

Prescription Pattern of Drugs Used for the Management of Diabetic Peripheral Neuropathy

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Abstract:

Introduction: Diabetic peripheral neuropathy is a common complication of diabetes mellitus, characterized by pain, numbness, tingling, and sensory loss. Appropriate pharmacological management reduces neuropathic symptoms, improves functional status, and enhances quality of life. Evaluation of prescription patterns helps assess drug utilization and treatment practices.

Aims: To evaluate prescription patterns, commonly used drugs, treatment combinations, dosing practices, and rational drug utilization for managing diabetic peripheral neuropathy among patients.

Materials and Methods: The present study was a descriptive Cross-sectional study. This Study was conducted from 1st January 2023 to 30th June 2024. Department of radio-diagnosis Burdwan medical college & hospital, burdwan, west Bengal. Study population 32.

Result: Among 100 patients, the mean age was 56.84 ± 11.27 years, with Type 2 diabetes predominating (92%). Burning pain was the commonest symptom (72%). Gabapentinoids (61%) and methylcobalamin (56%) were frequently prescribed, while monotherapy was most common (48%).

Conclusion: Assessment of prescription patterns provides insight into current pharmacological management of diabetic peripheral neuropathy. Identifying commonly prescribed drugs and combinations may support rational therapy, optimize symptom control, minimize adverse effects, and improve patient outcomes.

Keywords: Diabetic peripheral neuropathy; Diabetes mellitus; Prescription pattern; Drug utilization; Neuropathic pain; Pharmacotherapy; Antidiabetic drugs; Analgesics.

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Introduction

Diabetic peripheral neuropathy (DPN) is one of the most frequent and clinically significant complications of diabetes mellitus, resulting from progressive damage to peripheral nerves and commonly presenting as distal symmetric sensory neuropathy. Patients may experience burning pain, tingling, numbness, paraesthesia, electric-shock-like sensations, impaired balance, and loss of protective sensation, with symptoms often beginning in the feet and progressing proximally. Neuropathic pain can substantially interfere with sleep, mobility, psychological well-being, daily activities, and overall quality of life [1,2]. Approximately half of patients with diabetic peripheral neuropathy may remain asymptomatic, making regular clinical assessment important for early recognition and prevention of complications such as foot ulceration and amputation [1]. The

development and progression of DPN are influenced by glycaemic control and other metabolic and cardiovascular risk factors; therefore, appropriate diabetes management, weight control, blood pressure management, and lipid control form an important part of prevention and overall disease management [1,3]. However, established neuropathic nerve damage cannot generally be reversed by glycaemic control alone, and pharmacological treatment is primarily directed toward reducing neuropathic pain and improving functional status and quality of life [1,4]. Pharmacological management of painful diabetic peripheral neuropathy involves several therapeutic classes with different mechanisms of action. Commonly prescribed medications include gabapentinoids such as pregabalin and gabapentin, serotonin-norepinephrine reuptake inhibitors such

as duloxetine, and tricyclic antidepressants such as amitriptyline [2,5]. Sodium-channel blockers and selected topical preparations may also have a role in appropriate patients [1,6]. Among these agents, pregabalin and duloxetine are widely used because of their established efficacy, while gabapentin and amitriptyline remain important alternatives depending on patient characteristics, comorbidities, tolerability, cost, and treatment response [5,7]. Evidence suggests that these commonly used agents may have broadly comparable efficacy, while combination therapy can provide additional pain relief in patients who have an inadequate response to monotherapy [7,8]. Nevertheless, treatment selection must consider adverse effects, renal function, drug interactions, age, concomitant medications, and individual patient needs. Current recommendations support gabapentinoids, serotonin-norepinephrine reuptake inhibitors, tricyclic antidepressants, and sodium-channel blockers as initial pharmacological options, while routine use of opioids such as tramadol and tapentadol is discouraged because of potential adverse events [1,9].

Despite the availability of multiple pharmacological options, considerable variation may occur in real-world prescribing practices with regard to drug selection, dosage, frequency, treatment duration, monotherapy, polypharmacy, and combination therapy. Therefore, evaluating the prescription pattern of drugs used for the management of diabetic peripheral neuropathy is important for identifying commonly utilized therapeutic agents and assessing current prescribing practices. Such evaluation may contribute to rational drug utilization, appropriate selection of therapy, reduction of avoidable adverse effects, and optimization of symptomatic management in patients with diabetic peripheral neuropathy [1,6,10].

Materials and Methods

Study Design: A prospective observational study.

Place of Study: Department of Neuromedicine, North Bengal Medical College, P.O- Sushrutanagar

Period of Study: 12 months

Study Population: Patients diagnosed with diabetic peripheral neuropathy attending the Department of Neuromedicine, North Bengal Medical College during the 18-month study period.

Sample Size: 100 words

Inclusion Criteria

- Patients diagnosed with diabetic peripheral neuropathy.

- Patients of either sex.
- Patients aged ≥ 18 years.
- Patients receiving one or more drugs for the management of diabetic peripheral neuropathy.
- Patients willing to participate and provide informed consent.

Exclusion Criteria

- Patients with peripheral neuropathy due to causes other than diabetes.
- Patients with severe psychiatric or cognitive disorders affecting participation.
- Pregnant or lactating women, if applicable to the study protocol.
- Patients with incomplete prescription or clinical records.
- Patients unwilling to participate or withdraw consent.

Study Variable

- Age, sex, occupation, residence, duration and type of diabetes, and glycaemic status.
- Duration and severity of diabetic peripheral neuropathy, including pain, numbness, tingling, and sensory symptoms.
- Prescribed drugs, drug class, generic/brand name, dose, route, frequency, and duration of therapy.
- Monotherapy/polypharmacy, drug combinations, concomitant antidiabetic drugs, analgesics, antidepressants, anticonvulsants, vitamins, and supportive medications.
- Documented adverse drug reactions, drug-related complications, and other treatment-related outcomes.

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analysed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analyzed using SPSS and GraphPad Prism.

Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values ≤ 0.05 were considered statistically significant.

Result

Table 1: Sociodemographic and Clinical Characteristics of Patients

Variable	Category	Frequency (n)	Percentage (%)
Age	<40 years	12	12
	40–59 years	48	48
	≥60 years	40	40
Sex	Male	58	58
	Female	42	42
Type of diabetes	Type 1	8	8
	Type 2	92	92
Duration of diabetes	<5 years	24	24
	5–10 years	39	39
	>10 years	37	37
Duration of neuropathy	<1 year	29	29
	1–5 years	46	46
	>5 years	25	25

Table 2: Clinical Presentation of Diabetic Peripheral Neuropathy

Clinical symptom	Frequency (n)	Percentage (%)
Burning pain	72	72
Numbness	68	68
Tingling/paraesthesia	64	64
Reduced sensation	51	51
Electric-shock-like pain	34	34
Weakness	27	27
Sleep disturbance due to pain	39	39

Table 3: Prescription Pattern According to Drug Class

Drug class	Frequency (n)	Percentage (%)
Gabapentinoids	61	61
Antidepressants	32	32
Analgesics	38	38
Vitamins/neurotropic agents	56	56
Topical agents	9	9
Other supportive drugs	18	18

Table 4: Individual Drugs Prescribed

Drug	Frequency (n)	Percentage (%)
Pregabalin	42	42
Gabapentin	19	19
Duloxetine	24	24
Amitriptyline	8	8
Nortriptyline	5	5
Methylcobalamin	56	56
Tramadol	14	14
Other drugs	7	7

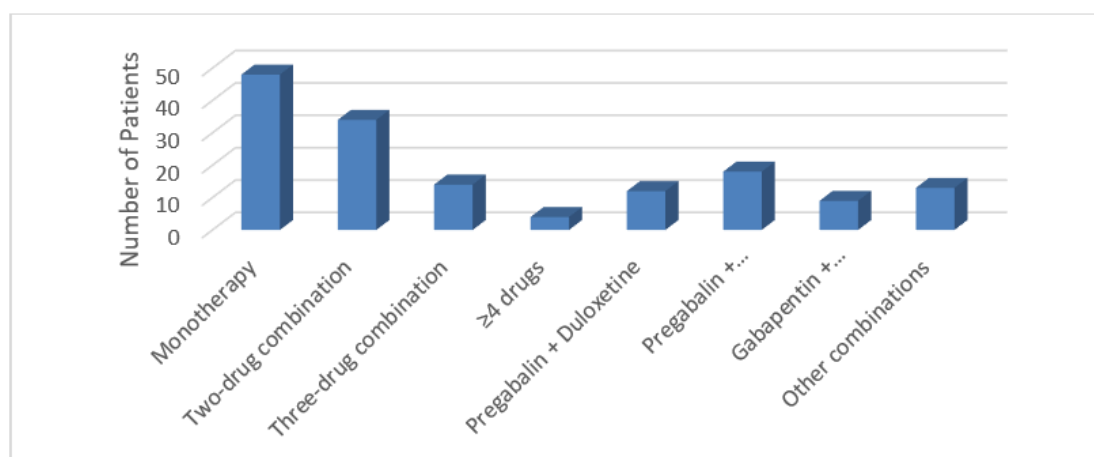


Figure 1: Pattern of Pharmacotherapy

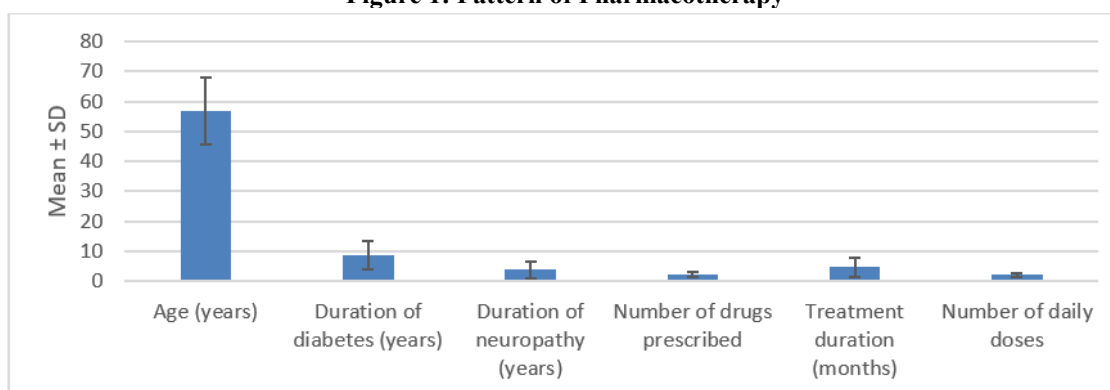


Figure 2: Quantitative Prescription Characteristics of Patients with Diabetic Peripheral Neuropathy

The study included 100 patients with diabetic peripheral neuropathy. Regarding age, 12 patients (12%) were aged <40 years, 48 patients (48%) were aged 40–59 years, and 40 patients (40%) were aged ≥60 years. Regarding sex, 58 patients (58%) were male and 42 patients (42%) were female. Regarding type of diabetes, 8 patients (8%) had Type 1 diabetes and 92 patients (92%) had Type 2 diabetes. Regarding duration of diabetes, 24 patients (24%) had diabetes for <5 years, 39 patients (39%) for 5–10 years, and 37 patients (37%) for >10 years. Regarding duration of neuropathy, 29 patients (29%) had neuropathy for <1 year, 46 patients (46%) for 1–5 years, and 25 patients (25%) for >5 years. [Table 1]

The study included 100 patients with diabetic peripheral neuropathy. Regarding clinical symptoms, burning pain was reported by 72 patients (72%), numbness by 68 patients (68%), tingling/paraesthesia by 64 patients (64%), reduced sensation by 51 patients (51%), electric-shock-like pain by 34 patients (34%), weakness by 27 patients (27%), and sleep disturbance due to pain by 39 patients (39%). [Table 2]

The prescription pattern according to drug class among 100 patients with diabetic peripheral neuropathy was as follows: Gabapentinoids: 61 patients (61%); Antidepressants: 32 patients (32%);

Analgesics: 38 patients (38%); Vitamins/neurotropic agents: 56 patients (56%); Topical agents: 9 patients (9%); Other supportive drugs: 18 patients (18%). [Table 3]

The prescription pattern of individual drugs among 100 patients with diabetic peripheral neuropathy was as follows: Pregabalin: 42 patients (42%); Gabapentin: 19 patients (19%); Duloxetine: 24 patients (24%); Amitriptyline: 8 patients (8%); Nortriptyline: 5 patients (5%); Methylcobalamin: 56 patients (56%); Tramadol: 14 patients (14%); Other drugs: 7 patients (7%). [Table 4]. The treatment pattern among 100 patients with diabetic peripheral neuropathy was as follows: Monotherapy: 48 patients (48%); Two-drug combination: 34 patients (34%); Three-drug combination: 14 patients (14%); ≥4 drugs: 4 patients (4%); Pregabalin + Duloxetine: 12 patients (12%); Pregabalin + Methylcobalamin: 18 patients (18%); Gabapentin + Methylcobalamin: 9 patients (9%); Other combinations: 13 patients (13%). [Figure 1]

The mean age of the patients was 56.84 ± 11.27 years, the mean duration of diabetes was 8.46 ± 4.72 years, and the mean duration of neuropathy was 3.82 ± 2.91 years. The mean number of drugs prescribed was 2.31 ± 0.96 , the mean treatment

duration was 4.68 ± 3.21 months, and the mean number of daily doses was 2.08 ± 0.71 . [Figure 2]

Discussion

In the present study, 100 patients with diabetic peripheral neuropathy were evaluated to assess the prescription pattern of drugs used for its management. The mean age was 56.84 ± 11.27 years, with 48% of patients aged 40–59 years. Males constituted 58% and females 42% of the study population. Type 2 diabetes was predominant (92%), while Type 1 diabetes accounted for 8%. The mean duration of diabetes was 8.46 ± 4.72 years, and the mean duration of neuropathy was 3.82 ± 2.91 years. These findings indicate that diabetic peripheral neuropathy was more frequently encountered among middle-aged and older patients with established diabetes.

Clinically, burning pain was the most common symptom, reported by 72% of patients, followed by numbness (68%) and tingling/paraesthesia (64%). Reduced sensation was present in 51%, sleep disturbance due to pain in 39%, electric-shock-like pain in 34%, and weakness in 27%. Price et al. [10] emphasized that painful diabetic polyneuropathy is characterized by a range of sensory symptoms and that pharmacological treatment should be selected according to symptom severity, treatment response, and tolerability. The predominance of burning pain, numbness, and paraesthesia in the present study therefore reflects the typical clinical presentation of diabetic peripheral neuropathy.

Regarding prescription by drug class, gabapentinoids were the most frequently prescribed medications (61%), followed by vitamins/neurotropic agents (56%), analgesics (38%), and antidepressants (32%). Topical agents were prescribed in 9% and other supportive drugs in 18% of patients. Syed et al. [11] described gabapentinoids as important pharmacological options for diabetes-associated peripheral neuropathy because of their established role in reducing neuropathic pain. The frequent use of gabapentinoids in the present study therefore appears consistent with current pharmacological practice.

Among individual drugs, methylcobalamin was most frequently prescribed (56%), followed by pregabalin (42%), duloxetine (24%), gabapentin (19%), and tramadol (14%). Amitriptyline and nortriptyline were prescribed in 8% and 5% of patients, respectively. Jang and Oh [12] reported that pregabalin, gabapentin, duloxetine, and tricyclic antidepressants represent important pharmacological options for painful diabetic peripheral neuropathy. The use of these agents in the present study indicates that prescribing was directed mainly toward symptomatic control of neuropathic pain.

The high use of methylcobalamin (56%) and other vitamins/neurotropic agents is an important finding of the present study. Chang MC [13] described diabetic peripheral neuropathy as a complex neurological complication involving metabolic, vascular, and nerve-related mechanisms. The use of neurotropic preparations in routine practice may therefore reflect an attempt to provide supportive treatment alongside conventional neuropathic pain medications. However, the choice of supportive therapy should be considered in relation to clinical evidence, patient characteristics, and the overall treatment objective.

With regard to treatment pattern, monotherapy was used in 48% of patients, while 34% received two-drug combinations, 14% received three-drug combinations, and 4% received four or more drugs. Pregabalin plus methylcobalamin was the most frequently observed specific combination (18%), followed by pregabalin plus duloxetine (12%) and gabapentin plus methylcobalamin (9%). Bilal et al. [14] evaluated prescribing patterns of antidiabetic and neuropathic pain medications in patients with Type 2 diabetes and diabetic peripheral neuropathy and highlighted the importance of evaluating real-world medication utilization. The combination therapy observed in the present study may reflect attempts to improve symptom control when treatment with a single drug is insufficient. The mean number of drugs prescribed was 2.31 ± 0.96 , while the mean treatment duration was 4.68 ± 3.21 months and the mean number of daily doses was 2.08 ± 0.71 . Preston et al. [15] emphasized that painful diabetic peripheral neuropathy remains challenging to manage because treatment response varies considerably between patients. They recommended individualized treatment selection, appropriate dose adjustment, assessment of therapeutic response, and monitoring for adverse effects. The findings of the present study similarly demonstrate that management commonly involved continued pharmacotherapy, with a considerable proportion of patients receiving more than one medication.

The use of combination therapy in 52% of patients, when two-drug, three-drug, and ≥ 4 -drug regimens are considered together, suggests that a substantial proportion required multiple medications. Although combination therapy may be useful in patients with inadequate response to monotherapy, excessive polypharmacy can increase treatment burden and the potential for adverse drug effects. Therefore, rational prescribing should involve regular assessment of symptom improvement, tolerability, and the continued need for each medication. This approach is particularly important in patients with long-standing diabetes and multiple comorbidities.

Finally, advances in understanding the cellular mechanisms underlying diabetic peripheral

neuropathy may provide opportunities for future therapeutic development. Majd et al. [16] demonstrated the potential of human pluripotent stem cell-derived Schwann cells for disease modelling and drug discovery in diabetic peripheral neuropathy. Such research may contribute to the development of mechanism-based therapies and potentially expand treatment options beyond conventional symptomatic medications.

The present study demonstrated that gabapentinoids were the most frequently prescribed drug class (61%), while methylcobalamin was the most frequently prescribed individual drug (56%). Burning pain was the predominant clinical symptom (72%), and monotherapy was the most common treatment pattern (48%). The findings highlight the predominance of established neuropathic pain medications along with supportive neurotropic therapy in routine management of diabetic peripheral neuropathy.

Conclusion

The assessment of prescription patterns in diabetic peripheral neuropathy provides important insight into the current pharmacological management of neuropathic symptoms. Identification of commonly prescribed drug classes, individual medications, dosages, treatment combinations, and duration of therapy can help evaluate prevailing prescribing practices. Appropriate selection of pharmacotherapy based on efficacy, safety, comorbidities, tolerability, and patient-specific factors is essential for effective symptom control. Regular evaluation of prescriptions may promote rational drug utilization, minimize adverse drug reactions and unnecessary polypharmacy, and ultimately improve therapeutic outcomes and quality of life.

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