ORIGINAL ARTICLE

Retrospective Analysis of Numerical Pain Rating Scale (NPRS) Scores in Diabetic Neuropathy Patients Receiving Gabapentin and Non-Gabapentin Therapies at an Indonesian Tertiary Hospital

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ABSTRACT

Introduction: Diabetic neuropathy is a common complication of diabetes, affecting over half of patients and frequently leading to diabetic neuropathic pain (DNP), which can be difficult to treat. Gabapentin is commonly used as a first-line therapy for DNP and works by modifying calcium channels to reduce pain. This study aimed to evaluate and compare Numerical Pain Rating Scale (NPRS) profiles in DNP patients receiving gabapentin and non-gabapentin therapies at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia.
Methods: This retrospective study analyzed the medical records of 24 DNP patients at Dr. Soetomo General Academic Hospital from January to December 2023. The inclusion criteria comprised patients diagnosed with diabetic neuropathy, according to the International Statistical Classification of Diseases, Tenth Revision (ICD-10) code E11.4, and treated for pain using gabapentin and/or other therapies. Patients with incomplete records or unrelated neuropathic conditions were excluded. The data encompassed NPRS scores, demographics, diabetes mellitus duration, pain characteristics, drug types, doses, and therapy durations.
Results: Among 24 patients, the majority were female (54.1%) and over 60 years old (58.3%), with a diabetes duration of 6–10 years (54.1%). Tingling was the most frequently observed symptom (75%). Gabapentin administered as monotherapy (1×300 mg) was the predominant treatment (56.5%) and provided the greatest reduction in NPRS scores (7 points) after 4–12 weeks. Combination therapies showed smaller reductions.
Conclusion: Gabapentin used as monotherapy is effective for managing DNP, especially over 4–12 weeks. Patients with long-standing diabetes, particularly older adults, are the most affected and benefit from targeted therapy.

Keywords: Diabetic neuropathy; diabetes; gabapentin; numerical pain rating scale (NPRS); pain management

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Highlights:
1. This study evaluates the demographic, clinical, and therapeutic profiles of patients with diabetic neuropathic pain, focusing on gabapentin and non-gabapentin therapies.
2. Novel insights into the distribution of therapies and numerical pain rating scale (NPRS) scores among patients offer a foundation for optimizing pain management strategies.
3. This research contributes to identifying patterns in drug efficacy and therapy duration, particularly with the administration of gabapentin for managing diabetic neuropathic pain.

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INTRODUCTION

Neuropathy refers to lesions or diseases involving the somatosensory nervous system, which may paradoxically not only result in the loss of function but also increased pain sensitivity and spontaneous pain (Scholz et al., 2019). According to the International Association for the Study of Pain (IASP), pain caused by lesions or diseases affecting the somatosensory nervous system is referred to as neuropathic pain. Patients with neuropathic pain typically exhibit three characteristics: allodynia, hyperalgesia, and anesthesia dolorosa. Allodynia is pain caused by a stimulus that does not usually induce pain, while hyperalgesia denotes an increased pain response to a stimulus that normally causes pain. Anesthesia dolorosa refers to pain occurring in a numb area (Brooks & Kessler, 2017).

Neuropathic pain can be identified through anamnesis and physical examination, characterized by positive (enhanced somatosensory function) and negative (loss of somatosensory function) sensory signs and symptoms, including burning pain, evoked pain, and clinical symptoms resembling a “stocking and glove” distribution (Gierthmühlen & Baron, 2016). Patients often report tingling ("pins and needles"), numbness, and electric shock-like sensations, which are hallmark features of peripheral neuropathic pain. These symptoms, along with sleep disturbances, are prevalent in diabetic neuropathy (Jensen & Finnerup, 2021). Among various neuropathies, diabetic neuropathy is the most common (Pop-Busui et al., 2022). Diabetic neuropathic pain, a subtype of peripheral neuropathic pain, is defined as pain resulting directly from abnormalities in the peripheral somatosensory system in patients with diabetes (Rosenberger et al., 2020).

Diabetic neuropathy is the most common chronic complication of diabetes, with a lifetime prevalence exceeding 50% in patients with diabetes (Pop-Busui et al., 2022). A cohort study conducted by Gylfadottir et al. (2020) in Denmark, involving 389 patients with an average diabetes duration of 5.9 years, identified 126 individuals with definite diabetic neuropathy, 53 of whom experienced pain. The study further revealed 88 probable cases and 53 possible cases of diabetic neuropathy. Diabetic neuropathy affects about one in five Danish patients with newly diagnosed type 2 diabetes.

Recent developments in simple screening tools, such as questionnaires, have facilitated large epidemiological surveys in various countries, such as the United Kingdom, the United States, France, and Brazil, with the prevalence of neuropathy estimated at 7–10% (Colloca et al., 2017). Type 2 diabetes mellitus is more prevalent in low-income and developing nations. Indonesia reported a prevalence rate that ranked the developing country seventh highest globally. East Java Province ranked ninth in Indonesia, with Surabaya being the top-ranked city in the country (Rahmawati & Hargono, 2018). Neuropathy is more common in females, exhibiting a prevalence rate of 8% compared to 5.7% in males, and more frequently affects patients over 50 years old, with a rate of 8.9% versus 5.6% in those under 49. Areas most often affected by neuropathy include the lower back, lower extremities, neck, and upper extremities (Colloca et al., 2017).

Although neuropathic pain is a common symptom, it remains a significant and unresolved issue. Many patients are often dissatisfied with their treatment. Such frustration may stem from neuropathic pain frequently being refractory to available therapies, adverse effects, inadequate evidence-based guidelines, and patients having unrealistic treatment goals. It is important to note that neuropathic pain affects many aspects of daily life and is associated with poor general health, reduced quality of life, and sleep disturbances, as well as increased anxiety and depression. In fact, the quality of life for individuals with neuropathic pain is comparable to those suffering from clinical depression, coronary artery disease, myocardial infarction, or uncontrolled diabetes mellitus (Zilliox, 2017).

Pharmacological therapy is the first step in managing neuropathic pain. According to the National Institute for Health and Care Excellence (NICE) guidelines, pharmacological interventions for neuropathic pain are categorized into three lines of therapy. First-line therapy for neuropathic pain involves the use of monotherapy drugs, such as amitriptyline, pregabalin, duloxetine, or gabapentin (Brooks & Kessler, 2017). Gabapentin is an anticonvulsant (antiepileptic) drug with analgesic properties (Mathieson et al., 2020). Initially approved in the United States in 1993 for seizure disorder therapy, its therapeutic uses have since expanded. Currently, gabapentin is one of the first-line treatments for managing neuropathic pain, which denotes discomfort caused by nerve damage (Mersfelder & Nichols, 2016).

Gabapentin, while originally developed as an antiepileptic, exerts neuropathic pain relief effects through α2δ-1 subunit binding to voltage-gated calcium channels, thereby reducing neuronal excitability (Rusciano, 2024). However, in neuro-pathic pain, it primarily targets dorsal root ganglia and spinal cord pathways at lower doses (300–1,800 mg/day), whereas higher doses (up to 3,600 mg/day) are typically required for epilepsy to modulate thalamocortical circuits (Mathieson et al., 2020). The mechanism of gabapentin primarily targets calcium channels, modifying neurotransmitter release and reducing nerve cell excitability (Boyle et al., 2014; Chang et al., 2014). This action produces antiepileptic, analgesic, and sedative effects. Gabapentin has been It has also been observed that

gabapentin works by inhibiting new synapse formation. In addition to gabapentin, paracetamol is used as one of the therapeutic drugs for patients with diabetic neuropathic pain (Harsa et al., 2024).

Dr. Soetomo General Academic Hospital in Surabaya, Indonesia, offers gabapentin and non-gabapentin therapies for the treatment of patients with neuropathic pain. Gabapentin and non-gabapentin therapies are generally administered with the goal of reducing and controlling pain associated with diabetic neuropathy, thereby improving patients' quality of life and daily activities. Effective management of diabetic neuropathic pain remains a challenge due to the unsatisfactory management of the disorder, necessitating a thorough evaluation of gabapentin and non-gabapentin therapies based on dosage and treatment duration. The Numerical Pain Rating Scale (NPRS) is a well-validated tool for assessing pain intensity, offering excellent reliability and superior responsiveness to changes compared to categorical scales. For instance, Chiarotto et al. (2016) reported an intraclass correlation coefficient (ICC) of 0.95 for NPRS, signifying its particular suitability for evaluating treatment outcomes in clinical practice.

Detailed analyses of therapy duration and efficacy in the treatment of diabetic neuropathic pain remain scarce. To address this gap, this study aimed to analyze the administration of gabapentin and non-gabapentin therapies in patients with diabetic neuropathic pain, utilizing NPRS to investigate therapeutic profiles and outcomes in pain management, with an emphasis on monotherapy and combination therapies at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. This research is expected to assist healthcare professionals in effectively managing therapy dosages and durations for patients with diabetic neuropathic pain.

METHODS

This descriptive retrospective study analyzed secondary data from the medical records of 24 patients with diabetic neuropathic pain treated at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, between January and December 2023. The retrospective design was used for this study, as it is optimal for evaluating real-world drug utilization patterns while minimizing patient burden (Prada-Ramallal et al., 2019). The inclusion criteria encompassed patients with diabetic neuropathy who experienced pain, with the diagnosis confirmed in accordance with the International Statistical Classification of Diseases, Tenth Revision (ICD-10) code E11.4, and underwent gabapentin and/or non-gabapentin therapies (amitriptyline, pregabalin, and paracetamol) (Schrepf et al., 2020). The exclusion criteria were incomplete medical records and patients with concurrent neuropathic conditions unrelated to diabetes.

The data collection involved reviewing the patients' NPRS scores before and after therapy. This study utilized NPRS due to its reliability and responsiveness to pain intensity (Chiarotto et al., 2016). Variables analyzed included age, sex, diabetes mellitus durations, pain characteristics, drug types, doses, and therapy durations. Microsoft Excel for Windows, version 2504 (Microsoft Inc., Redmond, WA, USA, 2021), was utilized to collect and sort the data from the medical records. This study received approval from the Health Research Ethics Committee of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, with a letter of exemption (certificate number 1619/LOE301.4.2/III/2024) issued on March 26, 2024.

RESULTS

The research data were obtained from the Communication and Information Technology Unit of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. The total sampling technique was employed to collect secondary data from January to December 2023.

Demographic characteristics of patients with diabetic neuropathic pain

This study indicated that the largest distribution of diabetic neuropathic pain occurred in the >60 years age group, with 14 patients (58.3%). The second largest distribution was found in the 40–60 years age group, comprising 9 patients (37.5%), and the lowest frequency was observed in the <40 years age group (4.16%). The study samples comprised a higher proportion of female patients, with 13 females (54.16%) compared to 11 males (45.83%), resulting in a female-to-male ratio of 1.2:1. The duration of diabetes mellitus was categorized into four groups: <1 year, 1–5 years, 6–10 years, and >10 years. The largest proportion of the samples belonged to the 6–10 years group, with 13 patients (54.1%). The second largest distribution was observed in the 1–5 years group (37.5%), while the third was in the <1 year group (8.3%). No samples were found in the >10 years group.

Characteristics of pain in patients with diabetic neuropathic pain

The distribution of pain characteristics in patients with diabetic neuropathic pain was categorized into seven types: tingling sensation, thick sensation, burning sensation, stabbing sensation, cramping, electric shock-like sensation, and sudden, intense pain (shooting pain). Tingling pain was the most frequently reported symptom, occurring in 18 patients (75%). This was followed by thick

sensation (20.83%), burning sensation (12.5%), stabbing sensation (12.5%), cramping sensation (8.3%), and electric shock-like sensation (4.16%). None of the patients across the samples reported sudden, intense (shooting) pain.

Distribution of therapeutic drugs administered to diabetic neuropathic pain patients

This study revealed the distribution of therapeutic drugs in patients with diabetic neuropathic pain, predominantly consisting of monotherapy, with gabapentin being administered to 13 patients (54.1%). This was followed by combination therapies involving gabapentin and additional drugs, including gabapentin + paracetamol in 3 patients (12.5%), gabapentin + amitriptyline in 3 patients (12.5%), and gabapentin + amitriptyline + paracetamol in 4 patients (16.6%). There was only one patient (4.1%) who received a non-gabapentin combination therapy, consisting of amitriptyline + pregabalin. No patients in the samples were treated with duloxetine.

Dose distribution of gabapentin in diabetic neuropathic pain patients

This study categorized the distribution of gabapentin doses into four groups: 1×300 mg, 2×300 mg, 3×300 mg, and 2×150 mg. The results indicated that the 1×300 mg dose was the most commonly administered, comprising 13 patients (56.5%). The subsequent doses included 2×300 mg, 3×300 mg, and 2×150 mg, as represented by 6 patients (26.08%), 3 patients (13.04%), and 1 patient (4.34%), respectively.

Dose distribution of amitriptyline in diabetic neuropathic pain patients

The distribution of amitriptyline doses was categorized into five groups: 2×12.5 mg, 1×12.5 mg, 2×6.25 mg, 2×3 mg, and 1×25 mg. The results revealed that the 2×12.5 mg dose was the most frequently administered, as observed in three patients (37.5%). The following amitriptyline doses included 2×6.25 mg (25%), 1×12.5 mg (12.5%), 2×3 mg (12.5%), and 1×25 mg (12.5%).

Dose distribution of pregabalin in diabetic neuropathic pain patients

For the distribution of pregabalin administration, it was found that one patient received a dose of 1×75 mg.

Dose distribution of paracetamol in diabetic neuropathic pain patients

The distribution of paracetamol doses was categorized into four groups: 3×500 mg, 1×400 mg, 2×400 mg, and 1×350 mg. The results indicated that the 3×500 mg dose was the most frequently administered, as noted in three patients (42.8%). The subsequent administration of paracetamol involved the 1×400 mg dose, received by 2 patients (28.5%), while the 2×400 mg and 1×350 mg doses were each administered to 1 patient (14.2%).

Distribution of treatment durations in diabetic neuropathic pain patients

The distribution of treatment durations in the diabetic neuropathic pain patients was categorized into three groups: less than four weeks, four to twelve weeks, and more than twelve weeks. The results indicated that an interval of four to twelve weeks was the most common treatment duration in the samples, encompassing 13 patients (54.1%). This was followed by treatment durations of less than 4 weeks, which included 10 patients (41.6%), and more than 12 weeks, represented by 1 patient (4.1%).

Profiles of the Numerical Pain Rating Scale (NPRS) scores

Table 1 shows the NPRS score profiles of patients with diabetic neuropathic pain who were administered gabapentin for durations of <4 weeks and 4–12 weeks. For the shorter treatment duration (<4 weeks), three dosing regimens were evaluated: 300 mg once daily (1×300 mg), 300 mg twice daily (2×300 mg), and 300 mg three times daily (3×300 mg). The highest dose (3x300 mg) resulted in the greatest reduction in NPRS scores (4 points), while the lowest dose (1×300 mg) led to a modest average decrease of 1.5 points. No reduction was observed with the intermediate dose (2×300 mg).

In the 4–12-week treatment group, the same gabapentin dosing regimens were assessed: 300 mg once daily (1×300 mg), 300 mg twice daily (2×300 mg), and 300 mg three times daily (3×300 mg). The results revealed that in the lowest dose (1×300 mg) group, one patient exhibited a seven-point decrease in NPRS scores, while another patient demonstrated no changes, yielding an average reduction of 3.33 points. The intermediate dose (2×300 mg) group exhibited a reduction of four points in NPRS scores. Meanwhile, the highest dose (3×300 mg) group produced two differing outcomes: a reduction of five points in one patient and an increase of two points in another.

Table 2 summarizes the NPRS score profiles of patients with diabetic neuropathic pain who received gabapentin-based combination therapies for a duration of less than four weeks. The following two regimens were evaluated: (1) gabapentin + paracetamol and (2) gabapentin + amitriptyline. The administration of gabapentin + paracetamol yielded

varying outcomes in NPRS scores. No NPRS score reduction was observed with 1×300 mg gabapentin + 1×400 mg paracetamol, whereas a two-point reduction occurred with 1×300 mg gabapentin + 3×500 mg paracetamol. In the group receiving gabapentin + amitriptyline with a dosing regimen of 1×300 mg + 1×25 mg, respectively, an NPRS score reduction of two points was noted.

Table 1. NPRS score profiles of diabetic neuropathic pain patients treated with gabapentin

Treatment durations	Doses	NPRS scores	
		Pre-therapy	Post-therapy
<4 weeks	1×300 mg	4	4
	1×300 mg	5	4
	1×300 mg	8	7
	3×300 mg	7	3
	1×300 mg	8	6
	1×300 mg	6	4
	2×300 mg	4	4
4–12 weeks	3×300 mg	8	3
	1×300 mg	6	3
	3×300 mg	4	6
	1×300 mg	4	4
	2×300 mg	7	3
	1×300 mg	7	0

Note: NPRS=Numerical Pain Rating Scale.

Table 2. NPRS score profiles of diabetic neuropathic pain patients treated with gabapentin and additional drugs for <4 weeks

Drug regimens	NPRS scores	
	Pre-therapy	Post-therapy
1×300 mg gabapentin + 1×400 mg paracetamol	8	8
1×300 mg gabapentin + 3×500 mg paracetamol	2	0
1×300 mg gabapentin + 1×25 mg amitriptyline	2	0

Note: NPRS=Numerical Pain Rating Scale.

Table 3 displays changes in NPRS scores among patients with diabetic neuropathic pain who were treated for a duration of 4–12 weeks using gabapentin in combination with other drugs. The drug combinations were divided into three groups: (1) gabapentin + paracetamol, (2) gabapentin + amitriptyline, and (3) gabapentin + amitriptyline + paracetamol. In the group receiving gabapentin + amitriptyline, two distinct outcomes were observed based on dosing. The lower dose combination (2×300 mg gabapentin + 2×6.25 mg amitriptyline) produced a two-point reduction, while the higher-dose (2×300 mg gabapentin + 2×12.5 mg amitriptyline) led to a two-point score increase instead. Patients receiving the gabapentin + paracetamol combination showed no change in NPRS scores.

The triple-therapy group (gabapentin + amitriptyline + paracetamol) demonstrated differing outcomes. Neither the 1×300 mg gabapentin + 2×3 mg amitriptyline + 1×350 mg paracetamol regimen nor the 2×300 mg gabapentin + 2×6.25 mg amitriptyline + 1×400 mg paracetamol combination exhibited alterations in NPRS scores. However, the highest-dose triple therapy (2×300 mg gabapentin + 2×12.5 mg amitriptyline + 2×400 mg paracetamol) resulted in a two-point increase in NPRS scores.

Table 3. NPRS score profiles of diabetic neuropathic pain patients treated with gabapentin and additional drugs for 4–12 weeks

Drug regimens	NPRS scores	
	Pre-therapy	Pre-therapy
1×300 mg gabapentin + 2×3 mg amitriptyline + 1×350 mg paracetamol	4	4
2×150 mg gabapentin + 3×500 mg paracetamol	5	5
2×300 mg gabapentin + 2×12.5 mg amitriptyline + 2×400 mg paracetamol	2	4
2×300 mg gabapentin + 2×6.25 mg amitriptyline	6	4
2×300 mg gabapentin + 2×6.25 mg amitriptyline + 1×400 mg paracetamol	4	4
2×300 mg gabapentin + 2×12.5 mg amitriptyline	4	6

Note: NPRS=Numerical Pain Rating Scale.

Table 4 shows the NPRS score profile of a patient with diabetic neuropathic pain who received gabapentin and additional drugs for a duration of more than 12 weeks. The administered drug combination consisted of gabapentin (1×300 mg) + amitriptyline (2×12.5 mg) + paracetamol (3×500 mg). This regimen resulted in a one-point reduction in NPRS scores over the treatment duration.

Table 5 exhibits the NPRS score profile of a patient with diabetic neuropathic pain who was treated using non-gabapentin drugs for a duration of 4–12 weeks. The patient received a drug combination consisting of amitriptyline (1×12.5 mg) + pregabalin (1×75 mg). The observation post-treatment exhibited that there was no alteration, either a reduction or an increase, in NPRS scores. No samples were identified for drug administration

with treatment durations shorter than four weeks and longer than twelve weeks.

Table 4. NPRS score profiles of diabetic neuropathic pain patients treated with gabapentin and additional drugs for >12 weeks

Drug regimen	NPRS scores	
	Pre-therapy	Pre-therapy
1×300 mg gabapentin + 2×12.5 mg amitriptyline + 3×500 mg paracetamol	8	7

Note: NPRS=Numerical Pain Rating Scale.

Table 5. NPRS score profiles of diabetic neuropathic pain patients treated with non-gabapentin drugs for 4–12 weeks

Drug regimen	NPRS scores	
	Pre-therapy	Pre-therapy
1×12.5 mg amitriptyline + 1×75 mg pregabalin	6	6

Note: NPRS=Numerical Pain Rating Scale.

DISCUSSION

This retrospective descriptive study analyzed medical records from 24 patients with diabetic neuropathic pain at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. The secondary data were provided by the hospital's Communication and Information Technology Unit. The analysis assessed the NPRS score profiles of patients with diabetic neuropathic pain at the tertiary healthcare facility from January to December 2023, focusing on age, sex, diabetes mellitus duration, pain characteristics, drug therapy, doses, and NPRS scores. The results showed that age played a major role in the prevalence of diabetic neuropathic pain, with the highest distribution observed in patients over 60 years old (58.3%), followed by those aged 40–60 years (37.5%). Previous studies have shown that elderly patients, especially those over 50, experience more severe neuropathic pain compared to younger patients (Giovannini et al., 2021; Pedowitz et al., 2021). Additionally, a study from Taiwan found that younger patients (<65 years) with poor glycemic control are more likely to develop diabetic peripheral neuropathy (Wang et al., 2024).

In terms of patient distribution by sex, this study revealed a higher prevalence of diabetic neuropathic pain in females (54.16%) than in males (45.83%). This aligns with research indicating that females report more severe neuropathic pain compared to males despite exhibiting fewer clinical neuropathies (Jensen & Finnerup, 2021). This study also found that the duration of diabetes is closely associated with the development of diabetic neuropathic pain, with the highest prevalence noted in patients with 6–10 years of diabetes (54.1%). This finding is consistent with other studies showing an increased risk of diabetic neuropathic pain with longer disease duration (Abdissa, 2020; Liau et al., 2022).

Regarding pain characteristics, the most common symptom reported in this study was tingling (75%), followed by thick sensation (20.83%) and burning sensation (12.5%). These findings correspond to other studies on diabetic neuropathy, which reported that symptoms such as tingling, sharp pain, and burning sensations are prevalent (Pinzon & Jesisca, 2018; Dirga et al., 2019). The predominance of tingling aligns with the pathophysiology of diabetic neuropathy, wherein hyperglycemia-induced nerve damage primarily affects large myelinated Aβ fibers responsible for light touch and vibration sensations (Pop-Busui et al., 2017).

In this study, gabapentin was the most frequently used drug, prescribed as monotherapy in 54.1% of all patients. The most common combination therapy was gabapentin paired with amitriptyline and paracetamol, which accounted for 16.6% of treatment regimens. This aligns with global studies showing that anticonvulsants, such as gabapentin, are commonly used for diabetic neuropathic pain management, particularly in combination with other drugs (Gil et al., 2015; Dirga et al., 2019). Gabapentin has demonstrated its established role as a first-line therapy for neuropathic pain, particularly effective against tingling and burning sensations through its calcium channel modulation (Fornasari, 2017). This study also highlighted the common use of analgesics, such as paracetamol, which are often used adjunctively to manage pain (Freo, 2022).

The predominant gabapentin dose noted in this study was 1×300 mg (56.5%), with a smaller percentage of patients receiving higher doses. Similar patterns were observed for amitriptyline, with the most common dose being 2×12.5 mg (37.5%). Studies have shown that these doses are effective in reducing pain, although side effects need to be considered, especially in older adults (Snyder et al., 2016; Khdour, 2020). Clinical guidelines recommend starting drug administration at low doses (300–900 mg/day) to minimize dizziness and sedation while maintaining efficacy (Wiffen et al., 2017).

This study indicated that the most common duration for the drug therapies was 4–12 weeks (54.1%), which is in line with recommendations for effective pharmacotherapy in diabetic neuropathic pain (Murnion, 2018; Varshney et al., 2021). The findings regarding changes in NPRS scores indicated that gabapentin substantially reduced pain, achieving a seven-point reduction for doses given within 4–12 weeks. However, no notable changes were found in other drug combinations and

treatment durations, highlighting the need for individualized therapy adjustments (Hanifah, 2021).

This study provides a comprehensive evaluation of diabetic neuropathic pain management, highlighting gaps in therapy duration and dosing strategies. The analysis utilized valuable datasets from a prominent tertiary hospital in Indonesia, reflecting real-world clinical practices. The findings offer insights into commonly used therapies, such as gabapentin, and their impact on NPRS scores, which can inform future clinical guidelines. However, the limitations of this study should be recognized. NPRS scores were not consistently documented in the patients' medical records, reducing the available sample size for analysis. Routine NPRS evaluation should be integrated into patient care documentation to facilitate more comprehensive pain assessments. This study predominantly focused on gabapentin therapies, leaving limited data on non-gabapentin monotherapy. Future studies should explore the efficacy of non-gabapentin drugs to provide a broader understanding of therapeutic options for patients with diabetic neuropathic pain. Research on the role of paracetamol in managing diabetic neuropathic pain is sparse, underscoring the need for more studies to evaluate its effectiveness as a standalone or adjunct therapy in this patient population.

CONCLUSION

This study highlights the effectiveness of gabapentin in managing diabetic neuropathic pain, as evidenced by reductions in NPRS scores. Demographic factors, such as age, sex, and diabetes duration, substantially influence the prevalence and severity of diabetic neuropathic pain, while tingling sensations persist as the most common characteristic of the condition. Gabapentin remains a primary treatment choice, particularly when tailored to individual dosing and therapy duration. Combination therapies, involving gabapentin, amitriptyline, and paracetamol, demonstrate variable outcomes, underscoring the need for individualized treatment strategies.

The findings of this study contribute novel insights into the impacts of treatment duration and demographic factors on patient outcomes, although its limitations, such as small sample size, warrant cautious interpretation. Future studies should investigate the long-term outcomes of combination therapies and explore innovative treatment options, offering a critical path for improving diabetic neuropathic pain management. Furthermore, early and proactive interventions optimized based on patient-specific factors, particularly in younger patients, may mitigate neuropathy progression.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ETHICS CONSIDERATION

The Health Research Ethics Committee of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, issued a letter of exemption (certificate number 1619/LOE301.4.2/III/2024) for this study on March 26, 2024.

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This study did not receive any funding.

AUTHOR CONTRIBUTION

The first and fourth authors contributed to the conception and design, analysis and interpretation of the data, drafting of the article, statistical expertise, provision of administrative, technical, or logistic support, as well as collection and assembly of the data. The corresponding/second and third authors contributed to the conception and design, analysis and interpretation of the data, drafting of the article, critical revision of the article for important intellectual content, final approval of the article, provision of study materials or patients, statistical expertise, and provision of administrative, technical, or logistic support.

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