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Efficacy of Gabapentinoids Versus Serotonin and Norepinephrine Reuptake Inhibitors (Snris) in the Treatment of Neuropathic Pain

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Abstract
Background: Neuropathic pain is a persistent and clinically challenging condition arising from damage or dysfunction of the somatosensory nervous system. Effective pharmacological management is essential for improving patients' quality of life. Gabapentinoids (Pregabalin and Gabapentin) and Serotonin–Norepinephrine Reuptake Inhibitors (SNRIs), particularly Duloxetine, are widely used first-line agents; however, robust head-to-head comparative evidence remains limited.
Objectives: The primary aim of this study was to evaluate and compare the efficacy of Gabapentinoids and SNRIs in reducing pain intensity among patients diagnosed with neuropathic pain, using the PainDETECT Questionnaire (PD-Q).
Methods: A prospective, observational, comparative study was conducted at Sri Naveen Advanced Neuro Center and Mahatma Gandhi Memorial Hospital, Warangal. A total of 350 adult patients with neuropathic pain were enrolled. Pain intensity scores were recorded at baseline, mid-treatment, and at the end of the study period. Data were analyzed using unpaired t-tests and one-way ANOVA to determine statistical significance.
Results: Of the 350 patients who completed the study, 272 received Gabapentinoids and 78 received Duloxetine. Both treatment groups demonstrated substantial reductions in pain scores. The mean reduction was 5.01 points in the Gabapentinoid group and 4.73 points in the SNRI group. Statistical analysis revealed no significant difference between the two groups ($p > 0.05$), indicating comparable efficacy.
Conclusion: Both Gabapentinoids and SNRIs offer clinically meaningful relief from neuropathic pain, with no statistically significant difference in overall effectiveness. Treatment selection should be individualized, taking into consideration patient comorbidities, tolerability, side-effect profiles, and personal preferences to optimize therapeutic outcomes.

Keywords: Neuropathic pain, Gabapentin, Pregabalin, Duloxetine, Gabapentinoids, SNRIs, PainDETECT, Comparative study, Pain management

Introduction
Neuropathic pain results from injury or disease affecting the somatosensory nervous system, involving both peripheral fibers (Aβ, Aδ, and C fibers) and central neurons. It affects approximately 7–10% of the general population and imposes a substantial burden on patients' quality of life as well as on healthcare systems and the broader economy. The condition is recognized as a distinct clinical entity with diverse etiologies [1].
Common underlying causes include diabetes mellitus, porphyria, other metabolic disorders, herpes zoster infection, HIV-related neuropathies, nutritional deficiencies, drug-induced neuropathies (e.g., paclitaxel, vinca alkaloids), uremia, chronic liver disease, paraneoplastic syndromes, genetic conditions, immune-mediated disorders, and direct physical trauma to a nerve trunk. In cancer patients, neuropathic pain may arise from direct tumor compression of peripheral nerves or as a consequence of chemotherapy, radiotherapy, or surgery [2].
Neuropathic pain (NeP) is initiated by a lesion or disease that alters the structure and function of the somatosensory system, resulting in spontaneous pain and pathologically amplified responses to both noxious and non-noxious stimuli. Peripheral causes include polyneuropathy, post-herpetic neuralgia, postoperative pain, and post-traumatic neuralgia, while central neuropathic pain may arise from spinal cord injury or stroke [4].
Updated international recommendations from the Special Interest Group on Neuropathic Pain support, with a strong GRADE recommendation, the use of tricyclic antidepressants (TCAs), SNRIs (such as Duloxetine), Pregabalin, and Gabapentin as first-line treatments for neuropathic pain [4]. Published evidence further reinforces this recommendation: approximately 7 of 9 studies involving Duloxetine, 9 of 14 involving Gabapentin, and 18 of 25 involving Pregabalin reported positive outcomes [3].
Gabapentin and Pregabalin are structural analogs of gamma-aminobutyric acid (GABA). Both agents bind to the α2-δ subunit of voltage-dependent calcium channels and are thought to modulate the release of neurotransmitters such as substance P and glutamate from primary afferent terminals, acting via interneurons in the dorsal horn of the spinal cord. While they share a similar mechanism, Pregabalin demonstrates greater binding affinity for the α2-δ protein subunit, which has been associated with superior analgesic and anticonvulsant activity in preclinical studies [2]. Pregabalin was approved by the US Food and Drug Administration (FDA) in 2004 for painful diabetic peripheral neuropathy and post-herpetic neuralgia, and by the European Medicines Agency for both peripheral and central neuropathic pain in adults. Gabapentin, initially approved only for partial seizures, subsequently demonstrated efficacy in chronic pain, particularly neuropathic pain [2].

Duloxetine is an SNRI that inhibits the reuptake of serotonin (5-HT) and norepinephrine, thereby increasing their availability in the central nervous system. It has shown promise in reducing neuropathic pain severity and improving functional outcomes [5]. Notably, Gabapentin has been found to primarily improve physical functioning, while Duloxetine appears to offer greater benefits for psychological and emotional well-being in patients with neuropathic pain [6].

Despite this growing body of evidence, direct comparative clinical trials between Gabapentinoids and SNRIs remain limited. Clinical studies suggest that Gabapentin, Pregabalin, and Amitriptyline demonstrate broadly similar efficacy, with Pregabalin producing greater improvements in Numeric Pain Rating Scale (NPRS) scores, Gabapentin offering better tolerability and adherence, and Amitriptyline being the most cost-effective option [8]. Systematic reviews support Duloxetine as an effective and well-tolerated treatment for neuropathic pain [9], and a retrospective chart review found no significant difference in efficacy between Duloxetine and Pregabalin [10]. The present study was therefore designed to directly compare the efficacy of Gabapentinoids (Pregabalin and Gabapentin) and Duloxetine in patients with neuropathic pain.

Material and Methods

Study Design

This was a prospective, observational, comparative study designed to evaluate and compare the efficacy of Gabapentinoids (Gabapentin and Pregabalin) versus the SNRI Duloxetine in managing neuropathic pain. The study was conducted at MGM Hospital, Warangal; KMC (PMSSY Super Speciality Hospital), Warangal; and Sri Naveen Advanced Neuro Centre, Hanamkonda.

Study Population

A total of 350 patients with a confirmed diagnosis of neuropathic pain were enrolled.

Inclusion Criteria [1]

- Patients diagnosed with neuropathic pain due to post-herpetic neuralgia, fibromyalgia, low back pain, or spinal cord injury.
- Patients on treatment with Pregabalin, Gabapentin, or Duloxetine.
- Patients aged above 18 years.

Exclusion Criteria [1]

- Patients diagnosed with diabetes, liver disease, cardiac illness, renal disease, or tuberculosis.
- Patients aged below 18 years.
- Pregnant or lactating women.

Assessment Tool

Pain intensity was assessed using the PainDETECT Questionnaire (PD-Q).

Statistical Analysis

All parameters were expressed as mean ± SD. Statistical analyses were performed using GraphPad Prism (version 10.4.2). One-way ANOVA and unpaired t-tests were applied to evaluate significant differences in pain intensity scores from baseline to the end of treatment, for both the Gabapentinoid and SNRI groups.

Results

A total of 364 patients were enrolled, of whom 350 completed the study. Among completers, 280 patients were assigned to the Gabapentinoid group and 84 to the SNRI group. Within the Gabapentinoid group, 205 patients received Pregabalin and 67 received Gabapentin; however, 5 patients in the Pregabalin subgroup and 3 in the Gabapentin subgroup were lost to follow-up. All 84 patients in the SNRI group received Duloxetine, with 6 lost to follow-up. Final analysis thus included 272 patients in the Gabapentinoid group and 78 in the SNRI group.

The 38–47-year age group constituted the largest proportion of participants, while the 78–87-year age group represented the smallest. The study population included a majority of female patients: in the Gabapentinoid group (n = 272), 92 (34%) were male and 180 (66%) were female; in the SNRI group (n = 78), 24 (31%) were male and 54 (69%) were female.

Efficacy Parameters

Pain intensity score, measured by the PainDETECT Questionnaire, served as the primary efficacy outcome. An unpaired t-test comparing scores between the two treatment groups at the end of treatment revealed no statistically significant difference ($p > 0.05$).

Effect on Pain Intensity Score

In the Pregabalin group, mean pain scores declined from 7.95 ± 0.85 (severe pain) at baseline to 5.31 ± 1.02 (moderate pain) at mid-treatment and further to 2.90 ± 0.89 (mild pain) at the end of treatment (Fig. 1).

In the Gabapentin group, mean pain scores decreased from 7.70 ± 0.94 (severe) at baseline to 5.05 ± 0.94 (moderate) at mid-treatment and to 2.89 ± 0.76 (mild) at the end of treatment (Fig. 2).

In the Duloxetine group, mean pain scores decreased from 7.62 ± 0.95 (severe) at baseline to 5.20 ± 0.87 (moderate) at mid-treatment and to 2.89 ± 0.79 (mild) at the end of treatment (Fig. 3).

Table 1: Changes in pain intensity scores across visits for Gabapentinoid and SNRI groups.

No. of Visits	Gabapentinoids Group (Mean ± SD)	Average Mean Reduction (%)	SNRIs Group (Mean ± SD)	Average Mean Reduction (%)
Visit 1	7.92 ± 0.88	—	7.62 ± 0.95	—
Visit 2	5.26 ± 1.00	33.59%	5.20 ± 0.87	31.76%
Visit 3	2.91 ± 0.86	44.57%	2.89 ± 0.79	44.42%

As shown in Table 1, both groups underwent three assessment visits. The Gabapentinoid group demonstrated mean pain reductions of 33.59% between visits 1 and 2, and 44.57% between visits 2 and 3. The SNRI group showed reductions of 31.76% and 44.42% over the same intervals, respectively. These findings indicate only a marginal difference in the rate of pain reduction between the two groups across the study period.

When comparing the total reduction in pain intensity from baseline to the end of treatment, no statistically significant

difference was observed between the two groups ($p > 0.05$; unpaired t-test). The Gabapentinoid group achieved a mean reduction of 5.01 points, while the SNRI group achieved a mean reduction of 4.73 points, confirming comparable therapeutic effectiveness (Fig. 6).

Discussion

Neuropathic pain frequently requires sustained pharmacological management. The present study compared the efficacy of Gabapentinoids (Pregabalin and Gabapentin) and the SNRI Duloxetine using the PainDETECT (PD-Q) score in 350 patients. The study population was predominantly female (66.8%), and the largest age group was 38–47 years.

All three agents produced marked reductions in pain scores: Pregabalin from 7.95 ± 0.85 to 2.90 ± 0.89, Gabapentin from 7.70 ± 0.94 to 2.89 ± 0.76, and Duloxetine from 7.62 ± 0.95 to 2.89 ± 0.79. Both treatment groups attended three clinical visits and demonstrated progressive, comparable reductions in pain intensity throughout the study period.

The difference in mean pain reduction between Gabapentinoids (5.01) and SNRIs (4.73) was minimal and not statistically significant ($p > 0.05$). These findings are consistent with those of Kancherla *et al*. (2021) [4], who reported equivalent efficacy between Gabapentin and Pregabalin for neuropathic pain management. Similarly, Amit *et al*. (2012) observed greater improvement in pain quality with Pregabalin than Gabapentin; our study likewise noted slightly superior reductions in the Gabapentinoid group, though the magnitude of difference was not significant. Manoj *et al*. (2015) also found no significant difference in efficacy between Pregabalin and Duloxetine in painful neuropathies, a conclusion that mirrors the findings of the present study.

Gabapentinoids were more frequently prescribed in this cohort: Pregabalin was used in the highest number of patients (n = 205), followed by Gabapentin (n = 67), while all SNRI-treated patients received Duloxetine (n = 78). Regardless of the agent used, all three treatments led to substantial reductions in pain intensity from severe to mild over the course of the study.

Mechanistically, these findings align with established pharmacological evidence: Gabapentinoids modulate voltage-gated calcium channels to reduce excitatory neurotransmitter release, while SNRIs enhance descending serotonergic and noradrenergic inhibition of pain signaling pathways. Despite these distinct mechanisms, the clinical outcomes achieved were comparable, reinforcing the value of both drug classes as first-line options for neuropathic pain.

Conclusion

Neuropathic pain is a chronic condition with significant impact on patients' daily functioning and emotional well-being. The findings of this study demonstrate that both Gabapentinoids (Pregabalin and Gabapentin) and Duloxetine produce significant reductions in pain intensity, with no statistically significant difference in overall efficacy (mean reductions of 5.01 and 4.73 points, respectively). Each agent carries distinct advantages: Pregabalin may offer faster onset of relief, Gabapentin is generally better tolerated, and Duloxetine provides additional benefits for mental health. These results underscore the importance of individualized treatment decisions. Future research should investigate combination therapies, long-term safety profiles, and personalized approaches to optimize pain management and quality of life in patients with neuropathic pain.

Ethical Consideration

Ethical approval for this study was granted by the Kakatiya Institutional Ethics Committee on March 27, 2025. The approved protocol was titled "Efficacy of Gabapentinoids vs. Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs) in Treatment of Neuropathic Pain," with reference number KIEC-2025/Pharm D-2020 [3, 5] Project-04.

References

1. Jetli S, Verma A, Sharma H. A comparative study on efficacy and safety for management of neuropathic pain with gabapentin, pregabalin and amitriptyline. International Journal of Pharmaceutical and Clinical Research,2022:14(12):805–811.
2. Ghosh AK, Ghosh A, Kundu A, Das AK, Bhattacharya KB. Comparative study of efficacy and safety of pregabalin and gabapentin in neuropathic pain. Asian Journal of Pharmacy and Life Science,2012:2(1):2231–4423.
3. Roche Bueno JC. Efficacy of pregabalin, gabapentin and duloxetine in neuropathic pain verified by the p-curve analysis. Journal of the Spanish Pain Society,2020:27(1):16–23.
4. Kancherla N, Babu GC, Singh H, Khandelwal M, Sharma N, Kumar MB. Comparative study of safety and efficacy of pregabalin, gabapentin and amitriptyline in management of neuropathic pain. International Journal of Basic & Clinical Pharmacology,2021:10(1):64–69.
5. Mayoral V, Galvez R, Ferrandiz M, Xoan MV, Cordero-Garcia C, Montero AA, *et al*. Pregabalin vs. gabapentin in the treatment of neuropathic pain: a comprehensive systematic review and meta-analysis of effectiveness and safety. Frontiers in Pain Research, 2025, 5.
6. Wani UH, Khursheed F, Fazili A, Upadhyay A, Garg B. The impact of gabapentin and duloxetine on quality of life in patients with neuropathic pain: a comprehensive review. World Journal of Pharmaceutical Research,2024:13(15):440–458.
7. Butranova OI, Zyryanov SK. Use of gabapentin for neuropathic pain therapy: a view from the perspective of evidence-based medicine. Pharmacy & Pharmacology,2024:12(1):74–88.
8. Singh NK, Jain H, Upadhyay M, Singh A. To evaluate efficacy and safety for management of neuropathic pain with gabapentin, pregabalin and amitriptyline. NeuroQuantology,2022:20(9):2891–2896.
9. Rodrigues-Amorim D, Olivares JM, Spuch C, Rivera-Baltanas T. A systematic review of efficacy, safety, and tolerability of duloxetine. Frontiers in Psychiatry,2020:11:1–11.
10. Mittal M, Pasnoor M, Mummaneni RB, Khan S, McVey A, Saperstein D, *et al*. Retrospective chart review of duloxetine and pregabalin in the treatment of painful neuropathy. International Journal of Neuroscience,2011:121(9):521–527.