ORIGINAL ARTICLE

Prevalence and Impact of Neuropathic Pain on Quality of Life in Chronic Pain Patients: A Cross-Sectional Study

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Received: 7 May 2026
Accepted: 17 May 2026

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Abstract

Background: Neuropathic pain (NeP) represents a significant global healthcare burden, frequently leading to profound morbidity and functional incapacity. Unlike nociceptive pain, NeP arises from a primary lesion or dysfunction of the somatosensory nervous system. This study aimed to evaluate the prevalence of NeP among chronic pain patients in a tertiary care setting in Bangladesh and investigate its specific impact on health-related quality of life (HRQoL).

Methods: A cross-sectional study was conducted at the Pain Outpatient Department (OPD), Kosaka Pain Clinic, and Pain Skill Lab of the Bangladesh Medical University (BMU), Dhaka, over a one-year period. A total of 220 adult patients with chronic pain (duration >3 months) were evaluated. NeP was screened using the Douleur Neuropathique 4 (DN4) questionnaire (threshold ≥4). Pain intensity was measured using the Numeric Rating Scale (NRS), and HRQoL was evaluated across nine domains using the Short Form-36 (SF-36) Health Survey. Data were analyzed using SPSS version 27.

Results: The mean age of the respondents was 44.36±13.28 years, with a distinct female predominance (65.9%). According to the DN4 questionnaire, the prevalence of NeP was 49.1% (n = 108). The most prevalent sensory descriptors were burning sensations (85.9%), tingling (76.4%), and numbness (70.0%). On the NRS, 75.5% reported moderate pain, and 24.5% experienced severe pain. Increasing age group was significantly associated with both higher pain severity ($p = 0.009$) and positive NeP status ($p = 0.001$), with individuals over 50 bearing the highest burden (73.13% positive). HRQoL was profoundly lower in the neuropathic group compared to the non-neuropathic group across multiple domains ($p < 0.05$), most notably in Physical Functioning (39.41±17.67 vs. 49.51±14.11, $p < 0.0001$), Vitality (31.32±13.39 vs. 44.34± 13.43, $p < 0.0001$), and Mental Health (35.55±12.19 vs. 43.56±14.27, $p < 0.0001$).

Conclusion: Neuropathic pain is highly prevalent among chronic pain sufferers in Bangladesh, particularly among older individuals. It induces a devastating decline in physical mobility, mental health, and vital energy, necessitating mandatory clinical screening with tools like the DN4 and early multidisciplinary interventions.

Keywords: Neuropathic pain, Chronic pain, Prevalence, Quality of Life, DN4, SF-36.

DOI: https://doi.org/10.62848/bjpain.v6i1.3079

Introduction

Chronic pain is a pervasive global health crisis, affecting an estimated one in five adults worldwide, with an additional one in ten diagnosed annually. Among non-cancer pain phenotypes, neuropathic pain

Citation: Chhanda CS, Kamal MM, Arin KM, Tanni SA, Boby N, Akter A, Akhtaruzzaman AKM. Prevalence and Impact of Neuropathic Pain on Quality of Life in Chronic Pain Patients: A Cross-Sectional Study. Bangladesh J Pain 2026; 6(1): 29-34 doi:10.62848/bjpain.v6i1.3079

(NeP)—caused by lesions or dysfunction within the somatosensory nervous system—is particularly debilitating[1]. It is estimated that one in five adults worldwide experience pain and an additional one in ten adults are diagnosed with chronic pain annually[2]. It affects an estimated 8% of the global population[3]. A global systematic review demonstrated that worldwide NeP prevalence varies dramatically, ranging from 1.3% to 17.9% due to geographic, socio-demographic, and methodological disparities[4]. NeP arises from a broad range of etiologies, including diabetes, shingles, stroke, multiple sclerosis, spinal injuries, radiculopathies, and post-surgical trauma[5]. Questionnaires for identification of NeP have been developed and validated, thus providing valid tools for larger surveys[6,7].

Despite its high prevalence, the majority of NeP patients are managed in primary care without specialist assessment, often leading to underdiagnosis or inadequate treatment. To address this, validated and efficient clinical screening tools based on semiological pain descriptors—such as the DN4 questionnaire—have been developed to reliably differentiate NeP from nociceptive pain[8].

Effective treatment for chronic pain mitigates associated symptoms—such as fatigue, depression, and sleep disturbances—while significantly improving overall quality of life, functional capacity, and workplace productivity[9,10]. Wide variations in population estimates suggest that neuropathic symptoms are frequently experienced but remain widely underdiagnosed[11]. Population-based prevalence data are vital for allocating primary care resources—clinical, financial, and educational—and for targeting effective treatment and prevention strategies[12]. The survey followed a three-step protocol: screening for potential NeP, a detailed pain evaluation for suspected cases, and a quality-of-life (QoL) assessment. Developed with two NeP experts, the digital questionnaire utilized binary (yes/no) and numerical rating scales (0–10)[13].

The World Health Organization defines quality of life (QoL) as an individual's subjective evaluation of their cultural standing and life satisfaction regarding achievements, expectations, and standard of living. Chronic pain severely diminishes the sufferer's quality of life, disrupting both their physical and psychosocial wellbeing[1,14]. Literature identifies three primary factors affecting patients' quality of life: biological (pain location, duration, and intensity), psychological (coping and adjustment), and social (personal perception and meaning attributed to the disease)[15]. Symptoms like pain, fatigue, sleep disturbances, and depression diminish patient motivation to participate in physical, occupational, and social activities[16]. The loss of physical abilities and social roles, coupled with the emotional toll of the disease, promotes physical inactivity and reduced exercise tolerance. This increases the risks of weight gain, helplessness, and low self-worth[7].The accumulated losses (bereavements) experienced during chronic illness can induce despair, alter pain perception, and severely hinder a patient's coping mechanisms[17].

NeP represents a leading cause of global disability, posing immense welfare and economic challenges. Its prevalence is rising sharply alongside an aging global population, severely impairing functional capacity, occupational productivity, and sleep architecture. Unmanaged chronic NeP inflicts a severe biological, psychological, and social toll. It alters physical wellbeing, induces sleep disturbances, exacerbates fatigue, and triggers profound emotional distress, including depression, social isolation, and suicidal ideation. Conversely, effective pain management has been shown to mitigate these secondary symptoms and substantially improve overall quality of life (QoL). While the burden of NeP is well-documented in Western cohorts, its exact prevalence, clinical severity, and specific impact on QoL remain uninvestigated in Bangladesh. While a substantial volume of patients frequently present with chronic pain at specialized centers like the BMU Hospital Pain Clinic, epidemiological data regarding the exact prevalence and burden of NeP in Bangladesh is entirely lacking. Optimal management requires a comprehensive baseline understanding of pain characteristics (location, intensity, quality, duration) and their explicit intersection with patient QoL. This cross-sectional study aims to address this critical knowledge gap by determining the prevalence

of NeP among chronic pain patients in Bangladesh and quantifying its negative impact on their physical and psychosocial QoL. Ultimately, these data are essential for informing primary care resource allocation, targeting prevention strategies, and improving clinical recognition and management of refractory NeP.

Methods

This cross-sectional study was conducted at the Pain Outpatient Department (OPD), Kosaka Pain Clinic, and Pain Skill Lab of the Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangladesh Medical University (BMU), Shahbag, Dhaka, Bangladesh. The study duration spanned from July 2025 to June 2026. The inclusion criteria are patients aged ≥18 years of both sexes presenting with a clinically diagnosed history of chronic pain persisting or recurring for more than 3 months and exclusion criteria are patients presenting with acute pain, pregnant women, and individuals with cognitive impairments preventing reliable survey participation. Purposive sampling was used to enroll participants who met the entry requirements. The baseline sample size (n = 212) was computed using a validated standard prevalence formula with a margin of error set at 5% and an assumed prevalence of 16.6% based on regional epidemiological literature. Accounting for a potential non-response rate, 225 patients were approached; 220 completed the full evaluation, yielding an active response rate of 97.8%. Socio-demographic & clinical case record form was used to capture baseline metrics (age, gender, BMI, socioeconomic tier, and clinical co-morbidities). Douleur Neuropathique 4 (DN4) Questionnaire comprising of a standard 10-item screening tool comprising 7 subjective symptom items and 3 physical examination items was used and a total score of ≥4 was operationally defined as a "Positive" neuropathic outcome. Numeric Rating Scale (NRS) comprising of an 11-point scale (0–10) used to categorize pain intensity as mild (0–3), moderate (4–7), or severe (8–10) was used. Short Form-36 (SF-36) Health Survey (Bengali version) was used to evaluate HRQoL across nine health-related dimensions. Higher domain metrics indicated superior functional states.

Statistical Analysis

Data compilation and structural testing were carried out using SPSS Version 27. Categorical variables were detailed as frequencies and percentages; quantitative metrics were expressed as mean ± standard deviation (SD). Group dynamics were compared via Chi-Square (x^2) tests or Fisher's Exact tests for categorical segments, and independent Student's t-tests were used for quantitative metrics. Statistical significance was designated at $p < 0.05$.

Results

Among the 220 patients examined, the mean age was 44.36 ± 13.28 years (range: 18–75 years), with 57.3% aged over 40. Females comprised 65.9% (n = 145) of the cohort, while males constituted 34.1% (n = 75). The population belonged entirely to either lower (51.8%) or middle (48.2%) socioeconomic classes. Body Mass Index (BMI) tracking showed that 56.4% were within the normal range, 34.1% were overweight, and 9.5% were underweight. Within the cohort, 51.36% (n = 113) presented with clinical comorbidities, led by Diabetes Mellitus (n = 45, 39.8%) and Hypertension (n = 33, 29.2%).

Table I: Socio-demographic and clinical Characteristics (n=220)

Characteristic	Category	Frequency (n)	Percentage (%)
Age Group	≤20 years	8	3.6%
	21–30 years	30	13.6%
	31–40 years	56	25.5%
	41–50 years	59	26.8%
	>50 years	67	30.5%
Gender	Female	145	65.9%
	Male	75	34.1%
Socioeconomic Status	Lower	114	51.8%
	Middle	106	48.2%
	Upper/High	0	0.0%
BMI Category	Underweight	21	9.5%
	Normal	124	56.4%
	Overweight	75	34.1%
Co-morbidity	Yes	113	51.36%
	No	107	48.6%

Data expressed as frequency and percentage.

On the NRS, 0.0% reported mild pain, 75.5% (n = 166) experienced moderate pain, and 24.5% (n = 54) reported severe pain. Age was significantly associated with pain intensity (p = 0.009) and positive NeP status (p = 0.001). Patients over 50 years old experienced the highest relative rate of severe pain and a high positive screening rate of 73.13% (n = 49/

67). In contrast, gender (p = 0.196), socioeconomic categorization (p = 0.429), BMI distribution (p = 0.114), and the presence of general co-morbidities (p = 0.116) demonstrated no statistically significant associations with pain severity.

Applying the DN4 screening threshold (≥4), the prevalence of NeP in this chronic pain population was 49.1% (n = 108), while 50.9% (n = 112) were classified as non-neuropathic.

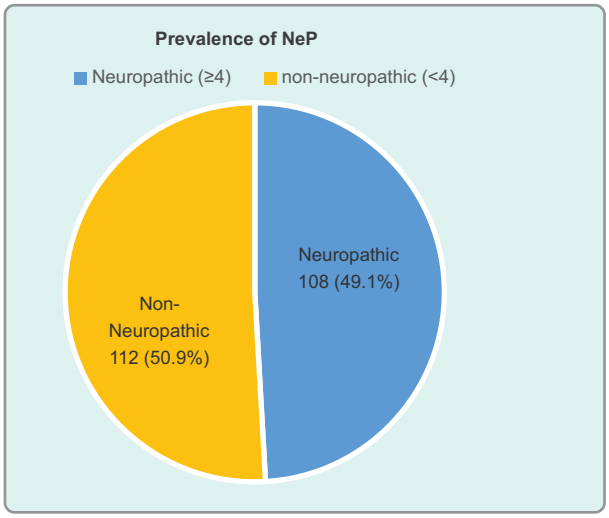

Figure 1: Prevalence of Neuropathic Pain.

Positive painful symptoms (burning, tingling, and numbness) were substantially more prevalent than objective negative sensory losses (hypoesthesia to touch or pinprick).

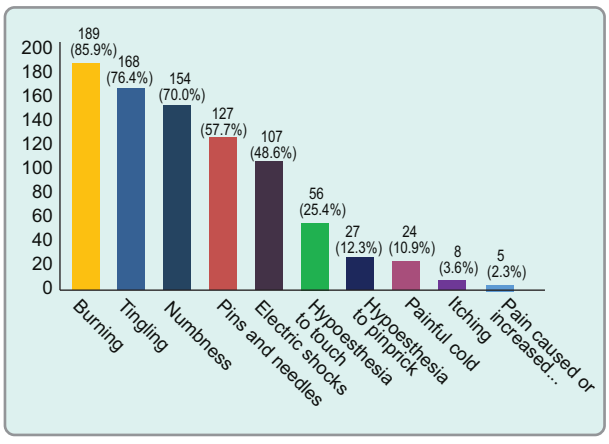

Figure 2: Sensory Characteristics of Neuropathic Pain.

The neuropathic cohort exhibited significantly reduced scores compared to the non-neuropathic group across multiple key HRQoL dimensions.

Table II: Impact of Neuropathic Pain on Quality of Life (SF-36)

SF-36 Health Domain	Neuropathic Mean±SD (n=108)	Non-neuropathic Mean± SD (n=112)	p-value*
Physical Functioning (PF)	39.41±17.67	49.51±14.11	<0.0001
Role Physical (RP)	51.32 ± 14.00	56.13±12.14	0.0101
Role Emotional (RE)	49.82±13.70	54.45±15.22	0.0208
Vitality (VT)	31.32±13.39	44.34±13.43	<0.0001
Mental Health (MH)	35.55±12.19	43.56±14.27	<0.0001
Social Functioning (SF)	45.60±22.59	48.43±17.15	0.3270
Bodily Pain (BP)	34.57±14.27	38.17±13.32	0.0643
General Health (GH)	32.77±13.49	36.15±14.25	0.0792
Health Change (HC)	31.32±13.91	30.33±13.43	0.6048

Data presented as Mean ± SD.

Note: Dominated by moderate-to-severe pain overall, global indices for Social Functioning, Bodily Pain, and General Health remained low across both groups without reaching statistical significance ($p < 0.05$).

Discussion

In a cohort of 220 respondents, a severe clinical burden was observed: 100% of participants experienced moderate (75.5%) or severe (24.5%) pain, with zero cases of mild pain. This absence of mild cases contrasts with general chronic pain studies suggesting that patients in this population may only seek clinical evaluation once their condition reaches a debilitating stage[18]. The cohort's mean age was 44.36±13.28 years. Age group was the sole demographic factor statistically associated with pain severity (p=0.009) and explicit neuropathic status (p=0.001). Participants over 50 demonstrated the highest rates of positive neuropathic screenings (73.1%) and severe pain (10.45% of the total sample). This aligns with a study noting slowed nervous system repair after age 45years[19]. Conversely, the 21–30 age group reported zero severe pain (0.0%). This highlights younger physiological resilience against "sensitization"—the process where chronic metabolic stressors transition moderate pain into severe pain[20].

A marked female predominance (65.9%) was observed. While gender did not reach statistical significance (p = 0.196), a clear clinical trend

emerged: 18.18% of females reported severe pain compared to 6.3% of males. This supports literature linking female pain sensitivity to sex hormones and psychosocial coping styles[21]. Women generally exhibit greater clinical pain sensitivity and a higher risk for severe chronic pain, driven by biological (sex hormones) and psychosocial (coping styles) factors. The lack of statistical significance in this study, however, may stem from the overriding influence of age or the cohort's specific pain etiology[22]. Socioeconomically, symptoms spanned lower (51.8%) and middle (48.2%) classes. lower socioeconomic status is often associated with delayed diagnosis and limited access to specialized neurological care, which may lead to the "moderate to severe" pain levels observed in the majority of this cohort[23].

Most participants had a normal BMI (56.36%), while 34.1% were overweight. While BMI did not linearly correlate with pain severity ($p = 0.114$), literature points to a "U-shaped" relationship where both obesity (via systemic inflammation) and underweight status (via frailty and nerve compression) drive chronic pain[24]. High rates of Diabetes Mellitus (39.8%) and Hypertension (29.2%) were clinically significant. General comorbidities ($p = 0.116$) trended toward higher pain severity (29.5% vs. 19.4%), as multi-morbidity promotes "central sensitization" and vascular nerve damage [25]. Chronic hyperglycemia in diabetic patient leads to structural damage of the nerve fibers, causing the "burning" and "tingling" symptoms reported by the majority of this study's participants. The diversity of multi-disease combinations (e.g., DM, HTN, and Anaemia) suggests that "multi-morbidity" is a complicating factor in managing neuropathic pain[26].

Using the DN4 questionnaire, 49.1% of participants screened positive for neuropathic pain. "Positive" sensory symptoms were vastly more prevalent than "negative" objective deficits. Burning (85.9%), tingling (76.4%), and numbness (70.0%) predominated, confirming an "irritable nociceptor" state. Conversely, objective signs like hypoesthesia to touch (25.45%) and pinprick (12.3%) were rare. This presentation validates the DN4 tool and aligns with the pathophysiology where hyperexcitable damaged neurons manifest as positive sensations before total structural sensory loss occurs[8].

Short Form-36 (SF-36) Health Survey (Bengali version) was used to evaluate HRQoL across nine health-related dimensions[27]. Neuropathic pain patients scored significantly lower ($p < 0.05$) than non-neuropathic peers across five crucial SF-36 domains, driven by a devastating drop in Physical Functioning (PF): Significant baseline mobility limitations (39.41 ± 17.67 vs. 49.51 ± 14.11, $p < 0.0001$); Role Physical (RP) & Role Emotional (RE): Reduced capacity to fulfill daily roles ($p = 0.0101$; $p = 0.0208$); Vitality (VT) & Mental Health (MH): Extreme deficits in energy (31.32 ± 13.39 vs. 44.34 ± 13.43, $p < 0.0001$) and psychological state (35.55 ± 12.19 vs. 43.56 ± 14.27, $p < 0.0001$). While the pattern of decline mirrors global literature, the depth of decline was remarkably severe. Western cohorts typically maintain VT and GH scores between 40 and 50, whereas this cohort reported critically low scores in General Health (32.77) and Vitality (31.32), likely reflecting compound socioeconomic stressors and limited intervention access[18,28].

Conclusion

Neuropathic pain affects nearly half of the chronic pain patients evaluated in this tertiary care setting in Bangladesh. Advancing age is significantly linked to both higher positive neuropathic status and severe pain intensity. NeP causes a clear decline in functional mobility, vital energy, and psychological health. These findings demonstrate an urgent need for mandatory, standardized clinical screening with tools like the DN4 questionnaire in primary care and pain clinics, alongside a transition toward multimodal, neuro-targeted therapies to reduce the burden of this condition.

Declaration:

Ethics approval: The study was approved by the Institutional Review Board (IRB) of Bangladesh Medical University, Dhaka, Bangladesh [Registration: BMU/2025/10809]

Author contributions

Conception and development of the idea: AKMA, CSC

Writing: CSC, MMK, KMA, SAT, NB, AA

Data analysis: CSC, NB, AA, MMK, KMA, SAT

Data collection: KMA, MMK, CSC, SAT

Review and Editing: AKMA, KMA, MMK, CSC, SAT

Funding: None.

Conflict of Interest: The authors declare no conflicts of interest.

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