely accepted tool. It encompasses eight domains, including physical functioning, bodily pain, general health perceptions, and emotional wellbeing. The overall reliability of this instrument is robust, with a reported Cronbach's alpha coefficient of 0.791. Most subscales exceed the accepted threshold of 0.70, indicating internal consistency, except for the social functioning domain which reflects a slightly lower coefficient of 0.631 (11,12). Despite extensive literature on the clinical manifestations of diabetic neuropathy, there remains a gap in understanding how these symptoms intricately relate to the overall quality of life, especially in under-researched populations such as those in Pakistan. Exploring this association is essential for developing integrated interventions that not only address the physical symptoms but also the psychosocial aspects of care. Therefore, the objective of this study is to evaluate the impact of diabetic peripheral neuropathy on the health-related quality of life and to identify the contributing risk factors influencing this relationship.

METHODS

A descriptive cross-sectional observational study was conducted to assess the impact of diabetic peripheral neuropathy on health-related quality of life. Participants were recruited through non-probability convenience sampling from two tertiary care hospitals in Lahore, namely Ghurki Trust and Teaching Hospital and Jinnah Hospital. Ethical approval was obtained from the institutional review board prior to data collection, and informed written consent was secured from all participants before their inclusion in the study. Participants were selected based on predefined inclusion and exclusion criteria. Adults with diagnosed type 2 diabetes mellitus and clinical features of peripheral neuropathy were eligible for inclusion. Patients with coexisting chronic illnesses unrelated to diabetes that could independently affect quality of life (e.g., malignancies, advanced cardiac or pulmonary disease), those with psychiatric conditions, and individuals unable to comprehend or respond to the questionnaire were excluded from participation. This ensured that the study specifically evaluated the burden of diabetic neuropathy on quality of life without interference from unrelated morbidities. The

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

assessment tool used was the SF-36 (36-Item Short Form Survey), a validated and widely used instrument for measuring health-related quality of life. This questionnaire comprises eight subscales: physical functioning, role limitations due to physical health, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems, and mental health. The SF-36 has demonstrated acceptable internal consistency, with a Cronbach's alpha coefficient of approximately 0.75 across most dimensions, though slightly lower for the social functioning subscale (9).

The sample size was calculated using the World Health Organization (WHO) sample size calculator. A 95% confidence interval, anticipated population proportion (p) of 0.07, and an absolute precision (d) of 0.05 were applied using the standard formula: $\mathbf{n = (Z^2 \times P \times (1\text{-}P)) / d^2}$ Based on these parameters, the required sample size was determined to be 100 participants. This approach ensured an adequate sample to yield meaningful estimates of quality of life among individuals with diabetic peripheral neuropathy. Data were collected through direct interviews using the SF-36 questionnaire and entered into IBM SPSS version 21 for statistical analysis. Descriptive statistics, including frequencies and percentages, were computed for categorical variables, while means and standard deviations were calculated for continuous variables. Histograms were used to visually represent the distribution of continuous data, providing an overview of the central tendency and variability within the sample.

RESULTS

A total of 100 participants were enrolled in the study, with an age range of 40 to 72 years. The mean age was 55.39 years (SD = 8.08), indicating a predominantly middle-aged to elderly population affected by diabetic peripheral neuropathy. Among the participants, 57% (n=57) were male and 43% (n=43) were female, reflecting a slightly higher male predominance. The assessment of health-related quality of life using the SF-36 instrument revealed significant reductions across multiple domains. Physical functioning was notably impaired, with a mean score of 37.3 (SD = 2.06), indicating limitations in mobility and daily physical tasks. Role limitations due to physical health problems had a mean score of 30.75 (SD = 2.45), reflecting difficulty in fulfilling work and daily roles due to physical health constraints. Pain, a central symptom of diabetic neuropathy, also impacted quality of life, with bodily pain scoring a mean of 40.78 (SD = 1.63). General health perceptions were poor among participants, with a mean score of 35.5 (SD = 1.28), suggesting a pessimistic view of personal health status. Vitality, representing energy levels and fatigue, scored a mean of 38.3 (SD = 15.57), underscoring reduced stamina and frequent tiredness. Social functioning was moderately impaired, with a mean score of 49.25 (SD = 20.85), indicating limitations in usual social activities due to health issues. Emotional role functioning, which reflects limitations in emotional well-being affecting daily tasks, had a mean of 30.66 (SD = 2.86). Lastly, mental health scored a mean of 49.72 (SD = 12.57), suggesting that symptoms of anxiety, depression, and psychological distress were present but less severely than physical limitations. These results collectively demonstrate a significant decline in all domains of health-related quality of life among patients with diabetic peripheral neuropathy. The findings are consistent with the multidimensional burden of this condition, impacting physical, emotional, and social aspects of daily life.

Table 1: Age Distribution of Study Participants

N	Minimum	Maximum	Mean	SD
100	40	72	55.39	8.077

Table 2: Gender Distribution of Study Participants

N	Frequency	Percentage
Male	43	43%
Female	57	57%

Table 3: Descriptive Statistics of SF-36 Quality of Life Subscale Scores

SF-36 Domain	Mean	SD	Range	Max–Min
Physical Functioning	37.3	2.055	90	90–0
Physical Role Functioning	30.75	2.45	100	100–0
Bodily Pain	40.775	1.632	67.5	77–10
General Health	35.5	1.276	55	65–10
Vitality	38.3	15.57	70	70–0

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SF-36 Domain	Mean	SD	Range	Max–Min
Social Functioning	49.25	20.85	100	100–0
Emotional Role	30.66	2.86	100	100–0
Mental Health	49.72	12.57	56	76–20

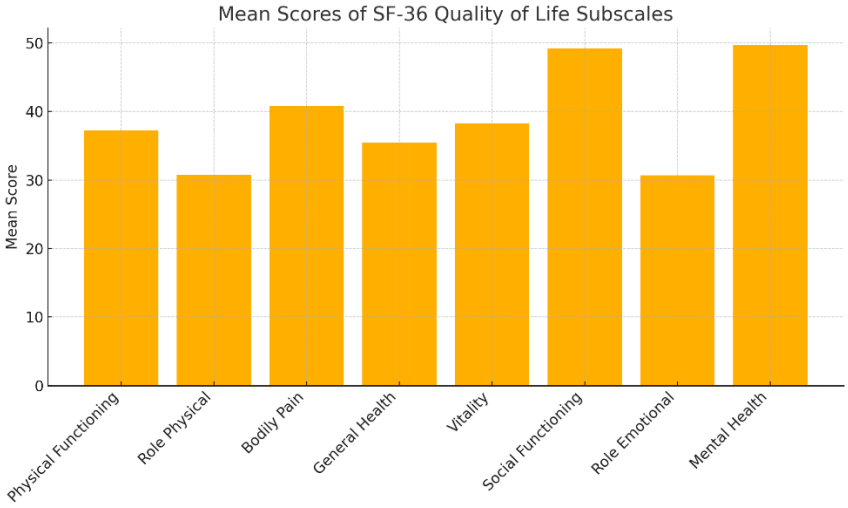

Figure 1 Mean Scores of SF-36 Quality of Life Subscales

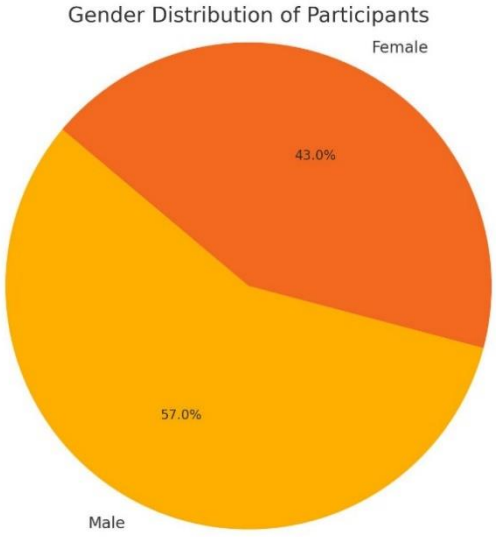

Figure 2 Gender Distribution of Participants

DISCUSSION

The present study demonstrated a substantial decline in health-related quality of life (HRQoL) among individuals suffering from diabetic peripheral neuropathy (DPN), with noticeable impairment across all SF-36 domains, including physical functioning, emotional role, pain, and vitality. These findings reinforce the multidimensional burden of DPN, confirming that its effects extend beyond somatic symptoms and significantly interfere with social engagement, psychological wellbeing, and overall life satisfaction. The observed association between increased age and reduced quality of life aligns with existing literature, where a higher prevalence of DPN and its complications has been reported among individuals aged 45–65 years (13,14). This age group is particularly vulnerable due to longer disease duration, progressive nerve damage, and the compounding effect of comorbidities. The decline in physical role functioning and mental health observed in this study reflects similar patterns reported in earlier investigations, in which fatigue, sleep disturbances, limb pain, and restricted mobility were among the most common complaints adversely impacting daily functioning and social roles (15,16). Painful diabetic neuropathy has been specifically recognized as a critical factor contributing to impaired quality of life. Previous studies utilizing validated tools such as the DN4 questionnaire reported a prevalence of painful neuropathy of 29.1%, with strong associations to age, poor glycemic control, and longer duration of diabetes (17,18). These findings are consistent with the present study, where participants with pronounced physical discomfort also reported lower vitality, emotional distress, and social withdrawal, suggesting a direct link between neuropathic pain and psychological burden. Additionally, prior research using the Nottingham Health Profile supported this interrelationship, reporting that energy deficits and poor sleep quality are strongly interconnected with pain intensity, further validating the current findings (19,20).

Social functioning was also significantly reduced in the diabetic population studied. This echoes findings from previous research showing that neuropathic complications and their associated symptoms such as numbness, limb swelling, and mobility limitations contribute to social isolation and reduced interpersonal interaction (21). Furthermore, it was highlighted in previous literature that patients with DPN perceived their illness as a source of emotional strain not only for themselves but also for those around them, a pattern similarly reflected in the current study where participants reported increased dependency and social burden due to their condition (22). The consistency of current results with past literature strengthens the external validity of the findings and highlights the ongoing

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relevance of evaluating HRQoL as an essential clinical outcome in patients with diabetic neuropathy. However, several limitations must be acknowledged. The use of a non-probability convenience sampling method and the study's confinement to two tertiary care hospitals may limit the generalizability of findings to the broader diabetic population. Furthermore, key clinical variables such as HbA1c levels, body mass index, comorbid hypertension, lipid profile, and diabetes duration were not included in the statistical analysis, despite their known impact on neuropathic progression and quality of life. The cross-sectional design also restricts causal inference between DPN severity and HRQoL deterioration.

A major strength of this study lies in its use of the SF-36 questionnaire, a well-validated instrument that captures a comprehensive picture of the physical, emotional, and social dimensions of health. Additionally, the inclusion of a balanced male-to-female ratio and a relatively large sample size enhances the internal reliability of the findings. Future research should prioritize longitudinal designs to better understand the trajectory of HRQoL decline in diabetic patients over time and incorporate biochemical markers to correlate metabolic control with neuropathic burden. Broader population-based sampling, inclusion of rural and underrepresented communities, and integration of qualitative patient narratives would provide deeper insight into the lived experiences of individuals with DPN and guide more targeted interventions. In conclusion, diabetic peripheral neuropathy emerges as a significant determinant of reduced quality of life across multiple domains. The findings underscore the urgent need for early identification, comprehensive management of modifiable risk factors, and multidisciplinary care approaches that address both physical symptoms and psychosocial challenges in this vulnerable population.

CONCLUSION

This study concludes that individuals with diabetic peripheral neuropathy experience a marked decline in their quality of life, affecting not only their physical capabilities but also their emotional wellbeing and social independence. The findings emphasize the significant burden this complication places on daily functioning, often forcing patients into increased reliance on others. These outcomes highlight the urgent need for early identification and proactive management of diabetes to prevent neuropathic complications. By addressing both clinical and psychosocial aspects of care, healthcare providers can play a pivotal role in preserving the dignity, autonomy, and overall wellbeing of individuals living with diabetes.

AUTHOR CONTRIBUTION

Author	Contribution
Kanza Shahbaz	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Isra Rizwan	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Noor Ul Ain Komal	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Maria Khan	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Muhammad Behzad Ali*	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Aiman Arif	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Iqra Wahid	Contributed to study concept and Data collection Has given Final Approval of the version to be published
Areej Fatima	Writing - Review & Editing, Assistance with Data Curation

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